

Review

A Retrospective and Foresight: Bibliometric Review of International Research on Strategic Management for Sustainability, 1991–2019

Suparak Suriyankietkaew^{ID} and Phallapa Petison *

Center for Research on Sustainable Leadership, College of Management, Mahidol University,
69 Vipavadee Rangsit Rd., Bangkok 10400, Thailand; suparak.sur@mahidol.ac.th

* Correspondence: phallapa.pet@mahidol.ac.th

Received: 22 August 2019; Accepted: 14 December 2019; Published: 21 December 2019



Abstract: Over the past 30 years, scholars have been calling for modern management theory and research to consider how strategic management tools could be applied to enhance corporate sustainability. While strategic management for sustainability has emerged as a multidisciplinary field, the existing knowledge base has yet to be systematic reviewed. This paper responded to the literature gap by conducting a bibliometric review of strategic management for sustainability. The paper aimed to document the landscape and composition of this literature through the analysis of 988 relevant Scopus-indexed documents. Data analyses found that the strategic management for sustainability knowledge base remained an emergent field with increasing interests from diverse groups of international scholars in various fields, particularly in environmental science, engineering, and strategic business management. Over the past three decades, the literatures have been continuously grown from a few publications in the early 1990s to almost 1000 documents to date. The review found that the most influential journals and authors of this knowledge base were international in scope but predominately from Western developed countries. Five Schools of Thought from author co-citation analysis revealed the intellectual clustering composition of the knowledge base on strategic management for sustainability: corporate sustainability strategy, sustainable waste management, strategic sustainability systems, strategic sustainability management and entrepreneurship, and sustainability assessment strategy. Key topics addressed in this research include the distribution of documents across the most highly cited journals, reflecting the breadth, quality and influential scholars in the strategic management for sustainability knowledge domain, naming of the influential scholars in the field and identification of contemporary foci and research front in the existing literature through the keyword co-occurrence analysis and co-word map. The strategic management for sustainability field has evolved from the key topics related to the green movement at the policy-driven macro level (i.e., ecological or environmental protection/impact, water/waste management and natural resource conservation) to the practicality in organizations with the topics related to social strategic responsibility and business management issues (i.e., corporate strategy, project management, supply chain management, information management, adaptive management, corporate sustainability). In addition to a retrospective, insightful prospective interpretation, practical implication, limitations and future research direction are discussed.

Keywords: strategic management; sustainability; sustainability strategy; sustainability management; sustainable strategic management; environmental strategic management; ecological strategic management; green strategic management; social strategic management; sustainable development; corporate sustainability; bibliometric review; science mapping; knowledge production

1. Introduction

Driven by the global development framework launched by the World Commission on Economic Development (WCED) in 1987, sustainability efforts have evolved at the strategic, macro-level of institutions and societies [1]. According to the WCED [2] (p. 43), “sustainable development aims to meet the needs of the present without compromising the ability of future generations to meet their own needs.” Over time, the concepts of sustainability and sustainable development have been expanded and deeply resonated with the eight Millennium Development Goals (MDGs) for 2015 and the 17 United Nations Sustainable Development Goals (UN SDGs) for 2030. Indeed, the topic of sustainability and sustainable development has emerged as defining essential moral and economic priorities that have guided human development in the 21st century.

In the literature, the topic of sustainable development and sustainability has emerged as an important topic and has highly become an interdisciplinary field with emergent areas, from ecological, environmental, economic, and cultural to social issues [3]. The topic has become an important agenda at country and institute levels. Most recent reports from Intergovernmental Panel on Climate Change (IPCC), Stockholm Resilience Institute and Sustainable Development Solutions Network (SDSN) addressed challenges in achieving sustainable development and sustainability [4–6]. Inevitably, roles of institutes and businesses for society are changing. More institutes have increasingly begun to adopt the topic as a strategic focus, while businesses have long been asked to go beyond profit maximization, care for morality with greater responsibility and embrace a holistic interconnectivity of all systems together (i.e., environment, society and profit) to enhance corporate sustainability [7]. While tensions in corporate sustainability between the traditional triad of economic, environmental and social dimensions occur at different levels in change processes, a systematic framework for simultaneous integration of the triad is called for [8]. In fact, a paradigm shift is required at all levels of the society. As we move forward into the future, a strategic management reorientation for corporate sustainability is much needed. For these reasons, strategic management for sustainability becomes a central investigation in this paper. Since today’s organizations operate in a fast changing environment, ‘strategic management’ has assumed center stage. Conventionally, strategic management stem from military science; its root word of strategy is originated from the word ‘strategos’ in Greek with the meaning of ‘army’ and ‘lead’ [9]. From its original applications in the military and government, contemporary strategic management scholars have long seen its significance in the efforts of businesses to achieve long-term goals and competitive advantage in dynamic environments [10–14]. Increasingly, sustainability strategy is analyzed as a source of competitive advantage [13–15], aimed at enhancing corporate performance [16] and long-term resilience [17].

