



Selecting the right contractor with a multi-criteria decision-making approach.

(Case study: Hamrah Awal Company)

* Mohsen Chalajour  ** Ghanbar Abbas Pour Esfadan 

* Master's degree graduate, Department of Information Technology Management, Faculty of Management, Islamic Azad University, South Tehran Branch, Tehran, Iran. m.chalajour174@gmail.com

** Assistant Professor, Department of Information Technology Management, Faculty of Management, Islamic Azad University, South Tehran Branch, Tehran, Iran. gh_abbaspour@azad.ac.ir

Received: 05.05.2025

Accepted: 17.06.2025

Abstract

One of the areas of interest for mobile operators is base transceiver stations (BTS). As they are always looking to increase the number of BTSs to maintain and expand the capacity of their communication networks, Marm-e-Owl uses the contracting sector with an outsourcing approach to logistics tasks to improve the delivery and distribution performance of this equipment, which has a significant impact on speeding up the installation and commissioning of BTS stations. Contractors must have the necessary qualifications and qualifications, because if the activities are not carried out in a proper manner, irreparable damage will be done to the employer's reputation and position. Therefore, conducting this research is important, given the lack of relevant research resources in the country. Its goal is to identify the most important dimensions and indicators of contractor selection for the purpose of distributing base transceiver station (BTS) equipment, clustering and identifying mandatory indicators using the fuzzy Kano method, extracting the weights of the dimensions and mandatory indicators using the BWM method, and finally ranking contractors using the fuzzy TOPSIS method. According to the findings, the selection of contractors was based on three important dimensions and 12 mandatory indicators, of which the technical and executive performance criterion had the highest weight and the environmental criterion had the lowest weight. Among all the mandatory indicators, the contractor's mastery of modern warehousing had the highest weight and the environmental control and management index had the lowest weight.

Keywords: Supply Chain, Outsourcing of Logistics Tasks, Best-Worst (BWM), Fuzzy TOPSIS, Fuzzy Cano.

Corresponding Author: Mohsen Chalajour- M.chalajour174@gmail.com



Introduction

• Statement of the problem

Selecting a contractor is one of the important issues that plays a significant role in the success or failure of a construction project, and selecting a competent contractor can greatly reduce the likelihood of failure. In a construction project, the largest investment is made in the project implementation phase, and mistakes in this phase of the project cause major waste of investment.[1]. Therefore, perhaps one of the most important issues in implementing construction projects is selecting the best contractor. In such a way that by selecting the best contractor, it is guaranteed that the risk of wasting resources in terms of cost and perhaps time is reduced to the minimum possible. However, the important challenge of selecting the best one is the existence of various criteria that the project management team needs to evaluate in the selection process. Basically, the method of selecting contractors is based on the lowest bid price, but it is clear that numerous quantitative and qualitative indicators with different degrees of importance are considered in determining the qualification of a contractor and should be considered in decision-making.[2]. Therefore, selecting competent contractors in telecommunication projects is of particular importance, because they guarantee the success or failure of projects.[3]. Given that a significant portion of the budget of telecommunications projects is allocated to the implementation stages, selecting a contractor who has the ability to complete the project on time, within the budget, and in compliance with quality standards is a major challenge.[4-5]. The issue of outsourcing is not a new issue for the First Mobile Company, because this company, as the leading operator in the Middle East, has, in order to develop its networks over the past years and at different times, outsourced services related to the installation and commissioning of various sites under its coverage, and other services such as: buildings and facilities, transportation, site optimization, software, etc. However, based on the research conducted, the most important outsourcing in the areas of logistics and technology and related to the creation of receiver/sender sites is related to the year 2016. Because at that critical time, this company was committed to implementing more than 40,000 BTS sites, and implementing this number of sites was unprecedented (in terms of volume and scope of implementation) and was also beyond the capabilities of the company's personnel. In order to provide the equipment required for BTS sites on time, the First Companion Company carried out activities related to the creation of sites (including logistics activities) by referring the work to one of the companies whose shares were all owned by the First Companion and which also had high technical execution capabilities in the installation and commissioning of the sites[6-7-8]. However, over time and with the emergence of problems such as the incompatibility of the equipment delivered to the sites and the equipment installed in the sites in terms of equipment serial numbers; Unusual packaging and failure to implement reverse logistics, etc. This need was raised that in order to identify the capabilities of the appropriate contractor for the delivery and distribution of BTS equipment, in addition to technical criteria, other criteria and dimensions should also be considered, and of course, this requires that the outsourcing issue be viewed as a process in the first place. In this regard, the aim of the present study is to select the appropriate contractor with a multi-criteria decision-making approach in Hamrah Awal Company.

