

Designing Science-Technology Park of Tabriz Based on Organic Architecture Approach

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Received: March 8, 2015

Accepted: May 10, 2015

ABSTRACT

One aim of Architecture Association is to establish Science and Technology Park in order to facilitate and accelerate science and technology transmission from universities to the society. Technology parks and development centers are mostly established in vicinity of industrial poles, being formed with the aim of industrial technology communication in the area with technological units and area universities. Tabriz city is considered as one of the most important industrial and academic areas in Iran. Establishment of science and technology parks can help social, economic and scientific development of the city and country. Use of organic methods in architecture is considered as effective and efficient method to use natural energies and its structure creates less pollution. Considering what was mentioned and that organic architecture has been forgotten in Iranian architecture and most tend to use new methods, so current study was designed with such approach to provide new experience from architecture in the form of science and technology park through employing philosophical issues and concepts, introductory issues on technology and making technology parks with new approach which follows organic architecture concepts.

KEYWORD: Organic architecture, science and technology park, technological studies, new technologies

INTRODUCTION

Although modern technology and civilization has brought some facilities to human life, it has imposed some problems and difficulties, such as environment pollution, too. Fossil fuels, combustion system of vehicles' engine, smoke of factories and lack of green spaces inside and outside of cities have resulted in oxygen decrease problem, increasing cities air pollution. Nature is the most beautiful and magnificent deposit to human which is motivation for softest and most impressive senses and emotional reaction. Every kind of intervention to the nature should be accompanied with architecture, i.e. principles of freedom, authenticity and honesty. "Nature as a pattern" is a rule which is considered in organic architecture. Organic architects believed that environment is one part of human and there can be no separation between human and environment. More or less, organic architecture is the same as organic community. Like an organic community which should resist against what is imposed from outside to the life and what is incongruent with human traits and nature, an organic architecture, also, is subdued to aesthetic rules or simple taste of an individual.

Organic architecture should provide such an appropriate place for human life and work, in which he feels happy and efficient. Wright believes that organic means integration of whole set (complex). He also believes that achievement of organic architecture is followed with spatial continuity, happiness and joy [1]. A technology park is an ownership-oriented development at a high quality and park-like physical environment. They enjoy advantages of closeness to important resources of spiritual capital, appropriate infrastructure and guideline policies. They also support technology and state organization-oriented companies at an organized environment and hence facilitate economic growth, technology development and interaction. Technology parks and development centers are established in vicinity of industrial poles aiming at developing technological relationship of industries in the area with its technological units and universities and its main objective is to promote technology of related industries in the area and to increase their competitive power. Accumulation of technological units in such areas provides capability of operation of industries more than their capacity, in addition to promoting level of scientific and technical interactions among related units. The ultimate goal of such parks is research and development in the field of high technologies and surely relying of studies which have been organized in knowledge development basis.

Role of Science and Technology Parks and Centers in Knowledge Production

Science and Technology parks and centers are playing the main role in a knowledge-oriented development. In fact, Technology Park as a physical and legal environment, as an efficient structure, should provide the conditions for presence and absorbing professional research centers and organizing their capabilities to meet the needs of society through understanding its respondents' needs and through creating motivational needs. Such places, undoubtedly, play

a major role at all stages of technological development from culture making and research organization to technology production and its marketing [2].

Human capital- communication and information technology- innovation and creating knowledge stream- knowledge economy, capability of stability and selling technology- ability to convert the idea into product- ability to produce and develop the knowledge.

