

# Supplier Selection in Retail Industry

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*Abstract:* - Today's economic conditions and competitive environment force companies to seek different solutions in order to increase their success and use their resources more efficiently. The best use of resources is among the most important strategies of companies in a competitive environment. Negative factors such as inflation and high costs reveal the importance of supply chain management. Therefore, managers should take the necessary precautions in such an environment. One of the most important goals of every company is customer satisfaction. This is closely related to the service offered, such as quality and inexpensive products, services and communication. The most accurate management of all these factors begins with the determination of suitable suppliers. In the model developed for this purpose, the supplier selection process is handled, and it is aimed to make the right decision in favor of the company. In addition, the structure of the model can be applied easily and effectively in practical life.

*Key-Words:* - AHP, Retail Industry, Supplier selection

## 1 Introduction

Retail known as one of the most competitive sectors in the world. Fluctuating demands, competition and difficulty of smooth supply chain operations make things harder for retail companies. Due to several complexities within supply chain operations, companies work harder to sustain product availability. Suppliers are the most substantial parts of these complex supply chain operations. Identifying, obtaining information, creating contract conditions, negotiating, and evaluating suppliers are all steps in the supplier selection process described in this study.

The retail industry is the link between production and consumption of commodities, and the academic and stakeholder groups pay special attention to it. Retail companies need to try to match their company strategy, activities, and operations with their supply chains to strengthen their competitive edge. The supply chain is responsible for selecting the best supplier feasible for an efficient product interaction network.

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availability. Suppliers are the most substantial parts of these complex supply chain operations. Hence, their supply accuracy level is important and evaluation-based systems applied to make things easier.

In Turkey, retail sector grew 26,8% and especially discounter retailers, they grow 32% which is above the average. In Europe, Turkey retail sector is one of the biggest sectors and is becoming more attractive. Şok Markets, one of the most extensive retail company in Turkey even had a growth rate for 33%. With the significantly increasing growth rate, supply chain operations became important. Due to increasing significance, having better suppliers and selection process of them is critical.

Analytical Hierarchical Process (AHP) is frequently regarded as a tool for the selection of suppliers since it enables decision makers to position suppliers based on their relative significance and suitability. AHP presents an alternative course of action technique based on the judgements of the decision-maker on the importance of the criteria and the extent to which each option is fulfilled. Therefore, AHP is best suited to the selection of the supplier. The hierarchy of problems provides the basis for an analysis based on the impact of a certain level on the next level. The procedure starts by analyzing if the criteria are relatively important in achieving the

objectives. Next, the focus will be on how much each of the criteria is achieved by the alternative. The results are summarized to determine the relative importance of the alternatives in achieving the objective.

In this study, identifying, obtaining information, creating contract conditions, negotiating, and evaluating suppliers are all steps in the supplier selection process described. This study is organized around the major steps involved in supplier selection. First, the buyer must select possible providers who are qualified. The buyer must then assess these vendors. When a buyer formally requests information from suppliers, this procedure begins. Suppliers reply by offering "bids" for the contract, specifying an offer on contract terms such as price, lead time, and quality, based on the information required. Finally, the buyer chooses which supplier or suppliers will be given a contract and then observes them during the contract's duration to enable future supplier selection iterations.

## 2 Model Design

Şok Markets is a discounter market. Its history began in 1995 with 13 stores in different regions around especially Istanbul in Turkey. After years, the company joined Yıldız Holding with 1.255 stores and 7 warehouses growth rate increased significantly.

Şok Markets is one of the best-known discount markets in Turkey. Şok Markets' objective is providing quality products to customers with low prices. Şok Markets become larger by incorporating with 3 other discount markets which are Dia S.A, Onurex, Devamlı İndirimli Mağazacılık (DİM) in 2013. Although Markets started its journey with 13 stores, today company has more than 8500 stores in Turkey.

Şok Markets conversion project completed in terms of design and practicality to consumer satisfaction at 2015. New business models and supply chain systems include more technology for their operation. Nowadays, they announced the "CepteŞok" has "Click and collect" mobile application to increase more efficient technological services for consumer satisfaction. Besides, Şok Markets is considering old brands which are represent heritage in the local customers memories like Mis, Piyale, Mintax, Evin, and Amigo are known national memorable brands. The brands back in the economy with loyal values for the costumer.

