

The Man-made Ecosystem

The ecological approach to product design

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Abstract: This thesis proposes a hypothesis by ecological approach to product design, considering all of the man-made products as a semi-ecosystem, and discussing about the interaction among these semi-ecosystems. We have found some similar phenomena between most of the artificial products and natural ecosystem; they both have the similar principles. The competition of products basing on marketing is very similar to the “Species-competition” of the Ecology. The model-change of products is like the “Species-evolution”, that is the ways we can have many kinds of new designs developed from the same basic concept, just like all unlike descendants have the same gene form their ancestors. Very similar to the “Variation” of the Ecology, lots of design renovations on the intensively market-change, typically the excellent and workable designs can be survived by market selection. We have also found the “Mimetism” phenomenon in many products, the products of infamous company are usually trying to be designed appear-like to the well-known brand. The “Parasitism” and the “Symbiosis” phenomena can be observed in some products too. At last, similar to the “chain of provisions” phenomenon has also found on the products, which the existence of the individual product almost depends on the other product. Therefore, we conclude all of the artificial products as an Ecosystem-to-be, and we call it the “Man-made Ecosystem” (or “the 3rd Nature”). On the other hand, some characters like the ecosystem also have found in the field of the standards of technologic specification, the patterns of consumer behavior and the restrictions of the law, etc. As we consider the field of laws, cultures, standards, rules ... to be analogous to the ecosystem, we call it the “Man-agreed Ecosystem” (also known as “the 2nd Nature”). Certainly many of the competitions and evolutions among these kinds of standards and measures can be observed, especially in the field of the IT-products. After defining the “Natural Ecosystem” (the 1st Nature), the “Man-agreed Ecosystem” and the “Man-made ecosystem”, we have discussed the interactions and mechanics among them. Through observing these three ecosystems, we have found most of the survived designs were selected by 2 interactions, one was between the “Man-made Ecosystem” and the “Natural Ecosystem”, and the other was between the “Man-made Ecosystem” and the “Man-agreed Ecosystem”. All of these 3 ecosystems have given large influence on the development strategy of product design.

Key words: *Product Design, Ecology, Man-made ecosystem, Man-agreed Ecosystem*

1. Introduction

After the development of our human being's civilization, we human being have made a number of uncountable artificial things on this planet we're living now. A lot of artificial things formed one huge set, for example from the harbors, the bridges, the roads to the architectures, from the cars, the furniture, the electric appliances to the stationery. Comparing with the Natural world, we discovered that many similar phenomena resemble to the natural ecosystem among the artificial things set. In this research, the artificial things set is called "the Man-made semi-ecosystem", also called as "the 3rd Nature".

On the other hand, according to the evolution of the civilization, we have a lot of laws, standards, properties and social restrictions are set to be behaved in our human society. These kinds of laws, standards, properties and mechanical specifications etc. are also gone to form a complex, abstract and huge system. We also discovered some phenomena resemble to the natural ecosystem in this huge system. In this research, it is called "the Man-agreed semi-ecosystem", also called as "the 2nd Nature".

And, in general, a so-called natural ecosystem is called as "the 1st Nature" in this research.

2. Documentary

According to the related documents of the past, it is roughly divided into two kinds of approach. One adopted a partial viewpoint or method from ecology to search the possibilities of design. The other one was from the angle of the history of science and technology, and it searched for the evolution phenomenon between the technology and design. But both of these two approaches were not completely elaborated in all respects. Especially, in regard to the field of the interaction between human's laws and the change of human being's society, there were still few research found.

In this research, we hypothesis the whole "the 3rd Nature" (=Man-made ecosystem) not only have the evolution phenomenon, but also have all the ordinary phenomena in the natural ecosystem. Moreover, we also assumed that the interaction relationship existing among the 3rd Nature, the 1st Nature and the 2nd Nature were more closely than our human being's imagination.

3. Method

In this research, we adopted the "natural observation method" (or called "fields observation method") and "Physical Condition Analysis" to do our research on the Man-made ecosystem, and discussed the phenomena among them. The IT (= Information Technology) products and their related technology standards, properties and specifications were the main objects in this research.

3.1 Species competition

3.1.1 Species competition in the Man-made ecosystem

"Boycott" mutually exists between the products design in the same category.

