



# *The Design and Development of a Design Consultancy for Product Design*

This 90-point Report is Submitted as a Partial Fulfilment of the  
180-point Master of Design Degree at Auckland University of Technology.

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2018

## *Attestation of Authorship*

"I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the qualification of any other degree or diploma of a university or other institution of higher learning, except where due acknowledgement is made in the acknowledgements."

A handwritten signature in black ink, appearing to read 'Siyu Guo', written over a light blue rectangular background.

Siyu Guo  
May 2018



# *Acknowledgements*

I would like to express my sincere appreciation to those who helped me in this research project. Their unfailing supports and enormous encouragements have made this design project possible.

To my supervisor, Professor Leong Yap who provided valuable insights, constructive critiques and constant guidance in this design project.

To my parents for their continual emotional and financial supports throughout my study in New Zealand.

To my friend Zengyue Wang who taught me and support in computer aided design.

Finally, I wish to express my gratitude to my Co-design partner, Yuansen, Zhang for his time, expertise and craftsmanship in the making and prototyping of the set of bamboo chairs. He has taught me many valuable secrets of the characteristics of bamboo during the production of the set of prototypes.

## *Abstract*

I am a product designer with three years of experience studying product design at the Limkokwing University of Creative Technology in Malaysia. I have always thought that product design was about drawing concepts and making things. Therefore, I have looked forward to being able to do a job that would allow me to create, develop and manufacture products as my career. However, when I began to study for my Master of Design in 2017 at AUT University, I found that design is much bigger than what I had imagined.

The Master of Design programme made me realise that design and manufacturing alone represent only a small part of the design, innovation and the commercialisation process. The three courses I have taken—Design Innovation, Design Enterprise and Creative Leadership—have changed my view of what design is really about.

These three courses have shown me that design is about innovation, entrepreneurship and creating value and meaningful experience. The programme has expanded my career opportunities. This is what I want to do as my career. Therefore, my design project involves setting up a design

consultancy. Though my consultancy still designs products and services, it also helps companies create value through innovation, commercialisation and creative leadership.

For this design project, I have developed a consultancy business model for product design and design business. The consultancy will be set up in China. The main goal is to emphasise the importance of creating value through Chinese culture. For my design project, I have positioned Chinese culture as an essential factor as the core value of the business plan. In this project, I focused on designing bamboo furniture and show how the design strategy comprising entrepreneurship, design innovation, enterprise and leadership is essential to the success of a design business.

This design report extends beyond talking about the theory of design innovation, design enterprise and what makes a good design leader. It puts these principles into practice. During the project, I travelled to China to manage the design process by negotiating with an artisan there to study the value of craftsmanship by working with bamboo. This partnership has resulted in the design and development of a set of chairs, as

a case study in what my consultancy could provide to future clients. I now believe that being a good product designer is more than merely designing products; it is also about innovation, entrepreneurship, design management, how products are made, product pricing and introduction to the market, sound design, leadership and business modelling.

Therefore, the Research Question asks:

***How can a product designer apply her creativity to build a design consultancy that assists business to develop value and manage a successful product design project?***

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## *Chapter 1. Introduction*

This project aims to build a design consultancy that helps companies create value in product design and development. The design project applies an interdisciplinary approach to discuss the importance of identifying potential business models, market gaps, value proposition, along with the design, development and production of products and services. Design thinking is an integral part of the project because the project aims to introduce innovative products to a growing market to meet the needs of consumers. Companies' development, sustainability and ability to improve the market depend on strategies and feasibility studies (Kuhn, 1989).

The core business of my consultancy focuses on culture, design innovation, entrepreneurship, besides design and development, prototyping and commercial services. I have conducted a comprehensive analysis of the requirements necessary to build a successful design consultancy and they are discussed in this report.

In general, "the value and nature of a particular product or service are always present in the eyes of bystanders." (Almquist, Senior & Bloch, 2016). I build on these two components to form my business. Product design can be combined with art, innovations, business and technology to create meaningful and enjoyable experiences for the target market.

Through contextual reviews of essential information and design processes, I have a better understanding of the necessities of successful, competitive products. Many critical, creative factors are required to drive business. Through an iterative methodology, concept development and operational participation (Hakatie, 2007), I have organised several essential components to establish a design consulting model, to ensure a competitive advantage in a competitive market. It is imperative to fully understand market gaps and needs, and create product value that is currently missing from the market (Kutaula, 2010). This approach increases the

opportunities for competitive advantage and optimises my understanding of the need to combine art, business and technology to support better innovations in the design business.

To better understand successful businesses, I have also conducted research on the design and industry profiles of several key design theorists and business executives. Research areas include Human-centred Design, the Four Pleasures of Design, Maslow's Hierarchy of Needs, Fogg's Behavioural Model, the Business Model Canvas, Value Proposition, and the DVF Model. In addition to design theories and principles, I have also adopted an interdisciplinary approach to identify business opportunities. Design thinking, and human-centred design are used to understand customer needs and wants (Hasdoğan, 1996). To produce a product that can create a meaningful experience for the user, compassion for the customer is critical. I have also ensured that my business follows a sustainable design ethos.

This Design Report consists of 6 chapters.

**Chapter One** introduces and scopes the areas of the project.

**Chapter Two** reviews literature and provides a study background of my design consultancy and related fields and analyses the business model and organisational structure.

**Chapter Three** discusses the methods used in the analysis, design and development of the project.

**Chapter Four** details the new bamboo furniture concept and discusses the contexts, design process and development of the project.

**Chapter Five** summarises the results and limitations of the new bamboo furniture.

**Chapter Six** is a conclusion on the design project.

## *Chapter 2. Contextual Review*

### **From Made in China to Designed in China**

To plan the direction of my consultancy in China, it is vital for me to bear in mind that since the Chinese national reform and the opening up of China, China has been continuously developing its economy. Today, China is a major manufacturing country, and its export trade is at the global forefront. The 'Made in China' movement not only expanded the scope of export trade but also eased Chinese employment pressures. However, compared to other developed countries, Chinese enterprises produce more low-end products. The profit value for such products is meagre, and their production consumes resources and pollutes the environment. Furthermore, the rapid development of China's economy has created a bottleneck in Chinese manufacturing. To address these issues, China must transform its economic strategy from Made in China to Designed in China (through innovation and value-added strategy) (Chen, 2006).



Fig 1. From Made in China to Designed in China.  
Resource from:  
<https://www.usj.edu.mo/en/events/public-lecture-made-china-designed-china/>

Since the 1990s, as the economy has developed, people's consumption has increased, consumer demand for products has diversified, and single products with single functions and forms no longer satisfy individualised consumer trends (Lu, 2001). Therefore, companies face an urgent need to quickly and efficiently develop high value, high-quality products. Faced with a rapidly changing market environment and diversified user needs, more and more companies have outsourced their design activities to design consulting companies as a strategic business decision (Schumpeter & Backhaus, 2003).

Design consulting companies are responsible for the development and design of new product features and can help shorten the overall product development lifecycle (Kutaula, 2010). They can also seek more effective technologies and solutions for implementing new product features. A successful design consulting company collects knowledge, experience and solutions across a variety of industries and flexibly applies them to help companies quickly obtain effective innovations (Lawrence, 1989).

A recent survey of 100 product design companies in Shanghai and Guangzhou has found that the companies

realised the importance of product design. Of the design companies in China, 65% were established after 2000. The demand for design has grown with the country's economic development. At the same time, Chinese companies' understanding of design is also changing. In the past, product design merely imitated overseas products; however, more and more companies now realise that they must innovate and develop unique designs to succeed in market competition. However, though the domestic industrial design consulting industry is rapidly developing, its future is unclear (Hongjie, 2018).

Current design consultants usually serve start-ups or manufacturing companies. Since they lack strong independent research and development capabilities, brand awareness and sense of innovation, customers tend to request only low-level design consulting services. Furthermore, companies focus on a number of services rather than their quality, which limits the development of the domestic design consulting industry (Zhang, 2006). The aim of my design consultancy is to address the current gaps.

Today, more and more professional design companies are aware that simple product design that does not take into account an emotional story, sustainability, ethical production and aesthetics has no way to adapt to the rapid development of society. It is difficult for design companies today to rely solely on design commissions for long-term growth without an authentic co-design participation with expert craftspeople who can create meaningful experiences that sophisticated consumers seek. China's design consulting service industry needs to explore new development models (Peng & Zhong, 2012).

Design consultancy should involve more than product design; it is long-term and diverse system engineering involving project presentation, market research, design, production, user experience, marketing and brand-building. Design consulting companies should not only comply with customers' needs but also help them establish correct and reasonable design directions from a professional perspective. Furthermore, they should actively design and manufacture products that can pass various tests and certifications based on product positioning and consumer demand to help customers avoid the risks of product development, reduce the costs of product development and increase profits from product sales.

As the design industry has matured, more and more design consulting companies have become dissatisfied with simple product design innovations and have moved away from single product modelling toward user behaviour and product development strategy research (Matsumoto, 2005). This is where I want my design consultancy to be positioned. Service models that integrate core products and brand positioning are designed to provide customers with early-stage strategies and design implementations, and incorporate brand image design, product planning and design, promotional material design and terminal display design into the scope of work, using a broad design approach to help customers improve their brand and product competitiveness.



With respect to management, these models expand the small-scale and single-minded model of the creative industry and design industry to establish professional, transparent and large-scale passionate design consortia capable of becoming enterprise-type design companies and winning more commercial value.

### **Designing the S.y Design Consultancy**

S.y. will be the logotype for my design consultancy. It represents my name Siyu. S.y. consultancy will be branded as an innovation-consulting firm delivering human-centred solutions with global impact. S.y. utilises design as a strategic tool to improve clients' ability to focus on customer's needs and aspirations while building a sustainable business model and societal benefits.

The company's services include product appearance, structural design, corporate strategic planning, brand planning and other services. S.y. will build a team of experts who have insights into culture for designing a product range comprising products for the home. With respect to service, S.y. is human-centred and focused on the product market positioning, and the overall planning of modelling, function and required processes. S.y. uses cost estimates to ensure that clients' capital investments will achieve the expected results, allowing the company to reposition itself in the market

and apply its company strategy to its products. It helps companies create products with market value to create profit. Sources of profit for S.y. include design fees for product development and business consulting fees.

S.y.'s mission as a design consulting company is to improve life through design and to change the future of the world with Chinese brands. Its objective is to become a well-known design consulting firm in China over the next six to eight years.

## S.y's Core Business

S.y.'s core business focuses on design innovation, entrepreneurship, design and prototyping. Great innovation, great design and great entrepreneurship are necessary to create great values (Dame, 2018).

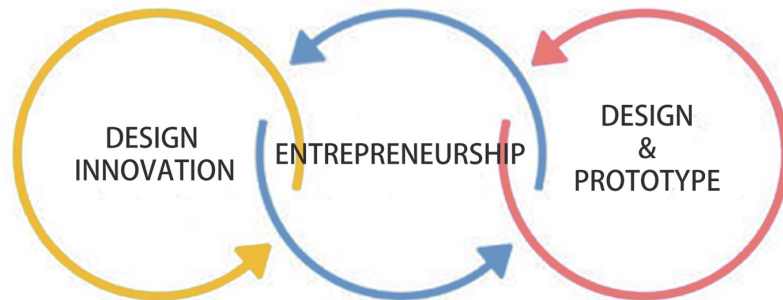


Fig 2. Design Innovation, Entrepreneurship and Design & Prototype as S.y's Core Business to Create Great Value. Illustrated by Siyu.

## S.y's Design Innovation

S.y. will adhere to the principle of helping clients to design and develop products and services that are desirable, viable and feasible (DVF Model). In 1912, Joseph A. Bear Peter (1883-1950) first proposed the concept of innovation theory in his book Economic Development Theory. Innovators combine resources in different ways to create new values. The best values combine three aspects: desirability from a human point of view, technological feasibility and economic viability. For design-oriented companies, innovative design capabilities are fundamental to product competitiveness (Roy, 1997).

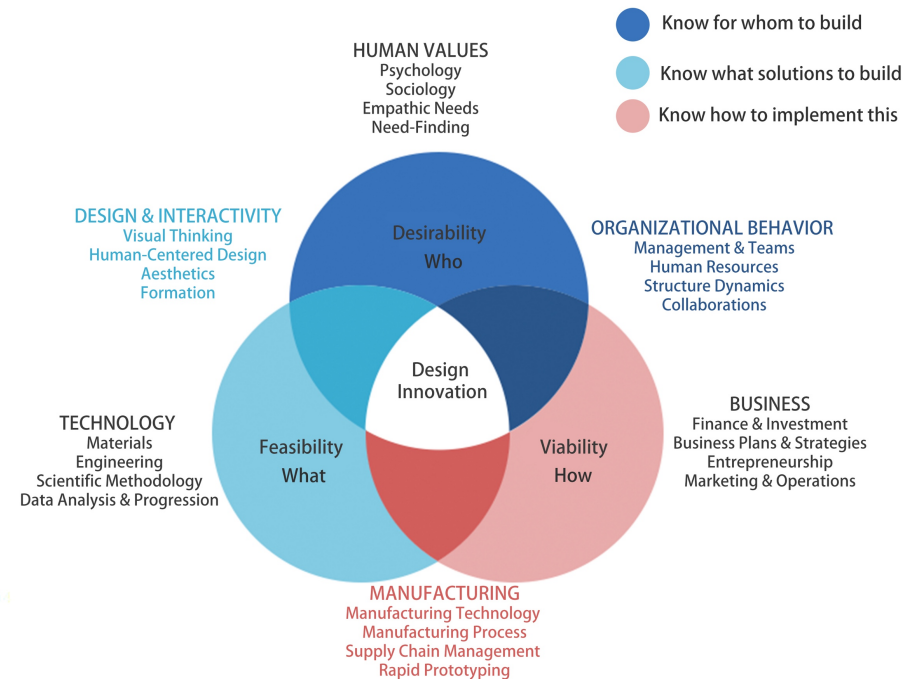


Fig 3. DVF Model Diagram Identified Design Innovation. Adapted from IDEO. Resource from: <https://www.ideo.com/pages/design-thinking>

## S.y's DVF Model

Design thinking is key to planning S.y., and design thinking serves as an important strategic business innovation. It helped me identify my business value, strategy and market needs (Grönroos, 1983), while also developing a strategic plan and expanding my business. Enterprises use design thinking to build DVF models.

## S.y's Fogg's Behavioural Model

Fogg's Behavioural Model (Fogg, 2011) comprises three main parts:

**Ability:** Products and services

**Motivate:** Different strategies for different markets.

**Trigger:** A design concept and strategy determined by consumer behaviour.

These three parts are interrelated. The model captures the essence of user behaviour when creating meaningful experiences and valuable products. This design factor triggers consumers' motivation to purchase a product.

