

From Technological Design to Service Innovation:  
A Case Study of the Development of Design Education  
in Taiwan

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## Abstract

In today's competitive market, "innovation" serves as a competitive advantage allowing companies to dominate particular market segments. Service design has increased attention in the academic and business communities over the past decade. Based on the "Taiwan experience", the purpose of this study is to explore the development of design education by integrating the difference between technological product design and the service innovation design. Two cases are expounded for the development of Taiwan design education in this article. One is the cover design of industrial design magazine which reflected the change of product design education from function, friendly, fun, fancy to feeling. The other case is the development of The National Taiwan University of Arts which being used as an example to illustrate how to link the service innovation design and cultural and creative industries through Our Museum, Our Studio and Our Factory respectively. The results showed that the development of Taiwan design education along with the economic development from OEM, ODM, to OBM that joins design, culture, creativities and economy, and further illustrates some implications through the cultural perspective.

*Keywords: design education, service innovation design, cultural and creative industries*

## Introduction

The trend of global economy transforming into service economy today has put the design to new arena, and it is also similar to the Bauhaus era of 100 years ago, which indicates the coming of new design era through the development of service innovation. The traditional industrial concept and creative thinking have faced huge challenges in the new economic and social situation, and the development of new design concept, design method and design tool will be inevitably transformed as well. In today's competitive market, "innovation" serves as a competitive advantage allowing companies to dominate particular market segments. The global design community thinks about design issues for user-centric, and the designers begin to be required to have the ideas, the methods and the skills that must have been beyond the traditional design because of the demand of information technology, network society and industry. Therefore, the design must return to the view of humanistic aesthetics, while technology is only a technical support tool that can't be used to lead the direction of product design. The future design trend, the integration of art, culture and science, is to solve the social problems and to reposit the form of life (Lin, 2009b). Mager & Sung (2011) proposed there was a continuous shift from the design of the tangible world to the world of interactions, moving from interaction to experience and then from experience to services. User-oriented principles make not only the manufacturing process but also the business process be taken into account in design thinking, and the trend of service innovation design is increasingly apparent.

The Taiwan design has been developed more than 50 years and the Taiwan design education has always been related to social needs, political and economic development, and science and technology situation. In the 21st century of digital technologies, it is more important that the design is based on humanity and culture, i.e., cultural and creative design. It is the task of future design education that how to transform "culture" into "creative" added into product design; i.e., how does "cultural creative" convert into "value-added design". Due to the economic transformation, nowadays, Taiwan is a service-oriented society, and industrial development is gradually changed from the "manufacturing-oriented" to "service-oriented" (Lin, 2010). The development of the design industry in Taiwan is currently in the process of enhancing design value, which steps towards the perceptual technology design of aesthetic experience (Lin, 2009a). The goals of design education are in accordance with the essence of design, but the design comply with the changes in science and technology in terms of design education that will conform to the development of times from technological design to service innovation.

Based on the development of Taiwan design education, therefore, the purpose of this study is to discuss the issue that a service innovation design approach is proposed by integrating the difference between product design and cultural and creative industries into the service innovation design of current development practice. Two cases are expounded for the development of Taiwan design education in this article. Firstly, this article will discuss the process of educational reform in Taiwan reflecting by the cover design change of "Industrial Design Magazine." Secondly, the National Taiwan University of Arts (NTUA) used as an example to illustrate how is the link between service innovation design and cultural and creative indus-

tries through Our Museum, Our Studio and Our Factory respectively. It is the service innovation design approach that joins design, culture, creativities and economy, and further illustrates some implications through the cultural perspective. Finally, there is a shift from technological innovation to service innovation that is based on discovering new opportunities in the marketplace. Companies are more focused on adapting new technologies and combining them in ways that create new experiences and value for customers. Service design has received increasing attention in the academic and business communities over the past decade. Therefore, this article is intended to give a general public idea of the chain effects expected for society by the development of the cultural and creative industries based on Taiwan design education.

