Supply Chains and Business Models in the Covid-19 era: Insights from the luxury industry

Rosa Criscuolo*, Nizar Abdelkafi** and Margherita Pero**

* *Gucci – Via della Nazioni Unite 1, 50018 Scandicci (FI)– Italy (rosa.criscuolo@gucci.com)*

** *Dipartimento di Ingegneria Gestionale, Politecnico di Milano, Via Lambruschini, 4/b – 20156 Milano – Italy (nizar.abdelkafi@polimi.it, margherita.pero@polimi.it)*

Abstract: This research deals with how luxury companies adapted their supply chains and business models to address the impact of the Covid-19 pandemic. The luxury industry is different from other industries and has many peculiarities such as high profitability margins and great reliance on personal selling experience. On the one hand, luxury customers may not suffer, in the short term, from lower buying power, but on the other hand lockdowns and shop closures can hinder the direct contact to customers. Consequently, the luxury industry seems vulnerable to disruptions and is, therefore, an interesting field of investigation. However, little is known about how luxury companies have addressed the negative effects of the pandemic. As such, our research fills this gap by identifying the actions undertaken by the luxury sector to cope with the pandemic, while taking supply chain and business model perspectives. Our research starts with a literature background that specifies the main characteristics of luxury supply chains and business models. To gain insights into how luxury companies adjusted their operations and businesses to deal with the pandemic, we conduct 24 semi-structured interviews with national and international industry experts, luxury companies' managers and consultants. We found that luxury companies, did not considerably change their supply chain structures, but to improve the coordination along the supply chain, they increasingly digitized their supply chain processes and adapted money flows with upstream and downstream supply chain partners to support them in overcoming liquidity issues. Regarding business models, luxury companies did not alter their initial value propositions, but increasingly leveraged the online channel to serve their customers, embarked more on vertical and horizontal relationships, and changed their profit formula, sometimes even by increasing their prices to compensate for the higher logistics costs due to home delivery.

Keywords: luxury industry, supply chains, business models, COVID-19

I. Introduction

In 2020, the world was shocked by the spread of the Corona virus, which resulted in a global pandemic that humanity has not experienced since many decades. The pandemic led to a novel situation for people, societies, and many countries around the globe. The pandemic has also induced a context, which companies and supply chains have never experienced before. Lockdowns obliged citizens to stay at home and to not have direct personal contact to others, leading to enormous restrictions in economic activity. It was also not predictable how long the pandemic will persist and what strategies governments will follow in the short term to reduce contagion. This high uncertainty made future planning of operations difficult.

The pandemic triggered disruptions along many value chains. For example, retailers, restaurants, cafes, and cultural institutions had to interrupt their commercial activities. Actors in so-called "vital" sectors such as grocery stores faced many problems, especially due to panic buying, leading to shortages in certain products. In spite of this, food supply chains have exhibited a high level of resilience [1], among others because of their agility and ability to react fast.

An industry that is not "vital" to the fulfillment of basic human needs and whose reaction to the global pandemic has been under-investigated is the luxury industry. This industry has very specific characteristics. As luxury clients are less likely to lose buying power during the pandemic, they are not price-sensitive [2]. This makes the industry more resilient than others. However, the luxury industry depends on experience buying and close personal contact with clients, making it sensitive to pandemic-triggered disruptions.

Like other industries, the luxury industry suffered during the pandemic from increased uncertainty and unpredictability. Uncertainty, mainly due to disruptions triggered by unexpected plant closures and product shortages, affected supply and demand sides [3]. Therefore, luxury companies adapted their businesses and operations to match supply and demand and sustain acceptable revenue streams [4]. At the same time, the pandemic acted as an accelerator for some already on-going trends such as adopting digital channels to conduct business [5], thus reshaping networks to serve local markets, building SC resilience against emerging risks, and adapting offers to respond to changing consumer's needs [2].

Scientific literature has, indeed, scarcely discussed the reaction of the luxury industry to the pandemic, especially from a marketing perspective ([6], [7], [8]). Marketing actions, such as the change in the pricing strategy and the shift to e-retailing [6], have implications for both the business models and supply chains of luxury brands. Whereas the reaction of companies to supply chain disruptions caused by Covid 19 has been studied in various sectors such as apparel, fashion and automotive, luxury companies have been rather neglected [9]. Because of this, we can derive our main research question: "How did companies in the luxury industry adapt their supply chains and business models to react to the pandemic?"