To sum up, Şok Markets offers their customers a "one-stop shop" experience for all their base shopping needs at the closest sale points to their homes or offices, through more than 8500 stores, 31 warehouses, and over 35,000 employees in all 81

provinces of Turkey. Besides, in the first quarter of the 2021 Şok markets informed their consumers and shareholders about Non- Şok operations climbed by %35 when Net sales occurred as 6,4 Billion TL and EBITTA raised to 113,4 Million TL.

While determining the alternatives within the scope of the study, the categories studied in Şok Markets, which we have implemented, have been evaluated. For Şok Markets, which includes many food and non-food categories, 3 alternative companies have been determined based on one of the most important categories. In the study, the alternatives will be referred to as Firm A, Firm B, and Firm C. The chosen category is of great importance as it is very critical in terms of both turnover and customer penetration. The geographical locations of the 3 selected companies are different. The first alternative firm has a factory in Düzce, the second in Konya and the third in Istanbul. If we look at the numerical data, we can rank the alternatives with the highest earnings as the first, second and finally the third company. Apart from these data, many non-numerical criteria such as communication, quality, shipment will be considered. Here, too, the importance of AHP emerges.

While determining the supplier selection criteria, articles in the literature were used. Since there are many studies on the subject, the most frequently encountered articles were examined and the criteria on which they were taken were examined. Especially the work done by Dickson in 1966 forms the basis of almost all articles.

Dickson [1] expressed quality, price, delivery, and retrospective performance as important criteria. Lehmann and O'Shaughnessy [2] used the criteria of price, delivery, guarantees and obligations, financial situation, technical support, response to customer demands, references, position in the sector, technical capacity, experience, service, reliability, and impression.

Perreault and Russ [3] In addition to price, delivery, quality, geographical location, service, technical and production capacity, product appearance, application control and management organization, Weber [4] also has stated that there are important selection criteria.

Ellram [5] emphasized that in addition to quantitative factors, long-term and qualitative factors are also important in supplier selection and these factors; financial elements, organizational culture, technology, reliability, speed, human resources, references, technical capacity, design, and management-organization factors were discussed.

Nydick and Hill [6] in supplier selection; While concentrating on four criteria, namely quality, price,

delivery and service, Siying [7] used the criteria of price, performance, quality and geographical location.

Verma and Pulman [8] quality, cost, just-in-time delivery, delivery time and flexibility in supplier selection. Boer [9] on the other hand, evaluated the supplier's financial situation, the distance between the firm and the supplier, the supplier's affordability, and quality.

Jayaraman [10] on the other hand, considered the criteria of delivery time, quality, production capacity and storage adequacy.

In Tam and Tummala [11] studies, they used criteria such as unit price, operational cost, experience, flexibility, quality, problem solving ability, technology, technical capacity, and delivery time.

Bhutta and Hug [12] used the criteria of manufacturing costs, quality, technology, service, product appearance. Bharadwaj [13] in his study in which he examined the decision-making criteria for supplier selection, stated that the most important criteria were delivery, price, quality and service level. Hwang et al. [13] service capability, capacity, quality, flexibility. It has considered factors such as response to customer demands, position in the sector, and the rate of defective products.

In this study, first, all the criteria that can be effective in the supplier selection problem in the retail sector are listed and organized in the form of a questionnaire by making use of the literature. The pre-criteria listed in the questionnaire were individually scored by the experts in the industry using the Likert scale.

The Likert scale is an attitude scale introduced by Likert in the early 1930s. It is a scale that allows to determine the behavior scores of individuals on a subject. A different number of options are determined for each of the k questions. The options are lined up in sequential order, and the options are scored with balanced (in the form of -2, -1, 0, +1, +2) or sequential numerical values (0, 1, 2, 3, 4, 5). The answers to all questions are collected. The total score is the individual's behavior, knowledge, and attitude score about the subject. According to everyone's score, the individual's behavioral position on the subject is determined by taking a place on the total scale as in Table 1.

