

## Designing a Model for Entrepreneurial Competency in Kashan's Machine-Made Carpet Supply Chain: A Mixed Approach

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### **Extended Abstract**

#### **Introduction**

The supply chain is recognized as a critical element for transferring goods from the supplier to the customer (Haque et al., 2023). The effective management of this chain yields numerous benefits, including better control over the production process and improved company economic performance (Hitajar, 2021). In this context, entrepreneurial competencies have gained attention as a key factor for developing supply chain capabilities. The mechanized carpet industry of Kashan, accounting for 10% of Iran's nonoil exports, has recently faced serious challenges, including a \$50 million decline in exports (Haqiqi, 2022). The COVID19 pandemic, as an exacerbating factor, has inflicted significant damage on this industry (Mazroui Nasrabadi et al., 2023). Given the regional economy's heavy reliance on this industry, focusing on entrepreneurial competencies is essential for crisis recovery. This study seeks to answer two main questions: first, identifying the entrepreneurial competencies within the supply chain of this industry, and second, delineating the Interpretive Structural Modeling (ISM) of relationships between these competencies. This endeavor can play an effective role in enhancing the capabilities of the supply chain in Kashan's mechanized carpet industry.

#### **Materials and Methods**

This research employed a mixed-method approach, conducted in two qualitative and quantitative phases. The statistical population in both phases consisted of experts from the supply chain of Kashan's mechanized carpet industry with a minimum of five years of experience, selected through purposive and snowball sampling. In the qualitative phase, data were collected through 13 semi-structured interviews, continuing until theoretical saturation was reached. The interview protocol was designed to cover all layers of the supply chain. To ensure data validity, triangulation (interviews, observation, and document analysis) was used. Reliability was confirmed by calculating an intercoder agreement of 87%. Data were analyzed using thematic analysis, leading to the extraction of codes, themes, and ultimately, the final competencies. In the quantitative phase, using the findings of the previous phase, a researcher-made questionnaire was designed, and its validity was confirmed by professors. This questionnaire was based on pairwise comparisons of the competencies.

Data from 10 experts were analyzed using the Interpretive Structural Modeling (ISM) method in five steps: forming the initial Self-Interaction Matrix (SIM), the initial reachability matrix, the final reachability matrix considering transitivity, factor leveling, and finally the drawing of the final model. A reliability condition of at least 60% expert agreement for each relationship was considered.

## **Results**

The findings were obtained from the analysis of interviews conducted with thirteen experts from Kashan's mechanized carpet industry. Interviews in the qualitative phase continued until the thirteenth participant after theoretical saturation was achieved in the tenth. The participants' profiles indicated their managerial positions in various supply chain sectors, including production, quality control, and spinning with work experience ranging from 7 to 31 years. The interview data were examined using thematic analysis and open coding. In the first stage, meaningful units were extracted from the interview texts and were initially coded. For instance, phrases like "pursuing development plans across all chain stages" and "aligning competitive strategies" were categorized under the theme of "Strategic Competency." Ultimately, 18 main categories were extracted from 51 initial codes, the most important of which included strategic competency, competency in using modern technology, interstage communicative competency, sales and marketing competency, and risk management competency. In the quantitative phase, the relationships between these competencies were analyzed using ISM. After forming the SSIM and converting it into the final reachability matrix, factor leveling was performed. The results indicated that the final model was structured at two levels. Level one variables included influential competencies such as strategic competency and modern supply chain management competency, which directly influenced other factors. These variables were identified as key levers for future interventions. Level two variables consisted of competencies influenced by the level one factors. This model provided a comprehensive view of the complex interactions among entrepreneurial competencies within the supply chain of Kashan's mechanized carpet industry.

## **Conclusion**

The analyses of findings revealed that 18 key competencies were extracted from interviews with the experts of Kashan carpet industry, which were positioned at two relational causal levels. These competencies aligned with well-known entrepreneurial components such as innovative orientation, risk-taking, and relational capital. Furthermore, two new competencies were identified at the supply chain level: "global level production," which emphasized adherence to international quality and environmental standards, and "effective returns management," which facilitated the smooth return of goods throughout the entire chain. To address existing disruptions, thus, adhering to the principles of strategic fit and strengthening collaborative models within the supply chain is recommended. Additionally, recruiting managers with characteristics such as risk-taking and analytical thinking along with improving the human resource management system through job fit and performance appraisal, are considered key factors in enhancing the entrepreneurial competencies of this industry.

**Keywords:** entrepreneurial competency, interpretive structural modeling (ISM), mechanized carpet, supply chain.