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Research Article

Prioritizing the Supply Chain of Small and Medium-Sized Enterprises in the Construction Industry Using Multi-Criteria Decision-Making Techniques

Abdoljavad Mansouri[1] **Ebrahim Niknaghsh**[2] **Shahram Bandpey**[3] **Ali Mehdizadeh Ashrafi**[4]

1. Ph.D. Candidate, Department of Industrial Management, Fi.C., Islamic Azad University, Firoozkooh, Iran, Email: ab.mansouri@iau.ac.com
2. Assistant Professor, Department of Industrial Management, Fi.C., Islamic Azad University, Firoozkooh, Iran Email: eniknaghsh@iaufb.ac.ir **(Corresponding Author)**
3. Assistant Professor, Department of Business Administration, Fi.C., Islamic Azad University, Firoozkooh, Iran Email: sh.bandpey@iau.ac.ir
4. Assistant Professor, Department of Public Administration, Fi.C., Islamic Azad University, Firoozkooh, Iran Email: a.mehdizadeh.a@iaufb.ac.ir, Iran

ABSTRACT

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Abstract:
Over the past two decades, global markets have undergone significant structural and qualitative transformations. The accelerating trends toward regionalization and globalization, alongside the transition from a production-centered to a customer-centric paradigm, have reshaped industrial dynamics. To optimize resource utilization and minimize waste, industrial producers have implemented strategies that have redefined industrial structures. A key feature of this evolution is the growing emphasis on small and medium-sized enterprises (SMEs). While large-scale industries still attract attention from policymakers due to economies of scale, scope, organizational capacity, and experience, SMEs have emerged as a competitive alternative, benefiting from advantages such as reduced transportation costs, regulatory flexibility, adaptability, and responsiveness to market demands. In recent years, even in advanced economies, the performance gaps have emerged within the industrial sector, with some SMEs outperforming their larger counterparts. This shift has renewed the discourse on optimal industry scale and highlighted the strategic role of SMEs in national economic development.This study aims to prioritize SMEs operating in the Tehran Industrial Park based on four critical criteria: independence from foreign resources, employment contribution, diversity of products and markets, and export share. Tehran Industrial Park is the only industrial zone beyond a 120-kilometer radius from the capital that is eligible to receive external resources, as stipulated in Iran's Fourth and Fifth Development Plans. Through an extensive literature review and expert consultation, relevant indicators were identified, and the prioritization was conducted using a Multi-Criteria Decision-Making (MCDM) technique. The expert panel consisted of professionals affiliated with the Industrial Parks Company. The results reveal the following prioritization:
1. Cement industry, 2. onstruction industry, 3. Chemical industry, 4. Food industry, 5. Automotive parts industry, 6. Electrical and electronics industry, 7. Wood industry

Keywords:
Small Industries, Resource Independence, Employment Share, Product and Market Diversity, Export Share and Multi-criteria Decision-making

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1. Introduction

Small industries have historically played a crucial role in industrial transformation. Alfred Marshall likened this process to "young trees in the forest that must struggle through the deadly shadow of their older competitors to reach the sunlight." Similarly, Mansfield emphasized the need to examine the dynamics within industrial structures, highlighting the lack of empirical studies on the birth, growth, and decline of industries. In 1971, the Bolton Commission in the United Kingdom underscored the transformative influence of new firms introducing innovative products, thereby challenging dominant players and contributing to the long-term vitality of the economy.

Despite the increasing shift toward flexible production technologies and away from large-scale, mass production, this transition has not led to the elimination of large industries. Rather, the global trend has been one of greater interaction and synergy between small and large enterprises. In this evolving context, the division of labor between the two has become complementary rather than competitive. This interdependence has fueled the growth of small and medium-sized enterprises (SMEs) across various economies.

Modern SMEs have become integral components of global supply chains and production networks, distinguished by their advanced technological capacities, specialized human capital, and agile management structures. The development of SMEs is now recognized as a strategic lever for national economic advancement. Studies have demonstrated their critical role in employment generation and income growth, particularly in the face of intensifying global competition, increased uncertainty, and rising demand for diversified products. World Bank research confirms that SMEs in developing countries have significantly contributed to employment creation and equitable income distribution, fostering inclusive economic growth.

Given national development objectives, such as poverty reduction, social equity, balanced regional growth, and economic self-reliance, it is imperative to adopt policies that support and strengthen the SME sector. Far from being instruments of rent-seeking, these enterprises are foundational to enhancing industrial competitiveness and addressing structural unemployment challenges.