## Literature review

### Taiwan's Economy and Design Development From OEM to OBM – Technological Design

The development of Taiwan design is accompanied by its economic development. Taiwan's companies have seen a recent transformation from technological design to service innovation design based on discovering new opportunities in the global marketplace. Taiwan's economic development was identified as progressing from OEM (Original Equipment Manufacture) to ODM (Original Design Manufacture) to OBM (Original Brand Manufacture) and represented as a smile curve, proposed by the former ACER president Shi as shown in figure 1 (Hsu et al., 2014; Hsu et al., 2013; Lin, 2012). Lin (2009a) suggested the idea that it eventually formed aesthetics and the experience economic, which corresponds to emotional technology, humanity design and the development of cultural and creative industry.

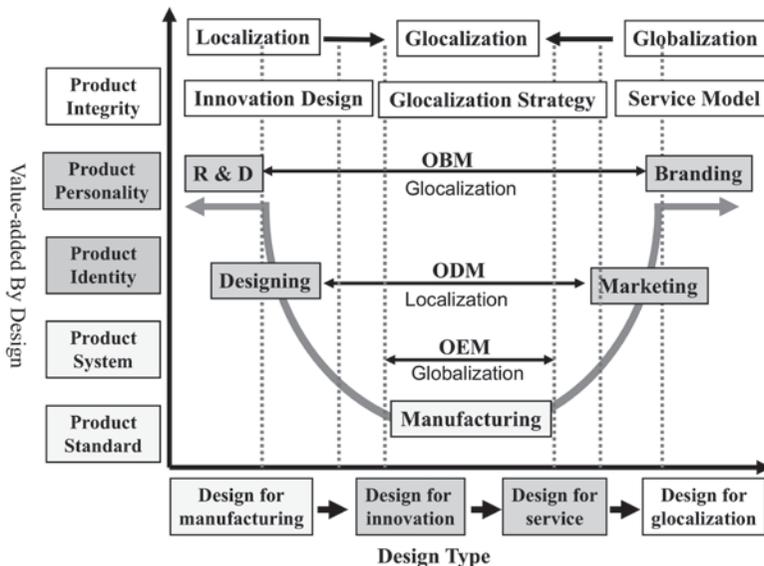


Fig.1 Taiwan's Economy and Design Development (Lin, 2012)

FROM TECHNOLOGICAL DESIGN TO SERVICE INNOVATION:  
A CASE STUDY OF THE DEVELOPMENT OF DESIGN EDUCATION IN TAIWAN

Before 1980, OEM vendors in Taiwan reduced costs to produce “cheap and fine” products to be successful in the global market. Those depended upon hard-working patterns from the OEM pattern became obstacles in developing their own designs. These vendors were extremely busy on producing products to meet manufacturing deadlines; there was no time to develop design capabilities so that design talents couldn’t be nurtured (Hsu et al., 2014; Hsu et al., 2013; Lin, 2012).

After 1980, Taiwan enterprises began to develop ODM patterns to extend their advantages in OEM manufacturing. Taiwan’s government promoted a series of policies to stimulate the nation’s economic growth including the “Production Automation Skill Guidance Plan”, and the “Assisting Domestic Traditional Industrial Skill Plan” (IDB, 2012). The design students worked with the enterprises on specific projects to set up a working pattern of industrial design based on enterprises’ real needs. This model led the development of design education accordingly. Especially starting from 1989, adapting the local marketing concept of “One Town One Product (OTOP)” had started to integrate local culture with innovations and to explore the development of distinctive local industry (Rana, 2008; Scott, 2004).

The Taiwan product design has stepped into the OBM era in recent years. In addition, cultural and creative industries have already been incorporated into the “National Development Grand Plan”, demonstrating the government’s eagerness to transform Taiwan’s economic development by “Branding Taiwan” with “Taiwan Design” based on Taiwanese culture (MOEA, 2012).

### Cultural and Creative Industry — Service Innovation Design

Design is now about strategies and structures, processes and interactions – also about services (Mager, 2011). Service design has become a very popular issue today (Morelli, 2009), but the most critical part of service design is to follow the principle of user-centered. Both academics and practitioners had emphasized that the role of service design in innovative product development relates not only to aesthetics, but also to the aspects such as ergonomics, user-friendliness, efficient use of materials, functional performance, and so on (Gemser & Leenders, 2001).

