

ASSESSING GEOGRAPHICAL AREAS IN TERMS OF THEIR CAPACITY TO BE AS SPECIAL SCIENCE AND TECHNOLOGY ZONES (CASE STUDY: TEHRAN)

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ABSTRACT

A knowledge-based economy is an economy that is directly based on the acquisition, production, distribution and application of knowledge in all economic activities. Achieving a knowledge-based economy is now a requirement of all countries in the world. In this regard, one of the strategies that have brought successful experience for many developed countries based on knowledge-based economy is the formation and expansion of technology clusters, special zones or science and technology corridors. The special science and technology zone is a centralized collection of universities, science and technology parks, research centers, companies with high technology, etc., which is formed in a geographical space and in an economic zone with centralized management and a special legal structure. Produces knowledge-based products and services. In this article, while determining the requirements for the formation of special zones or the same science and technology corridors, with emphasis on knowledge-based economy, examines the areas of tehran to become a special zone of science and technology and shows which zone to become a zone. Special science and technology is superior to other areas, so we compared the twenty-two urban areas and came to the conclusion that which area of tehran has a suitable platform to become a special area of science and technology.

Keywords: knowledge-based economics, science and technology special zone, technology cluster, science and technology park.

Introduction

Today, the creation of wealth from knowledge has become very important due to dramatic technological developments in the world. In the 21st century, the knowledge-based economy is expected to take shape in many countries, and societies in which national wealth and economic growth are measured in terms of ideas, knowledge, and technology, not in the form of physical materials and resources. To appear and develop one after another in our country, due to the importance of taking a systemic approach to the development of technology and innovation, activities have begun. (rahimi, 2012).

In order to realize the knowledge-based economy as one of the main goals of the country's development programs and in order to achieve the goals outlined in the vision document and strategies and criteria for land management and paving the way for the integration and synergy of elements effective in creating a knowledge-based society, promoting productivity in the necessary investments through the interconnection of existing elements for the development of knowledge-based economy, promoting the position of active elements in the field of knowledge in the national economy and strengthening their connection with the economy internationally by creating synergistic and competitive conditions, attracting and retaining creative and worthy human capital and creating employment of increasing value and creating legal, executive, communication and investment facilities and services to form industrial clusters of services with superior technology, special science and technology zones will be established in the eligible and talented provinces of the country. (regulations on how to establish and develop special science and technology zones in the country).

In the formation of knowledge-based areas, one of the possible approaches is to transform geographical areas into special areas of science and technology. Special zones of science and technology can play a unique role in creating knowledge, growth and economic development. Wealth, increasing the quality of life of citizens, providing effective access to transportation infrastructure, urban design and architecture linking new technologies, increasing the level of professional competition, creating influential business networks, building access to other markets, improving the level of education and citizens' skills, defending a participatory and competitive business culture,

providing creative and responsive public services, and paving the way for revealing a culture of tolerance and acceptance of diverse cultures based on meritocracy; play a role.

Therefore, considering that the city of tehran has a significant share of the country's science and technology capacities and activities in the special zone are not limited to a specific place, so the best place that has a suitable platform to become a special zone is a place that has extensive green spaces, numerous knowledge-based companies in the region, the existence of communication routes and proper access, higher education centers and universities, its infrastructure and facilities, etc. therefore, in this article, while presenting the requirements for the formation of special science and technology zones, we examine the capacities of the twenty-two zones of tehran to become a special science and technology zone.

The term knowledge-based economics and information economics entered the American economic literature in the 1960s, but the developments of the 1990s revived the term. However, the organization for economic co-operation and development (OECD) has made great efforts to index the knowledge-based economy; but it was not until the final conclusion in 1995 that the first time a codified framework for the term knowledge-based economy was published in the OECD, in the form of a ministerial document from the Canadian Science and Technology Policy Committee. This document determines the position of new models of growth and performance of innovations in the economy and refers to the completion of the project in such a way that in addition to the coefficient of production, the coefficient of dissemination and benefit of knowledge. Therefore, explaining the theoretical position of knowledge, how to interact and the facts that occurred in the outside world such as the accelerating process of market convergence, globalization, more competition and most importantly the dazzling leap of communication and information technology provide the basis for developing an executive model of this development paradigm. Has constructed. Since this decade, extensive efforts have been made to expand, strengthen, and integrate the concept of knowledge-based economics, and the boundaries of knowledge-based economics with production-oriented economics have become clear (Smith, 2002).