Table 1. Criteria and importance rates for supplier selection

CRITERIAS FOR SUPPLIER SELECTION		IMPORTANCE RATE					AVERAGE SCORE
		LOW	MEDIUM	HIGH			
1	PURCHASING PRICE	1	2	3	4	5	4.87
2	QUALITY	1	2	3	4	5	4.82
3	RELIABILITY	1	2	3	4	5	4.76
4	ASSURANCE AND LIABILITIES	1	2	3	4	5	4.61
5	COMMUNICATION ABILITY	1	2	3	4	5	4.47
6	ON TIME DELIVERY	1	2	3	4	5	4.47
7	SPEED	1	2	3	4	5	4.42
8	PRODUCTION CAPACITY	1	2	3	4	5	4.39
9	PROBLEM SOLVING ABILITY	1	2	3	4	5	4.34
10	PAST PERFORMANCE RESULTS	1	2	3	4	5	4.29
11	PRODUCTION	1	2	3	4	5	4.28
12	DEFECT RATES	1	2	3	4	5	4.24
13	LOGISTIC COSTS	1	2	3	4	5	4.24
14	SETTLEMENTS	1	2	3	4	5	4.18
15	FINANCIAL SITUATION	1	2	3	4	5	4.16
16	EXPERIENCE	1	2	3	4	5	4.11
17	RISKS	1	2	3	4	5	4.03
18	FLEXIBILITY	1	2	3	4	5	3.95
19	TECHNICAL SUPPORT	1	2	3	4	5	3.95
20	TECHNICAL CAPACITY	1	2	3	4	5	3.92
21	STORAGE CAPACITY	1	2	3	4	5	3.82
22	TECHNOLOGY	1	2	3	4	5	3.79
23	REFERENCES	1	2	3	4	5	3.66
24	IMPRESSION	1	2	3	4	5	3.53
25	RESOURCES	1	2	3	4	5	3.53
26	INFORMATION TECHNOLOGIES	1	2	3	4	5	3.32
27	LEAD TIME	1	2	3	4	5	3.29
28	GEOGRAPHICAL POSITION	1	2	3	4	5	3.13

Criteria which below 3 is eliminated because their importance level is low

### 3 Model

The model was created by grouping the 28 selection criteria determined after the survey participated by the experts in the sector. While creating this model, help was received from people who have been in the retail industry for 10-15 years. In line with their opinions, it was deemed appropriate to add some items later. Criteria such as company profile, customer complaints, promotional support, sales price, profit margin, market share, competitors, production, shipment, product have been added. The company profile is grouped under 4 main categories under the headings of cost, quality, and service.

In the model, firm profile, internal factors, external factors, quality, specified criteria such as cost, service, shipment, communication, product, production; The sub-criteria are explained as follows.

Service main criteria are grouped as product, communication, and shipment. First, the product title was discussed and detailed with packaging, product variety, product appearance and brand sub-criteria.

**Bilateral Agreements:** It covers the communication between company officials and chain purchasing authorities. It includes studies that will positively affect trade by leaving the agreement when necessary and sticking to the bilateral agreements.

**Problem Solving Ability:** There are some difficulties in trading from time to time. It is the tendency to solve these problems instead of magnifying them and share this with the relevant authorities.

**Warehouse Adequacy:** The supplier does not experience warehouse shortages in case of having enough or even extra stock in some special promotion periods. It has been considered that the retailer can meet all kinds of excess production demand.

**Quantity-Ordered Shipment:** Pro-order shipment is very important as orders are created based on estimated sales and safety stocks; especially during promotional periods. Therefore, the company should not deliver more or less than the order amount.

**Delivery Time:** It is the time between the delivery of the order to the company and the day of delivery.

**Logistics Cost:** It constitutes the sum of all costs of handling, etc., while the distribution of a product from the warehouse to the stores.

**Profit Margin:** It can be defined as the profit remaining to the company after deducting the purchase cost from the after-sales return of a product.

**Defective Product Rate:** The rate of product recalled from the shelf entirely due to reasons originating from the supplier.