Except for very few consumers' buying for hobby or collection, most of the consumers purchase only a necessary amount for necessities of life. Therefore, consumers face the choice of shopping. He has to do judgment and decision from the element of external shape, the function, the design, the price and the brand among the products he want to buy. And finally he makes a decision to buy a product (a design). Thus, we found the boycott is existing among the products of different design in the same category made from different

manufacturing companies.

By the process of the mass manufacturing of a designed product and the marketing selling network, a good-designed product can be purchased or chose by consumers. When we considered the designed product made by a same manufacturing company as one kind of the “artificial species “, thus we found the similar “species competition” phenomenon in the natural world also occurred among these kinds of artificial things. In order to get greater business profit, most of the companies consider it was a good way to reach their purpose by a good industrial design. Therefore, under the goals of expanding the market sharing rate and increasing business profit always led to the boycott-effect of every kind of the products (artificial species). This is so-called the “species competition” phenomenon.

3.1.2 Species competition in the Man-agreed Ecosystem

Similarly, a competition phenomenon exists during the standard of the technology. Similar phenomenon of the “species competition” also came into existence in the field of technological standards and properties. Many different industrial leagues and organizations have made many kinds of different technological standards and properties. Thus the competition among them occurs all the time. Some examples in the past can explain us this kind of competition. For instance, VHS-system vs. Beta-system in the old Video Tape Age, IEEE1394 vs. USB for the transfer property, blue-tooth vs. HomeRF for the cordless transfer property, and so on. Only the last winner can be survived, the failure ones of technological standards and properties go to die away from the world.

3.2 Gene and Evolution

3.2.1 Gene and Evolution in the Man-made ecosystem

The products with different function appeal are due to catch different marketing segmentation and different market targets. Such kinds of design concept also appear on series product. It means they mutually share the most design characteristics. Resemble to human being’s gene, the design concepts are kept and passed to the next generation all the time. Including the series products of the IBM’s “ThinkPad series”, the Sony’s “VAIO series”, etc., they show us the products made by a same company just like members of the same family always share many very similar “design genes”.

Time is the other factor that pays a big influence on the model-change of a product design. The new technology is applied to take place of the old ones, and the market-taste also gets changed time by time. Therefore, even sharing the same genes, design of product gradually gets evolution by itself.

3.2.2 Gene and Evolution in the Man-agreed Ecosystem

The technological standards and properties also have gotten evolution from time by time. For example, from WiFi802.11a to WiFi802.11b, and the newest one is WiFi802.11g. During the evolution of the technological standards and properties by time-change, we found the new ones typically are generated by old ones, however the new ones contains the most characteristics of the old ones. Such phenomena demonstrate that they resemble to human gene will pass its characteristics from old generations to new generations.

3.3 Variation

Most of he series products not only share the same design gene but also have occasionally to do some design shift catering to meet the changes coming from the outer surroundings including the sudden change of market-taste, technology standards and laws and the other changes outside. Such kind of variation phenomena

always can be found in the evolution movement of the natural ecology world. The sudden changes shown from the gene present an important meaning. That indicates in order to survive themselves the industrial products resemble to the natural species have the tendency toward variation or to make changes accompanied by the drastically environmental changes.

3.4 Mimetism

For the sake of keeping surviving, most of the product design shown in the small-and-weak brand usually imitates or follows the steps of the big-and-strong brands. Such kind of mimetic phenomena have shown in the natural ecological world. For example, many kinds of the IT products with transparent external design that followed and imitated the Apple's i-Mac. At the present time, too, so many imitation product design of i-Pod's MP3 is present in the market. These cases are also good evidence to explain the Mimetism phenomena.

3.5 Parasitism

The parasitic one has to depend on its lodging host for existence and the parasitism can not exist alone when it part from its dependent lodging host. The parasitic one shared the dependent relation with its lodging host. Some kinds of Parasitism's phenomena have found in the 3rd Nature. One of the cases is the connection between the remote controllers and TV sets. The remote controller becomes useless when the TV-set does not exist. The parasite cannot survive when it is away from its host.

