



Biological Collections; their necessities and needs for Nanotechnology in the new city of Parand

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ABSTRACT

The discussion of design in the new city of Parand, without the consideration of its environmental dimensions, can have many irreversible and unrecoverable consequences and effects both in the development and the exploitation phases, while the use of Nanotechnology for the provision of welfare, and further savings in costs and reduction of environmental pollutants is an important matter, therefore, the exploitation of it in biological collections as a human made physical element in the area and in connection with the existing environment and conditions that are interactively related to their environment, plays an important role in the quality of urban life and environment. This research is of descriptive-analytic type and it is intended to recognize the most necessary achievement of Nanotechnology application in the development of biological sustainability and new constructions in the new city of Parand. The statistical population of this research, are a group of the members of engineering council of Tehran province and Parand city, experts and pundits, out of which, 384 samples, have been directly questioned with the use of simple random method. After gathering field data through a questionnaire, the relations among the research variables are examined with the use of SPSS. The results of this research have shown that the most important achievement in statistical population's perspective in the exploitation of Nanotechnology for the development of biological collections is by 59.1% of the responses, related to acquiring renewable and recyclable materials and the weakest achievement is related to the "achievement of Nano-composite materials", by 17.3% of the responses.

Keywords: *New city of Parand, environmental pollutants, Nanotechnology, use of Nano, biological collections, urban environment.*

INTRODUCTION

Today, optimized exploitation of the potential possibilities and powers of any nation in the framework of goals related to human living environment has become one of the main local, international and national concerns. This matter is more important in arid and semi-arid regions of the world and Iran, especially in the new cities around Tehran including the new city of Parand, and the reasons for that are the vulnerability of the biological sources and the fragility of the ecosystems of this region, creation of small climatic pollutions, exacerbated landslide hazards, sound pollution, underground water and solid wastes, increasing population and also increase of region's pollutions that somehow reduce the natural environment of this city. Due the fact that these pollutions will gradually, affect the physical form of human communities and the norms and behaviors of these communities, the use of different technologies for the provision of welfare, and further saving of costs and reduction of environmental pollutants, are important, because the understanding and recognition of these great transformational technologies, will organization and develop many national plans in many countries across the world.

In this regard, following other factors, architects are also seeking new solutions to design new applications and provide living space, work, entertainment, and etc. The cohesion of and adhesion of architectural units fabrics, connection with the sky and earth, and protection against sun shine, has brought about the monitoring of climate, horizontal, compressed and covered landscape, in cities with semi-arid deserts. But what's ignored in the new cities around Tehran, are the crises resulting from biological agents, because natural agents and biological conditions play a fundamental role as the natural condition for the formation of the life of human groups in the regulation of settlement methods and ultimately, affecting the form of urban regions. In this regard, the development of biological collections with the use of

Nanotechnology that results in the change of the use of natural resources and human life structure, can be a central point for the preservation and survival of environment for the next generation, and create a strong relation between humans and the environment.

Accordingly, one of the new solutions is to use Nanotechnology, because Nanotechnology will cause great changes in the use of natural resources, energy and water, and will decrease waste and pollution. Also, Nanotechnology will provide the possibility to recycle and reuse materials, energy and water. In the area of environment, Nanotechnology engineering and science can, significantly affect the molecular understanding of Nano-scale processes that occur in nature. This technology can be used to solve environmental problems by controlling the emission of pollutants to develop green technologies. World energy status, is in a critical stage due to the discriminate use of recyclable energies and environmental hazards. Discovery of a solution will open the way for the survival and preservation of the future generation [1].

THE NECESSITY OF USING NANOTECHNOLOGY IN BIOLOGICAL COLLECTIONS

Nano is a name that is given to a production technology. As is clear by its name, it only realizes when there's a possibility to create objects from atoms, and in this case, it will provide the possibility of rearrangement with atomic accuracy. The nature of Nanotechnology, lies in the ability to work in the atomic, molecular levels and beyond in dimensions between 1 to 100 Nanometers, with the intention to build and interrupt the arrangement of atoms and molecules with the use of new tools and systems with new capabilities; actually, the goal of Nano, is to create the future, molecule by molecule [2].

