

A Study on Green Packaging Design in Taiwan

Yi-Chen Wu* Jen Yen**

**Graduate School of Design, National Yunlin University of Science and Technology
Yunlin, Taiwan, jane661111@yahoo.com.tw*

*** Graduate School of Design, National Yunlin University of Science and Technology
Yunlin, Taiwan, yenj@yuntech.edu.tw*

Abstract: The research was conducted by adopting the methodology of questionnaire survey and expert interview. It was revealed from the questionnaire survey that most of the consumers in Taiwan understood the policy of green packaging implementation and supported the policy of green packaging design. Those consumers would pay attention to the fact that whether or not the products are designed by green packaging concept. Also, it was included in the research that there are top 3 most environment-friendly factors and top 3 non environment-friendly factors regarding green packaging design that the consumers consider. It was also revealed from the expert interview that the green revolution is a global common cognition. Nowadays the product designers are supposed to take serious note of the trend of environmental protection in countries as well as the relevant regulations and rules. They are supposed to be equipped with professional knowledge. Only by combining consumers, governments, designers and enterprises together, the ultimate objective of green packaging design could be realized thereafter.

Key words: *Green packaging design, packaging design*

1. Introduction

1.1 Study Motivation

Design is supposed to solve human problems and contribute to improve the environment to benefit human beings. Packaging can draw consumer's attention to purchase the products; although it affords convenience to consumer and fulfills their visual expectation, the environmental damage caused by packaging should be noticed and reduced through design. According to World Health Organization's report, which pointed out the abandoned packing trash is over 32% in total amount of the trash that world produces per year. Information from Taiwan Environmental Protection Administration (EPA) showed that abandoned packing is approximately over one-third of the trash that a person produces per day. EPA also discovered 91.4% people supported the packing decrement policy, and 26% attached importance to environmental friendly packaging from a poll of merchandise packing decrement control [2]. While moving toward 21 century, the environmental awareness and related laws are growing rapidly; the concept of sustainable development has become a common consensus of the world. Therefore, the industrials, designers and consumers must take this important issue, the environmental compatibility, seriously.

The promotion of Green concept and the development of related regulations of Green design are being mature in Taiwan. How to pursue higher demand for environmental protection to reduce pollution and save limited resources and energy? This should require government and people cooperate with at the same time, and packaging designers are playing an important role to determine whether the package of merchandise will cause the environmental pollution or not in the packaging design process. To catch up the mainstream of Green, designer should pay attention to the trend of environmental protection and related regulations globally and infuse more concepts of environmental protection strategy during the process of packaging design for merchandise. From literature review, expert interview, and investigation on the consumer's cognition toward green packaging, this study concludes the present condition of green packaging design development and the execution principles in Taiwan. Through discussing the issue with the experts, this study is expected to establish the value of green design, a design system and mode that could conform to packaging technique and marketing equally. Then, enterprises and consumers could thus achieve the objective of environmental compatibility and follow the global tide of sustainable development.

1.2 Study Purpose

Based on the above-mentioned motivation, the purpose of this study includes the following points:

- (1). To understand the concept and present situation of green packaging in Taiwan.
- (2). To aggregate the embryonic form of knowledge and theory system about green packaging design in Taiwan.
- (3). To summarize the packaging design professionals and consumers' views on green packaging design in Taiwan, as well as its present situation and future development trend.

2. Literature Review

2.1 The Development of Green Packaging Design in Taiwan

Taiwan government attached great importance to promote packaging design and technology in the 1970s. Packaging design in Taiwan has been initiated during that period of time. At the early period of 1980s, due to worldwide economic recession, the conception of recycling and reusing of packaging has been emerged as the time required and has been developed up to the present. In addition, during the period of 1980s, the issues of how to reduce transportation cost, how to increase the convenience of use and to how to advance the competitive advantage of product have been regarded as the pursuing goal. In the 1990s, along with the rapid development of science, technology and economy, a variety of environmental protection issues had arisen and a nature-orientated, primal and healthy conception had come out and deeply affected the purchasing motives and actions of consumers. All those new factors together with the Green-ism that advocated by European packaging design pioneers, the focus on environment-friendly packaging design has been leading the direction in the 1990s and been commonly recognized by the future packaging practice [3].

