Prioritizing and Economic Performance Evaluation of the Free Zones in Iran Using Taxonomy Method

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Abstract

Objective: Since 1989, seven free trade and industrial zones (Kish, Qeshm, Chabahar, Aras, Arvand, Anzali and Maku) have been developed in Iran for increasing the national economy competitiveness, removing deprivation, attracting domestic and foreign capitals, creating new job opportunities, gaining advanced technology, presence in regional markets and increased exports. The purpose of the study was to examine the performance of seven free zones according to the goals defined in each zone constitution. **Method:** Numerical and weighted taxonomies (weighted using Shannon's Entropy) were used to evaluate the performance and prioritize the zones during from 2013 to 2018. **Results:** The examinations of the study showed that Maku Free Zone is in the first priority and at the developed level but the other areas are in the least developed regions. The regions should use their stagnant capacities to develop. Arvand needs to increase exports, attract foreign investors and tourists to reach development. Aras zone can develop by decreasing imports and increasing transit and export. Moreover, Chabahar could reach the development stage by increasing transit and export and Qeshm by decreasing imports and increasing foreign investment. **Results:** Finally, the results showed that except Maku Free Zone, other areas did not have acceptable performance regarding the defined goals.

Keywords: Free trade and industrial zone, taxonomy, Shannon's Entropy, development

INTRODUCTION

Many countries around the world - whether with a free economy or with a state-owned one - try to move their economy towards a free economy to expand their relationship with outside world to increase their share of trade. One of the ways to trade with the world is to create free zones. Nowadays, using free zone mechanism is not only for countries whose economies are shifting from a state to a free, to link and connect with the world economy to gain a greater share of the world economy. However, developed free economies use free zone mechanism. Free zone is a place of a country outside the physical, legal and administrative boundaries of customs facilities. The inflow and outflow of capital, profits, and the shifting of skilled labor is easy in the free zones. Non-prohibited foreign goods and materials can be transformed into warehouses or factories in these areas without no custom fees or transit barriers and converted to other goods [1]. The purpose of developing free zones in many world countries is to create employment, export development, attract and encourage foreign capital, generate foreign exchange earnings, transfer technology, regional development and set up exhibitions. The countries do not use free zones just to enter the international arena. Macro-level policymaking cannot be implemented in free zones given the uncertainty about results and if the results are favorable, policymaking is implemented throughout the society. Establishing free zones in Iran has started since 1955.

Nonetheless, the establishment of the first free zone according to Note 19 and 20 of the First Development Plan Act was in 1989. Since 1989, seven free trade and industrial zones, including Chabahar, Qeshm, Kish, Aras, Maku, Arvand and Anzali have been established for producing and exporting industrial and convertible goods, presence in the global and regional markets, accelerating infrastructure work, development and prosperity, economic development, economic growth and development, investment and raising public income, creating healthy and productive employment, regulating the labor and commodity market, active presence in industrial and exchange goods, and providing public

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services in the country. Each of these zones has had performance and feedback since its inception, so the study prioritizes and evaluates the performance of free zones according to the goals stated in their statutes.

First, the theoretical and empirical background is discussed, then the background of the establishment of free zones in Iran and the goals of these zones are discussed, followed by the research methodology and indices used. Finally, prioritizing and concluding the findings using taxonomy method is done.

Theoretical Literature

From the formation of commercial free zones up to now (almost four decades later) economists and scholars have done many analyses and opinions on free trade and the creation of free zones. The field of these studies in economics can be found in the field of economics, international trade and economic development.

To international trade theory, different theories have been presented about international trade based on the establishment of trade, the way in which trade is used, and how countries benefit from international trade. The base of these theories comes from the theories of classical and neoclassical economics. The classical economy was based on business freedom, private ownership, and competition. Neoclassical economists consider foreign trade as a source of competition, innovation, product quality, and economic mobility [2].

With the theory of comparative advantage in international trade, David Riccardo studied the framework of the theory of labor value between two countries and two commodities. According to Ricardo's law of comparative advantage, a country that does not even have an absolute advantage in the production of any commodity can trade and benefit from other countries by having a comparative advantage in the production of commodities.

Concerning economic development, there are three types of strategies that can be defined in terms of international trade:

A. Adopting foreign development-driven trade strategy: In the 50's and 60's, many developing countries have turned to industrialization. They had concluded that while specializing in the production and export of raw materials maximizes their welfare in the short term, but they are stopped from the benefits of long-term industrialization like workforce training, innovation and income, and thus more employment. Thus, the countries started foreign trade with each other after the world war [3].

