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DETERMINING IT SUPPLIER MONITORING CRITERIA USING BEST AND WORST METHODS: AN AIRLINE CASE STUDY

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ABSTRACT

Supplier monitoring is a critical step in the supplier development process within organizations, involving the formal evaluation of suppliers' performance. In the context of the airline industry, it is crucial to develop industry-specific criteria for evaluating IT suppliers who provide information technology services, including software, hardware, maintenance, data center, and cloud technologies. This study aims to create a set of performance monitoring criteria specifically tailored to IT suppliers in an airline company and assign weights to each criterion based on their degree of importance. The research analysis was conducted in three stages. In the first stage, 41 criteria were identified through expert interviews and literature review. In the second stage, expert consensus was reached, resulting in a final set of 27 criteria categorized into financial, operational, supplier abilities, strategic, and relationship dimensions. In the third stage, weights were assigned to each criterion using the best and worst method. Among all the criteria, the flexibility of the supplier, the supplier's ability to adapt the buyer company to changing technology, and the completeness of the quality of the offered product/service emerged as the most important criteria.

Key Words: information technologies management, supplier performance management, airline management, best and worst method.

EN İYİ-EN KÖTÜ YÖNTEMİ KULLANILARAK BİLGİ TEKNOLOJİLERİ TEDARİKÇİ İZLEME KRİTERLERİNİN BELİRLENMESİ: BİR HAVAYOLU İŞLETMESİ ÖRNEĞİ

ÖZET

Örgütlerde tedarikçi geliştirme sürecinin kritik adımlarından biri olan tedarikçi değerlendirmesi, tedarikçilerin performansının resmi olarak düzenli aralıklarla değerlendirilmesidir. Örgütlere yazılım, donanım, bakım, veri merkezi ve bulut teknolojileri gibi bilgi teknolojileri sağlayan BT tedarikçilerini değerlendirmek için bu sektöre özel kriterlerin geliştirilmesi gerekmektedir. Bu çalışmada seçilen bir havayolu işletmesi için BT tedarikçi segmentine özel performans değerlendirme kriterler setinin oluşturulması ve her kriterin önem derecesine göre ağırlıklandırılması amaçlanmıştır. Araştırmanın

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analizleri üç aşamada gerçekleştirilmiş olup birinci aşamada uzman görüşmeleri ve literatür taraması ile 41 kriter belirlenmiştir. İkinci aşamada uzman konsensusu yapılarak finansal, operasyonel, tedarikçi yetkinlikleri, stratejik ve ilişki boyutları altında toplamda 27 nihai kriter belirlenmiştir. Üçüncü aşamada en iyi–en kötü yöntemi kullanılarak her kritere bir ağırlık atanmıştır. Tüm kriterler arasında sırasıyla tedarikçinin esnek olması, tedarikçin alıcı işletmeyi değişen teknolojiye hızlı adapte edebilmesi ve sağlanan ürün/hizmetin kalitesinin eksiksiz olması en önemli kriterler olarak ortaya çıkmıştır.

Anahtar Kelimeler: bilgi teknolojileri yönetimi, tedarikçi performans yönetimi, havayolu yönetimi, en iyi-en kötü yöntemi.

INTRODUCTION

Turkish businesses are allocating a larger budget to IT (Information Technologies) due to the increasing importance of IT in their business processes (TC Investment Office, 2021). Specific components of IT infrastructures are increasingly being outsourced to reduce transaction costs, shifting from hierarchical governance to market governance mode under contractual arrangements (Author, 2021). Outsourcing IT components has become a common strategic tool for reducing costs, adapting to technology, and focusing on core business activities. IT outsourcing encompasses various areas such as data center management, application services, system integration, network management, application/software development, end-user support, and cloud services (Authors, 2020; Wang, 2002). Since IT services or projects are long-term and require customized applications, the buyer-supplier relationship often evolves into a partnership, differing from traditional outsourcing arrangements (Ali et al., 2020). To effectively manage such relationships, regular evaluation of supplier performance is necessary under supplier development programs. However, Simpson's study, which examined supplier evaluation systems in 299 companies, revealed that more than half of the companies lack a formal supplier evaluation process (Simpson et al., 2002).

Supplier relationship management is crucial in protecting organizations from the risks of opportunism, especially in relationships with high asset specificity and uncertainty. One approach to mitigate uncertainty risks is through supplier development, whereby buyer firms engage in activities to enhance the capabilities of suppliers with limited resources, thereby improving supply chain competitiveness and buyer-supplier performance (Yawar and Seuring, 2020). Dalvi and Kan (2015: 654) define supplier development as "any effort by a buying organization to increase the performance and capabilities of the supplier, which leads to positive results for the buying organization." Through supplier development activities, the buyer firm can improve its operational and organizational performance through effective communication, partnership strategies, and long-term relationships with suppliers. A significant benefit of supplier development for the buyer company is gaining a competitive advantage in the market by enhancing the performance of its suppliers (Govindan et al., 2010). Consequently, both product and service firms strive to develop suppliers to achieve their strategic and performance goals (Rezaei et al., 2015).

