

# University of Cincinnati

Date: 6/30/2011

I, Xin Fan, hereby submit this original work as part of the requirements for the degree of Master of Design in Design.

It is entitled:

**Industrial Design: Contrasting the United States and Chinese Methods  
- From the perspective of an industrial designer who has both studied and worked in the U.S. and China**

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# Industrial Design: Contrasting the United States and Chinese Methods

From the perspective of an industrial designer who has both  
studied and worked in the U.S. and China

A thesis submitted to the Graduate School  
College of Design, Architecture, Art, and Planning  
of the University of Cincinnati  
in partial fulfillment of the  
requirements for the degree of

Master of Design

in the Department of Industrial Design  
of the College of Design, Architecture, Art, and Planning  
by

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## Abstract

My professional experience is a combination of theoretical and practical education with employment in both China and the U.S. This duality gives me the proper perspective to both compare and contrast the problems and opportunities in the industrial design profession in the U.S. and China.

Chinese industrial design is experiencing rapid development on the grounds that China is becoming the world's manufacturing center. Each year, an increasing number of international collaborations occur between the U.S. and China, requiring accurate communication and mutual understanding. However, due to cultural differences, uneven industrial design development stages, and dissimilar education systems, Chinese industrial designers, in general, work differently compared to U.S. industrial designers. This difference very often creates difficulties in international partnerships which results in wastes of time, cost, and energy for both sides.

Based on my experience and research there appears to be significant differences in the goals that drive US and Chinese designers in the product development process. Most US industrial designer respond to emerging trends in markets, refine branding, clarify distinction, and create intellectual property, whereas most Chinese industrial designers' goals consist of observing the success of existing products in the market place. Thus, in the U.S., designers mostly focus on consumer research and have more of an influence on product strategy, opposed to Chinese designers who focus more on manufacturing and have greater influence on design execution. This thesis is to describe this difference and explain how China's industrial design education and practice must be changed. In addition, China must learn from the Japanese by integrating their own cultural value into industrial designing, so that China can occupy a unique position in the design world to compete with other cultures. Furthermore, design promotional organizations such as the IDSA (Industrial Designers Society of America), could be more effective if Chinese designers would create dialog with designers in the U.S.

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## Acknowledgements

I offer many thanks to Craig Vogel and Peter Chamberlain for their guidance and input throughout my thesis writing process. I also would like to thank Brigid O’Kane for her valuable advice and help outside of her duty.

I am grateful to the College of Design, Art, Architecture, and Planning, whose generous financial support enabled me to finish this research project. Thanks to all my former co-workers in Shanghai, China, and my current supervisor Frank Tyneski. Without all of you, I could not have completed my thesis. Many thanks to Anwar Spatafore, Alex Mathers, Alix Armour and Patrick Cundiff who assisted with writing style and language.

Thanks to my parents and my sister.

## Preface

From 2002 to 2007 I was an industrial designer in Shanghai, China. I practiced industrial design for both Chinese and international clients such as Haier, Huawei, Lenovo and Kyocera. However, feeling uncertain about the future, I decided to take a break from my career in China and pursue an advanced degree in industrial design in the U.S. In 2007 I moved to the U.S. to become a graduate student in the Industrial Design Program offered by the University of Cincinnati. After two years of learning the theories of design in graduate school, I was hired by Frank Tyneski, a former executive president of IDSA, who is currently working for Skinit Inc, a consumer personalization company for electronic devices. My professional experience has become a combination of theoretical and practical education with employment in both China and the U.S. This duality gives me the proper perspective to both compare and contrast the problems and opportunities in the industrial design profession in the U.S. and China. With this personal experience, I will be elaborating on industrial design in the U.S. and China.

There are numerous design entities practicing industrial design in China. Companies such as Lenovo and Haier are very successful in branding and clarifying distinction, but many design firms in China are not successful. They practice copycat designing rather than original concepts, and are usually trapped in the cycle of chasing quantity instead of quality. For this thesis, I will focus on the majority of design companies in China who are unsuccessful, explore the reasoning for their failure, and in turn propose a solution.

I must note that today's China includes mainland China, Hong Kong, Macau, and Taiwan. However, Hong Kong and Macau are special administrative regions

that apply different policies than in mainland China. Taiwan is also a separate entity due to its government and political motives. Therefore, the Chinese area discussed in this thesis focuses on mainland China, not its outlying areas.

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# Chapter 1

## Introduction

## 1.1 Industrial Design Development

### 1.1.1 Industrial Design Comparison between the U.S. and China

Today, industrial designers in China are practicing design in a different way than designers in the U.S. In China, industrial designers often practice copycat designs (imitations and derivatives) to preserve forms that have proven successful in the market; while in the U.S., industrial designers usually create original designs.

The purpose of this thesis is to describe this difference and explain how China's industrial design education and practice must be changed. In addition, China must learn from the Japanese by integrating their own cultural value into industrial designing, so that China can occupy a unique position in the design world to compete with other cultures.

### 1.1.2 Industrial Design in the U.S.: Then and Now

The "Roaring Twenties" epitomized the height of economic triumph in a post-industrial age. Though, for U.S. manufacturers, it also marked a time when many realized their product designs were outdated, unattractive, and less competitive when compared to their European counterparts (France, Germany, and England). Thus, to compensate for their design inadequacies, some American manufacturers explicitly sought and hired European professionals to improve and modernize the design of U.S. products. However, these professionals were not necessarily

industrial designers; instead, the group was comprised of accomplished artists, furniture designers, and architects. Raymond Loewy, Henry Dreyfuss, Charles and Ray Eames were among those who forged change in American industrial design (Vogel Interview).

These designers worked from the end of the 1920's into the Great Depression to reinvent American design into what it is today. Designers influenced almost all types of products, from cars to home appliances, and this is why the 1930's and 1940's became known as the "Golden Age" for industrial design. During this period of time, many products were redesigned to be more aesthetically pleasing and user-friendly, while retaining great American durability (Vogel Interview).

After World War II, industrial design was a mainstream practice across all U.S. industries. By the 1970's, the practice of industrial design became a critical part of new product development and existing product improvement for major manufacturers worldwide. (Vogel Interview).

Today, industrial design in the U.S. is more focused on the "fuzzy-front-end" of the whole design process: the research and development of innovative concepts, and improvements known as "R&D" (Vogel, Cagan and Boatwright, 2005). While manufacturability is still an integral part of the design process, product durability and effective utility are merely standards by default. American firms are more focused on consumer research and the development of intellectual property. This is because the transformation of design has created sophisticated consumers who demand more profound needs than before (personalization is one example). The basic standards of form design, such as aesthetics, function, and manufacturability

are now the minimum requirements for successful products (Tyneski, 2010).

Needless to say, research and development has never been a more integral part of the industrial design process in the U.S. than it is now. Its undoubted success has been proven by products such as the iPhone.

### 1.1.2 Industrial Design in China: Then and Now

China has only a recent history in the field of industrial design which began during the 1980's, although it has advanced greatly in recent years. Industrial design in China was born in Guangzhou and then later developed in both Shanghai and Beijing (see figure 1 below). These three cities have become important economic centers, yet each has made or retained its own unique character. Beijing, the capital of China, is home to many international companies. This is because governmental departments are often involved in business transactions. As a result, setting up headquarters at the nation's capital is not an uncommon strategy. Guangzhou and Shenzhen harbor the highest number of manufacturers, making it an epicenter of industrial production. Shanghai, considered to be China's global hub, is home to many high-end industrial design companies in China.

