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## Study on significance of industrial design in environmental protection

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### ABSTRACT

Human race has made brilliant achievements in the natural and economic development. At the same time, ecological destruction and environmental pollution have a real threat on human survival and development. So, it's a urgent task for humanity to protect the ecological environment and to achieve sustainable development of human society. Industrial design, as an important part of environment, has played a key role in the creation of the physical environment and lifestyle of human existence. Therefore, industrial design has become an important aspect of human solutions to environmental problems. The author presents how to solve the environmental problems in industrial design from the legal aspects and its significance in this paper. Compared with previous work, the core innovation that has been done in this research is that links the environmental issues in industrial design to legal rules and proposes technology management and verification methods.

### KEYWORDS

Environmental protection; Industrial design; Legal rule; Technology management.



## INTRODUCTION

Since the Industrial Revolution, accompanying with the unprecedented pace of the world economy, people also paid a heavy price which the human environment have been seriously destructed. Such as natural environment destroyed, water and air pollution, global temperatures rise, the destruction of the ozone layer, a mountain of garbage and other waste comes direct from industry, etc. Human come to realize that we must take a path of sustainable development instead of development at the expense of their own survival environment<sup>[1]</sup>.

Sustainable Development means “meets the needs of the present without compromising the needs of future generations “. Thus, the requirements of sustainable development is to change traditional attitudes and perceptions to nature completely and to change the traditional model of development in order to reduce and eliminate unsustainable patterns of production and consumption behavior. The responsibility of industrial design is not only just for enterprises to obtain economic benefits, but also for the benefit of coordinated development between man and nature to promote social progress and development.

The awareness rising from environment protection has become a distinctive feature in the contemporary industrial design.

## ENVIRONMENT OVERVIEW

### Environmental concept

Environment is everything surrounding us, including a variety of natural and anthropogenic factors that affects human survival and development<sup>[2]</sup>.

Environment for human survival will be divided into two categories of social environment and natural environment. The natural environment is the objective material world surrounding us and is the material basis for human survival and development. The social environment is an artificial environment created by human in order to meet their improving material and cultural life based on the natural environment.

### State of the world environment

Nowadays, there are very significant risks which are artificially manufactured on the earth, although the environmental situation looks very optimistic. The gas discharged by the world are more than 600 million tons annual and threat to mankind. It is estimated that one-third of the earth's land surface faces the danger of desertification.

From the Dryopithecus appearing in the forest to now, everyone has never stopped request from the nature. The earth has now no longer like before. Now the most significant environmental issues of the world are :global warming, ozone depletion, loss of biodiversity, acid rain, forest dropped, desertification, shortage of resources, serious water pollution, air pollution and solid waste pollution.

### The status of China's environment

With increasingly powerful China's national strength, the pace of China 's economic development is so shocked the world, however, the ecological environment has paid a huge cost.

According to incomplete statistics, land of China have encountered acid rain and a half water in 7 great river is completely useless. Even, about 1 /4 of the Chinese people do not have clean drinking water. Among them, the 1/3 urban population is breathing polluted air and fewer than 20% of the city 's trash is handled in accordance with environmental protection.

The major issues we are facing in our environment are serious like soil erosion, desertification, grassland degradation, forest resources dropped sharply, the extinction of species, falling of water tables,

reducing of the lake area, water pollution increasing, air pollution, excessive waste storage, garbage surrounding the city, the environment contamination spreading to rural areas and so on.

### **Chinese legal rules for the protection of the environment**

With the rapid development of the economy, Chinese environmental issues are very prominent after the reform and opening up. On the contrary, the western countries have entered the stage of vigorous management to environmental pollution. China should learn the experience from the West, to avoid repeating the mistakes from development to pollution and governance. The Chinese domestic two opposing voices did not stop until the “ People's Republic of China Environmental Protection Law”was enacted in 1989. Speed of environmental problems is still far greater than the speed of solving environmental problems because the environment conservation of the “Environmental Protection Law” is too weak.