Supplier development activities encompass various aspects, including supplier evaluation, competitive pressure, supplier incentives, and direct development activities. Supplier evaluation, a critical component of supplier development, involves formal performance evaluation, certification, and feedback (Krause and Scannel, 2002). Supplier segmentation is recognized as an effective approach to implement supplier evaluation processes for different types of suppliers. By segmenting suppliers, they can be categorized into distinct groups based on their specific needs, characteristics, or behaviors (Day et al., 2010; Dyer et al., 1998). This study specifically focuses on IT suppliers, considering the unique product/service features they provide. Characteristics such as the provision of after-sales maintenance and support services, rapid technology development, IT services integrated into overall architecture,

high asset specificity in projects tailored to the company, and project-oriented collaborative relationships between buyers and sellers are distinguishing traits of IT suppliers (Beulen et al., 2006; Lacity and Willcocks, 2008). Hence, due to these characteristics, it can be considered more effective for buyer companies to segment their suppliers and evaluate IT suppliers using specific methods and criteria.

Supplier performance evaluation has been extensively studied by researchers in previous studies (Chen and Wang, 2009; Kahraman et al., 2009; Khan et al., 2010; Authors, 2017). These studies have employed various criteria and methods to develop supplier evaluation models; however, there is no consensus on which criteria should be used for supplier performance evaluation. While previous research has primarily focused on evaluation for supplier selection, there is limited emphasis on monitoring supplier performance throughout the contract period. While some criteria used in supplier selection can be applied to monitor suppliers during the contract, it is also important to incorporate criteria that emerge after the relationship has been established. These criteria may include relationship-based elements such as information sharing, communication, commitment, and trust. Therefore, this study aims to develop a set of performance monitoring criteria to evaluate IT suppliers during the contract period in a specific case company.

1. SUPPLIER MONITORING

Supplier evaluation, also known as supplier monitoring, is a crucial initial step in the supplier development process (Krause and Scannell, 2002; Sanchez-Rodriguez et al., 2005). It involves the continuous evaluation of suppliers to enhance their performance throughout the contract period (Ittner et al., 1999). The evaluation process typically encompasses various aspects such as quality, price, communication, supplier competence, and relationship skills (Krause and Scannell, 2002; Verma and Girdhar, 2020). Supplier monitoring enables buyer companies to assess supplier capabilities, compare them with other suppliers, and provide feedback to enhance supplier performance (Krause and Scannell, 2002; Li et al., 2007). Through performance evaluation, positive performance can be rewarded to reinforce supplier commitment, while competitive pressures can be applied to encourage underperforming suppliers to improve their capabilities or commitments (Krause et al., 2000; Rezaei et al., 2015). The decision to continue working with critical suppliers or invest in supplier development is a strategic choice (Friedl and Stephan, 2012). In this context, supplier monitoring activities serve as a foundation for supplier changes, trigger supplier evaluation initiatives, and serve as a means of continuously monitoring the progress and success of development efforts (Zimmer et al., 2016).

2. IT SUPPLIER EVALUATION CRITERIA

There is no universally defined set of criteria for evaluating IT suppliers in the literature as it varies across organizations. However, organizations can consider criteria from different perspectives such as financial, operational, supplier abilities, strategic, and relationship dimensions to effectively monitor suppliers for their strategic objectivesThere is no set of universal criteria for all organizations to evaluate IT suppliers in the literature.

2. 1. FINANCIAL PERSPECTIVE

Criteria in the financial dimension are related to the organization's IT development and cost reduction. IT plays a significant role in business processes, but it also incurs a considerable portion of total costs. One of the motivations for outsourcing IT activities to suppliers is cost reduction. Suppliers can achieve lower costs due to economies of scale and higher productivity per employee, enabling them

to provide IT services at a lower cost compared to internal resources (Beulen et al., 2006; Goo et al., 2008).

2. 2. OPERATIONAL PERSPECTIVE

Criteria in the operational dimension are associated with functional development and improving quality to enhance end-user satisfaction (Goo et al., 2008). Organizations rely on IT suppliers to access technical competencies that may be beyond their internal capabilities, expecting higher quality IT products and services. Therefore, service completion and quality are critical factors. If the supplier fails to deliver satisfactory service quality, it may lead to termination of the relationship (Grover et al., 1996; Hirschheim et al., 2006).

