


## Article

# Implementing Sustainable Supply Chain Management: Reactive, Cooperative, and Dynamic Models

Dominik Zimon <sup>1,\*</sup> , Jonah Tyan <sup>2</sup> and Robert Sroufe <sup>3</sup>

<sup>1</sup> Department of Management Systems and Logistics, Rzeszow University of Technology, 35-959 Rzeszow, Poland

<sup>2</sup> National Chengchi University, Taipei 116-05, Taiwan; jonahtyan@gmail.com

<sup>3</sup> The Palumbo-Donahue School, Duquesne University, Pittsburgh, PA 15282, USA; sroufer@duq.edu

\* Correspondence: zdomin@prz.edu.pl

Received: 31 October 2019; Accepted: 15 December 2019; Published: 16 December 2019



**Abstract:** The purpose of this research is to propose a Sustainable Supply Chain Management (SSCM) implementation framework grounded in a literature review while categorizing practices adopted by firms' and industries. Given the evolution of the SSCM field and emerging trends, we examine why and how companies implement SSCM practices within a country context. The research methods employed in this study include theory building from a review of the literature and synthesis of insights regarding the design of SSCM implementation frameworks using multiple cases in Taiwan. The review of the literature, content analysis, and findings provide new insights into designing an implementation model, and generalizable models for reactive, cooperative, and dynamic SSCM implementation. Practical implications include but are not limited to the generalization of implementation frameworks in supply chain management, and opportunities to improve global practices. Our development of the conceptual framework complements existing theory by offering new knowledge on SSCM implementation practices. This study can help guide research, practitioners, and policymakers in future sustainability and supply chain management initiatives.

**Keywords:** implementation framework; sustainability; sustainable supply chain management; ethical leadership

## 1. Introduction

Sustainable development is an attempt to formulate a program integrating various levels of human action, which was often considered separately before, based on moral reflection regarding human responsibility for the environment. When considering the complexity of sustainable development in the context of supply chain management, it is a management concept extending beyond a supply chain's performance metrics of cost, time, and flexibility. The efforts to implement environmentally and socially sustainable performance supporting current and future generations greatly expands transparency in supply chain management into moral, economic, legal, social and technical attributes of performance. Roy et al. [1] speak in a similar vein, recognizing that sustainable supply chain management (SSCM) addresses the management of the integration of economic and non-economic issues in a supply chain. Furthermore, SSCM explicitly integrates social and environmental dimensions with economic considerations into a triple bottom line (TBL), and includes both forward and reverse supply chains [2]. Some have extended the trend of integrated annual sustainability and financial reporting [3] to now call for integrated bottom line (IBL) performance [4], while building on the impacts green supply chains have on performance [5]. In the process of creating a sustainable development strategy for

a firm, it is important to recognize and include links in the supply chain. Tuni et al. [6] concluded that companies beyond the focal firm are responsible for up to 80% of overall supply chain emissions. They take this further with the example of Marks & Spencer estimating that the environmental impact of its supply chain is 90%, with only 10% attributed to the focal firm. Precisely because of these emissions, environmental performance cannot be adequately addressed at a single company level anymore. On the contrary, it is necessary to have an integrated approach encompassing the supply chain. The implementation of Corporate Social Responsibility (CSR) in supply chains also seems to be important. The issue of CSR touches on the issues of economy, society, and values, as well as relations with the environment. In this sense, CSR issues include the interests of various stakeholder groups, consumers, local communities, and the natural environment. Voluntary CSR initiatives can contribute to the attractiveness and credibility of enterprises, making these initiatives highly attractive among companies with good practices. The idea is to make business better, make voluntary commitments for the local community, the environment and reduce the occurrence of negative phenomena.

There is a growing body of literature regarding the SSCM implementation. This includes studies such as the TBL frameworks (see for example, references [7,8]) drivers and barriers of implementation [9], and intersections with the UN's Sustainable Development Goals [10]. In the field of TBL framework research, a conceptual framework/model is normally derived from conducting systematic literature review or case study research. A total of 21 SSCM framework articles were identified from the sample of 311 over a period of 29 years (1990–2019) by means of a keyword search (i.e., SSCM + framework) through Science Citation Index Expanded, Social Sciences Citation Index, and Scopus databases. The selected literature is further categorized as SSCM implementation model [11], SSCM conceptual model [12], SSCM performance model [13], and SSCM contextual factor [14], whose corresponding numbers of each category are 2, 10, 7, and 2, respectively. Analyzing the literature sample using these categories reveals that the framework/model development in the area of SSCM implementation has gained less attention. These models are important as they help guide industries in taking a systematic approach to the adoption of SSCM practices [15]. We therefore argue that the examination and development of an implementation framework is a topic that will bridge a gap in the literature, and add value to both practitioners and the emerging SSCM field of research.

The purpose of this study is to develop an SSCM implementation framework grounded in a literature review and categorizing SSCM published empirical practices. Even though some efforts have been made to conceptualize the SSCM implementation framework, we still have ample opportunities to understand this complex implementation topic. Bahinipati and Panigrahi [11] develop a reduced implementation framework but confine its attention to barriers and risks in the decision making of alternatives for SSCM practices. Also, Luthra and Mangla [16] view adopting SSCM practices as a strategic matter, but they fail to formulate SSCM strategies to a framework level, instead treat implementation strategies as SSCM drivers such as “management involvement, support and commitment.” Therefore, it remains unclear on the connection between a sound implementation strategy and its corresponding practices. Then, we discuss RQ1. In response to sustainability requirements, what sustainable supply chain strategies and practices appear in the literature? The gap between theories and field practices also happens in the SSCM context. Most SSCM conceptual frameworks are developed through literature review [12,17], which may not represent implementation practices in the real world. In contrast, building an implementation framework through case studies seems more desirable as a way to resemble real-world practices. However, the scholarly SSCM literature remains a more credible source to conduct an implementation study. Thus, we arrive at RQ2. Are SSCM practices in the literature applicable in an empirical context? In building a framework, it can take different forming logic to structure the components. Ansari and Kant [12] conduct a comprehensive literature review and suggest that the most frequent reference logic used to build SSCM frameworks involves regulatory pressures/legal requirements, risk management, information transparency, and green purchasing. Meanwhile, some apparently critical SSCM logic such as corporate sustainability strategy and sustainable process management are used less often to construct such frameworks [12].

Gosling and colleagues [18] consider three SSCM strategies (i.e., reactive, contributive, and proactive) but apply supply chain leadership and learning to construct a conceptual SSCM framework. Similarly, Luthra and Mangla [16] operationalize SSCM strategies as implementation drivers or barriers instead of a matter of corporate strategy. Our study aims to build the SSCM implementation framework from the perspectives of corporate sustainability strategy and sustainable practices. Taking all discussions, we formulate the RQ3. What constitutes a generalizable SSCM implement framework? In the discussion section, we try to answer the question (RQ4.) whether Reactive, Cooperative and Dynamic Models can also be used in European countries and by North and South Americans.

Given the evolution of this field and emerging trends in environmental and social sustainability, we examine the critical reasons why companies implement SSCM practices. In searching for an evidence-based implementation model, we can propose a generalizable model. To help enable this model's development, we examine a global hub of supply chain activity within a Taiwanese business context to characterize SSCM practices that integrate issues of economic, environmental and social performance. Our classification process allows for the development of multiple SSCM models: reactive, cooperative, and dynamic. The methods employed in this study will help to define general operating principles and basic guidelines for decision-makers considering the implementation of a specific model. The contribution of this work is important to the advancement of both practice and theory. It provides an understanding of SSCM implementation practices enabling decision-makers to choose an optimal SSCM strategy. For researchers, insights from this study provide a foundation for the further development and improvement of the models, hypothesis development, and empirical testing of SSCM relationships.

In this study, we first propose that a review of the relevant literature is necessary to get an understanding of important practices and ground theory development regarding SSCM. Next, we conduct multiple case studies to propose a basic generalizable SSCM implementation model, and then further developed into more detailed models of implementation practices. To provide further insight and contributions to the field, we investigate the three primary research questions. To answer these questions, we next describe the research methodology in Section 2 and present our results in Section 3. In Section 4 we discuss the three major research questions our findings, before providing conclusions and contributions in Section 5.

## 2. Research Methodology

Since the focus of this study is exploratory. The use of qualitative data collection methods will best allow the development and understanding of important SSCM practices and implementation insights [19–22]. We conducted a literature review using content analysis to answer research questions, as this is a common practice in SCM studies [23]. A literature review methodology provides a systematic and reproducible design for collecting and evaluating the extant body of scholarly works on the topic studied. Through summary and critical analysis of the selected literature, these methods provide a more comprehensive understanding of the topic and form the basis for answering research questions [24]. A good review structure and process are essential to produce quality results, theory development, and drawing objective conclusions. Therefore, we adopted a literature review process [25,26] approach as shown in Figure 1.

In the exploration stage, we aim to achieve two objectives. Firstly, we conduct a literature review to search for ideas and gaps in the SSCM implementation framework, which was discussed in the previous section. In particular, we were looking for strategic practices in responding to sustainability requirements found within the SSCM framework literature. We identified key categories of the SSCM framework based on the literature. Then, we identified a plausible gap in the research and derive research questions to expand the understanding of the SSCM implementation field. Secondly, we conduct another narrative literature review with a focus on RQ1, as this will provide a foundation and reference structure to conduct content analysis and theory development in the next stage as suggested

by Yin [27] (p. 40). The review of our findings is presented in the result section and serves as the input to step 5.