The knowledge revolution is affected by several factors, including: increasing coded knowledge, increasing information analysis, storage and transfer, development and expansion of new technologies, increasing the importance of knowledge and skills of the workforce, increasing the importance of innovation and efficiency in competition and production growth gross domestic product, increasing intangible investment, globalization and fierce competition, and expanding global trade. (Dahlman & Anderson, 2000).

Special areas of science and technology, as one of the infrastructures for the development of the knowledge-based economy, provide the necessary platform for turning ideas, talents and capabilities into an innovation (which can be commercialized). On the other hand, these regions are a place for accumulation and concentration of national and international companies with technology and exploiting the benefits of this concentration. Therefore, they can provide the grounds for rapid change in technology to ensure sustainable economic growth and maintain economic superiority. Because the advanced technologies that are produced and developed in these areas, affect other industries in a progressive way and make it possible to increase productivity in the economy. The special zones of science and technology, according to the law, are the same industrial clusters with superior technology, so the definitions, characteristics and infrastructure of both are the same.

Materials and method

research methodology

The location of each urban element in a location from the city level is subject to special principles and rules that, if observed, will lead to the success and functional efficiency of that element in the same location. Therefore, the present study was conducted with the aim of finding the most suitable place for the establishment of tehran science and technology special zone. In this research, a questionnaire has been presented to weigh the indicators that the sampling method is judgmental (purposeful) sampling. In this type of sampling, the sample is selected based on personal judgment or study objectives. This method is used when we personally go to a number of them to ask questions about the research problem. According to the weight of the obtained indicators, for each of the main factors, its sub-criteria are examined and its amount in the city of tehran is determined by twenty-two regions. To examine the extent of these factors separately for twenty-two regions, after collecting data, we specify them in GIS software by points and apply the boundary layer of regions on it.

Weight of main and sub-indicators

To obtain the weight of the evaluation indicators of geographical areas, a questionnaire was presented, which was completed by experts in the field of science and technology management. The description of the experts is given in table 1 below according to the type of their degree.

Table 1 profile of the questionnaire completers

Number of respondents	Education rate	Row
20	Masters	1
10	Doctorate	2

Scientific and research factors

Scientific and research factors form the core of science and technology special areas.parks act as liaisons between universities, research and development centers, markets, and knowledge-based companies.to achieve the culture of innovation, science and technology parks stimulate the flow of knowledge and technology between universities and scientific and research centers and knowledge-based enterprises by providing facilities and facilities in different periods of growth for knowledge-based companies.