Nanotechnology is one of the new technologies with a bright future, and the diameter of the influence of this technology is so high that it's said, that this technology can influence most of the aspects of the future life of mankind. This technology is controlled in a very small world and its goal is to create objects, atom by atom and molecule by molecule, with a down-up approach, and that's something that the nature has been doing for millions of years. Many material attributes such as color, hardness, brittleness, will become controllable. The possibility to provide proper materials with the desired specifications for different parts of a building and the heating and cooling equipment related to it according to our needs, will play an important role in the prevention of energy waste and the direct and indirect reduction of consumption [3]. So in the area of energy, Nanotechnology can significantly affect the efficiency, saving and production of energy and reduce energy consumption, and given the major changes that will happen in Nanotechnology in the next 10 years, most of that can be produced in Nano dimensions [4].

With the use of Nanotechnology, the cheap solar energy can easily be used. Professor Nate Lewis and other Nanotechnology scholars of California institute of Technology are examining Nano materials, who imitated the architecture in grass and the photosynthesis in it, to capture and save energy from the sun. In fact, Nanotechnology provides ways to replace fossil fuels with resources that are harmless to the nature, so any cheap material such as color would be changed into solar cell and battery. Colors, roofs shingles with normal appearance which are reinforced by Nanotechnology, can replace black solar transparent cells that usually consist of crystalline silica that are heavy and expensive [5]. So in the future, the biggest designs to build environments, will be really small. The provided designs in the area of Nanotechnology and its effects on the human environment, can be predicted in three stages; first there are a number of materials with Nanotechnology engineering structure, which are currently available to architects and constructors, and the transformation of constructions with the use of these materials, is frequently discussed. Some of these materials that can be produced by using Nanotechnology, include thin transparent layers of windows guards that are scratch resistant and automatically clean themselves by sun UV and rain. Glasses that adjust environmental light, despite being expensive, have working efficiency and are not yet mass produced. Second, with a deeper look, the efforts of today's Nanotechnology, will result an achievement in the next 15 to 20 years, and example of which are carbon Nanotubes which provide a unique resistance and flexibility for constructions. And third, in farther futures it can be seen that the widespread effect of Nanotechnology in human life and the way humans interact with the environment and constructions, will be inevitable and unimaginable. Sun resistant skins, invisible walls, and copying will all be placed in the realm of reality. Social, ethical and environmental transformations will not be separate from this transforming process [6].

Nanotechnology, creates fundamental transformations through changing the structure of human life and creates a strong connection between human and the environment. Maybe some of the predictions about Nanotechnology, are exaggerated, but its ultimate goal is to create materials piece by piece with various properties. Nano had different definitions in different times, and with the coming of this technology, it took a new meaning in a new form, and it provides the spatial geometry of buildings in the form of molecules and atoms. In fact, this is not a science-fiction dream, because the Nano-science will happen much faster than a reality. [7] The potential of this technology in the creation of materials that can provide

the maximum satisfaction of human needs, is the main factor which makes it the option for future designs, and amongst these designs are a few items that can be used as insulators which include, a type of Nano-powder materials that are used in eliminating and directing radiations in buildings, and carbon Nanotubes that are greatly used in industries and compound materials that use carbon Nanotubes such as walls with carbon Nanotubes with a thin layer of titanium oxide and are white, and very small particles are used in them. These covers are water-proof and corrosion resistant and cure the environment, because they also destroy the polluted air around buildings and use less energy to keep buildings warm or cold. These covers that are designed with the use of Nano systems, will clean buildings and provide health to the living environment, and these materials have a specific effect in the high resistance of metals that are used in the structure of the building [8].

Today the problem of the pollution of the interior of houses and buildings can be solved by building a device. This device uses a type of photocatalytic Nano particle called Nano breeze, to clear and purify the air inside the building. This device, decomposes harmful gasses resulting from burning or tobacco smoke, allergen particles, musty smell or spoil smell, the smoke of plastics, colors, perfumes and cleaners. This product, oxidizes volatile and biological aerosols. The density of this volatile organic chemical can be ten times higher inside the buildings than outside of them. Titanium oxide semiconductor crystals that are only 40 Nanometers in size, release free radicals and charge by UV photons, and this agent, turns organic pollutions to carbon dioxide and water. Electronic air cleaners also include ionizers and ozone producers. Ionizers, charge particles which lie on the surface of a room or on metal surface which need cleaning. These ionizers cannot remove gases or smells and they may even produce ozone, thus this matter shows the use of titanium oxide instead of electrical cleaners, and shows the importance of using Nanotechnology for the cleaning of the air of residual spaces [9].

Today, given the remarkable advances in the area of Nanotechnology development in all the scientific and specialized dimensions and particularly house construction and the fundamental effects on economic and social matters of the present society, and the public unawareness towards this specialized matter, we need to conduct studies and researches in the area of the effects of Nanotechnology for the advancement of sustainable biological architecture in the future constructions. In this paper, efforts have been made to find the most important achievement from the fundamental studies of this area that can be used to exploit Nanotechnology to develop future biological collections, which is the main area for the provision of welfare, cost and energy control and biological pollutants reduction. And this matter will be evaluated by the comments from a group of engineers that can attract private and public financing in the new city of Parand as a developing city.