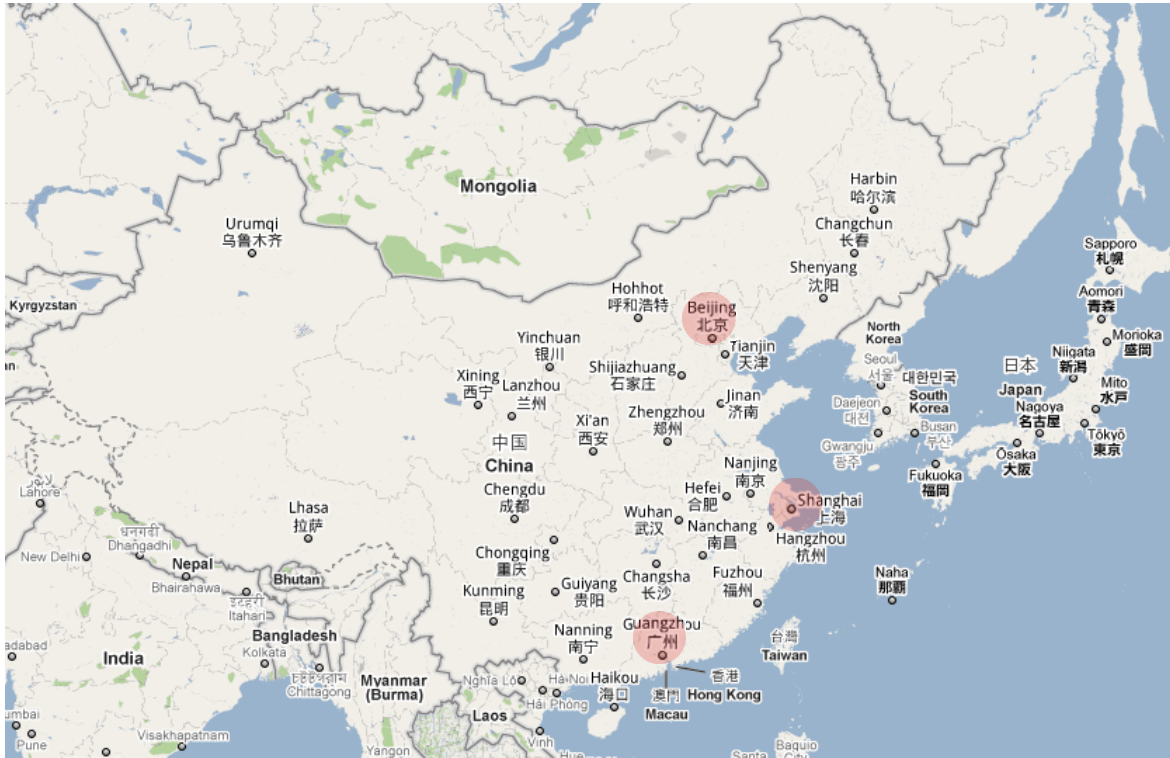


Figure 1: Three Industrial Design Centers in China (Google Maps, 2011)

The first Chinese industrial designs were home appliances, developed in Guangzhou during the early 1980's. The early Chinese industrial design entities began with "sub-departments of design" within large corporations. Media (美的) was the most successful Chinese industrial design firm of the era. Many designers followed their successful path and founded their own industrial design firms. Later, during the Chinese era of "Reform and Opening-up", industrial design branched off as its own independent field.

As Shanghai experienced increased economic success, various industrial design companies relocated to, or began setting-up shop in the area. It is believed that the strategic global location of Shanghai gave these companies better access to global markets, allowing them to learn and practice more effective branding than

their counterparts in Guangzhou and Shenzhen. Shanghai design firms not only developed higher quality products, which resulted in high profit margins, but also developed, if not defined, standards with respect to industrial design in China (Ronggiang, 2005).

In 2002, a new business model called “Design Houses” in the cell phone industry was introduced into China. These Design Houses, also known as Original Design Manufacturer (ODM<sup>1</sup>), were first developed in Korea and Taiwan. Design Houses were highly specialized, possessed sophisticated technology and equipment as well as occupied large buildings and employed hundreds of people. With extremely high profit margins in the burgeoning cell phone industry, dozens of enterprises quickly established their own Design Houses. ODM sprung up quickly and in large numbers throughout Beijing and Shanghai. However, since most of these Design Houses only developed “copycat” designs, China quickly became the copycat market for consumer electronics (Dongliang, 2006).

Another landmark for industrial design occurred on March 13<sup>th</sup>, 2008, when the Chinese government issued a document called the “Implemented Policy on Expedited Development of Service Industries” (issued by the General Office of the State Council of the People’s Republic of China), by which the Chinese government defined “industrial design” as a profession. This was the first time “design” was recognized by the Chinese government as a professional occupation, the document

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1 An **original design manufacturer (ODM)** is a company which designs and manufactures a product which is specified and eventually branded by another firm for sale. Such companies allow the brand firm to produce (either as a supplement or solely) without having to engage in the organization or running of a factory (ODM Group, 2009).

was issued 20 years after Korea's government noted at the 1988 Olympics in Seoul that, "design builds the country"; and more than 50 years since Japan stated "industrial design builds the country" (He, 2008).

As of 2011, the world's center for manufacturing had mostly relocated to China, making industrial design more important to China than ever. Thus, numerous firms have specialized in design and are rapidly growing in size. To date, companies like Lenovo and Haier have become successful at branding and clarifying distinction with unique designs, but most other Chinese firms have proven not so successful (Vogel, Interview). These unsuccessful companies most likely failed because their pursuits were simplistic and un-profound, attributing preference to quantity over quality.



## 1.2 Industrial Design Education

Industrial design education is vastly different between the U.S. and China in terms of historical importance, design methods, and students' freedom of expression. Chart 1 lists the major differences in industrial design education between the U.S. and China. It must be noted that the term "sketch" as used in this thesis refers to the early quick visualization of original idea, not the copying of any existing products in the market.

U.S. Industrial Education	Chinese Industrial Education
Systematic and Mature	Newly Developed
Visualization: design begins with hand sketch and ends with CAD	Visualization: design begins with CAD and ends with CAD
Critical Thinking	Heavily Influenced by Faculty

Chart 1: Industrial Design Education Comparison between U.S. and China

Industrial design education in the U.S. is more systematic and mature. Students can choose from a range of practical and theoretical courses to study, which provides a wide scope of knowledge in the field. Some schools, like the University of Cincinnati, even provide internship opportunities such as the "co-op program", for undergraduate students to obtain work experience before graduation. These diverse learning and educational environments attract students from all over the world.

For many years, China's education systems offered only fine-art programs and "craft" schools that might have been remotely similar to "design" school (Vogel, Cagan and Boatwright, 2005). However, it was not until 1984 that China began teaching industrial design at its universities and specialized arts colleges. Germany, Japan and the United States have had a huge influence on China's industrial design academic programs, especially with respect to the "industrial design method" (Vogel, Cagan and Boatwright, 2005). Around the year 2000, industrial design education began receiving support from China's government, making it a popular academic field. This is most evident by the change of an average classroom size in the industrial design programs. These classrooms consisted of 10 students or less when they were first introduced but now commonly comprise of 40 students or more (Munson and Tharp, 2005).

An example of different teaching methods between the U.S. and China can be seen by comparing the design process itself. In the U.S., students usually begin their designs with traditional hand sketches and end up with computer aided designs (CAD). Chinese students, on the other hand, usually begin with CAD and end with CAD. Nevertheless, the hand sketch is an integral component of the industrial design process because it allows the designer to share concepts quickly and shape the free-flow of ideas. Using CAD can be similar, but since it is a design medium, it takes longer and is less intuitive than creating a hand sketch during the first stage of design. (Munson and Tharp, 2005).

