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AN ANALYSIS FOR OUTSOURCING BASED RISKS AND PROBLEMS IN LOGISTICS ENTERPRISES

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Abstract: *Nowadays businesses transform into the faster, less costly, more flexible, and qualified structure because of developing world economy and fierce competition environment with each passing day. Outsourcing as one of the most essential concepts related to strategic management is considered to meet all the aforementioned conditions. In fact, logistics enterprises composing the main theme of this study tend to the outsourcing like other businesses and prefer it to increase the competitive power and specialized in main area of activity. Despite outsourcing in logistics enterprises provide numerous opportunity and advantage, some risks and problems emerge in case of not achieving the desired accordance and coordination. In this context risks and problems caused by the outsourcing for enterprises operated in international logistics activities in Giresun province are determined and ranked via the q-rung orthopair fuzzy subjective weighting as one of the multi-criteria decision analysis approaches. According to the results, essential risks and problems caused by the outsourcing for logistics enterprises were found as "Loss of control over the outsourcing firm", "Inaccurate sales pitches", "Layoffs" and "Unfulfilled contract provisions" respectively.*

Keywords: *Outsourcing, Outsourcing related risks and problems, q-rung orthopair fuzzy subjective weighting*

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1. Introduction

Due to the effects of the competitive climate and globalization, businesses increasingly outsource work that is not directly related to their core competencies in order to reduce costs and concentrate on their core competencies. Businesses can develop their core products while concentrating on them in this way. They can also more effectively carry out their external activities with the aid of specialist companies (Karamaşa et al., 2021).

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Businesses require new strategies to maintain a long-term competitive advantage. Outsourcing has evolved into a significant strategic tool for many businesses in this regard (Sreedevi & Tanwar, 2018). In current economy, when competition is increasing by the day, one of the main concerns that produce added value and provide cost advantage to businesses is outsourcing.

Outsourcing has been defined as the transfer of activities that are not among the enterprise's core capabilities but are strategically important to expert service providers in the field (Elmuti & Kathawala, 2000). Another definition of this concept is working in collaboration with businesses outside the organization to reduce costs, increase efficiency and effectiveness, ensure customer satisfaction, operate by establishing and developing new relationships, and as a result, being able to do business with the lowest amount of effort and cost (Kakabadse & Kakabadse, 2000).

Outsourcing, according to Yalçın (2011), is not a method application that will be handled separately and independently from other applications. On the contrary, as businesses focus on their own skills, outsourcing increases, and as outsourcing increases, partnership and network organizations develop and downsize, becoming more flexible and reactive. Outsourcing, which was first employed to deliver cost savings, has transformed into a management strategy used for a range of purposes. There are various reasons why businesses outsource, as well as potential problems that may occur as a result of outsourcing (Erer, 2018). Among these are problems and risks such as the inability to work in harmony with the outsourcing provider, the inability to enter the organizational process that includes coordination, faulty outsourcing, taking time to make the decision to benefit from outsourcing, and the loss of qualified personnel (Martinsons, 1993).

According to Barthelemy (2003), problems such as contract deficiencies, personnel troubles, and hidden expenses can all lead to disastrous results if outsourcing is not used with caution. The loss of control over the process is the most major drawback of outsourcing (Hiamey & Amenumey, 2013). One of the risks of outsourcing is the possibility of security or privacy violations. Concerns about the supplier company "not having a secure network, not performing the required service on schedule, and not maintaining the service quality" can influence the enterprise's outsourcing decision (Quelin & Duhamel, 2003). As a result, businesses may not always benefit from outsourcing. Businesses can suffer if the necessary decisions about outsourcing are not made, and the processes are not handled properly. As a result, while making outsourcing decisions, businesses must weigh both the benefits and the risks (Savaş & Yacan, 2022). According to Brannemo (2006), the nature of the relationship with specialist vendors will determine the power balance between the outsourcing company and these vendors. It is also anticipated that the quality level of the suppliers' products and/or services will be reflected in the company's performance, resulting in significant results in terms of customer satisfaction. Furthermore, it has been stated that outsourcing decisions may change the structure of risks that the company must manage by affecting the company's cost structures and long-term competitive position (Brannemo, 2006). Furthermore, it has been stated that the benefits of the outsourcing process to businesses may become significant risk factors as a result of ineffective process management (Barthelemy 2003).