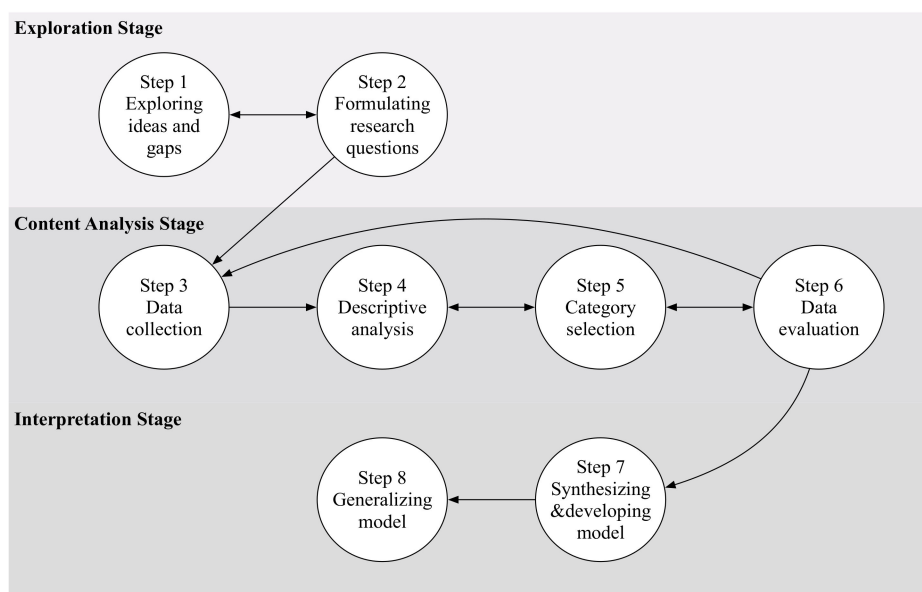


Figure 1. Literature review process framework.

Our objective was to develop a conceptual SSCM implementation framework based on the extant literature. Peer-reviewed journal articles represent a relevant unit of analysis for this study. In answering RQ2, we adopted a condensed set of SSCM literature by focusing on a specific and representable subset under the context of the Taiwanese SCM environment. At this stage, case study methods suggested by Yin [27] are a useful research strategy supporting theory development. This same approach has been used by several authors Azevedo et al. [28]; Pagell and Wu [29] to develop SSCM theory. Therefore, we adopted a similar approach at this stage to conduct an analysis of multiple cases. Unlike typical case data collection through interviews and other documentation, we collected data from sets of case study related papers from a search of the literature. Then, the content analysis stage consisted of four interconnected and recursive steps:

1. Data collection: The data to be collected is defined in terms of inclusion and exclusion criteria. Additionally, the unit of analysis (i.e., the single paper) is defined.
2. Descriptive analysis: Formal aspects of the papers assessed, for example, the number of publications. This forms the background for the theoretical analysis.
3. Category selection: Analytic categories or dimensions selected to structure the literature review and analysis. In this study, the analytic categories are derived in the exploration stage.
4. Data evaluation: The data analyzed and sorted according to the structural categories. Specifically, we assess category frequencies to suggest relevant SSCM practices for corresponding category.

In step 3 of this study, we focused on Taiwanese SSCM practices as the real-world context, and SSCM practices published in the Taiwanese Journals as primary sources of categories of cases to induce an SSCM implementation framework. The selection of cases was based on the Airiti Library online database, the most comprehensive collections of scholarly Journals in the Chinese research community, which was available to help conduct our targeted literature search (most selected papers were written in Chinese with English abstracts and some papers were written in English). From the historical development perspective, the sustainable considerations of the supply chain first evolved into the green supply chain in early 2000, and then become more widely labeled as SSCM in mid-2000 [30]. Next, using the keywords of “Sustainable Supply Chain” and “Green Supply Chain” between the years 2000 and 2018, it yielded 180 papers including journal papers, conference papers, and unpublished theses.

Further criteria were used to determine what publications would be included in our study: (1) case study-based journal paper; (2) case descriptions in Taiwanese context; (3) SSCM related implementation and practices. This resulted in 19 papers that specifically address SSCM implementation in Taiwan.

In step 4, the data analysis consists of anticipatory conceptual model development and simultaneous data coding, reduction, display, and conclusions testing. Therefore, step 4 has a recursive connection with step 5. In particular, we use the derived categories from step 1 as primary categories to conduct descriptive analysis. Due to the diversity of data sources, a descriptive analysis of case studies must be guided by a protocol to specify relevant evidence in step 6. The protocol in this study specifies a minimum amount of content analysis in operational terms. For example, in the content analysis on for 19 papers, we focused on: (1) whether the paper describes SSCM practices; (2) how do the practices within the paper respond to sustainability requirements; (3) is there an application of real-life SSCM empirical practices in the field instead of theoretical hypothesis; and (4) identification of the critical SSCM practices that are common across firms and industries.

In step 7 of the interpretation stage that addresses RQ3, we synthesized the findings in the Taiwanese context to develop a basic model composed of SSCM implementation strategies and corresponding practices. This model represents a plausible and practical SSCM implementation framework. In step 8, then, we departed from the focused Taiwanese context to include a broader scope and developed three more detailed models. Finally, we could develop a generalizable model with adaptive flexibility so it could be generalizable to organizations globally.

### 3. Results

In this section, we first present the literature review findings on the categories of strategic existing SSCM practices. Next, we provide analysis results of SSCM implementation in the Taiwanese context to formulate a basic implementation model. Finally, three progressive models are developed to constitute SSCM implementation frameworks.

#### 3.1. The Categories and Practices of SSCM Implementation

From historical SCM development perspectives, sustainability requirements are a new business mandate for firms to balance their financial performance with environmental and social responsibilities [31]. According to their strategic priorities and available resources, organizations may take different strategic responses to sustainability and form a unique strategic SSCM model [32]. We proposed an implementation framework consisting of three broad strategic responses (namely reactive, cooperative, and dynamic), which represent firms' business priorities and their underlying strategic mindsets. The conception of reactive, cooperative, and dynamic strategies was grounded on prior SSCM literature, including that of Azevedo et al. [29], Markman and Krause [33], Rebs et al. [34], and Walker and Jones [35]. These responses vary in the strategic intent of organizations ranging from passivity to increasing activeness as well as in complexity from less to more complicated levels. For example, dynamic strategies [36] take SSCM practices as dynamic capabilities that enable organizations to take flexible and adaptive responses to rapid changing environments, and achieve competitive advantage [37,38]. In this sense, a dynamic strategy has a high level of active intension and adaptive capabilities. Considering the idea that the implementation of SSCM practices is a long-term, complex, and complicated process, the proposed framework is expected to help organizations to co-create supply chains and to help choose SSCM strategies tailored to their needs and aspirations [39–41].

An effective implementation framework, composed of both grounded theory and corresponding practices, can translate SSCM implementation theory into practice [42]. The proposed implementation framework in this study can explain various aspects of implementation, including SSCM drivers, connections with firms' strategies, and expected performance. For this study, SSCM practices refer to a set of business processes among supply chain partners guiding sustainable activities. These practices have been extensively examined in the literature and are typically categorized into the upstream,



focal company, and downstream practices. Practices related to upstream suppliers include green purchasing and raw material procurement, green packaging and transportation, material recycling, strategic supplier collaboration, and supplier sustainability assessment [43]. Practices pertained to internal operations of the focal company include but are not limited to green product design, green process design and planning, green manufacturing and remanufacturing, waste management, emission reduction, and green packaging [9,12,29]. Practices related to downstream customers cover collaborative inventory management, green warehousing, green shipping and distribution, product recycling and reverse logistics, and corporate green image management [11,18,44]. Some practices across the whole supply chain consist of green product innovation and design [44], supply chain integration system [45], ISO 14001 environmental management system [46], and corporate social responsibility [47].

Based on the content review of the literature, we found that the SSCM implementation practices typically extend existing SCM practices into the realm of sustainability [30]. Markman and Krause [33] argue that sustainable practices should satisfy two inseparable criteria: (1) they must enhance ecological health, meet ethical standards to enhance social justice, and improve economic vitality; and (2) they must prioritize the environment first, society second, and economics third. We adopt this line of thinking and suggest these criteria can be used to distinguish between typical SCM practices and SSCM practices. Combining conceptual strategic responses and sustainable practices, we were able to develop SSCM categories and their corresponding practices outlined in Table 1. Our approach provides a foundation for further content analysis and model development.

**Table 1.** Categories and their description of strategic responses in sustainable supply chain management (SSCM).

Category	Description of Practices
Reactive	Adopting a minimum set of actions to comply with sustainable regulations and requirements such that organizations can focus on managing their economic performance.
Cooperative	Going beyond basic compliance and a myopic profitability goal, organizations adopt sustainability as collaborative actions toward environmental friendliness and socially responsibility.
Dynamic	Embracing sustainability as part of the organization's vision to build dynamic capabilities and competitive advantage, while actualizing "environment-first, society-second, and economics-third" principles in practices.

### 3.2. Why Look at SSCM Implementation in a Taiwanese Context

Taiwan, officially recognized as the Republic of China, shipped US\$317.38 billion worth of goods around the globe in 2017, which earned Taiwan the rank of 17th worldwide for transportation commerce in 2017 (Statista, 2018). It is worth noting that each product exported from Taiwan is associated with multiple global supply chains and some generalizability of practices. The development of Taiwan's global supply chain began in early 1990 [48,49], while the development of SSCM in Taiwan first appeared in literature in early 2007 [43,50,51]. With Taiwan being involved in highly globalized supply chain development, each of the selected SSCM papers reflects certain successful field practices. Given the significant importance of the global supply chains involved with products originating in Taiwan, this country context provides an important area of study and future opportunity for further exploration. We argue that the development of SSCM implementation frameworks through Taiwanese cases is a viable and feasible research strategy. To achieve this aim, we next address RQ2 to answer whether SSCM practices appeared in the literature are applied in business organizations, as reflected in the papers reviewed in this study. The first cycle of content analysis of 19 published papers identifies topic areas, industry type, primary SSCM drivers, and strategic intent toward sustainability requirements. We have summarized the results in Table 2.

