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When Sustainability Becomes an Order Winner: Linking Supply Uncertainty and Sustainable Supply Chain Strategies

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Abstract: This study investigates how to implement a sustainable supply chain strategy by choosing a set of sustainable practices while considering the strategic priority assigned to sustainability within a company's competitive strategy (i.e., an order winner (OW), market qualifier (MQ) or desirable attribute (DA)). Therefore, two research questions arise: RQ1. What are the sustainable supply chain management (SSCM) practices adopted by companies under the different levels of priority assigned to sustainability (i.e., OW, MQ and DA)? and RQ2. How does supply uncertainty influence the choices regarding the SSCM practices to adopt or vice versa? We addressed these questions through a two-step methodology that includes 10 exploratory case studies in different industries and four explanatory cases in the furniture industry. Six research propositions are developed, and we show how some sustainable practices are common to all companies in the sample, while others are only applicable when sustainability is an MQ or an OW. Moreover, in contrast to the suggestion in the literature, we observed that companies with sustainability as an OW implement sustainability practices despite increasing exposure to supply uncertainty. However, when sustainability is a DA or an MQ, companies might implement sustainable practices with the aim of reducing supply uncertainty rather than for sustainability goals. The cases show that investment in these practices can trigger a transition towards a situation in which sustainability is an OW.

Keywords: sustainable supply chain; order winner; market qualifier; supply uncertainty

1. Introduction

In today's competitive scenario, sustainability is seen by some companies as a source of competitive advantage, and different ways of including sustainability in the set of a company's competitive priorities are observed in practice. For instance, some companies have started to approach sustainability as an opportunity to differentiate and find a niche in which to compete within a dynamic and turbulent context [1]. For other companies, sustainability is instead considered as a minimum requirement to be fulfilled by supply chain members to remain part of the supply chain, while orders are won by leveraging other customer needs, or it can represent a way to respond to a "nice to have" requirement of the market [2].

These three interpretations mirror the concepts of the order winner (OW), market qualifier (MQ) and delighter or desirable attribute (DA). An OW is the key factor that allows a company to win orders in the market [3] and an MQ is the baseline to enter into a competitive arena [4]. Finally, delighters or desirable attributes are those features that allow companies to impress customers; i.e., they allow the company to earn "extra credit" [5]. Understanding these criteria is considered vital for a company to grow [6] and is pivotal to defining the operations strategy [3] and the supply chain strategy (e.g., [7]).

In this vein, OW, MQ and DA reflect a set of market attributes that need to be aligned with infrastructural and process-related decisions concerning supply chain management [8]. Sustainability currently acts more as an MQ rather than an OW [9], but with the greater public interest and concern regarding the themes of sustainability in different fields, related to some of the main sustainability challenges facing our planet, among other factors, we believe different companies will face the situation of requiring their current strategic orientation to be shifted towards considering sustainability as on OW.

This trend notwithstanding, how this differentiation impacts sustainable supply chain management (SSCM) decisions has rarely been explored in the literature [10]. SSCM is defined as "the set of supply chain management policies held, actions taken and relationships formed in response to concerns related to the natural environmental and social issues" [11] in the processes of sourcing, making, delivering and returning products.

Companies which attempt to implement SSCM practices have to face the traditional difficulties encountered when managing a supply chain; among others, coping with supply uncertainties. Supply uncertainties are manifested through supply market instability or instability in the lead time and quality of input materials [12]. SSCM practices interact with supply uncertainty in different ways. For example, the choice of a local supply base for fresh food products might expose the supply chain to the shortage effects of a seasonal supply system [13], or the migration towards a circular supply chain might expose the supply process to a higher uncertainty due to the volatility in return flows for such systems [14]. In other cases, SSCM practices can instead allow prevention to occur at the source or confer the ability to cope with uncertainty, triggering a set of actions which allow a company to gain control of the supply base [15].

The decision to implement an SSCM practice can be critical for companies as it can be a costly endeavor, and companies need to be directed towards those practices that best reflect the strategic orientation they are pursuing regarding sustainability. The decision to devote certain resources to SSCM practices rather than others becomes even more complex in the face of uncertainty.

The extant literature lacks thorough guidance regarding the balancing of market requirements and the implications of supply uncertainty for SSCM. Thus, our work aims to provide answers to the following research questions (RQs):

RQ1. What are the SSCM practices adopted by companies under the different levels of priority assigned to sustainability (i.e., OW, MQ and DA)?

RQ2. How does supply uncertainty influence the choices regarding the SSCM practices to adopt or vice versa?

Building upon the extant literature, we propose that the relationship between SSCM practices and supply uncertainty is bi-directional in nature. The choice to implement a certain SSCM practice can be driven by the intent to reduce supply uncertainty, thus building the condition for a company to increase the strategic relevance of sustainability. Nevertheless, at the same time, companies which are already aware of the strategic relevance of sustainability might decide to take the risk to implement a practice that exposes the supply chain to a higher uncertainty.

In our research work, we developed a set of exploratory case studies with a retrospective focus, which allowed us to formulate a set of research propositions. These propositions included both the determination of the SSCM practices adopted by companies that approach sustainability differently within their competitive strategy, as well as tensions pertaining to the role of supply uncertainty when sustainability becomes a strategic priority. The propositions were then supported by evidence collected through a set of explanatory case studies.

The paper is organized as follows: after the literature background investigation is presented in Section 2, Section 3 presents the research design, followed by the description of the methodology used in the two phases in Section 4. Section 5 presents the main results of the exploratory phase. In Section 6, we present the validations obtained through the explanatory case studies. We close the paper with a discussion (Section 7) and conclusions in Section 8.

2. Theoretical Background

Our work originates from the seminal contributions of [16,17], which are grounded in the importance of considering demand and supply related contingencies when implementing a supply chain strategy. These works have inspired a stream of research in these regards, which is focused on environmental contingencies for supply chain strategy designs [18]. Nevertheless, in line with the supply chain strategic alignment school [19], we embrace the view that supply chain management decisions are related not only to environmental contingencies (Section 2.2), but also to the company strategic priorities (Section 2.1).

2.1. The Strategic Alignment Perspective: The Role of Sustainability

In the strategic SCM alignment literature, OWs and MQs [3] are considered as the key links between market segments and supply chains and, as such, they are bridging concepts that allow the marketing and competitive strategy of a company to match with the supply chain strategy [20]. There is a consistent branch of literature that discusses the suitable supply chain strategies for different combinations of OW and MQ, which refers to different products [21,22], costumer behaviors [22] or stages in the product lifecycle [7]. Traditionally, the literature has included into the set of OWs and MQs items such as cost leadership, availability, lead time and quality [4] or innovativeness.

The literature has also referred to sustainability as a competitive priority (e.g., [23]). Researchers advocate that competitive advantage is built on the innovative contents brought by sustainability inside products and processes [24], both in environmental [25] and social terms [26].

On the product side, products with sustainable characteristics can be positioned in the market with a premium price related to environmentally friendly features [27] or in relation to the social value that is embedded in the product [28].

On the process side, leveraging on sustainability as a source of competitive advantage in the supply chain means to differentiate processes (from new product development to the distribution of the product to the customers) [29], even if this means to contrast other competitive priorities (e.g., cost reduction). Moreover, it also calls for embracing a "shared value perspective" that claims that sustainable initiatives can be the main means to expand the pool of economics and social value [30].

Sustainability can be strategically prioritized in different ways to take different decisions regarding SSCM [10]. In fact, Krause et al. [31] foresaw that sustainability would have to follow the same dynamics as quality in the 1990s becoming "the next MQ" when placing orders to suppliers [31]. Seuring and Müller [32] and Malik and Abdallah [33] agreed that sustainability is generally an MQ, yet a minimum performance needs be achieved by the company in the environmental, economic and social dimensions [32] in order for the product and/or service to fit the customers' purchasing requirements [33]. However, Mcwilliams et al. [26] discussed a set of cases that have sustainability as an OW, distinguishing between the different operating principles on which these companies leverage to "win orders", i.e., a green premium price (i.e., charging higher prices) because of its sustainability efforts or a different environmental "posture" based on how they incorporate environmental concerns in strategic decision-making. In these cases, the customers explicitly benefit from the efforts that the company puts in environmental practice, justifying the premium price charged over less sustainable alternatives offered by competitors [27]. Finally, to the best of our knowledge, sustainability is also discussed as a "nice to have" feature of a product or process [1] or as a "delighter" [5] in the offering to customers, nevertheless, there is a very limited focus on this concept in the operations strategy and supply chain strategy literature.

More explicitly, Shahbazpour et al. [34] integrate the two interpretations by inserting sustainability as an OW or as an MQ in the current and future patterns of changes in manufacturing strategies, suggesting how to handle the trade-offs between sustainability and other operational OWs and MQs (i.e., flexibility, quality, cost and delivery).

These contributions consider sustainability as a possible OW or MQ, nevertheless, they either do not analyze the commonalities and/or the different efforts needed to move from a certain strategic

approach for sustainability (e.g., MQ) to another one (e.g., OW) [27], or they have a narrow focus on a limited set of practices (i.e., manufacturing-related) [34].

2.2. The Environmental Contingency Perspective: The Role of Supply Uncertainty

Supply uncertainty refers to a limited and unreliable supply base that is characterized by uncertainty in the supply lead time [17]. Supply uncertainty is recognized as a contingent variable guiding supply chain strategy-related decisions [18]. Despite this, while some contributions recognize the key role of uncertainty in demand, supply and technology when analyzing "sustainability tensions" in SSCM practices [27], supply uncertainty is rarely addressed as a contingency and no agreement exists among scholars on the role of supply uncertainty when analyzing supply chain changes driven by sustainability. In fact, in the SSCM field, some scholars claim that the transition towards more sophisticated and strategic types of SSCM practices are associated with a higher level of maturity, thus implying higher control of the supply chain and lower uncertainty (e.g., [35]). Brindley and Oxborrow [13] and Knight et al. [36] question these implications, claiming that the transitions towards innovative forms of a sustainable supply might be hindered by supply failures [36] or can expose the supply chain to a greater upstream risk connected with availability, in case, for example, the change involves the choice of innovative local suppliers [13]. Brindley and Oxborrow [13] and Youn et al. [37] both present hybrid types of supply chain strategies moving from [17]'s framework and including different ways to match the supply chain strategy defined on the basis of supply and demand turbulences as environmental contingencies, with environmental strategic objectives and marketing goals [13].