Working with a reliable and respected expert company in the sector, as well as efforts to keep technical and commercial information confidential, serve as a protective barrier to some extent in order to protect the information that is the basis of the company's competitive advantage and basic competencies. However, the outsourcing company may obtain information about the company's basic competencies as a result of the supplier's efforts in this area or the customer company's negligence or inexperience. In this case, the firm raises its own rival with

its own hands, and its strategic partner may appear to be one of its most powerful competitors (Dolgui & Proth, 2013).

Again, if the service provider company is unable to provide services at the expected quality level, there may be some negative consequences, such as customer complaints and a desire to terminate the strategic partnership in the company that purchases these services (Batarliene & Jarasuniene, 2017). Because of mistakes made during the planning and process management stages, outsourcing has significant disadvantages that can result in customer loss, damage to the company's reputation, and even jeopardizing the company's existence (Jiang & Qureshi, 2006).

There are numerous reasons in this context that compel the authors to investigate the problem addressed in the study. Identifying the risks and problems of outsourcing in logistics enterprises, increasing competitiveness, creating customer satisfaction and loyalty, and ensuring an optimized safety stock are all critical issues, in light of the decision makers' expertise, experience, and knowledge. Identifying the risks and problems of outsourcing, which allows for quick response to market conditions and reduces reputation loss, is regarded as one of the most promising solutions for enterprises in terms of resource efficiency.

Furthermore, the study is regarded as an important component in bringing an effective and applicable solution to the decision-making problem involving the risks and problems of outsourcing in a critical sector such as logistics. It is useful to work on developing a model that will enable businesses to self-assess their outsourcing risks and problems. The study, which is a road map to help outsourcing practices in the logistics sector provide a sustainable service, also examines the similarities and differences in the risks and problems of outsourcing in enterprises in the relevant sector and to what extent these can be reflected. As a result, the study provides a practical roadmap for the logistics industry's level of outsourcing implementation.

Another theoretical and practical significance of the study is the aim of developing a robust, powerful, and practical decision-making model that can deal with current uncertainties. As a result, in addition to contributing to the long-term solution of the relevant decision-making problem for the logistics industry, it is hoped to provide a strong and robust methodological framework to fill theoretical gaps in the literature by leveraging the study's advantages.

As a result, the study will help to solve similar problems in other fields. Furthermore, when the results to be obtained are limited to the logistics sector and evaluated within the scope of its structure suitable for comparison with other sectors, it is anticipated that the relevant study will make a significant contribution to the business world and literature in general, particularly in terms of effective outsourcing management.

Outsourcing problems and risks affect critical business concerns such as cost, productivity, competition, and efficiency. It is vital to identify the associated difficulties and risks. Based on these concerns, the purpose of this study is to identify the risks and problems associated with outsourcing in logistics firms with corporate identities in Giresun province, and to assess their importance using MCDA methods. The literature review focusing on the concepts of outsourcing, risk, and outsourcing problems is presented in the following section of the study. Then, the explanations for q-rung orthopair fuzzy subjective weighting, which is the study's methodology, and its application for the problem is given. In the last section of the study, the conclusions and implications are presented.

2. Literature

There has been a lot of study done in the literature on outsourcing. Some recent studies are listed in Table 1.

