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### Service Innovation Model in Manufacturing Industry: A Perspective of Asset Specificity

Wen-Hong Chiu<sup>\*1</sup>, Sheng-Lung Lee<sup>1</sup>, Shieh-Liang Chen<sup>1</sup> and Xing Li<sup>2</sup>

<sup>1</sup> Department of Business Administration, Asia University, Taiwan

E-mails: [andychiu@asia.edu.tw](mailto:andychiu@asia.edu.tw); [jichuan168@yahoo.com.tw](mailto:jichuan168@yahoo.com.tw); [peterchen@asia.edu.tw](mailto:peterchen@asia.edu.tw)

<sup>2</sup> College of Economics and Management, LongDong University, QingYang City, China; E-mail: [leeblj@189.cn](mailto:leeblj@189.cn)

*\*corresponding author*

**Abstract:** The servitization of manufacturing is one of the main strategies for optimizing the industrial structure in Taiwan. Past studies on servitization mainly focused on innovation in technology services, supply chain integration services, technology processes and development, and servitization performance. Few studies have explored value creation through servitization innovation based on a perspective of asset specificity, i.e. how the manufacturing industry invests intangible or tangible specific assets into servitization innovation to gain customer attachment. This study adopts the method of case study and presents the case of Ruentex Industries Limited, and collects data through secondary data and in-depth interviews. Significant servitization events of Ruentex in 2003-2015 were organized. This study proposes the following three servitization strategies: 1. Services of an integrated platform for design and production: Value chain extension and integrated services, e.g. electronic management of suppliers, sample fabrics of clients, and sample design, create value by providing customers with convenience, immediate access, and flexibility; 2. Client business analysis service: The powerful database of digitalized sample fabrics and information on the latest global fashion trends can improve design and production efficiency and enhance the brand's style. It can also increase customer satisfaction and dependence on the company; 3. Customer dominant: The company integrated the experiences of distribution channels with its powerful database capabilities and successfully entered the B2C e-commerce market, making cheap customized products that better satisfy consumers' needs.

**Keywords:** Asset Specificity, Servitization of Manufacturing, Service Innovation, Manufacturing Industry, Value Chain

### INTRODUCTION

The growth of exports in Taiwan's manufacturing industry has been one of the main forces driving domestic economic growth. Financial and natural disasters, e.g. the subprime mortgage crisis in the U.S., the European

debt crisis, and the Great East Japan Earthquake, that occurred in recent years severely impacted consumption in advanced countries, and made Taiwan's situation in the international market even more dire. Yet, this has also brought opportunities for industrial transformation and restructuring. Optimizing the industrial structure through comprehensive upgrade of traditional industries, accelerated development of emerging industries, and servitization of manufacturing have enabled expansion into the global market, in hopes of making Taiwan's industries more competitive when the economy recovers. Past studies on servitization of manufacturing, however, mainly focused on IT-enabled service innovation models (e.g. Martinez, Bastl, Kingston & Evans, 2010), analyzing factors of success (e.g. Kinkel & Maloca, 2009), supply chain integration service (e.g. Oliva & Robert, 2003), technology processes and development (e.g. Johnston, 1994), organizational change (e.g. Nelson, 1994), servitization performance (e.g. Murmann, 2003), and value chain integration service (e.g. Wise & Baumgartner, 1999). Few studies have systematically examined the overall innovation strategy for servitization of manufacturing. Summarizing the above, this study will examine how the manufacturing industry invests intangible and tangible specific assets into customer services, so as to gain high dependency from partners.