Critical thinking is encouraged in the U.S., whereas in China it has been suppressed. Criticism and debate is an important aspect of American culture, as a result, U.S. students are encouraged to speak their mind, even if they disagree with

their faculty. This ideology helps U.S. students become confident in pursuing their original ideas. Conversely, in China, students' independent thoughts are usually suppressed and discouraged. Furthermore, an abundant amount of memorization is required in school programs; Examinations are the key determinants of whether a student can get into a particular area of study or attend a school of their choice. As a result, competition on college entrance examinations is severely intense. The educational system's informal motto is, "do exactly like you're told, and in no other way." This ideology prevents creativity and impairs the development of problem solving abilities of Chinese students (Munson and Tharp, 2005).

## Chapter 2

# Contrasting Industrial Design Process

## 2.1 Contrasting Industrial Design Process

Americans are willing and even encouraged to be *different* and *unique*, but in China most people are afraid to stand out and are even discouraged from being different than their comrades. This concept of suppressed innovation again links back the idea of "doing as you're told." The result is a highly homogenous society by comparison to the U.S., thus industrial design tends to rarely incorporate product differences and most designs end up being very similar to one another. The reason for this difference can be traced back to the unique culture backgrounds of the two countries.

China is heavily influenced by the philosophies of Laozi and Confucius<sup>2</sup>, whereas Plato<sup>3</sup> and Aristotle are philosophers who have greatly influenced the U.S. Nevertheless, these thinkers are at the root of major differences between the two countries, which is reflected in how American and Chinese industrial designers practice. Generally, people from the U.S. tend to be more willing to explore new areas of science or introduce innovative concepts, but people from China emphasize the maintenance of a harmonious social environment and promoting the status quo.

U.S. industrial design began during the late 18th and early 19th centuries. Therefore, the design culture in the U.S. has a longer history and is more

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2 Confucius, literally "Master Kong", (traditionally September 28, 551 BC – 479 BC) was a Chinese thinker and social philosopher of the Spring and Autumn Period. His philosophy emphasized personal and governmental morality, correctness of social relationships, justice and sincerity (Confucius).

3 Plato was a Classical Greek philosopher.

sophisticated than the Chinese industrial design culture. Industrial design has evolved for more than a hundred years in the U.S., in which time education and research on the subject has led to an evolution of changes in this field, further broadening the differences between the U.S. and China.

One of the biggest differences in design methods between the U.S. and China is apparent in their respective “design processes” of new products. Figure 2 shows examples of an American and a Chinese industrial design firm working on a same project (Tyneski, 2010). Notice the American industrial design firm’s production procedure: a) week one: they share very rough ideas and sketches with their client; b) week two: they provide refined sketches, but not final designs; c) weeks three and four: they submit a final detailed design. However, a Chinese design firm practices differently: a) first 3-4 days: Chinese firm provides client with many, very nice, detailed two-dimensional design renderings, each similar to products already on the market place; If the client does not approve any of these designs, the Chinese design firm will create another batch of detailed designs similar to the original batch after another three or four days. This cycle continues until the client finally approves a design. In China, industrial design is all about trial and error (Tyneski, 2010).

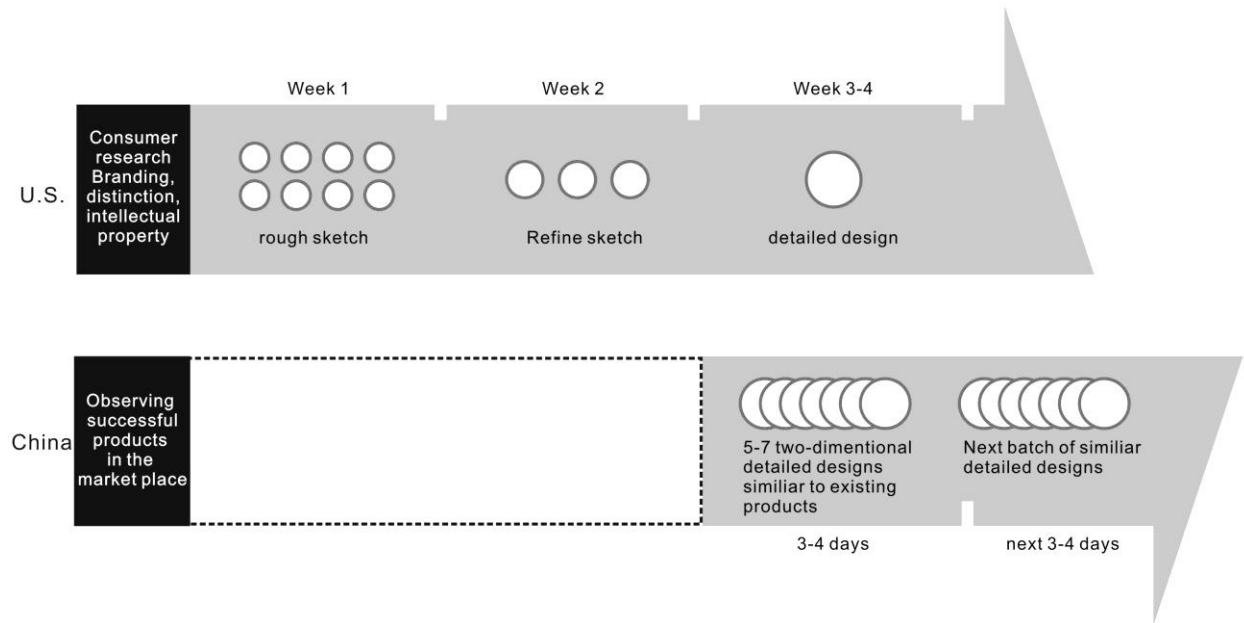


Figure 2: Different Design Process in U.S. Design Firm vs. in China Design Firm

Consumer research, branding distinction, and the pursuit of intellectual property drive the industrial design process in the U.S. (Figure 2). Thus, typical design firms in the U.S. invest more money, time, and energy on the design research and development phase compared to most Chinese design firms. Subsequently, U.S. design firms end up spending more time doing research during the fuzz-front-end of a design project, a process that requires three to four weeks as opposed to 3 or 4 days. Conversely, in China, the focus of most design firms is observing successful products in the market place, and trying to figure out how to generate a quick profit margin. This focus results in firms mostly practicing copycat designs, while trying to avoid copyright infringements of intellectual property patents. Furthermore, because Chinese design firms usually skip the “research phase” in design process, they are able to jump into detailed designs quickly.

Therefore, Chinese firms will usually work on several projects concurrently in the same amount of time an U.S. firm might work on only one project.

## 2.2 Interview

Figure 3 shows the complete process of new product development which is comprised of the following phases: a) design research; b) idea development; c) design execution; d) manufacturing; and e) product launch. The first three phases comprise the industrial design portion itself: design research, idea development, and design execution.



Figure 3: New Product Developing Processes

In order to find out more about how industrial designers in the U.S. and China differ in their design processes, I conducted an interview focused on the first three phases of the “new product development process” that pertain to industrial design. U.S. and Chinese industrial designers of various professional levels and from a variety of different industries were interviewed. The interview was conducted through email, phone, or in-person. It consisted of a brief introduction



and an open-ended questionnaire. The questionnaire was sent to 50 industrial designers. Responses were received from 40 subjects with quality data.

