ESCUELA DE INGENIERÍA INDUSTRIAL

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SUPPLIER SELECTION USING AHP AND TOPSIS IN FOOD COMPANIES CONSIDERING OPERATIONAL RISK

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Introduction

The problem of supplier selection within supply chain management is **one of the most difficult decisions** faced by organizations seeking to be successful and competitive in the market.

The **key to supplier selection** lies in **knowing the criteria** to use to select them; that is why various mathematical tools have been developed that evaluate both **quantitative and qualitative criteria** guaranteeing the best selection of them.

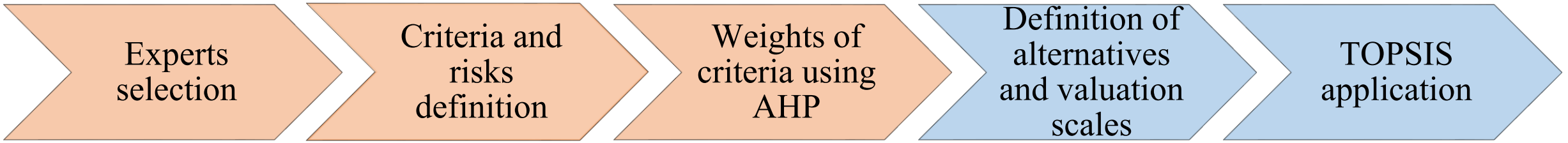
Literature review

There are a large number of papers use multicriteria techniques for supplier selection, and **recently some have appeared** that consider risk within the selection criteria.

In the literature review process, we considered the following works:

- ✓ (Nekooie, Sheikhalishahi, & Hosnavi, 2015)
- ✓ (Patra & Mondal, 2015)
- ✓ (Hosseininasab & Ahmadi, 2015)
- ✓ (Osorio, Garcia, Manotas, 2018)
- ✓ (Alikhani et al., 2019).

Research design/methodology



*We have a **strategic activity** applying the **AHP**, and a **tactical-operational** one applying **TOPSIS** to finally select the best possible provider from a list of potential suppliers, considering the criteria and risks that the organization defines as essential to its process.*

Data/model analysis

The supplier selection model was implemented in a Colombian origin multinational company where food supplies are produced and marketed for the bakery, gastronomy, agribusiness, and home food sectors.

There was then the participation of a group of people linked to the purchasing process.

By implementing the proposed methodology, it was possible to establish the best supplier for a fundamental product in the company's manufacturing process.

Data/model analysis

AHP Result

Criteria	Weight
Quality	27%
Technical support	7,7%
Supplier reputation	7,1%
Delivery time	20%
Price	14,4%
Guaranties	9,9%
Information and safety risk	4,89%
Supplier risk	8,95%

TOPSIS Result

Alternatives	Ri
A1	0,80
A2	0,16
A3	0,81
A4	0,78

Limitations

- This proposal has **two fundamental limitations:** firstly, the selection of the criteria and the inclusion of risks, and the weights thereof are based on the expertise of the group members. If they are not experts, the results will be less significant to the company.

- The second limitation relates to the **valuation scales designed for each of the criteria**. These scales are associated with the knowledge and judgments of those involved. The final result of the selection depends directly on those valuations.

Conclusions

- Although the proposed methodology was designed for a particular organization, the methodological scheme **can be easily replicated for any other type of organization**. According to the company's objective, the new criteria must be defined, and other risks considered.

- It is essential to **involve people with high knowledge and experience** so that the methodology's results are reliable and important to the organization.

References

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