## 2. LITERATURE REVIEW

### 2.1. Servitization

Servitization of manufacturing places emphasis on customers, and brings together products, services, support, knowledge, and self-service, in which service is the most important element (Vandermerwe & Rada, 1988). Servitization is the transition of a manufacturer's role from a provider of products to a provider of services. It is a dynamic process of change, and both enterprises and products may be in the process of servitization. Wise & Baumgartner (1999) examined the expansion of the manufacturing industry's scope of services downstream to the customer end from the perspective of value chains, while Davies (2003) used the perspective of "total solutions" provided by enterprises, and stressed that manufacturers may simultaneously expand both upstream and downstream, getting involved in the upstream planning and design stage as well to satisfy customer demands. Therefore, manufacturers must consider services in can provide at the upstream and downstream end of its value chain based on the concept of "total product life cycle (TPLC)" (Pei-Ju Yu, Shin-Horng Chen & Pei-Chang Wen, 2014; Chi-Kuo Liu, 2009). Such services include new value propositions, new core competencies/platforms, new organization and internal/external processes, new pricing model and revenue model, and defining the ownership of objects of transaction (Pei-Ju Yu, Shin-Horng Chen & Pei-Chang Wen, 2014). With regard to models for servitization of manufacturing, White *et al.* (1999) proposed that when manufacturers change its role from a provider of products to a provider of services, servitization will drive the change from a "transactional economy" to a "functionality economy/service economy." Services under a service economy can be further divided into non-material services and material/product-based services. In addition, Pei-Ju Yu, Shin-Horng Chen & Pei-Chang Wen (2014) summarized three modes of servitization of manufacturing: 1. "Product extended services/product-oriented": Manufacturers provide customers with value-added services based on the concept of TPLC, using service to achieve differentiation and technology innovation, and thereby create even higher value-added (White *et al.*, 1999; Mont *et al.*, 2004); 2. "Production functionality services/user-oriented": The manufacturer still owns the product and customers buy the product's functions, not the product itself, e.g. similar to concept of rental or sharing; 3. "Total solution/result-oriented": Manufacturers provide a solution/

result in response to customers' demands and ensure that customers are satisfied (Slywotsky & Morrison, 1997; Wise & Baumgartner, 1999).

## **2.2. Specific Assets**

Specific assets are assets invested for a specific supplier. Considerable transaction cost will be incurred if the asset is redeployed for another supplier (Williamson, 1985). In the process of a transaction, intangible and tangible specific assets are created by the buyer and seller. These specific assets are only valuable if the parties continue to make transactions. When any party terminates the transactions, the intangible or tangible specific assets will disappear or become less valuable. Specific assets are only suitable for specific subjects. When an enterprise invests specific assets, it will be bound to the trading relationship. When the trading relationship ends, the specific assets that were invested may lose their value (Anderson and Weitz, 1992). Therefore, specific assets are a type of sunk cost and hard to redeploy. Enterprises have begun to apply the concept of asset specificity to B2C, and argue that there are also specific assets between enterprises and consumers (Chiou & Droge, 2006). In summary, specific assets are assets invested by enterprises for a specific purpose, and only apply to the intangible or tangible assets created in the transaction process by the buyer and seller. Such assets are only valuable when both parties continue to make transactions.

## **2.3. Service Innovation**

Innovation is defined as new production methods created by enterprises to satisfy customers' needs and make a profit (Robbins & Judge, 2006). Degrees of innovation can be divided into incremental innovation, systematic innovation, and radical innovation (Marquis, 1982; Schumann, 1994). Furthermore, innovation can be applied to different industries. It can be a new product, a new technology, or a new service process. It can create a whole new market, satisfy customers' needs, and even change the behavioral model of customers (Damanpour & Gopalakrishnan, 1998; Hage, 2005). With regard to the types of innovation, Janszen (2000) distinguishes between the introduction of new technologies, new products and services or process applications, new market development, and new organization forms. Betz (1987) divided innovation into product innovation, process innovation, and service innovation. Chacke (1988) divided innovation into product innovation, process innovation, and organization innovation. Therefore, service innovation is an important type and trend of innovation. Other scholars also defined service innovation as fields that are not new to the world, but new to enterprises, customers, or other partners (Gustafsson & Johnson, 2003). Hence, this study adopts a broader definition and identifies any service offered by an organization for the first time as a service innovation event.