Some of the key questions in the questionnaire were:

1. What are the components of industrial design?
2. Which component is most valuable to you?
3. Are you spending most of your time on the most valuable component?  
If no, why not?
4. If no, what design component do you spend most of your time on?

Figure 4 shows a visualization of the responses received from the interviewees. The bold texts represent the most frequently discussed components of industrial design.

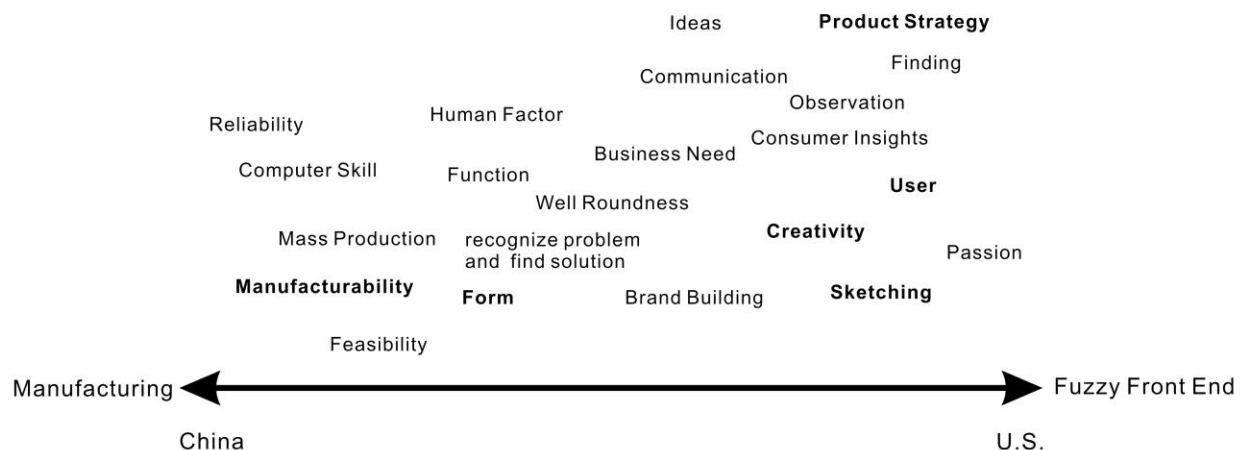


Figure 4: Most Valuable Industrial Design Components

## 2.3 Analysis of Highlighted Industrial Design Components

Based on my interviews, industrial designers in the U.S. generally think the most valuable components of industrial design are product strategy, user-centered designs, creativity, and sketching. Meanwhile Chinese industrial designers believe the most valuable components of industrial design are manufacturability, form, creativity, and the human factors. Almost all of the U.S. industrial designers agree hand sketching is important, whereas none of the Chinese industrial designers ever mentioned it. Both U.S. and Chinese industrial designers mentioned creativity as a critical component of industrial design.

### 2.3.1 Creativity

Both the U.S. and Chinese industrial designers agree that creativity is one of the most important components in industrial design. However, creativity could refer to many aspects of design, such as a modern look, creating a new way to use existing products, or a new process to do the work. Also, being creative is a significant part of innovation, without creativity, innovation cannot occur.

There is a subtle variation between what creativity means to designers in the U.S. and designers in China. U.S. designers are creative to meet the needs of rapidly changing markets, have a more profound understanding of consumers, and

confront more sophisticated issues in the design process like “branding.” To be exact, they are more focused on the the research and development phase of the design process by inventing new lifestyles, serving a more profound market, refining and redefining, branding, and most importantly creating intellectual property by clarifying distinction. In contrast, Chinese designers are creative to meet manufacturing criteria and producing new form designs that retain the essence of existing successful products, especially their forms.

## 2.3.2 Human Factors and Users

A *human factor* is a physical or cognitive property pertaining to an individual or social behavior specific to humans which influences the functionality of technological systems (Human Factors). The term *user*, also called user experience (UX), refers to how a person feels when interacting with a particular system. It also refers to a user's perception of the logistical aspects of technological systems, such as a product's utility, user-friendliness and efficiency. The concept of "product ownership," or a user's ability to personalize or "own" their experience using the system, is also a factor defined under UX. The user experience is, thus, subjective in nature, as it is concerned with an individual's feelings and thoughts about the system (Mike, 2010).

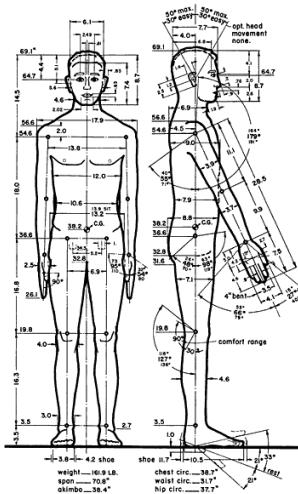


Figure 5: The Classic Human Factor Model  
(Diagram Human Factor)

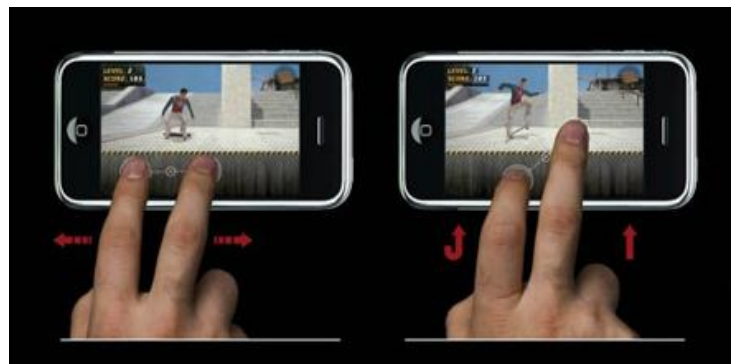


Figure 6: User Experience Model  
(iphone Innovation).

Chinese industrial designers believe that human factors are important, whereas U.S. industrial designers place their emphasis on the user. Human factors

and the user are similar, but not the same. Designers who focus on human factors are more concerned about physical dimensions as shown in Figure 5. Although, while designers focus on user are concerned about physical dimensions too, their main purpose is in optimizing the users' experience. Therefore, designers focused on the user are more interested in a user's perception and feelings about using a system than those concerned with classic human factors.

Five to ten years ago designers were more concerned about *human factors*, so they conducted research relating to a products' physical interface only. However, designers are currently more concerned with the *user experience*, which is more focused on the consumers' psychological experience, such as perception and satisfaction. For example, the iPhone interactive interface was designed mostly based on research concerning the users' experience. Figure 7 illustrates the differences between classic human factors design and the newer user-experience design.

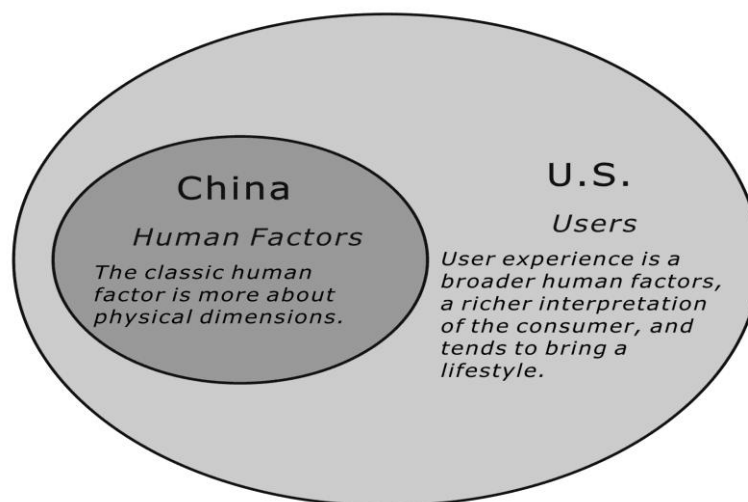


Figure 7: Human Factors and Users

### 2.3.3 Form and Sketching

*Form* is the physical appearance of a product, such as the look, curvature, size and shape. Form is very important because it is the first aspect consumers will see when they are shopping for a product. A superior form could be the determining factor that attracts a buyer, whereas inferior form design could be a turn off for prospective consumers.