Table 1. Literature about the outsourcing

Author(s)	Year	Applications & Findings
Lin et al.	2010	ISM and Analytical Network Process (ANP) methods were used to select an outsourcer at a semiconductor business in Taiwan.
O'Regan & Klilng	2011	It was investigated whether outsourcing was a competitive element for SMEs operating in the manufacturing sector. It was discovered that small firms with limited R&D spending tend to outsource.
Akbulut et al.	2012	It was compared and included various research findings on outsourcing in hospitals in Turkey and presented recommendations for further study through systematic analysis.
Koçer	2014	It was examined the methods used by Turkish private television channels for producing content. The study tried to expose the fact that current programming development in television organizations made extensive use of outsourcing techniques.
Özcan	2015	The study incorporated the idea of outsourcing, its varieties, benefits and risks, and instances of outsourcing in Turkey and Europe in his research.
Wang et al.	2015	It was found that managers are more likely to encounter trust issues when using Cloud Computing Systems for outsourcing.
Govindan et al.	2016	The DEMATEL method was employed to conduct their research, and they found that the delivery performance, technology level, financial stability, human resources management, service quality, and customer satisfaction are, in that order, the most crucial factors in the selection of 3PL companies.
Eriş	2017	It was examined the opinions of 302 managers working in 16 public hospitals in Şanlıurfa province on the performance of staff hired using the outsourcing method in his study.
Korucuk	2018	AHP and Gray Relational Analysis (GRA) methods were used to select 3PL for cold chain transportation companies in Istanbul.
Keshavarz-Ghorabaee et al.	2018	It was proposed a dynamic fuzzy methodology for subcontractor evaluation in construction projects based on the EDAS method.
Akbari	2018	A structured literature review was carried out in order to identify knowledge gaps and provide future research direction in the field of logistics outsourcing.
İnci & Acer	2019	According to the application on Black Sea region hazelnut operators and exporters in the context of logistics outsourcing, it was found that most of the firms operating in Turkey do not outsource their logistics activities.
Gossler et al.	2019	The study aimed to identify best practices for disaster relief logistics service providers used by aid organizations.
Ramadhani & Handayati	2020	AHP was used to select a subcontractor for an apparel in the apparel industry.
Lou et al.	2020	Options for outsourcing logistics services in a retail-led supply chain were investigated, with the retailer providing the logistics service on its own or outsourcing it to a third-party logistics service provider.

Simon et al.	2020	The management practices of a Brazilian company for outsourced logistics activities used in performance-based logistics contracts were examined.
Karamaşa et al.	2021	The factors influencing logistics outsourcing were listed using the Neutrosophic AHP.
Nevries & Wallenburg	2021	It was aimed to build a typology of organizational culture and investigate how different logistics service providers and customers interact in order to improve performance in logistics outsourcing relationships.
Budler et al.	2021	The most recent logistics outsourcing developments in Slovenia's manufacturing industry were examined.
Savaş & Yacan	2022	It was sought to assess alternative subcontractors for a company involved in the construction, installation, and modernization of manufacturing facilities.
Zarbakhshnia et al.	2022	It was aimed to outsource logistics operations within a closed-loop supply chain. To rank sustainable third-party logistics service providers, an innovative analytical multi-step fuzzy decision-making method was proposed.
Suharmono et al.	2022	Using statistical and common word analysis, a bibliometric analysis was performed to analyze trends and patterns in outsourcing and supply chain research results.

Very few studies on the risks and problems of outsourcing in logistics firms were identified in the extensive literature review. At this point, it is anticipated that the study will contribute to the literature. On the other hand, there has been a lot of study using q-rof MCDA methods. Some recent studies are listed in Table 2.

Table 2. Literature about the q-rung orthopair fuzzy MCDA

Author(s)	**Year**	**Applications & Findings**
Pinar & Boran	2020	The best supplier was selected using the q-ROF TOPSIS and q-ROF ELECTRE methods.
Wang et al.	2020	The q-ROF extension of the MABAC method has been proposed.
Rani & Mishra	2020	The appropriate alternative-fuel vehicle was selected using q-ROF-WASPAS.
Ikram & Shumaiza	2021	The q-ROF extension of the PROMETHEE method has been proposed.
Arya & Kumar	2021	A new entropy measure and a novel TODIM extension have been developed in the q-ROF environment.
Alkan & Kahraman	2021	The q-rung orthopair fuzzy TOPSIS method was used to evaluate government strategies against the COVID-19 pandemic.
Ali	2022	The q-ROF extension of the MARCOS method has been proposed.
Deveci et al.	2022	The q-ROF-OPA-RAFSI model is used to investigate three alternative implementation options for autonomous vehicles in the metaverse.
Albahri et al.	2022	COVID-19 vaccine distribution was performed using q-ROF- WZIC-DOSM methodology.