B. Inward-looking strategy (import substitute): During World War I and the recession of the 1930s, the import of industrial goods to developing countries faced difficulties. In some cases it was impossible to import. On the one hand, the foreign exchange earnings of developing countries were reduced by the export of raw materials, on the other hand, it was impossible to export industrial goods produced by developed countries involved in the war. These conditions made the developing countries adopt an import substitution strategy for their economic development between the two world wars until the early 1960s. The substitute strategy of importing means to satisfy the needs of the domestic market with domestic products that over time substitute domestic imports [4].

C. Outsourcing (export development) strategy: In the 1970s, economic development problems in developing countries caused by the substitution strategy of importing economic theories, considering exports as the cause of economic growth and development. Opposed to the import substitution of an outward-looking economy, this attitude recommended free trade, the use of comparative advantage, and the integration of the economies of developing countries into the international economy. One of the measures taken to promote exports was the creation of free industrial zones [1].

Experimental literature

In spite of the significance of free zones for the country, unfortunately not many studies have been conducted in this regard. However, Table 1 lists some of the domestic and foreign studies in this regard.

Table 1: The Studies on Free Zones

References	Goal	Technique	Results
[5]	Performance of export processing areas: Comparative Analysis and Analysis of India, Sri Lanka and Bangladesh	Econometric models	Factors like location, infrastructure, government quality, privilege policy, and specific characteristics of each region have a direct effect on the performance of each of these regions.
[6]	Analysis of the comparison of free zone policies in Taiwan and Korea based on the inland port area	Econometric models	The existing capacity in Taiwan seriously faces a land shortage problem, which needs a revised plan and the construction of a section of the port's interior

[7]	Evaluation of port free zones in Taiwan	Descriptive-qualitative writing style	For the port free zone to function properly, management must be segregated in the port, and this is recognized as a vital role
[8]	The development of special zones and industrial parks in Russia	Industrial clusters	The government approach to development is to strongly intervene in business activities, stopping the competitive and participatory behavior of companies in these areas
[9]	Evaluating and prioritizing Iran free trade zones using multi-criteria approach	Multivariate decision making method	Kish Free Zone has the highest ranking, followed by Qeshm and Chabahar
[10]	Performance of Iran industrial free trade zones in the first four years of the Fourth Development Plan	Descriptive-qualitative writing style	The performance of free zones is far from their main goals and objectives
[11]	Eamining the performance of Iran free trade-industrial zones in attracting foreign direct investment compared to special economic zones	Descriptive-qualitative writing style	The mean state of the factors that affect the attraction of foreign direct investment, the mean incentive and supportive factors of free zones, mean factors of economic structure affecting FDI flow of free zones, the mean economic policy factors of free zones and the mean geographical and political factors of free zones in China is above average and average in Iran
[12]	Evaluation of the performance of Anzali industrial free trade zones with emphasis on economic dimensions (Case study: Anzali port free zone)	Delphi method by considering the opinions of the experts of the country's free zones organization	Out of the 11 economic indices examined, six indices - employment, export, domestic investment, science and technology parks, local expert recruitment and raw material processing - have had appropriate and effective performance, respectively, and other indices of poor performance.
[13]	Evaluation of Tourism Development Capacities in Free Zones: (Case Study of Chabahar Free Zone)	A description of correlation type	Given the lack of a sociocultural, and tourism planning system, Chabahar Free Zone requires reviewing and proposing appropriate policies like advertising and promoting the right image of Chabahar as a tourist and investment area in welfare departments
[14]	Comparative study of the barriers to investment and conditions in the free zones of Iran with the free zones of China and the UAE	A comparative study	The lack of basic and advanced infrastructure, lack of legal explicitness and restrictions in attracting foreign investors have caused differences between the free zones between Iran, China and the UAE.

History and objectives of creating free zones in Iran

The history of establishing free trade and industrial zones in Iran dates back to 1951. In those years, establishing the first free ports and islands was set forth given the problems like the lack of port facilities and the equipment required to hold goods in the South in commercial and freight ports, but the plan to establish free zones was not approved by experts. In 1961, the plan to create a free port and islands was rejected by economic experts for scientific and practical reasons. Nonetheless, establishing the free customs warehouses at the entrance and customs points of the country became the focus [15].