To answer the research question, we proceed as follows. The next section deals with the literature background. Section three explains the research methodology, which is based on expert interviews. The fourth section addresses the key results derived from the interview study. Section five develops propositions based on the main findings, whereas section six concludes and proposes directions for future research.

II. Literature Background

A. Luxury concept

There is a plethora of definitions for luxury with each definition covering a different aspect. Moreover, the concept of luxury has evolved over time. Some representatives from the world of luxury define it as follows: (i) "Luxury is first of all everything that makes life easy" (Tom Ford); (ii) "For our customers, the ultimate luxury is defined by exclusivity and customization" (Giorgio Armani); and (iii) "Luxury is about the absence of vulgarity" (Coco Chanel). The disagreement about the definition of luxury [10; 11] is due to the fact that the concept itself refers to something extremely personal, desirable, which "makes you feel unique". According to Brun and Castelli [12], the lack of an operational definition of luxury can be compensated by identifying a set of features that luxury companies view as desirable.

B. Luxury supply chains:

The luxury supply chain is not different from supply chains in other fields. It is composed of actors such as raw material suppliers, manufacturers, distributors, and retailers. The main activities performed in the luxury supply chain are design, prototyping (or sampling in perfume industry), industrialization (called modelling in fashion), raw materials purchasing, production, or outsourcing to third party manufacturers, and merchandising [13]. Depending on the specific sector, such as apparel, jewelry and automotive, as well as brand positioning and product characteristics, different supply chains configurations can be identified for luxury companies. However, some critical aspects such as the protection of unique resources, premium quality along the supply chain, and make-to-order fulfilment strategy are common to the entire industry [14].

In the following, we deal with four important elements of the luxury supply chain: (i) The upstream supply chain structure, (ii) downstream supply chain structure, (iii) the order fulfilment strategy, i.e., the customer order decoupling point positioning, and (iv) the coordination along the supply chain.

Upstream supply chain structure: To deliver a luxury value proposition to customers, many luxury companies exhibit high level of vertical integration to preserve brand and product uniqueness.

Downstream supply chain structure: Luxury brands tend to reduce the length of the downstream supply chain through elimination or integration of intermediaries [13;15]. Downstream integration supports the establishment of direct relationships with customers to enable a better capture and understanding of customers' needs, while conveying the brand values through points of sales and shopping experience [16]. Shopping experience is fundamental to the emotional appeal of a brand, customer satisfaction and brand loyalty [16]. In addition, downstream integration leads to a better control of distribution channels, resulting e.g., in a better protection against counterfeiting.

Order fulfilment: Luxury products are produced in low volumes (medium volumes in the fashion industry) and high variety. To avoid high storage costs—due to high product value—companies generally operate a Make-to-Order (MTO) fulfilment strategy, i.e., production starts only after order arrival [17]. Note, however, that in luxury apparel, only some types of products, such as the carry over, are managed according to MTS [18]. With MTO, customers can receive customized products, thus fostering the perception of uniqueness. Whereas in other sectors MTO is only applicable if order fulfillment lead time is shorter than the lead time acceptable by customers, in the luxury market, competition is often not based on lead time, making MTO most adequate order fulfilment strategy [15].

Coordination along the supply chain: MTO transfers risk to retailers, an obvious weakness of this order fulfilment strategy. At the beginning of the season, retailers make sales forecasts with little knowledge of market needs and place their orders with luxury producers. Therefore, to match supply with demand, visibility, collaboration, as well as frequent and bidirectional information exchange is required along the supply chain [15; 16]. Integration is obviously more effective with proprietary shops [18]. To capture demand information, luxury companies can use the eCommerce channel, which provides a direct access to customers' requirements and enables forecasts based on real-time data [13].

C. Luxury Business Models

We discuss business models in the luxury industry with respect to three essential elements: (i) value proposition, (ii) value creation, and (iii) value appropriation or capture.

Value proposition: The luxury value proposition has three main characteristics: (i) expensiveness, (ii) exclusivity/uniqueness, and (iii) attractiveness [20]. Different classifications have been proposed for luxury value propositions such as (i) absolute luxury, (ii) aspirational luxury, and (iii) accessible luxury [12] or (i) supreme luxury, (ii) lifestyle luxury, and (iii) accessible luxury [21].

