

# Analyzing and Comparing the Architectural Specifications and the Urban Role of Scientific – Technological Parks in Iran and the World

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**Abstract**—The issue of scientific – technological parks has been proposed in several countries of the world especially in western countries since a few decades ago and its efficiency is under examination. In our county Iran, some scientific – technological parks have been established or are being established. This design would evaluate the urban role and method of architecture of these parks in order to criticize its efficiency and offer some suggestions, as much as possible to improve its building methods in Iran. The main problem of this design is that how much these parks in Iran do meet the international measurements. So for this reason, one scientific park in Iran and one from western countries would be studied and compared with each other.

**Keywords**—Applicability, Architectural pattern, Scientific – technological park , Urban role .

## I. INTRODUCTION

THE success of technological parks that had main role in improvement and development of economic – scientific areas, cause this pattern to increase rapidly in several countries and this issue indicates the countries consideration to this social institute. Most scientific – technological parks are indicated as a part of coordinated and thoughtful solution to national or regional development by politicians. On the other hand, these parks are known as an instrument of attracting high tech based companies at the level of internationality and in addition to it, they are a site to collect experts and scientists and development of job creators activities. Also, establishing and development of most of modern technological phenomenon are achieved from the inner parts of these parks. So, it is tried to provide employment and activity situation for small and average companies and attracting technology – based international companies by forming appropriate environment. So designing these parks properly, in addition to fulfilling this policy, can influence the urban view and add to the urban environment beauty and paying attention to this issue, in scientific and urban aspects could have positive effects on the urban view and morale and on the other hand on the urban economy.

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## II. DEFINITION OF SCIENTIFIC\_ TECHNOLOGICAL PARKS

There are several definitions but the definition of the international society of scientific – technological parks, is most acceptable due to its widespreadness and is as follow: "A *scientific – technological park is an organization that is managed by professional experts and its main goal is to increase the wealth in the society, by improving innovation culture and competition among the present companies in the park and institutes relying on knowledge in order to achieve this purpose, a scientific and technological park sets and manages knowledge and technology trend among the universities, research and development institutes, private companies and the market and facilitates the growth of companies relying on innovation through growth centers and generative procedures*" [1].

## III. MAIN PURPOSES OF SCIENTIFIC – TECHNOLOGICAL PARKS

- 1) To improve and develop technological assets of the country industries.
- 2) To decrease the needed time for commercializing procedures of research achievements.
- 3) To assist in widening interdisciplinary professions.
- 4) To encourage the establishment – of small and average companies relying on advanced technology.
- 5) To form a relationship among the industries, governmental institutes, universities and research centers.
- 6) To facilitate the cooperation and collaboration of private and governmental sectors.

## IV. MAIN AND COMMON PROPERTIES OF SCIENTIFIC – TECHNOLOGICAL PARKS ESPECIALLY FROM STRUCTURAL – SPATIAL PROSPECTIVE

- 1) These complexes space is like a park and their compass is very beautiful and the buildings are usually of low height and equipped with some kinds of service and recreational facilities. The building acumen lotion is low.
- 2) Several buildings have some distance from each other and there is open and nice space between them.
- 3) These parks space have usually close relationship with urban spaces and the public can use its spaces and there is no separation between them and urban spaces.

## V. LOCATING OF SCIENTIFIC – TECHNOLOGICAL PARKS

### A. Locating of the parks inside or outside the cities:

The most majority of scientific – technological parks, namely 75% of the parks have been placed inside the cities and mutually 25% of them have been located in outskirts. It must be noted that most of the parks outside the cities have less than 25 km distance from a large city.

### B. Locating the parks and the size of cities:

The relationship between the space location of the parks and the size of cities that the parks are built in or near them, can indicate to some extent these complexes role and purposes. Upon the available statistics, the universal experiences show that most of the parks, namely 44% of them have been placed inside the small towns (the ones with less than 500000 population). Also, 24% of the current parks have been located inside the large cities. (With more than 1 million populations) and only 7% of them have been located in the average sized cities (with the population between 500000 to 1 million people). Mean while, about the parks outside the cities, different patterns are seen that means 15% of the parks are near the large cities, 5% of them are near the small towns and 4% of them are located near the average sized cities [4] , [5].