After the Islamic Revolution, a serious discussion of the development of non-oil exports arose in 1989 alongside formulating the first development plan in parliament. Experts predicted that in the first five years of the economic, social, and so on non-oil export program, it would reach $ 17.6 billion, which was ultimately one of the tools to reach this goal, creating free zones. Time was allowed to establish free trade and industrial zones in the three border areas and finally three free trade zones were established in Kish (1989), Qeshm (1990) and Chabahar (1991) [1].

With the establishment of the High Council of Free Zones in the summer of 1992, the law on the administration of the free zones was adopted in September 1993. According to this law, the goals of the free zones besides the production and export of industrial and convertible goods were global and regional markets, the accelerated production and export of

infrastructure, civil and economic development, economic growth and development, investment and increased public revenue, healthy and productive employment, labor and commodity market regulation, public service provision were considered [9]. Then the establishment of four other free zones - Bandar Anzali (2003), Aras (2003), Arvand (2004) and Maku (2010) - was approved by the Islamic Consultative Assembly and began their work with the same goals.

METHODOLOGY

Taxonomy method was used in two ways (without applying weight and weighting by Shannon's Entropy) to evaluate the performance and ranking of free zones. The study was survey-applied and population was the seven free trade and industrial zones (Kish, Qeshm, Chabahar, Aras, Arvand, Anzali and Maku) in Iran. As Maku Free Zone started its work in 2013, the statistical data were collected from 2013 to 2018 by means of documents, libraries and frequent visits to the Free Zone Secretariat.

As one of the most popular methods for ranking zones is the numerical taxonomy method, based on which a set of points, locations, and cases in general is subdivided into more or less homogeneous subdivisions, and an acceptable scale to evaluate and measure the development of the area. This method was introduced in 1763 by Adelson. In the early 1950s, it was developed by a group of Polish mathematicians [16]. The introduction to numerical taxonomy is presented below. The steps are summarized in Table 2.

Table 2: Stages of numerical taxonomy (without weight)

Stages titles	The formula for the relevant steps	Explanation
1. Forming a decision matrix	-	A matrix of data based on activities and indices in m.n dimensions
2. Forming a standard matrix	$Z_{ij} = \dfrac{x_{ij} - \bar{x}_i}{s_i}$	To eliminate heterogeneity, unify the units and scales and eliminate the effect of the origin
3. Forming a composite distance matrix	$d_{ab} = \sqrt{\sum_{j=1}^{m}(z_{aj} - z_{bj})^2}$	The amount of difference or distance between two points for each m index
4. Determining the shortest distances and homogeneous activities	$D(\pm) = \bar{d} \pm 2s_j$	Maximum similarity or homogeneity between two activities if the minimum distance between activities a and b
5. Ranking homogeneous activities	$C_{io} = \sqrt{\sum(Z_i - Z_o)^2}$	Considering the ideal values of the standard matrix for one of the indices, assuming that the weight is the same and the importance of the indices
6. Wealth degree	$f_i = \dfrac{C_{io}}{C_o}$ & $C_o = \bar{C} + 2S_{cio}$	Final ranking

As seen in Taxonomy, all indices are considered to be of equal weight and significance, but in fact the indices are of particular weight and importance relative to each other. Weighing the indices was done by various methods like Shannon's Entropy, least squares method, AHP method and approximate methods. If the decision matrix is available, the decision maker tries to weight it using Shannon's Entropy [17].

As the decision matrix is available quantitatively, we used Shannon's Entropy. The only difference between taxonomy and weight is in the ranking of homogenous activities. This section deals with how to weight the indices using Shannon's Entropy (calculating the entropy rate, degree of deviation and weight of each index) and the ranking stage of homogeneous activities with weight application are Listed in Table 3.

Table 3: The steps of calculating Shannon's Entropy method

Stages titles	The formula for the relevant steps	Explanation
1. Calculating the entropy	$E_j = -k \sum_{i=1}^{m}[p_{ij} \ln p_{ij}]; \forall_j$	Entropy calculation of work units in relation to indices
2. Degree of deviation of each index	$d_j = 1 - E_j; \forall_j$	The degree of deviation provides a degree of confidence in the decision maker
3. The weight of each index	$w_j = \dfrac{d_j}{\sum_{j=1}^{n} d_j}; \forall_j$	Shannon's Entropy method gives more weight to the indices with the highest degree of deviation.