SMEs can be credited with a range of economic benefits: equitable income distribution, job creation, acceleration of industrial development (particularly as suppliers or satellites to large industries), added value generation, promotion of investment culture, reduction in time-to-market, efficient capital utilization, and foreign exchange savings. Due to their compact organizational structure and employment of skilled labor, SMEs possess a high capacity to absorb and localize technology. In advanced economies, new technologies are often piloted in SMEs before being scaled to larger industries. Their smaller production scales also limit resource wastage in case of technological failure.

The global production landscape is increasingly knowledge-intensive and less capital-dependent. This trend is particularly evident in industrialized nations such as Germany, the United States, and Japan. SMEs, with their flexible and responsive organizational structures, are well-positioned to meet the evolving demands of this knowledge-driven industrial transformation. Iran is no exception. The expansion of design-engineering units, R&D facilities, and technology localization programs is more practically and efficiently achievable within the SME framework. Moreover, the centralized decision-making typically found in SMEs allows for rapid responses to market dynamics, thereby enhancing overall managerial agility and industry resilience.

2. Literature Review

In the countries examined, small and medium-sized enterprises (SMEs) are widely acknowledged as key economic drivers and have received considerable policy attention.

Although financial, technological, and managerial support for these enterprises has been implemented in many instances, less emphasis has historically been placed on their export potential during early policy development phases. Initially, SMEs in developing countries entered international markets independently, often exporting traditional, handcrafted, and user-friendly products. As these nations developed, more structured efforts were made to support SMEs in expanding and formalizing their export activities.

Export-oriented countries such as Taiwan and South Korea have established robust institutional frameworks dedicated to SME export development. In nearly all countries studied, domestic support for SMEs has generally taken precedence over export incentives. Countries with mature export sectors typically maintain specialized SME export organizations, while less developed exporters often integrate SME support within broader industry associations, such as chambers of commerce. For instance, SMEs in India, South Korea, and Taiwan operate through dedicated institutions, whereas in countries like Malaysia and Indonesia, they are grouped alongside larger firms within general industry bodies.

Currency policies have been integral to export promotion strategies, particularly for SMEs. In many countries, exporters are exempt from import duties and taxes when sourcing inputs, thereby facilitating easier access to materials and encouraging export activity. These foreign exchange policies represent a key incentive mechanism, enabling SMEs to expand operations by leveraging favorable import conditions.

Direct regulatory controls, such as strict currency controls, import quotas, and high tariffs, have played a minimal role in the SME support strategies of these countries. Instead, policies have tended to be indirect, market-oriented, and aimed at strengthening the role of the private sector. This hands-off regulatory environment has fostered a more dynamic and autonomous SME sector.

A common element among the successful case studies is the provision of economic overhead services to SMEs. These include export-related administrative services, market research, participation in international trade fairs, information dissemination, and, in some instances, direct managerial support. Despite their benefits, SMEs face persistent challenges including limited access to finance, small-scale production, a shortage of skilled labor, inadequate testing and certification infrastructure, and limited marketing and export capabilities.

Government support measures for SMEs typically span the following categories:

1. **Financial Support**: Given the limited financial capacity of SME owners, loan and credit programs are essential components of support mechanisms.
2. **Technology Promotion**: Some governments incentivize the adoption of modern technologies through legal provisions or loan schemes tied to machinery upgrades.
3. **Consulting Services**: Public institutions often provide free or subsidized consulting in management, finance, business planning, and marketing.
4. **Information Services**: These include market data, technical updates, and business intelligence to inform operational decisions.
5. **Scientific Collaboration**: Several countries have developed programs linking SMEs with research and academic institutions for knowledge transfer and capacity building.
6. **Regulatory Reforms**: Efforts to simplify the processes of business registration and exit have aimed to reduce market entry barriers and improve business resilience.

Experiences from countries such as Japan, South Korea, Malaysia, Thailand, Taiwan, and Indonesia demonstrate several key lessons:

- SMEs play a vital and expanding role in both advanced and newly industrialized economies.

- Dynamic SME ecosystems are instrumental in supporting globally competitive large industries.
- Technical, managerial, and informational support has proven more effective than financial subsidies alone.
- Export-oriented SMEs have demonstrated considerable success compared to those focused solely on domestic markets.
- Developing production networks and subcontracting relationships is critical for SME scalability and competitiveness.

A recurring insight across these nations is that the successful promotion of SMEs requires foundational macroeconomic reforms. Experts agree that without a supportive national economic structure, efforts to develop SMEs will be limited in their effectiveness. Once such conditions are in place, tailored policy frameworks and development strategies for SMEs become essential.