**Table 2.** Summary of evidence concerning focus topics, SSCM drivers and strategic intents [19,43,52–66].

ID	Author (Year)	Industry	Topic Area	SSCM Driver	Strategic Intent Toward Sustainability		
					Reactive	Cooperative	Dynamic
1	Chien & Shih (2007)	Manufacturing (Electronics)	Financial and environmental performance	Regulatory and customers' pressure	Reduce emissions, waste, non-hazardous and non-toxic materials to comply with regulations	Green manufacturing to maintain competitiveness	
2	Chiou et al. (2007)	Manufacturing (Information and Electronics)	Green supplier selection and assessment	Environmental and regulatory requirements	Apply green supplier assessment to enhance green competence of upstream supply chain	Implement environmental management system to manage sustainability	Improve corporate social responsibility
3	Fang & Lin (2007)	Manufacturing (TFT-LCD)	Building competitive advantage through GSCM	Organizational vision and strategies	Comply with all environmental requirements in operations	Collaborate with customers and suppliers to enhance environmental performance and gain competitive advantage	
4	Chen et al. (2008)	Manufacturing (Textile)	Maintaining market competitiveness in green clothing supply chain	Environmental and customers' requirements	Comply with environmental regulations	Implement green manufacturing to maintain competitiveness	
5	Han, Wang, & Tzeng (2010)	Manufacturing (Printing)	Components of green supply chain implementation	Environmental requirement and organizational strategy	Implement material inspection system to sure procurement compliance	Work with upstream suppliers to build green supply chain	
6	Liao & Lian (2010)	Manufacturing (Consumer Electronics)	Enhancing sustainable performance	Regulatory requirement and organizational strategy	Comply with environmental regulations	Execute green manufacturing among supply chain partners	Adopt green marketing and green design strategies
7	Lin, Wen, & Lin (2011)	Manufacturing (Computer)	Enhancing sustainable performance	Regulatory requirement and global trends	Comply with regulatory regulations	Implement green manufacturing to enhance environmental performance	
8	Tseng, Lai, & Wang (2011)	Manufacturing (ICT)	Drivers and practices of GSCM	Environmental requirement and organizational strategy	Comply with environmental regulations	Implement green manufacturing to ensure environmental performance	Assume corporate social responsibility
9	Hsu & Liang (2011)	Manufacturing (TFT-LCD)	Green procurement performance	Regulatory and customers' requirement	Comply with regulatory regulations	Collaborate with suppliers to enhance green procurement	

Table 2. Cont.

ID	Author (Year)	Industry	Topic Area	SSCM Driver	Strategic Intent Toward Sustainability		
					Reactive	Cooperative	Dynamic
10	Chen & Han (2012)	Manufacturing (Printing)	Environmental branding	Environmental requirement and organizational strategy	Comply with environmental regulations	Implement green manufacturing to build environmental branding	Take green manufacturing as branding strategy
11	Rau et al. (2013)	Manufacturing (Computer)	Green supplier selection to improve environmental performance	Regulatory and social responsibility	Comply with regulatory regulations	Select better suppliers to reduce environmental impacts	
12	Tsai & Yen (2013)	Manufacturing (Electrical and Electronics)	Business impacts in response to sustainability	Environmental and regulatory requirements	Comply with environmental regulations	Collaborate with suppliers to improve environmental performance	
13	Chen et al. (2014)	Manufacturing (Electronics)	Environmental and economic performance	Regulatory requirement and firm competitiveness	Comply with environmental regulations	Select better suppliers to reduce environmental impacts	Assume social responsibility to manage sustainability
14	Wang & Yu (2014)	Service (Restaurant)	Environmental and social performance	Social responsibility	Comply with regulatory regulations	Collaborate with suppliers to improve environmental performance	Assume social responsibility
15	Liu (2015)	Manufacturing (Electronics)	Environmental and social performance	Environmental and regulatory requirements	Comply with regulatory regulations	Implement green manufacturing	Assume social responsibility
16	Lee & Yu (2015)	Manufacturing (Semiconductor)	Environmental and operational performance	Environmental and regulatory requirements	Comply with regulatory regulations	Implement green manufacturing and reverse logistics	Include green design into product design process
17	Lo (2016)	Manufacturing (Electronics)	Green supplier management	Environmental awareness and responsibility	Comply with regulatory regulations	Collaborate with suppliers to realize environmental responsibility	
18	Tseng & Chang (2016)	Manufacturing (Electrical and Electronics)	Sustainable supply chain integration	Sustainable responsibility	Build supplier information transparency	Develop supply chain integration system	Assume social responsibility
19	Lin (2016)	Manufacturing (Electrical)	Green energy and environmental performance	Sustainable responsibility	Reduce waste and recycle energy	Implement environmental management system to manage sustainability	Assume social responsibility



All publications are related to manufacturing industries with the exception of one service organization, and research topics focus on environmental performance, green supplier management, and competitiveness. The SSCM drivers among these cases are regulatory requirements, customers' requirements, organizational strategies, and social responsibility, which are consistent with extant SSCM research findings. For the sake of the next phase of the data analysis process, we assigned practices corresponding bundle codes (i.e., R for reactive, C for cooperative, and D for dynamic). With the progressive nature of SSCM bundles, the reactive model is a subset of the cooperative model. Likewise, both the reactive and cooperative models are subsets of the dynamic model.

The second cycle of content analysis of SSCM practices was used to verify our conjectures in the previous step, while simultaneously seeking answers to RQ2. The protocol for this second round of data collection identifies all applicable SSCM practices using quantitative tabulations. The results of the content analysis are summarized in Table 3. Further examination of SSCM practices and adoption provides several observations and insights. First, the adoption of SSCM in Taiwan is consistent with historical accounts of global SSCM development since 2007 [8,67]. This observation can be explained by the fact that Taiwan has close economic and technological connections with western markets [43]. Second, SSCM implementation has gone through two distinct stages. The former stage is mainly an extension of traditional SCM and ends around 2010, during which time the implementation strategies were a combination of reactive and cooperative models. The later stage commenced in 2010 and it shows a clear focus on a dynamic model with SSCM practices about green design and corporate social responsibility [52,53]. The shift of focus into the social dimension is related to a 2014 mandate requiring the inclusion of corporate social responsibility into the annual report of listed companies [67]. This finding is consistent with the concept that regulation is a strong driver of SSCM implementation. Third, academic research and publications lag behind the implementation practices used by practitioners and industries. A supplementary literature search in Google, Google scholar, and Airtiti Library using the same search criteria described in the methodology, produced papers or articles with 83370, 701, and 180 hits, respectively. The articles found in Google search are mainly contributions by industrial practitioners and local SSCM interested groups. The results of this search imply that the actual field adoptions of SSCM in Taiwan are much more significant than what academic publications have been able to capture.

**Table 3.** Descriptive results of SSCM applications by strategic categories.

ID	Author (Year)	R1	R2	R3	R4	R5	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3
1	Chien and Shih (2007)	1		1					1			1				
2	Chiou et al. (2007)	1	1	1		1		1	1			1			1	
3	Fang and Lin (2007)	1	1	1	1	1	1	1	1	1	1	1	1			
4	Chen et al. (2008)	1	1	1	1			1	1	1		1				
5	Han, Wang, and Tzeng (2010)			1		1	1		1		1	1				
6	Liao and Lian (2010)	1	1	1	1	1	1	1	1	1		1		1	1	1
7	Lin, Wen, and Lin (2011)	1	1	1	1		1		1	1	1	1				
8	Tseng, Lai, and Wang (2011)	1	1						1	1			1	1	1	
9	Hsu and Liang (2011)	1	1	1	1	1			1	1	1	1	1			
10	Chen and Han (2012)	1	1	1	1			1	1	1		1	1			1
11	Rau et al. (2013)	1	1	1	1	1				1			1			
12	Tsai and Yen (2013)	1	1		1		1			1			1			
13	Chen et al. (2014)	1	1		1			1	1				1	1	1	
14	Wang and Yu (2014)	1	1	1	1				1	1		1	1	1	1	
15	Liu (2015)	1		1		1		1	1				1		1	
16	Lee and Yu (2015)	1	1		1				1	1			1	1		
17	Lo (2016)				1	1	1			1						
18	Tseng and Chang (2016)					1	1				1				1	
19	Lin (2016)	1	1		1			1							1	
	<b>Subtotal</b>	16	14	12	13	9	7	8	13	12	5	10	10	5	8	2

In understanding the motives of SSCM implementation in Taiwan, the insights derived from the content analysis suggest that customer requirements and regulatory pressures are major drivers. In particular, the growing promotion of corporate social responsibility to public companies in Taiwan

has shifted the SSCM implementation mindset from “reactive” to “dynamic”, while aligning with organizational visions and strategies. This implies that contemporary SSCM drivers are closely related to market competition and social responsibility, and reflected in recent literature [54,55]. The industries examined over the 19 publications include the high-tech industry e.g. [49], traditional manufacturing [58], clean energy industry [68], and the service industry [69]. Taken together, we argue that the proposed SSCM implementation practices (i.e., reactive, cooperative, and dynamic models) derived from the Taiwanese context are consistent with findings in the SSCM literature and establish a plausible basic framework for further generalization.

The strategic intent of sustainability can start to explain how case organizations respond to sustainable requirements. The findings indicate all of the studied organizations take reactive actions and certain cooperative actions, while fewer organizations engage in dynamic strategic actions.

Next, we continue to build connections between strategic categories and SSCM practices (i.e., assign practices to their corresponding categories) through continued content analysis. A foundation of the analysis involves adopting the concept of “bundles” from the operations literature. This means bundles represent a set of best practices impacting the firm’s performance of a specific category [52]. A two-steps process was used to achieve the objective: (1) apply principles suggested by Markman and Krause [33] to generate an SSCM practice pool from the literature review findings; (2) take strategic intent derived from cases as a guideline to sort practices into similar categories. It can be argued that a practice is not easily assigned to a single specific category, or if it belongs in multiple categories. We take the former view as our objective is to build a basic reference model and the categorization is open for adjustment by decision-makers and their organizations. To this end, we categorize SSCM practices into three progressive bundles, as described in Table 4.