Our Environment and Resources Protection Law system mainly consists of the following components :

Constitutional provisions on the protection of environmental resources. Article 26 of the Constitution: “The State shall protect and improve the living environment and the ecological environment, prevent the pollution and other public hazards”. “The State guarantees the rational use of natural resources, protects the rare animals and plants, prohibit any organization or individual seizure or destruction of natural resources by whatever means”<sup>[3]</sup>.

Environment and Resources Protection Law: the “ People's Republic of China Environmental Protection Law”promulgated on December 26, 1989 said the purpose of the Environmental Law and mission is to protect and improve the living environment and the ecological environment, to prevent the pollution and other public hazards, to protect the human health, to promote the development of socialist modernization”.

Environmental Resources separate regulations. At present, China has promulgated laws and regulations are mainly “Atmospheric Pollution Prevention Act “, ”Water Pollution Control Act”, ” Environmental Noise Pollution Control Act “, ”Solid Waste Pollution Prevention Law”, ” Soil and Water Conservation Act”, ”People's Republic of China Marine Environmental Protection Law”, ” Nature Reserves Regulations”, ” City Planning Law”and supporting laws and regulations.

Other branches of law in the legal norms on the protection of environmental resources. For example, ” General Rule of Civil Law of People's Republic of China”, article 83 provisions on real property adjacent relationship, article 124 on infringement on environmental pollution;” Criminal Law of People's Republic of China”, chapter VI Section VI on “destroying the environment protected resource crimes “. In addition, International Convention that China has concluded or acceded to is an integral part to protect environmental resources.

While China's laws plays a role for the protection of the environment, the law is not perfect. This reflects the importance of industrial design in Environmental Protection.

## **INDUSTRIAL DESIGN OVERVIEW**

### **The concept of industrial design**

International Council of Societies of Industrial Design (ICSID)gives a complete definition for the industrial design in 1970: “Industrial Design, is a creative activities based on the industrial situation in order to determine the characteristics of the goods produced. To adapt to the characteristics of goods, means not only the article, but both views of users and producers. This means focusing on the fundamental relationship between the structure and skills, which expanded the the human environment under the conditions of industrial production”<sup>[4]</sup>. Fundamentally speaking, as a intermediary of person -

Products - environment - social, industrial design impacts on every aspect of people's lives based on people's needs with all kinds of industrial products. It's fundamental purpose is to create a more perfect way of life and to improve the quality of life.

### **The idea of industrial design**

Industrial design can bring the most impact to people. It's design, shape, style, atmosphere gives a feeling of beauty and art enjoyment. Thus functions are both in spiritual and material aspects.

Industrial design focuses on the meaning of material function and people's feelings, also research on the interaction between people with substance. It based on the needs of people constantly changing as a starting point to explore the people's way of life by means of positive momentum. Industrial design is no more a simple art design and a purely artistic shape than a product of science, technology, arts, economic integration. It services human through market exchanges under the constraints of science and technology, social, economic, cultural, artistic, resources, values, etc.

## **RELATIONSHIP BETWEEN ENVIRONMENTAL PROTECTION AND INDUSTRIAL DESIGN**

### **Environmental Awareness in Industrial Design**

As human activities to plan and create the living environment, design activities plays an important coordinating role between the three elements of the world---human, community and environment.

Any human design will effect on human in different ways. We can't ignore the long-term or comprehensive environmental impact while we evaluate to any activity only from the immediate or local interests.

Design has received unprecedented attention as a practice from disorder to order. However, the design value can be judged after the implementation of design activities from the following three aspects :1). Whether the design takes protecting the natural environment as precondition ? 2). Whether the design takes optimizing the cultural environment as the responsibility ? 3). Whether the design takes to balance the needs of people as a constraint?

Even though contemporary industrial design seems to have emphasized the concept of people-oriented design, they overlooked an important prerequisite - protecting the environment. We lack a systematic concept from a design perspective, i.e. Many of our designs in the past are aimed to meet people's needs best only start from, ignoring the sustainable development, the product's features and styling solely. Here, we emphasize more ecological design principles rather than the product 's humanistic design.