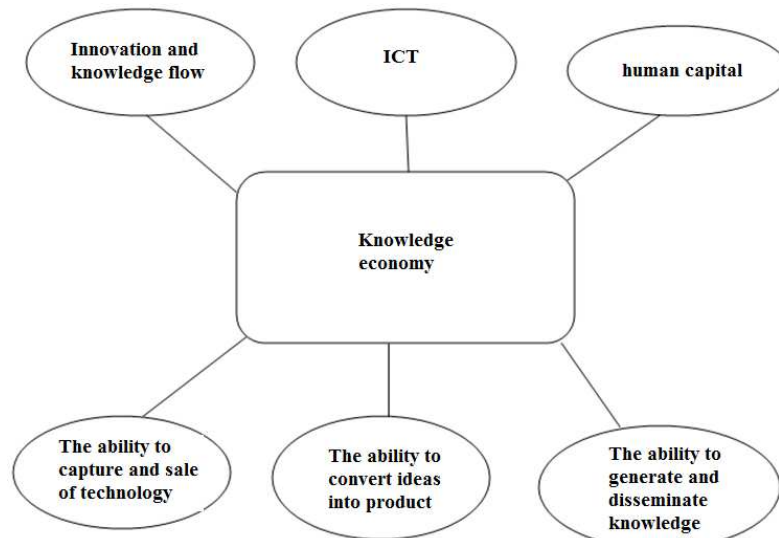


Fig 1. the relationship between information technology and knowledge economy

Increasing distance among economic sectors, universities and research institutes has caused advent of new organization in recent decades aimed at decreasing such distance and substantiation of research results in the society. Success of such organizations which had played an important role in scientific and economic development and growth of countries has caused rapid proliferation of such pattern in different countries. The core of philosophy of research parks establishment is similar in most countries. The main parts of this philosophy are as follows:

Providing needed objective and physical environments for booming and educating researchers' creativity and innovation through establishing appropriate spaces. Social saving in time and communication costs through gathering a set of elements, entities, companies and organizations and even individuals who work in the field of creating, training, producing and promoting quality of one or more defined technologies needed in the society.

Motivations for Establishment of Technology Parks:

Providing needed objective and physical environments for booming and training researchers' creativity and innovation through establishing appropriate spaces. Social saving in time and communication costs through gathering a set of elements, entities, companies and organizations and even individuals who work in the field of creating, training, producing and promoting quality of one or more defined technologies needed in the society. Facilitating face to face communications and closeness of all elements which are working in the field of research, development and production, holding different seminars, conferences and professional and educational meetings for scientific and technological development, economic savings in infrastructural investments, joint use of infrastructural facilities such as urban infrastructures, providing expensive laboratories, data banks, etc., optimal use of private micro-companies and their professional-scientific capabilities, obviating barriers on the way of these companies' development through providing infrastructural facilities and space with fewer cost and encouraging them to act in the field of technologies needed in the society, providing executive conditions for interdisciplinary research projects, creating environments with premium cultural characteristics and relations for industries, facilitating planning and management, gathering research centers in one place, ability to more accurate planning, better control on dedication of research budgets and evaluation of research institutes.

Similar Characteristics of Parks

- 1- The main space of such parks relies on research, innovation and increase in competitive power of specific industries
- 2- These parks encourage commercialization and formation of creativity and innovation
- 3- They have capability of new technology production and in addition to using world markets; they try to compete in them to achieve new technologies.
- 4- Absorbing professional and skilled individuals such as scientists, researchers, research and development experts and students.
- 5- Enjoying aids and supporting services at development center of companies and institutes established in the parks (most of the companies are private), parks create newly born research organizations in the field of their research priorities or they develop existing companies.

Status of Science and Technology Parks

Science and technology parks were established on 1980s as one of the most important social institutes and as one ring of technology-oriented economic development chain. The main goal of science and technology parks were, promoting technologic innovation, economic development and job creation for experts and most policy makers consider technology parks as one part of thoughtful and concordant strategy for national or regional development. On the other hand, parks are known at international level as an instrument to absorb advanced technology-oriented companies. Moreover they are considered as a place to absorb scientists and experts and development of entrepreneurship activities. Today, more than 800 science and technology parks have been established at more than 55 countries of the world and more than this amount are being established which shows importance of such social entity for countries.

