

Article

Establishing Circular Model and Management Benefits of Enterprise from the Circular Economy Standpoint: A Case Study of Chyhjiun Jewelry in Taiwan

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Abstract: Upon the development of a linear economy, global enterprises are facing resource depletion, ecological collapse, and unsustainable economic growth, and the living environment is facing ordeals as well. Taiwan's resources are extremely dependent on imports; hence the need for change in the thinking of economic development is arising. The purpose of this study is, based on the concept of circular economy, to discuss the business model and anticipated benefits of Chyhjiun Jewelry Co. Ltd., by using the method of expert interview, participant observation, and method of secondary data collection with the ReSOLVE framework. The results of the study found the developable ReSOLVE business model of the target company Chyhjiun Jewelry in our case study; the ReSOLVE business model includes the use of renewable energy, maintenance and repair services, modular product design, a recovery mechanism, a virtual online shopping platform, and 3D printing technologies. The model established enterprise recycling model as well as the benefits of green management, of which the research results could reduce costs, help the company in exercising its corporate social responsibility, add value to the brand, and generate anticipated benefits arising from other enterprises' follow-up actions.

Keywords: linear economy; circular economy; business model; sustainable development; brand image

1. Introduction

1.1. Background and Motivation

The industrial revolution was a giant leap for mankind in achievement, promoting prosperity and development in economic growth, as well as improving standards of living. However, the linear economic model of the industrial revolution has also brought negative impacts on environmental resources, wherein the exploitation, inputs, manufacturing, and discarding lead to further waste and depletion of resources and disruption of ecological balance, reflecting the decline in the quality of human life and rise of psychosomatic disorder. The concept formation of circular economy is constituted progressively by environmental awareness, green design, sustainable development, etc., and becomes an attitude of the mind being always positive towards everything. Its core value is the continuous recycling of materials and resources, reducing waste, achieving the goal of zero waste, and pursuing sustainable economic growth and environmental development.

If an enterprise wants to survive and develop, it should adjust its management appropriately with the changes of the environment and society, introduce the concept of circular economy into corporate

management, turn it into practical actions and performance, and respond to the environmental protection of circular economy advocated by the national government. As an example for the people, the policy promotes the concept of circular economy and proves its feasibility, reflects the value of fulfilling social responsibilities, and coexists with the environment, the country, and the people.

1.2. Research Objectives

Taiwan is an island country with limited resources available and reliance on imports. The linear economic model has created Taiwan's brilliant economic growth; however, it has caused more serious resource scarcity, environmental pollution, and a decline of quality of life. With the growing level of environmental consciousness and the government's aggressive policy of economic incentives for environmental protection, Taiwanese people are generally aware of the concept of sustainable development. However, the effect of circular economy implemented by enterprises is not statistically significant because the majority of companies in Taiwan are small and medium enterprises lacking in human resources, hence possessing very little willingness to implement circular economy. This study intends to use a representative of small and medium enterprises, Chyhjiun Jewelry Co., Ltd., as the object that we are attempting to discuss and analyze, thus proposing the following research purposes:

- Analyzing the developable business model of the target company in the case study from the perspective of circular economy;
- Establishing a business model for circular economy and anticipated benefits of the target company in the case study.

1.3. Significance of the Study

The purpose of this study is to propose a method of circular economy business model for small and medium enterprises, as well as proving its feasibility and anticipated benefits. This is to serve as reference data for SMEs (Small and Medium Enterprises) to be able to practice circular economy, and to inspire other SMEs' willingness to implement circular economy, jointly becoming pioneers of circular economy, creating endless growth and sustainable development.

2. Literature Review

2.1. Circular Economy

The concept of circular economy is to facilitate harmonious circulation of substances between economic system and natural ecosystem and maintain ecological balance through waste reduction, resource recovery and harmless treatment in economic development. It aims to develop the economy on the basis of material circulation, regeneration, and utilization in the process of integrating economic systems into the material circulation of natural ecosystems, harmoniously based on the material circulation of the natural ecosystem and energy flow. This is the economic development model based on resource recovery and recycling, its basic characteristics of production are low consumption, low emissions, and high efficiency [1]. The five concepts of circular economy are as follows:

- **Redesign of Product:** The first important step in the process of product recycling is design. The subsequent recycling process is rarely considered upon the existing product design; thus, the recycling plant has no choice but to smash and destroy all values. However, if we could design more durable, modularized, and easy-to-maintain products, providing renewable, recyclable, and biodegradable resources without choosing scarce resources as raw materials, as well as suitable production methods and recycling systems when designing products, we would be able to reduce waste, as well as reducing inefficient applications and even opening up large new markets [2].
- **Innovative Business Model of Ownership Transfer:** An innovative business model in which a company provides integrated product-service design, allowing the company to gain more mastery over resources, not only profiting by manufacturing and production, but also creating

new business value for the company by using various services. It also makes enterprises more motivated to recycle used products, thereby reorganizing and reusing the parts of used products. Various elastic and customizable leasing models and sharing mechanisms have been progressively applied in real life and industries [2].