**Quality System:** It refers to the quality certificates of the supplier's factory (ISO 9000, BRC etc.).

The profile of the firm, which is another main criterion, has been examined under two subheadings as internal and external factors. Of these, internal factors; production, information technologies, financial situation, past performance, reliability, experience, warranty, and liabilities.

**Reliability:** It is the feeling of trust that the supplier makes to the company. **Financial Status:** It includes the economic status of the supplier.

**Experience (know-how):** The experience of the supplier in the sector is considered. **Past Performance:** It is an evaluation based on the previous work of the supplier.

**Information Technologies:** It is the IT system owned by the supplier.

**Warranties and Obligations:** It covers the commitments given by the supplier to the chain company in line with their trade.

External factors examined under the firm profile are divided into sub-criteria as risk factors and references geographical location.

**Position in the Sector:** It is considered whether the supplier is a leader in the sector or a new entrant.

**Risk Factor:** It is the situation of suspicion that the supplier arouses in the chain company officials in general.

**References:** Includes statements made by other people about the supplier.

The production sub-criterion, which is among the internal factors affecting the company profile, is examined under production technologies. Production capacity is included under the title of production. Production technologies, on the other hand, are examined under the headings of technical support and technical capacity.

**Production Capacity:** It has been considered what percentage of the supplier's capacity is full and what percentage of this ratio is reserved for the contracted company.

**Technical Support:** It expresses how much the supplier has helped the chain company with which it

has signed an agreement, which is technically called the business partner.

**Technical Capacity:** Taken as a measure of how far the supplier can go technically (number of machines, specifications, etc.).

Following the determination of the relevant criteria, priorities were determined for each criterion. First, when the 4 main criteria are examined, 0.42 firstly, the most important is the company profile. It follows the company profile with the priorities of quality criterion 0.22, cost criterion 0.18 and service criterion 0.18.

Table 2. Main criteria for supplier selection

CRITERIA	PRIORITY
FIRM PROFILE	0.42
QUALITY	0.22
COST	0.18
SERVICE	0.18

**Company Profile**

When we examine the main criterion of 'Company Profile', which takes the highest priority, it is seen that internal factors take precedence over external factors with a priority of 0.59.

When the 'Internal Factors' criteria under the main heading of Company Profile are examined, it is seen that the most important criterion is 'Experience', followed by production and reliability. When we look at external factors, the 'Risk Factor' has become the highest priority with a ratio of 0.23. References are among the most important criteria with 0.18 priorities and competitors 0.17 priorities.

Table 3. Company profile criteria

CRITERIA	PRIORITY
PRODUCTION	0.21
INFORMATION TECHNOLOGY	0.14
FINANCIAL SITUATION	0.14
EXPERIENCE	0.23
PAST PERFORMANCE RESULTS	0.1
RELIABILITY	0.18

The sub-headings of the 'Production' criterion in the title of internal factors were examined. Accordingly, with a ratio of 0.59, it has been determined that the production capability has priority over the production technology.

When examined, they are in a more important position with 0.29 priority under the sub-title of production capability. In addition, technical capacity,

which is one of the sub-criteria of production technology, is 0.55 priority, which is approximately 1.8 times the closest criterion.

**Quality**

The factors under the title of 'Quality', which are among the 4 main criteria determined in the selection of the most suitable supplier, were examined. Accordingly, in line with the answers given by the experts, the rate of defective products is the most important sub-criterion with a rate of 0.56. The other two criteria, customer complaint and quality system, have priorities 0.32 and 0.12.

Table 3. Quality criteria

CRITERIA	PRIORITY
DEFECT RATES	0.56
QUALITY	0.12
COMMUNICATION ABILITY	0.32

**Cost**

Among the 7 criteria examined under the main cost criterion, 'Profit Margin' became the most important with 0.32 priority. Lead Time 0.25 is primarily in the 2nd place.

Table 4. Cost criteria

CRITERIA	PRIORITY
LOGISTIC COSTS	0.23
PROFIT RATE	0.32
PURCHASING PRICE	0.2
LEAD TIME	0.25

**Service**

The main criteria of service are discussed under 3 headings: product, communication, and shipment. When we sort by priorities, the product criterion is the most important, followed by shipping and communication.