## **3. METHOD**

This paper adopts the method of case study (Yin, 1994) with emphasis on analysis within the context and the relationship between the case, research topic, and overall environment according to Yin (1994). This study conducts exploratory research and examines the correlation between internal and external data of the case, environment evaluations, factors for servitization of manufacturing during different periods, and specific assets. This study selected the case based on three principles: First, the company must be well known and have asset specificity events related to servitization of manufacturing, so there are more events to sample. Second, there are examples of the company's correlation to the overall industry. Third, the

company's revenue. Based on the abovementioned principles, Ruentex Industries Limited, a company in the textiles industry in Taiwan, was selected for the case study. The company has a long history with abundant data and has drawn relatively more attention from the media. Data of servitization related specific assets over the twelve years from 2003 to 2015 were collected from [udndata.com](http://udndata.com). Yin (1994) proposed four analysis models, namely pattern-matching, explanation-building, time-series analysis, and program logic models, for increasing internal validity. Secondary data offers the advantage of panel data, objectivity, and research replicability (Chen, Tsui, Farh, Cheng, 2008). Furthermore, multiple sources of evidence are gathered from secondary data, in-depth interviews, and participatory observation, creating the chain of evidence. Aside from the investigators, in-depth interviews were conducted with several experts. Finally, during the analysis and writing stage, five in-depth interviews were conducted with senior executives and staff members of Ruentex, who examined the analysis report to prevent selective and cognitive bias of the investigator. In summary, data sources, research methodology, and investigator all meet the principles of triangulation to increase construct validity (Yin, 1994).

## **4. RESULTS AND DISCUSSION**

Among industries with servitization of manufacturing, the textiles industry has transformed from a traditional industry to gain higher capacity, internationalization and globalization. Hence, this study selects one of the leaders in the textiles industry. Specific assets of Ruentex are described below:

### **1. Integrated design platform**

Ruentex established a client data management system in 2009. The system is used for personnel management, interaction data management, business opportunity management, correspondence management, itinerary management, client CAD management, client sample fabric management, client transaction history management, color database management, and formula database management. The design and production integrated system mainly reduces human error. The color management system documents commonly used colors and colors chosen by clients in purchase orders; the system has significantly helped Ruentex shorten production time.

### **2. Digitalized database**

Ruentex began creating digital image files of sample fabrics in 2009. The digital images help stimulate designers' imagination and enabled more efficient and rapid response to customer demand, creating even greater commercial benefits. Ruentex develops exclusive fabrics for designated brands, and has accumulated an immense amount of historical data. The style and characteristics of a brand can be extracted by analyzing the brand's historical information. When brand characteristics are input into the sample fabric analysis and search system, users can find images of fabrics with the brand's style that will stimulate their inspiration, and engage in smart design based on recommendations for brand style.