- **Strength of Internal Circulation Creates the Highest Value:** In a circular economy system, resources should always be maximum value ensured, capable of being recycled and used continuously. People contribute an amount of labor and intelligence to a product from raw material preparation through product design and up to a finished product in order to add values layer upon layer; hence, one should try one's best to maintain the highest value of each product during and after use: through repairs, upgrades, remanufacturing, and remarketing to maintain the economic efficiency of each product; and generate greater value by using fewer resources [2].
- **Resource Recovery from Waste:** Turning waste into resources, recovering the value of raw materials hidden in end-of-life products, transforming the original waste into resources through innovative recycling and upgraded recycling, and returning to the life cycle of another product. Viewing from new aspects and processing the by-products that have been downgraded and recovered may save the cost of business waste disposal in the short term and generate different sources of income. In the long run, it helps companies save raw material costs, bring about local infrastructure and employment opportunities, and improve the quality of living environment by reducing waste and pollution emissions [2].
- **Industrial Symbiosis:** Bringing together different industry groups, sharing infrastructure through the exchange of materials, energy, water, or by-products, gaining mutual competitive advantage, mitigating ecological impact, and reducing costs of both waste disposal and product production. When planning new science parks and industrial districts, instead of attracting investment by offering low utility fees and tax preference, circular economy effectively makes an inventory of by-products and waste from industrial districts, allows complementary industries to enter and be stationed in it, sets up pipelines, and promotes enterprises' willingness to connect with each other, so that those in need may use others' waste as their own raw materials, as well as helping the industrial districts escape the dilemma of economic growth vs. environmental protection and yielding fruitful results (Taiwan Circular Economy Network) [2].

2.2. ReSOLVE Framework of Circular Economy Business Model

Ellen MacArthur Foundation proposed in 2015 that the circular economy should be based on the following three principles:

- **Solving resource-wasting and pollution problems at the source of design:** Damages to organisms and environmental pollution arising from economic activities usually come from the discharge of greenhouse gases and toxic substances, causing pollution to the atmosphere, land, and water sources, and causing structural problems as well, such as traffic jam problems. The circular economy can fully grasp and understand these problems and solve such problems at the design source [3].
- **Saving products and materials:** The circular economy saves more resources, raw materials, and labor, thus generating more value. Utilization and durability of products, components and materials can be improved in the circular economy, which makes remanufacturing and recycling faster and more convenient [3].
- **Protection and development of the ecosystem:** The circular economy tends to use renewable resources and attach great importance to the protection and development of renewable resources in order to achieve the control of limited resources and the balance of renewable resources. Circular economy works on investment in natural capital by promoting the material circulation in the system with respect to the ecological environment. For instance: recycling biodegradable materials may lead to compost and create regeneration conditions for the soil [3].

The foregoing three principals were transformed into the ReSOLVE framework by the Ellen MacArthur Foundation, which includes Regenerate, Share, Optimize, Loop, Virtualize, and Exchange, a total of six circular economy business models [4,5], the content and purposes of which are summarized in Table 1.

Table 1. ReSOLVE Framework of circular economy business model.

Principle	Explanation	Purpose	Instance
Regenerate	Use renewable energy and materials and establish a recycling energy system or mechanism	Restore and build a recyclable ecosystem	Nespresso recycled capsule coffee [6]
Share	Share assets and extend product life through maintenance, repair or upgraded design	Continue product life cycle and maximize product usage	Airbnb, a bed-and-breakfast platform for rental of accommodation [7]
Optimize	Improve product performance and efficiency, and optimize it by using big data, automation, and remote sensing technology for correction	Optimize product performance and eliminate waste gas from the production process and supply chain	Toyota hybrid electric vehicle has the advantages of saving fuel and reducing carbon dioxide emissions [8]
Loop	Reuse products and components, and use anaerobic digestion to generate fuel	Resources are continuously used in the internal loop	Yara and Veolia, in Norway, developed circular economy in the European agricultural food chain by recovering nutrients and promoting nutrient recycling [9]
Virtualize	Turn actual goods or services into virtual representation	Apply innovative digital tools so as to save resources	Netflix streaming media [10]
Exchange	Replace old materials with advanced new materials	Reduce resource-wasting, and reuse resources	Desso developed a non-toxic and continuous reusable carpet material [11]

