Analysing Performance of Incubation Firms Using Fuzzy Multi-Criteria Decision Making Approaches

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Abstract

This research proposes a competency model to analyse the entrepreneurship ecosystem and assess the performance of incubation firms in Türkiye. A comprehensive field study is conducted across various incubation firms in the country, utilising a detailed survey to collect data from entrepreneurs. The survey addresses key dimensions of firm performance such as Custom-er, Technology, Research and Development (R&D), Competition, Investment, Marketing, Environment & Sustainability, Human Resources (HR) and Commercialisation. The survey responses are compiled into a database for performance analysis. Five experts perform pairwise evaluations to determine each dimension's relative importance. Based on their insights, the Fuzzy Analytic Hierarchy Process (FAHP) approach (Buckley's extension) is employed to assign weights to each decision criterion. The analysis identifies Commercialisation and R&D as the most critical, followed by Technology and Competition. Environment & Sustainability is given the least weight, as it is considered a secondary factor that supports overall performance. The WASPAS (Weighted Aggregated Sum Product Assessment) method is applied to evaluate and rank the performance of incubation firms. The study defines common characteristics of top-performing firms by comparing the rankings generated by these decision-making approaches. The analysis highlights that the Marmara Region, particularly Istanbul, is a key hub for high-performing incubation firms. Other regions demonstrate more limited entrepreneurial potential, indicating that regional differences significantly affect the concentration of entrepreneurial activities. Successful firms are predominantly concentrated in the software and information technology sectors. This analysis provides strategic insights to help entrepreneurs and supporting organisations enhance firm performance and entrepreneurship ecosystem.

Keywords: decision support system; ecosystem assessment; entrepreneurial firm; entrepreneurship; performance analysis