Owing to the development of new ICTs, the globalization of services and the disappearance of liberalization and control, the service industry is constantly facing the pressure of innovation (Institute, 2008). In Taiwan, some domestic companies have adjusted their business strategy from product-orientation to service-orientation, e.g., ASUS and TSMC (Liu, 2012). Taiwan’s industry is in the transformation period, and the center of gravity of the economy gradually has shifted the traditional manufacturing industry to the service industry, then consumers buy the commodity instead of the entity itself, which extends to the invisible meaning and identity of goods. It’s difficult to attract consumers’ attention with meaningless products. Service innovation combines goods with “style” and “aesthetics”, i.e., the so-called “taste” of goods; since design and aesthetics have gradually become the important elements of the commodity itself, which add the quality and the brand elements, thus it will progressively focus on building “qualia” (Lin, 2011). Essentially, through the combination of design, taste of aesthetic, quality of manufacture and the brand of marketing, it is the direction that the future service innovation design will develop continuously, which creates the goods being cheerful, unique and

qualia (Chang & Lin, 2010; Lin & Lin, 2010).

### The Impact of International Design Education on Taiwan

By the opening of the nineteenth century, as long as the guilds had controlled production and the training of new craftsmen, there was a sufficient supply of trained artisans, since design education was an integral part of training in a craft (Arthur, 1990). How to educate modern designers, until 1919, the German Bauhaus was the first design school to incorporate design into formal education and had solved education problems. One of the most famous slogans for which the Bauhaus is renowned is Gropius's catch phrase used for the 1923 international exhibition held in Weimar: "Art and Technology: A New Unity (Findeli, 2001)." Bauhaus, essentially, was a new thinking design school, which not only opened an innovational design education but also established a design philosophy of people-oriented, and it stressed that the purpose of the design was people instead of products and they would design the practical life products with the cooperation of local business. Bauhaus combined with handicrafts and industrial technology to cultivate the future social builders, pursuing rational design thinking and guiding a new direction for modern design. Bauhaus design ideal, driving the modern design movement, has created a twentieth century modern style (Lin & Wang, 2008).

The development of early Taiwan design was deeply influenced by the educational concept of Bauhaus, therefore, it also followed the education concepts of Bauhaus. The earliest concept of Taiwan design was from Council for United States (CUSA) to plan how to promote Taiwan's industrialization, and civil institutions set up the organization promoting handicrafts and industry (Industrial Design Magazine, 1971). In 1957, the National Taiwan University of Arts established art and craft department, the first design department in Taiwan, which upheld the educational spirit of Bauhaus and opened Taiwan design education. The process of Taiwan design education is the reaction of the spirit of Bauhaus and the design education ideal based on practice. Mingchi Institute of technology firstly established industrial design department in 1964, and then many technical colleges and vocational schools set up the design departments afterwards. In 2000, many universities including National Cheng Kung University, National Chiao Tung University, National Yunlin University, National Taiwan Technological University, etc., set up Ph. D. Program, which open up a higher design education status in Taiwan. If Taiwan's economic miracle is due to the thrift habits, Taiwan's design miracle is due to pragmatic design education. Overall, the Taiwan design education originated from the technical education system of pragmatic practice, which corroborated Bauhaus' the design education concept of the combination of theory and practice, and now create a Taiwan economic and design miracle.

Recently, most of the design schools such as National Taiwan University of Arts began to rethink the new unity between art and technology, and to reorient the technology and humanities in design education, to explore how to adapt to social changes and technological development, and enhanced the value of modern design education to reproduce the design education ideal of Bauhaus (Lin, 2010).

## Research Framework

Based on the previous studies, a research framework was proposed as Figure 2. There are two aspects in this study including the development of “Industrial Design Magazine” and The National Taiwan University of Arts. More precisely, one is to discuss the design education process from function to feeling, including five stages such as functional valuation, usability valuation, aesthetic valuation, identity valuation and emotional valuation, and final aim is to achieve service valuation. Then, another one is to discuss a case study of The National Taiwan University of Arts through Our Factory, Our Studio and Our Museum in order to demonstrate that a shift from technological design to service innovation in Taiwan design education.