The research collation hereof and source: The Ellen MacArthur Foundation [4]

2.3. Green Business Management

Hopfenbeck and Waldemart proposed the concept of green management in 1993, pointing out that enterprises should change the traditional production and service operation mode, and innovate and develop new green business ideas [12]. Zhang Weiliang believes that with the increase of the public's awareness of environmental protection, and in order to follow the global environmental trends, companies may develop an operable green business management on the traditional five types of structures "production, marketing, personnel, research and development and finance" [13].

- **Green Manufacturing and Production:** The "Twelfth Five-Year Plan for Green Development" produced by the Taiwan Ministry of Science and Technology defines green manufacturing as follows. Green manufacturing is a modern manufacturing model comprehensively considering environmental impact and resource efficiency on the premise of ensuring product function, quality, and cost, through technological innovations and system optimization, enabling products to have the smallest impact on the environment, the highest utilization of resources and energy, and minimum harm to the human body and the society, and the enterprise economic and social benefits are coordinated and optimized during the entire life cycle of design, manufacturing, logistics, use, recycling, disassembly, and reuse [14].
- **Green Marketing:** The SURESCOM (Sustainable and RESponsible COMpany) model is based on a classical closed-loop cycle scheme for the management system and integrates a set of well-known and widely accepted measures and tools that can be applied to the three main areas of a company's activities, namely manufacturing processes, products/services, and cooperation with stakeholders. The proposed algorithm for the model application offers methodical suggestions to assess current sustainability conditions of the company on the basis of sub-indices of the composite index ISCP for sustainability evaluation and, according to them, can help to select and introduce the most suitable sustainable development tools for a particular enterprise to achieve its environmental and social performance goals [15].
- **Green Human Resources Management:** Daily and Huang suggested that the human resource management practices of top management support, environmental training, employee

empowerment, teamwork, and rewards are the key enablers of environmental management [16]. Other studies have mentioned additional human resource management factors, such as recruitment, short-listing, performance appraisal, engagement, culture, and organizational learning [17,18]. Some studies show training and rewards could generate environmental performance through employee empowerment and teamwork [19]. Another study theorizes that employees' affected commitment to environmental management initiatives arises from a combination of supervisory support, environmental training, and rewards [20]. These studies seem to suggest that the value of conceptualizing green human resource management as a set of human resource management practices comprises the development of green abilities, motivating green employees, and providing green opportunities [18], which enables the testing of the ability–motivation–opportunity (AMO) theory [17].

- **Green R&D and Design:** Designers should focus on the modern philosophy of health, safety requirements, low pollution, easy to tidy up, energy saving, easy operation, pithiness, easy recycling, fewer parts, and easy disassembly and assembly in the human living environment. The adverse impact on the environment during the manufacturing process and after use can be minimized by means of decent green design [21].
- **Green Accounting:** Sustainable management of the supply chain, continual improvement in the environmental area, continual improvement in health and safety, transparency with stakeholders and community development were associated to business performance. It is noteworthy that the factor of transparency with stakeholders and community development had the highest number of correlations with corporate performance, showing that it contributes to corporate performance [22].

2.4. Summary

Summarizing the foregoing literature review, the circular economy is the latest trend. In addition to the need for paying attention to the circular economy and formulating and promulgating relevant laws and regulations of the circular economy that the government should carry out, enterprises should invest in it and set an example. Most enterprises in Taiwan are SMEs that have limited resources and manpower; thus, this study intends to use the case study method from the perspective of a small and medium enterprise, taking Chyhjiun Jewelry as an example, analyzing the circular economy business model that the target company Chyhjiun Jewelry in our case study can develop and the anticipated benefits of green business management by using the ReSOLVE framework of the circular economy business model as the basis.

3. Methodology

The purpose of this study is to explore the innovative business model of the target company CHYHJIUN Jewelry in our case study from the perspective of circular economy. The author adopts the case study method, in-depth interviews, methods of secondary data collection, and participant observation to perform an analysis and research. Based on the principle of the ReSOLVE structure of the Ellen MacArthur Foundation [4], we explore the innovative business model scheme of the target company CHYHJIUN Jewelry in our case study, and explain the content of the implementation of individual innovative business models. In addition, we use triangulation to confirm the validity and reliability of the data, as well as researching the design perspectives.