3. Research Questions

Standing on the theoretical background above presented, our study was guided by two main research questions.

RQ1. What are the SSCM practices adopted by companies under the different levels of priority assigned to sustainability (i.e., OW, MQ and DA)?

SSCM refers to a set of supply chain management policies held, actions taken and relationships formed to provide responses to the challenges of sustainable development [11], and thus a set of key elements of SSCM are the commonly known "practices" that can be adopted with different levels of extension and sophistication [38].

Overall, there is a rich but fragmented literature on SSCM practices as a set of steps in the pathway towards building a truly sustainable supply chain. Existing frameworks focus on multiple processes (e.g., [39,40]), while others (e.g., [41–43]) have a specific focus on one particular supply chain process (e.g., source). In the sourcing process, for example, scholars suggest different ways to develop supplier relationships to reach sustainable performance, including green purchasing [44] monitoring and assessment, training and collaboration on sustainability aspects ([43,45]) as well as incentives and reward systems (e.g., [46,47]). As for another widely investigated process as production planning and management, authors differentiate between production control approaches and pollution prevention (e.g., [47,48]) thus distinguishing monitoring and "end of pipe" technologies from technological projects that foster the use of environmentally friendly resources, tools and techniques to be integrated into the manufacturing systems [49].

The list of SSCM practices reported in Table 1, partly come from the existing classifications of SSCM practices proposed by different authors (i.e., [39,40]) integrated with additional contributions adding upon existing classification. Each SSCM practice is a theoretical construct that includes a set of detailed items. They are applied in the following supply chain management related processes: product design, source, production and return. This work focuses on these processes since they are the ones that are most commonly performed by manufacturing companies. In fact, the delivery process is frequently outsourced to third party logistics providers and was therefore excluded from the investigation.

Table 1. List of sustainable supply chain management (SSCM) practices from the literature review.

Practice	Description	Items	Process(es)	References
Product (input) stewardship	The capability to gain favored access to raw materials, hence incorporating value upstream the supply chain (Hart, 1995; Pagell and Wu, 2009).	Biologic/natural origin of raw materials	Source	[25]
		Input de-commoditization: Transforming a non-differentiated input as a commodity into a value-added input, when the value is represented by sustainability (e.g., Fairtrade sourcing)		[39]
Supplier engagement	Partnerships with suppliers are built with formal recognition of suppliers' sustainable values through explicit incentives or through their empowerment.	Incentives and reward systems for suppliers	Source	[43,46–48]
		Exchange of ideas with empowered suppliers		[44]
Supplier selection and monitoring criteria	Suppliers are selected using criteria related to sustainability, and then their sustainable performance is monitored	Sustainability-related suppliers' selection criteria	Source	[44,46]
		Supplier monitoring of on sustainable standards (use of materials, production emissions, working conditions)		[40,43,50]
Building sustainable guardianship of the upstream supply chain	Collaboration with suppliers to provide guidance for materials selection, equipment, methods and service that support sustainable goals	Supplier process improvement (including training and development programs)	Source	[40,41]
		Providing inputs to suppliers to reach agreed targets		[41]
		Monitoring of second tier suppliers: direct or indirect (through the reporting of first tier suppliers) evaluation of second tier suppliers' sustainable practices and performance		[50]
Supply network design changes	Supply network design changes regard a reconceptualization of who is part of the network (Pagell and Wu, 2009).	Short supply chain: it refers to procurement from geographically close suppliers (physical proximity) and the creation of a disintermediated supply chain upstream (information proximity).	Source—Return	[39]
		Changing structure and flows of the chain/circular integration: using the forward distribution supply chain for backward flows		[51]
		Rationalization of the supply base: reducing the number of suppliers in order to focus on few compliant suppliers whom with to develop sustainable projects		[48]
		New suppliers/stakeholders to spur sustainable innovation		[39]

Table 1. *Cont.*

Practice	Description	Items	Process(es)	References
Product (development) stewardship	Integrate the "voice of the environment" into product design, thus including low environmental impact of the product in use	Light weight/green product design	Product design—Return	[39,41]
		Design to facilitate product disposal/dis-assembly/reduce environmental impact in the use phase of the product		[52]
		Product lifecycle extension/product value recovery: extension of the product life through revamping/refurnishing or product value recovery		[53]
Pollution prevention	Change in technology and manufacturing process as layout changes, process design changes, improved equipment performance, adoption of a new technology with a sustainable intent	Technological changes in production	Make	[49,54]
Internal sustainability monitoring and control	End of pipe approach that refers to the methods to monitor, "trap", treat and/or dispose pollution after it is created (adapted from Hart, 1995)	Monitoring of production emissions and on employees' health and safety	Make	[50–52]
		Adoption of standard certifications (e.g., SA8000, ISO 14001)		[50]
		Scrap recovery		[51]
Sustainable packaging	The adoption of environmentally friendly packaging solutions	Recyclable packaging: re-use and regeneration of secondary packaging	Product design—return	[39,51,55]
		Returnable packaging: ensuring the optimization of available space in transportation		
		Reduced packaging		

SSCM practices require different implementation efforts. As an example, the adoption of internal sustainability monitoring and control (e.g., the adoption of standard certifications) implies that less is leveraged on resources than building sustainable guardianship of the supply chain (e.g., supplier process improvement). Companies giving sustainability a strategic role might be more willing to invest in sustainability, thus opting for time and resource-intensive practices.

RQ2. How does supply uncertainty influence the choices regarding the SSCM practices to adopt?

Our second research question originated from the need to shed light on the implications and the tensions generated upstream the supply chain when companies adopt practices that can either put a burden on or reduce the risk exposure for the supply base [13]. These variables might be relevant in explaining the choice of SSCM practices as well. For example, the choice of buying fair-traded coffee (i.e., product input stewardship) allows companies to reduce the instability of their supply base [36]. Similarly, as claimed by Youn et al. [37], companies facing higher demand uncertainty might be more willing to encourage a supplier to innovate on the green front, thus choosing supplier engagement as a sustainable supply chain management practice.

4. Methods

As outlined in Figure 1, the research is divided into two phases, namely (i) the exploratory phase and (ii) the explanatory phase. The first aims to develop research propositions on the relationship between the strategic role assumed by sustainability and the SSCM practices adopted, as well as on the implications for supply uncertainty of the choice of SSCM practices. The latter provides evidence in support of or against the research propositions formulated during the explorative stages. Therefore, through this research design, we aim to better unfold the research problem, by producing new narratives on empirical evidence in the form of propositions, and then gather more observations to support them, in line with an abductive reasoning [56].

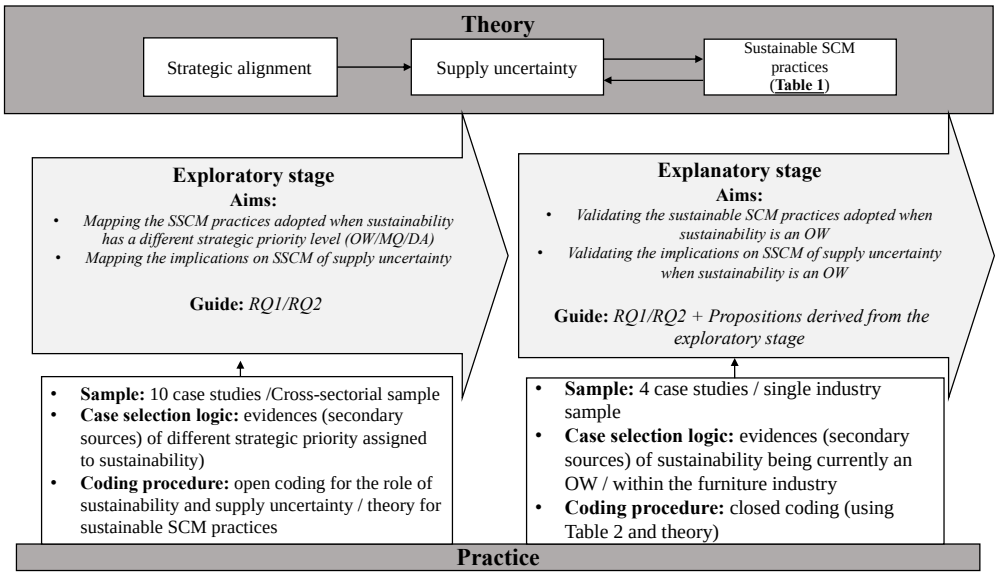

Figure 1. Research design process.

In both research phases, we adopt a multiple case study research design, which has been largely applied to both the supply chain management and sustainability realms [48]. Multiple case studies are the chosen methodology because of the nature of our research questions, which is focused on investigating the "how" of a certain phenomenon [57]. Moreover, in both the exploratory and explanatory phases, we also adopt a retrospective case study approach, asking those companies approaching sustainability as an OW to share how the transition took place [58].

4.1. Case Selection

4.1.1. Exploratory Phase

In the exploratory phase, the cases were selected to assure variety in the strategic role assumed by sustainability. To this aim, ex-ante collection of information through secondary sources (i.e., publicly available rankings, newspapers and corporate websites) and our prior knowledge of the companies were used to obtain a list of companies that appear to invest heavily in sustainability.

A cross-industrial sample was selected to detect the differences connected to different exposures to the uncertainty upstream the supply chain and to cover a wider set of SSCM practices. Nevertheless, the same case protocol has been applied to companies operating in different industries since the list of sustainable practices in the protocol has been designed in a way that is not industry-specific, as it is grounded in the literature.

Therefore, both literal (i.e., cases with a similar strategic role of sustainability and similar exposure to uncertainty upstream the supply chain) and theoretical replication (i.e., cases with different strategic sustainability roles and/or different exposure to uncertainty upstream the supply chain) approaches were used to select the cases to include in the sample [57].