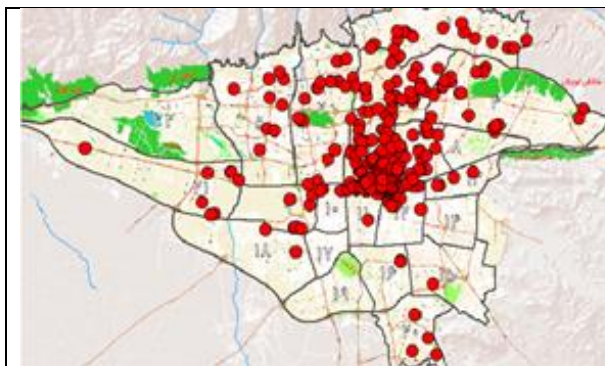


figure 4-1 Higher education centers and universities

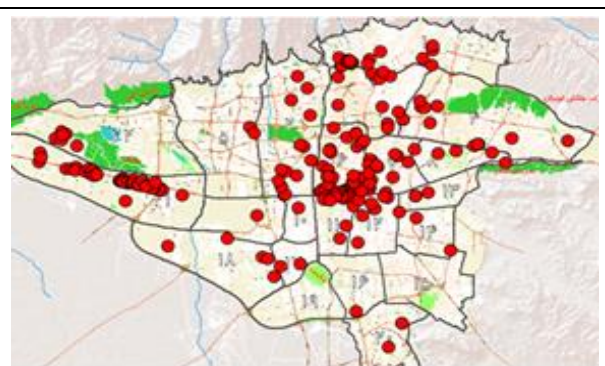


figure4-2 Research centers and research institutes

Table 2 scientific and research factors

Result						Region	Coloumn
	Research centers and research institutes	Free schools	Universities and higher education	Science and technology	Growth centers		
	O.0607	O.0373	O.0653	O.0576	O.0537		
0.08379	0.296	0.092	0.38	0.5	0.0917	Region6	1
0.04071	0.048	0.0885	0.086	0.5	0.0367	Region4	2
0.02029	0.06	0.0914	0.062	0	0.165	Region2	3
0.01898	0.116	0.05	0.145	0	0.055	Region1	4
0.01863	0.224	0.0197	0	0	0.0642	Region21	5
0.01248	0.056	0.0683	0.114	0	0	Region3	6
0.00972	0.056	0.056	0.043	0	0.0092	Region7	7
0.00765	0.012	0.049	0.008	0	0.0827	Region20	8
0.00732	0.024	0.0276	0.023	0	0.0642	Region12	9
0.0064	0.004	0.0197	0	0	0.101	Region17	10
0.00615	0.008	0.0695	0.023	0	0.0275	Region5	11
0.00539	0.012	0.04	0.03	0	0.0092	Region11	12
0.00532	0.004	0.025	0	0	0.0734	Region16	13
0.00465	0.008	0.0456	0	0	0.0459	Region14	14
0.00455	0.024	0.0319	0.008	0	0.0275	Region18	15
0.00413	0.024	0.0119	0.054	0	0.0092	Region22	16
0.00368	0.012	0.066	0	0	0.0092	Region8	17
0.00352	0.004	0.0264	0.004	0	0.0367	Region13	18
0.00343	0.004	0.023	0.008	0	0.0275	Region9	19
0.00265	0	0.0125	0.008	0	0.0367	Region19	20
0.00259	0.004	0.044	0.004	0	0.0092	Region10	21
0.00255	0	0.042	0	0	0.0183	Region15	22

Communication factors

the development of physical and information infrastructure is important for special science and technology areas. transportation systems are important to both people and products. high-tech products tend to be small and lightweight, and designing the right network for transporting large goods is not important. however, due to the short life of products, high-tech products must expand rapidly in the market.

Table 3 communication factors

Result	Highways and main roads	Public transportation	ict infrastructure	Average distance from the airport	Intercity communication infrastructure	Region	Coloumn
	0.0527	0.0431	0.0557	0.0215	0.0215		
0.0149	0.07	0.09	0.046	0.062	0.16	Region6	1
0.01471	0.07	0.04	0.045	0.025	0.066	Region4	2
0.01441	0.04	0.06	0.046	0.029	0.0304	Region8	3
0.01156	0.09	0.06	0.045	0.054	0.0265	Region5	4
0.01151	0.07	0.08	0.046	0.054	0.0304	Region2	5
0.01065	0.07	0.06	0.045	0.034	0.053	Region3	6
0.0105	0.05	0.06	0.045	0.046	0.0834	Region7	7
0.0094	0.01	0.07	0.046	0.044	0.109	Region12	8
0.00876	0.02	0.04	0.045	0.12	0.042	Region9	9
0.00844	0.06	0.04	0.045	0.025	0.0239	Region15	10
0.00822	0.06	0.04	0.045	0.02	0.0185	Region1	11
0.00806	0.02	0.04	0.046	0.1	0.0265	Region10	12
0.00776	0.02	0.06	0.045	0.03	0.045	Region13	13
0.00776	0.04	0.035	0.046	0.03	0.0438	Region16	14
0.0075	0.05	0.03	0.046	0.03	0.0172	Region14	15
0.00734	0.04	0	0.046	0.045	0.079	Region18	16
0.0073	0.05	0.015	0.045	0.036	0.033	Region21	17
0.007	0.05	0.01	0.046	0.024	0.04	Region20	18
0.00668	0.02	0.025	0.045	0.062	0.033	Region17	19
0.00609	0.05	0	0.045	0.04	0.004	Region19	20
0.006	0.04	0.015	0.046	0.03	0.005	Region22	21
0.00554	0.01	0.13	0.045	0.06	0.0304	Region11	22