4. Ranking homogeneous activities

$$c_{io} = \sqrt{W_i \sum (Z_i - Z_o)^2}$$

Ranking homogeneous activities by applying weight

RESULTS

Given the necessity, it is important to examine the performance indices of free zones according to the goals set in their statutes. As various factors affect the economic performance of free trade and industrial zones, 19 performance indices were developed and evaluated in accordance with the goals of the Free Zones contained in the Free Zones Statute. A decision matrix was constructed for seven free zones and twenty performance indices to rank and to evaluate the performance of free zones using numerical taxonomy. As the data are for 6 years, the decision matrix is compiled for each year and analyzed separately. As all stages of taxonomy are the same for all years, only one year (2013) was studied and only results were reported for other years. The first step in the taxonomy process is forming decision-making matrix whose corresponding matrix for 2013 is presented in Table 4.

Table 4: Decision Matrix (2013)

Maku	Anzali	Arvand	Aras	Chabahar	Qeshm	Kish	Zones
1392	1392	1392	1392	1392	1392	1392	**Year**
1/719298	1/642316	1/1343116	0/957239	1/361534	1/3068313	1/0177560	Operating income / costs and expenses
5/521127	4/112283	1/926437	2/245749	2/328931	1/894659	2/237374	Operating income / infrastructure
606/8111	255/2353	406/83918	1502/166	94/31238	135/04495	744/54066	Operating income / domestic investment
1795/665	894/8261	348/21903	1760/904	81/57389	179/80991	240/96385	Tourism / Domestic investment
5/087719	5/757775	0/9708723	1/122117	1/177636	1/5353739	0/3293875	Tourism / Costs and expenses
16/33803	14/4172	1/648863	2/632564	2/014369	2/226003	0/724106	Tourism / Infrastructure
0/000035	0	0/00000074	0/00001750	0/0000115	0	0	Foreign investment / cost and expenses
0/000113	0	0/00000126	0/0000411	0/0000197	0	0	Foreign investment / infrastructure
0/012383	0	0/0002658	0/027463	0/000799	0	0	Foreign investment / domestic investment
0	0/010602	0/0005316	0/450726	0	0/0042383	0/0007530	Transit / domestic investment
0	0/0000682	0/00000148	0/000287	0	0/0000361	0/00000102	Transit / Expenses
0	0/000171	0/00000252	0/000674	0	0/0000525	0/00000226	Transit / Infrastructure
0	0/135135	4/5454545	0/544303	0/051546	0/0842105	0/0697674	import / export
0	0/002120	0/0132908	0/069466	0/002399	0/0051374	0/0073418	Export / domestic investment
0	0/000013	0/000037	0/000044	0/000034	0/0000438	0/00001003	Export / Expenditure
0	0/0000342	0/0000629	0/000104	0/0000592	0/0000636	0/0000221	Export / Infrastructure
0/928792	1/789228	0/3487506	1/966074	0/223928	0/7731826	0/1767695	Employment / internal investment
0/002631	0/011512	0/000972	0/001252	0/003232	0/0066021	0/0002416	Employment / cost and expenses
0/008451	0/028828	0/001651	0/002939	0/00553	0/009572	0/000531	Employment / Infrastructure

For the analysis, the information of the zones is collected as a decision matrix, so that the decision matrix rows correspond to the free zone week and its columns are 19 performance indices. Next, we standardized the decision matrix in accordance with Table 2. The results of standardization of the decision matrix are given in Table 5.