3.1. Research Method

3.1.1. Case Study Method

A case study is an examination of a specific phenomenon, such as a project, an event, a person, an institution, or a social organization [23]. Stake proposed that a case is a bounded system, which refers to a well-defined object rather than a process [24].

3.1.2. In-Depth Interviews

In-depth interviews refer to the hope that some important factors can be obtained through interviews, and these important factors are not simply obtained by face-to-face ordinary interviews [25]. In this study, the general manager of the target company in our case study was interviewed. The interview lasted about one hour and was recorded throughout. This study adopts purposive sampling, dividing the interview questionnaire into two parts. The first part of the interview questionnaire refers to the interview questions and answers of Chen Bing-Cheng [26] and was appropriately amended and discussed according to the purpose of this study. We then further summarized three parts and nine question items, and firstly led the interviewee to discuss the awareness and development of circular economy. The second part of the interview questionnaire had two facets, including fifteen questions, exploring in depth the design and development of circular economy goods and services, employee management and customer-base management, and subject issues in future development plans, as shown in Table 2.

Table 2. Interview questionnaire items.

Part 1 Perceptions of Circular Economy		
Question Items	Interview Outline	
(Part 1) Interviewee Information	1. What is your current position in your company? How long have you been working in this company? What is your project in charge?	
(Part 2) Perceptions of Circular Economy	2. What is your opinion on the current status and trends of circular economy?	
	3. What characteristics do you think that the services and products of circular economy should have?	
	4. What values of services and goods in circular economy do you think they are?	
(Part 3) Future Development of Circular Economy Business Model in Metal Technology	5. What key considerations for consumers to purchase goods and services of circular economy do you think they are?	
	6. What effect does a circular economy consumer market environment have on the metal tech industries?	
	7. What do you think is the main motivation for incorporating the circular economy into the metal tech industries?	
Part 2 Innovative Business Model of Circular Economy		
Dimension	Facets	Question Items
Design Development of Goods and Services in Circular Economy	Introduction to Goods and Services	1. Development Project for Goods and Services
		2. Classification of Consumer Groups (Principle of Distinction)
	R&D Process	3. Fair and Transparent System
		4. Current Marketing Strategies
		5. Design Elements for Goods and Services in Circular Economy
Implementation Process	6. Dilemma of R&D	
	7. Material Application	
Production Process	8. Commodity Types	
	9. Dilemma of Production Recovery	
	10. Sales Market	
Sales Status	11. Sales Dilemma	
	12. Annual Operating Status	
	13. Staff Management	
Comprehensive Discussion	14. Consumer Feedback Management	
	15. Future Development Plan	

3.1.3. Method of Secondary Data Collection

The method of secondary data collection refers to suggesting the use of primary data collected in other previous studies as the subject matter of their own research data. Such data are “secondary data”. Secondary data can be searched across a wide range of fields and different eras, which help to understand the historical truth and the trajectory of change. This study summarizes the objective background information about the target company in our case study through the official website

information, publicity materials, internal database of the company, media reports, etc., and uses that as a basis for analysis and research purposes.

3.1.4. Participant Observation

Lofland and Lofland believe that participant observation is a kind of field observation or direct observation. Researchers establish and maintain a multi-faceted and long-term relationship with a group in order to develop a scientific understanding of the group. The main feature is that the observer is a member of the observed group as well, participating in activities or life, playing the role of participant and the role of observer simultaneously. The researchers of this study actually participated in the process of designing the goods and services in the circular economy proposed by the target company in the case study, and recorded and analyzed various data for an evidence-based analysis during this observation period [27].

3.2. Data Collection

3.2.1. Chyhjiun Jewelry

Chyhjiun Jewelry was founded on 25th September 1995. It is a silver jewelry brand in Taiwan, using sterling silver with a 925 mark as its raw material with a professional, complete design and development team. Starting from sketches, followed by combining the registered trademark, symbol, and emblem with jewelry, and finally manufacturing at the metalwork department, the company sells products in eight Taiwan stores and online, and provides a professional after-sales maintenance service system as well as a complete silver recycling service in order to continue the spirit of sustainable design and reflect the values of circular economy [28]. The status and number of silver jewelry recovered in a single store are shown in Figures 1 and 2. The number of monthly recoveries in the early stage of the implementation of the recovery mechanism was not stable. Since August 2019, the number of monthly recoveries has been around 15–16; therefore, it is concluded that the promotion of the concept of circular economy and the service of recovery mechanism of Chyhjiun Jewelry have achieved preliminary results. After the product path is developed for new products, maintenance is required due to silver oxidation. Jewelry damage can be repaired. When the damage is serious or it is no longer worn, it can be recovered, thus cycling the product path.