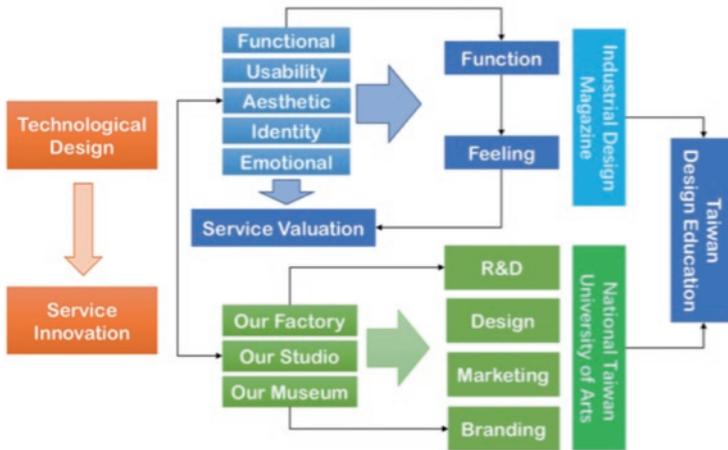


Fig.2 Research Framework

## Results and Discussions

### A case study of “Industrial Design Magazine”

Industrial Design magazine is the first Chinese industrial design magazine of the world, founded in December 15, 1967, which recorded nearly half a century of Taiwan’s design evolution and the process of Taiwan’s industrial design education. The magazine was funded by Wang Yung-Ching who set up industrial design department of Mingchi Institute of technology, which presented the history of Taiwan’s design education.

Nowadays as we put a high value on culture and creativity, the Industrial Design magazine is undoubtedly the most important cultural assets of the design industry, which recorded the transformation of Taiwan’s design. As shown on Figure 3, the cover of early magazines was made up of simple dotted lines and white ground, then emphasized the visual effects of the cover with photography techniques, afterwards published by a work for each issue, for instance, some of these works focus on design, some emphasis on shape, some centered on interesting and some focus on semantics, etc., which vividly described the diverse design works and indi-

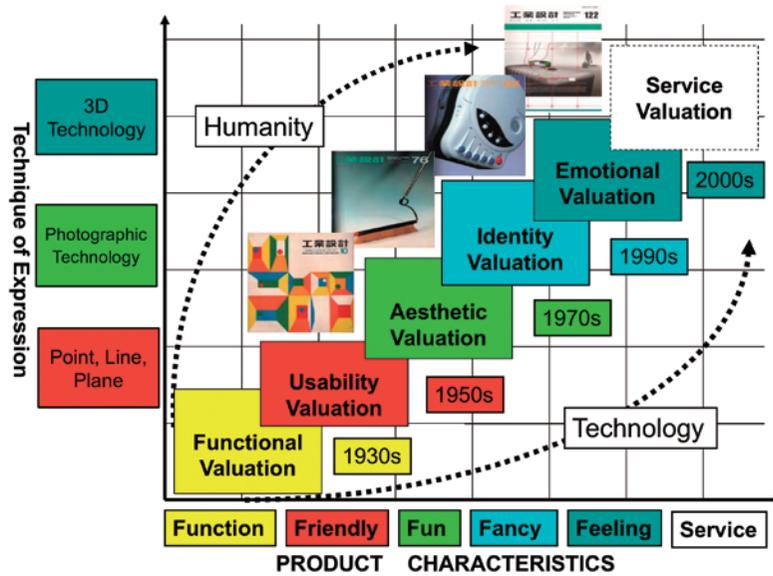


Fig.3 Taiwan Design Development from “Function” to “Feeling”

vidual style. With the progress of science and technology, there were a great deal of 3D works. This process identifies the progress of Taiwan's industrial technology, thus can summarize the transformation of product design from function to feeling.