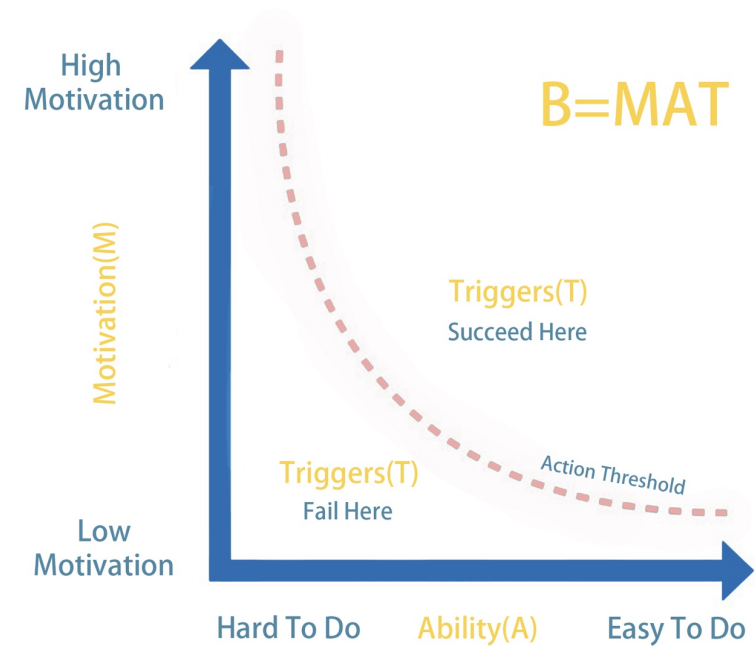


Fig 4. Fogg's Behavioural Model. (Fogg, 2011)

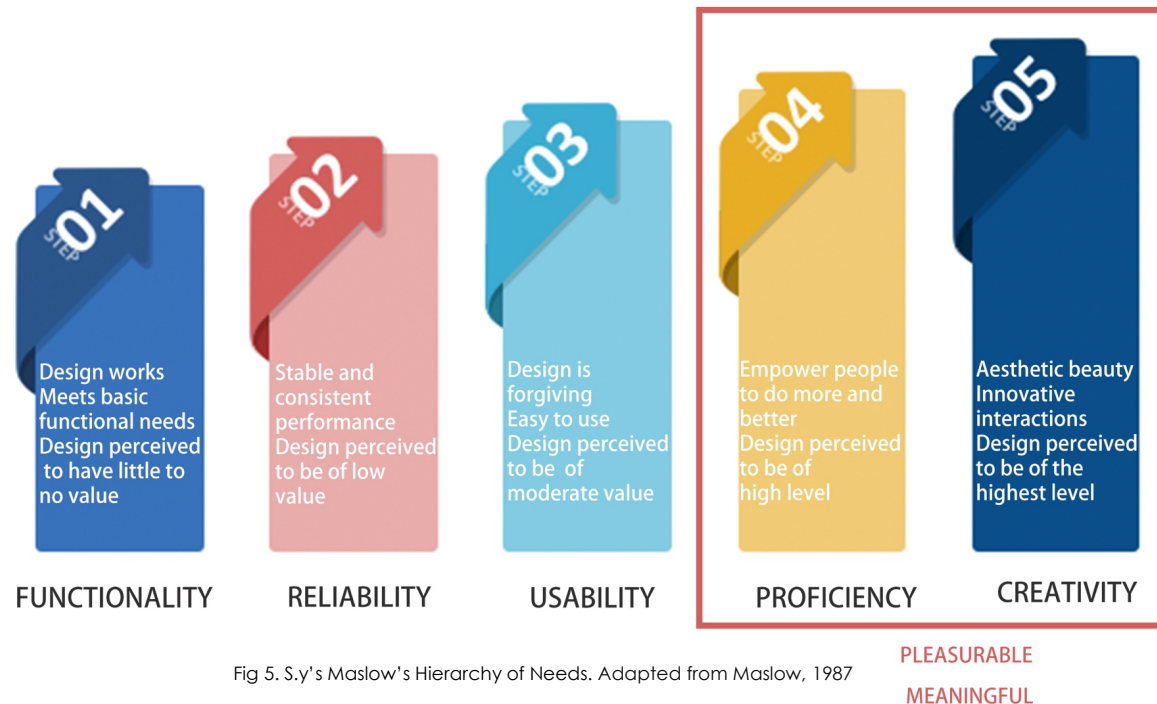


Fig 5. S.y's Maslow's Hierarchy of Needs. Adapted from Maslow, 1987

### S.y's Maslow's Hierarchy of Needs

A rigorous consumer value model guides the company to propose a new set of values for products and services. My analysis shows that the right combination can lead to higher customer loyalty, higher consumer willingness to try a product and more sustained income growth.

Any product that goes deep into people's hearts requires deep humanity. Therefore, companies such as S.y. Consultancy must distinguish between human surface needs and potential needs. Only by grasping the needs of human nature can the products be embedded with emotion.

Maslow's Hierarchy of Needs theory is one of the theories of humanistic science (Maslow & Lewis, 1987). Through an in-depth study of Maslow's needs, I explore the psychological relationship between designers and consumers. In the following, I discuss various requirement levels and content.

According to Maslow's hierarchy of requirements, my design consulting firm will use Levels 4 and 5 to ensure connectivity with market requirements and develop preliminary concepts to create meaningful experiences. My company will also use four fun analyses to provide customers better solutions. The four relevant pleasures are as follows:

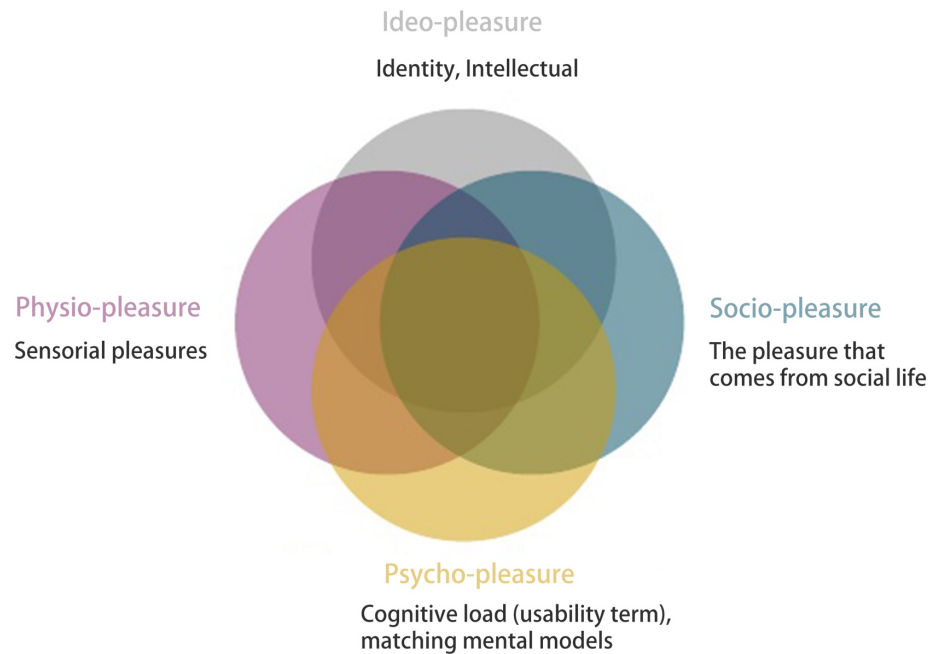


Fig 6. Four Relevant Pleasures. Adapted from Jorden, 2007.

1. Physiological pleasure: The five senses are linked to one another.
  - Creating products that drive the meaningful experience during use.
2. Social pleasure: The joy of creating social interaction.
  - Use consumer products to connect consumers with society.
3. Psychological pleasure: Human intelligence and emotions.
  - Develop products with empathy to increase consumer satisfaction and demand.
4. Thoughtful pleasure: Expressing ideological views
  - Adding cultural value, environmental value to new products. A product made from bamboo materials might be seen as embodying the value of environmental responsibility.

To design products that are aesthetically pleasing, sustainable and ethical to appeal to customers' ideological value.

## S.y's Business Model Canvas

The business model canvas is a framework to help organisations define propositional values (Walsh, 1996). I use it to capture the essence of S.y and to develop and understand the variables that define and test value propositions. The following diagram shows S.y's business model.

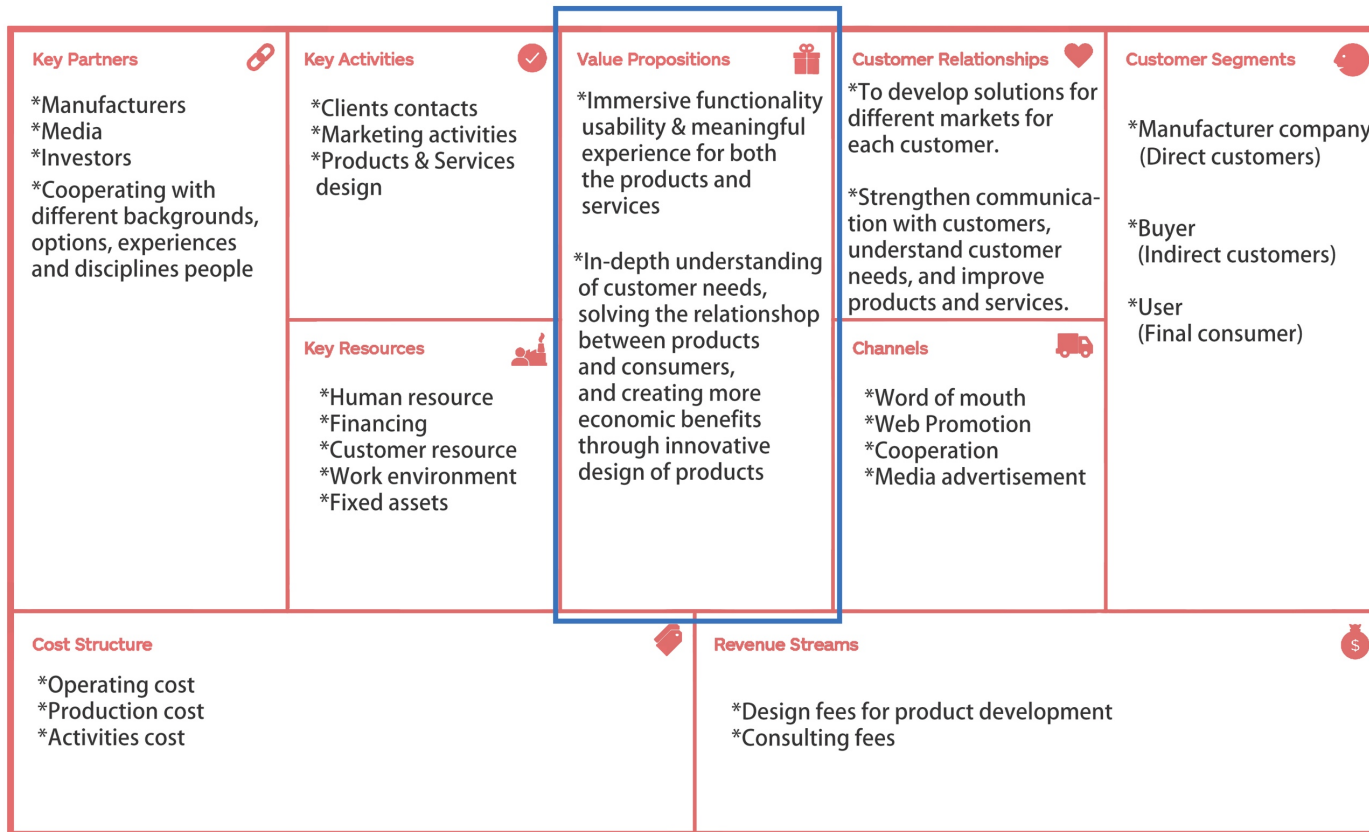
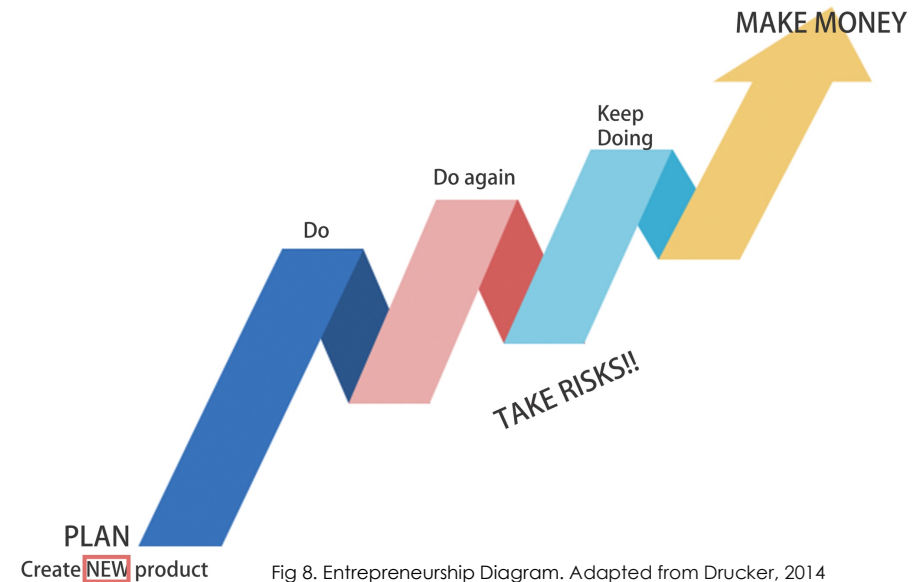


Fig 7. S.y's Business Model Canvas. Adapted from Walsh, 1996.

## Designer as an Entrepreneur

Design entrepreneurs must assume risk, attract financing and manage viable concepts (Dahlstrand, 2010). They must work to develop a collective vision and care as much about how the business is run as they do about their creative work. The goal of the design is marketisation or commercialisation to create an authentic business. As entrepreneurs, designers can integrate the power of business, finance, and business to jointly promote design into products and allow good products to reach the market to serve people's lives (Drucker, 2014).

Entrepreneurial designers have several core values. First, they have professional knowledge of people's experience needs that allows them to surprise customers. Second, they can solve problems on multiple dimensions. Third, they can control the quality of products and services. Fourth, they can engage in divergent innovative thinking. Companies involve several frameworks, including finance, team management, product development and design, production control, brand vision, marketing and media. Thus, design is only one part of a successful company (Stevenson, 2007).



Professor John Heskett (1980) of Hong Kong Polytechnic University believes that designers have three levels of value:

**Modifiers:** These beautify products and reflect basic underlying values.

**Differentiators:** These create different tones for different products, resulting in product differentiation.

**Drivers:** These allow designers to think about products at a strategic level and lead the entire company. Drivers offer a very strong sense of value.

## Design Management

### Organisation Management

S.y. consultancy will bring a holistic approach to product design to China. Product design has only been developing in China for two decades, and design companies focused on designing for production and operation have only existed for ten years. Design companies have developed rapidly in recent years, and many growing companies have experienced such problems as low design efficiency, unstable design and disagreements between managers and designers. The design company management model is an interdisciplinary category that effectively balances modern design companies' financial, material and human resources. This model manages the organisation structure of the entire design process to organise rights management, process management, cost management and intellectual property management (Jerrard, Hands & Ingram, 2002).

