

## Article

# A Study of Lacquerware Industry's Upgrading and Sustainability Strategies from the Perspective of GVCs—Using China Fuzhou Lacquerware Industry as Example

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**Abstract:** To discover how the lacquerware industry realizes its core competency, it is important to explore its upgrading strategies in the global value chains. The purpose of this study is to discuss the upgrading strategies applied during the lacquerware industry's four economic stages and the approach to realize the industry's sustainability. Results show that (1) OEM enterprises reach process upgrading with four strategies, ODM enterprises reach product upgrading with five strategies, OBM enterprises reach functional upgrading with four strategies, and OSM enterprises reach chain upgrading with two strategies; (2) the lacquerware industry's main elements in SSCM include the long-standing relations, reprocessing of defective products, employing the local community, and participation in regional and transregional development initiatives, wherein the design sector is the main link in the SSCM of the lacquerware. The result and implications provided by this study can serve as a reference for other lacquerware and local traditional handicraft industries that are seeking to upgrade and achieve sustainability during their economic development.

**Keywords:** global value chains (GVCs); design-driven innovation (DDI); industry upgrading; sustainability supply chain management (SSCM); local traditional craft



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## 1. Introduction

Achieving sustainable development is a common challenge for all resource-based regions. With the deepening of globalization, the division of global value chains (GVCs) has become increasingly prevalent. The question of how to achieve sustainable development in the GVCs is a crucial issue faced by resource-based areas [1]. As the global economy improves itself alongside with trading nowadays, some emerging countries have displayed rapid catch-up trajectories in recent years [2]. The past two decades have witnessed a shift in the global economic center of gravity towards the East and South. The so-called shifting wealth phenomenon has been driven by strong and sustained economic performance and improved livelihoods in emerging economies, especially in China and India [3]. New Multinational Enterprises (MNEs) have also emerged from developing economies, particularly those in East and Southeast Asia, as major strategic partners and manufacturing service providers for traditional MNEs from developed economies [4]. However, under the background of the GVCs, China's manufacturing industry is always embedded in the low-end of the chain. Because its independent innovation capacity is weak, China has a subordinate position and is dominated in the global value chain [5]. With the global outbreak of the COVID-19 pandemic in 2020, the global value chain has suffered virtual destruction. In particular, China's dominant role as the "world's factory" has escalated Western economies' dependence on the Chinese economy. Firms whose value chain strategies depend on Tier 1 (direct) or Tier 2 (secondary) suppliers in China and South-East Asian countries have experienced significant disruption [6]. Therefore, in this context, discussions about how local industries can achieve innovation, upgrading and

sustainable development in the GVCs in an emerging economy like China will not only contribute to the industry development, but also benefit the economic recovery.

Regarding how an industry achieves innovation and upgrading in the GVCs, studies have pointed out that the GVCs approach provides a holistic view from two contrasting vantage points: top-down and bottom-up [7,8]. Governance is a key concept for the top-down view. Attention is put to the integration of economic activities by leading companies [9]. Upgrading, another centerpiece from the bottom-up perspective, refers to firms, regions, or countries moving up the value chain into higher-value activities in GVCs [10]. Hansen et al. (2016) point out the importance of strategic intentions and behaviors with regard to innovation within the emerging market firms (EMFs) [11]. Specifically, some studies further argue that the scarcity of innovation capabilities (ICs) is the major challenge to those EMFs hoping to capture more added value within GVCs [12,13]. In view of the role of innovation in the industry, based on GVCs' Producer- and Buyer-driven innovations, Verganti proposed another theory for cultural creative industry called design-driven innovation (DDI), which calls for the integration of socio-culture and product language, and emphasizes the importance of collaboration in an innovation [14]. As a language, design deals with meaning, although it is not a simple linguistic operation because the features of a product are performative in explaining its materiality; a new meaning is created through a translation process, by connecting otherwise disconnected features of the product [15]. Therefore, it is one of the topics to be discussed in this study to explore how innovations can drive local industries at different levels to achieve upgrades in GVCs.

With the accelerated development of the production and trade globalization, the sophisticated interconnection of the productive structures of the different countries at the international level led the interdependence of the economies to increase remarkably. As a consequence, a production bottleneck in a hub of the dislocated supply chain can trigger a synchronized economic slowdown and, therefore, a global downturn [16–20]. In response to the threats, several directives have been issued over the last few years by national and supranational organizations (e.g., the United Nations, the European Union) to push towards more sustainable practices in areas encompassing resource consumption, emissions reduction, and waste management, and to encourage the implementation of circular economy models [21,22]. However, despite the numerous initiatives, the achievement of successful results in terms of sustainability is still very challenging, especially if the companies are multinationals. In this case, the distance between buyers and suppliers located in different markets, the cultural differences, and the dissimilar expectations in terms of sustainability goals still represent crucial barriers [23–25]. As the interconnection between DDI and socio-cultural environment become closer, studies regarding the role of DDI in sustainable supply chain management (SSCM) and if DDI could promote industry's sustainability, are currently lacking. Therefore, based on the perspective of innovations, analyzing the main elements in the industrial supply chain in order to seek the sustainable industry development is the second topic to be discussed in this study.

Lacquerwares are mainly manufactured in Asian countries such as China, Japan, Myanmar, and Vietnam, but China and Japan are still the main sources of production. As a part of cultural creative industry, the lacquerware industry's upgrading has been an important issue among the government's cultural policy [26]. It was included in Taiwan Executive Yuan Cultural Development Council's "Challenge 2008 National Development Plan" in the form of "Cultural Creative Industrial Development Initiative" project. It was also added to the "Culture and Related Industries Index" by China's Bureau of Statistics in 2012 as an emphasis for future development. As the most important lacquerware production site in China, Fuzhou's lacquerware industry has an extensive history that can be traced back hundreds of years. Its unique technique of making light-weight and durable lacquer substrate called "bodiless" is known globally and was included in National List of Intangible Cultural Heritage by the State Council of China in 2006 [27]. As time passes, problems begin to arise; not only is the industry facing issues with internal corruptions, but challenges from slow production, lack of industry standards, passive innovation, etc.

all contribute to the decline of the market [28]. Hence, the upgrading of the Fuzhou lacquerware industry is an imminent issue to be addressed.

This study uses GVCs, DDI and SSCM perspective as its theoretical ground to discuss the upgrading strategies of the local lacquer industry in the global value chain and the main elements of the supply chain to achieve industrial upgrading and sustainable development. Thus, this study will address the following purposes:

- Identifying the lacquerware industry's upgrading strategies in the GVCs.
- Exploring how local lacquerware manufacturers achieve sustainability in SSCM.

The expected findings of this study can provide the following two aspects of contributions. For industrial applications, upgrading strategies for the local lacquerware industry are provided to embed the high value-added links in the global value chain so as to achieve industrial upgrading. Besides this, references are made for traditional craft industries in the same predicament. At the theoretical aspect, the findings verify the different upgrading strategy alternatives of traditional lacquerware firms participating in the global value chain and provide relevant research on traditional craft industries for SSCM theory.

## 2. Literature Review

This segment of the study first discusses the core concept of the GVCs, GVCs' driving force mechanism, and different industry upgrading strategies in each stage of economic development. Next, it analyzes the concept of design innovation based on social and cultural implications in DDI theory. Thirdly, it analyzes the concept of SSCM and discusses the importance of the integration of internal and external resources in the supply chain for sustainability. Last, it explicates the local lacquerware industry's historical development and current situation.