According to Table 2, the q-ROF methodology has been increasingly expanded and used in decision problems in a variety of fields. In this study, the q-ROF methodology, which is highly effective at modeling uncertainty, will be used to assess outsourcing risk and problem factors.

3. Methodology

In this study, the q-rung orthopair fuzzy subjective weighting as a MCDM method is used for outsourcing related risks and problems in logistics enterprises having 10 and more employees in Giresun province. Because MCDM methods that consider and evaluate objective and subjective factors together are being applied different from statistical analysis techniques. Analysis are being made according to the experts' views including one or group (Korucuk, 2021).

The subjective weighting approach based on q-rung orthopair fuzzy sets (q-ROFSs) will be applied to weigh the criteria. In this context, first, we give some details and explanations related to the q-ROFs in the following part.

Yager (2016) proposed q-ROFSs having a flexible preference space. A controlling factor (q) that expands the preference space with respect to the increased value is taken into the account and stated as $\alpha^q + \beta^q \leq 1$ with regard to membership (α) and non-membership (β) degree.

In this context, $\psi = \langle \alpha, \beta \rangle$ is described as q-ROF Number (q-ROFN), where q can be taken into account to define different fuzzy sets as follows:

- Intuitionistic fuzzy set: $q = 1$ (Atanassov, 1986),
- Pythagorean fuzzy set: $q = 2$ (Yager, 2013),
- Fermatean fuzzy set: $q = 3$ (Senapati & Yager, 2020).

Eq. (1) shows a q-ROFS C in a fixed set $X = \{x_1, x_2, \dots, x_n\}$ (Yager, 2016).

$$C = \{\langle x_i, (\alpha_C(x_i), \beta_C(x_i))\rangle | x_i \in X\} \quad (1)$$

where $\alpha_C(x_i) \in [0,1]$ depicts the degree of membership and $\beta_C(x_i) \in [0,1]$ denotes the degree of non-membership of the element $x_i \in X$ to the set C, by satisfying the condition that $0 \leq (\alpha_C(x_i)^q + \beta_C(x_i)^q) \leq 1, (q \geq 1)$. The degree of indeterminacy is calculated as $\pi_C(x_i) = \left((\alpha_C(x_i))^q + (\beta_C(x_i))^q - (\alpha_C(x_i))^q (\beta_C(x_i))^q\right)^{1/q}$.

For simplicity, a q-ROFN can be written as $c = (\alpha_C, \beta_C)$ (Liu *et al.*, 2019; Liu and Wang, 2018; Wang *et al.*, 2019). Let $c = (\alpha_C, \beta_C)$ and $g = (\alpha_g, \beta_g)$ as two q-ROFNs, then basic operations can be determined as below (Ali, 2018; Yager, 2016):

- $c \vee g = \left(\max(\alpha_C, \alpha_g), min(\beta_C, \beta_g)\right)$;
- $c \wedge g = \left(\min(\alpha_C, \alpha_g), max(\beta_C, \beta_g)\right)$;
- $c \oplus g = \left(\sqrt[q]{(\alpha_C)^q + (\alpha_g)^q - (\alpha_C)^q (\alpha_g)^q}, \beta_C \beta_g\right)$;

- $c \otimes g = \left(\alpha_c \alpha_g, \sqrt[q]{(\beta_c)^q + (\beta_g)^q - (\beta_c)^q(\beta_g)^q}\right)$;
- $kc = \left(\sqrt[q]{1-(1-(\alpha_c)^q)^k}, (\beta_c)^k\right), k \geq 0$;
- $c^\lambda = \left((\alpha_c)^\lambda, \sqrt[q]{1-(1-(\beta_c)^q)^\lambda}\right), \lambda \geq 0$;
- $(c)^c = (\beta_c, \alpha_c)$.