We derived a sample of 10 cases, presented in Table 2, adopting as the unit of analysis the set of supply chain processes (i.e., product design, source, production and return) connected to the management of a product family/type, from the perspective of a single company inside the supply chain. The choice of the supply chain processes as a unit of analysis is consistent with the focus on SSCM practices that pertain all these processes.

Table 2. Exploratory phase—general data about the sample and interviewees.

Name of the Case	Revenues (2018)	Product Type	Industry	Person/People Interviewed (Number of Interviewees)
ALLOYCO (A)	11.5 billion USD	80% recycled aluminum sheet for beverage cans	Aluminum for beverage cans (B2B)	Senior manager—sustainability and recycling development (×2)
WATERCO (W)	977.55 million EUR (parent company)	Bottle of water with recycled and Bio-based primary packaging for the national market	FMCG (B2C)	Vice president international purchasing (×1) CSR manager (×2)
COSMECO (CS)	123.73 million EUR (parent company)	Biologic personal care products for children	Cosmetics and beauty care (B2C)	Quality and CSR manager (×2)
COFFEECO (C)	396.18 million EUR	High quality bundled with sustainability coffee capsules	Food (coffee) (B2C)	Quality manager (×1)
MACHINECO (M)	189.04 million EUR	Production line for bottling, with the possibility to insert "green" options and upgrades	Lines for packaging and bottling (B2B)	Environmental manager (×2)
TOOLCO (T1)	9 billion EUR	Torque wrench	Industrial tools (B2B)	Supply chain manager (×1)
FURNITURECO (F)	38.8 billion EUR	Light weight and simple designed wooden furniture	Furniture (B2C)	Global procurement manager (×1) Head of sustainability (×1)
PLCO (PL)	5.16 billion EUR	Programmable controllers with high efficiency in use	Industrial automation, electronic components (B2B)	Quality and environmental manager (×2)
PLASTICCO (P)	164.35 million EUR	Plastics with biologic origin.	Engineering thermoplastics (B2B)	R&D manager (×1) Supply chain manager (×1) Production manager (×1) Procurement manager (×1)
IND.TOOLCO (T2)	78.47 billion EUR	Industrial drills	Industrial tools (B2B)	Production manager (×2)

4.1.2. Explanatory Phase

The chosen setting for the explanatory stage is the furniture industry, which is an industry that is exercising relevant pressure on the consumption of natural resources, such as wood. We investigated both furniture producers and suppliers of wooden boards to capture the perspective of two actors that are exposed to different levels of supply uncertainty. We do not expect furniture producers to be directly exposed to high supply uncertainty, while we expected suppliers of wooden boards to experience constraints in the availability of raw materials, thus being exposed to higher supply uncertainty.

Given the results of the exploratory phase indicate that the role of supply uncertainty was relevant for companies for which sustainability is an OW, the sampling strategy for the explanatory phase was focused on identifying cases of companies heavily investing in sustainability. Therefore, we performed a purposeful sampling [59], looking for companies (the list is reported in Table 3) that we were confident from the analysis of secondary sources were approaching sustainability as an OW and with different exposure to uncertainty upstream in the supply chain. Moreover, we opted for a single industry setting to find supporting evidence that the findings regarding the sustainable practices derived from the exploratory stage are also valuable in a single industry context, controlling instead for other contingencies.

The unit of analysis for the explanatory phase is the same as that of the exploratory one.

Table 3. Companies in the sample for the explanatory phase.

Company (Sustainability Is the Ow)	Role in the Supply Chain	Country	Revenues (2018)	Product Type/Family	Interviewee(s)
FURNITURE1 (F1)	Manufacturer	Canada	4–7 million USD	Office furniture (e.g., desk, bookcase)	Partner (×2)
FURNITURE2 (F2)	Manufacturer	USA	2.38 billion USD	Office furniture (chairs)	Head of Design for the environment and repurpose program
WOODPANEL1 (WP1)	Supplier	Italy	606 million EUR	100% Recycled post-use wooden panel	Chief Transformation Officer (×2)
WOODPANEL2 (WP2)	Supplier	Italy	123.2 million EUR	100% Recycled post-use wooden panel	President and CEO (×2)

4.2. Data Collection

4.2.1. Exploratory Phase

We developed a semi-structured interview protocol (see Appendix A). The structured part aims at understanding the strategic role assumed by sustainability and by the other competitive priorities. Managers were asked to choose among the following pre-defined list of detailed competitive priorities: product quality, delivery, flexibility, innovation cost and sustainability. The unstructured part encompasses questions related to the strategic role of sustainability assumed by the company, i.e., (i) sustainable supply chain management practices and the (ii) reasons behind their adoption along with questions related to broad questions on the (iii) role of uncertainty connected with the adoption of the different practices.

Primary data were collected through in-field interviews with sustainability/quality/HSE-associated personnel as well as supply chain/logistics/purchasing/production managers. Each respondent was interviewed (where possible) twice for approximately 1 to 2 h each time. When we had the opportunity to interview more than one person, the information was cross-validated by asking for confirmation from all interviewees. Notably, regarding the identification of the role of sustainability (as an OW,

MQ or DA), a first interviewee was asked about it and the information was triangulated with the other interviewees as well as through secondary sources.

In all the cases, we conducted follow-up phone calls with some interviewees to check the outcomes and gather missing data. The interviews were then transcribed and the primary data were integrated with reports and corporate presentations, which allowed us to enrich the description of the different practices adopted as well as their linkages with the corporate strategy. As shown through an example in Table 4, secondary sources of information and, in particular, the sustainability reports, were used to understand if the practices we derived to be the most directly linked with the competitive strategy are the ones that stand out also from the sustainability report. When sustainability reports were not available, we relied on corporate websites.

Table 4. Excerpts of the coding performed for one of the exploratory cases—SSCM practices.

Example of Raw Data (Quotations from the Transcription of the Interview)	Example of Additional Information from the Sustainability Report	Item
"First of all, our product is good product in terms of light weight"	"Our low-carbon product strategy is focused on expanding our capacity to serve the automotive industry with lightweight aluminum for vehicles"	Light weight product design to reduce the environmental impact (part of the product strategy)
To deal with some new key stakeholders for our model we have a team of ten people that work with area municipalities, so public authorities that collect scrap material not just aluminum. The second sector would be traditional scrap industries, which buy materials, improve the quality, change the characteristic, and then trade it	"We support several programs that seek to boost recycling through improved collection from consumer making it easy for them to recycle"	New stakeholders that spur innovation

4.2.2. Explanatory Phase

In the explanatory stage, we adopted a different semi-structured interview protocol. The section of the questionnaire dedicated to investigating the current strategic role assumed by sustainability was enriched with a part to investigate a possible different role assumed by sustainability at an earlier time, when the decisions to implement the practices were taken. The section of the questionnaire devoted to the role of supply uncertainty was translated from an open to a semi-closed form to measure the supply uncertainty in a more structured way.

In line with [17], we indeed consider the following constructs and related items:

The supply systems were assessed considering the following:

- Wide: high availability of raw materials in the local market/suitable suppliers;
- Narrow: raw material scarcity in the local market/few suitable suppliers.

The specifications changes were assessed considering the following:

- Frequent changes: suppliers' process adaptations are frequent;
- Not frequent changes: suppliers' process adaptations are rare.

Variability in productivity and the main causes were assessed considering the following:

- High variability in the input flows (sourcing process): resources coming from suppliers are subjected to uncertainty (in quality and lead time);
- High variability in the production flows: throughput time in production is subjected to variability;
- Low: productivity is predictable.

4.3. Coding and Data Analysis

Using the transcriptions and the notes taken during the interviews, to ensure reliability, the researchers performed the coding activities independently [60]. Then, the authors conducted in-depth discussions to reach an agreement on the results of the coding.

If, for example, the researchers were unable to reach an agreement on the strategic role assumed by sustainability for a certain case, the research team jointly analyzed the secondary sources of information available for the specific case.

4.3.1. Exploratory Phase

The strategic role of sustainability was analyzed though the constructed code of OW, MQ and DA, adopting the definitions provided in the literature and reported in the introduction.

To avoid alternative descriptions of the same concepts and to maintain the chain of evidence [61], the information regarding SSCM practices was coded with the constructed codes represented by the SSCM practices reported in Table 1 and grounded in the SSCM literature. Information regarding the role of supply uncertainty was coded inductively [62] for the exploratory empirical stage,

While Table 4 reports an example of coding performed to identify the strategic role of sustainability, in Table 5 below, we provide an excerpt that shows how the coding was performed and how in the exploratory stage the information from secondary sources has been integrated to (i) cover a reliable list of SSCM practices implemented by a company and (ii) detect the role of supply uncertainty.

Table 5. Excerpt of the coding performed for two of the exploratory cases—supply uncertainty.

Raw Data (Quotation from the Transcription of the Interview)	Result of Inductive Coding–Exploratory Phase	Synthetic Code for the Relationship in Place
[with reference to the setting before the implementation of the practice of circular integration] *"Aluminum is effected by the London metal exchange price (LME). The LME price for aluminum varies and* ***fluctuates*** *quite a lot, and it therefore impacts the supply chain, (. . .)* ***stability*** *is the challenge that we had in the company (. . .). We put a fixed price into our buy-back contracts, to* ***secure*** *scraps from the market price, because our customers are really exposed to that since they can't change the price of a can of beverage (. . .)"*	Securing stability against price fluctuation	The SSCM practice (i.e., circular integration) allow to reduce supply uncertainty
"When dealing with BIO-Pet we needed to cope with a completely different supply market, with very few suitable suppliers for the beverage industry, we had to face a situation with a completely different bargaining power compare to the traditional PET market (. . .)"	An innovative material lead to a rationalization of the available supply base.	The SSCM practice (i.e., supply base rationalization) exposes the company to higher uncertainty upstream.

4.3.2. Explanatory Phase

For the second empirical step, the concept of supply uncertainty was coded with the constructs introduced in Section 4.2, thus referring to the detailed definitions provided for supply uncertainty as an environmental contingency. Table 6 shows an example of the coding performed with constructed codes.