Given the rapid pace of change in information technologies, organizations also expect IT suppliers to provide up-to-date and modern technology. IT systems have shorter lifespans compared to mechanical systems, and organizations with limited resources find it challenging to keep up with technological advancements while keeping costs low (Beulen et al., 2006). Timely delivery is another important performance criterion for evaluating suppliers, as any failure to comply with agreed-upon delivery schedules can result in customer dissatisfaction (Kern and Willcocks, 2000).

Additionally, support services are often bundled with IT product purchases, while for some products or services, support services are obtained separately through monthly payments. Therefore, the quality and responsiveness of the support services provided by suppliers for hardware or software issues play a crucial role in supplier evaluation for both software and hardware products (Lacity and Willcocks, 2008).

2. 3. SUPPLIER ABILITIES PERSPECTIVE

The criteria within the supplier abilities dimension encompass the supplier's expertise, human resource management capabilities, financial sustainability, and vertical industry knowledge. IT systems require high technical skills and specialized knowledge. Therefore, buyers expect IT suppliers to provide highly skilled personnel and technical supervisors who can deliver high-quality services (Fusiripong et al., 2017). Additionally, the technical proficiency and problem-solving abilities of IT professionals are crucial for addressing technical and relational issues. Hence, buyers prefer suppliers that employ skilled IT staff with low turnover rates (Koh et al., 2004). Furthermore, it is desirable for the supplier to have expertise in the specific industry in which the organization operates.

2. 4. STRATEGIC PERSPECTIVE

The criteria within the strategic dimension pertain to the supplier's contribution to the organization's long-term business goals and the implementation of its strategies (DiRomualdo and Gurbaxani, 1998). Organizations aim to outsource routine IT activities through contractual arrangements, allowing them to focus on their core business and allocate internal IT resources to improve overall business performance (Goo et al., 2009). One strategic benefit expected from IT suppliers is the provision of quick access to the latest technologies. Additionally, organizations seek to leverage the expertise of IT suppliers to enhance the knowledge and skills of their internal IT department (Nazari-Shirkouhi et al., 2011).

2. 5. RELATIONSHIP PERSPECTIVE

The criteria within the relationship dimension encompass intangible factors that reflect the presence of relationship norms between the buyer and the supplier over time. Norms such as flexibility, solidarity, cooperation, knowledge sharing, and trust within the buyer-supplier relationship have a significant impact on the competitive advantages of buyer companies (Rezaei and Ortt, 2012). For instance, in a relationship characterized by solidarity, both parties believe that acting cooperatively

rather than pursuing short-term personal gains will lead to mutual success and act accordingly for the benefit of the entire relationship (Cannon et al., 2000).

Flexibility is a critical element determining the success of a long-term partnership, as it enables parties to adapt their practices and policies in unforeseen or changing situations (Romule et al., 2019). Maintaining flexibility is essential due to the inherent difficulty of capturing all details in contractual agreements.

Another criterion reflecting relationship performance is information sharing. The parties expect open and frequent exchange of information from each other during their interactions. The quality and frequency of information sharing play a crucial role in enabling the parties to understand each other's goals and collaborate in a coordinated manner, ultimately leading to relationship satisfaction (Jonsson and Zineldin, 2003).

3. RELATED STUDIES

IT supplier evaluation has been extensively studied by researchers, with a predominant focus on criteria for supplier selection. Several studies have identified various criteria for evaluating IT suppliers. For instance, Chen and Wang (2009) identified criteria such as technical capability, financial performance, performance history, quality, price, flexibility, reputation, delivery time, experience, and market share for IT supplier selection. Similarly, Liu and Quan (2013) included criteria such as technical ability, financial performance, performance history, quality, price, flexibility, reputation, lead time, experience, and market share in their evaluation.

Kahraman et al. (2009) employed the Analytic Hierarchy Process (AHP) method and considered criteria like price/cost, product conformance quality, on-time delivery, facility and technological capability, quality of relationship with the supplier, professionalism of the salesperson, and responsiveness to customer needs for IT supplier selection. Karami et al. (2010) incorporated criteria based on a risk-based model, such as breach of contract, lack of supplier experience and expertise, cultural differences, project management experience, contractual issues, financial stability, information security, inflexible contracts, and lack of supplier innovation.

Infrastructure, cost savings, effective project management, product quality, and service quality were highlighted as criteria in software supplier selection by Khan et al. (2010). Authours (2017) proposed a three-dimensional framework for supplier selection, including product-related criteria (cost of ownership, price, quality-price compatibility, technical competence, after-sales support, integration, and proven products), supplier-specific features (financial stability, success track record, size and capacity, image, localization, references, and industry expertise), and relational characteristics (cultural adaptation, flexibility, interpersonal trust, intention to establish a relationship, and previous/current relationship experience).