In brief, the current patterns show that the general principle in locating the current parks are, respectively, at first inside the small towns, then inside the large ones and after that near the large cities.

### C. Locating the parks and its relationship with the universities

The considerable point about locating technological parks is that 44% of them are located in the property lands of the universities that indicate the strong relationship between the parks and universities. 27% of them are located inside the present paradise in the universities. Of course, most of technological parks are located in the lands that don't belong to the universities property.

But this does not mean to lack of relationship between them, because most of the present parks no matter what the land ownership is, are located near the universities [2].

## VI. THE SCIENTIFIC – TECHNOLOGICAL PARK OF THE BISHOP – RANCH, SAN RAMON , CALIFORNIA

### A. Comprehensive design of the park

In order to supply complete control on the construction method, the park has set the principles of the exact urban design containing the situation and limitations of the constructions and this park has been established in an area about 585 acre (see fig.1 & fig.2).



Fig. 1 The building of the Bishop-Ranch



Fig. 2 Floor plan of the Bishop-Ranch

### B. Main factors of the park location

- 1) The location sense: Considering a prospective and comprehensive design to the elements cohesion and coordination.
- 2) The land division method: The main consideration is on the size and shape of the land division plots with available path in "Loop" system.
- 3) Gates: Constructing identified gates in entrance part of the park, cause to achieve the identified position and metal imagination of the park.
- 4) Efficient transportation: A management program of transportation has been set.
- 5) Care giving to the children: An informing system to assist the staff in finding care giving services to the children in the areas near to the park has been created.
- 6) Exercise and recreational services: prediction of recreational facilities in indoor spaces and forming an outdoor loop path for running.

## VII. THE SCIENTIFIC \_ TECHNOLOGICAL PARK OF TEHRAN, PARADISE

The Scientific – technological park of paradise is under supervision of the presidential technological collaboration office and the Sharif industrial university. This park is in 20 km of east north of Tehran and in the boundary of the new town of paradise.

## VIII. THE ADVANTAGES OF THE DESIGN

- 1) Infrastructures availability: It is near to the fast transportation network.
- 2) Approximated to a university makes its research and education position suitable.
- 3) The life quality in this park is proper because of its approximated to desirable mountain areas.
- 4) The park structural environment has good potential because of proper topography.
- 5) The presence of suitable industrial and economical infrastructures.
- 6) Availability of proper and low cost land [3].

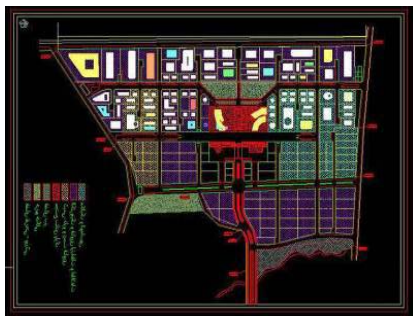


Fig. 3 Site plan of the Paradise Park

## IX. THE COMPARISON BETWEEN IRAN AND THE WORLD PARKS

In studying the world countries that are mainly industrial or becoming industrial ones, the following points are recognizable with high focus on description of the parks or scientific – technological park towns or under construction ones with regard to the architectural and urbanism prospective:

- 1) Considering clean energies especially clean electric and paying attention to the electric cars by forming charge stations to this kind of cars.
- 2) Considering the usage of bicycle by the staff and even the clients and predicting parking places for them.
- 3) Designing central engine room to improve energy efficiency and decreasing noise.
- 4) Connecting the buildings by means of light fiber.
- 5) Establishing paradise by large parks and forming good climatic environment with suitable view for the park and total city complex.
- 6) The possibility of forming private environment for the staff with the extent of keeping domestic animals in their rooms in order to create privacy and dependence sense.
- 7) Establishing medical and dentistry centers to save time and cost.
- 8) Forming daily service environments like retailers, laundry and A.T.M. Encouraging.
- 9) The staff to use stairs instead of elevator because of some reasons like decreasing energy consumption and forming reaction between the staff in order to establish relationship while traversing and assist to improve their creativity.
- 10) Establishing kindergarten spaces to give care to the staff's children.
- 11) Make it possible to use many windows in the units and work rooms, in order to use enough light and air and forming the view and green compass of the park and as a result creating suitable morale and motivation in the staff.
- 12) Establishing school for the staff's children and the possibility of eating meal for the staffs with their children in private self – services and near to both places inside the park in order to form comfort and ensuring the staffs from their children situation.
- 13) Attempt to use one – or two floored (low height) buildings.
- 14) In developed countries like America, high buildings like 6 to 14 floor are constructed that is essential to fulfillment of the sever and daily needs to the educational and research spaces.
- 15) Focusing on the possibility of energy and material recovery.
- 16) Focusing on constructing green or regional buildings.
- 17) Predicting parking units with the limit of 3 units for each 100 m<sup>2</sup> infrastructure.
- 18) Predicting of sport facilities and gyms.
- 19) Predicting restaurants with the facilities of white board and video system for experts meetings and forming the reaction between them.
- 20) Establishing satellite schools and the possibility of the staffs online learning.
- 21) Variability in services, cortex and form of the complex in order to create pleasurable and satisfactory paradises from the users point of view.
- 22) The possibility of the public presence in the case of walking in the streets and inside the parks in order to keep the complex vivid and a result connecting the park to the whole city and forming high morale in the whole city.
- 23) Lack of separation of the park as a close space and distinguishing its from as an urban complex and as a result consolidating park space with total complex of the city.
- 24) Forming public spaces and plazas in front of the buildings and spaces for sitting in parasol areas.
- 25) Reaching to shopping centers in near distances.
- 26) Providing home for the staffs in near places to easy transportation.
- 27) Attempt to forming identity in designing architectural elements like gates in order to form signs and mental imagination of the parks.
- 28) Focusing on development with mixed applications.
- 29) Using chess like network in designing circulations and forming visual corridors besides combining it with other forms.
- 30) Flexibility in combining and zoning applications in order to fulfill new demands.
- 31) Paying attention and focusing on public transportation and connecting inside transportation to the urban one.

- 32) The necessity of nearness to the main roads and airport to its applicability and prestige.
- 33) Forming close relationship with the universities and especially valid ones to transfer information and professors.
- 34) Using the park as a research and industrial units of the universities.
- 35) Using high advanced systems of communication and universal network.
- 36) Focusing on the formation of about 50% of total complex area as green space.
- 37) Focusing on low population accumulation about 7 residential units in each acre (4000 m<sup>2</sup>).
- 38) Forming temporal residential facilities like hotels.
- 39) Focusing on unit management system.

#### X. IRAN

Evaluating Iran Parks that are mainly under construction and have not reached to the final stage, indicates the points that are listed below. It should be mentioned that because of lack of final application of any of these parks, the following points are adapted in most parts from description of their designs and so perhaps there may be same differences.

- 1) Paying attention to goodness of the selected area climate.
- 2) Suitable connection position to the main city by highway.
- 3) Nearness to a university unit.
- 4) Considering the availability of transmission network.
- 5) Considering the price and proper land circumstances from topographical and context and view prospective.
- 6) Nearness to railway and air port.
- 7) Nearness to a small town especially new one in order to apply that city services.
- 8) Forming relatively wide green spaces in the extent of 30% of total complex.
- 9) Dividing the availability of riding and on foot.
- 10) Forming a parking space for each 100 m<sup>2</sup> infrastructure[6].
- 11) Prediction of research and development offices for needed disciplines as a part of park.
- 12) Prediction of management and official complex include: Internet center, lecture and exhibition space, education classes.
- 13) Prediction of services include: motels, restaurants, stores, transportation agencies, sport facilities, health care center, mosque, kindergarten ...
- 14) Focusing on comfort and quietness in research spaces.
- 15) Focusing on the usage of plant coverage and also indoor pathways in order to improve the quality of side walk spaces.
- 16) Managing the complex by board of directors and founders.