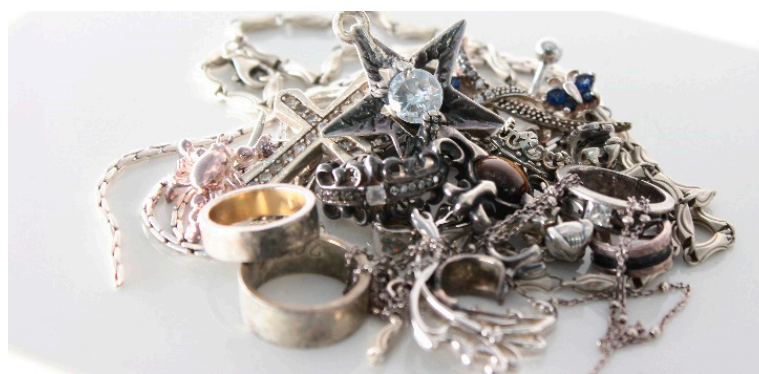


Figure 1. Chyhjiun Silver jewelry recovered in a single store.

3.2.2. Research Process and Method

According to the purpose of this study, the process was divided into three stages. In the first stage, document analysis was used to extensively collect and organize the basic theories. In the second stage, Chyhjiun Jewelry was used as the target company in the case study, and the methods of interviews and secondary data collection were used to collect information and summarize it; in the third stage, the authors used the ReSOLVE structure to analyze and explore the innovative business model of

Chyhjiun Jewelry’s circular economy, analyzing its implementation content and feasibility, and finally applying in-depth interviews, the method of secondary data collection, and triangulation of participant observation to improve the integrity and reliability of the analytical data. Table 3 summarizes the integrated research process, methods and steps.

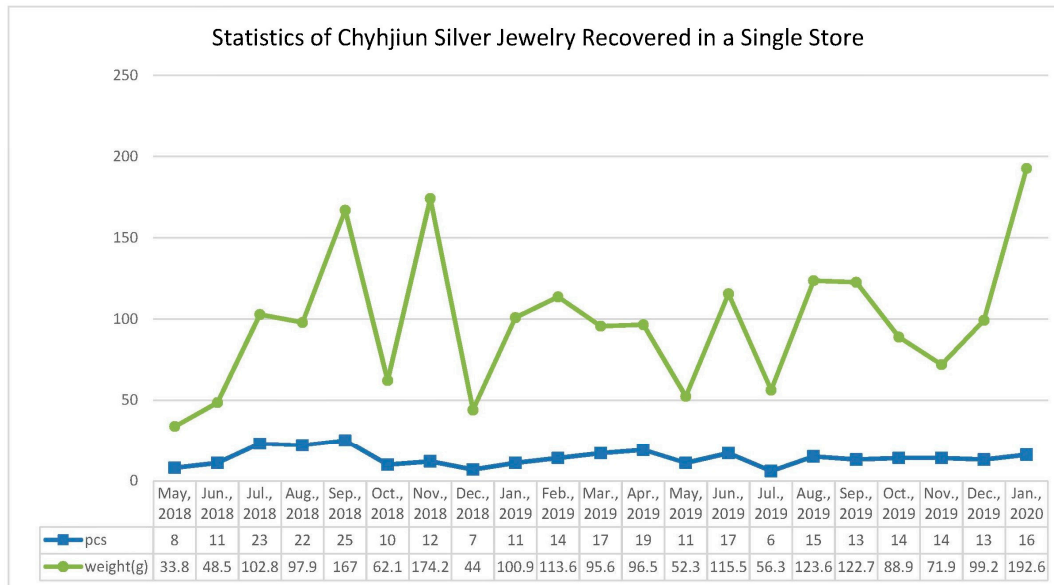


Figure 2. Statistics of Chyhjiun silver jewelry recovered in a single store.

Table 3. Research process, methods and steps.