Aiming at various design areas, the Industrial Development Bureau, Ministry of Economic Affairs, proposed the green design principles by introducing overseas green design technologies from 1994 to 1999. With the rapid progress of the packaging technology in Taiwan and the increase of national income over recent years, commodity packaging in Taiwan is becoming more sophisticated and complicated. Moreover, along with the emerging of the consciousness of environmental protection, it has become the necessity that commodity packaging should satisfy the demands of both the market purposes and decreasing the impact of waste to our

environment. The Environmental Protection Administration (EPA) of the Executive Yuan in Taiwan imposed restriction policy on over-packaging of commodities as early as in 2000, and carried them out officially in July 1, 2005. Packages of the commodities ranging from confectionary, cosmetics to computer disk and processed food should be conformed to the policy of packing reduction.

2.2 A Summary of the Status Quo of Green Packaging Design

With the development of environmental management system and revision of involved laws, more and more importance is attached to green design of product packaging. Currently, the concept of green packaging design can be analyzed from the following aspects: it is a designing process which is based on environment and resource; the strategy should be based on the need of basic packaging purpose to protect the product and environment to aim at being a quality packaging design; to look after both sides of environmental and marketing concerns to satisfy consumer's demand and environmental quality improvement; it is supposed to minimize the negative impact on the environment from the selection of packaging materials, the manufacture of packaging design, the realization of commercial transaction to the disposal of packaging waste. Green is the symbol of nature and simplicity; however, green packaging does not mean to ignore the commodity packaging function, namely, protection, convenience, and marketing which will lead to the loss of commercial profit. Therefore, the current situation of green packaging design in Taiwan is environment-oriented and taking overall account of both the interests of enterprises and what consumers really need [7].

Hansho Zeng (2000), proposed that the function of green packaging is to improve the quality of materials and ecology which helps to reduce wastes; the purposes of green packaging design is to assist enterprises in the creation of less quantity and higher quality. He presented the 5R design concept, packaging design technology and design principle for reference. (Figure 1) Hsing-Jung Hsu (2002) mentioned the concept of non-packed product. It means that a product which doesn't need to be packed is the optimal environment-friendly packaging design. Thus, the goals of green packaging design can be concluded to the following four aspects: environmental protection, legislation restriction, business marketing and social resource (Figure 2).



Figure.1 5R Design concept for green packaging

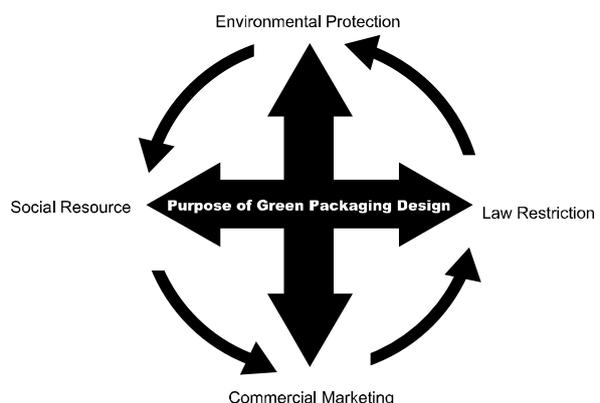


Figure.2 Purpose of green packaging design

2.3 Technology and Principle of Green Packaging Design

The research of relevant technology of green design in Taiwan can be traced back to 1994 and at present it mainly takes European countries for reference [5]. The development mode in Taiwan resembles that of foreign

countries. Brewer [1] proposed that green packaging design be conformed to such principle as KISS (Keep It Simple Stupid) and the concept of simplicity and pureness. To implement the spirit of green packaging design, designers should make series of plans all sidedly [4]. The design technology and principles of green packaging design can take H anshou’s Zeng (2001) opinion for reference who proposed 16 technologies and 15 principles based on the “Green Design Concept Based on Destination” which should be set as the guideline for designers when they are doing green packaging designing work [6]. (Table 1)