Quality factors in life

One of the key to success is to build livable communities with urban health and safety, urban infrastructure, adequate urban services, green space and cultural, recreational and sports centers for science and technology areas. efforts to improve the quality of life help to attract and retain the talent that is essential to the new economy. to examine the status of municipal services, we compare factors such as fire departments, municipalities and municipal-related bodies in the city of tehran.

Table 4 quality factors in life

Result	Cultural, and recreational, and sports centers	Green space	City services	Urban security situation	Therapeutic condition	Region	Coloumn
	0.0 392	0.0 315	0.0 411	0.0 2635	0.0 2635		
0.01777	0.112	0.04	0.073	0.173	0.173	Region6	1
0.01224	0.063	0.11	0.067	0.0548	0.08	Region4	2
0.012	0.083	0.05	0.066	0.071	0.0982	Region3	3
0.01163	0.087	0.1	0.056	0.043	0.062	Region2	4
0.01043	0.067	0.05	0.066	0.056	0.0775	Region1	5
0.00976	0.1	0.018	0.05	0.071	0.051	Region 12	6
0.00858	0.028	0.1	0.065	0.035	0.028	Region 18	7
0.00846	0.066	0.01	0.054	0.074	0.052	Region7	8
0.00772	0.034	0.1	0.03	0.0262	0.05	Region5	9
0.00761	0.027	0.064	0.05	0.06	0.034	Region 20	10
0.00746	0.033	0.08	0.04	0.049	0.027	Region 15	11
0.00631	0.055	0.02	0.039	0.044	0.029	Region 11	12
0.00613	0.03	0.05	0.048	0.0254	0.0278	Region 16	13
0.00534	0.04	0.02	0.04	0.027	0.0297	Region8	14
0.00501	0.023	0.064	0.033	0.0168	0.011	Region 19	15
0.00478	0.017	0.024	0.036	0.039	0.0323	Region 21	16
0.00458	0.034	0.03	0.017	0.033	0.0278	Region 14	17
0.00408	0.025	0.012	0.04	0.024	0.017	Region 17	18
0.00393	0.01	0.024	0.048	0.012	0.0189	Region 22	19
0.00371	0.029	0.007	0.029	0.0199	0.032	Region 10	20

0.00367	0.02	0.017	0.024	0.024	0.0278	Region 13	21
0.00314	0.017	0.01	0.029	0.0228	0.014	Region9	22

Industrial-commercial factors

High-tech industries and services are considered as the central part of knowledge-based economies and are one of the main indicators for measuring the degree of knowledge-based economy of an economy. High-tech firms have always played a leading role in the areas of science and technology, linking consumer needs to the technological capabilities of universities and research centers, and thereby applying the important results of high-level fundamental research to marketing. They are in charge of technology

