Connections

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A New Model To
Customizing Everything
Connections

Connecting all of the resources to realize mass customization.
Connecting design and manufacturing to build a mass customization platform.
Connecting the professional community to provide personalized service.

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by Shao-Hsuan Hou 2017

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致 父母親, 家人, 朋友, 以及給予我幫助的人
For my parents, families, friends, and people who helped me
Abstract

Mass customization has long been a dream. However, thanks to evolutions in technologies (e.g. Industry 4.0 and big data analytics), there are more and more enterprises that offer configured customization to consumers. In this business model, the customers have limited choices to customize their own goods, nevertheless, these limited choices may not be enough to satisfy all of the consumers' physiological and psychological needs.

In order to fulfill this need in the market, I propose a new ecosystem that connects consumers, design firms, and manufacturers. Moreover, based on this business model, I have designed an on-line platform and customization services for consumers to build their personalized products.
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Evolutions
1st - Mechanization, water power, steam power
2nd - Mass production, assembly line, electricity
3rd - Computer and automation
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1-1 Industrial Revolution

In the industrial revolutions, people applied the technologies they had into the manufacturing to increase the production and to improve quality of the products. For example, in the first industrial revolution, people used water power and steam power to build the machinery to replace the handmade goods and to increase the production of merchandise. In the second industrial revolution, people introduced electricity and electric motors into the production, so that manufacturing can mass produce the products. After that, people applied computers and automation into the manufacturing to increase the efficiency of the production in the third industrial revolution. Now, we are in an era which has the developed internet and various sensors to create a technology called “internet of thing” (IoT). So, people start to merge this technology into manufacturing to create intelligent manufacturing to improve the efficiency of production and to make the manufacturing become flexible. Therefore, it is the fourth industrial revolution, and it is happening now.
Image 02   Industry 4.0
Many countries have invested a lot of money and resources to develop their intelligent manufacturing systems, such as Industrie 4.0 (Germany), Intelligent machinery (Taiwan), Made in China 2025 (China), Smart Manufacturing Leadership Coalition (USA), and Industrial Internet (GE). These all have a similar goal: to create intelligent manufacturing systems and to enhance the competitiveness of local enterprises. So, what is the intelligent manufacturing?

Industry 4.0 (intelligent manufacturing) is also referred to the “fourth industrial revolution”, and this revolution is starts from cyber-physical system (CPS) technology, which brings the virtual and physical worlds together to create a truly networked world in which intelligent objects communicate and interact with each other [1]. The deployment of cyber-physical systems in production systems gives birth to the “smart factory.” Smart factory products, resources and processes are characterized by cyber-physical systems; providing significant real-time quality, time, resource, and cost advantages in comparison with classic production systems. The smart factory is designed according to sustainable and service-oriented business practices. These insist upon adaptability, flexibility, self-adaptability and learning characteristics, fault tolerance, and risk management [1].
Why do the manufacturers invest so much money and resources to upgrade their factories and systems to become intelligent manufacturing?
After I interviewed the entrepreneur, manager, and engineers, I realized that the main reason why they are upgrading their factories and systems is because the current products and services are already not enough to fulfill the clients’ requirements. Therefore, they have to upgrade their factories and systems to provide more customization services and to make the productions become more efficient and flexible.
1-2 Smart Customization

Before the fourth industrial revolution, the brand companies did the market researches about consumer needs, their preferences and ways to convince them to purchase. They then transformed these research information into designs and sent the designs to manufacturers for production. After that, these mass produced goods are distributed to the market for selling. In that way, the consumers could only decide among choices the brand companies designed for them. Mass customization was a myth, however, thanks to the technological evolutions (e.g. Industry 4.0 and big data analytics), there are more and more enterprises developing and offering configured customization services to consumers. For example, BMW and Tesla are providing many options for consumers to create their own vehicles, and NIKEiD and mi adidas are offering various sneaker models for customization.
Nevertheless, consumers are still constrained by limited choices, and these configured customization services do not seem to be able to satisfy consumers’ physiological and psychological needs, largely due to the differences in everyone’s body conditions. Therefore, some companies are developing their own customization technologies and systems in order to fulfill this gap in the market. They include Local Motors, Under Armour’s ArchiTech Futurist, and adidas Futurecraft.
In this kind of customization service, the enterprises use the power of industry 4.0 to provide a totally fitted personalized service and product for their consumers, which seem much "smarter" than the configured customization service. That is, the service and product provided better satisfy the client's physiological and psychological needs.
Customization is a critical topic for enterprises. In order to satisfy the consumers, they are investing a lot of money and resources in the development of their customization services. Although every company tries to maximize the available choices in their customization services, it still cannot entirely satisfy the consumers. For instance, most of the models in configured sneaker customization services are just designed for a certain foot shape. In other words, if someone fits in company A’s sole but wants company B’s upper, he does not have a chance to get the sneaker he wants.
Image 11 Nike + Adidas + Puma = ?
Therefore, what if there is a customization service like Apple’s iTunes, where people can buy one song from each album and build their unique music lists? If people can combine elements and materials from different companies to create their own product and fulfill their physiological and psychological needs at an affordable price, what will it be?