From the history of the development of modern product design, we could use five “Fs” to describe the change from designing “function” for the user’s need to servicing “feeling” for the user’s pleasure as shown in Figure 3. These five F’s are: (1) 1930’s – design for “Function”, (2) 1950’s – design for “Friendly”, (3) 1970’s - design for “Fun”, (4) 1990’s – design for “Fancy”, and (5) 2001’s – design for “Feeling” (Hsu et al., 2014; Hsu et al., 2013; Lin, 2012; Lin, 2012). These five “Fs” also reflect the process of Taiwan design development from Industrial Design Magazine. The development of Taiwan design industry is also generally follow this trajectory, and the core value of its design basically transform the needs for functional and physiological into the needs for aesthetic and psychological, to put it simply, which is from function to feeling



Fig.4 The Development of “Industrial Design Magazine” from “Function” to “Feeling”

FROM TECHNOLOGICAL DESIGN TO SERVICE INNOVATION:  
A CASE STUDY OF THE DEVELOPMENT OF DESIGN EDUCATION IN TAIWAN

(Lin, 2005).

In the era of digital technology in the 21st century, the design of human nature is more important, i.e., form follows feeling, which emphasizes aesthetic experience, i.e., the pleasant design. Through reviewing the development of industrial design magazines, we have found that design has returned to the level of human nature, which is to emphasize the creative life of the aesthetic (Lin, 2008a, 2008b, 2008c).

### A case study of The National Taiwan University of Arts Design Education Function of Cultural Creative Industry Park

National Taiwan University of Arts (NTUA) established an art museum, known as “Our Museum”, in 2007 for the purpose of linking professional teaching with the museum’s research, education, and display functions while presenting cultural and aesthetic ideas about art and artifacts to the public. Developing craftsmanship and creativity as well as competences related to the arts are important strategies to NTUA. Therefore, a design studio, known as “Our Studio”, was set up at the college of design in NTUA, following the “Our Museum” for providing innovative products. NTUA is located in the Taipei metropolitan area, one of the most competitive regions in Taiwan. This area contains a significant concentration of craftsmanship and research establishments, linked by various formal and informal networks. Due to the challenging nature of cultural and creative industries, NTUA is devoted to developing its regional and international networks by operating a cultural and creative industry park, known as “Our Factory.” NTUA has established the link between “Art” and “Business”, and combined “Creativity” and “Design” through Our Museum, Our Studio and Our Factory respectively.

**New Service Concept: Our Museum.** The purpose of Our Museum is to achieve the “Creative Learning” through “Digital Archive.” On the technical level, Our Museum has the symbolic meaning of “Digital Archive”, meanwhile, and achieve the purpose of creative learning education, which can play an efficient role in Digital Museum. The key concept of Digital Museums comes from the knowledge, which means that museum can be shown by teachers, students etc. who want to visit the museum without limits. The cultural and creative industries are the combination of art and technology, thus “Digital Archive” of Our Museum is to remind students the idea of “technology can’t be buried”, which achieves the educational function of “craftsmanship can’t be lost”, i.e., new service concept.

**New Service Organization: Our Studio.** The purpose of Our Studio is to achieve “knowledge economy” and “aesthetic economy” through “culture creativity”. Our Studio, with the transformation of Taiwan’s economic development, is based on the National Taiwan University of Arts whose specialty is the education of art, culture and design, which has formed cultural and creative industry chain that integrate the cultural creativity, design innovation and marketing. Our Studio works with the relevant industry to facilitate the operation with each other, which has established the models of market analysis, economic benefit assessment. Specifically, Our Studio has created regional creative industries through the development of “creative value-added products” and “localization industry”, which is considered to be new service connections.

**New Service Connection: Our Factory.** The purposes of Our Factory are to achieve the

promotion of cultural creative industry and make the artistic craftsmanship into business. To follow the concept of national cultural park, the paper factory near NTUA was converted to Cultural Creative Industry Park, which was a pioneering work for the development of design education. NTUA also launched a series of plans of cultural and creative industries including ceramic craft workshop, glass craft workshop, comprehensive craft workshop etc. Our Factory transforms art, design, performance, dissemination etc. into ceramic crafts, glass crafts, and integrated crafts to achieve the innovation art, which is new service connections between art and business.

### The Successful Operation of “Mufun Design Studio”

“Mufun Design Studio”, based on its own design philosophy, has achieved success from art to industry by finding Taiwan cultural material, and created creative design work to build wooden doll brand, as shown in figure 5. This Studio is focus on the design and development of wood-working products so that wood is no longer just furniture, containers or building blocks, whereas they are cultural, fun and creative. “Mufun Design Studio” embodies the teaching theories of the Taiwan University of Arts, which has transferred from cultural creativity to the design according to the cultural characteristics of Taiwan. As a result, it is a successful case of Cultural Creative Industry Park, which achieves the goals combining skills, creativity and business.