### 2.1. Global Value Chains

GVCs is the nexus of interconnected functions and operations through which goods and services are produced, distributed, and consumed on a global basis [29–31]. It focuses on analyzing how a product passes through each and every sector in a value chain to achieve maximum value-added, and how a key operator can affect the relationship in a value chain and the reconfiguration of profit sharing [32]. From the separation of production and consumption, it has developed gradually into inter-industry and intra-industry specialization, and then to the current GVCs specialization, which has become a new normal of international division [33–35]. In Gereffi's original model (1999), there are two ideal types of value chain: buyer- and producer-driven. Both have lead firms that do the "driving" or shape the governance and division of labor of the value chain [36]. Producer-driven value chain is a direct investment by the producer to effectively create market demand, and form a vertical producer-supply chain system. Buyer-driven value chain refers to large buyers with market advantage who are positioned to sell to the targeted market. Buyer-driven industries are common in labor-intensive consumer goods industries, and the production is generally carried out in developing countries. Buyers do not manufacture goods; design and retail are separated vertically from the manufacture in the supply chain [9]. Henderson points out that the buyer-driven industry's most important value is in the S&M sector [37]. A comparison between the two drivers in eight different distinct categories is presented in Table 1 to show the role each plays in the GVCs' upgrading strategies [38]. Producer-driven GVC emphasizes its R&D, manufacturing advancement, and product upgrading, while buyer-driven GVC outsources its production sector, and just focuses on expanding its market share and sales channels [39].

**Table 1.** Producer- and Buyer-Driven Chains Comparison [38].

	<b>Producer-Driven Commodity Chains</b>	<b>Buyer-Driven Commodity Chains</b>
Drivers of global Commodity Chains	Industrial Capital	Commercial Capital
Core Competencies	Research Development Production	Design; Marketing
Barriers to Entry	Economies of scale	Economies of Scope
Economic sectors	Consumer Durables Intermediate Goods Capital Goods	Consumer Non-durables
Typical Industries	Automobiles; Computers Aircraft	Apparel; Footwear; Toys
Ownership of Manufacturing enterprises	Transnational Enterprises	Local Enterprises predominantly in developing countries
Main Network Links	Investment-based	Trade-based
Predominant Network Structure	Vertical	Horizontal

The rapid spread of GVCs has provided emerging economies opportunities to reap the benefits of innovation offshoring and accelerate their structural transformation [3]. However, how does the industry achieve structural transformation? In GVCs literature, the concept of upgrading is defined as a move to higher-value activities in production, to improved technology, knowledge and skills and to increased benefits that can be derived through participation in GVCs [9]. Humphrey and Schmitz proposed a sequence of four upgrading stages for the industrial system in 2000: (1) Process Upgrading, the improvement of production efficiency through enhancing skills, (2) Product Upgrading, the improvement of a product's unit value through creativity value-added, (3) Functional Upgrading, the increase of value-added from low to high, or moving its position from OEM to OBM in the manufacturing process, as Stan's Shih's smiling curve theory indicates [40], and (4) Chain Upgrading, or inter-sectoral upgrading, the use of the industry's core competency to move to another industry [41]. These four system upgrading stages form a development sequence that usually begins with process upgrading, then product upgrading, functional upgrading, and ends in inter-sectoral upgrading [38]. This sequence allows local industry upgrading to achieve adjustment-making, improvement, and upgrading in both high and low value-added sector, as shown in Figure 1 [42].

	<b>Process</b>	<b>Product</b>	<b>Functional</b>	<b>Chain</b>
Trajectory	→			
Examples	Original equipment assembly(OEA) ↓ Original equipment Manufacture (OEM)	Original design manufacture (ODM) →	Original brand manufacture (OBM) →	Moving chains e.g. from black and white Tv tubes to computer monitors
Degree of disembodied activities	Disembodied content of value added increases progressively →			

**Figure 1.** Hierarchical Upgrade Track [42].

## 2.2. Design-Driven Innovative Theory

Verganti (2003) proposed design-driven innovation (DDI) to differentiate from producer-driven and buyer-driven chain innovations [14]. The concept's core thinking lies in the

radical change of product semantic (language), which focuses on the connection between product and culture [43]. It shows how product semantic as an interlanguage that creates its product value through the reflection of society, culture, and trend are informed to users through the use of symbols. Figure 2 show the basic concept of design-driven innovation. It delineates how three different strategic approaches: market-pull, technology-push, and design-push work in a system; the black arrow represents major driver and the grey arrow represents minor driver. When product semantics drive technologies and market demands to change, such strategy is referred to as design-driven innovation [14]. DDI is a framework that supports the interpretation of emerging socio-cultural norms and enables the proposal of radical new meanings [44] for new products that customers will love [45] and also for reinvigorating the life cycle of long-standing products [46,47]. Numerous DDI literature point out that its focus on changing the meaning of products can help in understanding how to change the meaning of the design processes [48]. Therefore, designers are crucial because they provide access to a particular type of knowledge as well as to product languages and meanings. They are able to provide interpretation for different cultures [49] and make product designs with more local cultural implications.

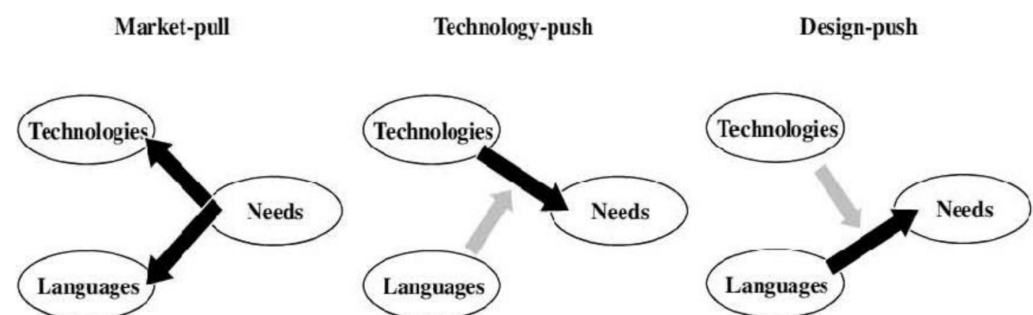


Figure 2. Knowledge Drivers in Different Approaches to Innovation [14].

The role of design evolved during the transformation of economic paradigms. This had been interpreted by the levels of design practice, which links the role of design with the business type of enterprise, ranging from the designer as an interpreter in OEM, to differentiator in original design manufacturing (ODM), to system creator in original brand management (OBM), and finally to a planner in original strategy management (OSM) [50]. OSM is on the top level of the business development hierarchy; it creates new sociocultural needs with strategic designs. In other words, enterprises in the OSM level are planners of holistic strategies [51]. Design as a planner in OSM has been interpreted by related theories, such as design thinking [52], design leadership [53], and DDI [54]. Based on the concept of DDI, applying innovations in OSM level may allow a company's upgrading in gaining competencies from certain sectors in the original manufacturing chain to be shifted to a new industry or value chain to achieve industry and societal innovation.

### 2.3. Managing the Sustainable Supply Chain

The question of how to achieve sustainable development in resource-based areas is also a concern of the governments [55–57]. Japan's economist Yamazaki (2019) believes that local industry is a cluster of smaller township economy which results from the collaboration between industries, the government, and schools. A sustainability strategy would require integration of industrial clusters, innovation, and local industries [58,59]. Now, the focus has moved from the enterprise level to the perspective of the supply chain because of the intense competition [60]. The balanced supply chain can be determined as "the system of connected business activities, including the entire product life cycle, which allows for the value creation for all stakeholders, simultaneously ensuring the commercial success, which contributes to the increase of the social welfare and the improvement of the environmental status" [61,62].