In a study conducted by Kusrini and Usman (2018) focusing on supplier performance evaluation during the contract period, criteria such as quality, on-time delivery, low price, vendor location, vendor reputation, integrity, and business confidentiality were utilized for software vendor evaluation.

Overall, these studies offer a range of criteria that organizations can consider when evaluating IT suppliers, whether for supplier selection or ongoing performance assessment during the contract period.

4.METHODOLOGY

The case study approach is used in this study. As a result of the analysis carried out in 3 steps, IT supplier monitoring criteria were determined for the selected airline company. In the first step, a set of primitive criteria was determined. In the second step, the final set of criteria was determined. In the last step, weights were determined for the criteria. Table 1 shows the analysis steps of the study.

Table 1. Analysis Steps of the Study

Steps	Methodology
Step 1: Deciding on a set of primitive criteria	• Literature review • Semi-structured interviews
Step 2: Deciding on a set of final criteria	• Consensus of expert
Step 3: Weighting criteria	• Best and Worst method

4. 1. CASE STUDY

The case study was conducted in a Turkish airline company that heavily relies on IT systems for its operations. The company regularly collaborates with more than 100 IT suppliers to obtain various services, including application services, system integration, data center management, network management, disaster recovery, server management and maintenance, company-specific application development, end-user support, and cloud services. These outsourced services are crucial for the airline's uninterrupted operation, considering economic, safety, and technical factors.

The scope of IT projects in the airline company is often extensive and complex. For instance, the reservation systems, a critical IT function directly linked to the airline's core business, are not internally developed but obtained from IT suppliers. This emphasizes the importance of establishing a partnership-like relationship between the buyer (airline company) and the seller (IT supplier) due to the significance of the services received and the long-term nature of the relationship. Consequently, monitoring the performance of IT suppliers becomes a vital management tool for the airline company's executives and managers (Erdoğan ve Tokgöz, 2017).

4. 2. STEP 1: DECIDING ON A SET OF PRIMITIVE CRITERIA

The criteria for monitoring IT suppliers should be key criteria covering all different IT vendors. The primitive set of criteria, which includes 41 possible criteria, was identified as a result of an extensive literature review and semi- structure interviews with 3 experts (IT Project Manager and Software Systems Manager) working in the airline company. Semi-structured interviews are a qualitative research method that involves conducting interviews with participants based on a flexible and open-ended interview guide (Yıldırım ve Şimşek, 2003).

The Primitive Criteria set and referenced sources are given in Table 2. Below are some examples of expert opinions obtained through semi-structured interviews

"The working standards, educational and financial contributions that the supplier provides to its employee portfolio, and actions to increase employee satisfaction directly affect the quality of the service it provides to us. A high service output cannot be expected from a supplier with poor employee satisfaction and low motivation." (Software Systems Manager)

"It is very important that a structure positioned as a "supplier" provides visible benefits in terms of budget as well as the operational benefit it adds. It should be observed that the supplier acts with this awareness, he should even regularly share new ideas, developments, and technologies with us that may reduce costs, and should support our business with innovations that will strengthen our market position among competitors by taking on the role of expert and consultant." (IT project manager)

"It is important that the quality of the product/service/operational activities provided by the supplier is reported accurately by the supplier himself, and that the reports provided are presented with dashboards in common and non-manipulating environments." (IT Project Manager)

Table 2. Primitive Set of Criteria

FINANCIAL PERSPECTIVE
(Chen et al., 2011; Fusiripong, 2017; Kahraman et al., 2010; Watjatrakul, 2014; Erdoğan ve Tokgöz, 2017)
F1-Pricing is competitive.
F2-Pricing is competitive for post-contract demands.
F3-Price/performance ratio meets our expectations.
F4-Working with this supplier, we have increased control of IT spending.
F5-The IT department does not exceed the budget for the provided product/service due to the supplier.
F6-By working with this supplier, we reduce our IT personnel costs.
OPERATIONAL PERSPECTIVE
(Chen et al., 2011; Fusiripong, 2017; Kahraman et al., 2010; Watjatrakul, 2014; Author, 2017)
O1-The product quality/service delivery provided is complete.
O2-The end user is satisfied with the product/service provided.
O3-The Supplier provides the full support service stated in the contract.
O4-The supplier provides feedback on the maintenance performed.
O5-The supplier finds solutions to problems under the times specified in the SLA.
O6-The technology of the products/services offered by the supplier is up-to-date.
O7-By working with this supplier, we ensure high performance in related operations.
O8-The supplier has systems such as dashboards to monitor the performance of services.
O9-Documents related to the product/service are arranged error-free and timely and delivered to us.
SUPPLIER ABILITIES PERSPECTIVE
(Fusiripong, 2017; Nazari-Shirkouhi et al., 2017; Westner and Strahringer, 2010; Mukherjee and Mukherjee, 2015)