Based on the interviews conducted, most Chinese designers believe form is one of the most important elements of design, whereas American designers, still regard this as important, but do not consider form to be their top priority.

According to the *design tendencies and forms of society* (Figure 8), China is currently in its “growing” phase. Thus, as a burgeoning society, China attributes greater value to style and modernity in its designs; versus “mature societies,” in which “use worth and function” are the preferably sought designs (Hauffe, 1996). However, Chinese designers do not create their own *distinct* style, such as Swedish furniture designers or Japanese Zen designers.

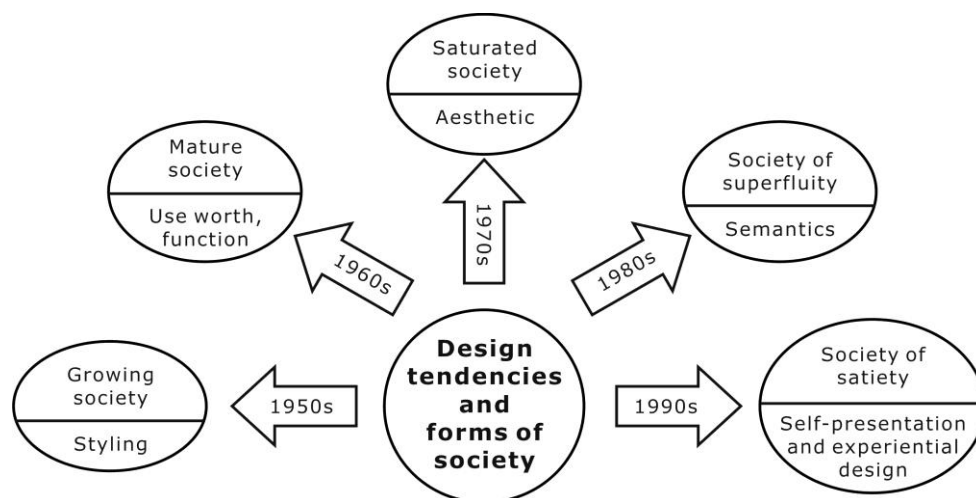


Figure 8: Design Tendencies and Forms of Society Charts (Hauffe, 1996)

Chinese designers recognize the importance of form, which is why their research is based on the proven success of other products. The result is what we call “copycat” designs. The iOrange in Figure 10, was developed solely based on photographs and features published prior to Apple’s release of the iPhone (Figure 9). In fact, the iOrange was released before the actual iPhone, boasting very similar-looking features, but offered to consumers at a much lower price. However, the iOrange phone was inferior in quality and functionality compared to the iPhone, exemplifying a first generation “copycat” design. At the beginning, many Chinese cell phone designers simply imitated successful products without attempting to make any improvements to the product at all. The result was that copycat products were not as good as the original. Nonetheless, the purpose of a copycat design is to produce products with a low risk in the market.



Figure 9: Original iPhone  
(Apple Inc., 2007)



Figure 10: iOrange phone illustrates an example of a  
Chinese “copycat” design (iOrange, 2007)

*Sketching*, in contrast to mere form, is a type of visual art and a method that designers use to capture their thoughts and convey, refine, and verify initial or novel ideas. Based on my survey, most U.S. designers think sketching is very

important, while not a single Chinese designer mentioned sketching methods as part of the design process. U.S. designers pursue new product possibilities through traditional hand sketching, which allows them to create revolutionary designs. This is because U.S. designers try creating unique designs in order to meet the needs of fast-changing markets, clarify product distinction, and define new or redefine existing brands (Munson and Tharp, 2005).

Many Chinese designers, however, believe that forms ought to be based on previously successful models and hold this to be the most important tenet of industrial design. Thus, many Chinese designers draft designs which do not require sketching, but are heavily based on computer aided software. As a result, Chinese designers pay little attention to the avoidance of intellectual property infringements. However, these designers also fail to understand that hand sketching is also an effective method that allows designers to explore design opportunities, invent new forms, and even conceptualize new lifestyles which does not merely rely on copying.

#### 2.3.4 Manufacturability

Manufacturability is the feasibility of manufacturing a product based on new designs using current techniques. It not only requires the designer to be knowledgeable about the costs and process of manufacturing, but also materials, current and upcoming technologies, and the ability to predict possible conflicts or barriers. Designers focused on manufacturability of products are thus required to



have specialized knowledge about production and its importance is mostly necessary in the execution phase of the industrial design process. Thus, no matter how unique or ground breaking a novel design might be, if it has poor or costly manufacturability, it may never become an executable design for the market.

When many of the world's manufacturers moved to China, China became host to some of the most specialized experts on manufacturing. Therefore, manufacturability is probably the main reason why the "execution" phase of industrial design is the primary focus for Chinese designers. In China, designers are more focus on feasibility, speed to market, and cost control. However, Chinese designers are trained to focused on executing cost-effective designs for manufacturing. While most U.S. designers are also concerned with manufacturability, execution is not usually their primary concern with respect to the industrial design process.

### 2.3.5 Product Strategy



Figure 11: A Brainstorming Wall Created by Students From the University of Cincinnati

U.S. designers generally believe research and new design development to be the main driving force behind the industrial design process. Thus, U.S. design firms combine form, function, and branding to create product distinction and create new intellectual property. This phase of the design process is called product strategy, which includes design planning, team working, strategic design frameworks, participatory design, user centered design research, ethnographic research, and personal modeling. These elements of product strategy comprise the main focus for many U.S. design firms.

## Chapter 3

# Product Strategy and Execution

### 3.1 U.S.: More Influence on Product Strategy, Less Influence on Execution

The industrial design process in the U.S. is considered to be fully developed and highly specialized in both stages of the industrial design process (product strategy and execution). Each phase of the design process is very complex and is divided into its own specifically specialized stages. Each possesses its own responsibilities, but both are interdependent for successful product completion. This system of dividing the process into two phases allows specialization and ensures a very high level of performance.

U.S. designers are mostly engaged in the fuzzy-front-end of the design process, in order to create new intellectual property and revolutionize markets. Therefore, design research plays a major role for industrial designers in the U.S. The old requirements of general aesthetics, functionality and manufacturability have become basic minimum standards (Tyneski, 2010). However, a high percentage of the world's products are manufactured in China, making many Chinese firms experts on manufacturing. Because most U.S. companies outsource their manufacturing to China, they rely on Chinese firms to practice the execution phase of design, due to economies of scale. This barter-like relationship allows each country to specialize in a separate phase of the industrial design process, and thus creates a lucrative, economic comparative advantage (Spatafore, 2011).

As Figure 12 shows, product strategy in the U.S. focuses on consumer research, giving these firms a better understanding about human needs. This research allows U.S. firms to satisfy the new complex needs and emerging desires

of today's markets. Design research methods include ethnographic research, human factors engineering, and persona modeling, all of which have become standard practice over the last decade. Newer trends in design methods also include participatory design and strategic design frameworks.

Today, teamwork is more important than any other design procedure. Industrial designers rarely work on their own. Instead, industrial designers work in teams with their marketing, engineering and other departments within their firm. Thus, the old ideology that each department works independently has become blurred (Cagan and Vogel, 2002).