MATERIALS AND METHODS

Due to the nature of the goals and subjects predicted for this paper, it's of descriptive-analytic type and is in the category of practical researches. Since interviews and questionnaires were used to gather data in this research, then this research can be called a survey research as well. The information required for this research is gathered by the two methods of document (library) and field methods. The statistical population of this research included a group of the members of the engineering council of Tehran and Parand, with specialized majors related to construction industry, and a group of the experts of this field. 384 samples were directly questioned with the use of questionnaire and the formula of Cochran, by the simple random method.

This paper had considered the following variables to identify the level of and the most necessary achievement from the use of Nanotechnology in the design and construction of biological collections, to promote the quality and reduce the destructive effects to develop biological sustainability: Acquiring renewable and recyclable materials in construction, acquiring proper materials to deduce the absorption of dirt, cleaning internal spaces, cleaning usable water (Nano-filtration), air cleaning colors and protective skins and radiation directors, climatic agents-resistant materials, acquiring sun radiation filtering, energy consumption control and saving, self-cleaning glasses and covers and concrete Nanotechnology. These variables were examined with the use of SPSS and One sample T-test.

RESULTS AND CONCLUSION

Today, different technologies are used to provide more welfare and reduce environmental effects and save costs especially in energy resources consumption. The use of Nanotechnology will play an important role to provide proper materials with the desired attributes in different parts of a building, for the reduction of energy consumption and the reduction of environmental hazards, in a direct or indirect way. Therefore, Nano-structures, are a combination of the form, performance, control and main facilities of a shelter that never wastes energy, and can save up to one million dollar of energy consumption per year, and the objective is to design a new type of building that is to a high level, consistent with the environment.

The basic premise of this research, considered the exploitation of Nanotechnology in the creation of biological collections, to be impossible. To examine this hypothesis, 10 questions concerning the application of Nanotechnology in the development of biological sustainability for the acquirement of the items below, were given:

1. To acquire renewable and recyclable materials.
2. To acquire proper construction materials to reduce dirt absorption and environmental pollution.
3. To acquire cleaned air in various residential spaces.
4. To acquire cleaned water by Nano filtration process in the optimization of the living environment.
5. To acquire self-cleaning and self-repairing Nano composite materials by concrete technology.
6. To acquire protective colors and skins and radiation directors.
7. To acquire construction materials highly resistant against climatic agents.
8. To acquire energy control and energy consumption saving.
9. To acquire sun radiation filtering and windows reflecting solar heat.
10. To acquire self-cleaning Nano glasses and Nano covers.

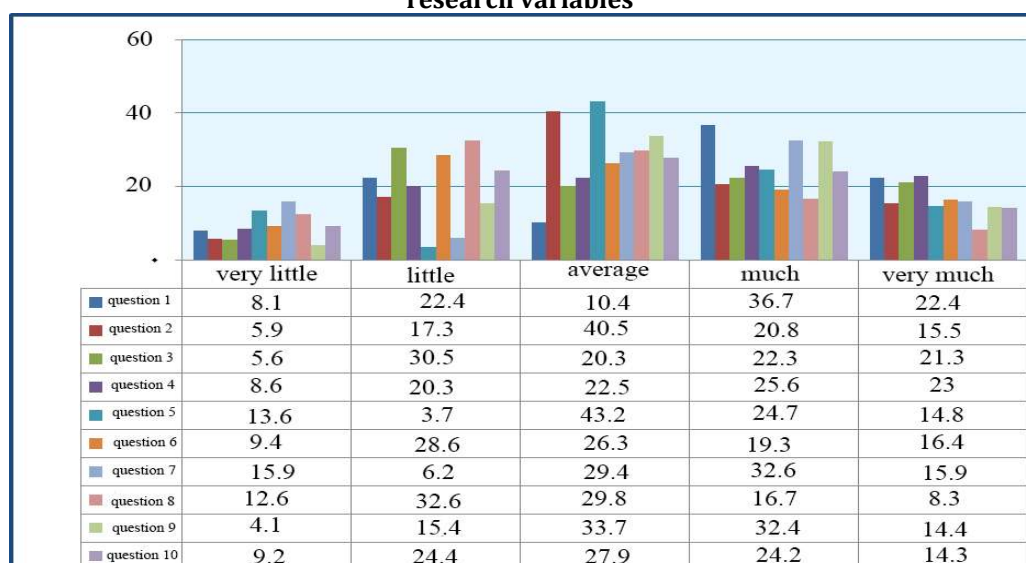
The results from the extraction of 384 questionnaires whose information is shown in chart number (1), imply that the most important achievement in the perspective of the statistical population in the exploitation of Nanotechnology for the development of biological collections is by 59.1% of the responses, related to acquiring renewable and recyclable materials and the weakest achievement is related to the "achievement of Nano-composite materials", by 17.3% of the responses.