Table 5: Standard matrix

Maku	Anzali	Arvand	Aras	Chabahar	Qeshm	Kish	Zones
1/403	1/142	-0/581	-1/181	0/189	0/004	-0/976	Operating income / domestic investment
1/897	0/879	-0/701	-0/469	-0/409	-0/722	-0/475	Operating income / domestic investment
0/142	-0/580	-0/268	1/983	-0/911	-0/790	0/425	Operating income / domestic investment
1/393	0/184	-0/549	1/347	-0/907	-0/775	-0/693	Foreign investment / domestic investment
1/284	1/591	-0/600	-0/531	-0/506	-0/342	-0/894	Foreign investment / domestic investment
1/597	1/308	-0/611	-0/463	-0/556	-0/524	-0/751	Foreign investment / domestic investment
1/933	-0/694	-0/639	0/616	0/170	-0/694	-0/694	Foreign investment / domestic investment
2/105	-0/599	-0/569	0/386	-0/125	-0/599	-0/599	Foreign investment / domestic investment
0/619	-0/553	-0/528	2/047	-0/477	-0/553	-0/553	Foreign investment / domestic investment
-0/393	-0/331	-0/390	2/267	-0/393	-0/368	-0/389	Transit / domestic investment
-0/535	0/113	-0/521	2/197	-0/535	-0/191	-0/525	Transit / Expenses and costs
-0/518	0/169	-0/508	2/195	-0/518	-0/307	-0/509	Transit / Infrastructure
-0/463	-0/383	2/254	-0/138	-0/433	-0/413	-0/422	Import / export
-0/576	-0/490	-0/038	2/232	-0/479	-0/368	-0/279	Export / domestic investment
-1/460	-0/700	0/603	1/005	0/469	0/983	-0/901	Export / Expenditure
-1/461	-0/451	0/399	1/609	0/291	0/419	-0/808	Export / Infrastructure
0/057	1/230	-0/733	1/471	-0/903	-0/154	-0/968	Employment / Internal investment
-0/286	1/932	-0/700	-0/630	-0/136	0/705	-0/883	Employment / cost and expenses
0/024	2/126	-0/676	-0/544	-0/276	0/140	-0/792	Employment / Infrastructure

The purpose of standardizing the decision matrix is to eliminate the heterogeneity and uniformity of units and scales. Thus, in Table 5, the decision matrices have the same unit and scale. The next step is to form a composite interval matrix to calculate the magnitude or difference of two points for each index m. According to steps 3 and 4 in Table 2, composite intervals, shortest intervals and homogeneous activities are calculated with the results shown in Table 6.

Table 6: Compound distance matrix

	Kish	Qeshm	Chabahar	Aras	Arvand	Anzali	Maku	Least interval
Kish	0	3/021	1/989	4/685	3/324	4/636	1/704	1/704
Qeshm	3/021	0	1/318	3/627	3/217	3/313	3/255	1/318
Chabahar	1/989	1/318	0	3/927	2/82	4/066	2/8	1/318
Aras	4/685	3/627	3/927	0	4/171	5/328	5/093	3/627
Arvand	3/324	3/217	2/82	4/171	0	5/313	4/085	2/82

Anzali	4/636	3/313	4/066	5/328	5/313	0	3/511	3/313
Maku	1/704	3/255	2/8	5/093	4/085	3/511	0	1/704
	High limit	D(+)=4.204						
	Low limit	D(+)=0.311						

According to Table 6, it is seen that the minimum distances are between the upper and lower limits, so all zones are homogeneous. Thus, the operation can continue. Homogeneous activities are ranked after homogeneous areas are identified. In this section, assuming the same importance and weight of the indices, the composite value of the ideal point for each of the indices is calculated according to the relation 5 and degree of each free zone using the relation 6 according to Table 2 and the results of calculation of compound distance and degree of ownership for 2013 is given in Table 7.

Table 7: Compound distance and degree of wealth Degree

	Compound distance	Degree of wealth
Kish	10/86	0/915
Qeshm	9/631	0/811
Chabahar	9/909	0/835
Aras	6/72	0/566
Arvand	9/891	0/833
Anzali	8/185	0/689
Maku	8/34	0/702

In the wealth table, zones close to zero are ranked as top performing areas. The degree of ownership shows the degree of development of the zones. According to Table 7, Aras Free Zone is in the first rank and has the favorable performance. Other areas - Maku, Anzali, Chabahar, Qeshm, Arvand, and Kish - are in second to seven rank respectively. In terms of development, Aras was in the developed, Anzali and Maku in less developed ones and the others are undeveloped or retarded. Performance evaluation and prioritization for all year reviews and survey results are presented in Table 8.

Table 8: Free zones priority (No weight applied)

	2013	2014	2015	2016	2017	2018
Kish	0/915	0/949	0/905	0/903	0/957	0/891
Qeshm	0/811	0/705	0/774	0/858	0/863	0/823
Chabahar	0/835	0/82	0/676	0/599	0/693	0/862
Aras	0/566	0/712	0/753	0/757	0/854	0/73
Arvand	0/833	0/601	0/92	0/856	0/847	0/725
Anzali	0/689	0/804	0/696	0/727	0/769	0/637
Maku	0/702	0/573	0/589	0/617	0/717	0/53

By examining the performance of the zones over the past seven years, Maku has had a better performance. According to Table 8, one can see that Maku Free Zone is in developed level except for 2013. The next priority is Anzali Free Zone. The degree of wealth of this area shows a lower level of development in this area. However, by increasing key and effective indices in Anzali, the area under question can be made developed. After Anzali, Aras, Arvand, Chabahar, Qeshm are in next ranks. These zones are similar in function and development with little differences. In terms of development, Kish is in an undeveloped area. As is seen, Kish Free Zone is in poor condition.