National SME strategies can be broadly categorized into two themes. In industrialized countries, policies focus on fostering healthy competition and correcting structural imbalances caused by dominant large enterprises. These strategies include:

1. **Financial Infrastructure Development**: Establishing specialized capital markets and credit institutions tailored for SMEs.
2. **Information Infrastructure Development**: Creating marketing and technical information networks for SMEs and subcontractors.
3. **Regulatory Support**: Enacting laws to streamline subcontracting relationships and ensuring timely payments to smaller contractors.
4. **Policy Integration and Data-Driven Planning**: Collecting SME-specific data and evaluating the outcomes of implemented policies.
5. **Supportive Institutions**: Facilitating the establishment of incubators, consulting centers, and SME-focused financial institutions.

Furthermore, key policy recommendations aimed at enhancing SME productivity include:

- Providing tax incentives for technology upgrades and workforce training.
- Supporting the establishment of intermediary organizations to deliver consulting and advisory services.

These findings underscore that while SMEs are structurally smaller, their impact on national development—through employment, innovation, and decentralization—is substantial. Designing policies that enhance their competitiveness and capacity remains a priority for sustainable industrial development.

3. Research Method

This study is applied in purpose, descriptive in terms of analytical approach, and employs a field survey method for data collection. Both library resources and field data were used, with primary data gathered through questionnaires distributed among managers and experts of the Tehran Industrial Estates Company.

Initial data were collected via field observations, literature review, and online sources. These data were then organized into a structured questionnaire to facilitate expert responses through pairwise comparisons and prioritization. In order to analyze the collected data effectively, the study employed group decision-making methods and the Analytic Hierarchy Process (AHP) technique to determine the relative importance of various factors.

3-1. Hierarchical Structure of Industry Prioritization

The evaluation framework of this study is structured hierarchically, as shown in Figure 4-1. At the top of the hierarchy is the overall goal: prioritizing small and medium-sized industries

with a focus on the construction sector. The second level comprises the key evaluation indicators identified based on literature review and expert consultations, including: (1) non-dependence on foreign resources, (2) employment share, (3) product and market diversity, and (4) industry export share. The third level includes the set of industries being evaluated.

This structured approach enables the use of the Analytic Hierarchy Process (AHP) to break down the complex decision-making process into manageable pairwise comparisons across different levels. The hierarchy facilitates systematic prioritization by aligning expert judgments with the defined criteria.

Table 1. Industry Evaluation Indices

row	Industry-related indicators
1	Non-dependence on foreign resources
2	Employment share of each industry
3	product diversity and market diversity
4	Contribution of each industry to exports

Figure 1 illustrates this multi-level hierarchy.

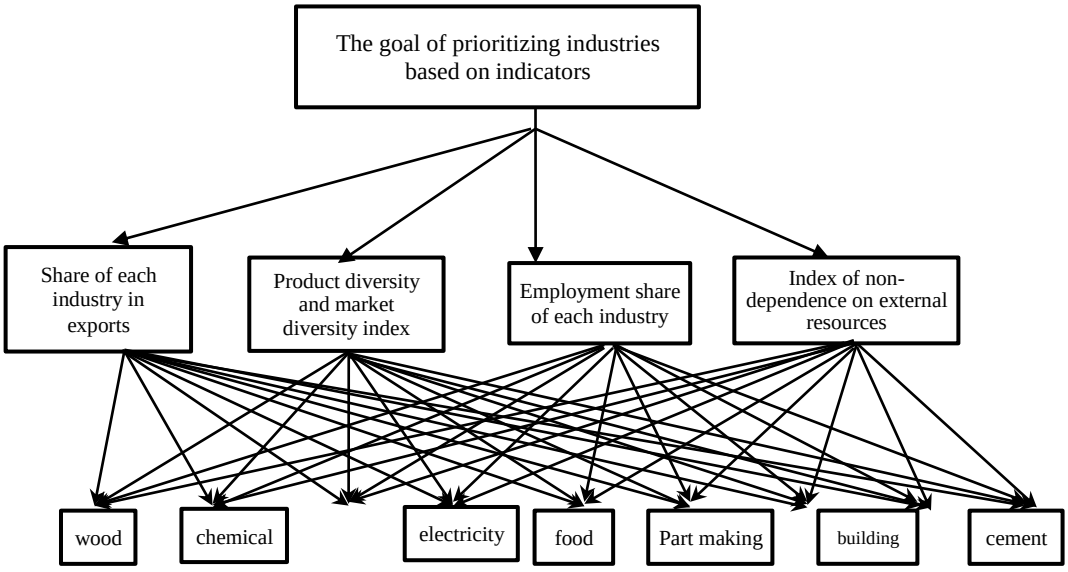

Figure 1. Hierarchical model of industry prioritization based on key indicators

3-2. Pairwise comparisons: Index of non-dependence on Foreign resources

Table 2. Pairwise Comparison Matrix: Non-dependence on Foreign Resources

Column to row priority	cement	construction industry	parts manufacturing	food industry	electrical industry	chemical industry	wood industry
Cement	---	14	13	12	14	11	14
Construction industries	1	---	14	11	14	10	13

