A NEW INTIUTIONISTIC INTEGRATED APROACH WITH FUZZY AHP AND FUZZY MOORA

ABSTRACT

This paper proposes a new integrated intuitionistic model consisted of Fuzzy AHP and Fuzzy MOORA methods to deal with the uncertainty in decision-making problems. The proposed model is implemented selection of new product alternative for one of the biggest firm in beverage industry. As a result of the study, the ranking of the new product alternative is determined and represented to the firm.

Keywords: Intuitionistic, AHP, MOORA, new product selection.

1. Introduction

The firms should extend product portfolio and reach different types of consumer segments for gaining competitive advantage. In this context, placing the right product in the market is very important. When make a decision to meet a new product with the consumer, several criteria should be taken into consideration. Because of this, new product selection problem is a multi criteria decision-making problem. Some of these criteria may be cost type; some of them may be benefit type. In addition, evaluations about selection of new product are intangible and related to human judgment. These judgements consist of uncertainty because of linguistics terms. In this study, a new integrated intuitionistic fuzzy decision-making model is proposed for ranking new product alternatives for one of the biggest firm of the beverage industry. For modeling the uncertainty of the decision makers' judgments, intuitionistic fuzzy numbers are used. According to this model, criteria weights are computed by using Intuitionistic Fuzzy AHP (IFAHP) and considering these weights, ranking related to new product alternatives are determined by using Intiutionistic Fuzzy MOORA (IFMOORA).

2. Literature Review

There are limited number of study used IFAHP and IFMOORA in different decision-making problems. Recent studies among these are represented below.
Lazim and Liana (2014) implemented IFAHP method for energy technology selection. Pérez-Domínguez et al. (2015) proposed IFMOORA and performed it for supplier selection problem. Xu and Lio (2014) used IFAHP for global supplier development problem. As seen from the literature and to best of our knowledge there is no study integrated IFAHP and IFMOORA.

3. Hypotheses/Objectives

The aim of this study is to identify new product alternative by developing a new decision-making approach that can give result in uncertainty.

4. Research Design/Methodology

As a result of interview with experts who are authority on new product strategies, decision matrix related to criteria and alternatives are formed. Also, due to the different levels of authority of experts, their opinions are weighted in the proposed model. Some of the criteria for evaluation of new product alternative are benefit criteria, some of them are cost criteria. According to this, for computing these criteria' weights IFAHP is performed, for ranking new product alternatives IFMOORA is implemented.

5. Data/Model Analysis

There are four different new product alternatives evaluated by the firm. These are carbonated beverage, pure natural fruit juice, mineral water and herbal tea. For evaluation of these alternatives towards the literature review and experts opinions, five criteria are determined. Two of these criteria are benefit types the others are cost types. Cost criteria are investment cost, competitive conditions and sale price. Also benefits criteria are ease of raw material supply and consumer preferences. As result of proposed decision model, carbonated beverages are determined as the best alternative. The other alternatives recommended for investment to the firm are mineral water, herbal tea and pure natural fruit juice respectively.

6. Limitations

Proposed model consists of too much mathematical iteration. If the number of alternatives and criteria increase, operation time and amount of operation will increase.

7. Conclusions

Proposed decision model is different from the other decision models that can model uncertainty in terms of considering hesitation degree. In addition, there is no decision model that can analyze cost and benefit type criteria separately by using IFAHP. For this reason, IFMOORA Method is integrated in IFAHP method. It is thought that this proposed model may have many different application areas in real life problems.

8. Key References

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