Assume $c = (\alpha_c, \beta_c)$ as a q-ROFN, then the score $\mathcal{S}(c)$ and accuracy $\mathcal{A}(c)$ functions can be calculated as follows (Liu and Wang, 2018; Wei *et al.*, 2018):

$$\mathcal{S}(c) = \frac{1}{2}(1 + (\alpha_c)^q - (\beta_c)^q), \mathcal{S}(c) \in [0,1] \quad (2)$$

$$\mathcal{A}(c) = (\alpha_c)^q + (\beta_c)^q, \mathcal{A}(c) \in [0,1] \quad (3)$$

The larger values of $\mathcal{S}(c)$ and HF(c), the larger q-ROFN c.

Consider $c = (\alpha_c, \beta_c)$ and $g = (\alpha_g, \beta_g)$ as two q-ROFNs, $\mathcal{S}(c)$ and $\mathcal{S}(g)$ are score functions, $\mathcal{A}(c)$ and $\mathcal{A}(g)$ are accuracy functions of c and g respectively, then (Liu and Wang, 2018; Wang *et al.*, 2019)

- if $\mathcal{S}(c) > \mathcal{S}(g)$, then $c > g$;
- if $\mathcal{S}(c) = \mathcal{S}(g)$, then

if $\mathcal{A}(c) > \mathcal{A}(g)$, then $c > g$;

if $\mathcal{A}(c) = \mathcal{A}(g)$, then $c = g$.

In this study, a simple approach was used to obtain the opinions of the experts in the evaluations required for the weighting procedure of the criteria. As a result, efforts have been made to keep experts unfamiliar with fuzzy multi-criteria decision-making methods in complex processes from abandoning their field of expertise. Because the validity of evaluations diminishes as procedure complexity increases, and evaluators prefer procedures that are simple to apply. (Aytekin et al, 2022). For this purpose, the q-rof subjective weighting approach is used in weighting the criteria. The application steps for the q-rof subjective weighting approach were detailed below.

Step 1. The problem including criteria and decision makers (or experts) is defined where criteria $C = \{C_1, \dots, C_n\}$, and decision-makers (DMs) $DMs = \{DM_1, \dots, DM_r\}$.

Step 2. The weight coefficients assigned to the DMs' evaluations related to the problem are specified. For this purpose, linguistic terms in Table 3 can be used (Albahri et al., 2022). Where $v_k = (\alpha_k, \beta_k)$ represents the significant levels of k[th] DM's evaluations with respect to q-ROFN, the weight of the k[th] DM will be computed using Eq. (4).

$$\lambda_k = \frac{\frac{1}{2}\left((\alpha_k^q - \beta_k^q) + 1\right)}{\sum_{k=1}^{r}\left[\frac{1}{2}\left((\alpha_k^q - \beta_k^q) + 1\right)\right]} \quad (4)$$

where $\lambda_k \in [0,1]$, and $\sum_{k=1}^{r} \lambda_k = 1$.

Table 3. Linguistic terms and the corresponding q-ROFNs

Notation	Linguistic terms for evaluating criteria and experts	q-ROFNs	
		A	B
VI	Very Important	0.90	0.20
I	Important	0.80	0.45
MI	Moderately Important	0.65	0.50
SI	Slight Important	0.40	0.60
NI	Not Important	0.20	0.90

Step 3. The evaluations given by k[th] DM for criteria can be shown as $w_{j(k)} = v_{jk}$, where $v_{jk} = (\alpha_{jk}, \beta_{jk})$ is a q-ROFN. The q-ROF Weighted Averaging (qROFWA) aggregation operator given in Eq. (5) is used to integrate the evaluations of DMs (Mishra and Rani, 2021). Hence, the integrated subjective importance values (ω_j) are computed using Eq. (5):

$$qROFWA_j = (\alpha_j, \beta_j) = \left(\sqrt[q]{1 - \prod_{k=1}^{r} \left(1 - \alpha_{jk}^{q}\right)^{\lambda_k}}, \prod_{k=1}^{r} (\beta_{jk})^{\lambda_k} \right) \tag{5}$$

Step 4. The crisp importance values $S(\omega_j)$ are computed using Eq. (6).