Both the growth of strategic management and its emerging centrality in the operation of organizations has been well documented in a number of broad-scale bibliometric reviews of research [18–21]. However, the field lacks documentation of ways in which strategic management is being used to achieve ‘sustainability’ goals that balance economic, environmental and social aspirations of the firm. More broadly, we lack information on the extent to which strategic management is being used and studied in relation to sustainability challenges.

This paper responds to this gap in the management knowledge base by using science mapping methodology to review literature on ‘strategic management for sustainability’ (SMS). The key research questions are addressed as follows:

RQ1: What is the size, growth trend, and geographic distribution of knowledge on strategic management for sustainability?

RQ2: What journals, authors and documentation have influenced the international research on strategic management for sustainability?

RQ3: What is the intellectual configuration of the strategic management for sustainability scholarship?

RQ4: What contemporary foci in the strategic management for sustainability literature have the greatest interest from academics?

This ‘science mapping’ review used bibliometric methods to analyze 988 Scopus-indexed, SMS-related documents [22–24]. These included descriptive statistics, citation and co-citation analysis, and co-word analysis.

The review extends the existing literature in four distinct ways. First, it offers a comprehensive retrospective on the evolution of the strategic management for sustainability (SMS) literature that has evolved over the past 30 years. Second, the science mapping methodology used in this review reveals the conceptual structure of this literature and provides intellectual insights into how strategic management can create sustainable organizations and societies. Third, the review provides a benchmark which can be used in assessing the future development of this line of inquiry. Finally, this paper suggests strategic foresight and ways forward to a more synergistic sustainable future.

2. Conceptual Background of the Review

The topic of sustainable development and sustainability has increasingly gained popularity over the past three decades. A bibliometric review of the literature investigated the World’s research landscape in sustainable development and its sub-areas using scientific literature from 2000–2010, and it has previously laid the groundwork for future research [3]. Yet, management studies on strategic management for sustainability (SMS) that employ the bibliometric research are still lacking to date. This paper intends to expand our currently-limited knowledge by reviewing the latest interdisciplinary literature that largely intertwines the prevailing topics of sustainable development, sustainability and strategic management.

More importantly, management research has not yet clearly creation process between traditional strategies and sustainability strategies [25]. When organizations expand their missions to include a broader set of explicit corporate goals (e.g., triple bottom-line), this results increased complexity. The firm is no longer evaluating its success by economic performance alone. An integrative view of corporate sustainability suggests a concurrent balance of the traditional economic, environmental and social triad in order to manage the paradoxical tensions and strategies in corporate sustainability [8]. The incorporation of SDGs into a firm’s mission changes both the internal and external environment of the organization, which lead to a need for different corporate strategies [25]. Thus, scholars have identified strategic management for sustainability as an emergent area of research, both in the strategic management field and sustainability science [25–29].

Strategic management for sustainability (SMS) centers on formulating and implementing business strategies that balance economic competitiveness, social responsibility, and ecological protection [28,29]. In a systematic review of research on strategic management for sustainability, Engert and colleagues [25] yielded a number of relevant findings worthy of note, including:

- Identification of key conceptual strands comprising this literature including strategic sustainability, strategic management for green, ecological, and environmental sustainability; social strategic management, and strategic management for sustainable development;
- One of the first literature reviews that combined the two research disciplines of corporate sustainability and strategic management and integrated corporate sustainability from a strategic management perspective;
- Finding of a growing importance of the integrated field based on the increasing trend in the number of on-topic publications in scientific journals from 1991–2013;
- Discovery that most literature focused heavily on theoretical frameworks and concepts, with the lack of empirical studies;
- Development of a “framework for the integration of corporate sustainability into strategic management of internal and external drivers, and factors supporting or hindering the integration of corporate sustainability into strategic management” (p. 2833)

The authors took note of these findings prior to undertaking our own review of this literature. However, since the Engert et al. [25] paper employed research synthesis as the mode of review, it

was based on a limited ‘slice’ of the literature (i.e., 114 documents). The current review, which used bibliometric techniques, was able to analyze a much larger sample of studies (i.e., 988 documents). Built on the previous bibliometric research, the current review both draws upon and extends findings from this previous effort at understanding the development of literature on strategic management for sustainability.