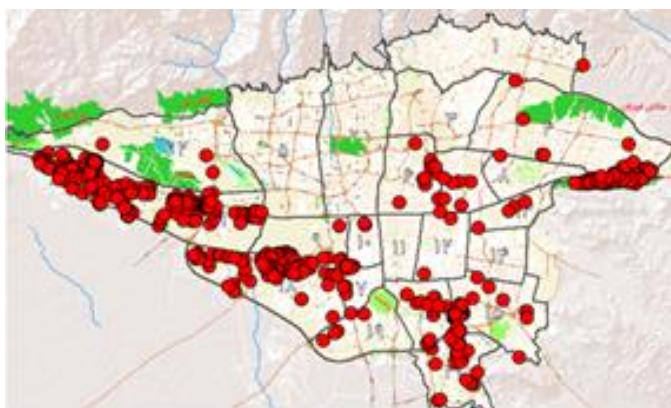


Figure 4-6 Large and small industries

Table 5 industrial-commercial factors

Result	Commercial and office companies	Large and small industries	Adjacent to industrial estates	Region	Coloumn
	0.0527	0.0498	0.047		
0.023	0.015	0.42	0.03918	Region 21	1
0.0103	0.134	0.022	0.04594	Region 6	2
0.0094	0.036	0.11	0.0426	Region 4	3
0.009	0.044	0.09	0.0453	Region 18	4
0.0084	0.01	0.117	0.04352	Region 9	5
0.0068	0.026	0.059	0.0526	Region 20	6
0.0067	0.026	0.06	0.05	Region 16	7
0.006	0.072	0	0.0475	Region 11	8
0.0054	0.023	0.037	0.051	Region 15	9
0.005	0.056	0	0.0426	Region 3	10
0.005	0.048	0.008	0.0453	Region 7	11
0.0045	0.008	0.037	0.04757	Region 13	12
0.0041	0.031	0.005	0.048	Region 17	13
0.004	0.314	0.001	0.0488	Region 12	14
0.0039	0.017	0.017	0.0454	Region 8	15
0.0038	0.035	0	0.0413	Region 2	16
0.0036	0.023	0.004	0.04674	Region 10	17
0.0032	0.018	0	0.0491	Region 14	18
0.00378	0.035	0.001	0.0401	Region 1	19
0.0028	0.016	0	0.041	Region 5	20
0.0026	0.006	0	0.04902	Region 19	21
0.0025	0.007	0.007	0.03743	Region 22	22

Innovative support factors

The research and technology fund is responsible for investing in communication and financing of new ideas for commercialization. they are necessary for the special areas of science and technology they can create. the role of employment agencies, which are responsible for communicating with professionals and organizations, is also included in the innovative support factors that are responsible for providing and equipping human resources.

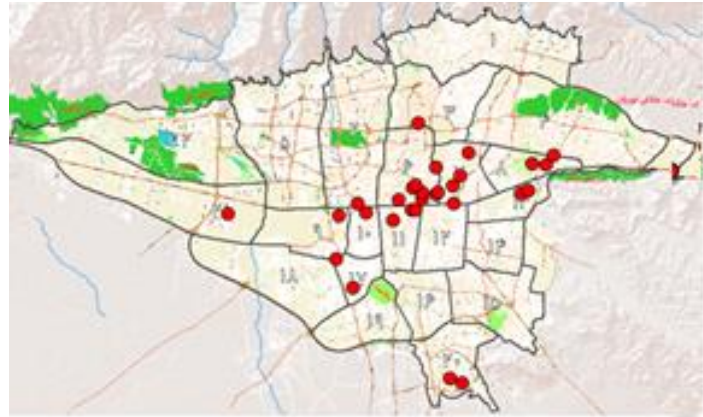


Figure 4-7 Recruitment agencies

Table 6 supporting factors of research

Result	Commercializati on services	Financial support institutions	Employment agencies	Specialized and library laboratory	Region	Colo umn
	0.05 76	0.05 38	0.05 08	0.05 47		
0.06317	0.57	0.16	0.34	0.11	Region6	1
0.02735	0.29	0.072	0.07	0.074	Region2	2
0.01388	0	0.07	0.14	0.05	Region7	3
0.01308	0.14	0.046	0	0.053	Region5	4
0.01181	0	0.037	0.14	0.047	Region8	5
0.01134	0	0.09	0.035	0.08	Region3	6
0.01087	0	0.127	0	0.065	Region12	7
0.0086	0	0.05	0.035	0.072	Region4	8
0.00691	0	0.055	0.035	0.036	Region11	9
0.00684	0	0.057	0	0.065	Region1	10
0.00674	0	0.024	0.07	0.033	Region20	11
0.00567	0	0.014	0.07	0.024	Region9	12
0.00446	0	0.018	0.035	0.03	Region17	13
0.00439	0	0.025	0	0.054	Region14	14
0.00424	0	0.03	0	0.046	Region15	15
0.00375	0	0.015	0.03	0.025	Region21	16
0.00347	0	0.028	0	0.034	Region10	17
0.00279	0	0.018	0	0.032	Region18	18
0.00242	0	0.025	0	0.018	Region16	19
0.00219	0	0.02	0	0.019	Region13	20
0.00156	0	0.009	0	0.019	Region22	21
0.00134	0	0.01	0	0.014	Region19	22