From some perspective, industrial design led to the destruction of the waste of social resources and the environment for the reason of commercial competition---commercial competition drives commercial design to the extreme and promoting people into excessive consumption then. In order to continue the development and survival of human, industrial design is facing the challenges and opportunities. On one hand, negative effects caused by design since the industrial revolution makes people to question on the concept of modern industrial design resulting in industrial design facing unprecedented challenges. On the other hand, from the view of protection of the environment, reduce waste of resources and sustainable development strategy, human are just a part of the nature and must proceed from the ecology planning for human life because maintenance of the natural environment is a prerequisite to ensure the survival of mankind.

## **ENVIRONMENTAL PRINCIPLES IN INDUSTRIAL DESIGN**

Industrial design will be restricted by many environmental factors in the process of creativity and change environment, e.g. the level of economic development, technical conditions, energy, materials, etc. Industrial design needs to establish harmonious relations between human, social and environment under the condition of taking into account the social environmental benefits of natural environmental benefit in order to achieve sustainable development.

### **Environmental aspects of industrial design**

Design is a social category in the process when human change the world purposefully. While the design is a natural category also for it is limited by the natural environment. Successful design should be an unite combine with social environmental benefits and physical environmental benefit. The products designed can improve performance and reduce the loss of energy and cost. Thereby it can reduce the adverse impact on the environment. The designer, with environmental awareness, may create the maximum value using of resources costs as small as possible and minimize pollution in the process of production, use and recycling.

## **THE SUSTAINABLE DEVELOPMENT OF ENVIRONMENT AND INDUSTRIAL DESIGN**

### **Environmental sustainability**

Sustainable Development, from aspect of resources and environment, means maintain or extend the resources using productively and did not affect future generations' production and life for exhaustion of resources. Since the Industrial Revolution in 18th century, the process of human civilization accelerate greatly and enhance the welfare of human beings. However, the natural ecological environment, where human live, has been greatly weakened and destroyed behind the huge victory, e.g. environmental pollution, ecological degradation, global warming, the spread of deserts, etc. To achieve sustainable development, we must make optimal combination between the resources, the environment, social and other factors and optimal coordination within economic, technological, and cultural aspects. Only in this way can we find the best overall development and social progress in the social structure and function.

### **Sustainable development of industrial design**

Sustainable Design means we get modest profits and development under the premise to meet consumer demand with the ecology principle as guideline in a system of People --- Machine --- Environment. Meanwhile, we should focus on the natural ecological balance, reduce environmental pollution, protect and conserve the natural resources and maintain long-term interests and development of human society.

Sustainable industrial development reflects in three areas:sustainable development of ecological environment, sustainable development of economic growth and sustainable development of society<sup>[5]</sup>. The design, as one of the basic forms of social and economic activities, is creators of social wealth, the manufacturer of environmental pollution also and the responsible person in environmental protection or ecological protection. According to this view, industrial design can not only consider the design of a narrow object but put it in a variety of ecosystems, considering its relationship with the living body and the environment including small-scale relations with large-scale relationship, sources of natural materials, energy cycle, synthetic materials recycling, waste loop processing, impact on other life and natural and effect of temperature, water, air, etc. Therefore, in order to achieve sustainable development the industrial design must adjust their way of thinking and change design concepts.

Sustainable industrial design is a new design raising in the case of the negative effects of traditional industrial design to human existence. The human has no choice facing the lessons learned in decades. Protection of resources and ecological environment is the most important in human

development. It's inevitable for mankind to assume this responsibility through sustainable industrial design.

Industrial design is based on the premise of "nature-based"<sup>[6]</sup>. We should control the effect in the minimum range in various stages of the design process and follow the principles of sustainable use of resources to maintain ecological balance and development.

This is the ultimate goal of sustainable industrial design to improve and enhance the quality of human life continuously and to meet the needs of the comprehensive development of human beings.

### **Sustainable development and the environment product design**

When the science and technology developed brought a great contribution to mankind, we consume the environment and resources for human survival continually at the same time. The Green Organization gives a negative attitude to Western model of economic development and consumer attitudes. They promote simplicity life and control immoderate consumption of products. From the 1980s, all European organizations and political parties are concern particularly for green ecological and resource consumption. The EU has proposed an environmental policy:Polluters must be responsible for the consequences of pollution. The United States has tried to pass laws to force companies give a limit waste in a period. Indeed, Western governments have laws related to suppress the negative impact of industry.