**Table 4.** Strategic implementation models and selected SSCM practices.

Category	Coding	Selected SSCM Practices
Reactive	R1	Waste, water, and air management
	R2	Energy consumption and emissions reduction
	R3	Procurement of non-hazardous and non-toxic materials
	R4	Product recovery
	R5	Supplier sustainability assessment
Cooperative	C1	Strategic supply chain collaboration
	C2	ISO 14001 environmental management system
	C3	Green manufacturing
	C4	Reverse logistics
	C5	Supply chain integration system
	C6	Green purchasing
	C7	Green shipping and distribution
Dynamic	D1	Green product innovation and design
	D2	Corporate social responsibility program
	D3	Corporate green image management

### 3.3. General Implementation Model Development

It should be noted that there is no single, universal model. Every industry and every company operates in a specific environment and creates its own unique system of supply chain management. However, there are a number of universal phenomena that affect this sphere, and which are important from the point of view of SSCM. They are commonly characterized as three models that combine economic objectives with the good of society and the environment. The choice to pursue a particular model depends on the strategic intent, resources, and capabilities of the companies that are co-creating these supply chains. This now leads us to unpack the different models and to RQ3 and the development of a general SSCM implement framework.

The reactive model (see Figure 2) is the lightest implementation approach where external pressures are small and internal resources may be limited. In this model, the mindset toward SSCM is risk avoidance in an effort to comply with regulatory requirements. Here a minimum set of SSCM practices is used. Suggested critical practices include waste, water, and air management, energy consumption and emissions reduction, procurement of non-hazardous and non-toxic materials, product recovery, and supplier sustainability assessment.

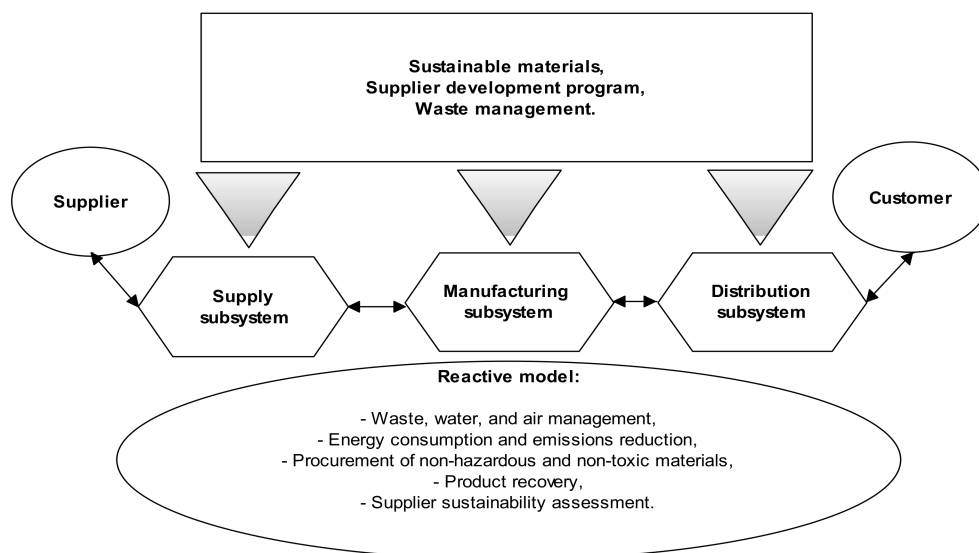


Figure 2. Reactive model.

Implementation of these practices includes:

- Limiting resource consumption; conservation efforts include the use of material-saving and energy-saving technologies.
- Using higher quality components, ensuring a longer product life.
- Optimizing packaging design: efficient packaging design strategies, abiding by regulations and utilizing end-of-life of packaging material [70].
- Replacing harmful materials with less harmful or harmless materials and looking for substitutes among renewable resources.
- Eliminating toxic materials and reducing emissions.
- Cooperating with suppliers who follow the basic guidelines for sustainable development.
- Suspending cooperation with companies using unethical practices.

Implementation of the above guidelines in Figure 2 improves not only some environmental performance but also have an impact on the improvement of economic performance. This is supported by Petljak et al. [71]. However, when merely striving to meet basic legal requirements and comply with applicable standards, the impact of the reactive model on society and the ecosystem is relatively small. Here, the organizations' co-creating supply chains focus on the economic aspects of creating the SSCM. This reactive model can be considered the basic form of SSCM and the foundation for implementing more dynamic practices of managing a sustainable supply chain. When these practices are part of the supply chain, managers and decision-makers should consider implementing more comprehensive development activities. With this model as a foundation, managers can next try to take on an environmental performance and a more comprehensive approach to fulfilling social needs. This is affirmed by Beske-Janssen and coauthors [72] who emphasized that it is necessary to develop SSCM models and design supply chains that are less harmful or even create new value for sustainable development.

The cooperative model presented in Figure 3 builds on the reactive model. This model represents a mindset shift from reactive to cooperative, in which the focal company views SSCM as a business opportunity instead of a reaction to meeting external requirements. Therefore, SSCM is treated as a strategic business responsibility with resources allocated for integrating SSCM practices with supply chain members and business processes.

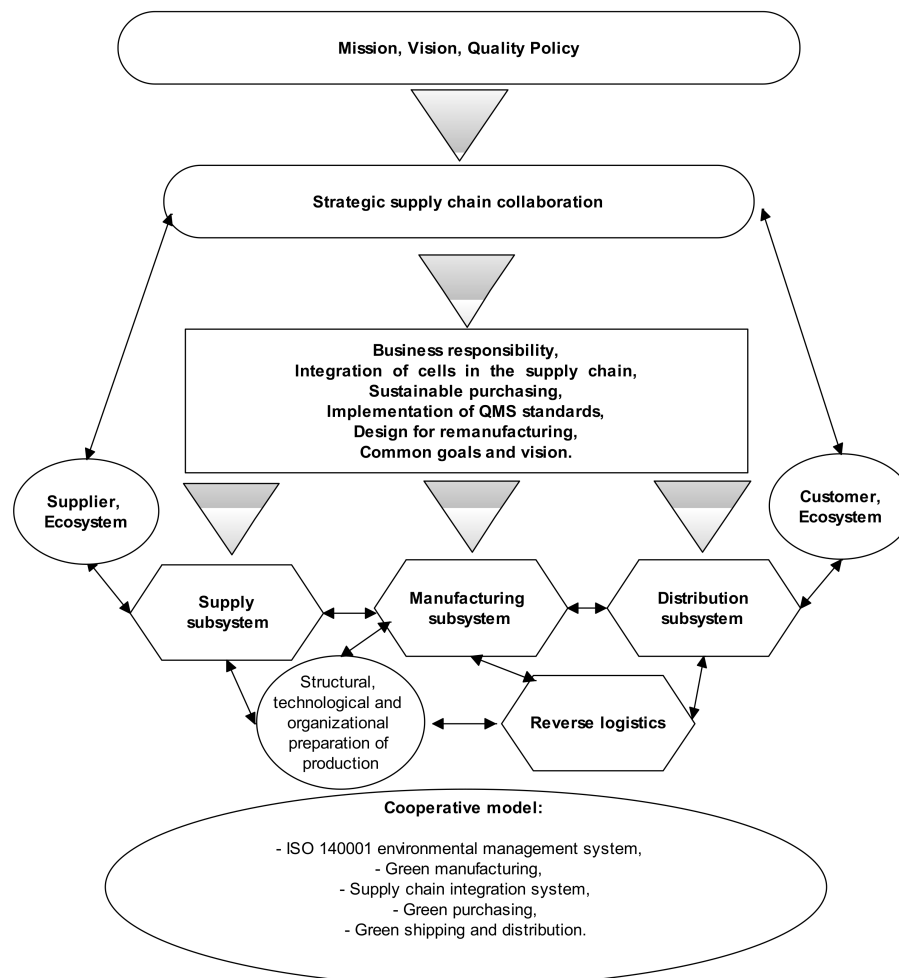


Figure 3. Cooperative model.

The strategy presented in this model utilizes the best practices from the reactive approach and expands them to additional aspects of implementation that have a significant impact on the external environment. The most important improvements offered by the cooperative model include:

- Development of a common mission, vision, and goals. Supply chain management strategy is perceived as many mutually harmonized elements and processes, the most important of which are: full focus on the needs of internal and external clients [73], development of basic values, and implementation of a standard accepted and recognized by the enterprises co-creating the supply chain, defining transparent rules and management procedures, and focusing on the needs of the client and the external environment. It should be stated that the policy of sustainable supply chain management is a strategic declaration for organizations that co-create the supply chain and sets out actions for all enterprises in this chain. However, the model must be implemented and developed in such a way that the supply chain can achieve the set of defined objectives [74].
- Sustainable procurement. The goal of sustainable procurement extends its basic green purchasing to consider environmental and social aspects of diversity, safety, human rights, philanthropy, and local procurement [75].