Thereinto, it is possible to include crucial factors associated with their outside and inside contexts of functioning among the barriers for the development of sustainable supply chains [63]. Kot (2020) has recommended having efficient and improved communication between internal departments as well as with external suppliers [64]. The research of D. Diaconu and C. Alpopi (2014) has examined different levels of SCM's strengths and weaknesses. Their study has shown the increase in the level of service, but a level of stock does not reduce, which is the key attribute of logistic cost [65,66]. Studies show that improved communication helps in attaining a competitive edge by improving customer satisfaction while reducing the cost of operations [65,67]. Many contributions in literature have highlighted that the managers' commitment towards sustainable practice is key for their effective implementation and success [68–70]. Studies show that an effective management of the supply chain is needed that can be most briefly characterized as integrating suppliers, producers, distributors, and customers in order to guide the long-term action of companies [62,71]. Therefore, it is critical to discuss how internal and external supply chain integrates to realize industry suitability. Based on the balance SCM, Kot (2018) proposed the concept of sustainable supply chain management (SSCM): it means actions, including the interconnections between the elements and connections in the supply chain that are taken in order to achieve sustainable development. Kot points out that the sustainable supply chain balances three dimensions well: business, environmental, and social, of which the business dimension includes 12 elements, the environmental dimension includes 8 elements, and the social dimension includes 10 elements [62]. Using the quantitative research on the elements of SMEs in SSCM proves the importance of SSCM for SMEs to achieve sustainable development. Therefore, it is critical to discuss how internal and external supply chain integrates to realize industry suitability.

### 3. Local Lacquerware Industry

Lacquer art is developed collectively by China, Japan, Korea, and other South East Asian countries [72]. Viewing lacquer art as its national treasure, Japan is not only the leader in global lacquerware manufacturing, but its technology and market value are both among the top in the world ranking [73]. As once Japan's colonial state, Taiwan was influenced by Japan during the early 20th Century. Combining Japan's lacquer craftsmanship and China Fuzhou's technique, lacquerware started to flourish in Taiwan. With the reformations in recent years, Taiwan had emerged as one of the top manufacturers of lacquerware in the world [74].

As a representation of Japan's traditional lacquer art, Wajima-nuri has conducted a series of innovations to realize industry upgrading. First of all, it went through several experiments to achieve innovation in coating skill by improving the paint's chemical components, life-cycle, and opticality, and consequently developed a new paint that doesn't fade easily in color and is allergy-free to human body. Furthermore, by adjusting the amount of egg white additive in the paint, the total dry time is shortened by 30%. Although drying time is not the only factor that affects the product's design and innovation, the new paint's synergy with lacquerware is critical [75]. Secondly, the recent development of Japan's lacquerware has been focusing on the design innovation which can be divided into three categories; (1) the preservation of traditional daily-use products, such as bowl, chopsticks, containers, etc.; (2) the collaborations with contemporary art to increase more value-added. Third, Design Center Ishikawa has been putting its emphasis on promoting lacquer related art to the international forum since year 2000 by hosting events such as triennial glass and lacquer shows and The Ishikawa International Urushi Exhibition to innovate in S&M. This strategy allows its "Wajima-nuri" brand image to be deeply rooted in customers world-wide, and subsequently achieve industry upgrading. Lastly, Wajima-nuri lacquerware industry co-developed new product with different industries like apparel, medical, furniture, electronics, etc. to achieve innovation in R&D [74,75].

Taiwan's Fengyuan is also known as the home of lacquerware. During the golden age of 1981–1986, Taiwan's annual exportation of lacquerware to Japan was valued at 200

Million US Dollars, 90% of which came from Fengyuan's OEM production [76]. Toward the end of the 1980s, Taiwan's art and craft industries were losing their market competencies due to surge in labor cost and lack of innovation from overly dependence on foreign orders [77]. Under such predicament, Taiwan's Ministry of Economic Affairs launched "Huludun Lacquerware Industry Counseling Project in Fengyuan City" in 2007 to help the industry upgrade. The project had four facets: (1) Skill Innovation, providing knowledge and skill training programs, applying multi-media materials on innovation, and improving machineries and tools; (2) Product Innovation, focusing on daily-use product and environmental awareness, and producing eco-friendly lacquered product such as chopsticks to reduce waste [74]; (3) Brand Innovation, launching brand certification and lacquerware classification system, and actively appearing in trade shows and exhibitions; and (4) Inter-Sectoral Innovation, engaging in cross-industry R&D to develop new product and expand market network. The partnership with enterprises from the tourism industry led Fengyuan lacquer enterprises to completely rethink the traditional approach to market lacquerware [74]. Through these innovations, Taiwan's lacquerware industry gradually transformed from OEM to OBM [78].

Fuzhou lacquerware are one of the three national treasures of China. After being taken over by the government in the 1950s, Fuzhou lacquerware industry's problems and scandals began to surface. From the manufacturing perspective, the making of lacquerware is a complicated process; the production cycle is too long, and the output is too low [79]. Conservative and old-fashioned managerial mentality of owners also hindered the development of lacquer art in which the production was mainly for replicas instead of new creations [80]. Due to the way skill was taught and passed down by mentorship, diffusion of lacquer profession was particularly difficult; subsequently, the industry development was stagnant and market demand neglected [28]. From the sales and marketing perspective, well-crafted and time-consuming lacquerware were catered to the overseas collectors and domestic luxury gift buyers. The expensive price tag had kept lacquerware away from the general public, and consequently narrowed its own market size [28]. In recent years, Fuzhou's lacquerware industry has begun to explore its upgrading strategies as the industry diversifies. Legacy comes from inheritance, and innovation derives from change, so it is a new challenge to find the perfect balance between inheritance and change [81]. With the market more opened and technology more advanced, the Fuzhou lacquerware industry should use its core competencies to insert itself in GVCs' strategic sector, and provide solutions to the problems it faces. This approach not only can realize the industry's upgrading and transformation, but also serve as a future insights for other lacquerware industries and local traditional handicraft industries that are having similar problems.

#### 4. Materials and Methods

This segment of the paper first constructs the Conceptual Framework based on the literature discussion of the above-mentioned GVCs and DDI theories; secondly, it explains the research methods; then, it explains the background and selection criteria of the research objects; finally, it explains the sampling process and the contents of the semi-structured interview outline.

##### 4.1. Conceptual Framework

The lacquerware industry's upgrading strategies are represented in different stages of innovation in the economic development process (Figure 3). Each stage represents an upgrading strategy in the GVCs: for example, in OEM, a firm can achieve process upgrading through Skill Innovation. In ODM, a firm can achieve product upgrading through Design Innovation. In OBM, a firm can achieve functional upgrading through Brand Innovation. Lastly, in OSM, a firm can achieve chain upgrading through Inter-Sectoral Innovation.