With China's accession to WTO, there is a broad prospects for China's economy development. However, as China's industrial design is still in its infancy, the lower level of environmental Indices embodied in products will be affected their export competitiveness directly. Developed countries, with its relatively high level of environmental standards, may disguised restrict the developing countries' sale goods to their countries. This requires us to strengthen relevant laws to enhance the environmental level of products.

## **THE LEGAL RULES IN ENVIRONMENTAL TECHNOLOGY AND MANAGEMENT OF INDUSTRIAL DESIGN**

### **Overview of environmental technology and management**

Environmental Management means, according to economic rules and ecological rules, that people meet their own basic needs and do not exceed the permissible limits of the nature by means of rules in such aspects of administrative, economic, legal, technological, educational and news media.

Environmental technology is an important part of environmental regulations and technical basis for standard-setting emission limits. The core of environmental management is to formulate some rules, such as, industry clean production technology, pollution control technology, pollution prevention technical guidelines and technical regulations, to guide the production process and to provide technical support and protection for environmental management. Through coordinating the relationship between technology, economy and environmental protection we can ensure continuous improvement for environmental quality.

Successful experience of developed countries shows that. It is can not rely solely on the market of development and application of environmental technology but the source of power must come from the government 's regulatory requirements, standard and legislation.

### **China's environmental technology and management**

With the development of the environmental protection. China has formed a set of effective Environmental Management System that main content consists with environmental policy, environmental laws, administrative regulations and environmental standards. In aspects of Environmental technology management, the works, that were carried out in appraisal and acceptance of environmental science and technology achievement, development plan of environmental protection industry, environmental assessment and application of scientific and technological achievements, Green

Technology Policy, technical standards of environmental protection equipment and formulation of engineering specifications, played a major role in China's environmental management<sup>[1]</sup>. But there are still large gaps in our environmental management system and environmental management compare with foreign countries, specifically, reflecting in that environmental technology assessment system is not perfect, environmental technology on the market shows a mixed bag and lack of a comprehensive environmental management system and technical support system, innovation and advanced technology is not strong, and so on.

The “Opinions on enhancing environmental technology innovation capability”, issued by State Environmental Protection Administration in 2006 said, the project has been implemented in the national environmental technology innovation projects, environmental standard system engineering and environmental technology management system<sup>[2]</sup>. It must enhanced environmental technology innovation capacity of China. Especially, the 8th meeting of the 12th National People's Congress, which closed on 24<sup>th</sup>, April, 2004, passed The Environmental Protection Law of the People's Republic of China (revised draft). The newly revised law has made major changes on the aspects of concept of environmental protection, legal responsibility and provides a stronger legal basis in environmental protection.

### **Inspiration from foreign environmental technology management**

It has been used successfully of foreign environmental technology management system. China can get some inspiration and reference from it. They are follows:

Technical and economic policy should adapt to technological level for a certain period to reflect industry characteristics. We should form a environmental technology policy covering all technical areas as a whole on the basis of absorbing the advantages of EU environmental technology policy. Meanwhile, we should lay down BAT guide covering various industries to instruct the application of environmental technologies. The government should absorb characteristic of American technology policy in the details to draft environmental technology guideline in order to limit different emission sources. Technology assessment system should reflect the objective and just feature and assessment methods should be scientifically valid. Environmental Technology Assessment System of China should use third-party evaluation system and eliminate irregularities in assessment in order that the results is scientific and impartial. These measures guarantee that we can increase our market penetration and competitiveness in future.

## **SUMMARY**

Industrial design is a creative activity by using scientific, technical and artistic means under the conditions of modern production. Also, industrial design is an inevitable demand of industrialized society, practical value of multitude and an integral part of human production life. Moreover, it's an important means of improving the human way of life and improve the quality of human life. We can verify the proposed methods in practice through the elements mentioned above.

With the increasing development of human society and the environment deteriorating, we should recognize the role of environmental protection in industrial design. Industrial design play an important role in modern society because it can promote everything in a harmonious world when it make people and environment in a coordinated relations. We also believe that there will be an increasing number of green design around us with the legal rules of environmental protection in the foreseeable future.

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