Stage	Object	Method	Steps
1	Literature related to circular economy, five central concepts of a circular economy, and ReSOLVE framework of circular economy business model	Document analysis	<ol style="list-style-type: none"> 1. Establish research topic. 2. Literature related to circular economy, five central concepts of a circular economy, resolve framework of circular economy business model. 3. Document analysis and narration.
2	Chyhjiun Jewelry	In-depth interviews, method of secondary data collection	<ol style="list-style-type: none"> 1. Take Chyhjiun Jewelry as the research object and conduct an in-depth interview with the person in charge. 2. Explore in depth the design development of innovative products and services in the circular economy of the target companies in the case study. 3. Typewrite the interview content and sort out and analyze it.
3	Researchers and literature	Participant observation and triangulation	<ol style="list-style-type: none"> 1. Analyze the classified data by using the ReSOLVE framework. 2. Analyze the content of each business model and evaluate the feasibility. 3. Use triangulation to verify the validity and reliability of data analysis and summarize the conclusions.

3.2.3. Data Analysis

This research adopted the “Triangulation” data analysis method advocated by Denzin (1970, 1978), which refers to the use of a variety of methods, theories, observers and resources in the research process to check the reliability of sources, collection methods, theoretical framework, etc. Such a research method can help researchers “seek trustworthiness”, deeply and thoroughly explain the phenomenon, forming the basis of knowledge construction and practice to obtain a thick description of the research phenomenon [29,30]. This study uses in-depth interviews, the method of secondary data collection, and participant observation, applying three perspectives to interactively compare, confirm and detect, and verify the correctness and completeness of the data.

This study used in-depth interviews, secondary data analysis, and participatory observation methods, and found that the product process of the case study company Chyhjiun Jewelry is in line with the circular economy; for example: using 925 silver as a raw material and adopting a modular product design methods and 3D printing technology, provide maintenance and repair services and recycling mechanisms, and make good use of online shopping virtual platforms to promote the concept of circular economy and push broadcast to provide maintenance and repair services and recycling mechanisms, combining the above with the circular economy business model ReSOLVE structure, and then developing the ReSOLVE business model that Chyhjiun Jewelry can develop.

4. Results and Discussion

4.1. Chyhjiun Jewelry's Developable ReSOLVE Business Model

This research used the ReSOLVE framework as the principle to carry out analysis. It collected data by means of in-depth interviews, the method of secondary data collection, and participant observation, and compared the content information of the various methods. The results show that the Chyhjiun Jewelry's developable ReSOLVE business model includes the use of renewable energy, maintenance and repair services, product modular design, recovery mechanisms, a virtual online shopping platform, and 3D printing technologies. Table 4 which summarizes Chyhjiun Jewelry's developable ReSOLVE business model and Figure 3, which illustrates Chyhjiun Jewelry's developable ReSOLVE business model are described and integrated below.

- **Use of Renewable Energy:** Chyhjiun Jewelry only uses silver as the raw material for jewelry. Silver is not easily corroded by chemicals, is stable in nature, low in activity, rich in ductility, and deemed a precious metal. Additionally, it can be recycled and reused.
- **Maintenance and Repair Services:** Chyhjiun Jewelry has a professional metalworking team, which provides silver jewelry repair services, and is located throughout the nation's stores, making it convenient to offer silver jewelry maintenance and repair acceptance services, so as to extend the life cycle of silver jewelry products.
- **Product Modular Design:** Product components are interchangeable and easy to maintain and upgrade. In addition to reducing waste and providing reuse of resources, it can better meet different market needs.
- **Recovery Mechanism:** The recovered silver jewelry can be dissolved and reused in crafts. Because the purity of silver has been affected during the production process, it is not appropriate to remake silver jewelry. Therefore, it is used as the raw material of crafts participating in competitions, which shows its recovery and reuse, as well as presenting its metal technology value.
- **Virtual Online Shopping Platform:** Via Facebook, IG (Instagram), Line and other social networking and communication media or APP (Application), the concept of circular economy is promoted, the recycling and maintenance service pushed forward, and related preferential information and virtual discount coupons are released for customers to enjoy discounts by presenting discount information or displaying barcodes on their mobile phones. Converting physical discount coupons and discount flyer into virtual online information brings convenience to customers, is easy to use, and saves paper and labor costs.
- **3D Printing Technologies:** The use of 3D printing technologies reduces the use and waste of raw materials, saving the time of the human wax carving process as well as making new product development faster.

Table 4. Chyhjiun Jewelry’s developable ReSOLVE business model.