Table 6. Excerpt of the coding performed for two of the explanatory cases—supply uncertainty.

Raw Data (Quotation from the Transcription of the Interview)	Constructed Code with Supply Uncertainty—Explanatory Stage
*"The company was initially born as a producer of boards obtained from virgin wood. Then the increase in production capacity required by the **growth** of the market and the **scarcity of raw materials** in the Italian territory, led the company to identify a new way to recover raw materials: buying it from abroad was not an option, it would have been too expensive given the low specific value of the product (. . .)"*	Narrow supply systems
*"The company encourages suppliers to **modify their production** process in order to implement sustainable practices such as recycling and reworking of **different** raw materials"*	Frequent supplier process adaptation

5. Results from the Exploratory Stage

5.1. Exploring SSCM Practices

The practices adopted by each case are presented in Appendix B. The companies in the sample revealed that the different roles assumed by sustainability have a competitive priority, as coded as in Table 7. When sustainability is not the order winner, this role is assigned to other operational performance dimensions (i.e., innovation, service level, quality, etc.). Nevertheless, these performance dimensions have not emerged as paramount to the choice of the SSCM practices, although they can contribute to building a different ground for the integration of these practices in a pre-existing supply chain strategy [10].

By crossing the strategic role of sustainability with the practices implemented, we outlined, as depicted in Figure 2, how a sustainable supply chain strategy is implemented depending on the strategic role assumed by sustainability. We found that this implementation of a supply chain strategy follows a "pyramid-shaped logic", which represents a novel way of structuring the classification of SSCM practices. At the bottom of the "pyramid" presented in Figure 2, there are practices adopted by all the companies in the sample, in the mid-part are the practices adopted by companies having sustainability as either OW or MQ and at the top are the practices used only by companies having sustainability as an OW.

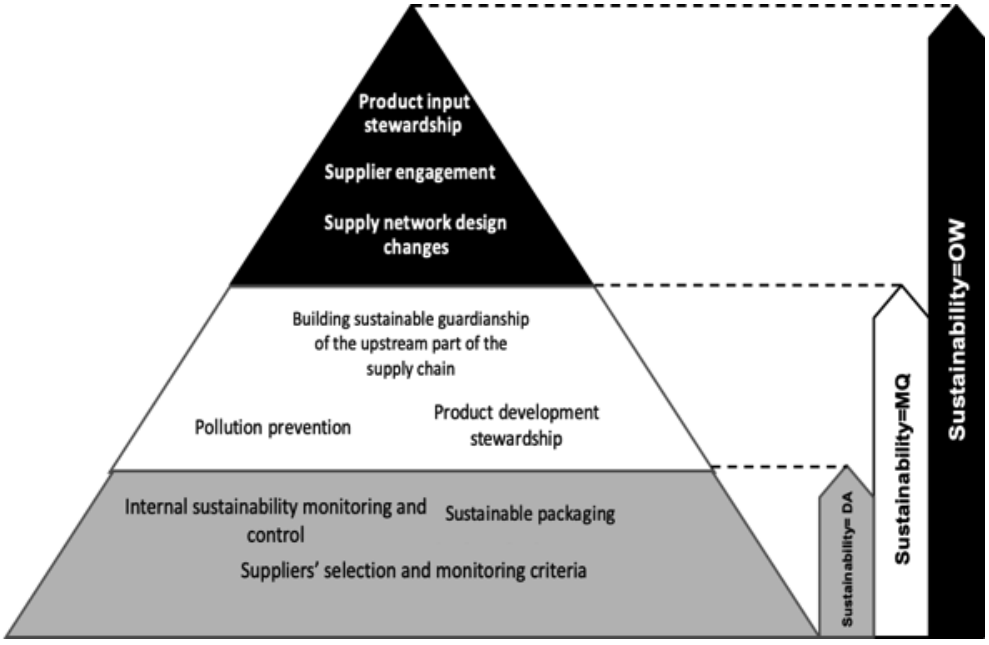

Figure 2. Pyramid of practices—research question 1 (RQ1).

Table 7. Coding of the strategic role assumed by sustainability.

Name of the Case	Strategic Priority Assigned to Sustainability	Supporting Quotations from the Interviewees	Main OW (When Not Sustainability)
ALLOYCO (A)	(1) OW (sustainability as a key feature of the product line offering)	*"Our sustainability strategy is a corporate strategy, we leverage on the opportunity to be a differentiated aluminum company pursuing a low-carbon strategy (. . .) We rely on scrap sourcing led by a strong vision for sustainability"*	/
WATERCO (W)		*"Ours is a green product. So far we limit the innovation to a sole SKU. (. . .) A significant portion of the final market is represented by environmentally conscious consumers willing to pay a premium price"*	
COSMECO (CS)		*"For us, sustainability is a business decision because we decided to position ourselves in the market with cosmetics and detergents based only on natural, biologic and certified raw materials. This has allowed us to differentiate from our competitors"*	
COFFEECO (C)	(2) OW (sustainability coupled with another performance dimension)	*"Here in CoffeeCo you can not make a quality coffee if you don't aim to sustainability, they are both essential and interlinked (. . .)."*	Sustainability coupled with quality
MACHINECO (M)	(3) MQ (sustainability as a baseline)	*"We offer packaging solutions that are entirely modular and the key driver for which our customers choose us is flexibility. (. . .) Our customers are beverage producers that are investing in solutions (i.e., primary packaging machines) that can accommodate recyclable materials"*	Flexibility to customer request
TOOLCO (T1)		*"Our major customers are investing heavily in sustainability, so they want their suppliers to be sustainable as well. They choose us because we offer a full package: quality, innovation above all and sustainability"*	Innovation
FURNITURECO (F)	(4) MQ (sustainability as part of corporate identity)	*"For us sustainability is built in, our customers know that, they take it for granted when buying our products. (. . .) Our customers choose us because of our low price, which is not in trade off with an appealing design"*	Cost efficiency
PLCO (PL)		*"For the company, sustainability has always been in its DNA. Sustainability is part of business strategy at the corporate level. (. . .) Our customers recognize these values, but choose us for the characteristics of innovation and product quality"*	Service Level
PLASTICCO (P)	(5) DA (sustainability is neither explicitly expressed, nor expected by the customer)	*"Having a wide product range is our key competitive weapon. (. . .) Sustainability is an opportunity for the company, because the adoption of sustainable practices such as recycling of waste can significantly reduce the purchase cost of raw materials."*	Flexibility in the product range
IND.TOOLCO (T2)		*"We are aware of the importance of sustainability and our parent company is investing a lot in that, but for our product division, but for industrial power tools, the key competitive factor is quality, then comes cost efficiency and innovation and sustainability comes third"*	Quality

In the sample, only the companies for which sustainability is an OW develop product input stewardship, change in the strategic network design and supplier engagement. The implementation of these practices requires a costly effort (i.e., paying a premium price to suppliers, investment in reverse logistics and new contractual agreements, giving financial and non-financial rewards to suppliers) that is justified by the recognition of a premium price by the customer that can offset the extra investment.

Product input stewardship requires a change in the way in which companies gain access to raw materials, which goes beyond the market transaction to become an investment that allows access to sustainable inputs. For instance, CoffeeCo supports its growers in harvesting and processing, improving their performance from the point of view of quality and efficiency and reducing the environmental impact. Moreover, CoffeeCo provides farmers with 30% more than the market price on average (based on the international stock market), thus rewarding producers for the quality obtained and giving them an edge even when the price decreases consistently in the international market. WaterCo pays a premium price for the recyclable and sustainable material bio-based PET, instead of buying PET (polyethylene terephthalate), which is a commodity easily found in the market. Similarly, AlloyCo buys-back aluminum scraps from its clients at a higher price than the stock exchange price, thus increasing the percentage of recycled aluminum. Finally, CosmeCo exclusively utilizes biologic raw materials (oils, and perfumes), which are vegetable-based, biodegradable, as well as organic-certified. The company pays a higher price for the inputs compared with traditional products to place more sustainable value in its products.

A change in the strategic network design involves radical changes in the supply chain structure and flows. Particularly emblematic is the "circular integration" of AlloyCo, which buys aluminum scraps from customers that have a strong partnership with the company. Furthermore, AlloyCo has included new actors in the supply chain, i.e., buying aluminum from the area municipalities and public authorities that collect scrapped materials.

Another radical change represented by supply base rationalization has been observed in both CosmeCo and WaterCo. In both cases, the choice of launching a "green" (WaterCo) or biologic (CosmeCo) product line caused a reduction in the available suppliers.

The development of a short supply chain upstream is another distinctive practice belonging to a strategic network design change. In line with the literature [63], a supply chain can be considered short in terms of either the physical proximity (local chain—as in CosmeCo's case), disintermediation or cultural proximity (e.g., CoffeCo that buys green coffee directly from producers in Central America, Africa, India and China, bypassing the mediation of the international markets for commodities).

Practices for which the three companies stand out also include some initiatives to create more engagement with key suppliers going beyond the payment of a higher price (under product input stewardship). One example is represented by the additional non-financial rewards CoffeeCo gives to its farmers in South America. In CosmeCo, the engagement is driven by the initiative of actively involving suppliers (e.g., through focus groups for exchanging ideas and to assess suppliers' willingness to be part of the sustainable change).

From the evidence collected about the abovementioned distinctive practices, and providing an answer to RQ1, we can formulate the first research proposition as follows:

P1. *When sustainability is an OW, companies develop product input stewardship, supply network design change and supplier engagement differently from companies for which sustainability is either an MQ or a DA.*

The mid-part of the pyramid depicted in Figure 2 shows that companies for which sustainability is an MQ implement a set of practices that companies for which sustainability is an OW also implement, whereas it is not implemented in the case that sustainability is a DA. These practices are as follows: building a sustainable guardianship of the supply chain, product development stewardship and pollution prevention. These practices aim at assuring a minimum level of sustainability in the supply, production and product development processes, given that the customer takes for granted a minimum

level of sustainability along the supply chain. Therefore, companies would lose orders if they do not comply with these minimum requirements.