Designers working in the field of industrial design pursue higher academic-level degrees than before and are expected to have a superior standard of professionalism. Designers can now also climb corporate ladders into executive positions; they too, have earned greater authority and respect within their companies. All these changes have fundamentally altered the way industrial design is perceived. In fact, today people are more likely to refer to industrial design as an entire process, rather than an isolated piece of work.

Because industrial designers in the U.S. have become highly specialized in the fuzzy-front-end of the design process, sometimes they lose sight of the final stage of design in the design execution. For example, in the U.S., most industrial designers usually begin a design with hand sketches to conceptualize their ideas in two-dimensional drawings, but many cannot build a 3-D computer-aided-design model (CAD), or render a 3-D design into a conceptualized visual. However, even some designers in the U.S. who can build and render these sophisticated CAD models mostly use mere designing software such as "Rhino" or "Alias Studio",

which are not compatible with engineering and manufacturing software such as “Pro/Engineering” or “Solid Works”. Thus, elements of an original design’s concept made using Rhino or Alias Studio are easy to lose when converted into software for manufacturing, such as Pro/Engineering. These Elements, such as curvature, size and even the look-and-feel of a product’s design can become slightly skewed, altered or even completely lost during the conversion.

In contrast, Chinese industrial designers are specialized in the execution phase of design and most will start and finish using engineering and manufacturing software such as Pro/Engineering. Thus, Chinese designs are generally less likely to lose characteristics during the process of design to final manufacturing. This execution generally gives Chinese designers more influence over the final stage of a product’s development, compared to U.S. designers. However, the engineering software which Chinese designers use also has its own limitations with respect to developing sculptural surfaces, which highlight China’s major limitation in the field of industrial design (Vogel Interview).

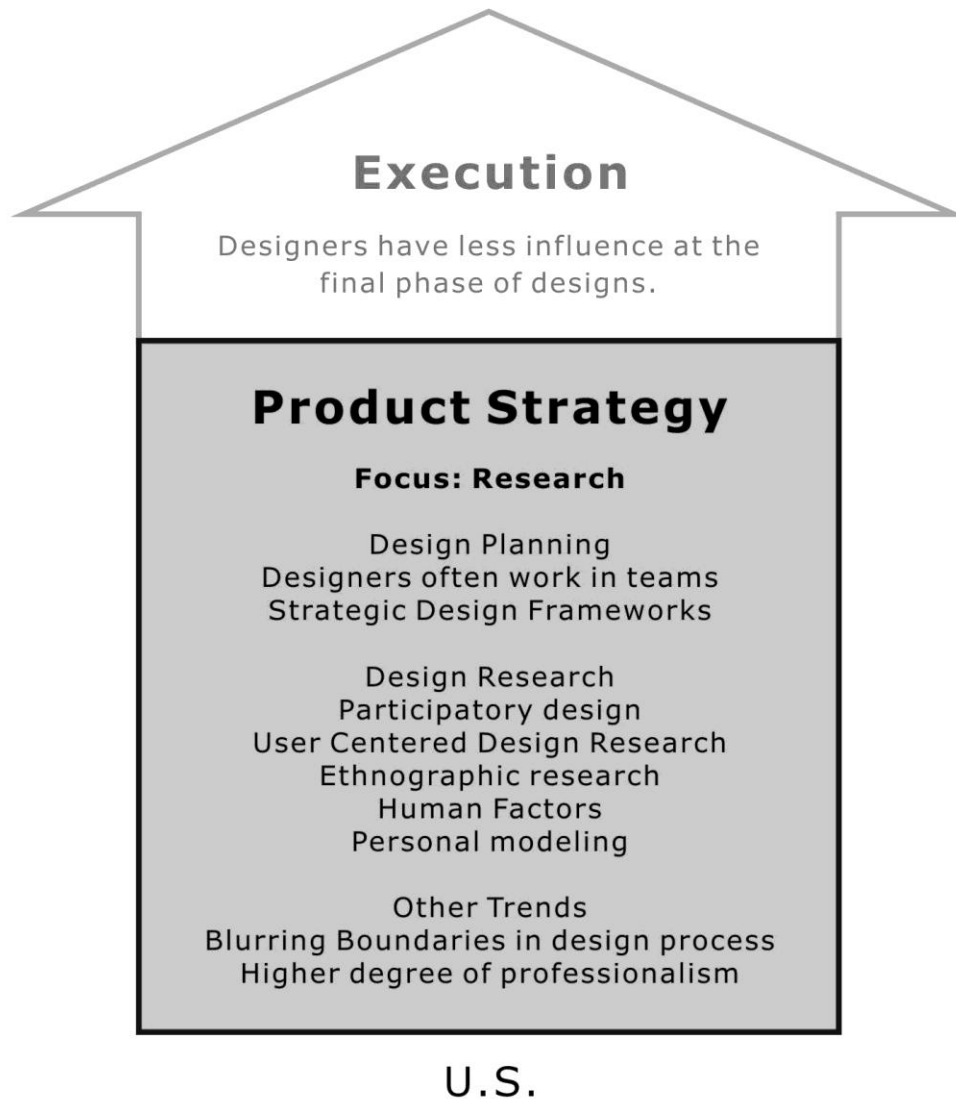


Figure 12: Product Strategy and Execution in the U.S.

### 3.2 China: More Influence on Execution, Less Influence on Product Strategy

Today, China is considered to be the world's factory because of its affordable labor, mature manufacturing technology, and a friendly environment for investors. However, product quality varies in China depending on different manufacturers. There are manufacturers like Foxconn, produce high quality products such as the iPhone; also, there are other manufacturers that produce inexpensive products for U.S dollar stores (Balfour and Culpan, 2010).

In China, it's all about speed. Industrial designs usually develop quickly from ideas to products on the market. For example, a Chinese design firm working on a cell phone design project can have five or six detailed two-dimensional CAD drawings prepared in three days; complete a three-dimensional design CAD model in two days; and have a mechanical design executed after another three days. The entire design process including the finalized mechanical design can be executed in two weeks and the cell phone can go on the market within six months. This "speed-to-market" design timeline is the aspect U.S. design firms cannot compete with.

Figure 13 shows a huge knockoff cell phone mega-market in Shenzhen, China, which displays thousands of cell phones in its counters. Most of the phones for sale at this market are copycat phones with slight variations and models that are updated quickly every month, based on global trends.





Figure 13: A Knockoff Cell Phone Market in Shenzheng, China, 2008

Chinese designers are generally highly efficient in execution, but lack the ability to practice original designs. They observe successful products' form factors instead of creating their own and make only slight alterations to a design. Copycat design has even come to define the identity of Chinese products. A good example of the copycat design is the iOrange. When iPhone arrived into global markets, China's local electronics stores became heavily stocked with iPhone look-alike phones because opportunistic Chinese entrepreneurs wanted to generate quick capital without investing too much time and money in design research.

Copycat designs have evolved in the market place; Motorola introduced the flip-phone which was copied; Palm introduced the handheld organizer, a design everyone adopted; Blackberry introduced the PDA with keyboard, which became popular; and now, most touch-screen cell phones resemble the original iPhone.

Although, copycat products have now incorporated many new or different improvements to form and human factors (see Figure 14 below).