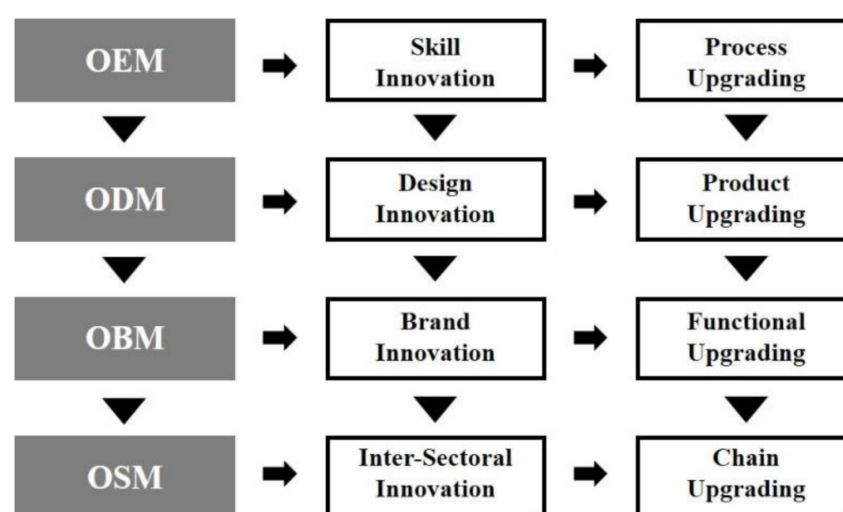


Figure 3. Conceptual Framework.

#### 4.2. Research Methods

This study is conducted using the methods of triangulation and content analysis. First of all, for the first purpose of the research, a qualitative study is carried out by a triangulation method consisting of secondary data, multiple-case study and expert verification. As a qualitative research strategy, the case study method is used in many situations to contribute to our knowledge of individual, group, organizational, social, political, and related phenomena. Researchers may begin an inductive analysis by analyzing themes emerging from data, and then conduct a deductive analysis to locate additional data either supporting or refuting emergent propositions [82,83]. The case study is the preferred strategy when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context. This method is particularly suitable for investigating a new phenomenon or developing theoretical framework [84–86]. With that said, the use of secondary data, in-depth interviews, and multiple-case study are suitable for conducting study on finding the Fuzhou lacquerware industry's upgrading strategies in the GVCs. Based on Gilbert & Ruigrok's (2010) and Yin's (2017) guidance, this study uses triangulation of data collected from multiple sources to strengthen confidence in the accuracy of findings [85,87].

For the second purpose of research, the content analysis method is used to encode and review the data to ensure the objectivity of the data. Qualitative content analysis is a systematic method to analyze qualitative data [88]. It offers opportunities to analyze manifest and descriptive content, resulting in categories, as well as latent and interpretative content, resulting in themes [89,90]. The research methods have two steps: the first is encoding. One week after an interview, a verbatim manuscript is made to encode the data: Interviewee codes are respectively from A to D. Item codes include three codes. The English letters in the front codes are the dimension codes, from A to C (Business dimension, Environmental dimension, Social dimension), and the last two codes are the items, respectively A1–12, B1–8, C1–10. The content codes include four codes. The first code is the interviewee code, the last code is the dimension code, and the last two numbers are the content codes. In this study, the contents of the question items answered by the interviewees are integrated one by one according to the semantic meaning of answers. The second step in the research methods is results review. After the researchers encode the data, the verbatim manuscripts with semantics are given to the interviewees for reconfirmation, and these are revised according to the opinions of experts and scholars.

#### 4.3. Selection of the Research Objects

Based on the research background of this article, the research objects were selected in two steps. First of all, this study used purposive sampling method to choose Japan's

Wajima-nuri and Taiwan's Fengyuan Lacquerware industries as the pilot research cases and secondary literatures and industry experts validation to explore their industry upgrading strategies in the cross-strait region. See Table 4 for the information of verification expert E. We interviewed the expert to verify the secondary literatures of Japanese and Taiwanese lacquerware industries. Second, in primary research, four cases were carefully selected from the Fuzhou lacquerware industry with the requirement that export sales must comprise 20% or more of their total annual revenue and they must be members of Fuzhou Bodiless Lacquerware Association. The chosen cases each represents OEM, ODM, and OBM in the global manufacturing strategies, hence allowing comparison to be made among rivals in the same industry [91,92]. The sample of the Fuzhou lacquerware industry description and role of interviewees is detailed in Table 2. The firm's representative respondents' codes are represented from F1 to F4.

**Table 2.** Sample description.

Sample	Firm Profile
Case 1: Mingdao Lacquerware Factory (Mingdao) Role of Interviewees: Founder Code: F1	Mingdao was founded in 1993. Total of 10 employees. Main source of revenue comes from producing lacquerware for Japan.
Case 2: Wu-Lun Lacquerware Studio(Wu-Lun) Role of Interviewees: Chief Designer Code: F2	Wu-Lun was founded in 2011. Total of 6 employees. It is a company whose operation mainly focuses on lacquer's research and development.
Case 3: An-Ho Bodiless Lacquerware Shop(An-Ho) Role of Interviewees: Manager Code: F3	An-Ho was founded in 2003. Total of 5 employees. Its main business focus is on Online sales, selling brand-name lacquerware.
Case 4: Shen Shao'an Bodiless Lacquerware Company (Shen Shao'an) Role of Interviewees: General Manager Code: F4	Shen Shao'an was founded in 2012, Total of 26 employees. and it's currently the only lacquerware company in China that is certified to use the trade mark "Shen Shao'an". Shen Shao'an focuses on the R&D, production, and S&M portions of the business.

#### 4.4. Data Collection, Interviews, and Analysis

The main sources of data for this study include archives of extensive secondary data, in-depth interviews with industry experts, and multiple-case study. Data were collected during the period of October 2018 and March 2021. The collection of secondary data began in October, 2018, which includes publications and information from 2007–2009 Local Specialties Guidance Program by the Small and Medium Enterprise Administration of Taiwan's Ministry of Economic Affairs, 2015 Handicraft Industry and Consumer Behavioral Program Report, study case's homepage, China statistical yearbook, etc.

In pilot research, secondary data and interviews on industry experts were conducted. In primary research, semi-structured interviews with industry experts from four chosen cases were scheduled by phone first, and the question outline was designed based on the notion of Gereffi's producer- and buyer-driven mechanism theory and SSCM (Table 3). Information elicited were then generalized into three parts: first, data were summarized and research findings explicated; secondly, cases were analyzed to look for any significant finding; third, cross-case referencing were applied to discover similar constructs or themes in the cases. These were later used to form the result and topics in the discussion for future research [82]. Please refer to Table 4 for data on interviewees, interview time, and frequency. Any missing or vague information were later followed up with phone interviews as supplement. This study used tables and other cell designs to compare several possible constructs at once and then highlight similarities and differences to form the result.

**Table 3.** Semi-structured interview questions.

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- Q1. Please describe your business and current status.  
 Q2. Who are your upstream and downstream suppliers and how do they work with you?  
 Q3. What are your marketing network structures?  
 Q4. What are some of the firm's activities in the export business?  
 Q5. What do you think is your company's core competitive advantage in the GVCs?  
 Q6. What innovation did you apply to your product? Of which sector it is mainly in the charge?  
 Q7. How does the department carry out innovation on the production side?  
 Q8. What innovation did you apply to your management? Of which sector it is mainly in the charge?  
 Q9. How does the department carry out market-side innovation?  
 Q10. What countries do you export your product to?  
 Q11. Among the 12 factors of SSCM's Business Dimension, which three factors are considered the most important by the main department of your company? and state the reasons.  
 Q12. Among the 8 factors of SSCM's Environmental Dimension, which three factors are considered the most important by the main department of your company? and state the reasons.  
 Q13. Among the 10 factors of SSCM's Social Dimension, which three factors are considered the most important by the main department of your company? and state the reasons.
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**Table 4.** Interviewees and Timetable.