SA1-The supplier's employees have sufficient technical knowledge.
SA2-The supplier has financial sustainability.
SA3-The supplier has effective human resource management.
SA4-The supplier ensures that its employees have up-to-date knowledge through workshops, seminars, etc.
SA5-The supplier has vertical industry expertise (aviation industry knowledge).
SA6-The supplier has occupational safety and health standards.
SA7-The supplier takes actions in line with environmental sustainability.
SA8-The supplier has the technological infrastructure to provide information security.
SA9-The supplier's compliance with IT standards (SDLC, Governance, Project Management Method, etc.) is complete.
SA10-The supplier constantly updates itself on the products/services it offers.
STRATEGIC PERSPECTIVE
(Grover et al., 1996; Qi and Chau, 2012)
S1-The supplier keeps us informed about "best in class" practices.
S2-By working with this supplier, we can adapt quickly to changes in technology.
S3-By working with this supplier, we have developed our IT competencies.
S4-By working with this supplier, we can focus on our core business as the IT department.
S5-By working with this supplier, we can gain competitive advantages.
S6-The supplier offers us innovative ideas in parallel with technological developments.
RELATIONSHIP PERSPECTIVE
(Cannon et al., 2020; Khan et al, 2010; Watjatrakul, 2014; Authour, 2019)
R1-The supplier considers the interests of our company when making important decisions.
R2-The supplier's personnel pay attention to our company's working principles.
R3-The supplier is flexible in adapting to our needs.
R4-The supplier does not tend to increase his earnings from this relationship unilaterally.
R5-The supplier is flexible when we have changes or new demands.
R6-The supplier considers emerging problems as a joint responsibility
R7-The supplier believes that success will come by working together and acting collaboratively.
R8-The supplier shares with us all the information that will benefit our company.
R9-Close working relationships have been established between the supplier's employees and our employees.
R10-The supplier shares with us all the information that will enable us to reduce our costs.

4. 3. STEP 2: DECIDING ON A SET OF FINAL CRITERIA

At this stage, 41 criteria determined in step 1 were turned into a questionnaire and sent as an online questionnaire to 13 experts working in the IT department of the airline company. The experts were asked to rate the criteria as Indifferent (1), Not Important (2), Somewhat Important (3), Important (4), or Very Important (5). The working positions of the 13 experts participating in the research are as follows: (1) Project Manager, (2) Project Management Office Manager, (3) Chief Information Officer (CIO), (4) Passenger Solutions Manager, (5) Business Intelligence and Software Services Manager, (6) Enterprise Solutions Manager, (7) Information Security Manager, (8) Alternative Sales Channels Manager, (9) IT CRM Solutions Manager, (10) BT Application Support Officer, (11) Operations Solutions Officer, (12) Business Intelligence Manager, (13) Project Manager.

Expert consensus (proportion within a range), which is one of the most frequently used methods in the literature, was used for the selection of the appropriate criteria. In order to reach a consensus on a criterion, the vast majority of the participants (the vast majority) must agree on the importance of the criterion, while a small minority of the participants are expected to think that the criterion is not important. Adversely, for a criterion to be removed from the criteria set, the vast majority of the participants must agree that the criterion is unimportant, and a small minority of the participants must consider the criterion important (Harman et al., 2013). The consensus definition agreed with the experts for this research is given in Table 3.

Table 3. Definitions of Consensus

Consensus classification	**Description**	**Definitions**
Consensus in	A consensus that criteria should be included in the core criteria set	69% or more experts scoring as 5 to 7 AND <16% experts scoring as 1 to 3
Consensus out	A consensus that criteria should not be included in the core criteria set	69% or more experts scoring as 1 to 3 AND <16% of experts scoring as 5 to 7
No consensus	Uncertainty about importance of criteria	Anything else

After ranking, 4 criteria under the financial dimension (F1, F2, F3, F5), 7 criteria under the operational dimension (O1, O2, O3, O4, O5, O6, O7), 6 criteria under the supplier abilities dimension (SA1, SA2, SA3, SA5, SA8, SA10), 5 criteria under the strategic dimension (S2, S3, S4, S5, S6), 5 criteria under the relationship dimension (S1, S3, S5, S6, S7) in the final criteria set remained. The consensus results are given in Table 4 and the criteria that will be included in the final criteria set are marked in bold.