Value creation: Key business model activities, i.e. activities required to generate the value proposition, can be different among luxury brands. Some brands emphasize craftmanship, which ensures the necessary expertise for manufacturing high quality products [22; 23]. This can be coupled with the country of origin where the manufacturing takes place (e.g., made in Italy). Other producers focus on superior technical performance. Best-in-class technical performance appeals to customers and allows them to distinguish luxury products from ordinary ones. Continuous innovation can sustain product positioning [22;24]. Another activity that can be of special relevance for luxury brands is design, which enables customers to recognize the brand even without seeing the label.

Value appropriation: Customers of luxury products (except for accessible luxury) are price insensitive. Customers of luxury brands constitute a tiny subset of the market. To preserve their revenues and avoid losses, luxury companies invest money to reduce the risk of counterfeiting and protect their intellectual properties. Over the last years, luxury brands have felt higher pressures toward more sustainable business models. Luxury companies are required: (i) to assume more responsibility regarding the use of scarce resources, (ii) to ensure ethical work conditions in manufacturing, and (iii) to engage in fair agreements with suppliers. Rebag, a US-based company, is an example of sustainable business model in luxury [25]. This trend has been amplified by the pandemic, as discussed by [26].

D. *The impact of the pandemic on luxury companies*

The pandemic had profound implications for luxury companies and supply chains. Companies had to enhance their digital engagement with customers, move to e-retailing, adapt merchandising plans to new buying behaviors, and manage supply chain disruptions that resulted from shutting down production factories as it happened with Italian family-based façonniers, i.e. small contract manufacturers ([5, 27]). McKinsey [27], for example, suggested that Italian luxury companies should support the small façonniers with prompt payments and provide them further assistance to start again production to not lose an important asset for the "Made in Italy".

Scientific literature has been mainly concerned with the implications of Covid-19 for marketing decisions of luxury companies. For example, [6] analyze, using secondary sources, the marketing actions put in place by luxury companies during the pandemic. Among others, they observed changes in the pricing strategies and companies moving to e-retailing.

III. Research Methodology

This work is exploratory in nature and aims to capture how luxury companies adapt their business models and supply chains to react to pandemic-triggered disruptions. Because the pandemic has induced a particular context that has never been experienced before, qualitative research that aims at "…conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation", is particularly adequate [28]. Therefore, we rely on interviews with experts in the luxury industry to capture their insights regarding their experiences, opinions, and motivations [29]. In this work, semi-structured interviews are conducted based on an interview guide, but still provide the researchers with the flexibility to deviate from the pre-defined questions whenever the key informant points to topics that are relevant to the research. The guide consists of four parts: (i) general information about the expert and his/her company, (ii) supply chain adaptations, (iii) business model adaptations, and (iv) future perspectives (Table 1). The answers of the interviewees refer to the reactions of companies and supply chains after the first wave of the pandemic.

TABLE 1
INTERVIEW GUIDE

	General Information
-	Could you please introduce yourself, your background, and role in the organization?
-	To which extent did the Pandemic influence your business? And what are the most affected areas?
	SC Adaptations
-	How did customers' demand change?
-	How did the relationships with suppliers change?
-	How did the company secure production and distribution capacity?
-	How did the company improve the level of visibility along the supply chain?
-	To which extent did the company improve its digital engagement with suppliers and customers?
-	What are the measures taken by the company to secure liquidity and financial stability?
	BM Adaptations
-	Did the pandemic change customers' perceptions of the brand?
-	How did the pandemic affect the typical customer's behavior? And how did the company respond to the changes in their requirements?
-	Did the pandemic drive or not new vertical and/or horizontal partnerships?
-	To which extent did the company improve its online presence to connect to end-customers?
-	Did the pricing approach and cost position change?
	Future perspectives
-	Do you think that the future of luxury retail will be digital, or the physical store will remain the most important channel?
-	If I would ask "tell me 3 main factors you believe will be order winners in the post-Covid environment for your business", what would you say and why?