According to the tables given for each of the main factors, we finally want to review the prioritization of the twenty-two districts of tehran to become a special zone of science and technology and see which is preferable to the other and which is the sixth district of tehran. the points are weak to become a special area of science and technology. therefore, table 7 calculates the sum of the numbers obtained for the main factors, the sum of the numbers obtained for the main factors, which shows which region in tehran has a priority over other regions to become a special science and technology zone.

Table 7 prioritization of tehran regions

Result	Innovative support factors	Industrial-commercial factors	Quality factors in life	Communication	Scientific and research	Region	Column
0.18993	0.063	0.01	0.018	0.015	0.084	Region6	1
0.08566	0.008	0.009	0.012	0.015	0.04	Region4	2
0.07458	0.027	0.003	0.012	0.011	0.02	Region2	3
0.05746	0.004	0.023	0.0048	0.007	0.019	Region21	4
0.05147	0.011	0.005	0.012	0.01	0.012	Region3	5
0.04825	0.007	0.004	0.01	0.008	0.019	Region1	6
0.04756	0.014	0.005	0.008	0.01	0.0097	Region7	7
0.04135	0.01	0.004	0.0097	0.009	0.007	Region12	8
0.04131	0.013	0.003	0.007	0.011	0.006	Region5	9
0.03914	0.012	0.0039	0.005	0.014	0.0037	Region8	10
0.0358	0.0067	0.0068	0.0076	0.007	0.0076	Region20	11
0.03226	0.0028	0.009	0.0086	0.007	0.004	Region18	12
0.03015	0.007	0.006	0.006	0.0055	0.0053	Region11	13
0.0294	0.0057	0.0084	0.003	0.0087	0.00343	Region9	14
0.02833	0.002	0.007	0.006	0.00776	0.0053	Region16	15
0.02809	0.004	0.005	0.007	0.008	0.002	Region15	16
0.02572	0.004	0.004	0.004	0.007	0.0064	Region17	17
0.02432	0.004	0.0032	0.0046	0.007	0.00465	Region14	18
0.02164	0.0022	0.0045	0.0037	0.008	0.00352	Region13	19
0.02143	0.0035	0.0036	0.0037	0.008	0.00259	Region10	20
0.01812	0.0156	0.0025	0.0039	0.006	0.004	Region22	21
0.01769	0.00134	0.0026	0.005	0.006	0.002	Region19	22

According to the obtained scores, it can be seen that the score of region six is 0.18993, which is more than double compared to the region after itself, which is region four. Map 4-8 shows the scores of the top five regions. As seen in the tables, tehran's sixth district is in factors such as science and technology park, universities and higher education centers, free schools, research centers and institutes, intercity communication infrastructure, medical centers and urban security, urban services, cultural and recreational centers. And sports, specialized libraries and laboratories, employment agencies, financial support institutions and commercialization services in the sixth region