3.6 Symbiosis

The phenomena of "Co-existence" recently have shown in the field of the IT products that always kept changing. For example, in Japan, the Nintendo Company has a product of portable game-machine that can be co-used with mobile phone. The users buy them because they want to use them to play with friends that live far away. Therefore, the Nintendo can make good sell to gamers who need that kind of products and the telephone companies also make a lot of profits from the same consumers' using of phone-calls.

3.7 Chain of Provisions

The relationship among all kinds of the IT products is undergoing to become more and more closely, especially the relationship between the personal computers and their related products has already established very deeply chain-like dependent relation of each other. Only one or any of their partial products stop manufacturing, or disappear in the market by accidents or unknown reasons the chain-like relationship will go break and the other part of related products will lose their market for their users. Similar to the Natural Ecosystem, the extinction phenomenon will be happened in the world of the IT products when "Chain of Provisions" goes break.

4. Results and Discussion

4.1 The Establishment of the Man-made Ecosystem

Concluding all of the above, we found that many phenomena appearing in the Man-made ecosystem resemble the phenomena that have existed in the natural ecosystem we've known. This is the reason that we

consider the whole Man-made ecosystem as a semi-ecosystem.

In the “Man-made Semi-ecosystem”, though every kind of the species (products) cannot give birth by themselves, and all of them are made by people’s design and mass-manufacturing, but most of the evolution phenomena and natural rules existing in the Natural Ecosystem also are appearing inside this system.

Most of the natural rules existing in the Natural can be applied to the Man-made Ecosystem. Because the Man-Made Ecosystem (=the 3rd Nature) is similar to the Nature world always full of dynamic phenomena constantly. Therefore, we thought we need to discuss and to find out what are the factors affecting the changing of this dynamic system.

4.2 The Nature Selection inside the Man-made Ecosystem

According to the Biogeography, owing to the limitation of environment resources and living space, the population size of the species have the tendency to keep a changing and evolutionary balance by each other’s interaction. The same phenomena were also found in the Man-Made Ecosystem. The interaction among many different man-made species (= products) in the Man-Made Ecosystem is existing and always keeping go on constantly.

In Japan, the MSN’s users are very limited. Because the mobile phone is very popular and full of so many convenient functions catering for the user’s need. The newest design of mobile phone even can do the photographic function. Therefore most of the users in Japan select the mobile phone, but not the MSN, as their main choice for chatting with friends.

This is the so-called “Natural Selection” and “The needed that survive” principle inside the 3rd Nature (the Man-made ecosystem).

4.3 The Interaction Among 3 ecosystems

We have identified some interaction relationship existing among these 3 ecosystems.

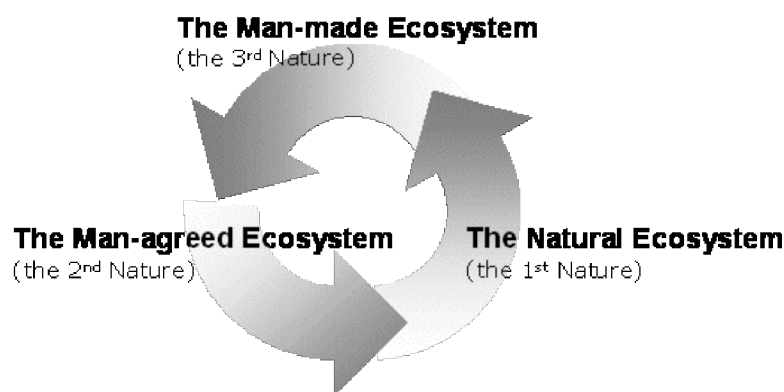


Fig.1 the relationships among the 3 ecosystems

4.3.1 The 2nd Nature affects The 3rd Nature

Many different kinds of law, rules and standards made by human society took major influences directly or indirectly on the development of man-made species (=products).

Different to the other countries, the mobile phone in Japan has its own unique system. At the present time three or more mobile phone companies have their different specific system and standards that not same to one

another's. The manufacturer has to make different kind of mobile phones with different specific standards for different mobile phone companies. In Japan the personal phone number of the mobile phone is attached with the machine, so it is a common sense that none of the consumers can change his own phone number by himself. But in Taiwan or other countries, the consumers can easily change their phone number by themselves, because all of their mobile phone companies share the same manufacture standards. The consumers only need to buy a new card with a new phone number inside and change the old card with the new card inside the phone machine when they want to renew a new number in Taiwan. We have discovered that the different standard of mobile phones in different areas also showed its big influences in the market scale and selling too. This case indicates that the 3rd Nature is easily influenced by the 2nd Nature and the interaction between them is very close.