Table 1. A list of technology and principle of green package design

Item	Design Technology /Design Principle
Technology of Green Packaging Design	1.Non- Packaging. 2.Packaging Simplicity. 3.Capacity Compression. 4.Capacity Maximization. 5.Package Reduction. 6.Repeated Use. 7.Material Simplification. 8.Material Signage. 9.Accessory Minimization. 10.Design Disaggregation. 11.Product Reinforcement. 12.Package Decomposition. 13.Cardboard Structuration. 14. Material Regeneration. 15.Innocuity-based Consideration
Principle of Green Packaging Design	1.Avoiding packaging or integrating packaging into products to make the formal a part of the latter. 2.Using non- toxicity ink and adhesives. 3.Using non- toxicity ink and adhesives. 4.Using re-generated or recycled material. 5. Using a single kind of material to avoid separation before reclamation. 6. Containers are refillable and reusable. 7.Package materials are light-weighted to increase transportation efficiency. 8.Extra- packaging is not needed for shipment. 9.Another function should be given and they should be reused after the accomplishment of the main function of packaging materials. 10.Consumers’ safety should be taken into consideration concerning packaging materials. 11.Raw materials should be reusable and environmental-friendly. 12. Materials should not pose any threats to the ecosystem. 13.Improving product intensity to reduce the use of packaging materials. 14.Packaging should not exercise negative influence on social environment. 15.Labels , seals, etc. are able to live harmoniously with circulatory system

3. Method

The research was conducted by adopting the methodology of questionnaire survey and expert interview. It targeted at packaging designers and consumers and aimed to explore the current situation of what attitude and cognition that Taiwan people have regarding green-packaging design. The final research result was brought forward after conducting interview analysis, questionnaire collection and statistics, interview concept coding and calculation of data obtained from questionnaire survey.

3.1 Questionnaire Survey

(1).Collection and Screening of Questionnaire

The questions and contents of questionnaire survey were conducted and collected through the design of “Close Questionnaire”. 5 persons with background of packaging design practical experience in education industry and design industry were required to list to p 10 most environment-friendly factors and non environment-friendly factors according to their own professional experience in packaging design. Based on those factors listed by professional persons mentioned above, the researcher(s) made professional knowledge judgment and decision, and screened out those design factors that fitted to the research analysis and study.

(2).Implementation Process

It has been only over 10 years since Taiwan started to promote the policy of green packaging design. As the promotion duration is comparatively short, Taiwan people are not familiar with the overall policy of green-packaging design and its implementation. As a result, in order to enhance the credibility and effectiveness of the questionnaire survey, the test takers were limited only to native citizens with in the reign of Taiwan. The

questionnaire survey was conducted through the way of randomly selecting individuals of being between 20-60 ages and of having developed mature personality and cognized decision-making capability in the northern, middle and southern districts of Taiwan as sample matrix of the research. There was no specific control or selection criterion on the percentage of gender and age group of test takers. The questionnaire survey was conducted during the period of from February to March 1998. Each 40 questionnaires were distributed to each district and the total questionnaires were 120.

3.2 Expert Interview

The research uses judgment sampling method to carry out expert interview. Interviewees are five well-known national designers, who have been engaging in packaging design for over 10 years.

4. Investigation Results

4.1 Questionnaire Survey Results

(1). Basic data of respondents

120 questionnaires were enrolled, 109 of them are valid for analysing (Table 2)

Table 2. Basic data of respondents

Area	Gender		Age			
	Male	Female	20-30(years)	31-40(years)	41-50(years)	51-60(years)
Northern area	14	21	17	10	5	3
Central area	16	20	13	11	6	6
Southern area	22	16	15	10	8	5
Subtotal	52	57	45	31	19	14
Total 10	9		109(Person)			

(2). Statistics of questionnaire survey on green packaging design

The following table is the statistical results of consumers' cognition survey on green packaging design.