### S.y Design Consultancy Organisational Structure

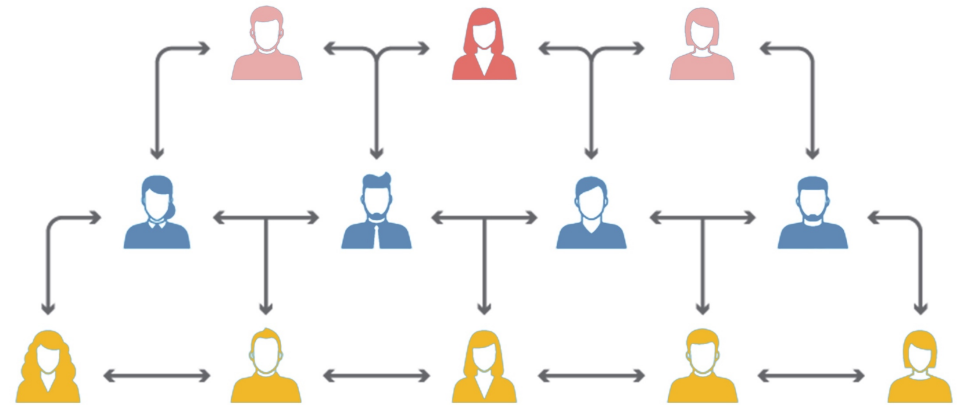


Fig 9. S.y's Matrix Organization Flowchart. Adapted from De Mozota, 2006

As a small to medium-sized design company, S.y. will use a matrix organisation system combining a project organisation system and a vertical organisation system to facilitate inter-departmental communication and exchange. This approach will also mobilise designers' creative enthusiasm without affecting the management of internal departments (De Mozota, 2006).



## Organisation Process Management

S.Y. consultancy will bring an effective design process management strategy to its clients.

Process management helps organisations manage and optimise their business processes to create more benefits. The core of process management is the process. The process is the basis of any organisation's operation and is critical to all business needs. Different departments, customers and personnel rely on processes to work together. For small- and medium-sized design companies, process management should focus on the product design process (Cooper, Junginger & Chung, 2016). The product design process involves market analysis, appearance design, product design, structural design, model-making and product promotion. Process management should also address several basic criteria: positioning an organisation for the future; design management as a strategy; creating an innovation culture; maintaining unity between organisational behaviour and organisational strategy; establishing an objective evaluation system; strengthening information feedback; strengthening the organisation's core competitiveness; and maintaining interactions between the organisation and consumers (Cooper, 2010).

## S.y Design Service Process

S.y's product design process involves clear intention, planning analysis, preliminary design, in-depth design, design review and brand promotion. These stages are described in more detail below (Berends, 2011).

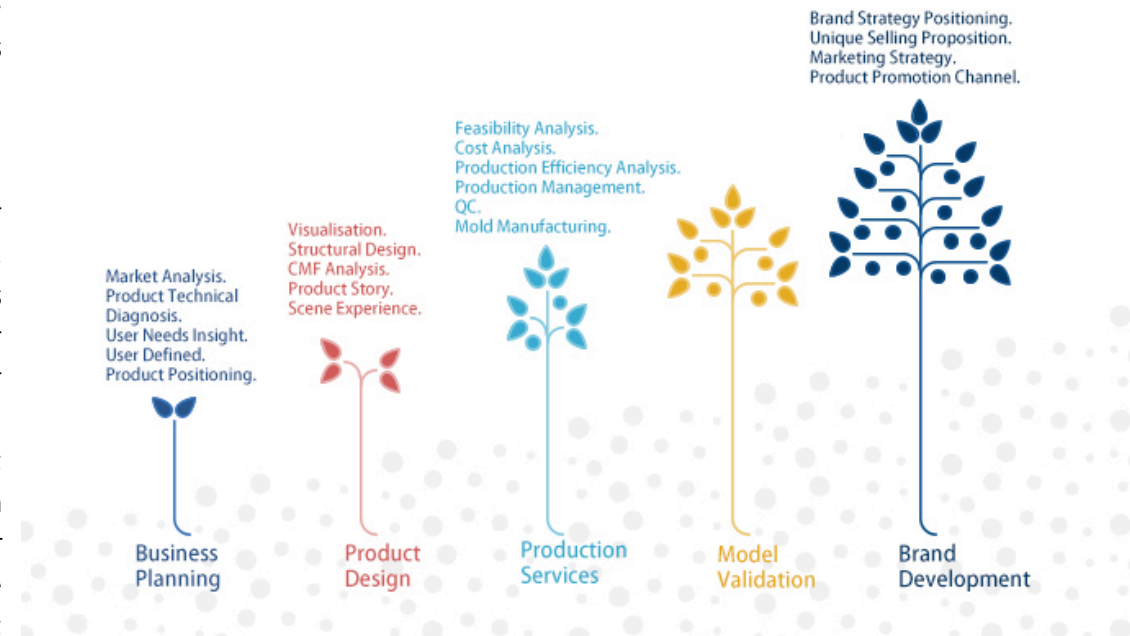


Fig 10. Design Service Process. Adapted from Berends, 2011

## Design Management

Users' needs can be identified through several research and development management activities. These activities can effectively mobilise designers' creative thinking in development, convert understandings of markets and consumers into new products, influence and change people's lives in new and more rational and scientific ways and maximise enterprise profits. To accomplish these results, organisations must engage in a series of design strategies and design activity management (Cravens, 2003). Design innovation penetrates every design and management activity. It is both the ultimate goal of design management and the driving force behind design success. Therefore, design innovation is at the core of the entire design management process (De Mozota, 2006).

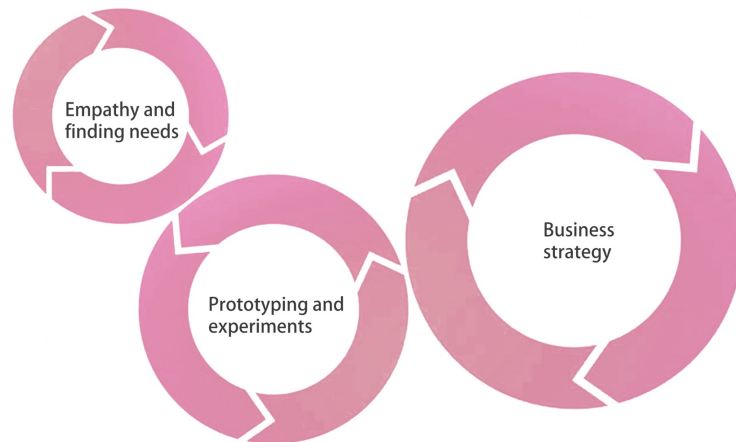


Fig 11. S.y's Design Strategy. Adapted from Cravens, 2003

## Design Strategy

To succeed in today's environment of fierce market competition, business owners must study the product characteristics of similar industries and adjust their design strategy accordingly. Product design and development, as essential components of a company's business strategy, must not only address consumers' needs but also be comparable to competitors' offerings (Berkowitz, 1987).

Oakley (2003) noted that a proper design strategy can maximise the use of corporate resources and fully reflect the advantages of market resources. Through detailed analysis and research on market technologies and resources, external competitors and design companies, and internal advantages and disadvantages, a company can identify its development prospects, market opportunities and risk factors. Understanding also provides a good foundation for a company's institutional design strategy.

As a design consulting firm, S.y. will set strategic plans for client companies based on the following key points.

1. A consideration of design goals and direction, and consumer desires and needs from the perspective of the company's survival and development.
2. The integration of design resources and other customer value creation resources.
3. Trend research, customer demand analyses, usage analyses and sales environment design.
4. Providing enterprises with direct, full and timely market information and information on changes in customer needs to drive corporate innovation.

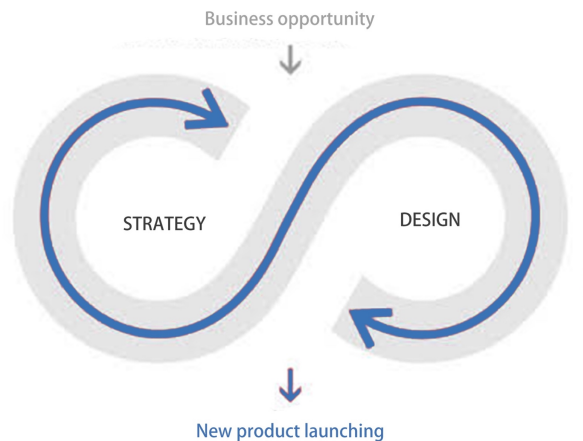


Fig 12. S.y.'s Business Strategy. Adapted from Oakley,2003

## Market-driven Marketing

The core principle of traditional marketing management is user satisfaction. User satisfaction involves meeting users' current needs. This marketing concept focuses exclusively on providing current services to users, ignoring the importance of users' marketing strategy resources in future business growth. Market-driven marketing is a brand-new corporate marketing concept and behaviour in which producers actively develop products, guide consumption and promote active marketing to form new markets. It focuses on discovering potential customers and tapping into their hidden needs instead of following the market (Hakatie, 2007).

S.y. will help companies take the initiative to create new market spaces in higher-level, larger-scale, new consumer markets, and to fill market gaps and effectively compete with competitors. This model serves as the design strategy for the S.y. design consulting firm.

## **S.y Design Consultancy Strategic Plan**

The project's development plan is divided into three phases:

The first stage will be implemented from 2017 to 2019. This period represents the initial period of the project and focuses mainly on market development, promotion activities and brand-building to attract customers. The S.y. brand will be gradually established in Fujian and southern regions to enhance brand awareness.

The second phase will take place from 2019 to 2022. This phase represents the project's growth period. The main objective of this phase is to occupy a larger market share, highlight economic benefits, and support project development with its own profits. During these years, the project is expected to experience rapid development.

The third stage will begin in 2023. This stage represents the company's continuous operation period. Beginning in the Fujian region, S.y. will gradually develop throughout the country to become an influential design company. During this stage, the company's strategy will be re-arranged to meet the business needs of different regions.

## Chapter 3. Research Methods

This project focuses on creating value through product design for companies. I use bamboo furniture design as a case study for the design aspect of my design consultancy. To generate the necessary information, I use the following research methods:

### Design + Business

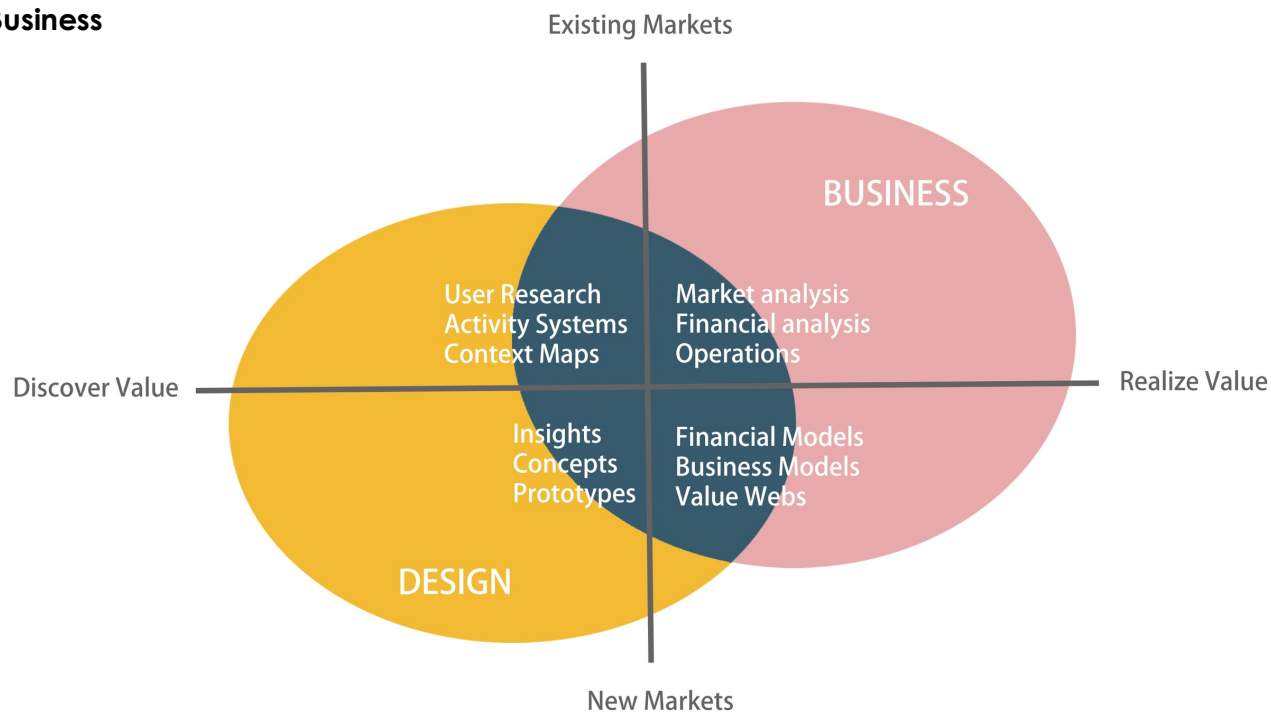


Fig 13. Interdisciplinary Methodology in Design Business. Adapted from Martin, 2009.

## Method 1: Design Thinking

Design Thinking (a process that creates possibilities and challenges for S.y's products and services)

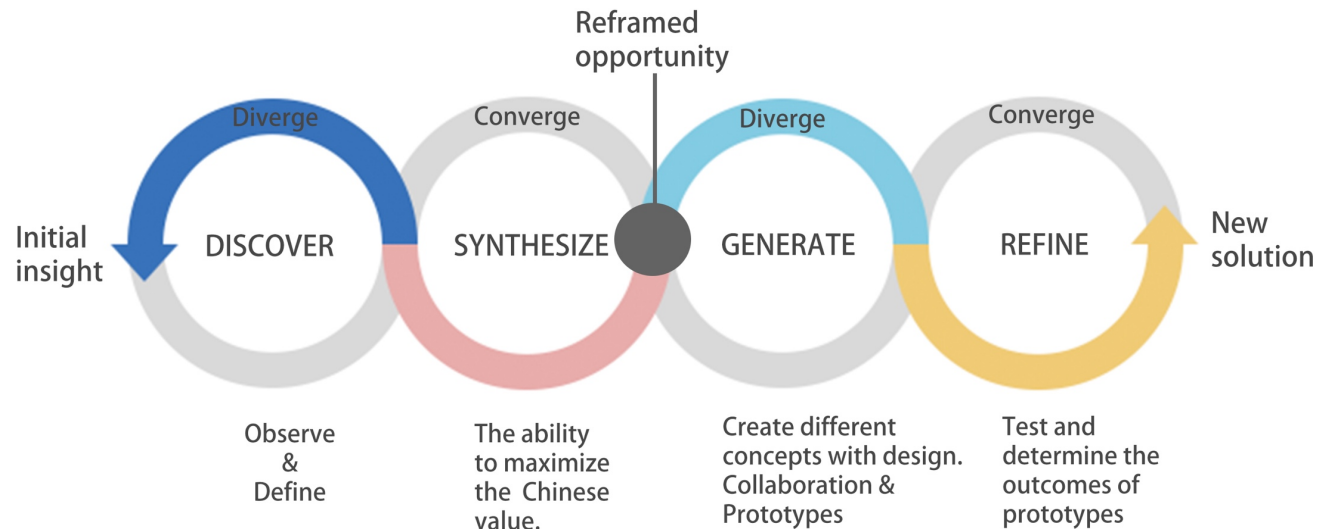


Fig 14. Design Thinking Process. Adapted from IDEO. Resource from: <https://www.ideo.com/pages/design-thinking>

The process of learning about the design and business aspect of the S.y consultancy is a continuous one. This framework determines the company's ability to drive, connect and integrate business and design. It focuses on discovering and observing the human-centred environment (Cross, 2013). As such, it evolves one's ability to empathise. In effect, it determines the key factors to enhance the market through different concepts, designs, collaborations, prototypes and different outcomes (Dorst, 2011).