In this thesis research, I would like to discuss and design a business model, a platform, and services for this hypothesis. As I believe a customization era is coming, this assumption proposes a practical way to provide consumers with maximum options to get entirely personalized products, and a chance for the companies to create a new market.
2-1 New Business Model

The existing system of product design, manufacturing, and sale is changing now, as people are becoming more and more dissatisfied with massively produced products. Therefore, design firms and manufacturers are starting to provide the configured customization services where consumers can create their own products by selecting among limited options in the design firm’s customization system. However, this kind of customization service will not satisfy the consumers to the fullest extent. Consumers want more --- a product which can fully fulfill their physiological and psychological needs. In this way, how to provide an entirely personalized customization service to consumers becomes a critical issue for design firms and manufacturers.
In the existing customization business model, consumers can only select a product model with partial appearance changes available in a design company’s system. As customers want a product which can totally fulfill their physiological and psychological needs, this service can no longer satisfy them. Therefore, in this research, I propose a new business model which integrates the customization resources, expert consultancies, and consumer community to build a totally personalized customization ecosystem beneficent to retailers, design firms, consultancies, consumers, as well as manufacturers.
Image 14 A new personalized customization business model
In this business model, there is an online platform where design firms can upload their design parts and expert consultants can provide online consulting services for customers. The consumer community in this model can not only offer usage feedbacks, but also directly give feedback to design firms. The consumers on this platform can consult with the experts and read usage feedbacks from the consumer community to decide on the parts that best fulfill their physiological and psychological needs. They can then combine these parts together to create their personalized product at an affordable price. The product production data will be sent to the manufacturers for production and eventually the final product to the consumers.
The platform in this business model is a key point to connect design firms, consultancies, consumers, and manufacturers. Consequently, this platform should be built by a third party international retailer who can integrate these resources and establish the rules to deal the profits out among design firms, consultancies, and manufacturers.
2-2 Sneakers

In order to verify the new business model I proposed, I have to pick a product that has to differentiate to fulfill individuals’ specific physiological and psychological needs. After a brief research, I selected the sneaker industry to verify my proposed new business model for three reasons.
Image 16 Opportunity in the market
First of all, in this era that we have many technologies and machinery to mass produce, but there are still many handmade processes in sneaker mass production. For that reason, athletic enterprises are starting to introduce Industry 4.0 into the sneaker manufacturing to accelerate the production and to provide the configured customization services for consumers[2].

Secondly, sneaker is a very personalized product where the mass produced sneaker can not fulfill a consumer’s physiological and psychological needs as the shapes of individuals’ feet are different and there cannot be an one-size-fits-all sneaker model. Moreover, everyone’s preference is different and so the limited configured options can not fully satisfy the consumer’s aesthetic requirements. Accordingly, as sneaker companies will eventually have to build a totally customization service for consumers one day, this research will be an important reference for them to design their system.

Thirdly, there is a huge gap in the shoes market that has not been so far filled. As people buy commercial shoes for athletic and aesthetic needs, they should be able customize a configured commercial shoe using the shoes company’s configured customization system. Even though they could have craftsmen customize personalized leather shoes to fit their feet shapes, the price tends to be very high. What is more, the existing craftsman are not providing sneaker customization service for the consumers. This is especially the case for athletic sneakers. Hence, sneaker customization is a good business opportunity to be developed.
2-3 Customization Service Design