We aimed at contacting a heterogeneous sample of key informants. Heterogeneity was intentionally sought out within all nine segments of the global luxury market: luxury cars; personal luxury goods such as apparel, perfumes and cosmetics, leather goods and accessories; luxury hospitality; fine wines and spirits; gourmet food and fine dining; high-end furniture and housewares; fine art; private jets and yachts; and luxury cruises.

The experts were identified and contacted via LinkedIn. LinkedIn enabled us to find people with the adequate level of expertise required for this study. The experts were selected based on their personal carriers and current employment. In total, 267 experts were identified, out of them 64 responded to our request, but only 24 agreed to participate in the interview study. The experts involved in this study are based in different parts of the world. Whereas most of them are representatives of luxury companies (20), we also interviewed consultants (3) and an international professor (1). When we present the results in the next section, we specify whether we refer to the whole sample of experts (24), or only to the luxury companies interviewed (20). Table 2 presents the summary of the experts' sample. All interviews were conducted remotely via MS Teams either in Italian or English. All interviews were also recorded and transcribed. Those conducted in Italian were translated to English. The interview analysis is based on coding. Two types of coding have been used: "in-vivo", or inductive codes, which emerge from the interviews, and deductive codes, which are derived from literature, in particular existing theoretical frameworks. As our research is exploratory, the combination of inductive and deductive coding is adequate to ensure flexibility and openness to new insights, while still drawing on useful knowledge from literature.

TABLE 2
SUMMARY OF INTERVIEWS STUDY SAMPLE

Firm	*Segment*	*Revenue (2019)*	*Interviewee's role - Area*
1	Fashion Luxury	€54M	Head of Supply Chain Strategic Planning - Italy
2	Fashion Luxury	€10B	Retail Supply Chain Director - Italy
3	Management Consulting	€9.8B	Associate Partner - Italy
4	Jewelry	€3.5B	Vice-President Global Logistics and Order Fulfilment - Switzerland
5	Management Consulting	€3.8B	Associate Partner - Italy
6	Luxury Sport Car	€1.8B	Marketing Manager - Singapore
7	Expert	-	Professor and coordinator of Project and SCM - USA
8	Fashion Luxury	€10.9B	Board Member of ISCEA -
9	Fine Art	€10.86 M	Supply Chain Manager - Italy
10	Luxury Yacht	€300M	CEO and Founder - Italy
11	Fashion Luxury	€150M	Supply Chain and Logistics Contract Manager - UK
12	Eyewear	€17.4B	Head of Business & Omnichannel Innovation - Italy
13	Jewelry	€6.2B	Business Operations and Development Director - Italy
14	Luggage Manufacturing	€500M	Supply, Demand and Distribution Planner - France
15	Cosmetics	€30B	Global Head of Supply chain planning - France
16	Luxury hospitality, fine dining, and luxury cruises	€3B	Supply Chain Director - France
17	Luxury hospitality, fine dining, and luxury cruises	€600M	General Director - France
18	Jewelry	€170M	Purchasing Manager - Perú
19	Luxury Sport Car	€3.7B	Director of Demand and Inventory Planning - Italy
20	Fashion Luxury	€500M	APAC President - China
21	Luxury Goods	€53.7B	WW Operations Director - UK
22	Jewelry	€4.4B	Supply Chain Group Practises Manager - France
23	Fashion Luxury	€5.5B	Manager Sourcing and Planning - Italy
24	Management Consulting	N/A	Vice President Global Operations Services & Engineering - USA

IV. Results

A. *Supply Chain Adaptations*

Upstream and downstream supply chain structure: Despite the pandemic, upstream and downstream luxury supply chains do not seem to undergo extensive structural change. The starting position of luxury companies (before the pandemic) makes them, per se, more resilient to disruptions than companies that serve mass markets. 22 out of 24 experts acknowledge that luxury companies maintain close relationships with suppliers and sustain high levels of vertical integration. In addition, they do local sourcing and tend to produce locally to benefit from the "Made in" advantage. As such, they are well-equipped to cope with pandemic-triggered disruptions: "We have an almost completely Made in Italy sourcing strategy, so the geographical proximity to our suppliers has allowed us to monitor closures and re-openings well, and after the first months of 2020 have passed, we have no longer had any problems" (Company 19).

Nevertheless, Company 19, for example, one of the largest luxury groups in the world, introduced some adjustments into its upstream and downstream supply chain structures by involving backup suppliers and opening warehouses from scratch within just 3 weeks.