Code	Position	Background	Times	Date
A	Founder	More than 30 years in the industry, high school education, entrepreneur in an old lacquerware plant	2 Times	2019. 1.10 2020. 8. 6
B	Chief Designer	10 years in the industry, lacquer design major, bachelor's degree, business owner and chief designer of a lacquer design workshop	3 Times	2019. 1.13 2019. 10.13 2020. 8.10
C	Manager	5 years in the industry, marketing major, bachelor's degree, manager of a cross-border online lacquer sales agency	3 Times	2019. 1.15 2019. 10.14 2020. 8.7
D	General Manager	8 years in the industry, marketing major, bachelor's degree, manager of a lacquerware private label sales company	4 Times	2019. 1.18; 2019. 10.16; 2020. 8.12; 2021.1.20
E	Professor	E specializes in lacquer art and is currently a faculty at the National Taiwan University of Arts and the Chairman of Taiwan Lacquer Association. He used to work at Hachimantai lacquer Research Institute in Japan	2 times	2020.12.4 2021.3.20

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## 5. Results

### 5.1. Producer-Driven Company's Upgrading Strategy in GVCs

From horizontal supply chain structure perspective (Table 5), it is clear that Mingdao and Wu-Lun belong to the producer-driven sector of the GVCs, and their upgrading strategies are as follows:

In the OEM stage, as a veteran manufacturer of lacquerware in Fuzhou, Mingdao is a company that provides OEM services, and its business model in the past three years is as follows: In 2015, its annual revenue was 70 thousand US Dollars (sales from handicraft product was 22.1% and OEM production was 77.9%). In 2016, its annual revenue dropped to 60 thousand US Dollars (sales from handicraft product was 20.8% and OEM production was 79.2%). In 2017, its annual revenue lowered further to only 57 thousand US Dollars (sales from handicraft product was 18.6% and OEM production was 81.4%). It can be seen from the decreasing annual income that how to innovate is an urgent problem for the development of enterprises at this stage. The National Bureau of Statistics of China has compiled statistics on the development trends of the product industry and the industrial

design industry including lacquerware in the 2020 China Statistical Yearbook: In 2017, the proportions of enterprises that innovated respectively in the product and industrial design industries were 24.2% and 36.5%, of which 15.1% and 23.5% of enterprises have technological and equipment innovations. By 2020, the proportions of innovative companies rose to 28.2% and 47.5%, and the proportions of companies subject to technological and equipment innovations rose to 23.5% and 30.9% [93].

For Japan's Wajima-nuri lacquerware industry, Expert E points out that Wajima-nuri, mentioned in the secondary data, has developed paint materials that can adjust the drying time to shorten the time and save the cost, but the drying time is not the shorter the better; the paint should be adjusted according to the design. For Taiwan's Fengyuan as a place of lacquerware production, E points out that using multi-media materials such as bamboo-weaving, leather, glass, stone, and others as substrate is a main focus in Taiwan's recent development. In addition, E further explains that improving complicated production process and upgrading machineries and tools are also critical. Some production steps such as polishing can be replaced by machines. Moreover, the secondary materials mentioned that both industries provided education and training program to their manufacturers. E pointed out that this is very important for the lacquerware industry. It not only preserves the craftsmanship and exchanges technology, but also helps to unify industry rules.

In the design and development (ODM) stage, in the case of Fuzhou, Wu-Lun provides ODM services to its customers by bringing in new production techniques and materials such as 3D printing, innovated woodcraft, and brass injection. F2 pointed out in questionnaire Q5 that "The design sector is dominant in budget of the firm. The firm spends approximately US \$15,000 on the development of every piece of work, and each takes more than 6 months to complete. This is why only 2~3 pieces of new work are launched per year. Although the cost of R&D was high, this is also our firm's core competitiveness". Besides Wu-Lun, there is also a company such as Shen Shao'an that carries out its brand from production, design and development to market sales. F4 explained in questionnaire Q2 that "each year we take 30% of our annual profit and invest in our design sector to develop new product. The design sector is our most important part". In comparison, E argues that Wajima-nuri mentioned in the secondary data mainly designs and develops lacquer artworks, emphasizing the artistic connotation of lacquerware to enhance the value of its products; E points out that the development of portable daily necessities by Fengyuan not only emphasizes the functionality of lacquerware, but also responds to current environmental issues.

### 5.2. Market-Driven Company's Upgrading Strategy in GVCs

From vertical supply chain structure perspective (Table 5), it is clear that An-Ho and Shen Shao'an belong to the market-driven sector of the GVCs, and their upgrading strategies are as follows:

For brand management (OBM) stage in the Fuzhou cases, during an interview with F3, he responded to question Q6 by saying that "Fuzhou lacquerware's characteristics of durability and lightweight enable it to have advantages over others in logistic. B2B and B2C strategies improve logistic efficiency and allow the company to grasp the market with higher accuracy, and subsequently make better back-order planning, which is mainly responsible by the marketing sector, with the help of the design sector. How to increase consumers' desire to shop through visual effects is also very important for online sales". Per the same question, F4 also indicated that "lacquerware is different from other consumer product in which the artistic factor of the product is particularly important, hence using O2O (Online to Offline) strategy allows their customers to shop online while enjoy the personal experience in offline retail shops. The design sector is mainly responsible for enhancing the consumer's sense of experience through design".

In addition, F4 also pointed out for question Q7 that "We also actively participate in global trade shows and exhibitions to strengthen our brand image. We attended international lacquerware tradeshow such as Ishikawa International Urushi Exhibition, Taiwan

International Lacquerware show, etc. and promote the brand in global marketplace. We also hosted international lacquerware shows in Shanghai and Shenzhen. Currently, we host 2 events and participate in 5 regular exhibitions every year, twice as many times as last year". F2 expressed that "lacquerware is not only a commercial product, but a work of art. Our company's lacquerware are privately collected by international museums and art galleries which eventually helps expanding our brand influence. This part of work is mainly coordinated by the design sector". In comparison, E points out that as shown in the secondary data, Wajima-nuri has many lacquerware exhibitions, such as the Ishikawa International Urushi Exhibition, 2020 Taiwan x Japan Contemporary Lacquer Art Exhibition, etc.; these trade shows provide manufacturers the opportunities to interact and communicate with the local and foreign enterprises. In addition, for the establishment of brand certification and lacquerware classification system mentioned in Fengyuan's secondary data, E believes that for lacquerware companies who are in the early stage of brand development, it is very important for the government to cooperate with them to establish a brand image. Classification and certification can also help regulate the lacquerware market.

For the Strategic Management (OSM) stage in the Fuzhou cases, Interviewee F2 indicated for question Q7 that "collaborating with cross-industry enterprises was our main strategy to expand our network. We are currently working with French designer DERIER to incorporate lacquer into accessory design. Some of the notable projects include Taiwan's famous Taipei LeeChi pastry box design and Fuzhou's five-star Juchunyuan Hotel's souvenirs packaging design". When answering the same question, F4 said, "How to use the advantages of other industries to expand the marketing network is very important. Our company's strategy is to cooperate with the Fuzhou Tourism Bureau to jointly develop cultural and creative products. The design department is mainly responsible for research and development of lacquerware travel souvenirs with Fuzhou cultural characteristics and so on". According to Wajima-nuri's second-level information, E points out that cross-industry collaboration is the current innovation trend in Japan. For example, through integrating fashion, furniture, high-technology and other industries, Japan develops contemporary product such as lacquered computer mouse; E thinks that the conduction of lacquerware experience activities by Fengyuan through matching tourism can reduce the gap between industry and customers, allowing customers to have hands-on experience can dramatically increase their loyalty to the brand.