Table 4. Results of Consensus

Dimension		Number of experts giving a score from 1 to 3		Number of experts giving a score of 4		Number of experts giving a score from 5 to 7		Conclusion
		N	%	N	%	N	%	
FINANCIAL	**F1**	**2**	**15,38**	**0**	**0**	**11**	**84,6**	**Consensus in**
	F2	**2**	**15,38**	**0**	**0**	**11**	**84,6**	**Consensus in**
	F3	**1**	**7,69**	**1**	**7,69**	**11**	**84,6**	**Consensus in**
	F4	1	7,69	4	30,76	8	61,5	Consensus out
	F5	**2**	**15,38**	**1**	**7,69**	**10**	**76,9**	**Consensus in**
	E6	3	23,07	3	23,07	7	53,9	Consensus out
OPERATIONAL	**O1**	**0**	**0**	**2**	**15,38**	**11**	**84,6**	**Consensus in**
	O2	**0**	**0**	**0**	**0**	**13**	**100**	**Consensus in**
	O3	**0**	**0**	**1**	**7,69**	**12**	**92,4**	**Consensus in**
	O4	**1**	**7,69**	**2**	**15,38**	**10**	**76,9**	**Consensus in**
	O5	**0**	**0**	**2**	**15,38**	**11**	**84,6**	**Consensus in**
	O6	**1**	**7,69**	**3**	**23,07**	**9**	**69,2**	**Consensus in**
	O7	**0**	**0**	**3**	**23,07**	**10**	**76,9**	**Consensus in**
	O8	4	30,76	3	23,07	6	46,2	Consensus out
	O9	1	7,69	4	30,76	8	61,6	Consensus out
SUPPLIER ABILITIES	**SA1**	**0**	**0**	**0**	**0**	**13**	**100**	**Consensus in**
	SA2	**1**	**7,69**	**1**	**7,69**	**11**	**84,6**	**Consensus in**
	SA3	**1**	**7,69**	**1**	**7,69**	**11**	**84,6**	**Consensus in**
	SA4	3	23,07	1	7,69	9	69,2	Consensus out
	SA5	**1**	**7,69**	**1**	**7,69**	**11**	**84,6**	**Consensus in**
	SA6	4	30,76	3	23,07	6	46,2	Consensus out
	SA7	4	30,76	3	23,07	5	38,5	Consensus out
	SA8	**1**	**7,69**	**1**	**7,69**	**11**	**84,6**	**Consensus in**
	SA9	3	23,07	1	7,69	9	69,2	Consensus out
	SA10	**2**	**15,38**	**0**	**0**	**11**	**84,6**	**Consensus in**
STRATEGIC	S1	4	30,76	0	0	9	64,6	Consensus out
	S2	**3**	**15,38**	**0**	**0**	**10**	**76,9**	**Consensus in**
	S3	**2**	**15,38**	**0**	**0**	**11**	**84,6**	**Consensus in**
	S4	**3**	**15,38**	**0**	**0**	**10**	**76,9**	**Consensus in**
	S5	**1**	**7,69**	**0**	**0**	**12**	**92,4**	**Consensus in**
	S6	**2**	**15,38**	**1**	**7,69**	**10**	**76,9**	**Consensus in**
RELATIONSHIP	**R1**	**3**	**23,07**	**0**	**0**	**10**	**76,9**	**Consensus in**
	R2	1	7,69	3	23,07	9	69,2	Consensus out
	R3	**1**	**7,69**	**0**	**0**	**12**	**92,4**	**Consensus in**
	R4	3	23,07	2	15,38	8	61,6	Consensus out
	R5	**1**	**7,69**	**1**	**7,69**	**11**	**84,6**	**Consensus in**
	R6	**1**	**7,69**	**0**	**0**	**12**	**92,4**	**Consensus in**
	R7	**2**	**15,38**	**0**	**0**	**11**	**84,6**	**Consensus in**
	R8	3	23,07	1	7,69	9	64,6	Consensus out
	R9	1	7,69	3	23,07	9	69,2	Consensus out
	R10	1	7,69	3	23,07	9	69,2	Consensus out

4. 4. STEP 3: WEIGHTING CRITERIA

In weighting the supplier monitoring criteria, a deterministic multi-criteria decision-making method (Best-Worst Method – BWM) developed by Rezaei (2015) was used. The Best-Worst Method (BWM) consists of five steps. These steps are used to determine the weights of the criteria and to find the scores of the alternatives according to each criterion (Rezaei, 2015). These steps are presented below for criterion weights. The methodological steps of BWM are as follows:

S_1: A set of criteria is determined.

$$\{C_1, C_2, C_3 \dots \dots \dots C_m\}$$

S_2: The Best and Worst criteria are chosen by the expert.