Within the building sustainable ownership of the supply chain practice, companies implement supplier process improvement and second-tier supplier monitoring practices. Both of these two sets of practice envisage an incremental change mostly in the ties established with the supply base, not implying any configurational change. The former consists of a buyer-led collaboration with suppliers on sustainability-related aspects, whereas the latter regards the cascade of environmental and social requirements to a tier upstream in the chain.

Supplier process improvement is implemented by CoffeeCo through knowledge transfer and higher fixed purchasing prices with suppliers. In PLCo and ToolCo, sustainable guardianship consists of the constant monitoring and auditing of suppliers against company standards, boosting also the monitoring of the supply chain one-tier upstream. The implementation of supplier process improvement programs comes as a consequence of not fully conforming with the code of conduct or having low performance in some environmental or social aspects (additional to the mandatory ones) or to cascade requirements to second-tier suppliers and thus engaging the first-tier suppliers as mediators to monitor and assess.

Moreover, both PLCo and ToolCo require their suppliers to source minerals and metals only from controlled sources, applying an avoidance policy. FurnitureCo and MachineCo instead collaborate with their suppliers for their production or logistics processes in some areas that are relevant for environmental aspects as well as for efficiency and cost reduction. Notably, FurnitureCo works to make suppliers aware of the savings they can obtain by buying less wood overtime, investing instead in a technologically advanced production process. In the MachineCo case, the collaboration with suppliers and the joint effort to improve the production process for environmental efficiency is instead driven by the transfer of lean principles.

Additionally, in terms of product design, the companies approach it with a form of stewardship (i.e., product development stewardship). The sample shows the following two distinct approaches: (i) design for weight and logistics cost reduction and (ii) design for efficiency in product use. Companies such as FurnitureCo, WaterCo and CosmeCo adopt the design for environment approach by focusing on product or packaging weight reductions and on the total product lifecycle cost.

For both ToolCo and PLCo, it is extremely important to incorporate sustainability into innovative product design by looking at the product in use, thus in terms of the ergonomics of workers that will be using the wrenches (ToolCo) or for that of environmentally friendly products (PLCo). Finally, MachineCo has designed "green options" for its filling machine to meet the sustainability requirements of the client. For instance, they designed a mold system that works at low pressure and has an air-recovery system.

In the area of production and internal operations, pollution prevention initiatives are observed in the sample. CosmeCo, for example, adopts design criteria and technical solution choices aimed at reducing the environmental impact, e.g., energy saving systems for mixers, melting and filling lines for liquids, as well as water saving systems for its soap production line. Finally, the company introduces two wrapping machines that are specially equipped to manufacture soap with ecological and recycled paper and a modular compressor for reducing energy consumption.

In the area of production, CoffeeCo has introduced new technologies in the factory in the north of Italy with the aim of reducing the consumption of resources, e.g., the heat recovery system at the roasting plant. In WaterCo's bottling process, the implementation of a new system for cooling the equipment and for washing the lines, as well as washing the returnable bottles, led to reductions in water consumption of several million cubic meters.

Furthermore, for AlloyCo, in spite of operating in a traditionally considered "heavy industry", the concept of pollution prevention is brought to the forefront, with the aluminum recycling process that indeed avoids 95% of energy use and CO_2 emissions, when compared with primary aluminum.

Based on these considerations and as an answer to RQ1, we can formulate a second research proposition as follows:

P2. *When sustainability is either an MQ or an OW, companies develop the following practices: building sustainable guardianship of the upstream part of the supply chain, product development stewardship and pollution prevention capabilities.*

Finally, at the bottom of the pyramid of Figure 2 are the practices that we found are implemented in all the companies of the sample. They are as follows: production control, sustainable packaging and suppliers' selection and monitoring criteria. In particular, those are the sole practices implemented by IndToolCo and PlasticCo, as reported in Appendix B. Therefore, we believe these are a "minimum requirement" for sustainability to be part of company strategy, even when seen as just a desirable attribute. At the industry level, customers expect companies to develop a minimum set of consolidated practices. Therefore, with reference to RQ1, we state the following proposition:

P3. *Regardless of the strategic role assumed by sustainability in a company's competitive strategy, practices associated with "production control", "suppliers' selection and monitoring criteria" and "sustainable packaging" are developed.*

As shown in Appendix B, companies implement practices differently, leveraging on different aspects (i.e., items). Moreover, not all companies adopt the full range of practices. Therefore, in the following paragraph, we will analyze each practice or practice's item and discuss the role of contingent variables to explain these results, providing an answer to RQ2.

5.2. Exploring the Role of Supply Uncertainty

For those companies assigning to sustainability the role of an OW, we observed that the development of supply network design changes and supplier engagement is contingent upon the uncertainty in the supply phase and the role of sustainability when the decision of adopting the practice was taken. For those companies that instead approach sustainability as an MQ or a DA, the implementation of certain SSCM practices did not emerge as the determinant of a shift in supply uncertainty. This is consistent with the fact that the practices associated with sustainability as an OW are the only ones implying a radical change in the supply configuration and relevant changes in supply market dynamics (i.e., higher purchasing price, narrow supply base).

CoffeeCo and AlloyCo were not yet approaching sustainability as an OW when the decision to adopt the practice was made, whereas for WaterCo and CosmeCo, sustainability was already an OW.

As shown in Figure 3, those cases where sustainability was not an OW when the decision to implement the practice was taken adopt SSCM practices aimed at reducing uncertainty, and vice versa for the cases where sustainability was on OW when the decision was taken. In fact, in CoffeeCo and AlloyCo, the practice helped to reduce supply uncertainty. On the contrary, for WaterCo and CosmeCo, the implementation of the practice caused the supply uncertainty to increase.

Interestingly, the adoption of sustainable practices facilitated the company to transition to using sustainability as an OW. In fact, CoffeeCo invested in supplier engagement to underpin strategic sustainability orientation but, at the same time, to benefit from a reduction of upstream instability due to the risk of low quality of the supply, as well as to green coffee price fluctuations. The same holds true for AlloyCo, where the adoption of the closed-loop model was originally driven by the intent to hedge against risks related to the supply of aluminum. The company was indeed born with no direct control over the aluminum extraction phase but as a mid-stream player in the industry. Originally, the aluminum supply came mainly from vertically integrated competitors. This business model was not considered a long-term sustainable commercial strategy and led the company to invest in scrap sourcing and recycling. The great ability of the two companies lied in reducing the instability upstream and then capitalizing on the investments made to build their competitive advantages on sustainability. *"We thought we wouldn't be able to survive as a traditional aluminium manufacturer, we would*

simply be squeezed by competitors selling us the raw materials, so we put together an opportunity to differentiate as an aluminium company with a strong vision for sustainability" says AlloyCo's Senior Manager for sustainability. For both CoffeeCo and AlloyCo, the shift induced by the sustainable practice exposes the company to lower supply instability. However, in the case of AlloyCo, the shift implies a change in the design of the supply chain and it is more significant.

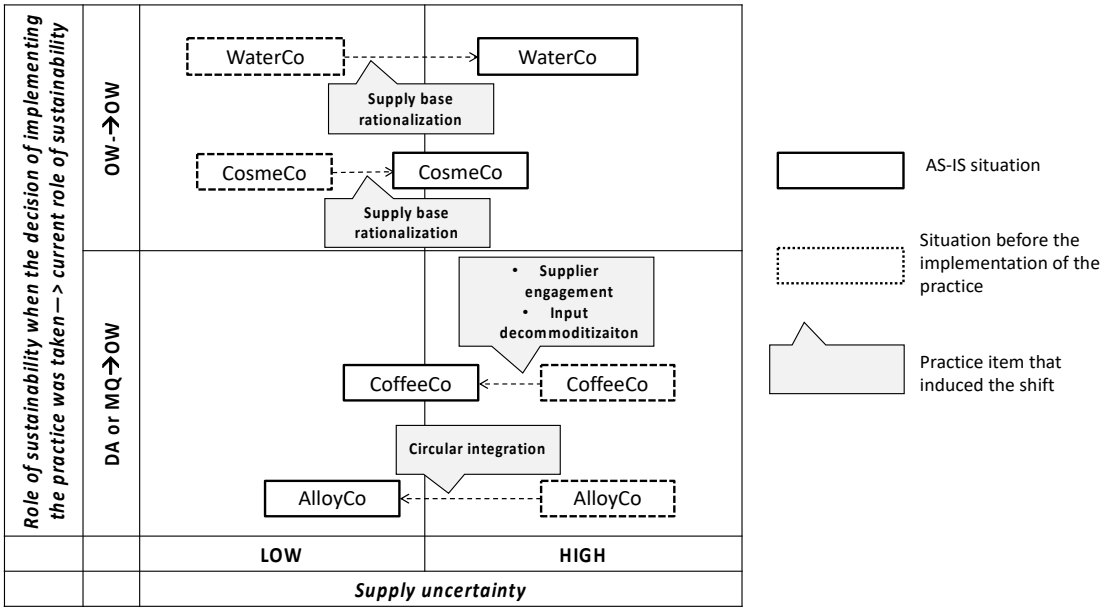

Figure 3. Results of exploratory phase—contingent role of supply uncertainty and role of sustainability when the decision of implementing the practice was taken.

A different situation is the one faced by CosmeCo and WaterCo. Being that sustainability is an OW, the two companies decided to devote resources to build a sustainable supply base, but the core initiatives (i.e., the introduction of biologic raw materials for CosmeCo and the introduction of the bio-based PET for WaterCo) caused an increase in supply uncertainty, due to a reduction in the number of potential suppliers. In the word of the interviewee from WaterCo: *"(. . .) when dealing with BIO-Pet we needed to cope with a completely different supply market, with very few suitable suppliers for the beverage industry, we had to face a situation with a completely different bargaining power compare to the traditional PET market"*. However, they could leverage on stable processes upstream and control the risk, limiting the supply volume (in WaterCo, bio-PET packaging was limited to a single SKU—stock keeping unit) and choosing to rely exclusively on a local and engaged supply base, which is the supply base CosmeCo retained after the rationalization.