Through the forces of two driving mechanisms based on GVCs (Table 1), the significant features of four Fuzhou lacquerware cases in GVCs were analyzed, the main innovation strategies of Fuzhou cases in different economic stages were summarized, and the innovation strategies of Japan's Wajima-nuri and Taiwan's Fengyuan were verified and supplemented by experts. The summary is as shown in Table 5.

**Table 5.** Case Companies' Significant Features in the GVCs.

	Mingdao	Wu-Lun	An-Ho	Shen Shao'an
Date Founded	1990	2011	2013	2012
Number of Employees	10	6	5	26
Drivers in GVCs	Industrial	Industrial	Commercial	Commercial Capital
Barriers to Entry	Economies of scale	Economies of scale	Economies of scope	Economies of scope
Core Competencies	Production	R&D;	S&M	R&D; S&M
Economic Sectors	Durables	Durables	Non-durables	Non-durables

Table 5. Cont.

	Mingdao	Wu-Lun	An-Ho	Shen Shao'an
Main Network Links	Investment	Investment	Trade-based	Trade-based
Upstream and downstream partners	Upstream raw material suppliers downstream retailers	Raw material suppliers, art exhibitions, museums, and art galleries	lacquerware workshops, transnational e-commerce companies	lacquerware workshops, transnational e-commerce companies, retail shops, art exhibitions, museums, art galleries
Predominant Network Structure	Vertical	Vertical	Horizontal	Horizontal
Upgrading strategies	Handicraft product Original Entrusted Manufact-ure	New production techniques and materials Cooperation with art galleries, museums and other institutions Collaborating with cross-industry enterprises.	B2B and B2C strategies	Investing in upstream supplier who co-develops product with producer-driven enterprises Offline experience stores Participation in and hosting lacquer art exhibitions at home and abroad Cooperation with the tourism industry to develop cultural and creative products
Main executive departments	Production sector	Design sector	Marketing sector	Design sector Marketing sector
Entry into Other Countries	Japan	South Korea; Germany; France	The US, the UK, Japan, Taiwan	The US, Canada, Australia, Indonesia, Singapore, Malaysia

### 5.3. Lacquerware Industry's Sustainability in SSCM

According to the second research purpose, this study stage discusses the main elements in the SSCM of the above-mentioned sectors subject to upgrades of the lacquerware industry supply chain. Based on the research framework of Kot (2018), the interviews were encoded through four interviewees concerning a total of 30 elements in the three dimensions of the SSCM (Appendix A), and the most frequently mentioned elements were marked in red and the content codes related to this element were listed. The results are shown in Table 6.

The following are described below: (1) In the Business dimension, all interviewees mentioned that “Building long-term relationships based on established guidelines” (A3). The content codes of the production sector include: materials supply (AA1), time cost (AA2), and exquisite craft (AA3). The content codes of the design sector include: new lacquerware (BA1), exhibition network (BA2), artistic value (BA3), and artistic experience sense (DA2). The content codes of the marketing sector include: quality of source of branded goods (CA1), online sales efficiency (CA2), and accuracy of lacquerware design (DA1);

(2) In the environmental dimension, all interviewees mentioned that “Processing defective and consumed products” (B6). The content codes of the production sector include: lowering the production cost (AB1) and craftsmanship of lacquerware (AB2). The content codes of the design sector include: lowering the production cost (BB1), new artistic value by redesign (BB2, DB2), and the products to be more diversified (DB3). The

content codes of the marketing sector include: lowering the production cost (DB1) and reducing inventory (CB1, DB4);

**Table 6.** Analysis of the three dimensions of the lacquerware industry in SSCM.

Interviewee	Upgrading Sector	Execution Status	Business Dimension (A)	Environmental Dimension (B)	Social Dimension (C)
A	Production sector	Item code	A1/A3/A6	B1/B2/B6	C2/C3/C10
		Content code	AA1/AA2/AA3	AB1/AB2	AC1/AC2
B	Design sector	Item code	A2/A3/A6	B2/B6/B8	C2/C5/C10
		Content code	BA1/BA2/BA3	BB1/BB2	BC1/BC2
C	Marketing sector	Item code	A1/A2/A3	B5/B6/B7	C2/C7/C10
		Content code	CA1/CA2	CB1/CB2	CC1/CC2/CC3
D	Design sector	Item code	A2/A3/A6	B1/B2/B6	C2/C5/C10
		Content code	DA2/DA3	DB1/DB2/DB3	DC1
	Marketing sector	Item code	A1/A3/A5	B2/B3/B6	C2/C7/C10
		Content code	DA1	DB4	DC2/DC3/DC4

(3) In the social dimension, all interviewees mentioned that “Applying honest principles of employing the local community” (C2) and “Participation in regional and trans-regional development initiatives” (C10). For C2, the content codes of the production sector include localization characteristics (AC1); the content codes of the design sector include cultural implications (BC1, DC1); and the content codes of the marketing sector include brand characteristics (CC1, DC2). For C10, the content codes of the production sector include expanding the source of orders (AC2); the content codes of the design sector include expanding cooperation network structure (BC2); and the content codes of the marketing sector include expanding sales network (CC3, DC4), connection through the supply chains (CC2), and promoting brands (DC3).

## 6. Discussion

In this section, the paper proposes four innovations and upgrading strategies based on different economic stages for the lacquerware industry.

### 6.1. Process Upgrading Strategy in the OEM

For lacquerware enterprises in the OEM stage in the cases of Fuzhou, Case1’s product types and annual revenues in the past three years show that as the demand for traditional handicrafts decreases, companies can only switch to the OEM-based business model; however, the annual revenues declining year by year reflects the unsustainability of OEM production. In the Japanese case, Wajima-nuri made innovations in raw material improvements and developed paints that can adjust the drying time and are not prone to allergies. This not only improves efficiency, but is also environmentally friendly. In the case of Taiwan, Fengyuan expands substrate materials to create dynamic visual effect, and improves machineries to increase productivity to improve and innovate materials and equipment. Both places have offered training programs to standardize production process and preserve the knowledge and heritage of traditional handicraft.

It can be seen that in the lacquer product industry and industrial design industry, innovation is the main trend of enterprise transformation, and skill innovation is one of the main driving forces for enterprises to achieve industrial process upgrades. Many studies also point out the value of skill innovation: For Teece [94], skill is an intangible asset that is a valuable resource because specialized skills are not easily acquired or imitated. Collaboration between workers of different skills and knowledge influences the development of new insights that have the potential to modify innovative behavior through

application, re-organization, or re-combination of knowledge [95]. Therefore, through the above upgrading strategy, the industry drives the lacquer enterprises in the OEM stage to upgrade in GVCs by skill innovation.

### 6.2. Product Upgrading Strategy in the ODM

For lacquerware enterprises in the ODM stage in the Fuzhou cases, the interviewees of Case 2 and Case 4 all mentioned the importance of the design department at this stage. Case 2 emphasizes the importance of innovative design based on the historical and cultural connotation of lacquerware by integrating current multiple technologies. Case 4 sets up a circulating collaboration between S&M and R&D and provides funds for the design sector. For Wajima-nuri, it emphasizes the artistic and daily-use value of lacquerware by developing products that are connected with lifestyle. For Fengyuan, its design innovation lies in the concept of environmental awareness. It develops products that are eco-friendly, handy, and recyclable.