In this review, we define ‘strategic management for sustainability’ (SMS) as an approach to strategic management that aims to systematically and simultaneously integrate the three sustainability domains (i.e., environmental protection, social responsibility, and economic performance) in order to create long-term values and sustainability outputs (i.e., sustainable competitive advantage, performance impact and triple-bottom-line benefits) and contribute to enhanced sustainability outcomes (e.g., sustainable development and resilience from uncertainties) in firms. Therefore, we conceptualize SMS as a systematic and integrative sustainability-oriented strategy that can help organizations manage opportunities and risks in the environmental, social and economic domains of the firm’s operation. Going beyond the traditional triad and paradoxical tensions in corporate sustainability, the proposed SMS conceptual model addresses the challenges for balance and interdependencies of the triad as well as offers an alternative pathway forward to achieve corporate sustainability, consistent with the previous literature [8,25,28,29]. With this in mind, we propose a conceptual model for SMS research as illustrated in Figure 1.

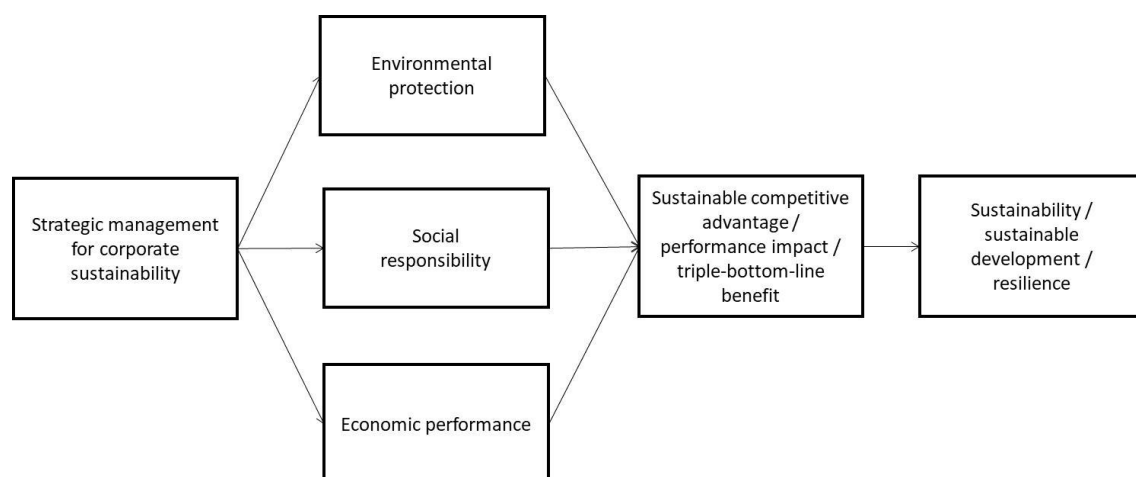


Figure 1. Conceptual model of strategic management for sustainability.

Figure 1 conceptualizes SMS as a process model centered on three explicit sustainability domains: (1) Environmental protection (2) social responsibility, and (3) economic performance. As suggested above, a concurrent systematic integration of these multiple orientations will reshape business operations at all levels towards achievement of sustainable balance of the triad, strategic competitive advantage, stronger corporate performance on the triple-bottom-line in organizations. From a longer-term perspective, integrating all three dimensions systematically and simultaneously will also build the firm’s resilience by improving its ability to withstand shocks and adaptability to uncertainties in the environment over time. This combined effect is what leads to ‘sustainability’ of the firm. In fact, the conceptual model is proposed as a proxy for a sustainability-oriented business model, which will be discussed later [30–32]. This model is therefore adopted as a strategic framework, which underlines the scope of our SMS study. The SMS model is also employed as a conceptual filter during the identification of eligible studies for this review.