- Implementation of the requirements of the ISO 14001 standard. The goal of this standard is to provide organizations co-creating the supply chain with guidelines for the development of an effective environmental management system that will facilitate the implementation of environmental and economic objectives [76]. It is also important that the standard is compatible with other management systems and supports them in an ecological context [77,78]. We should also agree with Maletic et al. [79], who recognize that ISO 14001 can be an effective standard with supporting systems for pursuing sustainable development. The importance of ISO 14001 in the context of improving the SSCM is supported by Chiarini [80] and de Sousa Jabbour and co-authors [81], who claim that based on the requirements of ISO 14001, a firm can develop a multi-stage model for developing partnerships with suppliers in supply chains and also is improving the green efficiency. Also, Wu et al. [82] emphasize that enterprises in developing Asian countries treat ISO 14001 as a very important element of SSCM. It should be noted that ISO 14001 does not cover all aspects of sustainable development [83], so it must be properly developed to enable integration with this model and other business systems.
- Improvement of reverse logistics. The increased interest in trends such as closed-loop systems and reverse logistics involving products and materials is something an enterprise is dealing with regarding their management of environmental performance. Waste reduction has become one of the main areas of scientific interest in industrialized countries. Due to legal, economic, and technical limitations, enterprises are looking for new solutions that would enable the reuse of products while capturing value in new ways [84]. That is why sustainability is part of solutions aimed at capturing value from used materials and re-introducing them into the value stream. The re-use of products is economically attractive due to the costs of disposal, availability of raw resources, and new opportunities to create added value [85].
- Implementation of QMS standards. Quality management, on a large scale, is important to improve key supply chain management processes [86]. Quality management in the supply chain is inextricably linked to enterprises co-creating the supply chain, customers and external stakeholders. The ability to adapt to constantly changing market conditions and the effective use of innovative solutions to improving quality management systems will continue to be necessary to improve and integrate basic areas of sustainable supply management.
- Lasting partnerships. The basis for increasing the competitiveness of the supply chain is wide-ranging integration and cooperation. This includes enabling the selection and implementation of a common strategy aimed at increasing the efficiency of the supply chain while considering the needs of individual enterprises [87]. Building sustainable relationships with suppliers is based on the principles of sustainable development and provides opportunities for innovation. A company can learn from its suppliers and cooperate with them on new initiatives in the area of sustainable development [88,89].
- Structural, technological and organizational preparation of production. There is a constant need to improve production technologies. Improvements include increasing productivity, increasing quality levels, integrating processes, and reducing negative impacts on the environment. These activities should be targeted, including technology development in the overall strategy, analyzing life cycle impacts, and introducing constant supervision while implementing processes that increase staff competence.

The cooperative model is recommended for organizations that strive to simultaneously improve economic efficiency and implement sustainable solutions in the supply chain. Sustainable development, in this case, can begin with efforts to improve management practices for better economic and/or operational performance, which leads to better social performance. Conversely, integration of social concerns in operations brings economic benefits to firms both directly and indirectly. This does not mean that firms necessarily focus on social performance before economic consideration, or vice versa. Rather, progression in sustainability can occur in parallel with performance, which influences improvements in other areas [90]. The guidelines presented in this model more closely represent the

approach adopted by European enterprises. This model would find support among the management staff of European enterprises and companies operating in developing countries as it promotes balanced solutions that improve supply chains both economically and socially. These considerations are confirmed by Wang and Dei [91] where they find that internal SSCM practices have a positive impact on a firm's environmental performance and social performance. Moreover, environmental performance and social performance are positively related to economic performance. It is worth emphasizing that Pagell and Wu [29], in their case study research, have concluded that those organizations that follow a sustainable supply chain strategy are successful in aligning their financial goals with environmental and social goals, and are successful in ensuring transparency in their business processes.

The model with the most potential for a positive impact on the environment, society, and ecosystems, is a dynamic model (see Figure 4).

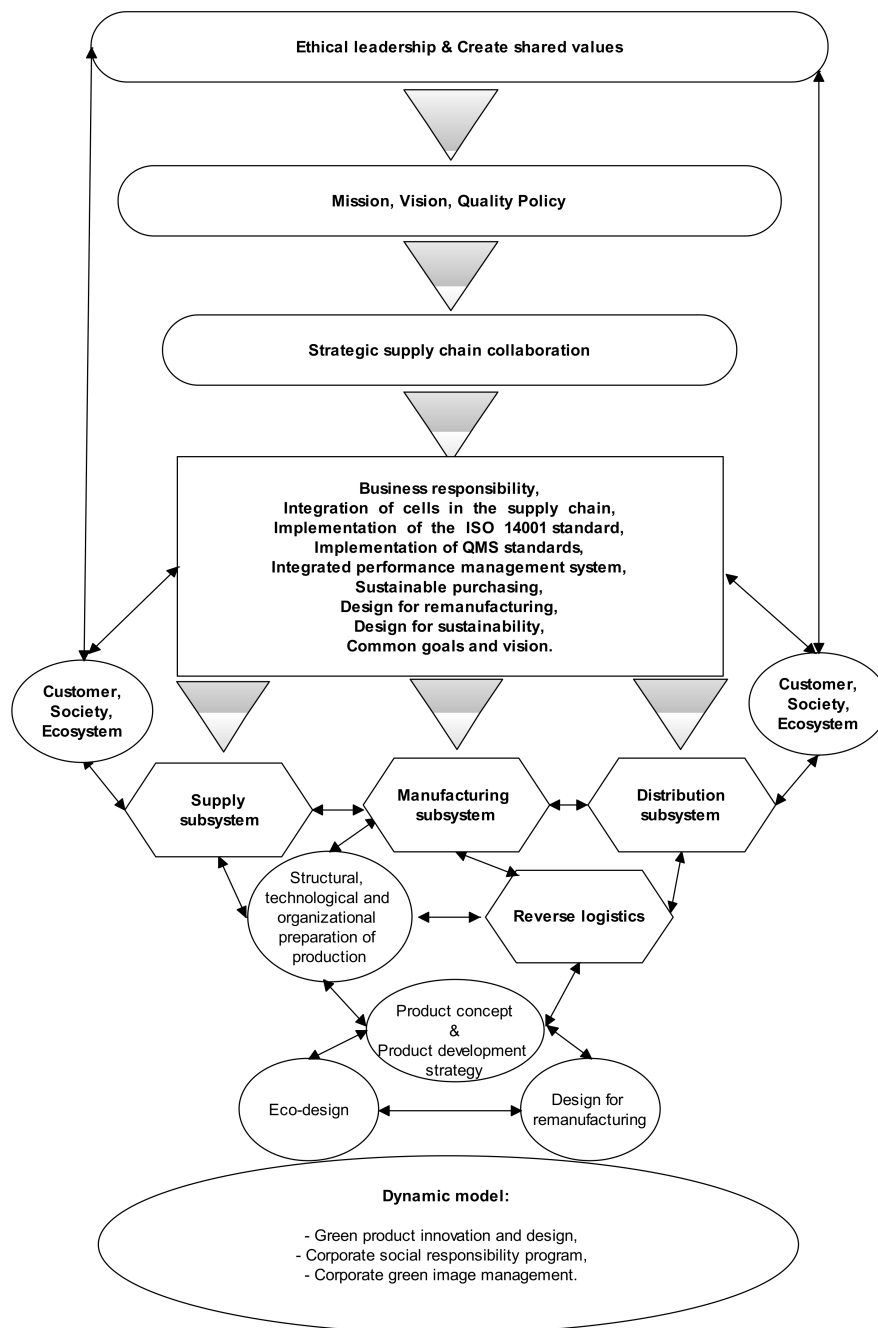


Figure 4. Dynamic model.



A dynamic model further extends the scope of problem-solving to ethical responsibility and value creation in a dynamic environment. Here, the focal company views SSCM as a new business opportunity. As a result, the focal company actively collaborates with its' upstream suppliers and downstream customers on value creation processes. These dynamic SSCM practices include:

- Ethical leadership. Development of ethical management standards and the implementation of solutions that mobilize employees to fully engage in the implementation of adopted strategies [19]. This view is shared by Wichmann et al. [92], who recognize that employee involvement is crucial in the proper implementation of SSCM practices.
- Green product innovation and design. Identification of environmental performance related to the product and taking this into account in the design process at the initial stage of its development, reduction of component consumption, extensive use of recycling, and searching for more environmentally friendly alternative components, design, and energy-saving products.
- Corporate social responsibility programs. Provide a positive influence on business culture. This influence is visible in the treatment of employees, organizational culture, relations with investors, contractors, subcontractors, and suppliers, as well as in relationships with local communities and public administrations.
- Corporate green image management. The presence of a green image has become an important element of the supply chain strategy [93]. Providing stakeholders with reliable information on the environmental aspects of products produced in the supply chain is part of this. Image management also includes demonstrating care for the ecological performance of the logistics processes.
- High-quality recycling. Recycling involves the recovery of materials without contamination, to serve as raw materials for subsequent production systems of the same or similar quality products [70]. This model leans towards circular supply chain management as the concept that minimizes the amount of waste and maximizes the possibility of material reuse [94,95].

New performance metrics include the level of green-design, community relations, green image and marketing. With a focus on the social aspect of sustainability and innovative green design, the dynamic model can turn SSCM into a competitive advantage in changing the business environment for a focal company [96]. The dynamic model, when applied to supply chains, can bring about distinct values in both the business and social context. In the business context, by strengthening internal environmental management and social responsibility management, firms can improve both environmental and social performance. Firms working closely with suppliers can promote corporate environmental performance. The continuous improvement of environmental and social performance will ultimately improve economic performance. According to Dubey et al. [97], sustainability can provide a significant competitive advantage and improved economic efficiency in the long run. In a social context, firms become a complementary social unit complementing national level actions promoting global sustainable development effort [10]. This idea is similar to the approach suggested by Markman and Krause [33] which recognizes that in supply chain management, or any other business activity must follow ethical standards to enhance ecological health and further social justice. When firms demonstrating ethical leadership through prioritizing the environment first, society second, and economics, their sustainable supply chain assumes an institutional role to achieve sustainable development goals. It should be noted that this is a long-term and complicated process that requires full involvement on the part of supply chain enterprises co-creating value and is brought down to the level of employees understanding of this value within enterprises. The efforts undertaken in this model can result in a positive and multifaceted shift in supply chain practices that positively impact society and consumers. This in turn, translates into an improvement in the economic situation of an entire supply chain.