Based on the strategic analysis of the above, life-related design trends based on social culture and green environmental protection are the focus of design innovation at this stage. This view is in line with the core concepts of DDI theory, Bertola et al. (2016) points out that DDI is powerful as it is embedded in a cultural dimension [43] incorporating cultural, symbolic, and evocative contents, which communicate and make sense of companies' values [96]. In addition, the National Bureau of Statistics calculated the proportion of product innovations from 2017 to 2020 in the product category and industrial design category: in 2017, enterprises subject to product innovations in the product category and industrial design category accounted for 12.8% and 24.9%, respectively. In 2020, it rose to 14.0% and 31.6%. The number of new product developments increased from 2339 and 7279 in 2017, to 3715 and 10,356 in 2020, respectively [93]. It can be seen from this that product R&D innovation is also one of the main driving forces for enterprises to realize the transformation of industrial structure. Therefore, through the above upgrading strategy, the industry drives the lacquer enterprises in the ODM stage to upgrade in GVCs by design innovation.

### 6.3. Functional Upgrading Strategy in the OBM

For lacquerware enterprises in the OBM stage in the Fuzhou cases, Case 3 uses B2B and B2C online marketing strategies to quickly respond to market reactions by adjusting its distribution plans. Case 4 emphasizes the artistic factors of its lacquerware with online promotion and offline in-person experience. Interviewees from case 3 and 4 both point out that actively attending international trade shows and exhibitions is an effective way to brand promotion. This approach is also applied by Wajima-nuri. The Fengyuan lacquerware industry not only establishes product classification system and brand certification system for people to follow, but it also enhances the brand image of individual workshop through collaborations between manufacturers and their contracted workshops.

Through the above strategic analysis, it is found that in the brand innovation of the lacquerware industry at this stage, customer experience, expansion of the marketing network, and government agency participation are important strategies for the industry to achieve functional upgrades. Among them, the customer experience was mentioned by several interviewees. This view is consistent with the fact that users' affective/emotional and sociocultural/symbolic needs are important in brand promotion as Chen (2012) mentioned. The increase in product language's radical change helps pushing a company's business development to the strategic level [97]. Therefore, through the above upgrading strategy, the industry drives the lacquer enterprises in the OBM stage to upgrade in GVCs by brand innovation.

### 6.4. Chain Upgrading Strategy in the OSM

For lacquerware enterprises in the OSM stage in the Fuzhou cases, Case 2 applies lacquer materials and technologies through design to integrate with other higher value-

added industries. In the Case 4, design sector cooperates with the tourism industry to develop cultural and creative paint products. This strategy is reflected in current Japan lacquerware development where lacquer is applied to fashion and furniture industries. Fengyuan collaborates with tourism industry and provides immersive experience that allows customers to have hands-on experience in the making of lacquerware. This helps the heritage to be passed-on and image deeply rooted in people's mind.

Through the strategic analysis of the above, it is found that expanding the cooperation network structure is the focus of cross-industry development and innovation. The design sector, which is the main sector, selects the field to be integrated, according to the cultural and language characteristics of lacquer products to realize the upgrade of the industrial value chain. This view echoes with and verifies the view of Koomans & Hilders (2016) that DDI has the potential to create a significant competitive advantage as it understands the meanings for customers and has the potential to create disruptive new markets [98]. Therefore, through the above upgrading strategy, the industry drives the lacquer enterprises in the OSM stage to upgrade in GVCs by inter-sectoral innovation.

In short, the lacquerware industry's economic stages can correspond to different type of innovation and upgrading strategies in order to move up in the GVCs (Table 7).

**Table 7.** Lacquerware Industry's Upgrading Strategies in the GVCs.

Economic Stage	Type of Innovation	Upgrading Strategy	Purpose of Upgrading
OEM	Skill Innovation	Paint Improvement & Innovation Training Camp & Seminars Dynamic Substrate Materials Tools & Equipment Improvement	Process Upgrading
ODM	Design Innovation	Integration of technologies Internal Collaboration in the Chain Emphasis on Contemporary Lacquerware Focus on Daily-Use Product Develop Eco-Friendly Product	Product Upgrading
OBM	Brand Innovation	O2O Marketing Exhibition & Trade Shows Participations Lacquerware Classification System Brand Certification	Functional Upgrading
OSM	Inter-Sectoral Innovation	Further Partnership with Cross-industry Enterprises Tourist Factory Visit	Chain Upgrading

#### 6.5. Lacquerware Industry's Sustainability in SSCM

Based on the above interviews with four local lacquerware companies embedded in the GVCs and analysis from three dimensions: (1) In the business dimension of SSCM, "establishing a long-term relationship with the internal and external resources of the supply chain under the established guidelines" is considered as the most important. Through the content encoding analysis, the design sector is the main link in this element, which can not only assist the production sector to achieve proficient and exquisite technical processes and training, but also cooperate with the art marketing network structure of the marketing sector. This conclusion is consistent with Kot (2018), who pointed out that long-term relationships are important for the sustainable development of SMEs [62]. (2) In the environmental dimension, "reprocessing defects and consumable products" is considered as the most important. Through the analysis of content encoding, the design sector is the main link in this factor. Due to the artistry of lacquer products, the artistic value of the defective products is redesigned and created through the integration of multiple technologies, such as gilding and other processes. (3) In the social dimension, "Applying honest principles of employing the local community" and "participation in regional and

cross-field development” are considered as the most important. Through the analysis of content encoding, the design sector as the main link in this element not only upgrades the industrial value chain through cooperation with higher value industries, but also expands the network structure of the industry through cooperation with art exhibitions, art galleries, museums and other platforms. This conclusion also echoes Giuffrida and Mangiaracina (2020) on the key findings mentioned in sustainability research. Cooperation can promote sustainable implementation [99].

## 7. Conclusions

In the context of global value chains, how to achieve upgrade and sustainable development in regions with local cultural characteristics is an important issue on a global scale. On the one hand, under the wave of globalization, we focus on how to retain its own cultural characteristics in the local traditional craft industry, and also to “dialogue” with the world and embed in the high value-added links of the GVCs, so as to innovate in tradition, and achieve industrial upgrading. On the other hand, how to achieve sustainable development while upgrading the industry is also an important issue facing the local traditional craft industry. This study takes the lacquerware industry as an example, on the theoretical basis of GVCs, DDI and SSCM, and analyzes the upgrading strategy of the industry and the sustainable links of the supply chain with a qualitative research method.

The study has two findings: First, we analyzed the corresponding innovation and upgrading strategies for the lacquerware industry in the four economic development stages: OEM enterprises reach process upgrading through skill innovation with four strategies—Paint Improvement & Innovation, Training Camp & Seminars, Dynamic Substrate Materials, Tools & Equipment Improvement; ODM enterprises reach product upgrading through design innovation with five strategies—Integration of technologies, Internal Collaboration in the Chain, Emphasis on Contemporary Lacquerware, Focus on Daily-Use Product, Develop Eco-Friendly Product; OBM enterprises reach functional upgrading through brand innovation with four strategies—O2O Marketing, Exhibition & Trade Shows Participations, Lacquerware Classification System, Brand Certification; OSM enterprises reach chain upgrading through inter-sectoral innovation with two strategies—Further Partnership with Cross-industry Enterprises, Tourist Factory Visit. The second finding is that the main elements of the business, environmental and social dimensions of the local lacquerware industry in SSCM are long-term relationships, reprocessing of defective products, employing the local community, and participation in regional and cross-industry cooperation and development, in which the design sector is the main link in the sustainable development of the lacquerware supply chain. The results of this study not only provide a theoretical basis and a practical guidance for the local lacquerware industry managers and decision makers, but also serve as a reference for the traditional craft industry.