3. Materials and Methods

Despite the increasing application of strategic management concepts and tools to sustainability challenges, no bibliometric review has yet been conducted on strategic management for

sustainability [31]. This research review employs science mapping in order to develop a comprehensive picture of knowledge accumulation with respect to a specific management domain in the sustainability literature. Consequently, the review extends prior bibliometric reviews of the strategic management [18–21] and managing for sustainable development and sustainability [3,24,33,34] literatures. This section describes the procedures for identifying the sources for review as well as data analysis and synthesis.

3.1. Identification of Sources

Data in this review study was retrieved from the Scopus index database. The database from the Scopus index was selected as the source for in this study is due to its superior coverage in management fields, comparing to Web of Science (WoS) [35,36]. More importantly, it has been widely used to generate database for systematic research reviews [23,24,35,37,38].

The timeframe of the study was ‘open-ended’ in the document search; the relevant data appear from the period of 1991 to present (February 2019). As well, the scope of the review comprised studies of strategic management for sustainability in all types of organizational setting with a focus on strategic management from a sustainability perspective. This study employed the PRISMA guidelines for conducting systematic research reviews [37]. Initially, the authors explored the SMS field at the broadest perspective using a single key word set, (TITLE-ABS-KEY (“sustainable strategic management”). This yielded 9865 documents. Next, the authors screened only relevant, appropriate keywords, including “strategy” AND “strategic management” AND “sustainability” AND “sustainable development”. These keywords generated a total of 1006 documents. The broad keywords were adopted with an aim to portray the holistic view of the ‘knowledge base’ in the subject of strategic management for sustainability. The data sources in the review consisted of journal articles, editorials, conference papers, books, book review, book chapters, research notes and letters, excluding seven documents (i.e., article in press, short surveys, conference reviews and non-English documents). Then, we screened for articles eligibility and four articles were excluded. Finally, a total of 988 documents were included in the bibliometric syntheses. Figure 2 illustrates a PRISMA diagram used in this review.

3.2. Data Analysis

Meta-data related to the 988 documents data were exported from Scopus to an Excel file for use in data analysis. The collected data comprised the names of authors, their affiliation, titles of articles, keywords, abstracts, sources, and sorted citation data.

Descriptive statistical analyses were conducted using Scopus analytical tools and MS excel. The descriptive analyses documented the size, growth trajectory of publications, and geographical distribution of authors, types of papers, and research methods. Bibliometric analyses included direct citation analysis, co-citation analysis of authors and visualization of similarities in the SMS knowledge base. These approaches to citation analyses have been broadly used to describe the scholarly influence of authors, documents and journals from different perspectives [24,38].

In this review, author co-citation analysis was conducted with VOSviewer software to measure the frequency with which two authors were cited together in the ‘reference lists’ of documents located in the review documents. By analyzing citations in the reference lists, co-citation analysis captures citations from the broader literature beyond Scopus [39]. Co-citation analysis provides a second useful capability in the context of research reviews. By analyzing the occurrence with which any of the two units are cited together, co-citation metrics also offer insights into the ‘similarities’ between them [23,40]. From the perspective of science mapping, this is an indication that those authors share a similarity in theoretical perspective and/or empirical lines of inquiry [41]. In other words, science mapping assumes that when two authors are frequently cited together in the reference lists of research documents (i.e., co-cited), it suggests a similarity in their intellectual interests. For example, if Porter and Baumgartner are frequently ‘co-cited’, the science mapping assumes that the content of their research bears a distinct similarity or affinity. This assumption has led scholars to use author co-citation analysis as a means of

depicting the ‘intellectual structure’ or research traditions, theories and lines of inquiry that define an area of study [23,40]. For example, in a widely cited bibliometric review of research, Nerur and colleagues [19] employed author co-citation analysis to illuminate the intellectual structure of the strategic management literature.

In order to analyze topical trends in SMS research, the authors used keyword co-occurrence analysis, or co-word analysis. In co-word analysis, VOSviewer computed the frequency when two keywords appear together in the title, abstract, and keywords of documents in the review database [40]. Co-word analysis was used to determine the frequency with which topics had been studied within a literature and the relationships among those topics on a network map [23]. In addition, ‘temporal co-word analysis’ was also employed to identify the distribution of contemporary foci over time. The results of temporal co-word analysis could offer insights into the ‘research front’ or topics of most recent interest to scholars within a field of inquiry [42,43].