Whether the results are good or bad, design thinking involves iterations of the learning curve to show value. Design thinking also involves rethinking factors to capture and find ground-breaking innovations for S.y customer.

### **Method 2:**

#### **Literature Reviews**

A literature review is a method to help collect and analyse data, which can be used to inform and describe practical work (Hsiao, 2002). I reviewed several sources, including books, journals, websites, and reports. These sources provided me with valuable information and offered substantive data for my market analysis. I also used a series of business models to analyse and build valuable products and services.

### **Method 3:**

#### **Co-design**

Collaborative design involves two or more professionals completing a design goal through information exchange (King, Conley, Latimer & Ferrari, 1989). As a design director, my job is to grasp the direction of the design. In the product development process, I worked with an experienced bamboo craftsman, who used his many years of experience and skills to help me develop bamboo furniture. My cooperation with the craftsmen progressed from concept development to model-making. After many discussions, we developed the most effective solutions to achieve my design goals. It is very important for design consulting companies to cooperate with individuals from various fields of expertise. By working with the craftsman, I demonstrated my ability to

communicate and operate as a communication leader (Steen, Manschot & De Koning, 2011).

### **Method 4:**

#### **Design Methods (Heuristic-Generative Methods)**

In this project, I used the design methods of heuristics, generative methods, knowledge exploration design ideas from previous research methods and user needs analyses to develop a series of new ideas for desirable, feasible and viable bamboo furniture (Hsiao, 2002). In particular, I used the following heuristics and reflections:

#### **Ideation**

A reflective practice involving the exploration of various new ideas through data and the use of imagination to solve problems during the concept phase.

#### **Visualisation**

The process of analysing, exploring, improving and developing pre-design ideas after establishing user requirements. These visual ideas support a better understanding of the aesthetic value and desirability of the product.

## **CAD**

CAD software was used to bring more realistic performance to the design ideas (Säde, 2001). I used the experience and techniques of the craftsman to develop design ideas, focusing on dimensions, ergonomics, materials and processes. The renderings and technical drawings visually demonstrate the design ideas and standards and support subsequent prototypes-making.

## **Prototyping**

To develop realistic representations of proposed design ideas, it is necessary to create several prototypes. This process explores the possibility of mass production with bamboo as the main material and the skill of the craftsmen as a primary resource.

## **Reflection-in-action**

I recorded the design and development process in a design journal, which traces designing, developing and evaluating processes. This approach is known as reflection-in-action. It is an important method based on practical research. Data collection, creative analysis, the design thinking process and the model-making process were recorded for analysis, assessment and discussion.



## Chapter 4. New Product Design and Development

### Observation (Culture, Experience and Needs)

The target market for S.y's products is the mid-market. I observe furniture products in three environments: home, restaurant and office space.



#### Home:

In middle-income families, furniture has exceeded basic needs. Furniture choices reflect the tastes of the family. Middle-class families pay more attention to furniture's beauty and experience.

#### Restaurant:

Specialty restaurants create cultural experiences for consumers.

#### Office:

Today's offices attach great importance to the human environment

Furniture is an essential product of our daily lives. Furniture can support human and emotional communication. It is, therefore, especially important to inject emotional factors into furniture to achieve an emotional communication.

Fig 15. Meaningful Experience of a Restaurant Environment. Photo by Siyu.

### **Market Analysis: What do customers need?**

According to Nielsen's market insight report (2017), environmental protection is among the most important factors by which Chinese consumers measure product quality. More than half of Chinese respondents are willing to pay for products containing organic natural ingredients and environmentally friendly recycled materials.

The general manager of Nielsen China (2017) noted that as consumers' income increases, they increasingly wish to buy better-quality products. In addition to meeting basic needs, many consumers are now more concerned with using special, sophisticated and high-end quality products. Therefore, providing products that meet consumers' quality expectations is critical. To be successful, high-quality products need constant exploration and improvement. Consumers' expectations with respect to experience are crucial in this process, and the most successful high-end products are those that have improved past unsatisfactory products or created products that did not previously exist.

Emotion is an important factor in Chinese consumers' choice of products (Leung,2008). In addition to gaining better experiences through product functionality, Chinese consumers are concerned with whether high-quality products can improve their mood and make them feel more confident. Quality products not only convey the buyer's culture and taste but also give the buyer a sense of accomplishment. Therefore, companies can attract more customers by creating product connotations and making products unique.

## Design Strategy

Observation and market analysis shows that Chinese consumers attach great importance to the meaningful experiences, personality and humanity of furniture. Therefore, I developed furniture products with the core value of culture. During the design stage of product development, I consider several factors: aesthetics, practicality, functionality, Chinese culture and emotions. I also consider cost, time, and division of labour to achieve market competitiveness and product differentiation and to help customers gain profits.

### Bamboo- The Power of Chinese Cultural Values

#### Return to tradition in the bamboo kingdom

Bamboo is one of the best plants to describe the spiritual world of the Chinese people. In the History of Chinese Science and Technology, author Joseph Needham marvels that China is a country of "bamboo civilisation". In past Chinese society, bamboo used to be everywhere. At a 7,000-year-old Hemudu cultural site, bamboo appeared. At a 1,000-year-old Yangshao cultural site, the word 'bamboo' is clearly recognisable on pottery. Within the past 60 centuries, there have been 209 areas marked with the word 'bamboo' along the shore of the Ci Hai (Cisheng, 2004). Bamboo is used in food, ornaments, and other creations. It is a utensil of life. It is also a gentleman's metaphor and a spiritual symbol.

However, at the end of 2011, when Junjie Zhang was a teacher at the China Academy of Fine Arts and founded the Sozen studio, he realised for the first time when he took his students to the bamboo craftsmen in Shaoxing that bamboo was slowly disappearing in daily life. Perhaps only from the perspective of bystanders can we clearly see the value of these ancient techniques for using bamboo. Traditional Chinese bamboo art urgently needs a modern renaissance (Sozen, 2018).

How can we remove the part of bamboo art that does not conform to contemporary art and the aesthetics of life, and combine the cultural and commercial values of bamboo art?

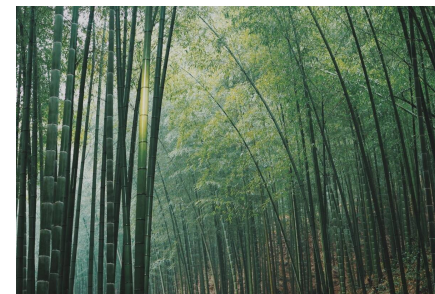


Fig 16. Bamboo Forest.  
Resource from:  
[http://www.china.org.cn/travel/gallery/2009-08/11/content\\_18316407\\_2.htm](http://www.china.org.cn/travel/gallery/2009-08/11/content_18316407_2.htm)

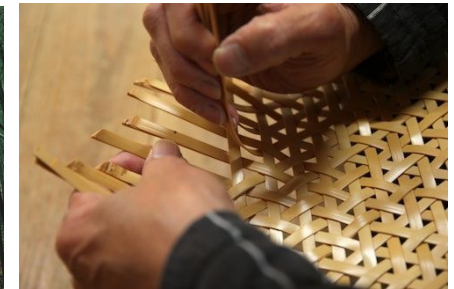


Fig 17. Traditional Bamboo Woven Art.  
Resource from:  
<http://www.ajkanazawa.com/3012/arts/craft/bamboo-ending-with-the-wind>

The debilitation of traditional craftsmanship has had a number of inevitable causes. Aside from being out of touch with the aesthetics and values of the times, there are also problems of technical feasibility, reproducibility and production efficiency.

How can contemporary design use tradition when it is "contrary to traditional creation"?

China is one of the world's leading bamboo-producing countries. The quality production area and output of bamboo can be ranked as number one in the world. In recent years, global forest resources have been gradually declining, but China's bamboo-forested area has been increasing at a rate of 3% per year. With the global deterioration of the environment as well as the sharp decline in forest resources, the development of the bamboo industry will continue to receive more and more attention (Lu, 2001).

The development and utilisation of bamboo have already been attracting such attention. China has a long history of bamboo culture and bamboo furniture construction due to bamboo's naturalness (Bond, 1993). The texture gives consumers a feeling of simplicity and elegance, and it is deeply loved. However, bamboo furniture has not been well-developed, as Chinese enterprises and designers often do not make full use of bamboo due to industrialised production and design. Nowadays, China has been developing a conservation-minded and innovative society. We believe that as people's awareness of environmental protection and innovation increases, there will be a huge market for bamboo furniture (Cisheng, 2004).

### **Bamboo furniture meets a low-carbon life**

Living a low-carbon life demonstrates a return to nature and is an act of promoting natural, comfortable, green, and environmentally friendly living. The raw material for the production of bamboo furniture comes from the natural, environmentally friendly base material of bamboo, which fully meets the requirements for a low-carbon life. (1) Bamboo has excellent physical properties. It has a low density and high strength (including tensile strength); a higher compressive strength than wood; it is rich in toughness and elasticity; it has a strong anti-bend ability; it does not break easily, and the material itself is smooth and hard, the texture straight, with minimal shrinkage. Also, it is easy to process bamboo, and its performance under sawing, planning, drilling, milling and bonding is good. Furniture made using bamboo is strong, reliable and durable. (2) Bamboo has a natural texture, offering a feeling of simplicity, elegance, and naturalness. (3) Bamboo furniture also has high flexibility, is breathable, elegant, has a cool shape, and feels cool. It can create a leisurely, comfortable and peaceful atmosphere when used in home decor, which can satisfy consumers' needs of being close to nature and returning to nature. (4) Bamboo is warm in the winter and cool in the summer (Van, 2012). Due to its natural characteristics, its moisture absorption and heat absorption performances are higher than those of other wood types. During hot summers, sitting on a bamboo chair is cool and sweat-absorbing. In cold winters, it creates a warming feeling (Lakkad, 1981).

## Design Exploration – Bamboo Chair Design

A bamboo chair design will be used as an example for the product development.

Most Chinese people have a bamboo chair in their memories. It is a bench for the body, and it can also be the backrest of a chair. The chair stays quietly in the yard, enjoying the sun, waiting for the owner to return home. It has a long lifespan and can accompany a person from toddler to old age (Finlay, 1983). This kind of bamboo chair can be especially emotional for Chinese people. My design inspiration comes from the chairs in our memories. In combination with traditional craftsmanship, traditional cultural values are brought into play to stimulate potential emotional empathy.



Fig 18. Bamboo Chairs Used in Daily Life in China.  
Resource from: <http://static.anywood.com/Uploads/Editor/2018-05-02/5ae91eeab56d5.jpg?x-oss-process=style/content>



## Concept Design & Development

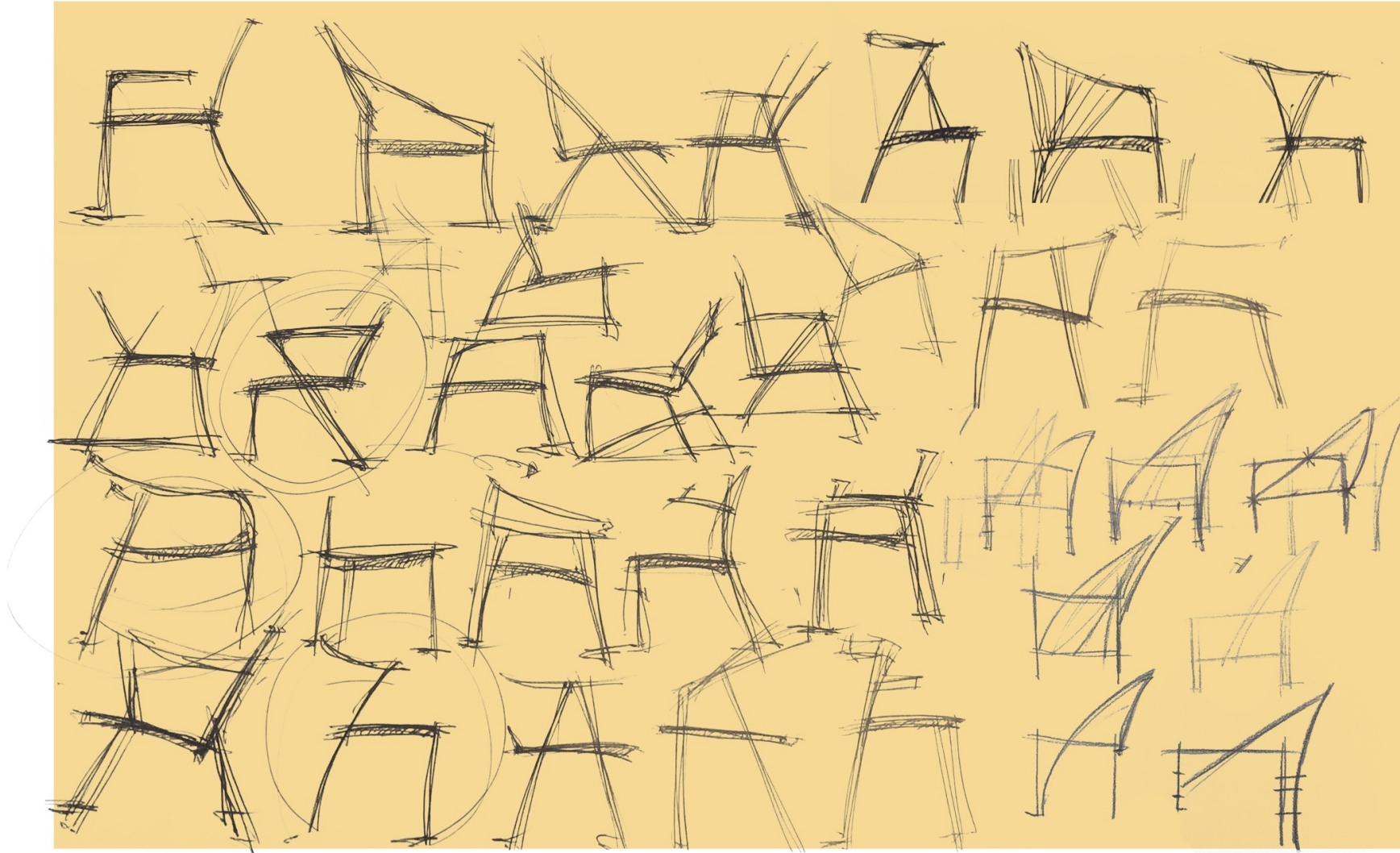


Fig 19. Concept Explorations of Chair Forms. Drawn by Siyu.