Figure 14: Huawei U8230 Android Phone (iTechnews, 2009)

### 3.3 Product Strategy and Execution in the Design Process

"Product strategy" refers to the research and development phase of the design process, whereas "execution" refers to the development of finalized designs or blueprints for manufacturing. As Figure 15 shows, consumer research and the development of intellectual property drives the U.S. industrial design process. Meanwhile, the Chinese purpose of design is execution and is therefore characterized mostly by copycat designs. Because U.S. designers are engaged in creating new original designs, firms in the U.S. take several weeks to deliver just one detailed design. In contrast, Chinese firms base its designs on already existing research and successful products, so they can execute final designs in days.

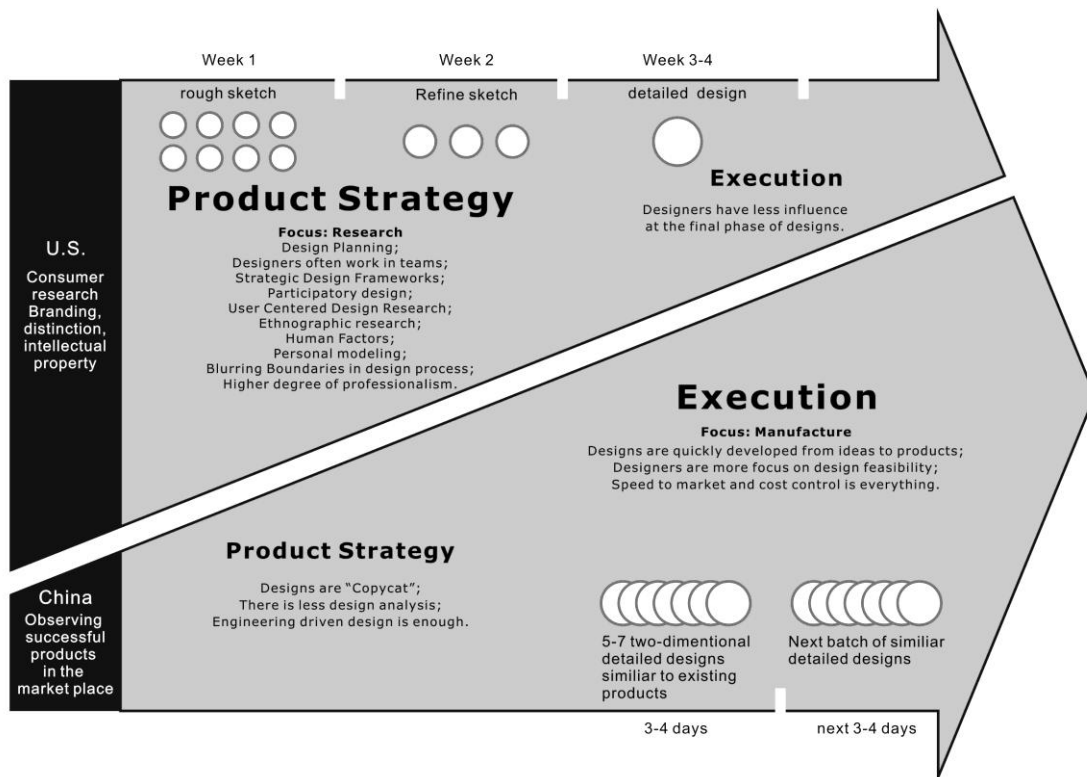


Figure 15: U.S. Product Strategies and China Execution

In the U.S., creating intellectual property is the goal of industrial design which drives the design process. U.S. designers incorporate a wide range of influential elements into the development of new products in order to meet the profound needs and demands of changing markets. This determination has placed U.S. designers among the world's leaders of product strategy, although design execution is less influential in the U.S. compared to in China.

China's massive and undervalued labor force gives China a strategic position that allows its global dominance in manufacturing (Spatafore, 2011). Therefore, Chinese industrial designers specialize in the execution phase of design, rather than product strategy, which results in designs are developed quickly in China. However, China lacks its own unique products, branding, and intellectual property. Cost of time and money are Chinese designers' biggest concerns when considering a new project and China's unique position, being one of the centers for manufacturing, makes the pursuit of an original product merely an afterthought.

Taiji 太极, as shown in Figure 16, is a Chinese cosmological term which means the "Supreme Ultimate" state of undifferentiated absolute and infinite potentiality (Robiner, 2008).

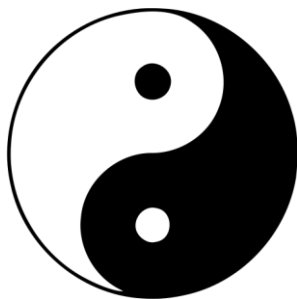


Figure 16  
Taiji / Yin and Yang

*Taiji is understood to be the highest conceivable principle, that from which existence flows. The "supreme ultimate" creates yang and yin: movement generates yang; when its activity reaches its limit, it becomes tranquil. Through tranquility the supreme ultimate generates yin. When tranquility has reached its limit, there is a return to movement. Movement and tranquility, in alternation, become each the source of the other (Robinet, 2008).*

Product strategy and execution are the components of industrial design, just like the Yin and Yang in Taiji, they affect and neutralize each other. Without the ability of execution (doing), a good idea will only remain as an idea, never to become reality. Vice-versa, without good product strategy (thinking), products would never meet the changing needs of the marketplace.

Today, the engagement in product strategy and execution, with respect to industrial design, are unbalanced between the U.S. and China. However, the two countries do complement each other in an interdependent economic relationship, whereby each is specialized in one half of the design process, but depends on the other for a balanced design (Spatafore, 2011). Though, the unbalanced state between product strategy and execution is unhealthy for the industrial design field of any one country. Only when industrial designers can balance the two elements of design, will they achieve a higher standing in their profession (Tyneski, 2010).

### 3.4 Innovation Roadmap for China

Currently in China, companies like Lenovo and Haier are considered to be successful because they put an emphasis on branding and quality as well as execution. Unfortunately, most design companies in China fail because they cannot compete on quality. These unsuccessful companies are usually small firms with a limited number of employees and are typically trapped in cycles that chase quantity over quality.

Because product development is a process that requires a lot of time and funding, smaller, undercapitalized design firms have to compromise their expectations, usually resulting in a short-lived existence. Instead, these firms choose to simplify the design process to reduce the cost of consumer research. To produce cookie-cut designs in copious quantities became their main objective.

Copying is part of the learning process for anyone. “A good designer designs, the best designers borrow” is an unspoken motto in the design industry. Learning design from others and improving on its qualities is common practice for many major companies. Example could be seen when iPad began making huge sales, competitors produced their own copycat “tablature” computers (based on the form and function of the iPad). As Figure 17 below shows, the Motorola Xoom, HP Touch Pad, and the Black Berry Play Book all look like iPad’s first generation “tablature” computer, offering only minor changes.



Figure 17: iPad2 vs. Motorola Xoom vs. HP TouchPad vs. BlackBerry PlayBook (Engadget, 2011)

Surpassing foreigners by learning from them (师夷长技以制夷, 清末人魏源, 《海国图志·叙》) is a Chinese traditional aphorism from the Qing Dynasty and the idea is still very popular in China today. However, many Chinese industrial designers have misunderstood the lesson. These designers create imitations, or make only superficial changes, without making significant improvements to functionality or the user experience. In the example of the iOrange phone, the copycat product had the same look as the iPhone, but was inferior in quality and user experience. However, if China had improved on the iPhone by making its iOrange better in some way, then it might have been a brilliant move. Instead, it evokes the western mantra that “cheaters never prosper.”

The good news is some Chinese firms have already begun infusing their own culture into designs and have created impressive hybrid products. One example is the “Vertu” copycat phone, but decorated with Chinese traditional designs on the margins (Figure 18).