Order fulfillment: Because of the pandemic, 15 companies (out of 20) developed new agreements with distributors to better match supply and demand, whereas three luxury companies managed the shift from MTS to a MTO order fulfillment. MTO entails companies higher resilience as supported by this statement: "Usually, we work with products that are sold 6 months before components are purchased. In this way, the company does not take on its behalf a great risk: when a product is put into production, in 85% of cases we already know that there is a final customer ready to buy it" (Company 6).

Luxury companies fulfilling orders to forecast have implemented measures to capture real customer demand. 18 out of 20 companies have improved their forecasting capabilities, e.g., through advanced technologies. Seven companies leveraged downstream partnerships through collaborative forecasts with their clients to adjust replenishment. This collaboration was not only advantageous for focal companies to avoid excessive stocks due to decreased demand volumes and closures triggered by lockdowns, but also for partners such as retailers and wholesalers, who needed to sell the available stock first. In addition, in the experiential luxury segment, the effects on the service supply chain were highly negative, e.g., due to low hotel capacity utilization.

Coordination along the supply chain: Supply chain coordination can be improved through increased visibility. Digitalization is an effective instrument to achieve visibility. 15 experts out of 24 acknowledge the relevance of end-to-end digitalization along the whole supply chain: "The Covid-19 disruption has contributed to a momentum in the adoption of technologies, especially to integrate the supply chain that was managed in a traditional way" (Company 3).

Several companies (7), however, refer to digitalization not along the whole supply chain, but only at the downstream part: "Regarding the downstream part of our supply chain, we have digitized the management of sales, orders, and the presentation of collections through dedicated platforms and virtual showrooms for B2B clients. On the upstream part, we are not very advanced in the use of new technologies." (Company 10). Interestingly, two companies, mention that a growing digitalization is not due to the pandemic, because their companies have already digitalized their supply chains before the outbreak of Covid-19: "Years ago, we developed a project with suppliers to facilitate the integration of the entire value chain via a digital platform […]. In this way, the impact of Covid on the SC was limited" (Company 4).

The coordination of money flows has been adjusted during the pandemic. Because of high margins in the luxury industry and price insensitivity of the customer segment, most of luxury companies (18) did not suffer from liquidity issues. In addition, they were conscious of the difficulties faced by their supply chain partners, leading them to adjust the stock levels along the supply chain as well as their accounts payable and receivable: "Most of luxury companies have focused on optimizing their net working capital, while minimizing the stock levels as they had to carry extra-products unsold during lockdown periods" (Company 5). And, "For our suppliers who have been most exposed to the crisis, we shorten the lead time for payments, with systematic immediate payments for close to 9,000 suppliers. On the other hand, we froze payments receivable for more than 100,000 clients like hair salons until their businesses resume" (Company 14).

B. Business Model Adaptations

Value proposition: Most of the respondents (23 out 24) acknowledge that luxury companies did not change their value propositions because of the pandemic, as they are strongly loyal to their values and want to be further perceived by their clients as unique and exclusive. In our sample, 17 companies capitalized on their existing assets to foster their current value propositions: "The pandemic has influenced the way by which we connect to our partners, but what we sell, a hedonistic experience, is something that could not be replaced, and I think that our clients have always the same perception of us" (Company 8). Because of the lack of face masks and disinfectant gel during the pandemic period, some fashion companies (e.g., company 14) – also with the objective of improving the utilization of their production capacities – added a new value proposition that is related to these essential products to support infection prevention.

Value creation: Luxury companies did not change drastically their system of activities – in other words their value creation system [25]. Nevertheless, two main business model changes are worth noting. First, the system of activities has been supported by new distribution channels (e-commerce) (18 luxury companies out of 20), while targeting customer segments that are willing to buy luxury products online: "They [our customers] have never bought so much over the e-commerce channel. Before the crisis, the jewelry sector has not been fully able to benefit from digital channels, as people want to see and touch the product before spending thousands of dollars. Now, they are trusting us and accepting to buy remotely" (Company 17).