#### 4. Discussion

Our contributions to the field from this study come from building on a foundation of information regarding sustainable supply chain strategies and best practices from a narrative literature review. We next discuss the answers and insights from our primary research questions. Our first question, RQ1, explores how firms respond to sustainability requirements by reviewing what supply chain practices appear in the literature. What we find is that firms take strategic actions to respond to sustainability requirements depending on their intents, available resources, and capabilities. When looking for primary categories of SSCM implementation, we find evidence of reactive, cooperative, and dynamic models best capture the implementation of SSCM and a broad array of specific actions firms have taken. Further insights come from exploring what we see happening within a global hub of supply chain activity using a Taiwanese supply chain context to address RQ2, as we align field practices with the outcomes of the content analysis identified in the results section of this study. Based on the content analysis of 19 published studies, we can create a generalizable SSCM implementation model. Finally, we can provide more detailed information about SSCM implementation frameworks to help researchers and practitioners while addressing RQ3 when looking for what constitutes a generalizable framework.

It should be noted that although the models in this study have been developed on the basis of an analysis of enterprises operating in Taiwan, we believe they are generalizable for several reasons. First, in the exploration stage of this study, we conducted a search and review of the literature from mainstream journals so the findings regarding strategies and practices uncover attributes of the most common practices that are also international. Next, the basic implementation model derived from Taiwanese cases is consistent with the existing literature. Third, Taiwanese business development is global in its reach with supply chain development that has already been integrated with leading western enterprises for over 30 years. Finally, the proposed models are flexible as related to the specificity of an industry or area of operation. Therefore, we believe organizations can successfully implement these practices within enterprises operating in different country contexts such as Europe and the USA.

Currently, in European countries, sustainable development is a source of innovation, especially organizational and technological, which translate into increased profits and revenues. Also, the perception of the supply chain as an environmentally friendly entity contributes to a significant improvement of its image. Within the European Union (EU), more and more enterprises are and will be interested in implementing sustainable development practices [98]. For supply chains, this means taking actions towards innovation and transparency, which are new opportunities for development and increase of competitiveness and attractiveness on the market. Striving to maintain ecological and social sustainability, transforms the landscape of competition. For supply chain enterprises, this means changing thinking about products, technologies, procedures, processes and business models [99]. The models developed in this study are a response to the needs of organizations operating globally, and throughout Europe, and can be applied to the integration of sustainability at three different levels. The reactive model is applicable for Eastern European countries where there are they may be lagging infrastructural and technological development and research. Supply chains operating within these conditions need a baseline understanding of their supply chain systems. A systems understanding can lead to better solutions, allowing companies to implement foundational practices for sustainable development in a relatively short time.

Cooperative and dynamic models can find opportunities for advancement in Western European countries. In this global, yet regional context supply chains are flexible, adapt to new conditions, and can also carry out complex change management projects [16]. It is worth noting that Europeans increasingly understanding that supply chains derive from the environment, social and human capital in order to generate profit for owners and shareholders. This integrated understanding of sustainability and supply chains provides a path to creating jobs. In return, there are expectations that these supply chain systems will give much more to society and the environment in which they function, that business will be run in a different, more balanced manner, and that it will eventually become a standard [100].

Meeting the expectations of the public, external stakeholders, and supply chains themselves in the areas outlined in this study will significantly support the development of the integrated bottom line (IBL) valuing environmental and social performance.

North and South Americans can also find value in the models developed in this study. There are many opportunities for the application of reactive, cooperative and dynamic models in the implementation of sustainability into supply chains. There is already a shift underway in the focus on environmental management and operations, moving from local optimization of environmental factors to consideration of the entire supply chain [53]. Sustainability is a timely topic that captures an increasing focus on performance from public interests, legislation, and competitive opportunity. For those analysts and stakeholders evaluating performance across industries, there are already hundreds of environmental, social, and governance (ESG) performance metrics. See for example, MSCI Global Socrates, TruCost, CDP, and Bloomberg databases. These databases provide insight into each publicly traded firm in the United States and information on their supply chains. Research involving corporate social responsibility reports shows how companies are already integrating environmental and social performance within internal operations and external supply chains with institutional pressure as a leading driver of change [101]. Findings show different facets of environmental and social practices upstream and downstream in supply chains and implementation frameworks can help with further integration of sustainability into supply chains and business practices.

## 5. Conclusions

Sustainable supply chain strategies and practices have evolved. Where in the past supply chains were a non-competitive, overlooked element of strategy before the 1970s, today, they are a synergistic and dynamic part of corporate competitive advantage. For competitive Taiwanese firms, there are many challenges and hidden opportunities in recognizing and integrating SSCM. Suppliers are critical to the competitive success of firms and the success of implementation projects. The fact that future supplier performance is expected to continuously improve and involve new attributes of sustainable performance adds to the complexity of the essential role of the supply chain management professionals. These decision-makers will need to understand several foundational elements of SSCM. They also must have the skills to then operationalize these elements through reactive, cooperative and dynamic development of their organizations while working with their supply chain partners.

Building on several premises, sustainability is a dynamic system's approach to business management (Tables 3 and 4). Recognizing opportunities to integrate sustainability in an organization is an important part of management. Understanding that the elements of SSCM, no matter the model applied, contribute to the creation of value and success of larger systems, such as a supply chain, ecosystem services, and society. These foundational elements include the following: green purchasing, waste and water management, energy consumption and emission reduction, green manufacturing, product recovery, and reverse logistics. With the growing awareness of environmental protection and dynamic business environments, firms can opt for taking more active strategies to realize the potential opportunities sustainable business practices can provide. In this sense, our proposed SSCM implementation framework can be a useful guide for both researchers and practitioners.

Limitations of this study include but are not limited to a qualitative approach to the identification of articles from a single country context, content analysis and coding in an attempt to develop generalizable insights within one region of global supply chain management. Fortunately, a literature review provides a foundation for later model development and generalization. The scope of the study does not go into the analysis of complex relationships between environmental, social, and financial performance or extensions of performance across other members of supply chains. We also do not look at testing relationships to firm performance or internal social sustainability attributes as we attempt to take a more integrated approach to the development of implementation models. In the future, researchers can extend the research in this study to a larger context and conduct empirical research based on the evolution of SSCM implementation.

SSCM is an issue of managing perceptions, performance measurement, transparency, and trade-offs. Transforming the supply chain business model to include environmental and social sustainability performance is the corporate strategy of the future. Because much of a firm's impacts are likely to be in its supply chain, it makes sense to integrate the supply chain as early as possible through considering supply chains when making decisions about internal operations, in new product development, and business model development. For researchers, understanding how SSCM implementation unfolds and leveraging SSCM provides impacts globally provides opportunities for further research. To make SSCM a reality, technology providers, businesses, citizens, and policymakers need to collaborate to develop the right policies and infrastructure to drive environmental and social performance, economic growth, and motivate sound business model changes to ensure the sustainability of manufacturers and our communities for future generations.

**Author Contributions:** Conceptualization, D.Z. and J.T.; methodology, J.T., D.Z. and R.S.; formal analysis, D.Z., J.T. and R.S.; data curation, D.Z. and J.T.; writing—original draft preparation, D.Z., J.T. and R.S.; writing—review and editing, D.Z., J.T. and R.S.; visualization, D.Z.; supervision, D.Z., J.T. and R.S.; project administration, D.Z.; funding acquisition, D.Z.

**Funding:** This research received no external funding.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

- Roy, V.; Schoenherr, T.; Charan, P. The thematic landscape of literature in sustainable supply chain management (SSCM): A review of the principal facets in SSCM development. *Int. J. Oper. Prod. Manag.* **2018**, *38*, 1091–1124. [\[CrossRef\]](#)
- Elkington, J. Enter the triple bottom line. In *The Triple Bottom Line: Does It All Add Up?* Henriques, A., Richardson, J., Eds.; Earthscan: London, UK, 2004.
- Eccles, R.; Krzus, M. *The Integrated Reporting Movement: Meaning, Momentum, and Materiality*; Wiley: Hoboken, NJ, USA, 2014.
- Sroufe, R. Integration and organizational change towards sustainability. *J. Clean. Prod.* **2017**, *162*, 315–329. [\[CrossRef\]](#)
- Green, K.; Zelbst, P.; Meacham, J.; Bhaduria, V. Green supply chain management practices: Impact on performance. *Supply Chain Manag.* **2012**, *17*, 290–305. [\[CrossRef\]](#)
- Tuni, A.; Rentizelas, A.; Duffy, A. Environmental performance measurement for green supply chains: A systematic analysis and review of quantitative methods. *Int. J. Phys. Distrib. Logist. Manag.* **2018**, *48*, 765–793. [\[CrossRef\]](#)
- Carter, C.R.; Rogers, D.S. A framework of sustainable supply chain management: Moving toward new theory. *Int. J. Phys. Distrib. Logist. Manag.* **2008**, *38*, 360–387. [\[CrossRef\]](#)
- Seuring, S.; Müller, M. From a literature review to a conceptual framework for sustainable supply chain management. *J. Clean. Prod.* **2008**, *16*, 1699–1710. [\[CrossRef\]](#)
- Luthra, S.; Garg, D.; Haleem, A. Green supply chain management: Implementation and performance—a literature review and some issues. *J. Adv. Manag. Res.* **2014**, *11*, 20–46. [\[CrossRef\]](#)
- Costanza, R.; Daly, L.; Fioramonti, L.; Giovannini, E.; Kubiszewski, I.; Mortensen, L.F.; Wilkinson, R. Modelling and measuring sustainable wellbeing in connection with the UN Sustainable Development Goals. *Ecol. Econ.* **2016**, *130*, 350–355. [\[CrossRef\]](#)
- Bahinipati, B.K.; Panigrahi, S.S. A framework for sustainable supply chains: Evaluation of implementation barriers. *Int. J. Intell. Enterp.* **2018**, *5*, 231–265. [\[CrossRef\]](#)
- Ansari, Z.N.; Kant, R. Exploring the Framework Development Status for Sustainability in Supply Chain Management: A Systematic Literature Synthesis and Future Research Directions. *Bus. Strategy Environ.* **2017**, *26*, 873–892. [\[CrossRef\]](#)
- Qorri, A.; Mujkic, Z.; Kraslawski, A. A conceptual framework for measuring sustainability performance of supply chains. *J. Clean. Prod.* **2018**, *189*, 570–584. [\[CrossRef\]](#)
- Dubey, R.; Gunasekaran, A.; Papadopoulos, T.; Childe, S.J.; Shibin, K.T.; Wamba, S.F. Sustainable supply chain management: Framework and further research directions. *J. Clean. Prod.* **2017**, *142*, 1119–1130. [\[CrossRef\]](#)