4.3.2 The 1st Nature affects The 3rd Nature

Many factors coming from the climate and geographic condition were putting its direct or indirect influences on the development of man-made species. For instance, we found the architecture, furniture and transportation design in the tropical countries are very different from those in the frigid countries. The same thing is occurring in the field of the IT products. For example, Japanese living space is very limited, that is why the PC and its accesses must be a compact design. This case showed us the 3rd Nature was entirely influenced by the 1st Nature.

Another case on LCD products demonstrated us the evidence that the 1st Nature has a big influence on the 3rd Nature. That why the LCD can take place of the CRT is owing to the LCD is much more compact than CRT and its smaller size get more popularity than CRT in Japan where most consumers living in a very limited space. Thus the products that compact and smaller size than other products with the same function will get much more chances for surviving in Japan than in the other countries.

4.3.3 The 3rd Nature affects The 2nd Nature

In the other way, we found the man-made species play a big role to influence the change in the 2nd Nature.

The mobile phone was the most distinct case to show the truth. For instance, after the mass production and mass consumption of the mobile phone, many countries have made law to prohibit the drivers using mobile phone when they are in driving. In many cities in Japan, the mobile phone was forbidden to use in the subway and bus.

4.3.4 The 3rd Nature affects The 1st Nature

Most of today's environmental problems came from man-made.

In fact, recently the variation and abnormal phenomena in the Nature World was due to the influence of man-made. For example, we found that some hermit crabs used water-pipes or plastic can or something like that as their lodging house when they found no suitable shells for them to live.

5. Conclusions

5.1 The Extermination of the Species

Though it was still an unclear puzzle in extinguish of the Dinosaurs, but the biology researchers have got a lot of researches on knowing how the species became extermination.

In the same way, in the past we found there were so many man-made species have disappeared.

5.1.1 Extermination by Species competition

The new species got die out or become extinct owing to the failure of facing new challenge in the 3rd Nature. For example, they cannot use English typewriter to write Kanji (Chinese-Character) in Korea, Japan and China because they mostly use Kanji (Chinese-Character). In the 1980s, a very popular product called “Wah-Pu-Ro” (=Japanese Word-Processor) was wide-spread for typewriting Japanese in Japan. But now after the wild-spread of personal computers and office software suit, all over the world, the “Wah-Pu-Ro” was disappearing in Japan now.

5.1.2 Extermination by the change of the 2nd Nature

The other reason of the extermination of the man-made species is coming from the outside environment, especially the influence of the 2nd Nature. The change of law and technique standard is attributed as the biggest influence on the extermination of man-made species. In Taiwan, one decade ago when the stock market was very hot and in a very booming time, many investors used a passenger-like device called “Stock Navigator” to exchange the information of the stock market on real time. But now, after the boom calm down, nobody use the Stock-Navigator and they disappeared from Taiwan.

5.2 “Market Selection” or “Standard Selection”

Which is the most important factor that pays crucial influence on the distribution of the 3rd Nature, is it the 1st Nature or the 2nd Nature? This investigation found the changing on the standards is the most crucial influence for product design especially in the field of the IT products. The viewpoints in the past time considered that product design was dominated by the market scale and market demand. But it shows that the specific standards and rules have a stronger influence on the product design on the IT products. Before, the consumer’s preference that collecting from market survey dominated the development of product design and the outcome of market survey was considered as the most important data for doing product design. But now we found that the tendency of the shifting on the standards or rules is considered as the most crucial influence for product design in the field of the IT products.

5.3 The Estimation of the Artificial-species population size (market scale)

People working at the front line of R&D play a very important role to judge and predict the future market scale of the product. A few years ago, before the i-Pod shown on the market, none can image how big of the MP3-player market is going to be. And now it is too popular to beyond our imagination. On the other hand, some other kinds of product like PMP (Personal Media Player) did not extent to what we expected.

We have used some kinds of the professional methods to estimate the distribution and population size in the Community Ecology. In the same way, we can apply these findings in the Man-made Ecosystem to develop and search for a new method for estimating how the scale of the product market is.

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