Second, luxury companies reinforced their activity system through horizontal and vertical relationships with partners (16 out of 20 luxury companies) involve partners that are external to the company's network such as competitors. For example, one company in the eyewear industry mentions: "Beyond major collaborations with our customers, with whom we have improved our relationships, we have also established new collaborations with other brands and large companies of the digital world. On the upstream side of SC, we have improved our relationships with our suppliers to support them in managing orders and upstream raw materials procurement" (Company 11).

Value appropriation: In general, the pandemic has led to a deterioration of the cost position of the interviewed companies (20) e.g., because of lockdowns that led to slower inventory turnover. The reactions to increased costs happened in different ways. Some companies (8) did not change their prices and continued selling their products at the same price, despite the cost increase. Others (3) have decreased their prices, especially luxury hotels, with the objective of attracting customers despite lockdowns and unfavorable conditions in the tourism industry. Some companies (9) even increased their prices to compensate for the increased costs because of the pandemic. In this regard, company 20 notes: "In general, logistics costs have increased considerably due to the explosion of online selling. Certainly, shipping to home is more expensive than to boutiques. Furthermore, marketing and retail underwent changes when events have been created in a digital format. In terms of prices, some houses have even increased their prices to keep the margin high as well as the perception of the brand unique and inimitable" (Company 20).Table 3 summarizes the results of the interviews conducted with the luxury companies (20).

TABLE 3
SUMMARY OF RESULTS

Adaptation due to Covid-19	*#of companies changing*	*#companies NOT changing*
SC Adaptation		
Upstream structure changes	2	18
Downstream structure change	5	15
Order fulfillment strategies	14	6
Coordination along the SC	20	0
BM adaptation		
Value proposition	1	19

Value creation		
New distribution channels	18	2
New horizontal and vertical relationships	16	4
Value appropriation		
Revenue streams (in particular pricing)	12	8
Cost position	20	0

V. Discussion and Propositions Development

In the following, we summarize our findings by means of two propositions. The first is related to supply chain adaptations, and the second refers to business model changes initiated by luxury companies because of the Covid-19 pandemic.

Proposition 1 (SC adaptations because of Covid-19):

Proposition 1a. Companies in the luxury industry did not change considerably the structure of their supply chains because of the pandemic.

A considerable change in the supply chain structure could not be observed. However, MTO companies are found to cope more effectively with disruptions, as they can better align supply and demand. Luxury companies that produce to forecast (MTS) aimed at improving their predictions of customer's demand through advanced technologies and algorithms to overcome better the disruption.

Proposition 1b. To improve coordination along the supply chain, luxury companies partially or fully digitalize their supply chains, depending on the level of their upstream integration.

The luxury supply chains in our sample companies have some features that are inherently conducive to resilience, e.g., the reliance on local networks and higher levels of vertical integration than mass market companies. Furthermore, changes in the luxury supply chain were rather related to improvements of visibility along the chain instead of structural changes that create new or suppress existing links to network nodes. In other words, supply chains have been working toward the reinforcement of existing links through technological solutions to manage disruptions better through increased visibility. For example, visibility enabled luxury companies to reallocate their existing stocks along the supply chain to serve markets that are still open and where products can be still sold in traditional stores. While literature has mainly focused on the leverage of new e-retail channels to reach customers, our results extend this view to include the digitalization of the supply chain.

Proposition 1c. During the pandemic, companies in the luxury industry re-adjust the coordination of money flows to protect the liquidity of their upstream and downstream partners.

Luxury companies also exhibit a long-term orientation in the management of their supply chains, as many of them re-adjusted their money flows with the objective of protecting the financial liquidity of their suppliers and customers. This positive behavior is also supported by features that are inherent to the luxury companies that have commonly higher financial capabilities than companies in other sectors due to higher profitability margins. This result related to the protection of smaller and vulnerable suppliers also shows that what consulting companies like McKinsey [27] were proposing , has been put in action by luxury brands.

The supply chain adaptations were accompanied with business model changes. Supply chain and business model adaptations seem to be consistent with each other. However, the business model changes are not radical and do not seem to be the result of luxury companies implementing tools such as the business model canvas or other templates to adapt their business models to the pandemic.

Proposition 2 (BM adaptations because of covid-19):

Proposition 2a: Companies in the luxury industry did not change their value proposition during the pandemic.