Moreover formation and development of most newly born technologic phenomena happens inside such parks and governments try to provide conditions for activity and work of small and large companies and absorb technology-oriented international companies through creating appropriate environment. Furthermore, the role of government especially in countries like Iran becomes more effective and critical in development and success of these parks [3].

Buildings of Development Centers and Technology Parks

Style, form and function of buildings of high-tech are influenced by costs, capability of development, infrastructural needs and flexibility of spaces to be abdicated to other users. Other issues which influence physical design of buildings are work culture, social aspect and specific technology of companies and also their expectation from workplace quality. All high-tech companies predict and take high level of security measurements for their buildings.

Building Size and Flexibility:

Different high-tech or knowledge-oriented industries have different needs. As an example, biotech, biomedical companies tend mostly to make low height buildings, because costs of ventilator and its equipment increase suddenly with increase in building height. On the other hand, software producer companies have recently tended to medium and high height buildings. This increases success of the company by minimizing needed population of staffs. With ability to consider secondary uses, the probability of achieving such minimum threshold increases accordingly [4].

Characteristics of Organizational Culture

Most technology companies have relatively horizontal organizational structure. For example Mr. Bill Gates' office size, owner of Microsoft Company, is the same as his staffs'. Existence of at least one window in the office is essential for staff of such companies, which is usually considered in all workplaces. Poursmaeel [4] found that most personnel of department of new technologies prefer to use stairs instead of elevator. Most high-tech companies design their buildings' stairs and corridors in a way that, they cause accidental interaction and discussion among staffs, doing so they aim to increase probability of generation of new and creative ideas to solve the problems.

Concept of Organic

Organic effect is referred to an effect which, like plant and animated creatures, grows dynamically in all directions and no factor other than vital factor can violate and impede its growth. Examples of these effects are all natural creatures and phenomena in the world.

Relationship between Human and Nature:

In a general classification, the relationship between human and nature is divided into religious and cosmology, in a way that nature rules human and human is less valuable than nature. At second state, they have coexistence relationship. Human and nature are in balanced condition and human finds himself as responsible to the land and nature against God. At third state, human is firstly accomplicher and definer of the nature, then it is considered as creator and finally he is considered as destructor of the nature. The relationship between human and nature is individual at first two conditions and human along with nature is referred to something which is worked on and exploited [5].



Fig 2. Designing Method of Green House

Relationship between Architecture and Nature

The nature is influential in most strategies resulting to architectural creativity. The nature is ubiquitous; classification is undeniable, being considered as powerful instrument for inspiration. Its presence can be seen in metaphor, imitation, form dynamism and architectural materials [6].

Use of Green Roof to Save Energy Consumption:

Green roof is referred to a roof which is covered with growing medium. Such roof is made to change its dead space to a dynamic space. Although, these roofs are considered as private and semipublic spaces, they play an important role in urban ecologic outcome and creating desired quality in urban life. Changing roof of houses to green spaces improves humidity of the city, increases air exchange at areas with higher building density and improves free spaces between them. Introducing Environmental, Ecological and Geographical Context of Tabriz City

Azerbaijan plain lands and fields have been located at hillsides of two old volcanic mountains: Sabalan (called Savalan in Turkish) and Sahand. Various mineral and hot springs have surrounded them from thousands of years ago [7].

Climatic Solution in Designing

Studies and investigations about Tabriz city in the field of geographical and climatic characteristics of the land gives an image to determine its effects on design through concluding data and to change them into practical and usable guidelines. Cold climate and its relatively long duration in the city necessitate use of sunlight and optimal direction of buildings in ratio of it. Hence the main spaces should not be placed at shadow of each other. In the summer, also, we can use summer shadow through installing 30-80 cm canopy on southern wall, without preventing sunlight shining into the space in the winter.

Analysis and Selection of the Site in Tabriz City

Considering rapid development of technology, focusing on creation of dynamic and open spaces seems necessary in design of underlying complex in order to locate new technologies and equipment. On the other hand, establishing a spatial relationship among the site's available spaces (airport, communication pathway, green space ...) enables us to use them as one kind of spatial complementary.