Column to row priority	cement	constructio n industry	parts manufacturing	food industry	electrical industry	chemical industry	wood industry
Parts manufacturing	2	1	---	6	8	4	9
Food products	3	4	9	---	13	10	12
Electrical industry	1	1	7	2	---	3	6
Chemical industries	4	5	11	5	12	---	11
Wood industries	1	2	6	3	9	4	---

3-3. Pairwise Comparison: Employment Share Index

Table 3. Pairwise Comparison Matrix: Employment Share of Each Industry

Column to row priority	cement	construction industry	parts manufacturing	food industry	electrical industry	chemical industry	wood industry
Cement	---	11	11	12	13	10	13
Construction industries	4	---	9	10	11	11	14
Parts manufacturing	4	6	---	10	11	9	13
Food products	3	5	5	---	9	6	11
Electrical industry	2	4	4	6	---	5	8
Chemical industries	5	4	6	9	10	---	11
Wood industries	2	1	2	4	7	4	---

3-4. Pairwise Comparison: Product and Market Diversity Index

Table 4. Pairwise Comparison Matrix: Product and Market Diversity

Column to row priority	cement	construction industry	parts manufacturing	food industry	electrical industry	chemical industry	wood industry
Cement	---	4	3	2	4	1	6
Construction industries	11	---	7	6	11	6	11
Parts manufacturing	12	8	---	9	13	8	12
Food products	13	9	6	---	11	6	12

Column to row priority	cement	construction industry	parts manufacturing	food industry	electrical industry	chemical industry	wood industry
Electrical industry	11	4	2	4	---	3	10
Chemical industries	14	9	7	9	12	---	14
Wood industries	9	4	3	3	5	1	---

3-5. Pairwise Comparison: Industry Contribution to Exports

Table 5. Pairwise Comparison Matrix: Export Share of Each Industry

Column to row priority	cement	construction industry	parts manufacturing	food industry	electrical industry	chemical industry	wood industry
Cement	---	11	14	10	13	8	13
Construction industries	4	---	13	9	13	7	12
Parts manufacturing	1	2	---	4	9	3	10
Food products	5	6	11	---	10	6	12
Electrical industry	2	2	6	5	---	3	9
Chemical industries	7	8	12	9	12	---	13
Wood industries	2	3	5	3	6	2	---

3-6. Pairwise Comparison of the Main Indicators

Table 6. Pairwise Comparison Matrix of Industry Evaluation Indicators

Column to row priority	Index of non-dependence on foreign resources	Index of employment share of each industry	Index of product diversity and market diversity	Index of share of each industry in exports
Index of non-dependence on foreign resources	---	2	6	1
Index of employment share of each industry	13	---	11	9
Index of product diversity and market diversity	9	4	---	6
Index of share of each industry in exports	14	6	9	---

3-7. Weight Calculation of Each Industry Relative to the Main Indicators

The pairwise comparison matrices were normalized, and relative weights were calculated for each industry under each indicator using the eigenvector method. Below are the corresponding tables representing industry prioritization based on each index:

Table 7. Weights Based on Non-dependence on Foreign Resources

Column to row priority	cement	construction industry	parts manufacturing	food industry	electrical industry	chemical industry	wood industry
Cement	---	$\frac{14}{1}$	$\frac{13}{2}$	$\frac{12}{3}$	$\frac{14}{1}$	$\frac{11}{4}$	$\frac{14}{1}$
Construction industries	$\frac{1}{14}$	---	$\frac{14}{1}$	$\frac{11}{4}$	$\frac{14}{1}$	$\frac{10}{5}$	$\frac{13}{2}$
Parts manufacturing	$\frac{2}{13}$	$\frac{1}{14}$	---	$\frac{6}{9}$	$\frac{8}{7}$	$\frac{4}{11}$	$\frac{9}{6}$
Food products	$\frac{3}{12}$	$\frac{4}{11}$	$\frac{9}{6}$	---	$\frac{13}{2}$	$\frac{10}{5}$	$\frac{12}{3}$
Electrical industry	$\frac{1}{14}$	$\frac{1}{14}$	$\frac{7}{8}$	$\frac{2}{13}$	---	$\frac{3}{12}$	$\frac{6}{9}$
Chemical industries	$\frac{4}{11}$	$\frac{5}{10}$	$\frac{11}{4}$	$\frac{5}{10}$	$\frac{12}{3}$	---	$\frac{11}{4}$
Wood industries	$\frac{1}{14}$	$\frac{2}{13}$	$\frac{6}{9}$	$\frac{3}{12}$	$\frac{9}{6}$	$\frac{4}{11}$	---