P4. *The implementation of (a) supplier engagement, (b) input decommoditization and (c) circular integration is associated with a reduction in supply uncertainty, which is an enabler of the transition from sustainability as an MQ or DA to sustainability as an OW.*

At the same time, our cases showed that the role and the impact on supply uncertainty are not straightforward.

P5. *When sustainability is an OW and a reduction in the width of the supply base is implemented, there is an increase in the uncertainty pertaining to the supply process.*

6. Results from the Explanatory Phase

In this section, we seek to further explain the role of sustainability in selecting supply chain practices and the contingent role of supply uncertainty. Table 8 summarizes the key features for each case.

Table 8. Strategic priority assigned to sustainability and supply uncertainty.

Company (Sustainability = Ow)	Strategic Role Assumed by Sustainability	Impact on Supply Uncertainty (Components)	Impact on Supply Uncertainty (Overall)
FURNITURE1 (F1)	*OW* *"We try to make a difference in the furniture industry by investing in a re-manufacturing program to offer to our customers a take back service alongside a sustainable product. (. . .) We are proud to be a green company"*	**Supply system:** narrow but local **Specifications changes:** become frequent, as natural consequence of re-manufacturing program **Variability in productivity:** medium-high, as natural consequences of re-manufacturing program	Increase
FURNITURE2 (F2)	*OW* *"During our 10-year sustainability strategy, we have developed our products around the idea of "eco-inspired" design. This product level feature is then expanded to include principles of transparency and inclusiveness, which are the pillars on which we build our supply chain"*	**Supply system:** large and global, but with new SMEs added for the supplier diversity program **Specifications changes:** not frequent with the exception of some product lines **Variability in productivity:** high due to instability in the availability of inputs	Increase
WOODPANEL1 (WP1)	*OW* *"We produce a 100% post-use recycled wooden panel. We have invested heavily in a new logistics system and in new machinery to support this strategic choice. We position ourselves clearly in the market as a sustainable company, providing components which can improve the sustainable properties of finished furniture"*	**Supply system:** originally narrow, due to wood scarcity in the Italian territory becomes larger thanks to new recycled inputs **Specifications changes:** not frequent **Variability in productivity:** originally high, due to due to instability in the availability of inputs, becomes lower thanks to circular integration	Reduction
WOODPANEL2 (WP2)	*OW* *"Pioneering the use of chipboard, we classify as a green company because of our line of panels made exclusively from post-use recycled wood (. . .) In Italy, increasingly more manufacturers require our "green" panels"*	**Supply system:** originally narrow, due to wood scarcity in the Italian territory becomes larger thanks to new recycled inputs **Specifications changes:** not frequent **Variability in productivity:** originally high, due to due to instability in the availability of inputs, becomes lower thanks to circular integration	Reduction

As for the propositions dealing with the pyramid-shaped framework (i.e., P1, P2 and P3) given that for all the companies in the explanatory sample, sustainability is an OW, it was possible to find supporting evidence only for P1.

As for P4 (a) and (b) and P5, referring to input decommoditization and to supplier engagement, respectively, has been excluded from the discussion, given that no companies in the explanatory sample have actually adopted these practices. The discussion is focused instead on P4 (c).

For WoodPanel1 and WoodPanel2, sustainability, when the decision to implement the practice was taken, was not considered as an OW.

What initially brought WoodPanel1 to adopt circular integration was the need to grow in volume in a market where there is a structural scarcity of wood. Over the years, the firm has invested an important amount of resources in new technologies for sorting, cleaning and processing to handle the wood that is needed to be recycled after usage. Over the years, the company has started to capitalize on its structural investment, becoming aware of the environmental driver of their choice. *"With the development of the recycled product, we felt ready to compete vis a vis, we became proud to do what we were doing. We began to communicate that we are sustainable."* Company WoodPanel2 instead built

a closed-loop system, involving a virtuous network of actors. WoodPanel2 buys scrap wood from municipal companies, following the lead of WoodPanel1.

The cases of these companies, which are players active upstream the furniture industry, reflect therefore a shift in supply uncertainty: the SSCM practice of circular integration reduces supply uncertainty, similarly to the case of AlloyCo in the exploratory sample.

For Furniture 1 and Furniture 2, instead sustainability was already an OW when the decision to implement the SSCM practice (i.e., the addition of new suppliers in the supply base and the supplier process improvement) was made and this decision has caused an increase in the supply uncertainty. In fact, Furniture 1 and Furniture 2 relied on a stable supply condition when the decision to implement the practice was taken. They both implemented the practices without an easily predictable and clear return. Furniture 1 was interested in a remanufacturing program. The company has encouraged suppliers to invest in production technologies to reprocess used components (fabric, steel and plastic) collected from Furniture 1's clients. This initiative was founded on the consolidated relationships between Furniture 1 and its suppliers. Over the past years, the company has guided its suppliers within the remanufacturing project. Moreover, Furniture 1 has asked its suppliers to make investments in ad hoc production technologies. For Furniture 2, changes to the strategic network design concern the supplier diversity program. The company added new suppliers to its supply base to "build an inclusive supply chain" and create a supply base made up of minority business enterprises (MBEs). The company sees this as a way to complement the economies of the different markets they are serving and to create the cultural competences needed to understand and serve customers around the world. The company avoids single sourcing for different materials and component purchasing categories. Moreover, the company is attentive towards specific suppliers and tries to secure particular credentials for them when starting business with MBEs.

Therefore, we can conclude that P4 (c) has been supported for what concerned circular integration practice and the influence on supply uncertainty.

Moreover, the items "introduction of new suppliers to spur innovation" and "supply process improvement" were observed to instead cause an increase in the supply uncertainty for these companies. Interestingly, supply process improvement amplifies the uncertainty upstream, given that suppliers are asked to radically change their production process by introducing remanufacturing programs. Both these additional practices include a radical change in the configuration of the supply base and a radical change in the production process as the main focus of their strategic approach.

From this evidence, a further proposition can be developed to be validated in future studies.

P6. *When sustainability is an OW, the implementation of the introduction of new suppliers to spur innovation and supplier process (radical) improvements is associated with an increase in supply uncertainty.*

7. Discussion

Our findings suggest that when sustainability changes its role as a strategic priority, moving from being a DA to an OW, the number of sustainable practices implemented increases. Further, the type of practices increases, showing a shift in both supplier management and supply chain configuration (see Table 9). When sustainability is a DA, the focus is on controlling the suppliers, and when sustainability is an MQ, the focus is on control and monitoring as a supply management approach with just incremental changes configuration-wise. Lastly, moving towards OW, the company increases the sense of reasonability towards the suppliers' behavior and wellbeing. As for supply chain configuration, companies leveraging sustainability as an OW should be ready to radically change it by investing in circular integration or by changing the structure of the supply network by rationalizing the supply base in order to reach a condition with a more trustful and narrow supply base and/or introducing new suppliers to spur innovation. This view of the possible approaches represents a different perspective on the reactive-cooperative and dynamic model presented by Rusinko et al. [55]. Additionally, it sheds light on possible determinants (i.e., the role of sustainability as a strategic priority)

of opting for different governance mechanisms with suppliers, as choosing between the monitoring and development approach [41] or between supplier screening and development [43].

Table 9. Summary of the different management and configuration approaches for different roles of sustainability as a competitive priority.

Role of Sustainability as a Strategic Priority	Focus of the Strategic Approach	Suppliers Management Approach	Supply Chain Configuration Approach
OW	Purchase from suppliers with an extra investment (i.e., premium price and rewards, new partnerships and new—reverse-flows)	Engagement	Radical change
MQ	Assuring minimum requirements in company processes	Guardianship	Incremental change
DA	Assuring minimum requirements aligned with industry standards	Control	No change

As far as RQ2 is concerned, the literature suggests that companies should implement practices to manage or reduce supply uncertainty when they have to face a situation with high supply uncertainty (Lee, 2002). The companies for which sustainability is an OW, differently from what is suggested by the literature, might decide to implement sustainable practices even though they increase their exposure to supply uncertainty, thus making their supply chain management more complex.

Differently, for the companies considering sustainability as an MQ or DA, the need to reduce supply uncertainty might be the trigger for choosing sustainable practices and then changing the competitive priority, despite the company not yet considering sustainability as an OW. In fact, it has been observed that companies considering sustainability as an MQ or DA behave in line with the suggestion of the literature, in that they implement practices, such as circular integration, with the aim to reduce the exposure to uncertainty coming from, e.g., a structural risk of the industry being related to scarcity of localized raw materials. Interestingly, these practices are "accidentally" also sustainable, and are practices used by companies that consider sustainability as an OW. Then, the results suggest these firms would capitalize their effort, to change the strategic role assumed by sustainability to OW and increasingly invest in sustainability to be recognized by the market for their sustainability effort.

As a whole, in terms of theoretical implications, our work contributes to extend two streams of research, with one regarding the transitions of companies towards a higher strategic importance for sustainability and the strategic supply chain management stream.

In fact, differently from most of the studies on the maturity of the concept of sustainability within a certain corporate or supply chain strategy (e.g., [55,64]), our work goes beyond the idea of the transition from one stage to another to be determined solely by a different approach towards the challenges that companies need to face, rather, according to our findings, it is determined by a different strategic priority assigned to sustainability and the impact on supply uncertainty.

Moreover, our results show that there are companies for which sustainability has become a competitive priority by now, therefore frameworks to guide the choice of tailored supply chain strategies [4,17,19] should be extended to encompass sustainability, but maintain the importance of the match between an uncertain environment within which a supply chain operates and its strategy [12].

8. Conclusions

Through this work, we propose a novel classification for SSCM practices, in the form of a pyramid-shaped framework which considers the strategic role of sustainability as the main criterion to classify SSCM practices. Moreover, we underline the key role played by supply uncertainty, as a paramount factor to consider when sustainability is intended as an OW. The framework and the considerations on the linkage with supply uncertainty are incorporated in a set of five propositions developed in a cross-industrial setting and then supported by evidence in the furniture industry with

a specific focus on those companies that have already made the transition towards sustainability as an OW.