This study has two contributions. First, for the implications for industry: This paper proposes the corresponding innovations and upgrading strategies during different economic stages for the lacquerware industry. It enables enterprises to make the decision based on their position in the economic development in order to achieve upgrading. In addition, it determines the main sector and elements in the supply chain for the lacquer industry in order to realize the sustainable development of the industry. Second, for research contributions: The main theoretical contribution of this paper is to verify the different upgrading strategy alternatives of traditional lacquerware firms participating in the global value chain. Upgrading of global value chain activities from low value added functions (e.g., assembly, production) to higher value added functions (e.g., design and branding) is a key driver of increased profitability for lacquerware manufacturers in developing countries. Therefore, traditional manufacturing firms should identify their own industrial position in the global value chain and the corresponding development direction, and also create higher values according to the sustainability of enterprises embedded in the process of design, manufacturing and branding of the global value chain activities. In addition, In the current SSCM related research, had not yet involved the analysis of traditional craft

industries such as lacquerware. Therefore, This paper identifies the research gaps in the current literature concerning enterprises from the lacquerware industry in the context of supply chains. The perspectives of enterprises from lacquerware industry of sustainability opened new opportunities for formulating questions and new areas of research regarding sustainable supply chain management.

This study has achieved valuable results on the upgrading strategies of the local lacquerware industry in GVCs and the discussion of the main factors of the supply chain in SSCM. However, due to the limited research time, theoretical level, and research capabilities of this study, this study has two limitations: First, limitations of the research managerial implications. The sampling is small-sized due to regional limits, with much room for improving representativeness. In the future studies, there will be a greater diversity of sampling in order to acquire more accurate study information. Second, the limitation of research methods. Although the case-study method offers an environment for context specific investigations, multiple data collection methods, and in-depth perspectives for examining instructive phenomena, numerous scholars still question the viability of such studies in terms of generalization, accuracy, objectivity, rigor, and bias. Therefore, future studies should test this result from a quantitative approach. In the future research, there are other local traditional handcrafts such as ceramics, glass, metal work, bamboo weaving, etc. On the basis of this study, we can further discuss the upgrading of other traditional craft industries to explore a traditional craft industry upgrading model applicable to the world, and construct industry's upgrading strategies in the GVCs and achieve the goal of sustainability for the local traditional industries in many countries.

**Author Contributions:** J.H. provided the core idea, collected the data and wrote the manuscript. Y.G. analyzed the Interview recording. C.L. revised and constructively commented on the paper and checked the formal correctness. C.-I.C. constructed and refined conceptualization and methodology. All authors have read and agreed to the published version of the manuscript.

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## Appendix A

**Table A1.** 30 elements in the three dimensions of the SSCM

Business Dimension	Original Data(Initial Material)
<p>A1: Cooperation in inventory and logistics management</p> <p>A2: Use of information technologies to increase the efficiency of communication</p> <p>A3: Building long-term relationships based on established guidelines</p> <p>A4: Common clear vision of supply chain management</p> <p>A5: Use of the “Just in Time” concept/as a tool for enhancing competitiveness</p> <p>A6: Exchange of production information on a regular basis, e.g., through sales and operations planning meetings</p> <p>A7: Common introduction of benchmarking and performance metrics</p> <p>A8: Standardization of quality policy for both products and processes with established guidelines</p> <p>A9: Aligned product strategies, supply, and distribution within the supply chain strategy</p> <p>A10: Information sharing about customer requirements and design plans</p> <p>A11: Usage of the supply chain concept within the design of products, processes, and packaging</p> <p>A12: Common procedures to obtain feedback from customers, who are involved in product development</p>	<p>Please select three elements between A1 and A12, which you consider the most important: A: A1, A3, A6 B: A2, A3, A6 C: A1, A2, A3 D: A2, A3, A6; A1, A3, A5</p> <hr/> <p>Explain for the most frequently mentioned element (A3): A: a long-term relationship ensures the upstream supplier provides us with materials (AA1) with a steady price and source of supply. The craftman on a stable cooperation relationship ensures the production time cost (AA2) and an exquisite craft (AA3). B: a long-term relationship is crucial to the development of new lacquerware(BA1)with an integration of a diversity of technologies. In addition, the cooperation with art institutions like art gallery, museums and others are conducive to expanding exhibition network (BA2) and enhancing the artistic value of lacquerware(BA3). C: We try to work with workshops in order to ensure the quality of source of branded goods (CA1) and the cooperation with logistics supply chain ensures online sales efficiency (CA2). D: The cooperation between design department and market department is essential. The market trend serves as a guidance in level of accuracy of lacquerware design (DA1). The diversity of design and development deepens the consumers’ artistic experience sense (DA2) and expands exhibition network (DA3).</p>
Environmental Dimension of SSCM	Original Data(Initial Material)
<p>B1: Environmentally-friendly production processes</p> <p>B2: Actions for reducing the quantity of waste</p> <p>B3: Commitment to production processes that are free from the release of pollutants</p> <p>B4: Applying renewable sources in production</p> <p>B5: Re-use of materials</p> <p>B6: Processing defective and consumed products</p> <p>B7: Selection of partners in the supply chain based on ecological guidelines</p> <p>B8: Commitment of employees to environmental protection programs</p>	<p>Please select the factors between B1 and B8, which you consider the most important: A: B1, B2, B6 B: B2, B6, B8 C: B5, B6, B7 D: B1, B2, B6; B2, B3, B6</p> <hr/> <p>Explain for the most frequently mentioned factors (B6): A: the paints are expensive. This action can be effective in lowering the production cost (AB1). The craftsmanship of lacquerware(AB2) ensures the reprocessing of defective products. B: first of all, lowering production cost (BB1) must be important to the small-sized enterprises. And the fake lacquerwares can be filled with new artistic value by redesign (BB2). C: to our brand agents, reprocessing of lacquerwares results in destocking (CB1) and thus lowers the stress from sales (CB2). D: be able to enhance artistic value (DB2)through recreation while lowering cost (DB1)allows the products to be more diversified (DB3). In addition, this results in a lower level of stress from destocking (DB4).</p>

Table A1. Cont.

Social Dimension of SSCM	Original Data(Initial Material)
C1: Applying an ethical code towards employees and contractors C2: Applying honest principles of employing the local community C3: Delivering equipment ensuring hygiene and job security C4: Investments in infrastructure objects C5: Timely and legally paying taxes and associated charges C6: Transparency of incomes as the basis of tax calculation C7: Applying ethical norms of business and trade C8: Investments in poverty reduction programs C9: Participation in the charity actions of the local community C10: Participation in regional and transregional development initiatives	<p>Please select the factors between C1 and C10, which you consider the most important: A: C2, C3, C10 B: C2, C5, C10 C: C2, C7, C10 D: C2, C5, C10; C2, C7, C10</p> <p>Explain for the most frequently mentioned factors (C2, C10): A: C2 ensures the localization characteristics of the lacquerwares (AC1)and C10 helps expand the source of orders (AC2) B: C2 ensures the social and cultural implications in the design and development of the lacquerwares (BC1). C10 is very important in expanding cooperation network structure (BC2). C: C2 ensures the stability of source of branded goods(CC1)in order to ensure a smooth connection through the supply chains at upper and lower streams(CC2). C10 is useful in expanding sales network (CC3). D: C2 ensures that the products bear local cultural characteristics (DC1) and are identifiable in the market(DC2). C10 is particularly important in promoting brands (DC3) and expanding network structure (DC4).</p>

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