15. Seman, N.A.A.; Zakuan, N.; Jusoh, A.; Arif, M.S.M.; Saman, M.Z.M. Green supply chain management: A review and research direction. *Int. J. Manag. Value Supply Chain*. **2012**, *3*, 1–18. [\[CrossRef\]](#)
16. Luthra, S.; Mangla, S.K. When strategies matter: Adoption of sustainable supply chain management practices in an emerging economy's context. *Resour. Conserv. Recycl.* **2018**, *138*, 194–206. [\[CrossRef\]](#)
17. Chen, I.J.; Kitsis, A.M. A research framework of sustainable supply chain management: The role of relational capabilities in driving performance. *Int. J. Logist. Manag.* **2017**, *28*, 1454–1478. [\[CrossRef\]](#)
18. Gosling, J.; Jia, F.; Gong, Y.; Brown, S. The role of supply chain leadership in the learning of sustainable practice: Toward an integrated framework. *J. Clean. Prod.* **2017**, *140*, 239–250. [\[CrossRef\]](#)
19. Eisenhardt, K.M. Building theories from case study research. *Acad. Manag. Rev.* **1989**, *14*, 532–550. [\[CrossRef\]](#)
20. Miles, M.B.; Huberman, A.M. *Qualitative Data Analysis: A Sourcebook of New Methods*; Sage Publications: Thousand Oaks, CA, USA, 1984.
21. Mayring, P. Qualitative content analysis: Theoretical background and procedures. In *Approaches to Qualitative Research In Mathematics Education*; Bikner-Ahsbahr, A., Knipping, C., Presmeg, N., Eds.; Springer: New York, NY, USA, 2015.
22. Sroufe, R.; Curkovic, S.; Montabon, F.; Melnyk, S.A. The new product design process and design for environment: "Crossing the chasm". *Int. J. Oper. Prod. Manag.* **2000**, *20*, 267–291. [\[CrossRef\]](#)
23. Gold, S.; Seuring, S.; Beske, P. Sustainable supply chain management and inter-organizational resources: A literature review. *Corp. Soc. Resp. Env. Manag.* **2010**, *17*, 230–245. [\[CrossRef\]](#)
24. Hart, C. *Doing a Literature Review: Releasing The Research Imagination*; Sage: London, UK, 2018.
25. Cooper, H.M. *Synthesizing Research: A Guide for Literature Reviews*; Sage: Thousand Oaks, CA, USA, 1998; Volume 2.
26. Seuring, S.A. Assessing the rigor of case study research in supply chain management. *Supply Chain Manag.* **2008**, *13*, 128–137. [\[CrossRef\]](#)
27. Yin, R.K. *Case Study Research and Applications: Design and Methods*; Sage Publications: Thousand Oaks, CA, USA, 2014.
28. Azevedo, S.G.; Carvalho, H.; Machado, V.C. The influence of green practices on supply chain performance: A case study approach. *Transp. Res. Part E Logist. Transp. Rev.* **2011**, *47*, 850–871. [\[CrossRef\]](#)
29. 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. [\[CrossRef\]](#)
30. Tundys, B.; Wiśniewski, T. The Selected Method and Tools for Performance Measurement in the Green Supply Chain—Survey Analysis in Poland. *Sustainability* **2018**, *10*, 549. [\[CrossRef\]](#)
31. Fonseca, L.M.; Domingues, J.P.; Pereira, M.T.; Martins, F.F.; Zimon, D. Assessment of Circular Economy within Portuguese Organizations. *Sustainability* **2018**, *10*, 2521. [\[CrossRef\]](#)
32. Sroufe, R.; Melnyk, S. *Developing Sustainable Supply Chains to Drive Value, Management Issues, Insights, Concepts, and Tools—Foundations*; Business Expert Press: New York, NY, USA, 2017; Volume I.
33. Markman, G.D.; Krause, D. Theory building surrounding sustainable supply chain management: Assessing what we know, exploring where to go. *J. Supply Chain Manag.* **2016**, *52*, 3–10. [\[CrossRef\]](#)
34. Rebs, T.; Brandenburg, M.; Seuring, S. System dynamics modeling for sustainable supply chain management: A literature review and systems thinking approach. *J. Clean. Prod.* **2019**, *208*, 1265–1280. [\[CrossRef\]](#)
35. Walker, H.; Jones, N. Sustainable supply chain management across the UK private sector. *Supply Chain Manag.* **2012**, *17*, 15–28. [\[CrossRef\]](#)
36. Teece, D.J.; Pisano, G.; Shuen, A. Dynamic capabilities and strategic management. *Strat. Manag. J.* **1997**, *18*, 509–533. [\[CrossRef\]](#)
37. Beske, P. Dynamic capabilities and sustainable supply chain management. *Int. J. Phys. Distrib. Logist. Manag.* **2012**, *42*, 372–387. [\[CrossRef\]](#)
38. Markley, M.J.; Davis, L. Exploring future competitive advantage through sustainable supply chains. *Int. J. Phys. Distrib. Logist. Manag.* **2007**, *37*, 763–774. [\[CrossRef\]](#)
39. Brandenburg, M.; Rebs, T. Sustainable supply chain management: A modeling perspective. *Ann. Oper. Res.* **2015**, *229*, 213–252. [\[CrossRef\]](#)
40. Reefke, H.; Ahmed, M.D.; Sundaram, D. Sustainable supply chain management—Decision making and support: The SSCM maturity model and system. *Glob. Bus. Rev.* **2014**, *15*, 1S–12S. [\[CrossRef\]](#)
41. Wu, Z.; Pagell, M. Balancing priorities: Decision-making in sustainable supply chain management. *J. Oper. Manag.* **2011**, *29*, 577–590. [\[CrossRef\]](#)



42. Nilsen, P. Making sense of implementation theories, models and frameworks. *Impl. Sci.* **2015**, *10*, 53–60. [[CrossRef](#)] [[PubMed](#)]
43. Chiou, C.-Y.; Wang, P.-Y.; Chen, H.-C.; Yeh, C.-Y. Green Supplier Selection and Assessment in GSCM Using Analytic Hierarchy Process (AHP) for Information and Electronic Industry. *J. E-Bus.* **2007**, *9*, 147–176.
44. Chiou, T.-Y.; Chan, H.K.; Lettice, F.; Chung, S.H. The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan. *Transp. Res. Part E Logist. Transp.* **2011**, *47*, 822–836. [[CrossRef](#)]
45. Vachon, S.; Klassen, R.D. Extending green practices across the supply chain: The impact of upstream and downstream integration. *Int. J. Oper. Prod. Manag.* **2006**, *26*, 795–821. [[CrossRef](#)]
46. Arimura, T.H.; Darnall, N.; Katayama, H. Is ISO 14001 a gateway to more advanced voluntary action? The case of green supply chain management. *J. Envir. Econ. Manag.* **2011**, *61*, 170–182. [[CrossRef](#)]
47. Ageron, B.; Gunasekaran, A.; Spalanzani, A. Sustainable supply management: An empirical study. *Int. J. Prod. Econ. Rev.* **2012**, *140*, 168–182. [[CrossRef](#)]
48. Arntzen, B.C.; Brown, G.G.; Harrison, T.P.; Trafton, L.L. Global supply chain management at Digital Equipment Corporation. *Interfaces* **1995**, *25*, 69–93. [[CrossRef](#)]
49. Tyan, J.C.; Wang, F.K.; Du, T.C. An evaluation of freight consolidation policies in global third party logistics. *Omega* **2003**, *31*, 55–62. [[CrossRef](#)]
50. Chien, M.-K.; Shih, L.-H. Practices of Green Supply Chain Management: Pressures, Drives and Organization's Performance with Taiwanese Electrics and Electronics Industry. *Npust Hum. Soc. Sci. Res.* **2007**, *1*, 72–98.
51. Fang, S.-C.; Lin, S.-L. Green Supply Chain Management as Competitive Advantage a Perspective of Intellectual Capital. *Chaoyang Bus. Manag. Rev.* **2007**, *6*, 79–102.
52. Shah, R.; Ward, P.T. Lean manufacturing: Context, practice bundles, and performance. *J. Oper. Manag.* **2003**, *21*, 129–149. [[CrossRef](#)]
53. Linton, J.D.; Klassen, R.; Jayaraman, V. Sustainable supply chains: An introduction. *J. Oper. Manag.* **2007**, *25*, 1075–1082. [[CrossRef](#)]
54. Chen, S.-S.; Chen, P.-Y.; Yu, M.; Chen, Y.-C. An empirical study on drivers affecting gscm practices from the institutional theory. *Commer. Manag. Quart.* **2014**, *15*, 247–278.
55. Liu, Y.-C. The Role of Internal Audit Department in Green Supply Chain: The Perspective of Stakeholder Theory. *Int. Audit. Quart.* **2015**, *88*, 62–65.
56. Chen, Y.-H.; Lin, G.-M. Taiwan Stock Exchange Corporation Rules Governing the Preparation and Filing of Corporate Social Responsibility Reports by TWSE Listed Companies. *Secur. Serv. Rev.* **2015**, *633*, 115–116.
57. Chen, L.M.; Han, F.N. The Construction of Assessment Indicators for Ecolabelling of Printing. *J. Cagst* **2012**, *34*, 16–40.
58. Chen, Y.-S. The driver of green innovation and green image—green core competence. *J. Bus. Eth.* **2008**, *81*, 531–543. [[CrossRef](#)]
59. Hsu, C.H.; Liang, G.S. Constructing Performance Evaluation Model of Suppliers' Purchase in Green Supply Chain. *Mart. Quart.* **2011**, *20*, 71–84.
60. Lee, C.W.; Yu, H.M. The Influence of Lean Manufacture and Green Supply Chain on Product Design. *J. Adv. Eng.* **2015**, *10*, 163–168.
61. Liao, P.W.; Lian, S.B. The study discussion on green environmental issues: A case of after-sales maintenance services company in Taiwan Sony. *East-Asia Rev.* **2010**, *467*, 15–31.
62. Lin, K.Y.; Wen, Y.F.; Lin, S.C. Evaluation of Green Supply Chain Management of PC component suppliers in Taiwan by Applying AHP Method. *J. Innov. Res. Dev.* **2011**, *7*, 126–137.
63. Lo, S.M.S. How Supplier Management Practices Affect Exchange Cost when Going Green: An Empirical Study. *Manag. Rev.* **2016**, *35*, 71–92.
64. Rau, H.; Lai, C.H.; Fang, Y.T.; Hus, H.Y.; Kuo, T.C.; Shiang, W.J. Optimal Multi-stage Green Suppliers Selection with Consideration of Product Life Cycle. *J. Adv. Eng.* **2013**, *8*, 151–159.
65. Tsai, S.; Yen, S.Y. From the Perspectives of Policy and Industry to Analyze the EU Environmental Directives WEEE. *Bio-Ind. Tech. Manag. Rev.* **2013**, *4*, 51–96.
66. Tseng, Y.H.; Lai, K.H.; Wang, Y.C. A study on practices of green supply chain management and performance - the moderating role of information technology. *Commer. Manag. Quart.* **2011**, *12*, 23–51.
67. Han, F.N.; Wang, S.M.; Tzeng, S.Y. Constructing the Essential Items of Green Supply Chain in Taiwan's Printing Industrials. *J. Cagst* **2010**, *12*, 122–147.