Normalize:

$$W_1 = \sqrt[7]{\frac{14\times13\times12\times14\times11\times14}{1\times2\times3\times1\times4\times1}} = 1/099889717 \quad W_2 = \sqrt[7]{\frac{1\times14\times11\times14\times10\times13}{14\times1\times4\times1\times5\times2}} = 1/049757762$$

$$W_3 = \sqrt[7]{\frac{2\times1\times6\times8\times4\times9}{13\times14\times9\times7\times11\times6}} = 0/958772931 \quad W_4 = \sqrt[7]{\frac{3\times4\times9\times13\times10\times12}{12\times11\times6\times2\times5\times3}} = 1/015410915$$

$$W_5 = \sqrt[7]{\frac{1\times1\times7\times2\times3\times6}{14\times14\times8\times13\times12\times9}} = 0/931554987 \quad W_6 = \sqrt[7]{\frac{4\times5\times11\times5\times12\times11}{11\times10\times4\times10\times3\times4}} = 1/007934444$$

$$W_7 = \sqrt[7]{\frac{1\times2\times6\times3\times9\times4}{14\times13\times9\times12\times6\times11}} = 0/947456127$$

$$W_1 = 1/099889717 \div 7/010776883 = 0/156885568$$
$$W_2 = 1/049757762 \div 7/010776883 = 0/149734869$$
$$W_3 = 0/958772931 \div 7/010776883 = 0/136757016$$
$$W_4 = 1/015410915 \div 7/010776883 = 0/144835719$$
$$W_5 = 0/931554987 \div 7/010776883 = 0/132874716$$
$$W_6 = 1/007934444 \div 7/010776883 = 0/143769294$$
$$W_7 = 0/947456127 \div 7/010776883 = 0/135142815$$

Calculating the weight of industries relative to the employment share index of each industry

Table 8. Weights Based on Employment Share

Column to row priority	cement	construction industry	parts manufacturing	food industry	electrical industry	chemical industry	wood industry
Cement	---	$\frac{11}{4}$	$\frac{11}{4}$	$\frac{12}{3}$	$\frac{13}{2}$	$\frac{10}{5}$	$\frac{13}{2}$
Construction industries	$\frac{4}{11}$	---	$\frac{9}{6}$	$\frac{10}{5}$	$\frac{11}{4}$	$\frac{11}{4}$	$\frac{14}{1}$
Parts manufacturing	$\frac{4}{11}$	$\frac{6}{9}$	---	$\frac{10}{5}$	$\frac{11}{4}$	$\frac{9}{6}$	$\frac{13}{2}$
Food products	$\frac{3}{12}$	$\frac{5}{10}$	$\frac{5}{10}$	---	$\frac{9}{6}$	$\frac{6}{9}$	$\frac{11}{4}$
Electrical industry	$\frac{2}{13}$	$\frac{4}{11}$	$\frac{4}{11}$	$\frac{6}{9}$	---	$\frac{5}{10}$	$\frac{8}{7}$
Chemical industries	$\frac{5}{10}$	$\frac{4}{11}$	$\frac{6}{9}$	$\frac{9}{6}$	$\frac{10}{5}$	---	$\frac{11}{4}$
Wood industries	$\frac{2}{13}$	$\frac{1}{14}$	$\frac{2}{13}$	$\frac{4}{11}$	$\frac{7}{8}$	$\frac{4}{11}$	---

Normalize:

$$W_1=\sqrt[7]{\frac{11\times11\times12\times13\times10\times13}{4\times4\times3\times2\times5\times2}}=1/063216567\ W_2=\sqrt[7]{\frac{4\times9\times10\times11\times11\times14}{11\times6\times5\times4\times4\times1}}=1/037800061$$

$$W_3=\sqrt[7]{\frac{4\times6\times10\times11\times9\times13}{11\times9\times5\times4\times6\times2}}=1/002051823\ W_4=\sqrt[7]{\frac{3\times5\times5\times9\times6\times11}{12\times10\times10\times6\times9\times4}}=0/986336487$$

$$W_5=\sqrt[7]{\frac{2\times4\times4\times6\times5\times8}{13\times11\times11\times9\times10\times7}}=0/962742387\ W_6=\sqrt[7]{\frac{5\times4\times6\times9\times10\times11}{10\times11\times9\times6\times5\times4}}=1$$

$$W_7=\sqrt[7]{\frac{2\times1\times2\times4\times7\times4}{13\times14\times13\times11\times8\times11}}=0/935462684$$

$$\sum W=1/063216567+1/037800061+1/002051823+0/986336487+0/962742387+1+0/935462684=6/987610009$$

$$W_1=1/063216567\div6/987610009=0/152157399$$

$$W_2=1/037800061\div6/987610009=0/148520031$$

$$W_3=1/002051823\div6/987610009=0/143404085$$

$$W_4=0/986336487\div6/987610009=0/141155056$$

$$W_5=0/962742387\div6/987610009=0/137778494$$

$$W_6=1\div6/987610009=0/143110448$$

$$W_7=0/935462684\div6/987610009=0/133874996$$

Calculating the weight of industries relative to the product diversity and market diversity index