Table 3. Descriptive statistic results form questionnaire survey

Questions	Answers	Northern Area	Central Area	Southern Area	Total (%)
Q1. Do you know the green packaging policy on commodities in Taiwan market?	Yes	22	25	23	70 (64.2%)
	No	13	1	15	29 (35.8%)
Q2. Do you support the policy of green packaging design?	Yes	34	35	35	104 (95.4%)
	No	0	0	0	0 (0%)
	Not necessarily	1	1	3	5 (4.6%)
Q3. Do you emphasize on green packaging design when purchasing?	Yes	8	8	10	26 (23.9%)
	No	10	10	1	21 (28.4%)
	Not necessarily	17	18	17	52 (47.7%)
Q4. The top three environment-friendly factors of the commodities' packaging design in Taiwan market.	The structure is integrated as one.	11	4	13	28 (8.6%)
	Environment-friendly packaging material.	29	31	27	87 (26.6%)
	The printing ink is reduced	7	5	5	17 (5.2%)
	Recyclable and regenerative	25	33	31	89 (27.2%)
	The packaging can be transferred to other functions after usage.	10	21	21	52 (15.9%)
	The material is reduced	8	4	5	17 (5.2%)
The packaging is easy to	7	3	4	14 (4.3%)	

	disassemble.				
	The volume is minimized	8 7 8 23			(7.0%)
Q5. The top three non-environment-friendly factors of the commodities' packaging design in Taiwan market.	Too excessive packaging material.	18 19 17 54			(16.5%)
	Too large volume.	12	5	14	31(9.5%)
	The cost of packaging material is too high.	12	7 8 27		(8.3%)
	Too many kinds of packaging material.	16 17 15 48			(14.7%)
	Non-recyclable packaging material.	18 25 31 74			(22.6%)
	Too excessive printing ink.	8	17	6	31(9.5%)
	Packaging material is easy to pollute the environment.	13 1	1	14 38	(11.6%)
	The composition of the structure is excessive.	8 7 9 24			(7.3%)

4.2 Expert Interview Results

(1). Interviewees data

Table 4. The data of interviewees

Code No.	A	B	C	D	E
Date of interview	2009.2.16	2009.2.19	2009.3.12	2009.3.26	2009.5.08
Seniority	30 18 13			10	20
Job Title	Creative Director	Creative Director	Director	Designer	Director

(2). Interview Data

Table 5. Summary results of interview content

Item	Conceptual Information of the Interview Content	
Question	Q1. Definition of green packaging design?	
Answer	A	The definition of environmental protection is that the paper is recyclable and reusable.
	B	Be simple, pure; reduce pollution
	C	5R Principle : Reduce, Reuse, Recycle, Regenerate, Refuse; behaviour that can promote sustainable consumption
	D	The packaging doesn't result in secondary pollution; ' packaging material ' orientation; the basic design principle of reduce, recycle, reuse and regenerate
	E	Recyclable material
Question	Q2. Standard of green packaging design ?	
Answer	A	Focused on visual and tactile sense; affinity and attraction; convenient for toting; concept of primitive simplicity.
	B	Be pure; discard excessive material.
	C	The packaging should be integrated with the product as one; not contain poisonous ink or adhesion agent; minimum material fit for the function; recyclable, regenerative and reusable function.
	D	The reduction of packaging is the premise of environment-friendly design; decrease the pollution from the printing, etc.
	E	Reduce packaging material and printing area of the ink.
Question	Q3. Criterion of green packaging design ?	
Answer	A	Use the environment friendly packaging material; Pressing mold without printing; design the packaging according to the situation; make good use of skill; choose single paper material.
	B	Reduce the cost; recyclable material; appearance be the top priority and followed by the cost; analysis of market competition; look for green concept; competitive image view.
	C	Know the packaging material; lighten the packaging and reduce the applying colours with the safety of the commodity ensured.
	D	Environment-friendly policy is the basis of design; use the packaging material to create the tactile sensation; reduce the packaging forms and compound material; develop new