In order to verify whether the new business model I proposed can be carried out in the sneaker industry, I discussed this new business model with R&D engineers in sneaker manufacturing, shoe designer as well as experts in the sports industry. Based on their advices, I have adjusted the business model for the sneaker industry and designed the personalized sneaker customization services for consumer, design firm, consultancy, and manufacturing.
Image 17 New business model for sneaker industry
First of all, the platform in this model has to be built by a third party retailer, such as Walmart, Costco, and Carrefour, where they not only have the internet sales channel, but also the physical store sales channel. The physical store is a very important factor for this business model, because it is expected that most big design firms and famous consultancies will not participate in this new business. This business will start from small sneaker design firms and the third party retailer can set up a personalized sneaker customization section in the physical store to provide foot/sneaker consulting service and to promote this new business. As more and more people participate in this new business and the market becomes big enough, the big design firms and famous consultations will join and make it more complete.
Secondly, the customization platform is divided into three sections - sole, upper, and decorations - for design firms to upload their design elements. The design firms in this model need to upload their design elements and patented materials onto the platform, and send the element information and samples to manufacturers to verify whether these elements can pass the test and be physically combined together. After the design elements are verified, the design firms will have to authorize the intellectual property of using these design elements for production. Therefore, every time the manufacturer produces these design elements, they have to pay license fee to the design firms. Furthermore, design firms may have their own manufacturing partners to produce their design elements and materials, the design firms can send these produced design elements and materials to the platform’s manufacturing to combine them with other elements according to the consumers’ orders.
Image 18 The design elements verification procedure
Image 19 Tests for a complete sneaker
Thirdly, the optional consulting service available through communication tools on the platform. After consultation, the consultancy can send consumers reports and their data. Consumers can then pick the design elements using the information to customize a sneaker that best fit their feet.
Fourthly, the manufacturing can be separated into two parts: the last manufacturer and the sneaker manufacturer. After the consumer places the order, the platform will send the consumer’s foot data to the last manufacturer to customize their personalized last. The customized last will be sent to the sneaker manufacturer, where the factory will combine the elements to build the customized sneaker. Finally, the manufacturer will do some tests to verify whether the sneaker can meet all of the requirements. If the sneaker passes the tests, the manufacturer will package it and send it to the consumer. If the sneaker does not pass the tests, the manufacturer will analyze the root causes, solve the problems and make new sneakers for testing until it pass all of the tests. As different sneakers have different functions and usages, they have to pass different tests. Therefore, the platform will allow consumers to narrow down options for desirable usages and manufacturers to narrow down the number of test terms.
Image 20 Different sneakers have different tests
There are three ways for consumers to customize their personalized sneakers. First of all, they can go to the sneaker customization section in the physical store where there will be foot measurement machines to scan the customers’ feet and provide them with analytic reports. The consumer may ask the clerk to offer them some sneakers for fitting and some samples of sneakers to experience the materials and designs of sneaker elements. After the consumer places the order, the sales clerk will upload consumer’s foot data and the selected sneaker elements onto the platform. The manufacturer will receive the data from the platform for building consumer’s personalized sneaker.
Secondly, consumers can reach the local shoe maker to ask for sneaker customization services. The local shoe maker will measure their feet and offer advices for them to pick out sneaker elements. After that, the shoe maker will help the consumers upload their foot data onto the platform, and the consumers can select the sneaker elements they want to build their personalized sneaker on the platform according to the advices and place the order.
Thirdly, consumers can use the online platform to build their personalized sneaker themselves. They can download the measurement tool from the platform and use it to measure their feet. They will then have to upload the data onto the platform and be asked a few questions about their preferences. They will be provided with recommendations as their answers to the questions are analyzed. Consumers can also contact the professional consultancies through the platform, and these consultancies can offer online medical consultations, fashion consultations, sports consultations, etc for consumers to build their personalized sneakers. Some of these consultancies may send the consumer fitting tools to help them make detailed measurements of their feet. After consumer builds their sneaker on the platform and places the order, these data will be sent for the manufacturing of the sneaker.
So ?
3-1 What’s next?

We have many products that intend to make our life better nowadays. Nevertheless, we are still not satisfied and always expect the emergence of better new products. Why?
In my opinion, these products are designed for a specific user group to fulfill their needs. The designer tries to find the common problems in this specific user group and proposes solutions to solve them. However, everyone in this user group is different and unique as they have different needs and preferences. For that reason, the product that the designer designed can only fulfill a part of their needs and preference. So, is it possible that we can customize every product we need and have them available at an affordable price?
Thanks to technological evolutions, product manufacturing is changing in attempt to provide more and more services in customization. As a result, the business model of the industry is also changing. Therefore, in this research, according to the existing technologies and environment, I have proposed a new business model for consumers to customize an individualized best fit product. Design firms can have a new market to sell their products, and the manufacturers can increase their production.

In conclusion, I have verified the new business model in the context of the sneaker industry, and designed customization services that integrate consumers, design firms, consultancies, and manufacturers for this business model.
Bibliography


List of Images

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Image 02 Roland Berger, 2015

Image 04 http://www.bmw.com/

Image 05 https://www.tesla.com

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Image 07 http://www.adidas.com/


Image 10 http://ar3dprinter.com/page/2/


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