Table 9. Weights Based on Product and Market Diversity

Column to row priority	cement	construction industry	parts manufacturing	food industry	electrical industry	chemical industry	wood industry
Cement	---	$\frac{4}{11}$	$\frac{3}{12}$	$\frac{2}{13}$	$\frac{4}{11}$	$\frac{1}{14}$	$\frac{6}{9}$
Construction industries	$\frac{11}{4}$	---	$\frac{7}{8}$	$\frac{6}{9}$	$\frac{11}{4}$	$\frac{6}{9}$	$\frac{11}{4}$
Parts manufacturing	$\frac{12}{3}$	$\frac{8}{7}$	---	$\frac{9}{6}$	$\frac{13}{2}$	$\frac{8}{7}$	$\frac{12}{3}$
Food products	$\frac{13}{2}$	$\frac{9}{6}$	$\frac{6}{9}$	---	$\frac{11}{4}$	$\frac{6}{9}$	$\frac{12}{3}$
Electrical industry	$\frac{11}{4}$	$\frac{4}{11}$	$\frac{2}{13}$	$\frac{4}{11}$	---	$\frac{3}{12}$	$\frac{10}{5}$
Chemical industries	$\frac{14}{1}$	$\frac{9}{6}$	$\frac{7}{8}$	$\frac{9}{6}$	$\frac{12}{3}$	---	$\frac{14}{1}$
Wood industries	$\frac{9}{6}$	$\frac{4}{11}$	$\frac{3}{12}$	$\frac{3}{12}$	$\frac{5}{10}$	$\frac{1}{14}$	---

Normalize:

$$W_1=\sqrt[7]{\frac{4\times3\times2\times4\times1\times6}{11\times12\times13\times11\times14\times9}}=0/937024851\ W_2=\sqrt[7]{\frac{11\times7\times6\times11\times6\times11}{4\times8\times9\times4\times9\times4}}=0/998343218$$

$$W_3=\sqrt[7]{\frac{12\times8\times9\times13\times8\times12}{3\times7\times6\times2\times7\times3}}=1/042413219\ W_4=\sqrt[7]{\frac{13\times9\times6\times11\times6\times12}{2\times6\times9\times4\times9\times3}}=1/049757762$$

$$W_5=\sqrt[7]{\frac{11\times4\times2\times4\times3\times10}{4\times11\times13\times11\times12\times5}}=0/972444962\ W_6=\sqrt[7]{\frac{14\times9\times7\times9\times12\times14}{1\times6\times8\times6\times3\times1}}=1/059034743$$

$$W_7=\sqrt[7]{\frac{9\times4\times3\times3\times5\times1}{6\times11\times12\times12\times10\times14}}=0/948921565$$

$$\sum W=0/937024851+0/998343218+1/042413219+1/049757762+0/972444962+1/059034743+0/948921565=7/007940$$

$$W_1=0/937024851\div7/00794032=0/143404085$$

$$W_2=0/998343218\div7/00794032=0/1432458864$$

$$W_3=1/042413219\div7/00794032=0/148747445$$

$$W_4=1/049757762\div7/00794032=0/149795476$$

$$W_5=0/972444962\div7/00794032=0/138763305$$

$$W_6=1/059034743\div7/00794032=0/151119258$$

$$W_7=0/948921565\div7/00794032=0/135406627$$

Calculating the weight of industries relative to the index of each industry's share in exports

Table 10. Weights Based on Export Share

Column to row priority	cement	construction industry	parts manufacturing	food industry	electrical industry	chemical industry	wood industry
Cement	---	$\frac{11}{4}$	$\frac{14}{1}$	$\frac{10}{5}$	$\frac{13}{2}$	$\frac{8}{7}$	$\frac{13}{2}$
Construction industries	$\frac{4}{11}$	---	$\frac{13}{2}$	$\frac{9}{6}$	$\frac{13}{2}$	$\frac{7}{8}$	$\frac{12}{3}$
Parts manufacturing	$\frac{1}{14}$	$\frac{12}{3}$	---	$\frac{4}{11}$	$\frac{9}{6}$	$\frac{3}{12}$	$\frac{10}{5}$
Food products	$\frac{5}{10}$	$\frac{6}{9}$	$\frac{11}{4}$	---	$\frac{10}{5}$	$\frac{6}{9}$	$\frac{12}{3}$
Electrical industry	$\frac{2}{13}$	$\frac{2}{13}$	$\frac{6}{9}$	$\frac{5}{10}$	---	$\frac{3}{12}$	$\frac{9}{6}$
Chemical industries	$\frac{7}{8}$	$\frac{8}{7}$	$\frac{12}{3}$	$\frac{9}{6}$	$\frac{12}{3}$	---	$\frac{13}{2}$
Wood industries	$\frac{2}{13}$	$\frac{3}{12}$	$\frac{5}{10}$	$\frac{3}{12}$	$\frac{6}{9}$	$\frac{2}{13}$	---