As for practical implications deriving from our work, managers can benefit from our findings by understanding how to target the investments in sustainability depending upon the role of sustainability inside the competitive strategy, both with a static and a dynamic perspective. In fact, the pyramid-shaped framework of practice can guide managers regarding which practice to implement given the strategic priority assigned to sustainability. Moreover, since the literature teaches us that this year's OW is likely to become next year's MQ [7], managers could use the pyramid of practices to understand what additional practices to plan for in the future to cope with the increasing strategic relevance of sustainability.

Additionally, our findings can help managers in understanding that implementing a sustainable supply chain strategy is a long journey that requires resources and time. In fact, companies for which sustainability assumes the role of an OW implement their strategy by adopting the practices at the top of the pyramid of practices, as well as implementing the practices at the bottom. Moreover, these companies have progressively implemented their sustainable strategy over the years, building each new practice leveraging on the ones already implemented. For example, companies that are currently engaging suppliers with monetary and other forms of awards, or are radically changing the structure of their supply base (i.e., practices at the top of the pyramid of practices), have walked along a path starting with the introduction of qualification and monitoring criteria based on social and environmental aspects (i.e., practices at the bottom of the pyramid), then building a guardianship of the extended supply chain upstream by monitoring second-tier suppliers and devoting resources to different types of supplier process improvements (i.e., practices in the intermediate layer of the pyramid).

Finally, our results suggest interesting managerial implications for companies at each stage of the supply chain. Indeed, the strategic approach of framing sustainability, such as an OW, MQ or DA, can guide the choices of a focal company as well as of other supply chain partners. The strategic approach can indeed be beneficial for a company to understand what strategic interpretation is assigned by the end customers and then transferred upstream to other process stages. When, for example, a downstream stage of the supply chain approaches sustainability as an OW, it can be reflected by sustainability becoming an MQ for its supplier because the downstream stage needs to assure that the required components/materials are sourced according to particular baseline requirements.

A main limitation of the present work is represented by the fact that our findings, which are connected to the "pyramid of practices", might encounter some industry-specific disconfirmations, due to a likely different level of maturity for the different practices in some industries. The explanatory stage of the present research shows this and revealed that some practices better fit another position in the "pyramid". More studies set in a single industry context can help in detecting how it is best to adapt the model to industries with an inherent level of maturity.

Finally, we investigated non-born sustainable companies only, and our findings might not be true in the case of born-sustainable start-ups. The limited resources of these types of companies might indeed be devoted from the beginning of their life to adopting truly differential practices (at the top of the pyramid) and to shaping their business model entirely around this practice, such as the implementation of a circular economy business model. Future research might be devoted to investigating this type of company.

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Appendix A. Interview Protocol for the Exploratory Phase

Choice of product family to focus on: _____

Business strategy on the product considered
Strategic goals

- Which are the performance dimensions that represent the most important competitive priority for the supply chain (of the chosen product) that let you win orders in the market (please select just one performance dimension and justify why)? Which among them represent a "not negotiable" condition/a baseline for competition/a qualification criteria to be in the marketplace? Which instead is a "nice to have" feature"?
    - Distribution/Service level;
    - Low Cost;
    - Quality;
    - Flexibility;
    - Innovation;
    - Sustainability (environmental and social).
- Is the supply chain strategy defined "formally" (for example through a supply chain mission statement)?

General overview on the role of sustainability

- Which is the definition of sustainability for your company?
- Is there an organizational role responsible for sustainability? Where is this role positioned in the organizational chart?
- (given the strategic role assigned to sustainability in the previous section) when have you started to recognize to sustainability this strategic role? What was the main trigger?

Overview of SSCM practices

The list of SSCM practices in Table 1 was used as a reference to ask companies (i) if they were adopting the practice; (ii) why they believe the practice to be important.

Appendix B.

Table A1. Practices adopted by companies in the exploratory and explanatory sample. The codes to indicate the different companies refer to the acronyms indicated in Tables 7 and 8.

Practice	Occurrences **	Items	Companies in the Exploratory Sample			Companies in the Explanatory Sample
		Strategic role of sustainability	*OW*	*MQ*	*DA*	*OW*
Product (input) stewardship	4/4 OW 0 MQ 0 DA	Biologic/natural origin of raw materials	CS			–
		Input de-commoditization	W/C			–

Table A1. *Cont.*

Practice	Occurrences **	Items	Companies in the Exploratory Sample			Companies in the Explanatory Sample
		Strategic role of sustainability	*OW*	*MQ*	*DA*	*OW*
Supply network design changes	4/4 OW 0 MQ 0 DA	Local chain and supplier proximity	CS/C			WP1/WP2/F1/F2
		Changing structure and flows of the chain (circular integration)	A			WP1/WP2/F1
		Rationalization of the supply base	CS/W			–
		New suppliers/stakeholders to spur innovation	CS/A			WP2/F1/F2
Supplier engagement	3/4 OW 1/4 MQ 0 DA	Incentives and reward systems for supply chain partners	C	M		F2
		Exchange of ideas with empowered suppliers	CS			F1/F2
Building sustainable guardianship of the upstream SC	4/4 OW 4/4 MQ 0 DA	Supplier/customer process improvement	C/CS/A/	M/F		F1
		Providing inputs to suppliers to reach agreed targets		PL/T1/F		F1/F2
		Monitoring of second tier suppliers		PL/T1		F2
Product (development) stewardship	3/4 OW 4/4 MQ 0 DA	Light weight/green product design	CS/W	F/PL		F1/F2
		Design to facilitate product disposal/dis-assembly/ Design product to reduce environmental impact in use		M/PL/T1		–
		Product lifecycle extension/product value recovery	C	M		F1/F2/WP1/WP2
Pollution prevention	3/4 OW 1/4 MQ 0 DA	Technological changes in production	W/C/A	M		F1/F2/WP1/WP2
Sustainable packaging	3/4 OW 4/4 MQ 2/2 DA	Recyclable packaging	C	M		F1/F2
		Returnable Packaging	CS		T2	–
		Packaging reduction	CS/W	F	P	–
Suppliers' selection and monitoring criteria	3/4 OW 2/4 MQ 2/2 DA	Sustainability-related suppliers' qualification criteria	C/W	M/F	T2/P	F1/F2
		Suppliers' monitoring on sustainable standards (use of materials, production emissions, working conditions)	CS	M/F	P	WP2/F2

Table A1. *Cont.*

Practice	Occurrences **	Items	Companies in the Exploratory Sample			Companies in the Explanatory Sample
		Strategic role of sustainability	*OW*	*MQ*	*DA*	*OW*
Internal sustainability monitoring and control	4/4 OW 4/4 MQ 0 DA	Monitoring of production emissions and on employees' health and safety	C/W/A/CS	M/F/T1/PL	P/T2	WP1/WP2
		Scraps recovery	CS/A		P	WP1/WP2
		Adoption of standard certifications (e.g., SA8000, ISO 14001)	C/W/A/CS	M/F/T1	P/T2	WP1/WP2/F1/F2

** number of companies adopting the at least one items/total number of companies approaching sustainability as an OW, MQ or DA.

References

1. Markley, M.J.; Davis, L. Exploring future competitive advantage through sustainable supply chains. *Int. J. Phys. Distrib. Manag.* **2007**, *37*, 763–774. [CrossRef]
2. Pagell, M.; Shevchenko, A. Why research in sustainable supply chain management should have no future. *J. Supply Chain Manag.* **2014**, *50*, 44–55. [CrossRef]
3. Hill, A.; Hiil, T. *Manufacturing Operations Strategy: Texts and Cases*; Macmillan Education UK: Basingstoke, UK, 2009; ISBN 9780230520912.
4. Christopher, M.; Towill, D.R. Supply chain migration from lean and functional to agile and customised. *Supply Chain Manag. Int. J.* **2000**, *5*, 206–213.
5. Sharifi, H.; Ismail, H.S.; Reid, I. Achieving agility in supply chain through simultaneous "design of" and "design for" supply chain. *J. Manuf. Technol. Manag.* **2006**, *17*, 1078–1098. [CrossRef]
6. Murali, S.; Pugazhendhi, S.; Muralidharan, C. Modelling and Investigating the relationship of after sales service quality with customer satisfaction, retention and loyalty—A case study of home appliances business. *J. Retail. Consum. Serv.* **2016**, *30*, 67–83. [CrossRef]
7. Aitken, J.; Childerhouse, P.; Christopher, M.; Towill, D. Designing and managing multiple pipelines. *J. Bus. Logist.* **2005**, *26*, 73–96. [CrossRef]
8. Spring, M.; Boaden, R. "One more time: How do you win orders?": A critical reappraisal of the Hill manufacturing strategy framework. *Int. J. Oper. Prod. Manag.* **1997**, *17*, 757–779. [CrossRef]
9. Bask, A.; Rajahonka, M.; Laari, S.; Solakivi, T.; Töyli, J.; Ojala, L. Environmental sustainability in shipper-LSP relationships. *J. Clean. Prod.* **2016**, *172*, 2986–2998. [CrossRef]
10. Ciccullo, F.; Pero, M.; Caridi, M.; Gosling, J.; Purvis, L. Integrating the environmental and social sustainability pillars into the lean and agile supply chain management paradigms: A literature review and future research directions. *J. Clean. Prod.* **2018**, *172*. [CrossRef]
11. Haake, H.; Seuring, S. Sustainable procurement of minor items—Exploring limits to sustainability. *Sustain. Dev.* **2009**, *17*, 284–294. [CrossRef]
12. Salam, M.A.; Ali, M.; Seny Kan, K.A. Analyzing supply chain uncertainty to deliver sustainable operational performance: Symmetrical and asymmetrical modeling approaches. *Sustainability* **2017**, *9*, 2217. [CrossRef]
13. Brindley, C.; Oxborrow, L. Aligning the sustainable supply chain to green marketing needs: A case study. *Ind. Mark. Manag.* **2014**, *43*, 45–55. [CrossRef]
14. Densley Tingley, D.; Cooper, S.; Cullen, J. Understanding and overcoming the barriers to structural steel reuse, a UK perspective. *J. Clean. Prod.* **2017**, *148*, 642–652. [CrossRef]
15. Gokarn, S.; Kuthambalayan, T.S. Analysis of challenges inhibiting the reduction of waste in food supply chain. *J. Clean. Prod.* **2017**, *168*, 595–604. [CrossRef]
16. Christopher, M.; Towill, D.R.; Aitken, J.; Childerhouse, P. Value stream classification. *J. Manuf. Technol. Manag.* **2009**. [CrossRef]