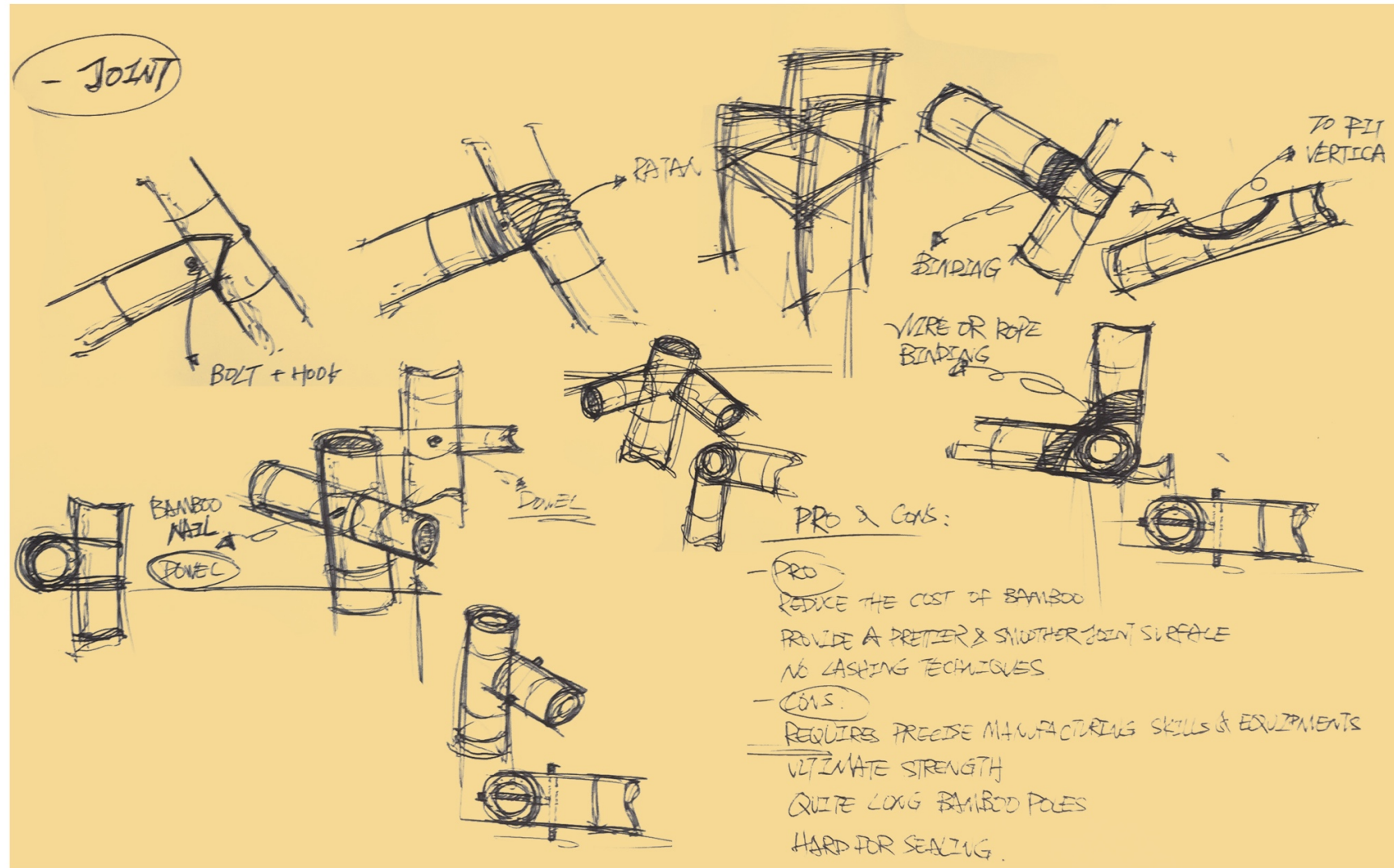


Fig 20. Studies of Joints for Chairs. Drawn by Siyu



Fig 21. Concept Explorations of Mixed-Material Chairs.  
Using Bamboo, Aluminium Steel Wire. Drawn by Siyu.



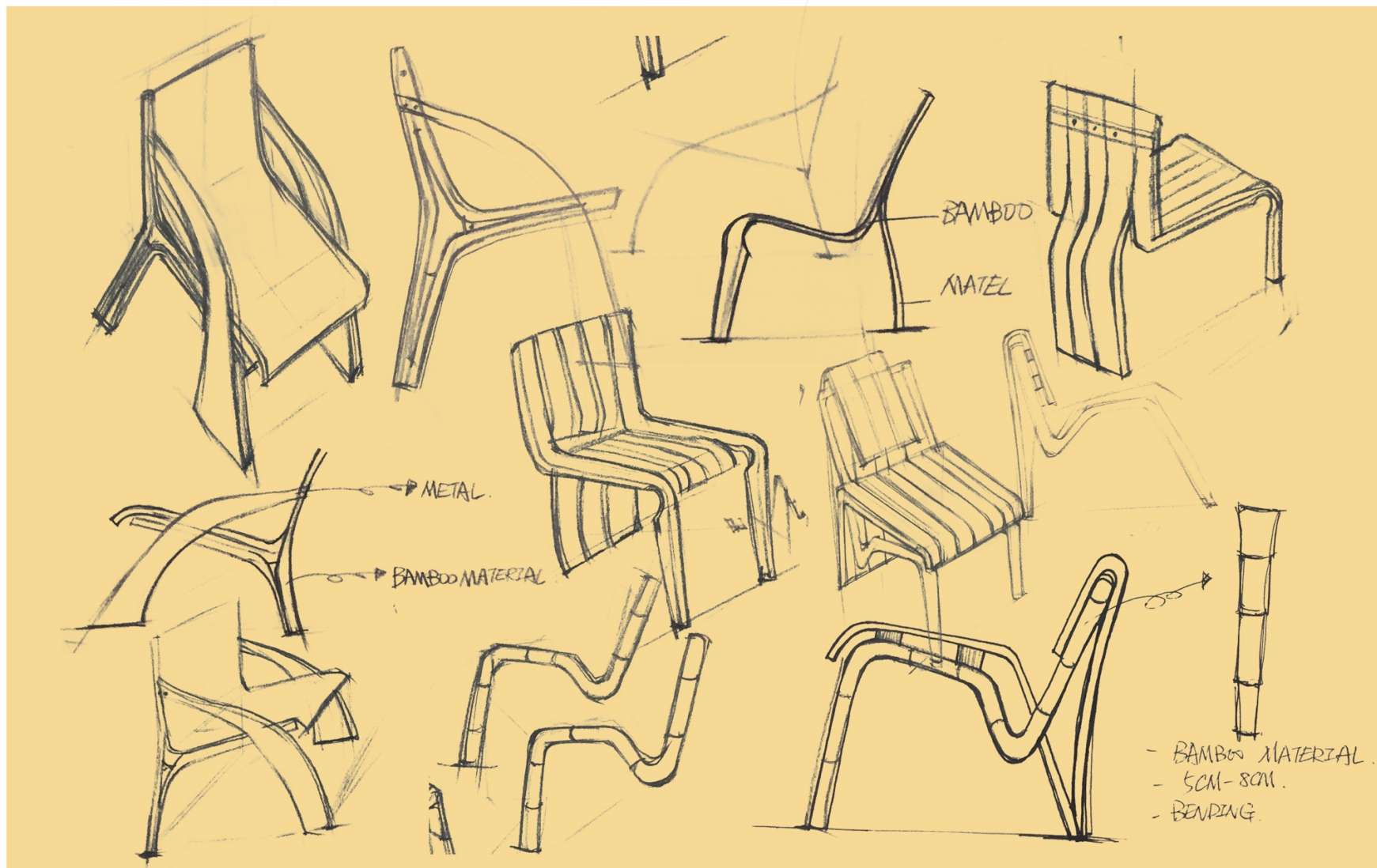


Fig 22. Concept Explorations of Mixed-Material Chairs.  
Using Bamboo, Aluminium Steel Wire. Drawn by Siyu.

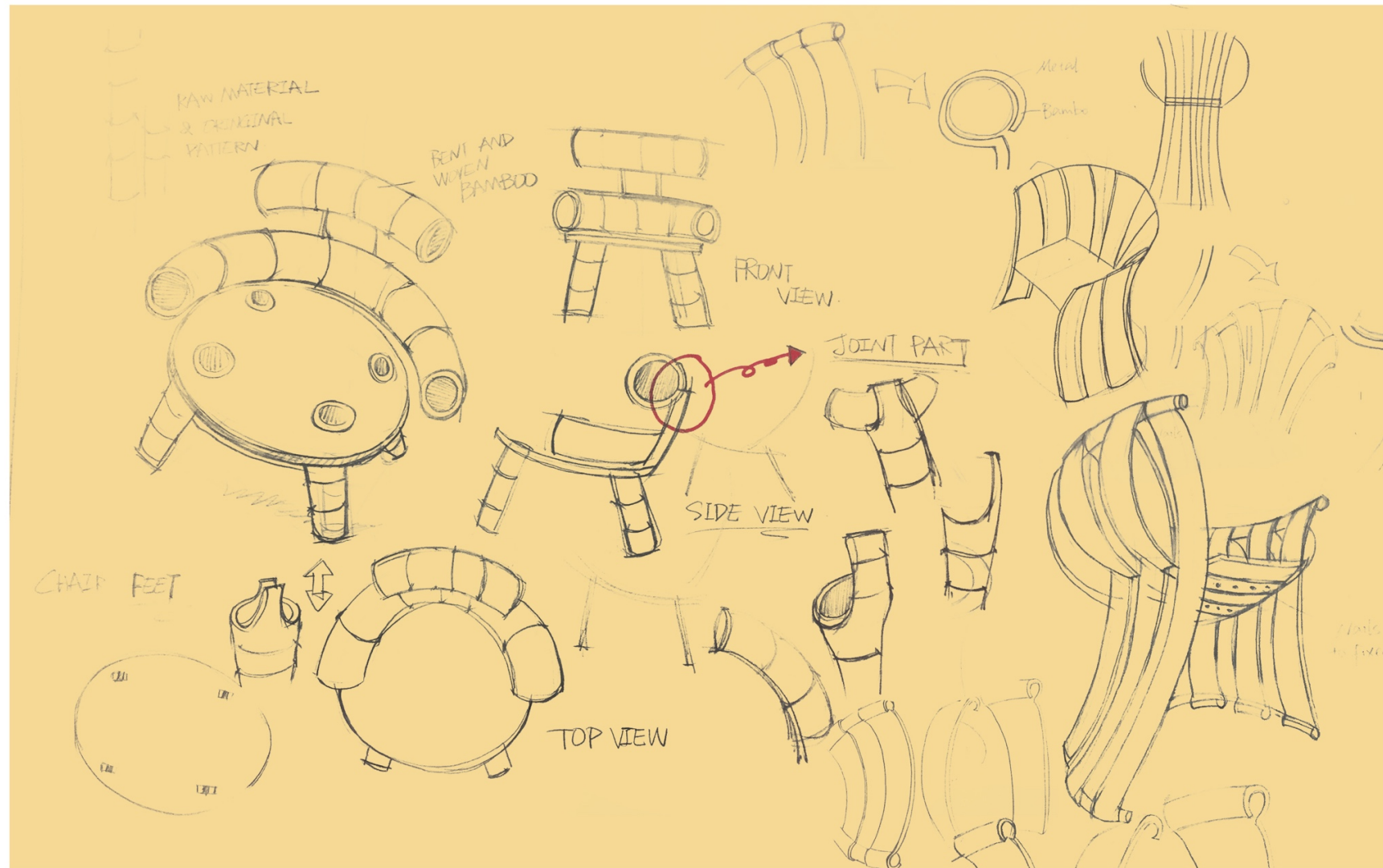


Fig 23. Exploration of Playful Round Bamboo Chairs. Drawn by Siyu.





Fig 24. Exploration of Some Playful Concepts by Copying Nature - Bionics of Leaves and Umbrella. Drawn by Siyu.



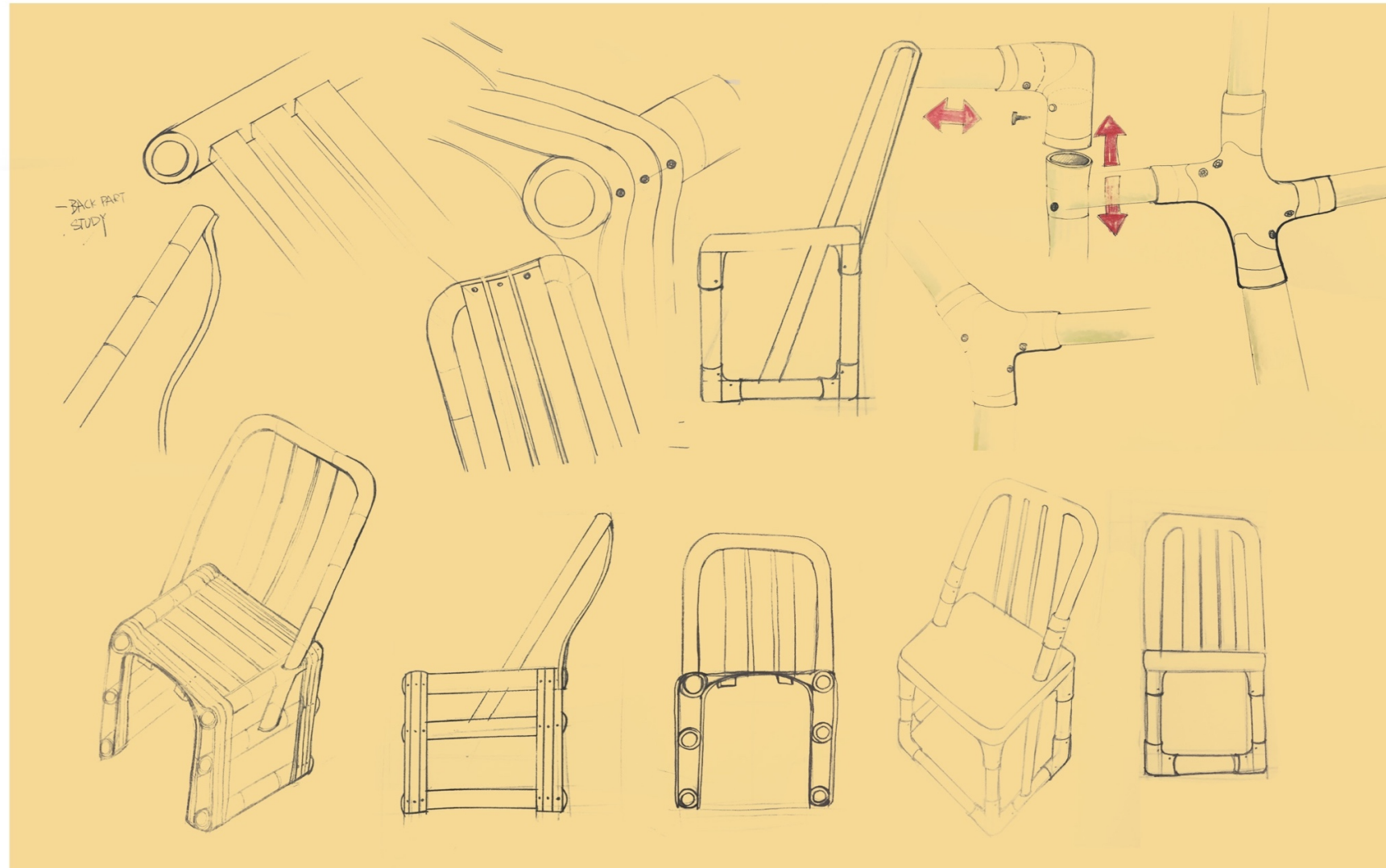


Fig 26. Exploration of a More Traditional Bamboo Chairs. Drawn by Siyu.