These results were checked while we gave the same weight to all performance indices. Indeed, we considered all indices to be of equal importance. However, the indices are of particular weight and importance relative to each other. We then rank and evaluate the performance of free zones using taxonomy by applying weight as Shannon's Entropy. In this section, in calculating the weights of each index, after forming a decision matrix within a normalized matrix, the entropy of the units, the degree of reliability and weight of each index for 2013 are calculated in accordance with Table 3 and the results are shown in Table 9.

Table 9: Entropy rate, degree of deviation and weight of each index for 2013

	Operating income/expenses and costs	Operating income / infrastructure	Operating income / domestic investment	Tourism / Domestic investment	Tourism / Costs and expenses	Tourism / Infrastructure	Foreign investment / cost and expenses	Foreign investment / infrastructure	Foreign investment / domestic investment	Transit / domestic investment	Transit / Expenses and costs	Transit / Infrastructure	Import /export	Export / domestic investment	Export / Expenditure	Export / Infrastructure	Employment / Internal investment	Employment / cost and expenses	Employment / Infrastructure
.																			

Entropy	0/988	0/955	0/836	0/786	0/815	0/733	0/536	0/465	0/379	0/092	0/405	0/375	0/326	0/532	0/860	0/868	0/847	0/772	0/744
Degree of deviation	0/011	0/044	0/163	0/213	0/184	0/266	0/463	0/534	0/620	0/907	0/594	0/624	0/673	0/467	0/139	0/131	0/152	0/227	0/255
Weight	0/001	0/006	0/024	0/031	0/027	0/039	0/069	0/081	0/092	0/135	0/088	0/093	0/101	0/069	0/021	0/019	0/022	0/034	0/038

The entropy of each index is a number between zero and one. The closer the measured values of the index to zero, indicating that the competing units do not differ significantly from that index. Thus, the role of that index in the selection process should equally reduce. Among these indices is the ratio of transit to domestic investment. After calculating the entropy, the degree of deviation of any index that gives the decision maker confidence that is the result of subtracting one from the entropy value is calculated. The weight of each index is calculated then. Shannon's Entropy method gives the highest weight to the index with the highest degree of deviation. According to Table 9, most of the weight is related to the transit index to domestic investment. After calculating the weight of each index, the homogeneous activities weighted according to Equation 4 are calculated in Table 3 and the results of taxonomy prioritization of different free zones were presented in Table 10.

Table 10: Prioritizing Free Zones (by applying weight)

	2013	2014	2015	2016	2017	2018
Kish	0/895	0/860	0/852	0/848	0/871	0/803
Qeshm	0/809	0/765	0/812	0/843	0/835	0/788
Chabahar	0/818	0/799	0/676	0/641	0/743	0/807
Aras	0/444	0/711	0/787	0/798	0/823	0/733
Arvand	0/791	0/687	0/836	0/834	0/805	0/697
Anzali	0/743	0/799	0/747	0/776	0/779	0/663
Maku	0/714	0/396	0/444	0/481	0/491	0/329

As Table 10 shows, the performance of the zones is improved by making the weights for the indices. Moreover, the level of development has improved and there is no area in undeveloped zone. Maku ranked first in terms of performance, but Maku performance in this analysis shows the region is in better state. Among the reasons for its proper operation is the proximity to Aras Free Zone, the capital of Iran (Tehran), relative security, provision of infrastructure, wide area, and border with Turkey, being on the trade route and merchant border and having customs with a long history. Considering the performance of this area, it can be expanded to the current level with the slightest increase in key indices. Other areas are at a less developed level in terms of performance and development with a slight difference. Thus, Maku Free Zone is the top zone whose performance can be increased by planning to increase key and effective indices of other regions to Maku level. Considering Table 10, the development status of free zones during the years 2013 to 2018 can be plotted. This state is seen in Table 11.

