Feasibility study on the implementation of a knowledge-based city in Tabriz metropolis with a knowledge-based approach

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Abstract:
Today, knowledge and information play a key role in global economic growth. Since cities around the world are growing on the basis of the industrial capitalist model and will soon face urban resource constraints, therefore, knowledge-based cities are considered as a suitable way for economic growth and proper management of infrastructure resources and improving the quality of life in the 21st century. Knowledge-based cities can be divided into two categories: 1. Developed knowledge-based cities with good infrastructure resources like: Barcelona, Boston, Helsinki, Ottawa, and Singapore. 2. Newfound knowledge-based cities like: Istanbul, Manchester, Melbourne, San Francisco, and Sydney in which are developing with the KBUD approach. Creating knowledge-based cities cannot be easily realized, but it needs features and capacities in various economic, cultural, social and technological fields, such as having a high level of technology, improving services and educating citizens through communication, and thus strengthening human capital. This research examines the knowledge-based urban development (KBUD) approach as a method for the realization of the knowledge-based city. Then, a novel framework is devised for the KBUD approach according to the situation of Iran. This new approach consists of six aspects: Knowledge-based economy, knowledge-based community, knowledge-based government, knowledge-based environment, knowledge-based healthcare, knowledge-based security. Then, in order to evaluate the realization possibility of a knowledge-based city in Tabriz Metropolis, a questionnaire was designed based on the SWOT of the city and six different aspects of the KBUD approach and was distributed among twenty persons selected from the elites of the city. The data extracted

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from the questionnaire were analyzed then. The results of the T-test showed that all indicators for knowledge-based development in Tabriz Metropolis are evaluated in good and above average level, and the results of the Friedman test showed that the variable knowledge-based healthcare with average score 4.75 is in a better and more favorable situation than other knowledge-based cities. Hence, Tabriz Metropolis has possible potential and substrates to turn into a knowledge-based city.

Introduction
In the past two decades, the most recent challenge of the scientific community was the development of knowledge-based cities. Paul Romer, Stanford's leading economist, believes that we are currently facing a period where if developing countries do not move towards the knowledge-based economy, they cannot achieve economic growth even with significant levels of natural resources. Knowledge-based cities aimed with achieving sustainability and improvement of the quality of life, provide services required by citizens. In recent years, the "knowledge-based urban development (KBUD)" approach has attracted a lot of interest from cities that are going to transform into a knowledge-based city.
Considering the emphasis of the world countries on the knowledge-based economy, and given the magnificent scientific background of our country, it is necessary to take important and influential steps to achieve knowledge-based cities. Hence, the goal of this research is to evaluate the feasibility and launching possibility of the transformation of Tabriz Metropolis into a developed knowledge-based city.

Materials and Methods
The method of the current research is descriptive-analytical. This research investigates the latest achievements of the world in the field of knowledge-based cities, and thus strengthens different aspects of the knowledge-based development approach for Iranian cities. Then, the SWOT table consists of the weakness, strength, threats, and opportunities of the Tabriz metropolis is established by the opinions of the community, authorities, master plan and the prospect of the city. Then, a questionnaire was designed based on the SWOT table and six different aspects of the KBUD approach. Finally, twenty persons selected from the experts and elites of the city of Tabriz was interviewed by this questionnaire. Later, the data obtained from the responses of these elite individuals were evaluated using inferential statistics and the SPSS software.

Results and Discussion
In this research, a questionnaire with sixteen questions was prepared using the data of the SWOT table which comprised all the six different aspects of the KBUD approach. Then, considering that the concept of the knowledge-based city was not known to ordinary citizens of Tabriz Metropolis, the questionnaire was conducted among twenty elite scholars of the city. According to the results

of the Kolmogorov-Smirnov test, it can be concluded that the studied variables obey normal distribution (p > 0.05). The one-sample T-test was used for evaluating the feasibility of the realization of the knowledge-based city according to the knowledge-based development approach. The scores are distributed between 1 and 5. Therefore, the test with the value 3 which is the center variable was considered. If the average of the variable is greater than 3, it shows a desirable situation. The results of the one-sample T-test shows that the possibility of the realization of the knowledge-based city in the city of Tabriz is significantly higher than the average level (p = 0.001, mean = 3.40). Furthermore, the results show that the level of knowledge-based community (p = 0.001, mean = 3.32), knowledge-based economy (p = 0.001, mean = 3.72), knowledge-based environment (p = 0.046, mean = 3.40), knowledge-based government (p = 0.023, mean = 3.28), knowledge-based security (p = 0.018, mean = 3.33), knowledge-based healthcare (p = 0.001, mean = 3.88) in the city of Tabriz is notably higher than the average level. Also, the Friedman test was used to the prioritization of different aspects of knowledge-based development. The results indicate that there is a meaningful difference between the average scores of the aspects of knowledge-based development (χ_2 = 22.05, degrees of freedom = 5, and the meaningfulness level = 0.001). The aspects of knowledge-based development are listed below form high to low priority, respectively: knowledge-based healthcare, knowledge-based economy, knowledge-based community, knowledge-based security, knowledge-based government, knowledge-based environment. The highest priority belongs to knowledge-based healthcare and the lowest belongs to knowledge-based environment.

Conclusions
The results of the T-test showed that all six aspects of the KBUD approach in Tabriz Metropolis were evaluated in good and higher than average level. The results of the Friedman test indicate that the variable "knowledge-based healthcare" with average score 4.75 is in a better and more favorable situation than other knowledge-based cities, and the variable "knowledge-based environment" with average score 2.85 is less favorable than other knowledge-based cities in Tabriz Metropolis. Considering that the "knowledge-based environment" aspect affects the quality of life element, and in a result, impacts on the scientific employees in the city of Tabriz, special efforts should be made in order to reinforce this aspect of the knowledge-based development approach in the city.
The results of the T-test which describes the general situation of the indicators show that all the indicators of the knowledge-based development in Tabriz Metropolis are evaluated in a good and above average condition. Therefore, one can argue that Tabriz Metropolis has sufficient potential and substrates for transforming to a knowledge-based city.
According to the low value of the average score for the knowledge-based environment, knowledge-based security, and knowledge-based government,

these items should be considered to reinforce by municipal authorities, elites, and citizens, and since the knowledge-based government aspect affects all other aspects, it should be considered with the highest priority. In order to transform Tabriz Metropolis to a newfound knowledge-based city which is a target for scientific employees, it is necessary to include strategies and policies for all six aspects of the KBUD approach in a sort- and long-term prospect of the city of Tabriz.

Keywords: City of knowledge, knowledge-based development, KBUD framework, economic growth, Tabriz Metropolis.

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