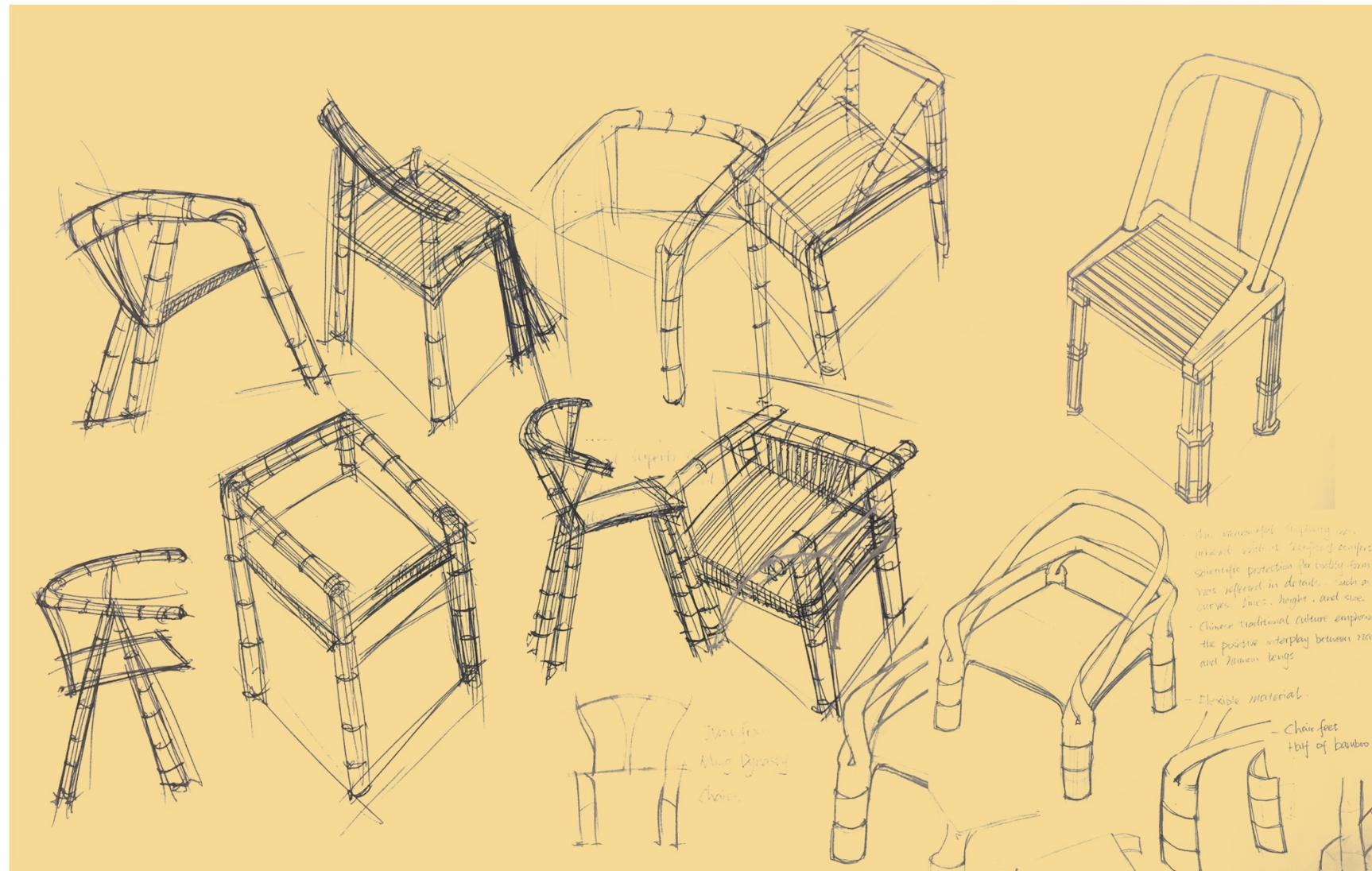


Fig 27. Exploration of a Simple Traditional Bamboo Chairs. Drawn by Siyu.

### **3D Renderings & Technical Drawings**

After communicating with the bamboo craftsman, we selected four ideas. These four concepts are technically more likely to be achieved. We began to determine the details, such as how to connect each part of the chair and what processes needed to be used. With the experience of a craftsman, we determined the size and structure of the bamboo chair. I made these data into technical drawings and renderings to provide data for the next model production. The renderings will also help crafters better understand my concepts.

## Concept Chair One

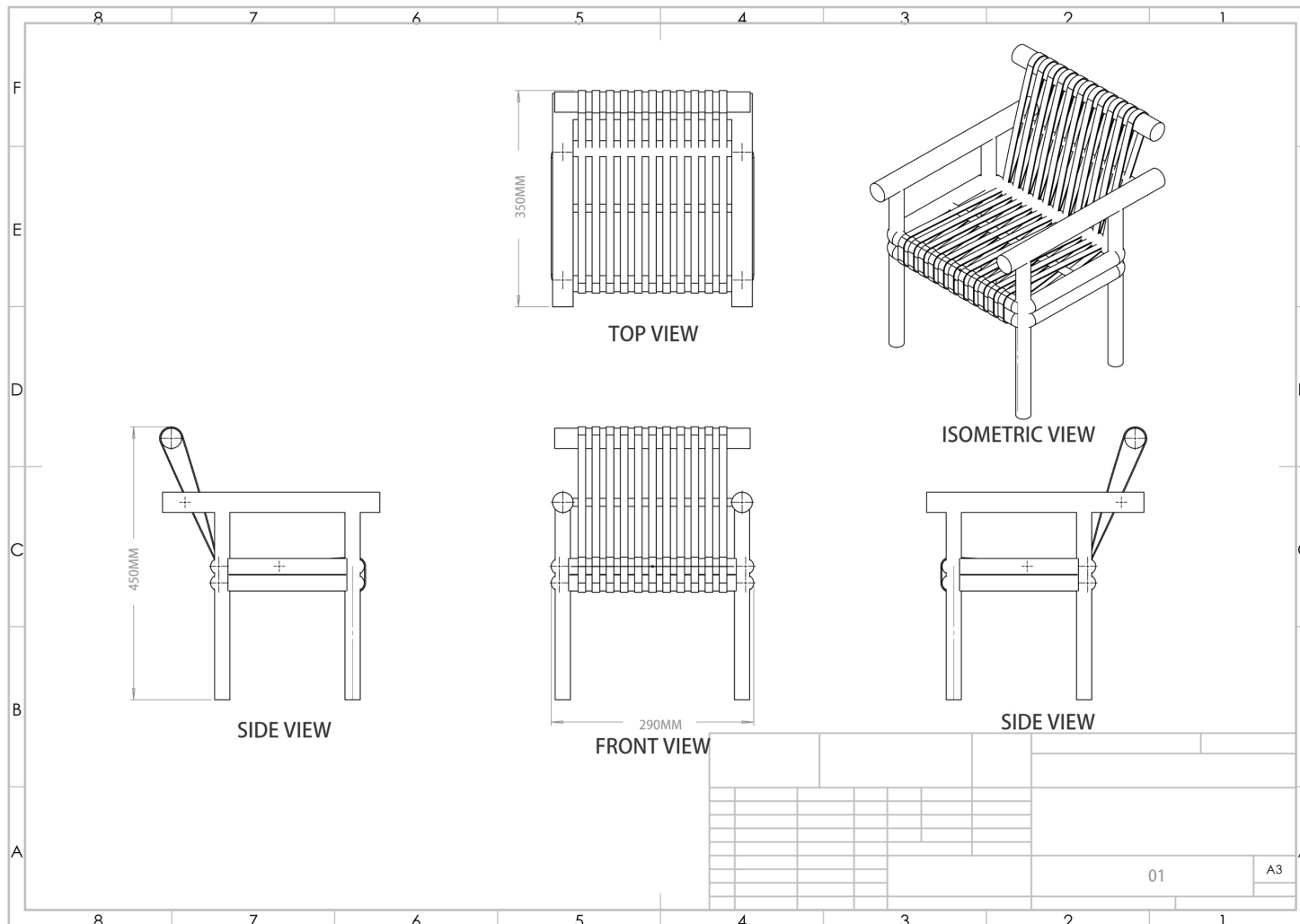


Fig 28. Technical Drawings of Concept Chair One. Created by Siyu.

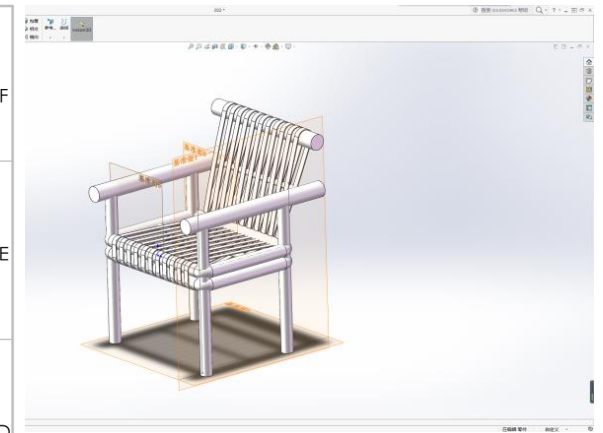


Fig 29. Concept Chair One Modelling. Created by Siyu.



Fig 30. Concept Chair One Rendering. Created by Siyu.





Fig 31. Concept Chair One in a Spatial Environment.  
Created by Siyu.

## Concept Chair Two

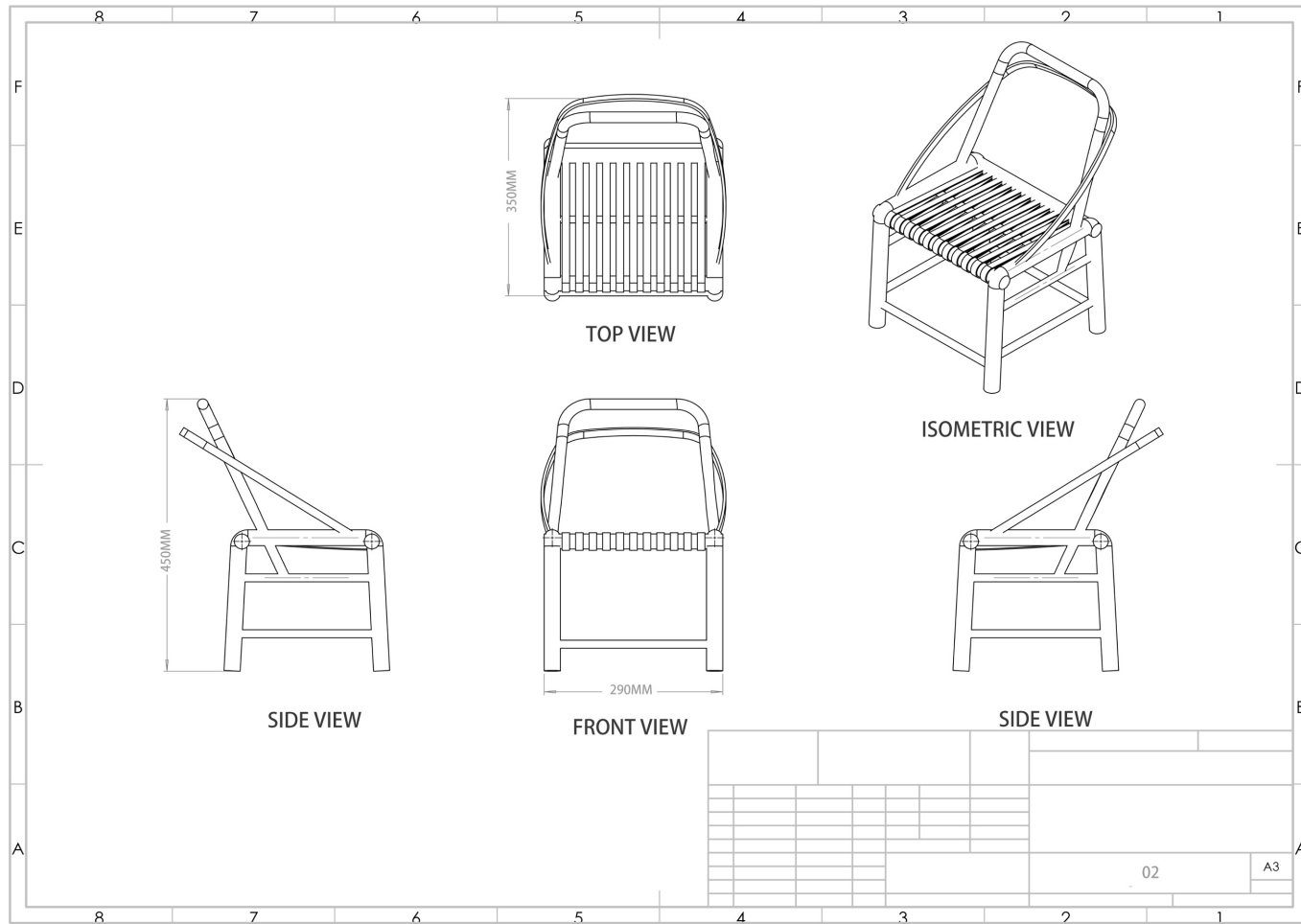


Fig 32. Technical Drawings of Concept Chair Two. Created by Siyu.

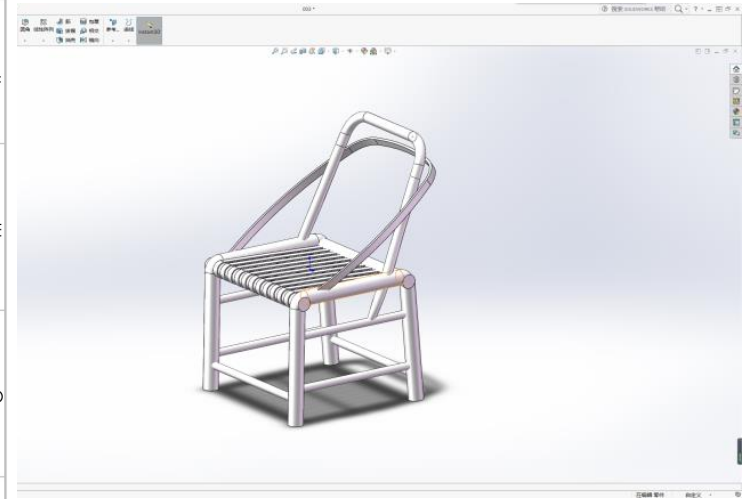


Fig 33. Concept Chair Two Modelling. Created by Siyu.



Fig 34. Concept Chair Two Rendering. Created by Siyu.



Fig 35. Concept Chair Two in a Spatial Environment.  
Created by Siyu.