**Our Museum:** The students of “Mufun Design Studio” created works with culture and creativity, and the works were mostly on the extension of traditional culture and were to achieve the concept of local conservation. Our Museum provided students with material about skill study and inspiration of creativity.

**Our Studio:** “Our Studio” helps students of “Mufun Design Studio” realize an advanced application of their skills and improve the design process, and provides a space for starting a business with the assistance of The National Culture and Arts Foundation and professional guidance. Students design creative products through the course of learning to explore different creative business models through practical research, and then achieve the educational purposes combining practice and theory.

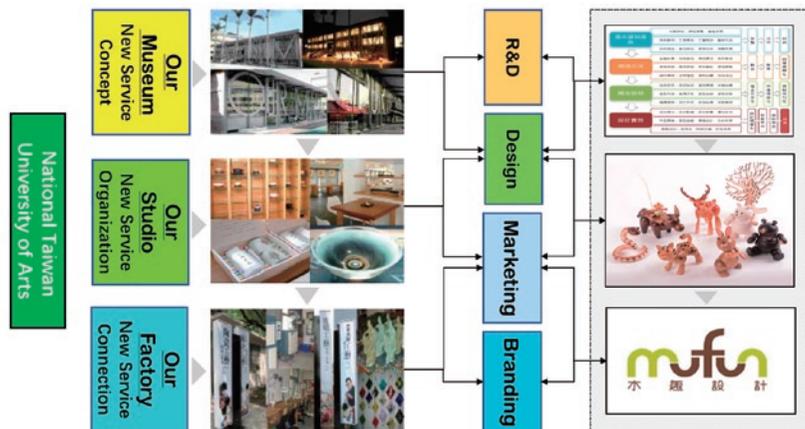


Fig.5 Design Education of The National Taiwan University of Arts

FROM TECHNOLOGICAL DESIGN TO SERVICE INNOVATION:  
A CASE STUDY OF THE DEVELOPMENT OF DESIGN EDUCATION IN TAIWAN

Our Factory: “Mufun Design Studio” establishes a win-win cooperation between designers and manufacturers with the shared concept to solve problems of quality and production, which sets up own brand and successful business model. NTUA has established the link between “Art” and “Business.”

## Conclusion

Based on the previous studies and Taiwan experience, this paper researched the process from technological design to service innovation which were merged into design thinking to explore Taiwan design education development. Firstly, this paper explored the relationship between Taiwan’s economy and design development, and then identified the three stages of OEM, ODM and OBM for illustrating how to transform “local culture” into “global market” through a process of design evolution in Taiwan design development. Afterwards, the article explained the concepts of service innovation design. Secondly, according to the impact of international design education on Taiwan, this study elaborated the process of design education that was deeply influenced by the educational concept of Bauhaus.

As a result, “Industrial Design Magazine” is the first study case to explore the development of Taiwan design education, which identified technological progress has shifted dramatically and provides platforms for completely new forms of “design” and “service” delivery. National Taiwan University of Arts, a typical example of Taiwan creative industry design education, has solved the problems of art education and provided a new direction for the development of design education. The goal of the cultural and creative park is to combine artistic craftsmanship and economy with service design, and ultimately establish NTUA as a distinctive trademark associated with the park. To accomplish this goal, NTUA aims to combine artistic craftsmanship from “Our Museum” with cultural creativities from “Our Studio” in order to result in aesthetics in business for “Our Factory”. Creativity and business are the elements for reaching an aesthetic economy. It is the concept of “Think Globally - Act Locally” to process the “Digital Archive” of Our Museum through the cultural creativities of Our Studio, and to produce cultural products in Our Factory in order to establish a local industry by making aesthetic and economical products (Ko, Lin & Lin, 2009). Meanwhile, NTUA, with the transformation of service innovation, has enriched the connotation of cultural and creative products through culture and creative, innovative value-added, R&D design, etc., which cooperates with the relevant industry to facilitate the operation through market analysis, economic benefit assessment and business model.

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