Table 5. Service criteria

CRITERIA	PRIORITY
LOGISTICS	0.28
PRODUCT	0.46
COMMUNICATION	0.26

The product sub-criteria were examined, and it was observed that the brand criterion surpassed the other criteria with 0.42 priority. 0.27 primarily follows the packaging criteria and product variety takes the last place with a ratio of 0.11.

Table 6. Product criteria

CRITERIA	PRIORITY
BRAND	0.42
PACKAGING	0.27
PRODUCT VARIETY	0.11

When the communication sub-criterion is taken as a basis, it is seen that all 3 criteria have similar priorities. Bilateral communication criterion has become the top priority with a rate of 0.37. Next comes problem solving ability and response to customer requests.

Table 7. Communication criteria

CRITERIA	PRIORITY
COMMUNICATION ABILITY	0.37
PROBLEM SOLVING ABILITY	0.33
TECHNICAL SUPPORT	0.3

Six sub-criteria are discussed under the shipping factor. Among these criteria, 0.29 primarily takes the lead in warehouse adequacy. Then, on-time delivery with priority 0.27 and delivery time with priority 0.19.

Table 8. Shipping criteria

CRITERIA	PRIORITY
STORAGE CAPACITY	0.29
ON TIME DELIVERY	0.27
LEAD TIME	0.19

**4 Application**

As mentioned in the previous sections, 3 alternative companies are discussed within the framework of our study. Therefore, all the criteria in the last step of the hierarchy were handled for the 3 alternative companies and pairwise comparisons were made. As a result of these comparisons, alternative companies have had different priorities. For example, while the first company is in the first place in the purchase price criterion, it is in the last place when it comes to reliability. Company priorities are visualized for all criteria.

When all the criteria under the heading of data analysis are examined, the priority order of the three alternative companies is as follows. In this direction, company A is in the first place with a priority of 0.44. The first firm is followed by firm B with 0.33 points and finally firm C with 0.22 priority. Firm A stands out as an alternative with a clear difference. When all the analyzes are examined, it has been seen that the

priority order of the alternative 3 companies is compatible with the result of the study.

Table 9. Priorities of alternatives

Alternative	Priority
Firm A	0.44
Firm B	0.33
Firm C	0.22

Therefore, it will be more advantageous to work with company A for Şok Markets compared to other companies. Şok Markets currently continues its trade with all 3 companies. In order to reduce the risk, it is possible to act with multiple suppliers, but as seen in our study, giving the weight to Company A will be beneficial for Şok Markets. Or, the business may encourage its suppliers to continue in areas of high performance, and demand improvement in areas of relatively low performance. In addition, this model, which we created in the company where we have done our application work, has been transferred to the authorities and evaluations will be made by considering the priorities of the criteria determined in the selection of suppliers.

The concept of supply chain has gone beyond the understanding of competitive short-term trade and has begun to be evaluated as a strategic partnership by going beyond long-term relationships. Therefore, choosing the suppliers with whom such reliable relationships will be established is a critical decision process for managers.

#### 4 Conclusions

In this study, a methodology based on the analytical hierarchy process is presented in order to evaluate the supplier, which is an important link in the performance of the supply chain. As it is known, in today's conditions, decision-making becomes quite complicated as the available information about supplier selection is often uncertain and variable. It is aimed to minimize these uncertainties and variables by using AHP in decision making.

This study, among other previous AHP-based supplier evaluation studies, is a comprehensive study in terms of the criteria considered.

Thus, an example is given that AHP is successful in complex problems where the criteria used in supplier evaluation are very comprehensive. The Analytical Hierarchy Process is one of the complex, multi-criteria decision-making methods, making the solution very easy and allowing decision makers to make the right decisions. With these findings, the validity of the AHP method was scientifically tested

once again, the suppliers were evaluated with a scientific approach, and the relative advantages of the suppliers were determined.

The model developed in this study can be transformed into a structure that can be used by companies of different sizes operating in different sectors.

In future studies, it may be considered to include some uncertain judgments of decision makers in the model and to use fuzzy set theory alongside the AHP technique. With an integrated approach in which fuzzy numbers are used, solutions in which judgments about criteria and alternatives can be evaluated better can be obtained.

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