$$S(\omega_j) = \frac{1}{2}\left((\mu_j^q - \nu_j^q) + 1 \right) \tag{6}$$

Step 5. The sum-based normalization is applied as seen in Eq. (7), and then the subjective criteria weights (w_j) are obtained.

$$w_j = \frac{S(\omega_j)}{\sum_{j=1}^{n} S(\omega_j)} \tag{7}$$

4. Case Study

In this study a multi criteria decision model is formed with the purpose of the risks and problems of outsourcing in logistics companies were investigated. In this study, experts' views (one academician and four logistics firm managers) in logistics enterprises with corporate identity were interviewed. Decision criteria are given in Table 4.

Table 4. Decision Criteria

Codes	Criteria	Source(s)
C1	Control Difficulty	Tafti (2005), Erer (2018)
C2	Control Costs	Tafti, (2005), Hiamey & Amenumey, (2013)
C3	Redundancies	Bristol (2005)
C4	Staff Morale	Scott (1995)
C5	Loss of Control Over the Outsourcing Firm	Erer (2018)
C6	Lack of flexibility	Öztürk & Sezgili (2002)
C7	Inaccurate Sales Conversations	Goolsby et al. (2002)
C8	Failure to Meet Contract Terms	Erer (2018)
C9	Loss of Important Skills, or Acquisition of Wrong Skills	Tafti (2005), Korucuk (2018)

A survey is formed for evaluating criteria according to the q-rung orthopair fuzzy subjective weighting method. A total of 5 experts (4 logistics firm managers and 1 academician) are responded the survey. All DMs' evaluations were given the linguistic importance value of "high importance (H)". Therefore, the weights of the experts were calculated to be 0.20 using Eq. (4). Table 5 shows the DMs' linguistic evaluations for the criteria.

Table 5. The linguistic evaluations of DMs for criteria

	C1	C2	C3	C4	C5	C6	C7	C8	C9
DM1	SI	MI	VI	NI	SI	MI	I	VI	SI
DM2	SI	I	MI	SI	MI	NI	VI	I	MI
DM3	MI	I	VI	SI	VI	I	I	MI	MI
DM4	MI	SI	I	I	VI	VI	VI	I	I
DM5	VI	SI	NI	I	VI	MI	MI	MI	SI

Eq. (5) was employed to aggregate the DMs' evaluations, where $q = 3$. In this context, the weight values and importance rank of criteria are presented in Table 6.

Table 6. The weighting results for criteria

	C1	C2	C3	C4	C5	C6	C7	C8	C9
ω_j	(0.6982, 0.4478)	(0.6801, 0.5156)	(0.8035, 0.3817)	(0.6465, 0.5800)	(0.8326, 0.2993)	(0.7454, 0.4584)	(0.8351, 0.3323)	(0.7892, 0.3991)	(0.6366, 0.5266)
Weights	0.1049	0.0988	0.1228	0.0902	0.1301	0.1105	0.1297	0.1198	0.0933
Ranking	6	7	3	9	1	5	2	4	8

As seen in Table 6, the importance ranking order of the criteria is C5>C7>C3>C8>C6>C1>C2>C9>C4.

Conclusion

Outsourcing is becoming one of the strategies for organizations to sustain their competitive power. Businesses outsource issues that are not in their main area of expertise to businesses who are experts in that field. As a result, efforts are undertaken to improve efficiency and reduce costs. However, if the outsourced organization is not operating at the appropriate level of security and coordination, it creates a variety of risks and problems. As a result, this situation has a negative impact on businesses and can result in a wide range of losses in terms of efficiency, productivity, competitiveness, and cost advantage.

In this regard, the problems and risks of outsourcing in logistics firms with corporate identities in Giresun province were examined in this study. According to the study's findings, the most serious risks and problems associated with outsourcing are "Loss of Control Over the Outsourcing Firm," "Inaccurate Sales Conversations and Redundancies."