Chyhjiun Jewelry’s Developable ReSOLVE Business Model	ReSOLVE Framework of Circular Economy Business Model	Specifications
Use of Renewable Energy	Regenerate	Only use silver, which is recyclable, as material.
Maintenance Services	Share	The metalworking team and the nation’s stores provide maintenance and repair services to extend the life cycle of silver jewelry.
Product Modular Design	Optimize	The components are interchangeable, easy to repair and upgrade, reduce resource wasting and meet market demand.
Recovery Mechanism	Loop	Silver recycling and reuse, showing the value of metal technology.
Virtual Online Shopping Platform	Virtualize	Promote the concept of circular economy through social networking and communication media or APP (Application), promote recycling and repair after-sales services, and issue preferential information and discount coupons. Use of mobile phones to enjoy discounts is convenient and saves costs.
3D Printing Technologies	Exchange	Reduce the use and waste of raw materials. Accelerate the development of new products.

**Figure 3.** Chyhjiun Jewelry’s developable ReSOLVE business model diagram.

4.2. Circular Business Model of Chyhjiun Jewelry

Chyhjiun Jewelry uses the ReSOLVE framework as an analytical principle, exploring developable business models, and combining them into Chyhjiun Jewelry’s circular business model. The details will be described below and integrated into Figure 4. After the product path is developed for new products, maintenance is required due to silver oxidation. Jewelry damage can be repaired. When the damage is serious or the jewelry is no longer worn, it can be recovered, thus forming a cycling product path.

- **Renewable Energy:** Chyhjiun Jewelry only uses silver as the raw material. The stable nature and low activity of silver can reduce the incidence of allergies, and it is easy to clean and maintain. It is easy to clean the surface oxidation of silver jewelry with the use of toothpaste and a toothbrush to gently wipe it; silver is a precious metal, which has good ductility, and can be recycled and reused.
- **Product Modular Design:** Chyhjiun Jewelry designs product parts into a unified specification, combined with the use of magnetic principles and the tenon structure, making them modules that are easy to dismantle, maintain, and exchange so as to reduce resource-wasting and provide customized service, transforming and upgrading product parts according to customer needs to meet market demand.
- **3D Printing Technologies:** Design can be changed instantly, saving manpower wax carving time, and the production task can start immediately after completion of design. It greatly shortens the manufacturing process, reduces the use of raw materials, saves personnel costs, accelerates new product development, and quickly responds to market demand.
- **Virtual Online Shopping Platform:** Chyhjiun Jewelry uses its official website and social networking and communication media, such as Facebook, IG, Line, and YouTube, to promote the concept

of circular economy, and produces promotional films to push forward recycling services and after-sales repair services.

- **Maintenance and Repair Services:** A professional metalworking team as well as eight stores and online shopping services across Taiwan provide maintenance and repair services to facilitate customers to send products for repairs and maintenance and to track their progress so as to extend the life cycle of silver jewelry products.
- **Recovery Mechanism:** Chyhjiun Jewelry provides a recovery mechanism service, which allows customers to purchase new style silver jewelry at a discount. It also solves the problem of silver jewelry that is no longer worn, and the recycled silver jewelry is transferred to the raw materials of the crafts participating in competition, showing the metal technology value.



Figure 4. Chyhjiun Jewelry's circular business model.

4.3. Benefits of Green Business Management of Chyhjiun Jewelry

Based on the ReSOLVE framework, this study analyzed and found that the developable ReSOLVE business model of Chyhjiun Jewelry included the use of renewable energy, maintenance and repair services, product modular design, recovery mechanism, a virtual online shopping platform, and 3D printing technologies, which further contributed to the recycling model of Chyhjiun Jewelry. This section will analyze the anticipated benefits of the ReSOLVE business model that Chyhjiun Jewelry can develop with five types of managements, which are “production, marketing, personnel, R&D, and finance” of the company’s green management. The analysis is as follows. Table 5 shows the anticipated benefits of green management of Chyhjiun Jewelry:

- **Green Manufacturing and Production:** The “renewable energy, recovery mechanism” business model enables repeated use of the raw material silver, and the recycling incentive scheme may encourage customers to trade in old product for new ones. Switching recycled goods to recycled crafts can reduce the inputs of raw materials, while providing maintenance and repair services can extend the life cycle of silver jewelry.
- **Green Marketing:** Through the business model of the maintenance service, recovery mechanisms recycling characteristics, and the nation-wide access, it is convenient to provide maintenance, repair and recycling services, allowing customers to buy silver jewelry at a lower price, so that customers not only enjoy the happy mood of ownership and use of new products, but also save money, and take into account green consumption as well. For the benefit of the target company

Chyhjiun Jewelry, it can increase the customer retention rate and repurchase rate, as well as stimulating consumer consensus on sustainable development.