17. Lee, H. Aligning supply chain strategies with product uncertainties. *Calif. Manag. Rev.* **2002**, *44*, 105–119. [CrossRef]
18. Prajogo, D.; Mena, C.; Nair, A. The Fit Between Supply Chain Strategies and Practices: A Contingency Approach and Comparative Analysis. *IEEE Trans. Eng. Manag.* **2018**, *65*, 168–180. [CrossRef]
19. Chi, T.; Kilduff, P.; Gargeya, V.B. Alignment between business environment characteristics, competitive priorities, supply chain structures, and firm business performance. *Int. J. Product. Perform. Manag.* **2009**, *58*, 645–669. [CrossRef]
20. Godsell, J.; Diefenbach, T.; Clemmow, C.; Towill, D.; Christopher, M. Enabling supply Chain segmentation through demand profiling. *Int. J. Phys. Distrib. Logist. Manag.* **2011**, *41*, 296–314. [CrossRef]
21. Mason-Jones, R.; Naylor, B.; Towill, D.R. Engineering the leagile supply chain. *Int. J. Agil. Manag. Syst.* **2000**, *2*, 54–61. [CrossRef]
22. Christopher, M.; Gattorna, J. Supply chain cost management and value-based pricing. *Ind. Mark. Manag.* **2005**, *34*, 115–121. [CrossRef]
23. Porter, M.E.; Van Der Linde, C. Toward a new conception of the environment-competitiveness relationship. *Corp. Environ. Responsib.* **2017**, *9*, 61–82. [CrossRef]
24. Lin, Y.H.; Tseng, M.L. Assessing the competitive priorities within sustainable supply chain management under uncertainty. *J. Clean. Prod.* **2016**, *112*, 2133–2144. [CrossRef]
25. Orsato, R.J. When Does it pay to be green? *Calif. Manag. Rev.* **2006**, *48*, 127–144. [CrossRef]
26. Mcwilliams, A.; Siegel, D.S. Creating and Capturing Value: Strategic Corporate Social Responsibility, Resource-Based Theory, and Sustainable Competitive Advantage. *J. Manag.* **2011**, *37*, 1480–1495. [CrossRef]
27. Wu, Z.; Pagell, M. Balancing priorities: Decision-making in sustainable supply chain management. *J. Oper. Manag.* **2011**, *29*, 577–590. [CrossRef]
28. Bocken, N.M.P.; Short, S.W. Environmental Innovation and Societal Transitions Towards a sufficiency-driven business model: Experiences and opportunities. *Environ. Innov. Soc. Transit.* **2016**, *18*, 41–61. [CrossRef]
29. Kumar, S.; Teichman, S.; Timpernagel, T. A green supply chain is a requirement for profitability. *Int. J. Prod. Res.* **2012**, *50*, 1278–1296. [CrossRef]
30. Porter, M.E.; Kramer, M.R. Creating Shared Value. *Harv. Bus. Rev.* **2011**, *89*, 62–77. [CrossRef]
31. Krause, D.R.; Vachon, S.; Klassen, R.D. Special topic forum on sustainable supply chain management: Introduction and reflections on the role of purchasing management. *J. Supply Chain Manag.* **2009**, *45*, 18–25. [CrossRef]
32. Seuring, S.; Müller, M. From a literature review to a conceptual framework for sustainable supply chain management. *J. Clean. Prod.* **2008**, *16*, 1699–1710. [CrossRef]
33. Malik, M.; Abdallah, S. Sustainability initiatives in emerging economies: A socio-cultural perspective. *Sustainability* **2019**, *11*, 4893. [CrossRef]
34. Shahbazpour, M.; Seidel, R.H.; Zealand, N. Using Sustainability for Competitive Advantage. In Proceedings of the 13th CIRP International Conference on Life Cycle Engineering, Leuven, Belguim, 31 May–2 June 2006; pp. 287–292.
35. Reefke, H.; Sundaram, D. Sustainable supply chain management: Decision models for transformation and maturity. *Decis. Support Syst.* **2018**, *113*, 56–72. [CrossRef]
36. Knight, L.; Pfeiffer, A.; Scott, J. Supply market uncertainty: Exploring consequences and responses within sustainability transitions. *J. Purch. Supply Manag.* **2015**, *21*, 167–177. [CrossRef]
37. Youn, S.; Yang, M.G.M.; Roh, J.J. Extending the efficient and responsive supply chains framework to the green context. *Benchmarking Int. J.* **2012**, *19*, 463–480. [CrossRef]
38. Correia, E.; Carvalho, H.; Azevedo, S.G.; Govindan, K. Maturity models in supply chain sustainability: A systematic literature review. *Sustainability* **2017**, *9*, 64. [CrossRef]
39. Pagell, M.; Wu, Z. Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars. *J. Supply Chain Manag.* **2009**, *45*, 37–56. [CrossRef]
40. Marshall, D.; McCarthy, L.; Heavey, C.; McGrath, P. Environmental and social supply chain management sustainability practices: Construct development and measurement. *Prod. Plan. Control* **2015**, *26*, 673–690. [CrossRef]
41. Gimenez, C.; Sierra, V. Sustainable Supply Chains: Governance Mechanisms to Greening Suppliers. *J. Bus. Ethics* **2013**, *116*, 189–203. [CrossRef]

42. Rusinko, C.A. Green manufacturing: An evaluation of environmentally sustainable manufacturing practices and their impact on competitive outcomes. *IEEE Trans. Eng. Manag.* **2007**, *54*, 445–454. [CrossRef]
43. Akhavan, R.M.; Beckmann, M. A configuration of sustainable sourcing and supply management strategies. *J. Purch. Supply Manag.* **2017**, *23*, 137–151. [CrossRef]
44. Rao, P.; Holt, D. Do green supply chains lead to competitiveness and economic performance? *Int. J. Oper. Prod. Manag.* **2005**, *25*, 898–916. [CrossRef]
45. Sancha, C.; Longoni, A.; Giménez, C. Sustainable supplier development practices: Drivers and enablers in a global context. *J. Purch. Supply Manag.* **2015**, *21*, 95–102. [CrossRef]
46. Terpend, R.; Krause, D.R. Competition or Cooperation? Promoting Supplier Performance with Incentives Under Varying Conditions of Dependence. *J. Supply Chain Manag.* **2015**, *51*, 29–53. [CrossRef]
47. Hart, S.L. A natural-resource-based view of the firm. *Acad. Manag. Rev.* **1995**, *20*, 986–1014. [CrossRef]
48. Vachon, S.; Klassen, R.D. Extending green practices across the supply chain. *Int. J. Oper. Prod. Manag.* **2006**, *26*, 795–821. [CrossRef]
49. Galeazzo, A.; Furlan, A.; Vinelli, A. Understanding environmental-operations integration: The case of pollution prevention projects. *Int. J. Prod. Econ.* **2014**, *153*, 149–160. [CrossRef]
50. Zhu, Q.; Sarkis, J.; Lai, K. hung Confirmation of a measurement model for green supply chain management practices implementation. *Int. J. Prod. Econ.* **2008**, *111*, 261–273. [CrossRef]
51. Tsoulfas, G.T.; Pappis, C.P. Environmental principles applicable to supply chains design and operation. *J. Clean. Prod.* **2006**, *14*, 1593–1602. [CrossRef]
52. Kleindorfer, P.R.; Kalyan, S.; Van Wassenhove, L.N. Sustainable Operations Management. *Prod. Oper. Manag.* **2005**, *14*, 482–492. [CrossRef]
53. Rogers, D.S.; Tibben-Lembke, R. An examination of reverse logistics practices. *J. Bus. Logist.* **2001**, *22*, 129–148. [CrossRef]
54. Granek, F.; Hassanali, M. The Toronto Region Sustainability Program: Insights on the adoption of pollution prevention practices by small to medium-sized manufacturers in the Greater Toronto Area (GTA). *J. Clean. Prod.* **2006**, *14*, 572–579. [CrossRef]
55. Zimon, D.; Tyan, J.; Sroufe, R. Implementing sustainable supply chain management: Reactive, cooperative, and dynamic models. *Sustainability* **2019**, *11*, 7227. [CrossRef]
56. Tavory, I.; Timmermans, S. *Abductive Analysis: Theorizing Qualitative Research*; The University of Chicago Press: London, UK, 2014.
57. Yin, R.K. *Case Study Research: Design and Methods*, 4th ed.; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 2009.
58. Voss, C.; Tsikriktsis, N.; Frohlich, M. Case research in operations management. *Int. J. Oper. Prod. Manag.* **2002**, *22*, 195–219. [CrossRef]
59. Hancock, D.R.; Algozzine, B. *Doing Case Study Research: A Practical Guide for Beginning Researchers*; Teachers College Press: New York, NY, USA, 2006; ISBN 9780807747087.
60. Miles, M.B.; Huberman, A.M. *Qualitative Data Analysis*, 2nd ed.; SAGE Publications: London, UK; New Delhi, India, 1994.
61. Golafshani, N. Understanding reliability and validity in qualitative research. *Qual. Rep.* **2003**, *8*, 597–606.
62. Timmermans, S.; Tavory, I. Theory construction in qualitative research: From grounded theory to abductive analysis. *Sociol. Theory* **2012**, *30*, 167–186. [CrossRef]
63. Renting, H.; Marsden, T.K.; Banks, J. Understanding alternative food networks: Exploring the role of short food supply chains in rural development. *Environ. Plan. A* **2003**, *35*, 393–411. [CrossRef]
64. Wu, T.; Jim Wu, Y.C.; Chen, Y.J.; Goh, M. Aligning supply chain strategy with corporate environmental strategy: A contingency approach. *Int. J. Prod. Econ.* **2014**, *147*, 220–229. [CrossRef]

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