		material; decrease printing ink.
	E	Reduce the packaging material and be able to protect the content; use single material and discard compound material.
Question	Q4.Knowledge and ability the packaging designers should possess ?	
Answer	A	Basic design ability; know the production process and environmental laws; take the responsibility of educating the clients; realize the green trends; customize the commodity packaging for clients; develop communication ability to deliver the environment-friendly concept to clients.
	B	Think creatively; refuse the products with bad design; conception of green commodities; the strategy of maximally simplifying and repeatedly using the material
	C	Adjust the structure function of the packaging; develop the application of paper product in packaging; construct a recyclable and reusable system of the packaging material and resources.
	D	Five functions of packaging (productive management, transport protection, identification and promotion, information passing and environment protection); environment-friendly education is blended into new design thought; develop new environment-friendly material; comply with future trends.
	E	Basic design ability; value the environment-friendly concept; know the environmental laws and special application of the packaging material.
Question	Q5.Present situation of green packaging design in Taiwan ?	
Answer	A	Follow the trends that are naturally formed in the current of the times.
	B	The brand is not manifest; the life of product is short; the change of packaging is frequent; green concept is not popular.
	C	Strengthen the awareness and legislation education about green packaging; manage the production and circulation of packaging; promote the development of green packaging.
	D	Adaptive transition duration; not easy to immediately accept the conception of simplifying and reducing packaging; environmental law is the milestone of the packaging design.
	E	The development of environment-friendly concept should be jointly executed by designers, manufacturers, consumers and the government.
Question	Q6.Future development trend of green packaging design in Taiwan ?	
Answer	A	The packaging fit for current trend and the needs of the times can be called successful packaging design
	B	Green packaging is the world-wide trend; strengthen the conception of brand packaging; the packaging should possess diversified functions; green consumption; strengthen the designer's social responsibility
	C	Oriented by the 'green design ' to face the challenge from sustainable development; emphasize on decreasing the impact of commodity's life cycle on the environment.
	D	Conceptual design; recycle and regenerate; recycle efficiency; concept of social benefit; environmental protection and sustainable consciousness; ecological environment protection; reduce the pollution to ecological environment; overcome technologically.
	E	The environment-friendly concept is from the brand of the commodity (the brand itself is the environment-friendly concept)

5. Conclusions

5.1 Conclusion from Questionnaire

(1). Of the 109 effective questionnaires, 64.2% consumers have noticed and paid attention to the government implementation of green policy; 95.4% consumers are supportive to government implementation of policy on green packaging design; 23.9% consumers pay attention to the green packaging design, and 47.4% consumers are not necessarily to take notice of the green packaging of product in market (mostly are dependent on product itself).

(2). It is evaluated by consumers that the top 3 environment-friendly factors of market products are “Recyclable and Regenerative” (27.2%), “Environment-friendly of Packaging Material” (26.6%) and “Functionally Transferable of Packaging Material after Use” (15.9%). Contrarily, the top 3 non-environment friendly factors of

market products are “Non-recyclable of Packaging Material” (22.6%), “Overuse of Packaging Material” (16.5%) and “Overuse of Packaging Material Category” (14.7%).

(3). It is revealed from the research that consumer perceptions toward green packaging design of product in Taiwan take standard from the 5R Design conception (Figure.1) initiated by Hanshou Zeng. One of the points worthy of mentioning is that along with social development and conception enhancement of green environment protection, consumers do not define packaging as simple as a way of protecting product, but expect more functions from the packaging after it has been used as a way of decreasing packaging disposal and responding the idea of reduction in quantity, recycle and regeneration required by green packaging.

5.2 Conclusion from Expert Interview

(1).The concept of green packaging design

It is perceived by packaging designers in Taiwan that the definition of green packaging design is based on the conception of environment protection to use paper to design packaging, based on the fundamental design conception of 5R principle which is to use simple, pure, non-polluted, recyclable and regenerative green packaging and based on the purpose of encouraging consumer to take sustainable consumption actions. The use of pure and adequate packaging material and nontoxic oil ink reduce the use of printing and adhesive glue is the design standard. In designers' conception, packaging design should be integrated with product and be enabled to have the function of reuse. Furthermore, it is needed to put emphasis on sense of vision and touching of packaging material so that the designers are able to design products that bring pleasant and close feeling to consumers and create simple and nature to green packaging according to different product attributes.

(2).The professional knowledge of green packaging design

It is responded by designers in interview that it is necessary for designers to be familiar with and well-acquainted to the integrated system procedure of green packaging design because of the professional feature of packaging design. Only by being professional, the designers are able to have more comprehensive consideration to different phases of packaging design system. In planning packaging design work, as the pioneers of leading green design trend, the designers are supposed to have innovative thought, to make attempts and to discern the development uptrend of green packaging design. Designers should also follow 5R Principle to design green packaging and take priority of designing integrated packaging structure; to set the goal for less quantity and higher quality and put the concept of non-packed product in practice but also give consideration to both the innovative product technology and product marketing.