Normalize:

$$W_1 = \sqrt[7]{\frac{11\times14\times10\times13\times8\times13}{4\times1\times5\times2\times7\times2}} = 1/066333473 \quad W_2 = \sqrt[7]{\frac{4\times13\times9\times13\times7\times12}{11\times2\times6\times2\times8\times3}} = 1/034893666$$

$$W_3 = \sqrt[7]{\frac{1\times12\times4\times9\times3\times10}{14\times3\times11\times6\times12\times5}} = 0/980259585 \quad W_4 = \sqrt[7]{\frac{5\times6\times11\times10\times6\times12}{10\times9\times4\times5\times9\times3}} = 1/01247534$$

$$W_5 = \sqrt[7]{\frac{2\times2\times6\times5\times3\times9}{13\times13\times9\times10\times12\times6}} = 0/955526725 \quad W_6 = \sqrt[7]{\frac{7\times8\times12\times9\times12\times13}{8\times7\times3\times6\times3\times2}} = 1/040240566$$

$$W_7 = \sqrt[7]{\frac{2\times3\times5\times3\times6\times2}{13\times12\times10\times12\times9\times13}} = 0/942244327$$

$$\sum W = 1/066333473 + 1/034893666 + 0/980259585 + 1/01247534 + 0/955526725 + 1/040240566 + 0/942244327 = 7/0319736$$

$$W_1 = 1/066333473 \div 7/031973646 = 0/151640709$$

$$W_2 = 1/034893666 \div 7/031973646 = 0/14716973$$

$$W_3 = 0/980259585 \div 7/031973646 = 0/139400349$$

$$W_4 = 1/01247534 \div 7/031973646 = 0/143981674$$

$$W_5 = 0/955526725 \div 7/031973646 = 0/135883149$$

$$W_6 = 1/040240566 \div 7/031973646 = 0/1479301$$

$$W_7 = 0/942244327 \div 7/031973646 = 0/133994291$$

3-8. Weight Calculation of the Indicators Themselves

Table 11. Pairwise Comparison Matrix of the Main Indicators

Column to row priority	Index of non-dependence on foreign resources	Index of employment share of each industry	Index of product diversity and market diversity	Index of share of each industry in exports
Index of non-dependence on foreign resources	---	$\frac{2}{13}$	$\frac{6}{9}$	$\frac{1}{14}$
Index of employment share of each industry	$\frac{13}{2}$	---	$\frac{11}{4}$	$\frac{9}{6}$
Index of product diversity and market diversity	$\frac{9}{6}$	$\frac{4}{11}$	---	$\frac{6}{9}$
Index of share of each industry in exports	$\frac{14}{1}$	$\frac{6}{9}$	$\frac{9}{6}$	---

This matrix was similarly normalized, and the priority weights of each index were calculated to determine their relative importance in the final decision-making process:

$$W_1 = \sqrt[7]{\frac{2\times6\times1}{13\times9\times14}} = 0/962319477 \quad W_2 = \sqrt[7]{\frac{13\times11\times9}{2\times4\times6}} = 1/026027226$$

$$W_3 = \sqrt[7]{\frac{9\times4\times6}{6\times11\times9}} = 0/992128015 \quad W_4 = \sqrt[7]{\frac{14\times6\times9}{1\times9\times6}} = 1/020831647$$

$$\sum W = 0/962319477 + 1/026027226 + 0/992128015 + 1/020831647 = 4/001306365$$

$$W_1 = 0/962319477 \div 4/001306365 = 0/240501323$$

$$W_2 = 1/026027226 \div 4/001306365 = 0/256423061$$

$$W_3 = 0/992128015 \div 4/001306365 = 0/247951025$$

$$W_4 = 1/020831647 \div 4/001306365 = 0/25512459$$

3-9. Final Aggregated Weight of Each Industry

The final priority of each industry was computed by aggregating the industry weights under each indicator, weighted by the relative importance of the indicators. The results are summarized below:

Table 12. Final weight of each industries

Final Weight	industry
$(0/156885568\times0/240501323)+(0/152157399\times0/256423061)+(0/143404085\times0/247951025)+(0/151640709\times0/25512459)=0/150992314$	Cement Industry
$(0/149734869\times0/240501323)+(0/148520031\times0/256423061)+(0/1432458864\times0/247951025)+(0/14716973\times0/25512459)=0/147159975$	Construction Industry
$(0/136757016\times0/240501323)+(0/143404085\times0/256423061)+(0/148747445\times0/247951025)+(0/139400349\times0/25512459)=0/142108894$	Parts Manufacturing Industry

Final Weight	industry
$(0/144835719\times0/240501323)+(0/141155056\times0/256423061)+(0/149795476\times0/247951025)+(0/143981674\times0/25512459)=0/144903825$	Food Industry
$(0/132874716\times0/240501323)+(0/137778494\times0/256423061)+(0/138763305\times0/247951025)+(0/135883149\times0/25512459)=0/136359762$	Electrical and Electronics
$(0/143769294\times0/240501323)+(0/143110448\times0/256423061)+(0/151119258\times0/247951025)+(0/1479301\times0/25512459)=0/146484304$	Chemical Industry
$(0/135142815\times0/240501323)+(0/133874996\times0/256423061)+(0/135406627\times0/247951025)+(0/133994291\times0/25512459)=0/13459011$	Wood Industry

4. Conclusion

Given the country's current economic conditions, the emphasis on national and resistance economy policies, and the need to optimize the use of national capital, industry prioritization has become an essential concern. This study aimed to identify the most suitable investment options by prioritizing key industries based on multiple criteria.

Using the Analytic Hierarchy Process (AHP) and relying on expert judgments from 15 specialists in the field of small and medium-sized industries, the following four main criteria were considered in the prioritization process:

- Non-dependence on foreign resources,
- Employment share of each industry,
- Product and market diversity,
- Export share of each industry.

The results of the AHP analysis yielded the final prioritization of industries, as presented in Table 13.

Table 13. Final prioritization of industries based on AHP results

Ranking	Indusrty Category	Normalized weight
1	Cement Industry	0/150992314
2	Construction Industry	0/147159975
3	Chemical Industry	0/146484304
4	Food Industry	0/144903825
5	Parts Manufacturing Industry	0/142108894
6	Electrical and Electronics Industry	0/136359762
7	Wood Industry	0/13459011

As shown in Table 13, the **cement industry** ranks first in terms of investment priority. This is attributed to the presence of two major cement factories in the region, availability of raw materials, and proximity to the Tehran metropolitan area as a large consumer market.

The **construction industry** ranks second. It benefits from abundant mineral resources, a readily available workforce, and ease of access to expanding urban areas around Tehran, which enhances its market reach.

The **chemical industry** is ranked third. Despite its higher complexity, this sector offers a significant contribution to employment and exhibits substantial product and market diversity, making it a strong candidate for investment.

The **food industry** holds the fourth position. While its employment share is relatively low due to mechanization, its closeness to the consumer market is a key advantage.

The **parts manufacturing**, **electrical and electronics**, and **wood industries** are ranked fifth to seventh, respectively. Their lower rankings are primarily due to their limited contributions to employment and exports, indicating weaker performance in critical strategic dimensions.

In conclusion, the findings provide valuable insights for policymakers and investors in directing capital toward industries with the highest strategic and economic returns under current national priorities.

5. Managerial Implications

Considering the prioritization results of industries based on key economic indicators and expert opinions, several practical implications can be drawn for industrial managers, investors, and policymakers:

1. **Strategic Investment Focus:**
   The cement industry, as the top priority, offers a promising opportunity for investment due to its abundant resources, existing production facilities, and proximity to major markets such as Tehran. Managers should focus on expanding capacities and improving technologies in this sector to maximize economic returns.
2. **Leveraging Regional Advantages:**
   The construction industry ranks second because of its access to mineral resources, skilled labor, and a growing demand fueled by urban development. Policymakers should support infrastructure development and workforce training programs to enhance the industry's competitiveness.
3. **Employment and Market Diversification:**
   Chemical industries hold a significant place due to their high employment share and diverse market applications. Encouraging innovation and export-oriented policies in this sector can stimulate economic growth and job creation.
4. **Supporting Mechanized Sectors:**
   The food industry, despite its lower employment share caused by mechanization, benefits from proximity to consumer markets. Targeted support for technological advancements and supply chain optimization can strengthen this industry's market position.
5. **Addressing Weaker Sectors:**
   The parts manufacturing, electrical and electronics, and wood industries currently hold lower priorities mainly due to their limited employment share and export performance. Strategic interventions such as investment incentives, skill development, and market expansion efforts are necessary to boost their competitiveness.

Overall, this prioritization provides a roadmap for allocating national capital effectively, supporting economic resilience, and guiding sustainable industrial development aligned with national goals.

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