68. Lin, C.S. Realization of cycling economic using green technology integration. *Econ. Outlook Bimon.* **2016**, *168*, 115–119.
69. Wang, Y.-F.; Yu, T.-A. Can We Implement Green Management in Restaurant? *J. Hosp. Tour.* **2014**, *11*, 219–242.
70. Kalmykova, Y.; Sadagopan, M.; Rosado, L. Circular economy—From review of theories and practices to development of implementation tools. *Resour. Conserv. Recycl.* **2018**, *135*, 190–201. [[CrossRef](#)]
71. Petljak, K.; Zulauf, K.; Štulec, I.; Seuring, S.; Wagner, R. Green supply chain management in food retailing: Survey-based evidence in Croatia. *Supply Chain Manag.* **2018**, *23*, 1–15. [[CrossRef](#)]
72. Beske-Janssen, P.; Johnson, M.P.; Schaltegger, S. 20 years of performance measurement in sustainable supply chain management—what has been achieved? *Supply Chain Manag.* **2015**, *20*, 664–680. [[CrossRef](#)]
73. Lu, H.E.; Potter, A.; Sanchez Rodrigues, V.; Walker, H. Exploring sustainable supply chain management: A social network perspective. *Supply Chain Manag.* **2018**, *23*, 257–277. [[CrossRef](#)]
74. Zimon, D.; Domingues, P. Proposal of a Concept for Improving the Sustainable Management of Supply Chains in the Textile Industry. *Fibers Text. East. Eur.* **2018**, *128*, 8–12. [[CrossRef](#)]
75. Yun, G.; Yalcin, M.G.; Hales, D.N.; Kwon, H.Y. Interactions in sustainable supply chain management: A framework review. *Int. J. Logist. Manag.* **2018**, *30*, 1–35. [[CrossRef](#)]
76. De Vries, H.J.; Bayramoglu, D.K.; van der Wiele, T. Business and environmental impact of ISO 14001. *Int. J. Qual. Reliab. Manag.* **2012**, *29*, 425–435. [[CrossRef](#)]
77. Fonseca, L.M.; Domingues, J.P. Exploratory Research of ISO 14001: 2015 Transition among Portuguese Organizations. *Sustainability* **2018**, *10*, 781. [[CrossRef](#)]
78. Zimon, D. The Impact of Implementation of the Requirements of the ISO 14001 Standard for Creating Sustainable Supply Chains. *Qual. Access Success* **2017**, *18*, 99–101.
79. Maletic, M.; Podpečan, M.; Maletic, D. ISO 14001 in a corporate sustainability context: A multiple case study approach. *Manag. Environ. Qual. Int. J.* **2015**, *26*, 872–890. [[CrossRef](#)]
80. Chiarini, A. Designing an environmental sustainable supply chain through ISO 14001 standard. *Manag. Environ. Qual. Int. J.* **2012**, *24*, 16–33. [[CrossRef](#)]
81. De Sousa Jabbour, A.B.L.; Jabbour, C.J.C.; Latan, H.; Teixeira, A.A.; de Oliveira, J.H.C. Quality management, environmental management maturity, green supply chain practices and green performance of Brazilian companies with ISO 14001 certification: Direct and indirect effects. *Transp. Res. Part E Logist. Transp. Rev.* **2014**, *67*, 39–51. [[CrossRef](#)]
82. Wu, J.Z.; Santoso, C.H.; Roan, J. Key factors for truly sustainable supply chain management: An investigation of the coal industry in Indonesia. *Int. J. Logist. Manag.* **2017**, *28*, 1196–1217. [[CrossRef](#)]
83. Pesce, M.; Shi, C.; Critto, A.; Wang, X.; Marcomini, A. SWOT Analysis of the Application of International Standard ISO 14001 in the Chinese Context. A Case Study of Guangdong Province. *Sustainability* **2018**, *10*, 3196. [[CrossRef](#)]
84. Mastrogiacomo, L.; Barravecchia, F.; Franceschini, F. Service recycling and ecosystems: An intriguing similarity. *Inter. J. Qual. Serv. Sci.* **2016**, *8*, 555–562. [[CrossRef](#)]
85. Meng, K.; Lou, P.; Peng, X.; Prybutok, V. Quality-driven recovery decisions for used components in reverse logistics. *Int. J. Prod. Res.* **2017**, *55*, 4712–4728. [[CrossRef](#)]
86. Yu, Y.; Huo, B. Supply chain quality integration: Relational antecedents and operational consequences. *Supply Chain Manag.* **2018**, *23*, 188–206. [[CrossRef](#)]
87. Gualandris, J.; Kalchschmidt, M. Customer pressure and innovativeness: Their role in sustainable supply chain management. *J. Purch. Supply Manag.* **2014**, *20*, 92–103. [[CrossRef](#)]
88. Sinha, A.K.; Anand, A. Development of sustainable supplier selection index for new product development using multi criteria decision making. *J. Clean. Prod.* **2018**, *197*, 1587–1596. [[CrossRef](#)]
89. Miemczyk, J.; Johnsen, T.E.; Macquet, M. Sustainable purchasing and supply management: A structured literature review of definitions and measures at the dyad, chain and network levels. *Supply Chain Manag.* **2012**, *17*, 478–496. [[CrossRef](#)]
90. Sroufe, R. *Integrated Management: How Sustainability Creates Value for Any Business*; Emerald Publishing Limited: Bingley, UK, 2018.
91. Wang, J.; Dai, J. Sustainable supply chain management practices and performance. *Ind. Manag. Data Syst.* **2018**, *118*, 2–21. [[CrossRef](#)]

92. Wichmann, B.K.; Carter, C.R.; Kaufmann, L.; Wilson, J.R. Making environmental SCM initiatives work—Moving beyond the dyad to gain affective commitment. *J. Supply Chain Manag.* **2016**, *52*, 21–40. [[CrossRef](#)]
93. García-Arca, J.; Prado-Prado, J.C.; Gonzalez-Portela Garrido, A.T. “Packaging logistics”: Promoting sustainable efficiency in supply chains. *Int. J. Phys. Distrib. Logist. Manag.* **2014**, *44*, 325–346. [[CrossRef](#)]
94. De Angelis, R.; Howard, M.; Miemczyk, J. Supply chain management and the circular economy: Towards the circular supply chain. *Prod. Plan. Contr.* **2018**, *29*, 425–437. [[CrossRef](#)]
95. Geissdoerfer, M.; Morioka, S.N.; de Carvalho, M.M.; Evans, S. Business models and supply chains for the circular economy. *J. Clean. Prod.* **2018**, *190*, 712–721. [[CrossRef](#)]
96. Schulz, S.A.; Flanigan, R.L. Developing competitive advantage using the triple bottom line: A conceptual framework. *J. Bus. Ind. Mark.* **2016**, *31*, 449–458. [[CrossRef](#)]
97. Dubey, R.; Gunasekaran, A.; Childe, S.J.; Papadopoulos, T.; Fosso Wamba, S. World class sustainable supply chain management: Critical review and further research directions. *Int. J. Logist. Manag.* **2017**, *28*, 332–362. [[CrossRef](#)]
98. Leszczynska, A. Sustainable supply chain capabilities-factors stimulating the processes and organisational performance. *Int. J. Sustain. Econ.* **2018**, *10*, 263–282.
99. Darkow, I.L.; Foerster, B.; von der Gracht, H.A. Sustainability in food service supply chains: Future expectations from European industry experts toward the environmental perspective. *Supply Chain Manag.* **2015**, *20*, 163–178. [[CrossRef](#)]
100. De Brito, M.P.; Carbone, V.; Blanquart, C.M. Towards a sustainable fashion retail supply chain in Europe: Organisation and performance. *Int. J. Prod. Econ.* **2008**, *114*, 534–553. [[CrossRef](#)]
101. Tate, W.; Ellram, L.; Krichoff, J. Corporate social responsibility reports: A thematic analysis related to supply chain management. *J. Supply Chain Manag.* **2010**, *46*, 19–44. [[CrossRef](#)]



© 2019 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).