"Loss of Control Over the Outsourcing Firm" was the most serious risk and problem associated with outsourcing. The results are consistent with those of Barik and Rout (2021) and Ömürgönülşen & Selvi Sarigül (2021). In other words, if the outsourcing firm's superiority is lost, leaking the management information systems to an external source may reveal the firm's current strategies and confidentiality policies to others. This situation poses a significant risk and problem. Also, the results obtained can be examined within the context of a variety of conditions, such as the absence of management control or a quality improvement process. It can be seen in examples such as layoffs with the use of outsourcing in businesses. While this undesirable situation prevents the business from benefiting from expert personnel, it has a significant impact on employees' motivation for loyalty to the company in these circumstances. Finally, there is always the potential that the contract terms will not be met. Contracts with no alternative terms may cause major problems for businesses.

"Inaccurate Sales Conversations" is another important criterion. The obtained result does not support Erdoğan & Tokgöz's studies (2017). As a result, incorrect sales calls are a major issue for companies that receive and provide logistics services. Differentiation and misunderstandings have a negative impact on the contract and undermine trust in outsourcing practices. Concurrently, it causes the processes specified within the scope of outsourcing to produce incorrect results. Another important outsourcing risk and problem is "redundancies." This result supports the studies of Bhagat et al. (2007) and Reyhanoğlu & Akın (2016). Because, in today's highly competitive and uncertain environment, the behavior of the leader and/or manager can result in negative situations such as job loss, psychological, behavioral, and health problems in the organization's employees. In this sense, organizations require healthy, strong, and talented leaders, managers, and employees to maintain their lives, productivity, and competitiveness. Increased outsourcing as a result of competition and globalization leads to business downsizing and layoffs, which has a significant impact on employees, leaders/managers, and their families.

In this context, the study focuses on the problems and risks associated with outsourcing. Due to the scarcity of studies on risks and problems within the context of outsourcing practices, this study is important for future research and allows for comparison with other studies. Furthermore, the method used in the relevant study is thought to contribute to the subject and the general literature.

Outsourcing practices that are efficient, effective, and economical are critical for businesses. Relevant applications and approaches should be developed in such a way that they provide the greatest benefit while also reducing costs and increasing customer satisfaction in businesses. Because outsourcing necessitates identifying and resolving risks and problems. The fact that the current study's findings clearly reveal this situation is regarded as yet another contribution of the study. Furthermore, decision makers face a number of uncertainties and complexities when it comes to outsourcing practices. At this point, the study's findings can be used to create a road map for removing the identified uncertainties.

Furthermore, there are numerous criteria related to the risks and problems associated with outsourcing. As a result, determining the most appropriate one by considering many competing qualitative and quantitative criteria is critical. The findings at this point contribute to the study's overall value. Furthermore, in order to obtain reliable, logical, and reasonable results, an effective decision-making model that can overcome the study's complex criteria must be established. A related study proposes a fuzzy decision-making model that takes these needs and motivations into account.

It is also obvious that the proposed model, which is based on the q-rung orthopair fuzzy subjective weighting method, makes numerous theoretical contributions. The study has significant implications for logistics decision makers and practitioners, as well as those interested in the subject, in addition to its theoretical contributions. These enable you to assess businesses that benefit from outsourcing. It offers a flexible and structured decision-making environment, as well as a decision-making environment and opportunity that takes into account various and distinct points of view. Another significant contribution of the study is that it assists decision-makers in developing a new road route and planning that takes the proposed model's criteria into account.

Finally, the evaluation of the risks and problems of outsourcing the study with the method in the study enabled logistics decision makers to convey their practical approaches in a scientific perspective, and also contributed to the interaction of theoretical and practical applications.

One of the study's major limitations was the limited number of expert groups interviewed, which could not be increased due to time constraints. Another limitation is that the study was only conducted in one industry. Furthermore, no criteria for the theme of outsourcing risks and problems were found in both the expert group's opinions and the literature review. At this point, the study can be considered pioneering in terms of filling a significant gap in removing the aforementioned risks and problems. Moreover, the study's problem can be examined in the future using various multi-criteria decision analysis methods or other parametric or non-parametric methods. Also, the findings obtained from different perspectives can be compared to various extensions of fuzzy multi-criteria decision methods.

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