S_3: In this step, the expert is scored using a scale of 1 to 9, how well the best criterion is compared to other criteria. The vector showing best to others' preference would be:

$$V_{B=}\{V_{B1}, V_{B2}, V_{B3}, \dots \dots \dots V_{Bm}\}$$

S_4: In this step, how well the other criteria are better than the worst criterion is scored by the expert using a scale from 1 to 9. The vector showing the preference of the other would be:

$$\{V_{1W}, V_{2W}, V_{3W}, \dots \dots \dots V_{mW}\}$$

S_5: Final weights of criteria are computed. The problem equation is transferred to the formula below. The ξ value indicates the consistency ratio of the analyses. Values close to zero show a high level of consistency, and as the value of ξ increases, the consistency decreases.

$$\left|\frac{W_B}{W_j} - vBj\right| \leq \xi \text{ for all j,}$$

$$\left|\frac{W_j}{W_w} - vjW\right| \leq \xi \text{ for all j}$$

As stated above (Step 2: Deciding on a set of performance monitoring criteria), the criteria on which the experts reached a consensus was determined as the final criteria set. After that, the weighting of the criteria was done by 3 IT project managers working in the IT department of the airline. These experts are who are not involved in the consensus stage.

At this stage, first of all, experts gave preference the best dimension over other dimensions and also other dimensions over the worst dimension. Similarly, they gave a preference for best criteria over other criteria and also other criteria over worst criteria. Then, final weights were calculated for each dimension and each criterion. Table 1 presents the final rankings for supplier monitoring criteria. The local weights in Table 5 are the average weights of all experts. The consistency values of the analyzes are given in Table 6. Local weights provide a consistency check as all values of ξ are close to zero.

Table 5. Final Ranking of Supplier Monitoring Criteria

Dimension	Dimension Weight	Dimension Rank	Code	Local Weight	Local Rank	Global Weight	Final Rank
Financial	0,110892042	5	F1	0,150584244	3	0,016698594	**24**
			F2	0,309955369	2	0,034371584	**14**
			F3	0,423644002	1	0,046978748	**9**
			F5	0,090310668	4	0,010014734	**27**
Operational	0,263581416	2	O1	0,239863429	1	0,063223542	**3**
			O2	0,183701907	2	0,048420409	**8**
			O3	0,153910116	3	0,040567846	**10**
			O4	0,071841898	7	0,018936189	**22**
			O5	0,092794765	6	0,024458976	**19**
			O6	0,12438016	5	0,032784299	**15**
			O7	0,133507725	4	0,035190155	**12**
Supplier	0,179474441	3	SA1	0,322902777	1	0,057952796	**7**
Abilities			SA2	0,097937709	5	0,017577316	**23**
			SA3	0,092929237	6	0,016678423	**25**
			SA5	0,157652345	3	0,028294566	**17**
			SA8	0,127536846	4	0,022889604	**21**
			SA10	0,201041086	2	0,036081737	**11**
Strategic	0,276818704	1	S2	0,233422084	1	0,064615599	**2**
			S3	0,116103633	5	0,032139657	**16**
			S4	0,213959533	3	0,059228001	**5**
			S5	0,224168674	2	0,062054082	**4**
			S6	0,212346077	4	0,058781366	**6**
Relationship	0,169233396	4	R1	0,139894553	4	0,02367483	**20**
			R3	0,41363143	1	0,070000252	**1**
			R5	0,207214788	2	0,035067662	**13**
			R6	0,093289641	5	0,015787723	**26**
			R7	0,145969588	3	0,024702929	**18**

Table 6. Consistency Values

	Expert_1	Expert_2	Expert_3	Average
ξ for Financial Dimension Criteria	0,10869565	0,15831135	0,288820	**0,185276**
ξ for Operational Dimension Criteria	0,06976744	0,09195817	0,123457	**0,095061**
ξ for Supplier Abilities Dimension Criteria	0,07142857	0,14825581	0,159732	**0,126472**
ξ for Strategic Dimension Criteria	0,07142857	0,14825581	0,159732	**0,126472**
ξ for Relationship Dimension Criteria	0,16666667	0,07692308	0,181430	**0,141673**
ξ for Dimensions	0,19626168	0,07142857	0,196262	**0,154651**