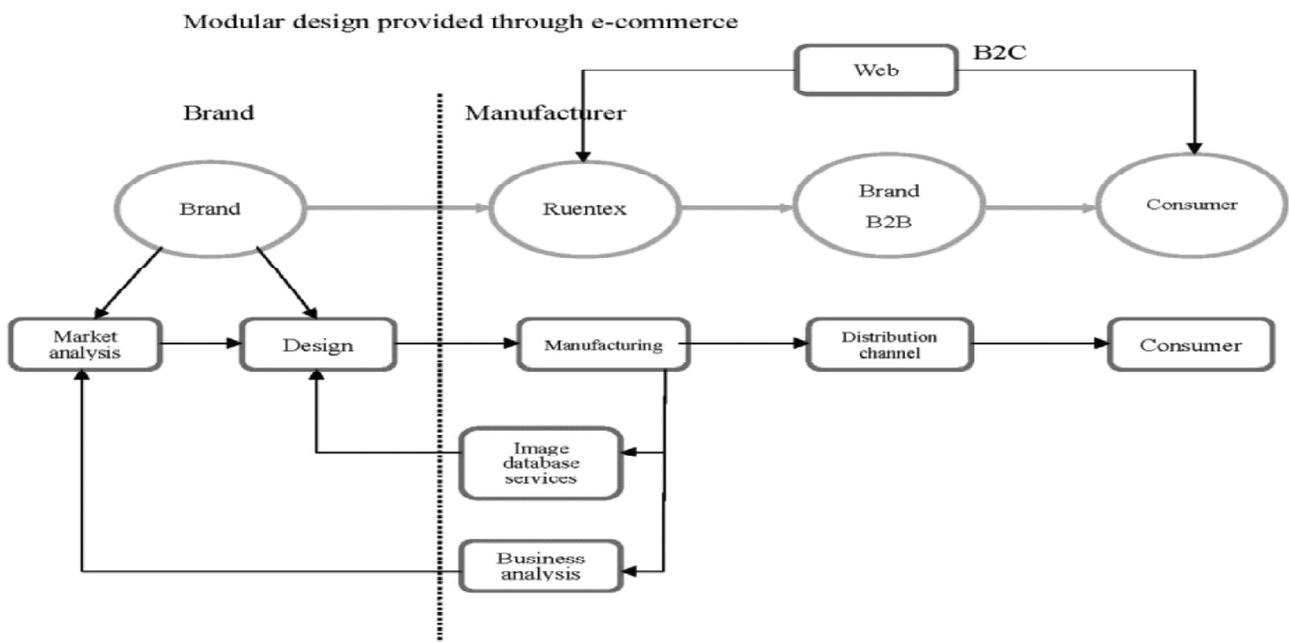
### **3. Client business analysis**

Ruentex began collecting data on brands, yarn count, components, weave, color and other information in 2009. Sources of information include brands, the market, fashion information, sales data, and company history, forming a fabric knowledge base. The client marketing platform must be capable of analyzing

information in the knowledge base, reducing manual operations, and outputting analyzed information for product developers to utilize. The client data management system is used for personnel management, interaction data management, business opportunity management, correspondence management, itinerary management, client CAD management, client sample fabric management, client transaction history management, color database management, and formula database management. The design and production integrated system was developed to reduce the need to redraw CAD files and reduce human error. The purpose of the color management system is to document commonly used colors and colors chosen by clients for each transaction. Once the color used by a client is known, the dyeing department can use the formula in the color record and use spectrum for color matching; it is no longer necessary to perform dye tests and color matching each time, which greatly helps shorten production time. The purpose of formula management is to establish a standard formula for every color, and thereby reduce the need for dye tests and increase the reproducibility of colors (see Figure 1).

#### 4. Customer dominant

Ruentex established the online order system, Corpo in 2011. Every step on the system shows the abilities that Ruentex has accumulated. On the website, consumers can see the appearance, components, yarn count, and test method of every fabric, and choose the type of collar and cufflinks. Consumers then measure their height, chest girth, and shoulder width, and then fill in the numbers to complete the purchase order. The online shopping platform “Fashion Cookie’s” monthly revenue is nearly NT\$10 million with a monthly growth rate of nearly 20%. Revenue growth of Fashion Cookie is mainly driven by Ruentex’s brand “Corpo,” and supported by cheap foreign brands. Revenue of Corpo, Ruentex’s online custom made male shirt brand, is almost doubling every month, and currently accounts for nearly 60% of Fashion Cookie’s revenue. Corpo, a new brand that was created less than a year ago, is sweeping through the online



**Figure 1: Servitization Innovation Model of Ruentex: Asset Specificity Perspective**

clothes shopping market with the fabric design ability that is the pride of Ruentex, as well as experience with integrating distribution channels. Corpo brings together custom made and the internet in the recently popular C2B (consumer to business) approach. This is the future of e-commerce.

In summary, Ruentex provides value-added services through design and production integration, electronic customer management, customer design platform, resource integration, and production scheduling, and gains high customer satisfaction and trust through service innovation that is convenient, immediate, and rich with resources. On this basis, Ruentex has been able to increase its stickiness and expanded into the global market. The servitization innovation model of Ruentex is shown as Figure 1.

## 5. CONCLUSION

This study proposes the following three strategies for servitization innovation in the manufacturing industry based on value created by specific assets: 1. In the servitization of manufacturing value chain extension and integrated services, e.g. electronic management of suppliers, sample fabrics of clients, and sample design, create value by providing customers with convenience, immediate access, and flexibility; 2. Client business analysis service: In the servitization of manufacturing, the powerful database of digitalized sample fabrics and information on the latest global fashion trends can improve design and production efficiency and enhance the brand's style. It can also increase customer satisfaction and dependence on the company; 3. Customer dominant: Ruentex utilized its powerful database capabilities and integrated its experiences with distribution channels, and successfully entered the B2C e-commerce market, making cheap customized products that better satisfy consumers' needs. This study mainly examines servitization innovation in the manufacturing industry from an asset specificity perspective, and does not consider the company's performance. Hence, future studies can further examine the correlation with company performance.

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