## Concept Chair Three

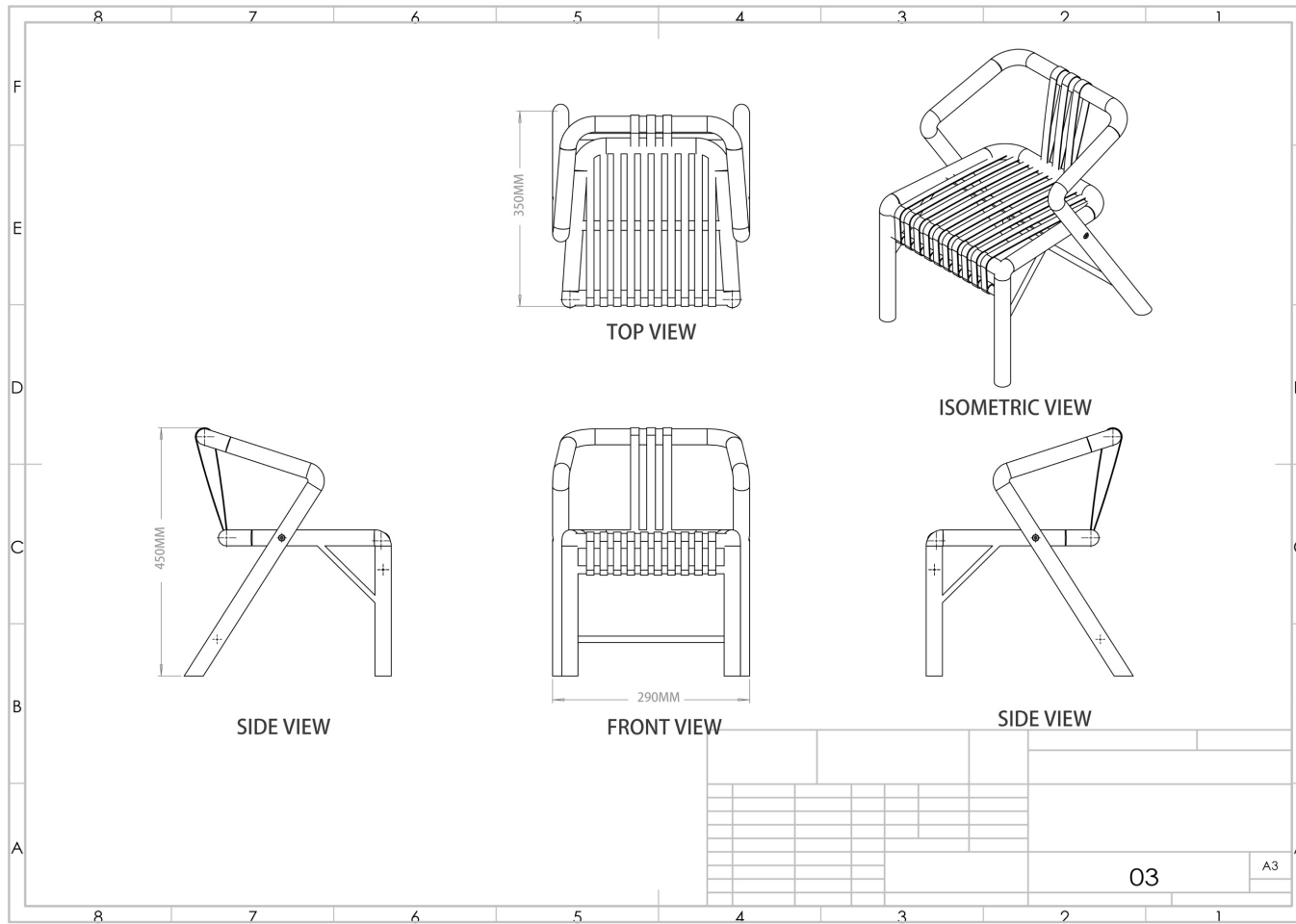


Fig 36. Technical Drawings of Concept Chair Three. Created by Siyu.

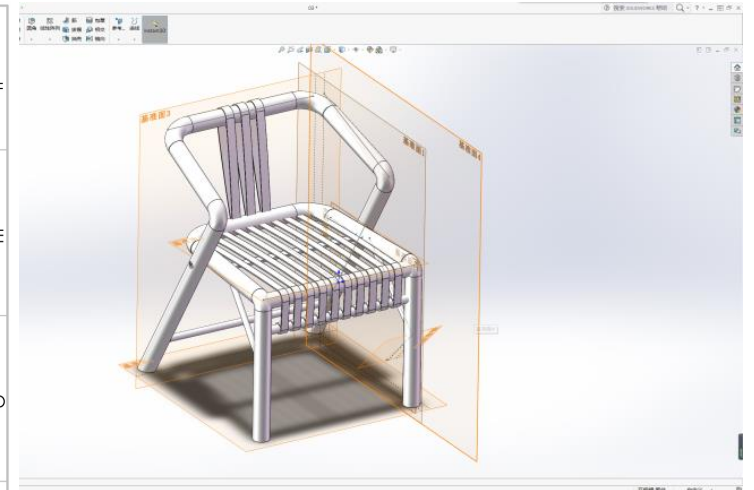


Fig 37. Concept Chair Three Modelling. Created by Siyu.



Fig 38. Concept Chair Three Rendering. Created by Siyu.





Fig 22. Rendering for concepts

Fig 39. Concept Chair Three in a Spatial Environment.  
Created by Siyu.

## Concept Chair Four

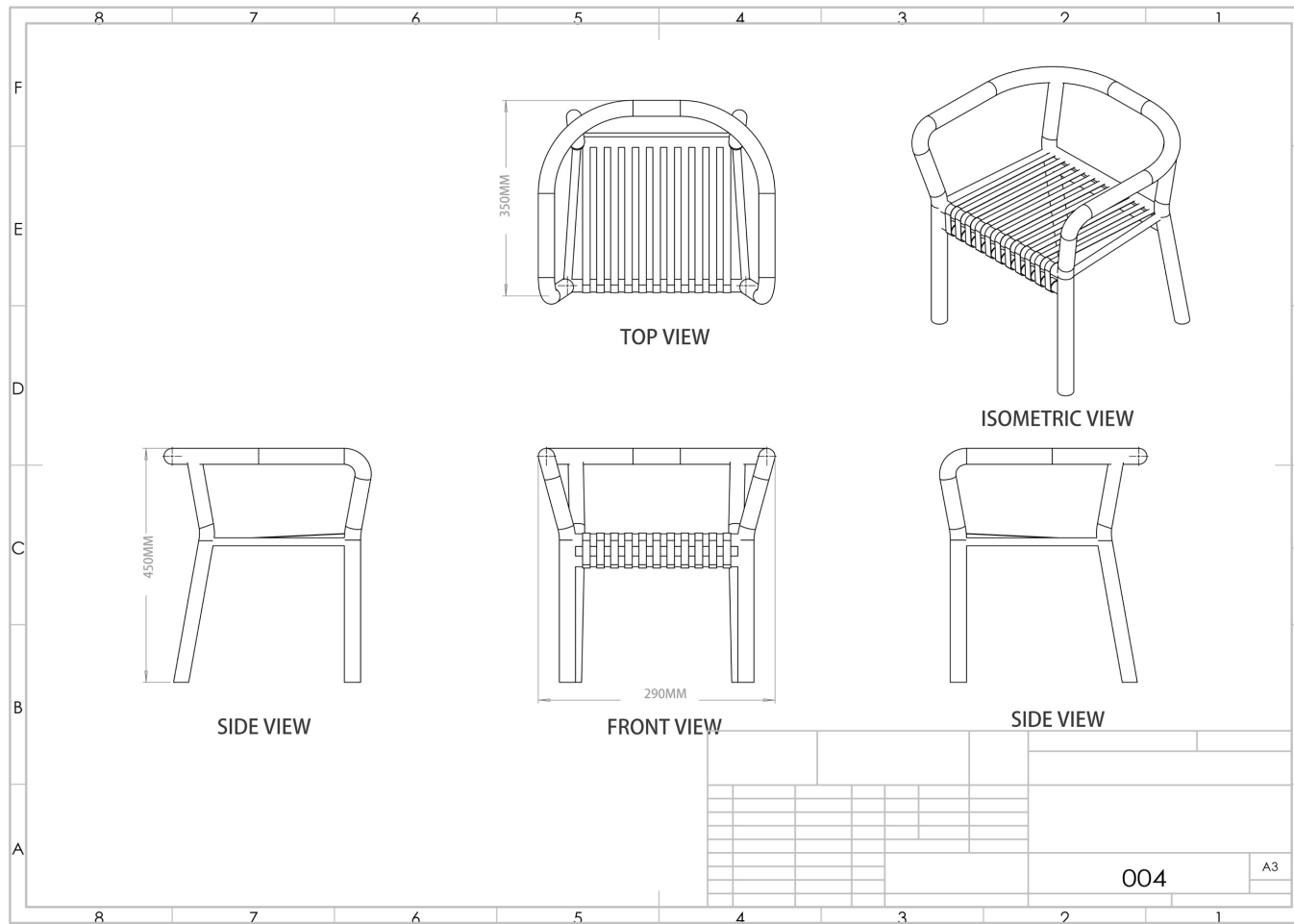


Fig 40. Technical Drawings of Concept Chair Four. Created by Siyu.

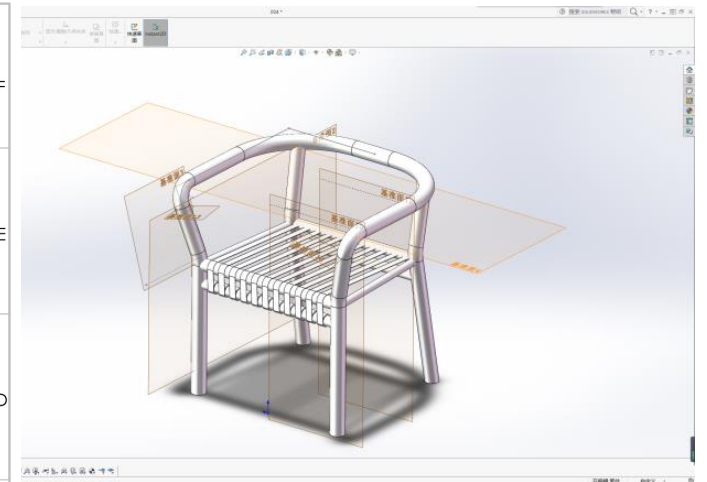


Fig 41. Concept Chair Four Modelling. Created by Siyu.



Fig 42. Concept Chair Four Rendering. Created by Siyu.



Fig 43. Concept Chair Four a Spatial Environment.  
Created by Siyu.



## Design and Development of the Prototypes

### The Prototyping Process

In the Prototyping stage, I returned to my hometown of Longyan, Fujian. I worked with Master Zhang, a bamboo craftsman. He had started making bamboo chairs from the age of 20 and therefore had a lot of experience. When he was young, he had learned how to make bamboo chairs, a craft that had circulated for five generations, by watching his father. Master Zhang also worked as a carpenter and tailor when he was young. During my discussion with him, he told me about the characteristics of bamboo materials, the differences between bamboo and wood, the production process of bamboo chairs, and the local culture of bamboo. He still maintains the use of traditional tools to make the chairs, and he hopes that this technique will continue in the future.



Fig 44. Concepts Discussion with Master Zhang. Photo by Weidong.



Fig 45. Technical Discussion. Photo by Weidong.



Fig 46. Master Zhang Working with a Traditional Bamboo tool. Photo by Siyu.



## The Prototypes Construction Process



Fig 47. Bamboo Selection. Photo by Siyu.



Fig 48. Drying Bamboo. Photo by Siyu.



Fig 49. Bamboo Surface Smoothing. Photo by Siyu.





Fig 50. Cutting.  
Photo by Siyu.



Fig 51. Drilling the holes.  
Photo by Siyu.



Fig 52. Heating & Bending.  
Photo by Siyu.

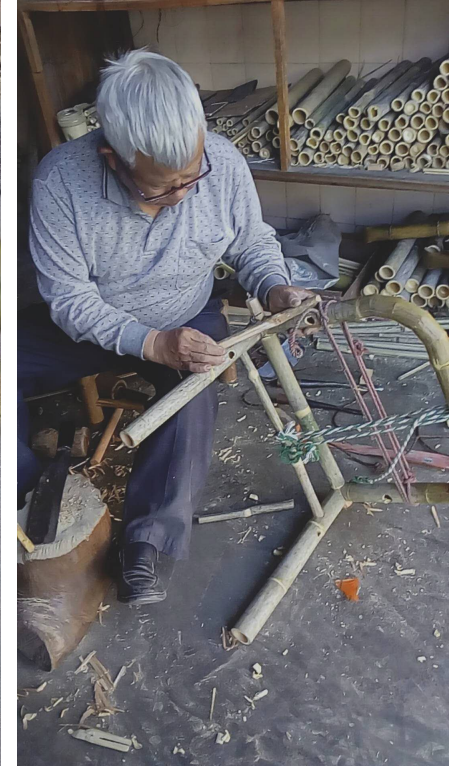


Fig 53. Chair Frame Fixed.  
Photo by Siyu.





Fig 54. Measuring & Spotting  
Photo by Siyu.



Fig 55. Bamboo Slicing.  
Photo by Siyu.



Fig 56. Chair Back and Seat Setting.  
Photo by Siyu.



Fig 57. Sanding. Photo by Siyu.

## Prototype One

In the first Prototype-making process, Master Zhang was not satisfied. Because there was no model, it was not possible to bend the bamboo strip into a uniform curvature. This caused the chair's surface to be uneven.



Fig 58. Bamboo Chair Prototype One. Photo by Siyu.



Fig 59. Prototype One Detail – Bending. Photo by Siyu.



Fig 60. Prototype One Detail – Connection by Bamboo Nail. Photo by Siyu.



## Prototype Two



Fig 61. Prototype Two. Exploring the combination of modernity and tradition. Photo by Siyu.



Fig 62. Prototype Two. Exploring the combination of modernity and tradition. Photo by Siyu.

### Prototype Three



Fig 63. Prototype Three. Photo by Siyu.



Fig 64. Prototype Three- Front View. Photo by Siyu.

After a discussion with Master Zhang, we have chosen three concept bamboo chairs of which to make prototypes. These three concept chairs embrace tradition, technology, and comfort. Having explored some forms in the prototype process, we are satisfied with concept three. It balances the functionality of technology, the aesthetic of traditional Chinese culture and the user's need for comfort. We slightly modified the third concept chair to make a full-size bamboo version.



## Full-scale Prototype



Fig 65. Full-scale Prototype with Added Bamboo Members to Increase Strength of The Chair. Photos by Siyu.



Fig 66. The User Experience of The New Bamboo Chair. Photo by Siyu.



Fig 67. Full-scale Prototype Details  
Photos by Siyu.





Fig 68. New Bamboo Chair Matched to The Environment.  
Created by Siyu.



Fig 69. New Bamboo Chair Matched to the Environment.  
Created by Siyu.

## *Chapter 5. Results & Discussion*

The final bamboo chair retains the traditional bamboo chair design. The structure was modified to meet modern aesthetics and functionality. At the same time, people's memories were evoked. The dimensions of the chair are ergonomically beneficial. The support of the backrest and armrests brings relaxation to the user. In terms of shape, the chair combines Ming Dynasty furniture aesthetics with simple, smooth lines.

A craftsman needs two days to complete a chair, from the choice of bamboo to the finished product. The cost of a chair is \$NZ100, most of it coming from labour costs. In subsequent batch productions, craftsmen can group together to form a workshop-style production mode to increase production efficiency. This has potential in future markets.

Bamboo culture has been formed through thousands of years of history. It is part of China's outstanding culture and brings about many concepts that are worth carrying forward. For example, the concept of "Heaven and Man" gives bamboo spiritual connotations that emphasise people, nature and things (Yang, 2001). The concept of harmony and unity has extreme significance in today's society, with its shortage of resources and severe environmental problems. Furthermore, in the fast-paced, high-intensity modern life,

people tend to need more spiritual relaxation, and the aesthetic image of bamboo's lightness, and clarity is of practical and emotional importance in the Chinese culture.

In addition, bamboo has many spiritual meanings, and many of these meanings still need to be respected in today's society through design and innovation.