Table 11: Development status of the zones

	2013	2014	2015	2016	2017	2018
Kish	Undeveloped	Undeveloped	Undeveloped	Undeveloped	Undeveloped	Undeveloped
Qeshm	Undeveloped	Undeveloped	Undeveloped	Undeveloped	Undeveloped	Undeveloped
Chabahar	Undeveloped	Undeveloped	Less developed	Less developed	Less developed	Undeveloped
Aras	Developed	Less developed	Undeveloped	Undeveloped	Undeveloped	Less developed
Arvand	Developed	Less developed	Undeveloped	Undeveloped	Undeveloped	Less developed
Anzali	Less developed	Undeveloped	Less developed	Undeveloped	Undeveloped	Less developed
Maku	Less developed	Developed	Developed	Developed	Developed	Developed

As Table 11 shows, Maku Free Zone is in the less developed range in 2013. In this year, Aras is among the developed regions and the others are undeveloped. In the years later, Maku level was enhanced to an advanced, and has progressed in its level of development since then. The highest increases of the indices and Maku's reaching this level are the ratios of export to import, employment to domestic investment, transit to domestic investment, revenues and resources to domestic investment, and income and resources to infrastructure. Aras Free Zone all indices have somehow reduced in 2014. This decrease reduced Aras from the level of developed to the level of less developed. The most reduction in indices for Aras is

the index of employment to domestic investment, transit to domestic investment, tourism at cost and expenditure, and income and resources to domestic investment. Increasing income and resource cost and expenditure indices, income and resources to infrastructure, transit to domestic investment, export to expenditure, employment to domestic investment and employment to infrastructure enhanced Arvand Free Zone to developed level in 2013, but the indices enhancing the level of development of Arvand once again reduced the level of Arvand to undeveloped in 2014. In 2015 and 2016, Chabahar's level of development increased and reached less developed region class. Increases in the indices of income and resources to domestic investment, tourism to domestic investment, foreign investment to domestic investment, transit to domestic investment, and export to domestic investment and employment to domestic investment enhanced Chabahar's level of development. In terms of overall performance over the past seven years, except Maku, other free zones have been at one level of development. Thus, Maku Free Zone is an exemplary area that can be increased by planning to increase key and effective indices of other regions to Maku level.

CONCLUSION

Free zones have been established in Iran since 1989 and the number of these zones has reached seven (Kish, Qeshm, Chabahar, Aras, Arvand, Anzali and Maku). These zones have been developed with some specific goals and missions and shown some actions and feedback. The question in the mind is whether the free zones have reached the objectives defined in their statute. In the study conducted to evaluate the performance of the seven free zones, 19 relative indices were determined based on the goals defined in the statutes of the regions and then these twenty relative indices were prioritized using taxonomy approach. Based on the results, Maku, Anzali, Aras, Kish, Arvand, Qeshm and Chabahar free zones were prioritized, respectively. The results indicated that Maku Free Zone performs better than other regions. The region is in the range of developed regions, with less growth in domestic investment, imports, infrastructure, costs and expenditures than would be expected in other areas of employment, exports, transit, and attraction of foreign investors. Other areas are less developed. Experts expect Kish Free Zone to rank higher than other areas and Chabahar to be in less favorable zone, but Chabahar has proven to be in a better state than previously thought. Anzali is ranked second although in the less developed region. In data analysis, other areas are in or near undeveloped status. Kish's status was not as favorable as expected and ranked last and was thus undeveloped. On the other hand, by weighting the indices, the changes have only made the region better.

Except Maku, other Free zones have to increase their performance indices to reach level of development given the potential of regional stagnation. Anzali Free Zone has to gain more domestic and foreign investment, transit, more infrastructure and more benefits to be more developed.

Moreover, it has stagnation potential in these indices. Arvand has to spend more on exports to reach development level. Having a land connection with Iraq allows the region to attract more tourists and foreign investors and to transit. This region can use stagnant capacities in these indices by spending some cost. Aras Free Zone can be more successful in transit and export by creating the necessary infrastructure because of its close proximity to Azerbaijan and Nakhchivan. Given its special status, Chabahar can create infrastructure for export and transit, which in turn leads to increased employment. Qeshm can reach development by reducing imports and creating the necessary infrastructure for transit and foreign investment. Finally, Kish Free Zone can reach development by reducing costs and imports and attracting tourists. All these indicated that zones are far from reaching the goals set out in their statute except Maku.

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