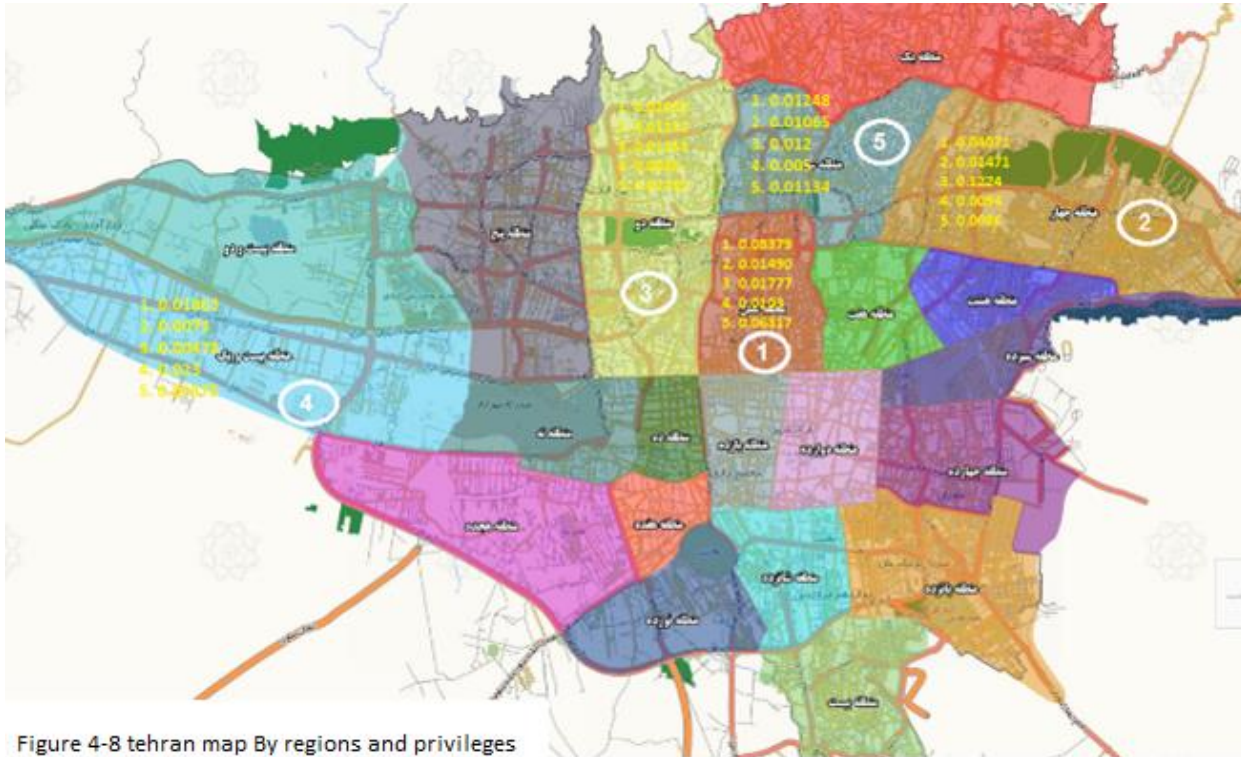


Figure 4-8 tehran map By regions and privileges

Result

According to the scores of the indicators obtained by completing the questionnaire by experts, it was observed that among the main factors, 50% of the scores include the two main factors of scientific, research and innovative support factors, and the remaining 50% include communication factors, quality in life and industrial-commercial factors. Therefore, according to the obtained numbers, it can be concluded that innovative scientific, research and support factors are more important. Table 1-5 prioritizes the main routes according to the scores obtained by the questionnaire. Factors such as ict infrastructure and customs services are considered equally for twenty-two urban areas of tehran. The areas of tehran all include proper ict infrastructure and fiber optic substrate, and also the same rules and regulations for customs services, so these two factors are considered the same for everyone.

District 6 of tehran is ranked first among the main factors in all major factors except industrial-commercial factor. In the sub-factors among the factors of science and technology park, universities and higher education centers, free schools, research centers and research institutes, intercity communication infrastructure, medical and urban security centers, urban services, cultural, recreational and sports centers, library and the specialized laboratory, employment agency, financial support institutions and commercialization services of the sixth region are in the first place. In

factors such as public transportation, major highways and main roads, commercial-administrative companies are ranked second and growth and entrepreneurship centers are ranked third.

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