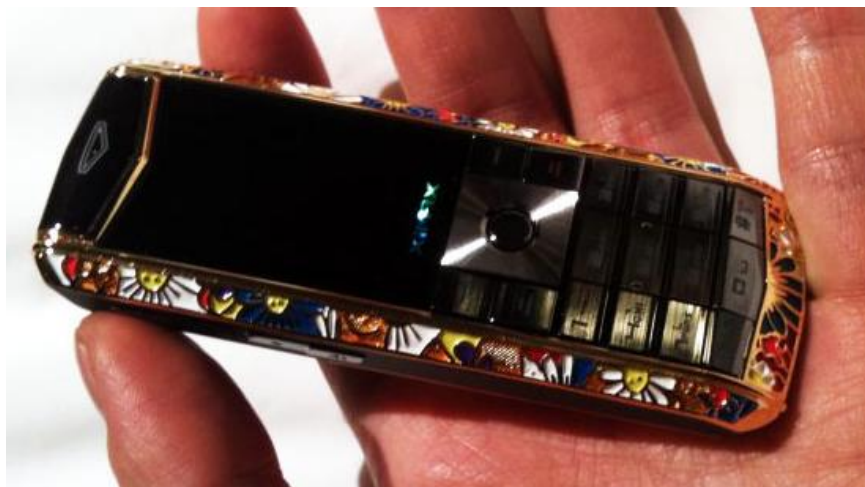


Figure 18: XiMRX “Vertu” copycat phone

This unique decorative technology, called “Jing Tai Lan,” was developed in China more than 600 years ago. The use of traditional art “Jing Tai Lan” on this modern phone is a good example “borrowing to make it your own”.

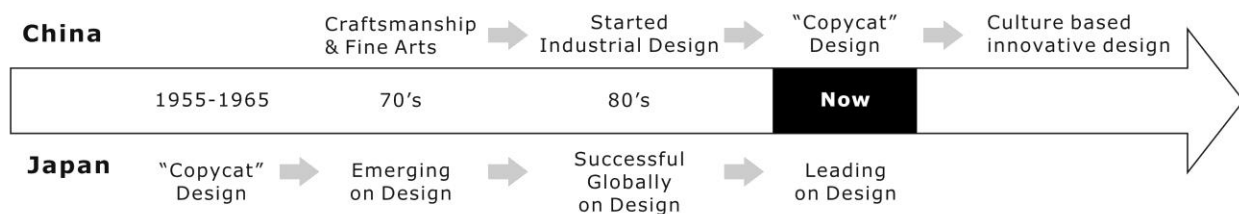


Figure 19: Innovation Roadmap for China

When discussing the future of Chinese industrial design, Japan is a good example. Figure 19 shows how Chinese industrial design now is walking in the footsteps of Japanese industrial design during the period between 1955 and 1965. In this respect, Japan’s past is China’s present; and South Korea’s development is also somewhere in between that of China and Japan. Japan was very good at copying successful products’ form factors, producing them more cheaply, and bringing them to market faster. However, eventually Japan stopped merely making “copycat” designs on or around 1975; South Korea stopped making “copycat” designs on or around 1995; and both Japan and South Korea now incorporate their own unique cultural elements into their industrial designs. They can even be described as having devised their own unique “design languages”. Thus, China needs to follow the lead of Japan and South Korea by integrating its own cultural identity in its industrial designs. Only by creating its own unique position in the world, will China be able to compete with other cultures (Ekuan and Stewart, 1998).



As one of the oldest countries in the world, China has had a continuous and rather unaltered culture, which most other countries do not have. Confucianism, Taoism, and Buddhism are the three most popular beliefs in Chinese history. These philosophies are so popular that they have even greatly influenced the West.

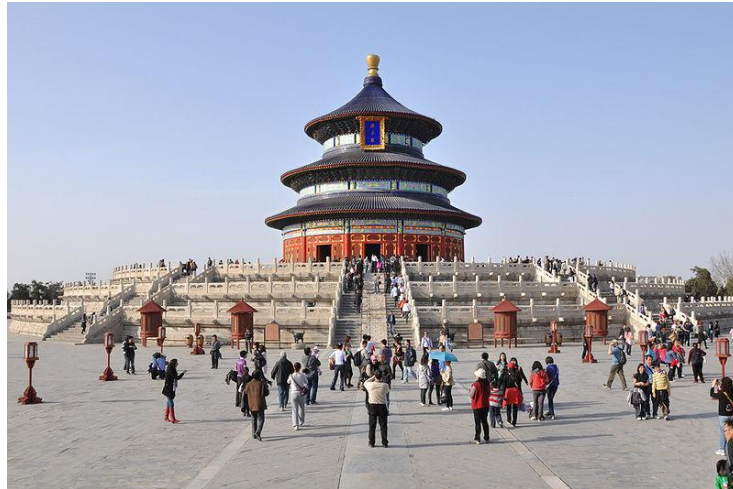


Figure 20: Temple of Heaven, photography by Charlie Fong

Many of China's traditional buildings were also built with these philosophies in mind. For example, the Temple of Heaven (天坛), shown in Figure 20, is regarded as a famous Taoist <sup>4</sup> temple because of its design. It is located in the Southeastern part of central Beijing and was used for annual ceremonies of prayer and for good harvest in ancient times. Chinese industrial designers must integrate Chinese cultural heritage into their own design methodology, just like when the Temple of Heaven was designed. Only then will China forge an original place in the field of industrial design.

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<sup>4</sup> Taoist propriety and ethics emphasize the Three Jewels of the Tao: compassion, moderation, and humility, while Taoist thought generally focuses on nature, the relationship between humanity and the cosmos (天人相应); health and longevity; and wu wei (action through inaction). Harmony with the Universe, or the source thereof (Tao), is the intended result of many Taoist rules and practices (Lao Tzu).

## CHAPTER 4

## CONCLUSION

Industrial designers' goals are the primary driver to the industrial design process. In the U.S., consumer research to create intellectual property is considered to be the goal of industrial designers. U.S. industrial designers usually contribute a wide range of influences to the development of new products. The U.S.'s purpose of design, in general, is to meet the emerging needs of dynamic markets, redefine branding, clarify distinction, and create intellectual property. However, because of specialization in the U.S., individual industrial designers are very often not involved in the full design process, and because of this, they can sometimes be less influential at the final stage of design.

For most Chinese designers, the goal is to observe successful products in the market place. Chinese industrial designers usually focus on manufacturing rather than product strategy. Designs usually develop quickly from ideas to products in the market place. However, China generally lacks an emphasis on unique brand positioning and intellectual property. Cost and time-to-market are considered to be a designer's biggest concern in China.

Currently, product strategy and execution in industrial design are unbalanced in both the U.S. and in China. In the U.S., product strategy is the primary focus rather than execution; while in China execution is the main objective. However, only when industrial designers can become balanced in both product strategy and execution will they prosper in the field of industrial design.

Chinese industrial design in 2011 is tracing the footsteps of Japanese industrial design during the 1950's. China needs to learn from the Japanese by integrating their own cultural value into its industrial designs, so that China can occupy a unique position to compete with other cultures. Finally, while there is a

current economic comparative advantage between the U.S. and China (each country is specialized in product strategy and execution respectively), each country ought to exhibit a greater balance in its design process. One way to achieve this might be through “design communication exchange” or an organization that could facilitate a dialog between industrial designers in the U.S. and China. Additionally, it is important for China to be mindful of intellectual property laws and copyright infringement, so they may industrialize their design culture, in the footsteps of Japan and South Korea.

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