

Chapter 12

Selection of The Best Supplier in Furniture Industry by Using Fuzzy Analytic Hierarchy Process Method

Yusuf Ersoy

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

Uşak University, Turkey

ABSTRACT

Considering the globalization and the global economy, companies need to make strategic decisions in the furniture sector, as in many other sectors. In today's competitive conditions, supply chain management plays a major role in the success of firms and ensuring their sustainability in the sector. Therefore, companies need to work with suitable suppliers to be successful in supply chain management. There are many different methods used in the literature for evaluating suppliers. Fuzzy analytic hierarchy process (FAHP) method, which is one of the multi-criteria decision-making (MCDM) methods, is widely used in supplier selection problems. This study aimed to determine the best suppliers of a furniture production company in Turkey using the FAHP. In the study, four suppliers of the company were evaluated according to price, quality, delivery, innovativeness, and reliability criteria. As a result of the application, the ranking of the suppliers was made, and the best supplier selected.

INTRODUCTION

In today's world, where competitive conditions are increasing, businesses need to cooperate with their suppliers to provide quality and sustainable service. Given the supply chain, the importance of working with suitable suppliers for the success of businesses is even better understood. For these reasons, the decision to choose suppliers for companies is a strategically important decision that can affect the entire supply chain (Tekez and Bark, 2016). Sustainable supplier selection aims to identify and evaluate

DOI: 10.4018/978-1-7998-5886-7.ch012

the suitable supplier that performs best in the supply chain economically, socially and environmentally (Suraraksa and Shin, 2019).

Supply chain management provides a sustainable competitive advantage for businesses. The supplier selection process is an important part of the purchasing procedure. Therefore, businesses have become increasingly dependent on suppliers to supply previously provided services. The supplier selection process plays an important role in reducing costs and improving quality, and firms often misjudge the supplier selection problem as a single criteria decision-making problem, taking into account only cost factors (Taherdoost and Brard, 2019). A systematic approach is required to choose from a list of potential suppliers. The adequacy of suppliers should be measured based on several criteria (Davras and Karaatlı, 2014).

Supplier selection problems have gained importance in the literature in recent years (Chaharsooghi and Ashrafi, 2014; Davras and Karaatlı, 2014; Aouadni, Aouadni and Rebai, 2019; Suraraksa and Shin, 2019). There are many criteria and alternatives to be considered in the decision making process in such selection problems. When it comes to evaluating multiple criteria together in a decision problem, such decision making problems are expressed as a multi-criteria decision making problem (Öztürk and Başkaya, 2012). Dickson (1966) has prepared a ranking list of 23 criteria regarding supplier selection and has shed light on future researchers with this study.

In the study, it was aimed to select the best supplier of a furniture company in Turkey using the fuzzy AHP method, which is one of the MCDM methods. The company where the application is carried out in the study is a furniture manufacturer company in the Central Anatolia region. The rest of the study is organized as follows. In the second part, it is given to the literature review on supplier selection. The third section is the methodology section. This section includes the fuzzy logic and fuzzy AHP method. 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

There are many methods for supplier selection in the literature (Kuo et al., 2010; Mardani et al., 2015). MCDM methods are widely used in supplier selection (Mardani et al, 2015; Supçiller and Deligoz, 2018). In the literature, it is possible to come across studies using MCDM methods in supplier selection (Tam and Tummala, 2001; Hou and Su, 2006; Kang and Lee, 2010; Chen, Pai and Hung, 2010; Chen, 2011; Bruno et al, 2012; Kuo and Lin, 2012; Rezai and Ortt, 2013; Kasirian and Yusuff, 2013; Dou, Zhu and Sarkis, 2014, Mardani et al., 2015 Kara, Köleoğlu and Gürol, 2016; Amindoust and Saghafeina, 2017). It is possible to find out many studies in which suppliers are selected in different sectors. Some of these studies carried out using the FAHP method are given in Table 1.

METHODOLOGY

Fuzzy Logic

The concept of fuzzy logic was first introduced by Zadeh (1965) with the study called Fuzzy Sets that published in the journal Information and Control (Zadeh, 1965). In this study put forward by Zadeh, the

16 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/selection-of-the-best-supplier-in-furniture-industry-by-using-fuzzy-analytic-hierarchy-process-method/269007

Related Content

Optimal Order Quantity and Inventory Classification Using Clustering

Reshu Agarwal (2017). *International Journal of Applied Management Sciences and Engineering* (pp. 41-52).

www.irma-international.org/article/optimal-order-quantity-and-inventory-classification-using-clustering/185493

Risk-Averse Newsboy Problem with Incomplete Demand Information: Risk-Averse Newsboy Problem

Bibhas Chandra Giri (2016). *Analyzing Risk through Probabilistic Modeling in Operations Research* (pp. 344-353).

www.irma-international.org/chapter/risk-averse-newsboy-problem-with-incomplete-demand-information/140432

'Grey Model'-Based Simulation Tool for Predictive Product Quality Control

Leonid Burstein (2017). *International Journal of Applied Management Sciences and Engineering* (pp. 13-26).

www.irma-international.org/article/grey-model-based-simulation-tool-for-predictive-product-quality-control/185491

Corporate Social Responsibility: Way Forward for Sustainable Growth

Ganga Bhavaniand Reena Agrawal (2021). *Transforming Corporate Governance and Developing Models for Board Effectiveness* (pp. 71-88).

www.irma-international.org/chapter/corporate-social-responsibility/266721

Artificial Intelligence Effectiveness in Customer Experience at Retail

João M. S. Carvalho, Sílvia Fariaand Daniel Alves de Oliveira (2023). *Management and Marketing for Improved Retail Competitiveness and Performance* (pp. 180-199).

www.irma-international.org/chapter/artificial-intelligence-effectiveness-in-customer-experience-at-retail/327417