By staying loyal to the exclusivity and reputation of their brands, luxury companies are not expected to change their value propositions. Luxury companies provide customers with value propositions that go beyond the mere jobs to be done to confer to customers exclusive experiences and satisfy needs that are different from those of customers in mass markets. Consequently, disruptions do not seem to be main triggers for luxury companies to change their value propositions.

Proposition 2b. Because of the pandemic, companies in the luxury industry adapted their value creation by extending their activity system to customer segments served through the online channel and establishing more horizontal and vertical partnerships.

Our study's results suggest that luxury companies would engage in more intensive vertical and horizontal relationships. This was well predictable. What's surprising, however, is that luxury companies leveraged an additional distribution channel (online) that has not been exploited intensively so far due to the strong reliance on personal experiences, which are provided in a physical environment. This confirms the results of the analysis of the secondary sources by [6] performed at the beginning of the pandemic.

Proposition 2c: Due to the pandemic, to maximize the level of value appropriation, luxury companies, maintained inventory at full price as long as possible, increased their sales price, or decreased budgeted marketing costs.

Regarding value appropriation, luxury companies maintain their prices at the same level or even increase their prices to cope with higher costs such as those incurred in logistics to ensure home delivery. The dilemma of lowering prices and attracting new customers versus keeping prices high with the risk of not generating enough revenues has been faced in the luxury hotel sector. Lowering the prices could damage the exclusivity aspect of the experience, leading to negative consequences that can persist even after the end of the pandemic. [6] found that brand companies increased their prices, while some retailers reduced them since they have done some temporary discount sales. Our insights are in line with this finding.

VI. Conclusions

Companies in the luxury industry experienced during the pandemic, similarly to companies in other sectors, a reduction in demand and supply, due to closures, as well as an increase in the uncertainty both on the demand and the supply side. By means of 24 experts' interviews, we investigated how companies in the luxury industry changed their supply chains and business models to tackle the pandemic-triggered challenges. The results suggest that luxury companies did not alter their supply chain structure, but they embarked on digitalization of their processes to, on the supply side, increase visibility along the supply chain, and, on the customer side, reach their customers through online channels. Moreover, luxury companies show a caring approach towards their supply chain partners, in that they increase the flow of information to their partners to reduce the impact of disruptions, while re-adjusting the coordination of money flows to protect the liquidity of their suppliers. As for the business model, during the pandemic, the luxury companies did not change their value propositions, nor did they modify their pricing policy in order to not damage the sense of exclusivity for the customers.

This paper has some limitations. The propositions have been developed based on expert's insights, so in-depth analysis of specific case studies might further enrich and provide more support to them. Moreover, given the fact that the pandemic has changed customer behavior, that e-commerce has attracted new customers, and that new trends such as increased customers' attention to sustainability are becoming more relevant than ever, companies in the luxury industry should understand whether their supply chains and business models still fit these new trends. Future research is, therefore, needed in this direction.

References

[1] Prater E., Biehl M., and Smith M.A. (2001). International supply chain agility: trade-offs between flexibility and uncertainty. *International Journal of Operations & Production Management*. Vol 21. No. 5-6, pp. 823–39.

[2] D'Arpizio C., Levato F., Prete F., Costance G. and De Montgolfier J., (2020). The Future of Luxury: Bouncing Back from Covid-19. *Bain & Company.*

[3] Shen, B., Minner, S., Chan, H. L., & Brun, A. (2020). Logistics and supply chain management in the luxury industry. Transportation Research Part E: Logistics and Transportation Review, 143, 102095.

[4] Willersdorf S., Hazan J., Ricci G., Prénaud A., Bianchi F., Seara J., Yang V. (2020). A new era and a new look for luxury. *Boston Consulting Group.*

[5] Atkearney (2022) How the pandemic changed the luxury industry https://www.kearney.com/consumer-retail/article/-/insights/how-the-pandemic-changed-the-luxury-industry (accesses 25/7/2022)

[6] Xie, J., & Youn, C. (2020). How the luxury fashion brand adjust to deal with the COVID-19. International Journal of Costume and Fashion, 20(2), 50-60.

[7] Hoang, D., Kousi, S., & Martinez, L. F. (2022). Online Customer Engagement in the Aftermath of COVID-19: Opportunities for the Luxury Industry. In Advances in Digital Marketing and eCommerce (pp. 259-266). Springer, Cham.