5.RESULTS AND DISCUSSION

From Table 1, it is observed that the final weight of dimension "Strategic" (0,276818704) ranked higher followed by "Operational" (0,263581416), "Supplier Abilities" (0,179474441), "Relationship" (0,169233396) and "Financial" (0,110892042). The results show that the Strategic Dimension is the most important criterion in monitoring the performance of IT suppliers, while the financial dimension is seen as the least important. The success of airline operations is highly dependent on IT systems. Therefore, the IT suppliers of the buyer company are the suppliers that play a critical role in the achievement of the strategic goals of the airline business. As a matter of fact, an arm's length relationship is established between IT suppliers and the buyer company, which is much closer and based on trust relationships than the traditional competitive market mechanism. Therefore, it is expected that fulfilling the strategic expectations of the buyer company while monitoring the supplier's performance is a priority. Although financial performance criteria such as cost reduction are important in the short term, the importance of strategic contribution increases in long-term relationships. Because the contribution of the supplier in achieving the strategic goals of the business will enable the business to gain a competitive advantage in the long run. As a matter of fact, in some previous studies Levina ve Ross (2003), it has been revealed that IT outsourcing has more strategic-oriented reasons than tactical or economic reasons. The fact that the operational dimension is the second most important dimension after the strategic dimension is consistent with previous studies in the literature. Some authors (Erdoğan and Tokgöz, 2020; Qi and Chau, 2015) have found that operational criteria contribute the most to IT outsourcing success.

From Table 1, among *the financial criteria,* "Price/performance ratio of services (F3)" (0,046978748) is found to be the most important criterion in supplier monitoring. It expresses that the buyer company attaches importance to high service quality in return for the payment made for the product or service rather than the price. The criterion (F3) is followed by (F2) (0.034371584), F1 (0.016698594), F5 (0.010014734), respectively.

Among *operational criteria,* "The product quality/service delivery provided is complete. (O1)", (0,016698594) is found to be the most important criteria in supplier monitoring followed by (O2) (0,048420409), O3 (0,040567846), O7 (0,035190155), O6 (0,032784299), O5 (0,024458976), O4 (0,018936189) respectively.

Among *supplier abilities criteria,* "The supplier's employees have sufficient technical knowledge (SA1)" is found to be the most important criterion in supplier monitoring. One of the most important motivational reasons why the buyer company outsources its information technology services instead of providing its services with internal resources is to increase the quality in its operation. Of course, in order to achieve this, the supplier must hire competent staff. The criterion (SA1) is followed by SA10 (0,0360817370), SA5 (0,028294566), SA8 (0,022889604), SA2 (0,017577316), SA3 (0,016678423), respectively.

Among *strategic criteria*, (S2) "By working with this supplier, we can adapt quickly to changes in technology." (0,064615599) is found to be the most important criterion in supplier monitoring. An enterprise's internal resources are often not sufficient to develop new technology. In addition, the annual budget mostly held by IT departments does not cover innovation development (innovation). IT firms, on the other hand, can allocate more budget to innovation development and sell it to many buyers at lower prices (Beulen et al., 2006). Therefore, the buyer company expects the IT supplier to adapt itself to new technologies. The criteria (SA1) is followed by S5 (0,062054082), S4 (0,059228001), S6 (0,058781366), S3 (0,032139657), respectively.

Among *relational criteria*, "The supplier is flexible in adapting to our needs. (R3)" is found to be the most important criterion. IT services, especially software development, represent an uncertain process involving highly complex and unpredictable activities. In services where requirements uncertainty is high, it is not possible to write all the details in service agreements and unforeseen requests arise. For this reason, the requirement uncertainty of the buyer company is high, so flexibility, which means that the parties can make changes in practices and policies under unexpected or changing conditions (Kim and Young-Soo, 2003), is of great importance for the buyer. The criteria (R3) is followed by R5 (0,035067662), R7 (0,024702929), R1 (0,02367483), R6 (0,015787723), respectively.

6. CONTRIBUTIONS

In this research, several results have been obtained that can provide valuable insights for practitioners. Firstly, a criteria set for monitoring IT suppliers, developed through supplier segmentation, has been established and is ready for use by managers.

The weight rankings of the criteria reached in the study draw attention to which issues IT suppliers should focus more on in their relations with the buyer. The top 5 criteria are listed below. From this point of view, it is the primary expectation that IT suppliers should not be rigid due to the nature of IT services and be flexible in the face of the changing needs of the buyer. One of the most important sources of motivation in the outsourcing of the buyer company is to adapt to the current technology, so it is of great importance that the suppliers constantly update themselves and adapt these to the services they provide. Within the framework of the Top 5 criteria, supplier companies are expected to provide complete product/service quality. It is most desirable by the buyer company that the supplier companies see their relations with the buyer companies as a partnership relationship and takes actions towards the competitive advantage of the buyer company in the long run.

Top five supplier monitoring criteria:

1. The supplier is flexible in adapting to our needs.
2. By working with this supplier, we can adapt quickly to changes in technology.
3. The product quality/service delivery provided is complete.
4. By working with this supplier, we can gain competitive advantages.
5. By working with this supplier, we can focus on our core business as the IT department.

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