In contrast to the primary assumption of this research that has considered the exploitation of nanotechnology to be impossible for the development of environmental sustainability, the results have shown that the effect of these changes is a little more than the acceptable mean, in a way that among the 10 mentioned factors in this research, all factors have shown values a little higher than 3. (Table 1).

This means that despite the relatively proper educational and scientific activities that have been carried out for the development of knowledge and its relevant technologies across the country, unfortunately, stakeholders and officials and even users have not used this technology in the discovery of the effectiveness nature of these materials in Nano-scale on some architectural and constructional elements, to provide the maximum welfare and cost saving and reduction of environmental pollutants and thus, to solve the problems in the construction industry. This issue, will double the necessity of informing and educating and efficient restatement in nanotechnology for the sustainability of biological and construction industry.

The results of One sample T-test have shown that the observed mean with the value of 33.30, was 30% higher than the expected value in this research, (table 2). Thus, the primary hypothesis regarding the impossibility of nanotechnology exploitation in the area of the development of biological collection in the new city of Parand, was proven, in the one hundredth level of error in the H1 area.

Chart 1 -The frequency number and percentage of the statistical population response to the research variables



Reference: research findings

Table 1: Analysis of the comparison of the mean of the comments of the respondents regarding achievements resulting from using nanotechnology for the development of biological collection in the new city of Parand

Significant level	T	Mean (observed mean)	Test Value (expected mean)	Research variables
0.000	11.909	3.68	3	acquirement of renewable and recyclable materials
0.000	4.532	3.38	3	acquirement of proper construction materials to reduce dirt absorption
0.000	5.765	3.25	3	Acquirement of cleaned air in various residential spaces.
0.000	5.513	3.440	3	acquirement of cleaned water
0.000	4.170	3.32	3	acquirement of self-cleaning and self-repairing Nano composite materials
0.000	.747	3.37	3	acquirement of protective colors and skins and radiation directors
0.000	4.083	3.26	3	Acquirement of construction materials highly resistant against climatic agents.
0.000	8.727	3.22	3	Acquirement of energy control and energy consumption saving.
0.000	8.324	3.51	3	acquirement of sun radiation filtering
0.000	4.871	3.32	3	acquirement of self-cleaning Nano glasses and Nano covers.

Reference: research findings

Table 2- One sample T-test

One-Sample Statistics						
	N	Mean	Std. Deviation	Std. Error Mean		
Calculated mean of the research hypothesis based upon the 10 provided questions	384	33.3301	6.54376	.33215		
One-Sample Test						
Test Value = 30						
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Variance decomposis performed in the 10fold research questions	10.533	382.0	.000	3.33010	2.5345	4.2101

Reference: research findings

Therefore in order to change the current construction approaches in the new city of Parand which lack this technology in their buildings, and based upon the results of this research and the results from the other researchers' works mentioned above, the following recommendations are offered to promote the adoption of this technology for the environmental sustainability and construction of future buildings in this country:

RECOMMENDATIONS

1. Integration of theoretical and practical topics related to different technology patterns, into academic courses, to promote the adoption of this technology in the construction industry and awareness of using nanotechnology in future projects.
2. International cooperation for the facilitation and acceleration of research activities and development and supporting of newborn small and medium Nano-companies to develop this technology in the construction industry.

3. Focus on the method that advanced countries use this technology and modeling their performance method with nanotechnology.
4. Promotion of the awareness of officials, stakeholders and users about the benefits of using nanotechnology, especially in the area of energy control and saving and environmental effects.
5. Promotion of general self-confidence in using this technology in public and private constructions, for energy saving and reduction of environmental impacts.
6. Formation of workshops and advertisement of the achievements of using nanotechnology in country-wide constructions.
7. Inviting the engineers and experts of this technology from advanced countries to our country, and provision of practical training to national engineers to institutionalize and motivate the use of this technology in future constructions.
8. Considering a proper government budget and capital investment to execute the studies and researches in the area of nanotechnology in the construction industry.

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