[8] Peng, Y. (2021, December). Marketing Strategies and New Focus for Luxury Companies under COVID-19 Pandemic. In 2021 3rd International Conference on Economic Management and Cultural Industry (ICEMCI 2021) (pp. 949-952). Atlantis Press.

[9] Rahman, T., Paul, S. K., Shukla, N., Agarwal, R., & Taghikhah, F. (2022). Supply chain resilience initiatives and strategies: A systematic review. Computers & Industrial Engineering, 108317.

[10] Vickers, J.S. and Renand, F. (2003). The marketing of luxury goods: An exploratory study–three conceptual dimensions. *The Marketing Review*. Vol. 3, no. 4, pp. 459-478.

[11] Godey, B., Pederzoli, D., Aiello, G., Donvito, R., Wiedmann, K. and Hennigs, N. (2013). A cross-cultural exploratory content analysis of the perception of luxury from six countries. *Journal of Product & Brand Management.* Vol. 22, no. 3, pp. 229-237.

[12] Brun, A. and Castelli, C. (2013). The nature of luxury: a consumer perspective. *International Journal of Retail & Distribution Management.* Vol. 41, no. 11/12, pp. 823-847.

[13] Brun, A., Caniato, F. and Moretto, A. (2016). A New Research Agenda for Luxury Supply Chain Management. *Workshop on Business Models and ICT Technologies for the Fashion Supply Chain Springer*. Vol 1, pp. 3.

[14] Caniato, F., Caridi, M., Castelli, C. and Golini, R. (2011). Supply chain management in the luxury industry: a first classification of companies and their strategies. *International Journal of Production Economics.* Vol. 133, no. 2, pp. 622-633.

[15] Caniato, F., Caridi, M., Castelli, C.M. and Golini, R. (2009). A contingency approach for SC strategy in the Italian luxury industry: do consolidated models fit? *International Journal of Production Economics*. Vol. 120, no. 1, pp. 176-189.

[16] Brun, A. and Castelli, C. (2008). Supply chain strategy in the fashion industry: Developing a portfolio model depending on product, retail channel and brand. *International Journal of Production Economics*, Vol. 116, pp. 169-181.

[17] Simchi-Levi, David (2010). Operation Rules: Delivering Customer Value through Flexible Operations. *MIT Press Books.* Vol 1.

[18] Bindi, B., Bandinelli, R., Fani, V., Pero, M. (2021) Supply chain strategy in the luxury fashion industry: impacts on performance indicators, *International Journal of Productivity and Performance Management* article in press

[19] Brun A., Moretto A. (2012). Contract design and supply chain management in the jewellery industry. *International journal of retail & distribution management.* Vol. 40.2012, 8, p. 607-628

[20] Cambridge Business English Dictionary (2022). *Cambridge University Press.*

[21] Corbellini, E. and Saviolo, S. (2014). Managing fashion and luxury companies. *Etas*.

[22] Catry, B. (2003). The great pretenders: the magic of luxury goods. *London Business School Review.* Vol. 14, no. 3, pp. 10-17.

[23] Hanna, J. (2004). Luxury isn't what it used to be. *Harvard Business School Bulletin*. Vol. 80, no. 2, pp. 54- 62.

[24] Reddy, M. and Terblanche, N. (2005). How not to extend your luxury brand. *Harvard Business Review.*

[25] Teixeira, T. S. (2019). Unlocking the Customer Value Chain: How Decoupling Drives Consumer Disruption. New York: Currency.

[26] Pelikánová, R. M., Němečková, T., & MacGregor, R. K. (2021). CSR statements in international and Czech luxury fashion industry at the onset and during the COVID-19 pandemic—slowing down the fast fashion business?. Sustainability, 13(7), 3715.

[27] Achille, A., & Zipser, D. (2020). A perspective for the luxury-goods industry during—and after—coronavirus. McKinsey & Company, 1.

[28] Boyce, C., and Neale, P. (2006). Conducting in-depth interviews: A guide for designing and conducting in-depth interviews for evaluation input. *Pathfinder International Watertown, MA.*

[29] Hak, T., and Dul, J. (2007). Case study methodology in Business Research. Routledge.

[30] Zott, C. and Amit, R. (2010). Business model design: An activity system perspective. Long Range Planning. Vol. 43, No. 2-3, pp. 216-226.