## Limitations

In Chinese culture, bamboo is often found in clothing, food, supplies, poetry, paintings, thoughts and emotions. This implies that bamboo in its native form has the symbolic function of transmitting its culture. The further the new material is from the natural form of bamboo, the more it lacks a symbolic ability. Therefore, in the product development process, I did not use a bamboo board to design the furniture. At the same time, this is limiting. The material of bamboo itself is not suitable for drilling holes and installing screws, which affects the detachability of bamboo furniture and can also lead to increased transportation costs. This is a question that needs to be discussed in the future of bamboo furniture.

## Discussion

When I started looking for bamboo craftsmen, I faced several challenges. In this era of industrialisation, most bamboo products are mass-produced by machines, which improves production efficiency but also limits the product style. Factory workers can operate the machine after a few months of simple training, and the production of bamboo furniture can be completed through assembly line operations.

The craftsmen I wanted to find were those who really understand bamboo and could give me information based on experiences that goes beyond the literature. After repeated inquiries, I found Master Zhang in a village. In the beginning, he was not interested in my project. In his more than 20 years of experience, he had made no more than 10 types of chairs. Regardless of the structure, the process had not changed in 20 or even 50 years.

This was a challenge for Master Zhang, for he did not know how to use his skills to help me create a new bamboo chair. After much time spent communicating and expressing the purpose for this project, he agreed to cooperate. He hopes that this new bamboo chair will allow more people to pay attention to this skill, which is also a recognition of his lifelong career. The whole process was two months long, and during this time, the Chinese New Year occurred. In the Chinese tradition, we rest for a month, and all factories stopped work.

In order to complete the chair production, Master Zhang rested for only one day. His wife told me that he put forth his best effort into the chair, even researching drawings during meals. This craftsman's spirit deeply affected me. I am proud of doing something meaningful. S.y. will help clients to source materials and skills as part of the design and production process.

With the establishment of the design concept dominated by the awareness of sustainable development and designed with a variety of specific languages to outline the environmental relations to human life, we will increasingly pay attention to human nature and the healthy development of future society. Bamboo as a sustainable material has attracted more and more domestic and foreign designers (Van, 2006). The design of bamboo furniture is not only sustainable for Chinese designers but is also sustainable for the bamboo culture in China.

Furthermore, it is important to find a broader promotional channel for the product. Many inn operators appreciate the simple style of bamboo home products (Van, 2006). Bamboo would improve the product line, further enter the inn market, and provide sales expansion, from living spaces to the field of tourism and leisure.

## *Chapter 6. Conclusion*

In this interdisciplinary design project, I comprehensively studied the literature on business and design theories for building the S.y. design consulting firm that influences clients' success and sustainable development. Using design methods, entrepreneurship, and innovation, the company will be competitive in the furniture design consultancy market. Identifying market gaps makes it possible to develop a viable and desirable S.y. business model. The two primary entities of the business model are products and services. In the product development phase, simulations based on the needs of consumers are integrated into the design and business to ensure that the problem is solved for the customer. These development phases have been shown throughout the ideation concept design and prototyping stages. In addition to developing products and services, I have also developed a business strategy to ensure sustainability.

Steve Jobs (2010) suggested that designers should 'think differently' to influence other people. This led me to use different ways of thinking to open up a unique business model to create value. To meet the growing market, we emphasise the importance of digging deep into market demands and opportunities, developing products of cultural significance and meaningful experience, and ensuring

Interdisciplinary research provides substantial evidence and data to justify this project. In the process of creating a stable company, I have always faced challenges. As a product designer, I must strike a balance between creation and commerce. In the face of fierce competition in the market, I must ensure that my products are forward-looking, pioneering and desirable. At the same time, to bring benefits to the company, I must use different methods and strategies to succeed in a highly competitive market, which begins with a people-oriented understanding.

In design theory and design concept, we use information-data and insight-knowledge-intelligence methods. S.y. also uses business models for analysis, such as the DVF Model, Fogg's Behaviour Model and Maslow's Hierarchy of Needs to understand customer requirements and how to trigger customers to purchase. It is essential that I create value. Besides design strategy, branding, and future planning are the keys to feasibility and potential market expansion. I can find different opportunities for S.y. design consulting companies.

China is a world-recognised manufacturing centre, but the development of the manufacturing industry has brought about low labour costs, low-end technology, and

environmental pollution. In recent years, China has continuously proposed innovations to change the world's impression of China as a "world factory" (Chen, 2001). In this context, China's current business environment is perfect. From the government's policy support, improved laws, intellectual property protection, and capital assets, this provides young designers with entrepreneurial conditions.

In this project, I created a design company to spark innovation. I hope this theory can be truly realised. I am a qualified product designer, who finds inspiration in design business inspiration, through the courses I took in my Master of Design studies. I now believe that only through entrepreneurship can I occupy a dominant position in design value distribution and complete the closed loop of the product lifecycle. A design consultancy, such as S.y., its business can gain most from the value brought by its creativity through innovation and commercialisation of value-added products and services.

In this design project, I have not only been inspired by the theories and principles of the three papers that I have completed, but the knowledge that I have gained has opened up valuable opportunities that will change my career path in the future. I have attempted to put this knowledge into the design of the S.y. design consultancy. I believe that an innovative design consultancy should combine human-centric principles, design practice, innovation, strategy and

management to create value and meaningful experiences.

S.y. Design Consultancy will tap into a vast array of traditional skills and craftsmanship in China and S.E. Asia. It will be a consultancy to assist businesses to add value to their products and services that are sustainable and meaningful to the customers. The company will be multi-disciplinary and multi-sectorial to help clients design sought-after products, services and brands through the design and development of business models inspired by culture, traditional craftsmanship, sustainability and significance.

Design lives in the real world. It is important that S.y. Design Consultancy also lives in the real world by involving as many stakeholders (users, designers, craftspeople, manufacturers, businesses and retailers) as possible through co-design or participatory design. In this project, I have documented the design process of co-designing a bamboo chair from the designer to a skilled master craftsman. The process has been more important than merely designing and prototyping the three half-size and one full-size prototype. I have found that the mutual sharing of ideas and opinions with the craftsman very educational and rewarding. Throughout the process, we worked cooperatively to discuss shape and evaluate the initial ideas I put forward; this was followed by deep discussions and consensus on the aesthetics, cultural significance, materiality, ergonomics, desirability, viability and feasibility of the bamboo.

Co-design has taught me the importance of participation in the design process, especially through scholarly discussion on how a designer with a theory, good ideas, imagination and entrepreneurship could jointly design with a craftsperson in value creation. This creating through making and experimenting is key to forming and shaping the bamboo. It cannot be found in textbooks or merely drawing in front of a computer in the studio! I have recorded the process step by step on how the master craftsman and I worked on the prototype through 'trial and error' exploration, and I have 'practised' through 'reflection' and 'thinking while making'. I have found the co-design process creative, effective and meaningful at each step of the design process. The prototyping process is especially efficacious.

My trip to China was very short, which also limits the development of the chair. The bamboo chair prototype is viable, but there are changes I wish to make to the design before production. However, this prototype serves as a modest case study, evidencing how designers can organise and manage a piece of furniture design and development. Designers at S.y. Design Consultancy can work with skilled craftspeople to make a business case that is desirable, feasible and viable.

The business model that I have used to serve as an example of product design and development for my consultancy is not perfect. While I have designed and developed a set of chair prototypes through co-design, this is intended to show only the participative product design and management processes. Considerable more time and work are needed to test their emotional desirability, technical and production feasibility and business viability. The co-design process will also need to involve the intended users more systematically throughout the design process, from ideation to the prototype evaluation stages.



## *References*

- Berends, H., Reymen, I., Stultiens, R. G., & Peutz, M. (2011). External designers in product design processes of small manufacturing firms. *Design Studies*, 32(1), 86-108.
- Berkowitz, M. (1987). Product shape as a design innovation strategy. *Journal of Product Innovation Management*, 4(4), 274-283.
- Bond, M. H. (1993). Emotions and their expression in Chinese culture. *Journal of Nonverbal Behavior*, 17(4), 245-262.
- Brand | sozen. (2018). Retrieved from <http://sozen.cn/brand/>
- Chen, B., & Feng, Y. (2000). Determinants of economic growth in China: Private enterprise, education, and openness. *China Economic Review*, 11(1), 1-15.
- Cisheng, L. (2004). Bamboo Culture Bamboo Furniture [J]. *Furniture & Interior Decoration*, 7, 020.
- Cooper, R., Junginger, S., Lockwood, T., & Chung, K. *The Handbook of design management*.
- Cravens, D. W., & Piercy, N. (2003). *Strategic marketing* (Vol. 8). Boston, MA: McGraw-Hill Irwin.
- Cross, N. (2011). *Design thinking: Understanding how designers think and work*. Berg.
- Dahlstrand, A., & Stevenson, L. (2010). Innovative entrepreneurship policy: Linking innovation and entrepreneurship in a European context. *Annals of Innovation & Entrepreneurship*, 1(1), 5602. doi: 10.3402/aie.v1i1.5845
- De Mozota, B. B. (2006). The four powers of design: A value model in design management. *Design Management Review*, 17(2), 44-53.
- Dorst, K., & Cross, N. (2001). Creativity in the design process: co-evolution of problem-solution. *Design studies*, 22(5), 425-437.
- Drucker, P. (2014). *Innovation and entrepreneurship*. Routledge.

- Ergeneli, A., Gohar, R., & Temirbekova, Z. (2007). Transformational leadership: Its relationship to culture value dimensions. *International Journal of Intercultural Relations*, 31(6), 703-724.
- Finlay, O. E., Bayles, T. B., Rosen, C., & Milling, J. (1983). Effects of chair design, age and cognitive status on mobility. *Age and ageing*, 12(4), 329-335.
- Fogg, B. J. (2011). BJ Fogg's behavior model. A behavior model for persuasive design URL: [http://bjfogg.com/fbm/files/page4\\_1.pdf](http://bjfogg.com/fbm/files/page4_1.pdf) [accessed 2014-01-09] [Web Cite Cache].
- Grönroos, C. (1997). Value-driven relational marketing: from products to resources and competencies. *Journal of marketing management*, 13(5), 407-419.
- Hakatie, A., & Ryyänänen, T. (2007). Managing creativity: A gap analysis approach to identifying challenges for industrial design consultancy services. *Design Issues*, 23(1), 28-46.
- Hara, K. (2007). *Designing design*. Baden, Switzerland: Lars Müller Publishers.
- Hasdoğan, G. (1996). The role of user models in product design for assessment of user needs. *Design Studies*, 17(1), 19-33.
- Hsiao, S. W. (2002). Concurrent design method for developing a new product. *International Journal of Industrial Ergonomics*, 29(1), 41-55.
- Heskett, J., & Giorgetta, A. (1980). *Industrial design* (p. 72). London: Thames and Hudson.
- Jerrard, B., Hands, D., & Ingram, J. (2002). *Design management case studies*. London: Routledge.
- Johnston, A. I. (1998). *Cultural realism: Strategic culture and grand strategy in Chinese history*. Princeton University Press.

- King, S., Conley, M., Latimer, B., & Ferrari, D. (1989). Co-design: A process of design participation. Van Nostrand Reinhold Company.
- Kutaula, P. (2010). Funcastle: Creating a Business Opportunity from a Design Consultancy Assignment. *Design Management Review*, 19(3), 23-29. doi: 10.1111/j.1948-7169.2008.tb00125.x
- Lakkad, S. C., & Patel, J. M. (1981). Mechanical properties of bamboo, a natural composite. *Fibre science and technology*, 14(4), 319-322.
- Lawrence Kuhn, R. (1989). How Strategic Management Builds Company Value. *Journal of Business Strategy*, 10(6), 57-59. doi: 10.1108/eb039339
- Leung, K. (2008). Chinese culture, modernization, and international business. *International Business Review*, 17(2), 184-187
- Lindgren, P. (2012). Business Model Innovation Leadership: How Do SME's Strategically Lead Business Model Innovation. *International Journal of Business and Management*, 7(14). doi: 10.5539/ijbm.v7n14p53
- Liu,Hongjie. (2018). From "Made in China" to "Design in China" - Chinese International. Retrieved from [http://www.chinadaily.com.cn/hqcj/2013-04/12/content\\_16396376.htm](http://www.chinadaily.com.cn/hqcj/2013-04/12/content_16396376.htm)
- Lu, F. (2001). China's bamboo product trade: performance and prospects [M]. Beijing: INBAR.
- Martin, R. L. (2009). The design of business: Why design thinking is the next competitive advantage. Harvard Business Press.
- Maslow, A., & Lewis, K. J. (1987). Maslow's hierarchy of needs. Salenger Incorporated, 14, 987.
- Matsumoto, I. T., Stapleton, J., Glass, J., & Thorpe, T. (2005). Use of process maps to develop a management briefing sheet for a design consultancy. *Engineering, Construction and Architectural Management*, 12(5), 458-469.
- McAlhone, B. (1987). British design consultancy: anatomy of a billion-pound business. Design Council.
- Mitchell, R. K., Busenitz, L., Lant, T., McDougall, P. P., Morse, E. A., & Smith, J. B. (2002). Toward a theory of entrepreneurial cognition: Rethinking the people side of entrepreneurship research. *Entrepreneurship theory and practice*, 27(2), 93-104.

- Roy, R., & Riedel, J. C. (1997). Design and innovation in successful product competition. *Technovation*, 17(10), 537-594.
- Säde, S. (2001). Towards user-centred design: A method development project in a product design consultancy. *The design journal*, 4(3), 20-32.
- Sanders, E. B. N. (2003). From user-centered to participatory design approaches. In *Design and the social sciences* (pp. 18-25). CRC Press.
- Schumpeter, J., & Backhaus, U. (2003). The theory of economic development. In Joseph Alois Schumpeter (pp. 61-116). Springer, Boston, MA.
- Stevenson, H. H., & Jarillo, J. C. (2007). A paradigm of entrepreneurship: Entrepreneurial management. In *Entrepreneurship* (pp. 155-170). Springer, Berlin, Heidelberg.
- Steen, M., Manschot, M., & De Koning, N. (2011). Benefits of co-design in service design projects. *International Journal of Design*, 5(2)
- Terziev, V., & Arabska, E. (2017). Social Entrepreneurship, Social Values and Social Impact. *SSRN Electronic Journal*. doi: 10.2139/ssrn.3142904
- Utterback, J., Vedin, B. A., Alvarez, E., Ekman, S., Walsh Sanderson, S., Tether, B., & Verganti, R. (2006). Design-inspired innovation and the design discourse. *Design-inspired innovation*, 154-186.
- Van der Lugt, P., Van den Dobbelsteen, A. A. J. F., & Janssen, J. J. A. (2006). An environmental, economic and practical assessment of bamboo as a building material for supporting structures. *Construction and Building Materials*, 20(9), 648-656.
- Van der Lugt, P., Vogtländer, J. G., Van Der Vegte, J. H., & Brezet, J. C. (2012, April) Life cycle assessment and carbon sequestration; the environmental impact of industrial bamboo products. In *Proceedings of the 9th World Bamboo Congress* (pp. 73-85).
- Walsh, V. (1996). Design, innovation and the boundaries of the firm. *Research policy*, 25(4), 509-529.
- Yang, Y., & Hui, C. (2010). China's bamboo culture/resources/cultivation/utilization. Technical Report-International Network for Bamboo and Rattan (INBAR), (33).

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