- **Green Human Resources Management:** The target company Chyhjiun Jewelry regularly organizes education and training to cultivate the professional knowledge, quality and green awareness of employees, and in the activities of product introduction and implementation, it transmits the company's philosophy and expectations, so that employees can understand the company's policies accordingly. The implied meaning tacitly cultivates employees' green consciousness, affecting their behavior, and conveying the concept of Chyhjiun Jewelry to the customers during sales and service.
- **Green R&D and Design:** "Recyclable and Extended Use" is the core of the design and R&D of the target company Chyhjiun Jewelry. Therefore, recyclable silver is selected as the raw material. In terms of extending the life cycle of silver jewelry, one way is to use silver Jewelry to design as two sides of the same coin, in two-style and one-piece multi-purpose multiple wearing methods. The second is to set up a professional metalworking team to provide repair and maintenance services. In addition, the introduction of 3D printing technologies and equipment can save man-hours and manpower in the manufacturing process, and also shorten the time for new product development.
- **Green Accounting:** The business model of the target company Chyhjiun Jewelry records its details in detail, and uses the company's internal data to measure the external environmental costs and benefits to assist the target company Chyhjiun Jewelry to change or determine the policy voucher base, exercising corporate social responsibility and anticipated value-added brand and encouraging other companies to follow up.

Table 5. Anticipated benefits of green business management of Chyhjiun Jewelry.

Green Business Management	Business Model	Anticipated Benefits
Green Manufacturing and Production	Adopt renewable energy, maintenance services, and recovery mechanisms	Reduce raw material costs and extend the life cycle of silver jewelry.
Green Marketing	Maintenance service, recovery mechanism	Increase customer retention rate and repurchase rate, as well as stimulating consumer consensus on sustainable development.
Green Human Resources Management	Adopt renewable energy, maintenance and repair services, product modular design, recovery mechanism, virtual online shopping platform, 3D printing technologies	Cultivate employees' green awareness and stimulate consumer consensus on sustainable development.
Green R&D and Design	Adopt renewable energy, maintenance and repair services, 3D printing technologies	Extend the life cycle of silver jewelry, save costs and shorten new product development period.
Green Accounting	Adopt renewable energy, maintenance and repair services, product modular design, recovery mechanism, virtual online shopping platform, 3D printing technologies	Exercise corporate social responsibility, add value to brand and encourage other companies to follow up.

The case study company Chyhjiun Jewelry uses 925 silver as the raw material. Because the raw material is simple, about 90% of the silver material can be recycled into the manufacturing process after the goods are deducted, and the online shopping virtual platform, IG and Facebook and other communication media are used. Digital advertising of recovery services and maintenance and after-sales services saves about 20% of the expenditures on paper and text.

5. Conclusions

Facing the depletion of global resources and the imbalance of the ecological environment, circular economy is the solution and trend. Therefore, this study uses the perspective of circular economy to explore the innovative business model of the target company Chyhjiun Jewelry in the case study. First of all, the literature review showed the five concepts of circular economy and the ReSOLVE framework of the business model of circular economy. The research method was to use the expert interview

method, participant observation, and secondary data collection to explore the company's business model based upon the ReSOLVE structure. The correctness and completeness of the data content was verified by using triangulation, the future benefits of the target company Chyhjiun Jewelry are expected, and the following conclusions are further reached:

- Developable ReSOLVE Business Model of the Target Company Chyhjiun Jewelry in the Case Study: Based on the analysis of the ReSOLVE framework, evaluate the developable “use of renewable energy, maintenance and repair services, product modular design, recovery mechanism, virtual online shopping platform, and 3D printing technologies” business model, and generate the Chyhjiun Jewelry loop model.
- Reduce Costs, Exercise Corporate Social Responsibility, Add Value to the Brand, and Inspire Other Companies to Follow Up the Anticipated Future Benefits: Innovative business models not only reduce the cost of raw material input, save process costs and shorten the new product development period, but also exercise better corporate social responsibility and enhance the corporate brand image to encourage other companies to follow suit.

It is advised that for the subsequent research, the innovative business model of this study can be used as the basis for the implementation of innovative business models for the target companies in the case study, which are documented in detail and evaluated in depth. In addition, it is recommended to find additional target companies in different industries in the case study for discussion and analysis, and further develop the applicable circular economy business model for SME industries.

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