#### XI. COMPARISON

In comparison of scientific parks in Iran and in the world, we will just indicate the differences because, after studying the differences and clearing their distinguishing points, whatever is not indicated will be their similarities, So here we try to say them in brief and just indicate their difference points because surveying these aspects and solving the probable shortcomings in the case of Iran parks, could help the improvement of the quality of them.

- 1) Unfortunately one of the most remarkable negative points in Iran parks in comparison to the world samples, is lack of clean energy thought and decreasing the energy consumption and encouraging the staffs and the clients to use bicycle and not to use car and it is just indicated in paradise park on division of on foot and riding pathways and only roofing the sidewalk and using plant coverage suitable for sidewalk is suggested as an alternative. However there is no opinion about the distances or facilitating bicycling or walking in order to speed up the affairs.
- 2) The other main difference along with the above discussion is lack of considering the building designing as green buildings or regional ones in Iran and only in describing them, we just indicate the numbers and infrastructure and nothing is said about energy consumption. However, the existence philosophy of scientific – technological parks is to provide pattern on technological advancements and modern technical and scientific issues and this complex buildings as its indicative elements, should be regional buildings pattern in the world. Because the modern and future world discussion in the field of architecture is to design regional and environmental buildings that use clean and natural energy like the wind and solar energy and also their materials should be recovered.
- 3) Designing the parks in Iran, has been done as separate complex of urban context that has no reaction and full nearness with the urban structure and the parks are separated from the city streets by the walls and fences. However in other countries of the world, this complex is solved within the city context and the public can easily use its open and green space and in fact it is like a common park in the city and serving the citizens.
- 4) In designing Iran parks, the buildings are often in low height and this is because of lack of the need for more space. Of course having fewer floors could be a positive point because a high building takes away the quietness and visual equilibrium.
- 5) In designing Iran parks, in contrast to the world countries, there is no discussion about forming secure, memorable and with sense dependent environment and just quietness in research spaces is focused that is different from Memorable memories.

- 6) In explanation of Iran parks, nothing is said about giving identity sense to the complex so that this complex would be able to act as a symbol and indication of the city. However in most of the world parks, identities giving and memorable in the parks elements especially on the gates are of main points of the design.
- 7) The issue of presence of school in the complex and the possibility of eating meal for the staffs beside their children in Iran parks is mentioned that can lead to the staffs satisfaction.
- 8) In designing Iran parks, nothing is said about the interaction between the staffs in stairs, circulations, restaurants and so on and it's better to include this idea in designing Iran parks.
- 9) Predicting parking areas in Iran parks is considered one unit for each 100 m<sup>2</sup>. However in other countries this measurement is 3 units in each 100 m<sup>2</sup>. If this issue would be along with encouraging bicycling running or walking, it is sufficient, but it is doubtful.
- 10) In Iran parks, online learning is not seen.
- 11) The amount of green space in Iran parks is relatively less than other counties that can demolish the parks visual aspect conclusion.

## XII. CONCLUSION

In summary, in studying and comparison scientific – technological parks in Iran and the world, some points are mentioned from architectural and urban design points of view that indicate Iran parks weakness in comparison to the other countries. Of course the novelty of these parks is one of the main reasons of these weaknesses and in any case such evaluating can help to improve these parks designing in the future and develop the existing parks level. Of course the mentioned weaknesses do not include technical and structural aspects of this complex in the case of information, communication, electronic systems, computerized ones, etc, because these discussions are not related to Architecture and urban design and must be followed by their own specialists.

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