• Objective

The aim of this research is to select the appropriate contractor using a multi-criteria decision-making approach in the first mobile company.



• Methodology

The present study was conducted based on descriptive (case) methods. This research is expert-based, meaning that in order to carry out the various stages of the research, including extracting criteria and indicators for evaluating suitable contractors, weighting the criteria and sub-criteria, and also ranking contractors, 9 experts with expertise and interests in various fields of Hamrah Awal Company who have a master's degree or work experience related to the research title, and some who have both conditions, i.e. a master's degree or higher and work experience related to the thesis title, were selected as a sample and purposefully. They were experts from the following departments: control and maintenance of goods (warehouses), order planning and inventory control, site design and engineering, purchasing, and finance of Hamrah Awal Company. The second sample used in this study was 5 contractors who had some experience in the field of delivery and distribution of equipment for base transceiver (radio) sites, directly or indirectly, at different times, and were willing to cooperate in this study for ranking. The best and worst method and fuzzy TOPSIS were used to analyze the data.

• Research Findings

The main objective of this research is to extract useful indicators for selecting the appropriate contractor for the delivery and distribution of Base Transceiver (BTS) equipment. The specific objectives of the research also include clustering the indicators and presenting mandatory indicators, determining the weight for the extracted mandatory indicators, and finally ranking the contractors based on their performance against the mandatory indicators, and of course with a multi-criteria decision-making approach. Among the criteria, the most important criteria is criterion C1 (technical and executive performance), and the least important criterion is criterion C3 (environmental). Also, among the sub-criteria, sub-criteria SC2 (complete mastery of modern warehousing and related mechanized systems such as ERP (SAP) in all stages of storing technical equipment in order to track equipment delivered to the base transceiver station (BTS) sites and for the serial number of the part (from the stage of goods entering the warehouse to the stage of installation at the base transceiver station (BTS) sites) was selected as the most important sub-criteria, and criterion SC11 (the contractor follows the environmental control and management approach by preparing appropriate checklists and at regular intervals) was also selected as the least important sub-criteria.

Conclusion

The results of the research show that the technical performance criteria and its sub-criteria have the highest degree of importance, and the environmental criteria and its sub-criteria have the lowest degree of importance from the perspective of the experts of the first companion company. On the other hand, the performance of the contractors in the evaluation shows that the contractors are also more focused on the technical and executive performance, while for example, for environmental issues, the International Environment Organization (UNEP) has raised many concerns and challenges such as increasing greenhouse gases, increasing types of pollution, decreasing natural resources, increasing waste and effluents, and the companies and organizations of the employer or contractor must commit themselves to complying with environmental issues.

• References

1. Awasthi, A., Govindan, K., Gold, S., (2018). Multi-tier sustainable global supplier selection using a fuzzy AHP-VIKOR based approach. *International Journal of Production Economics* 195(1). 106–117.



2. Becerra, P., & Diaz, J. (2025). Supplier Selection Model Considering Sustainable and Resilience Aspects for Mining Industry. *Systems*, 13(2), 81-98.
3. Chen, Zhihua. (2020). Sustainable supplier selection for smart supply chain considering internal and external uncertainty: An integrated rough-fuzzy approach. *Applied Soft Computing Journal*.5(9).34-56.
4. Govindan, K., Rajendran, S., Sarkis, J., Murugesan, P., (2015). Multi criteria decision making approaches for green supplier evaluation and selection: a literature review. *Journal of Cleaner Production* 98(1). 66–83.
5. Tohidi, M., Homayoun, S., RezaHoseini, A., Ehsani, R., & Bagherpour, M. (2024). Sustainability-Driven Supplier Selection: Insights from Supplier Life Value and Z-Numbers. *Sustainability*, 16(5),
6. Shaw, K., Shankar, R., Yadav, S.S., Thakur, L.S., (2012). Supplier selection using fuzzy AHP and fuzzy multi-objective linear programming for developing low carbon supply chain. *Expert Systems with Applications* 39(8), 8182–8192.
7. Rezaei, J.(2015) Best-worst multi-criteria decision-making method. *Omega*. [In Persian].
8. Wang, J., & An, N. (2024). Research on Evaluation Method of Green Suppliers Under Pythagorean Fuzzy Environment. *Sustainability*, 16 (20).