Figure 2. Area of the site



Fig 3. Area of Underlying Site

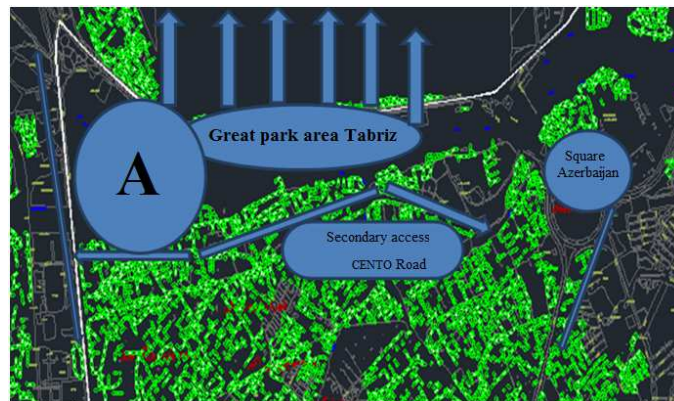


Fig 4. Proposed Alternatives for the Site

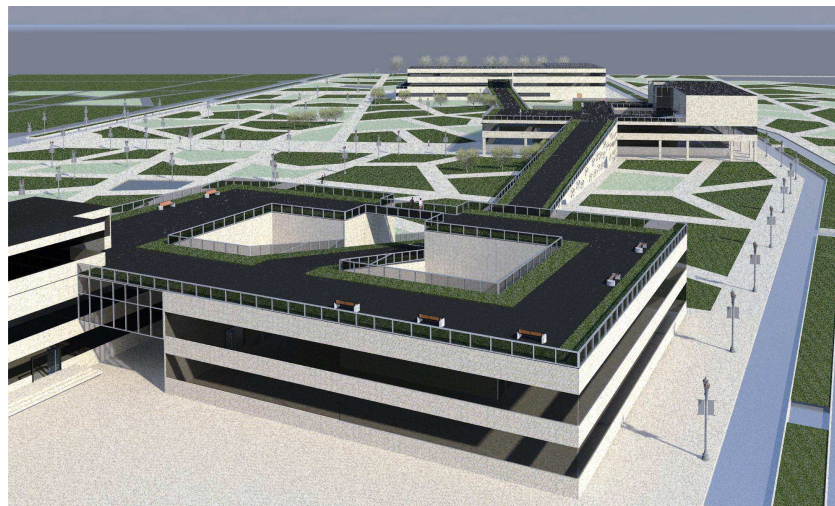


Fig 5. Site Analysis

Potentials of Selected Site

Being located at urban area, direct access to ground, air and rail transportation networks, vicinity and closeness to research and academic centers, vicinity to industrial zones and appropriate access to them, future development considering the site condition, desired environment and view due to its location inside Tabriz Grand Park, presence of required infrastructures.

Fig 4: Design Scheme of Completed Site of Technology Park According to Organic Architecture

Acknowledgment

We thank vice chancellor of Islamic Azad University of Shabestar and my supervisor Mr. Shaghghi (PhD) who helped me throughout the study.

CONCLUSION

The aim of current study was to establish a relationship between technology and organic architecture. If we consider Science and Technology Park as essence of technology of the land, then it seems we can provide new qualities through flowing spring of it, in accordance with their achievement bed and we can also use spatial methods and materials, spatial, water, light and sky fluidity, way of treating the bed, going to the heart of soil or being located above it which are among characteristics of organic architecture. Moreover, it can be concluded from current study that science and Technology Park has direct relationship with economy and these development centers can be economic resource and income resource for cities and countries at macro-level. Designing science and technology parks which rely on organic architecture patterns and solutions can provide appropriate conditions for establishment of Science and Technology Parks in Iran.

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