

# Chapter 36

## Supplier Selection in Food Industry Using Analytic Hierarchy Process (AHP) Method

Yusuf Ersoy

 <https://orcid.org/0000-0002-0106-1695>

Uşak University, Turkey

### ABSTRACT

*The human population has been growing rapidly in recent years. One of the most basic needs of people is food. Many countries around the world invest in the food industry. Climate change, population growth, urbanization, natural disasters, and agricultural efficiency are important factors affecting food production. Companies must constantly control their production, marketing, and supply chain process depending on the rapidly changing competitive conditions. Supply chain management is an important process for companies to be successful and ensure their continuity in the food industry, as in many industries. Analytical hierarchy process (AHP) method is widely used in supplier evaluation. In this study, it was aimed to determine the best supplier of food production company using the AHP method. In the study, three different suppliers were evaluated according to five different criteria by taking the opinions of four experts working in the purchasing department. As a result of the study, the best supplier has been selected.*

### INTRODUCTION

People need food to sustain their lives. Therefore, it is considered that the food industry will become an even more important sector in the future. Businesses that produce under reliable and human health conditions will be successful in the industry. From this point of view, companies need to select suitable suppliers due to global competition.

Some of the problems of food production are financial incentives, moral hazards, and information asymmetry. Each partner of the supply chain has different complex claims regarding financial aspects (Mau and Mau, 2009). Supplier selection is a strategic decision and plays a significant role in supply chain performance. Companies and decision-makers need to identify suppliers that can deliver the right

DOI: 10.4018/978-1-7998-4459-4.ch036

product at the right time and the right quality. The purchasing department plays an important role in the efficiency of a business. Suppliers have an important impact on the success of a company, and the purchasing process is considered a strategic responsibility (Kaviani et al., 2020).

Suppliers have an important place in the food industry. Food industry suppliers provide machinery, equipment, after-sales maintenance services, and raw materials for companies. Identifying the appropriate supplier in the food industry has a direct impact on cost reduction, flexibility, and profitability of the company (Ramlan et al., 2016).

The importance of food supply chain management is increasing both scientifically and industrially. Companies of the food sector must deal with more uncertainty in the supply chain. Those uncertainties are related to product variety, customer demands and interconnected distribution network. This case reveals that companies of the food sector must manage cost/risk trade regardless of sustainability, freshness, and corporate social responsibility problem (Amorim, et al., 2016).

This study aimed to select the most suitable supplier of a food company in Turkey using the AHP method. The company in the study is a food producer company in the Aegean region of Turkey. The rest of the study is organized as follows. In the second part, a literature review related to supplier selection is given. AHP method is included in the third section, the methodology section. The fourth part of the study consists of the application phase where the criteria weights are calculated and the suppliers are ranked. In the fifth, in the last part, a general evaluation of the study has been made.

## **LITERATURE REVIEW**

Multi-criteria decision-making (MCDM) methods are widely used in supplier selection in the literature, (Hou and Su, 2006; Bruno et al., 2012; Kasirian and Yusuff, 2013; Mardani et al., 2015; Frej et al., 2017; Amindoust and Saghafeinia, 2017; Wang et al., 2020).

Some of the studies in which suppliers are selected in different sectors using the AHP method are given in the following paragraphs.

Hou and Su (2006) were used the AHP method to select a web-based supplier in the electronics industry. In their study, 5 suppliers were evaluated considering technology, research and development, quality, service, price, location, and delivery criterion.

Paksoy and Güleş (2006) were used the AHP for supplier selection problem in a company in the textile sector in Turkey. In the study, 6 supplier firms were evaluated according to quality, supplier performance, cost, compromise ability, technology, color supply and distance criterion.

Hudymáčová et al., (2010) were used the AHP method to select the best supplier of a firm in the manufacture of plastic and rubber products in Slovakia. In the study, 3 suppliers were evaluated according to quality, cost, delivery, equipment, flexibility, documentation and cooperation criterion.

Ni-Di and Ming-Xian (2010) were used the AHP method for agri-food supplier selection of an enterprise. In their study, 3 suppliers were evaluated according to quality, cost, delivery and service criterion.

Bronja (2011) was used the AHP method for supplier selection problem in a company producing mechanical devices for cars. In the study, 20 suppliers were evaluated according to price, range of supply, lead time, quality, performance, flexibility, locations, and delivery criterion.

Rouyendegh and Erkan (2012) were used the AHP to determine the best suppliers that are providing equipment to a university in Turkey. In the study, 3 suppliers were evaluated according to cost, quality, delivery and flexibility criterion.

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