(3).The present attitude and cognition on green packaging design

Regarding the current status and development trend of green packaging design in Taiwan, packaging designers figured out that green packaging is formed as times and trend require. Currently, the conception of green packaging in Taiwan is still at the interim phase that needs to be adaptive. It is not easy for Taiwan people to accept immediately the conception of decreasing product packaging. Consumers in general have relatively low idea to the conception of green environment protection and they have low concern on the issue of green packaging in their product purchasing process. Consequently, beneficiaries of governments, manufacturers, designers and consumers are needed to work together to develop the conception of green packaging. Education on green packaging is needed to be strengthened; consumers are needed to be encouraged to have green consumption and green sense of value; designers are needed to be advocated to establish social responsibility; strict management on packaging production and circulation is needed to be set up; and product packaging is

needed to be designed with multi-functions. Also, by bringing environment protection conception into product brands, product brands themselves are able to present the conception of environment protection, ideas of mutual and supplemented development of environment protection and economic development are able to be realized and the advancement of green packaging industry is able to be pushed forward.

5.3 Comparison between questionnaire survey and interview survey

(1). Similarity

First of all, the consumers held similar opinions with expert research results on the aspect of the definition of green packaging design and its cognition. Secondly, according to the consumers' opinions, green-packaging design was supposed to be transformed to other functional mechanism after being used. This opinion was consistent with the expert opinions that the function of green packaging is supposed to be secondly used. Lastly, in deciding the most non environment-friendly factors of green packaging, the consumers believed that it was the overuse of packaging material and categories, which might cause the difficulty of being recycled. And the experts also considered the best green packaging design to be purity and simple. The products were supposed to be packed with limited packaging material and the packaging material was supposed to be best fit into product so that it could be minimally consumed and be structurally and functionally protective to product. The expert opinions were consistent with the consumer opinions again.

(2). Dissimilarity

According to expert opinions, on the aspect of visual printing ink, printing was supposed to be reduced and the environmental protection concept was supposed to be brought into product brands. The concept of environmental protection should be established and the gallant visual design should not be emphasized. However, according to the survey result, it seemed that the consumers did not attach that great importance to this concept. In explaining the reasons, it is mainly due to the fact that consumers are still in the early stage of having cognition of green-packaging concept. This is an adaptive and transitional period to consumers and it is difficult to enable consumers to immediately accept the concept of reducing packaging quantity and adopting non visual design. Besides, product designs without visual color display would affect consumers' intention of purchasing products.

5.4 Uptrend and Prospective of Green Packaging Design

(1). Build up conception and regulations

The 21st century is a century of green. As world economy develops, green thought has been expanded to the whole world, and has facilitated the governments to regulate legislation and to push forward the green authentication of green products. In the past, the traditional packaging design technology is focused on the direction of production in large quantity. Nowadays, green issue has been gradually taken into serious consideration internationally, which indicates that the future trend of green packaging design is taken good notice. We should keep encouraging consumers to build up the senses of green consumption and green value, purchase green products as the priority choice to gain the profit of environmental protection.

(2). Uptrend and prospective

The worldwide green environment issue is required by times. As a member of global village, we are supposed to understand the trend of the times. The government, enterprise, designers and consumers should cooperate to each other to co exist with the Earth. In designing packaging, designers should consider the production and

consumption of packaging; and take full consideration of design logic, design methodology and even future sales rather than just simply implementing design work. Another responsibility of packaging designers is to educate enterprise for adjusting business philosophy, establishing green sense of value, synchronizing the world by adopting the theory and action of green marketing, transmitting green information with consumers and satisfying visionary needs of consumers. The ultimate prospective of green packaging design is able to be achieved by setting the design goal as less quantity and higher quality and improving international competitive power of the industry.

This study puts more emphasis on packaging designers and consumers' present cognition on green packaging design and its future development trend, but less emphasis on the related issues of green packaging design, such as life cycle of green packaging products, corporation social responsibility, marketing & sales and implementation case study, packaging waste logistics, which are suggested for future research directions.

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