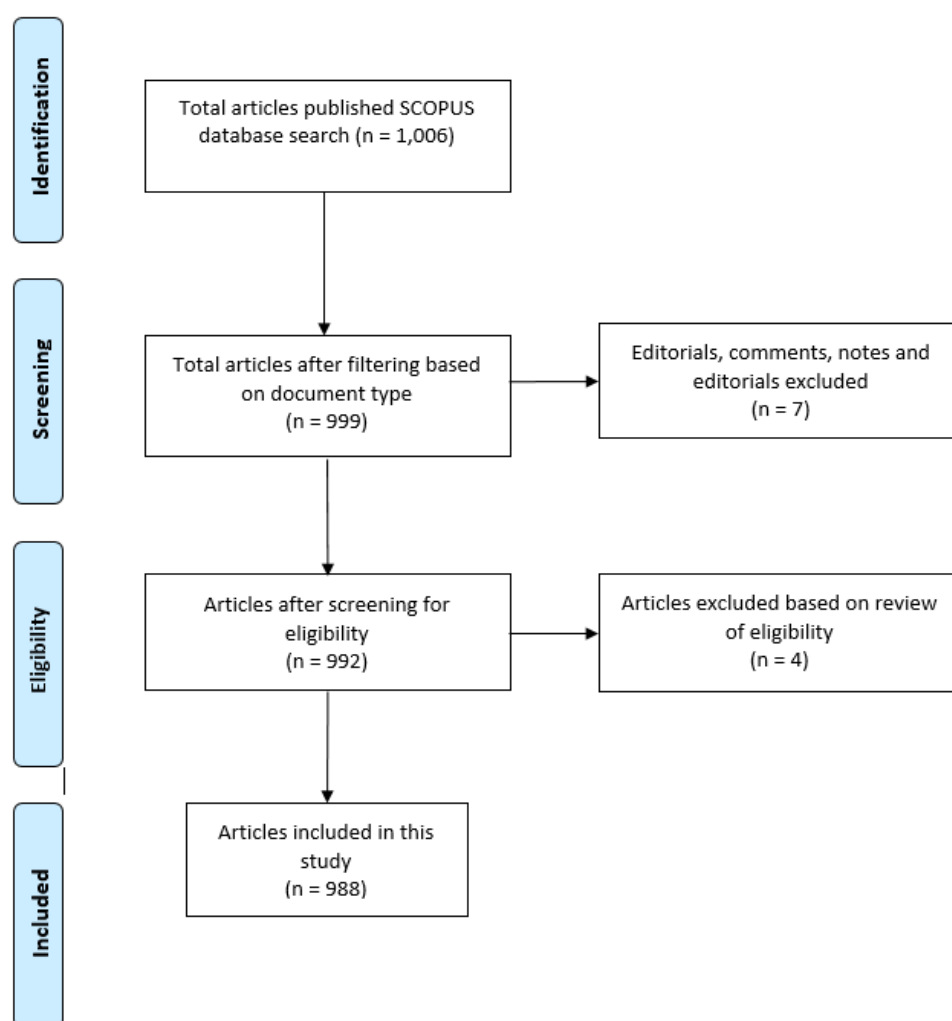


Figure 2. PRISMA diagram and steps in source identification of strategic management for sustainability.

4. Results

This section presents the results of the SMS knowledge base that respond to the four research questions.

4.1. Size, Growth Trend and Geographical Distribution of the SMS Literature

This part answers the first research inquiry regarding the size, growth trend, and geographic distribution of knowledge on the SMS knowledge base. The result shows a total of 988 SMS documents since 1991 to February 2019, which signifies a reasonable body of knowledge. This review included 636 journal articles, 212 conference papers, 78 reviews, 46 book chapters, 7 conference reviews, 5 books and 4 short surveys.

Figure 3 displays that the rising interests in the SMS research study with size, growth trend and distribution of the SMS literature over the last three decades. During the 1990s, only 23 Scopus-indexed, SMS-related documents were published. Growth increased gradually during the 2000s but accelerated dramatically in the years since 2009 (see Figure 3). As well, over the last decade, the interest on the SMS literature has been increased to 765 documents. These data describe a literature that is only beginning to mature.

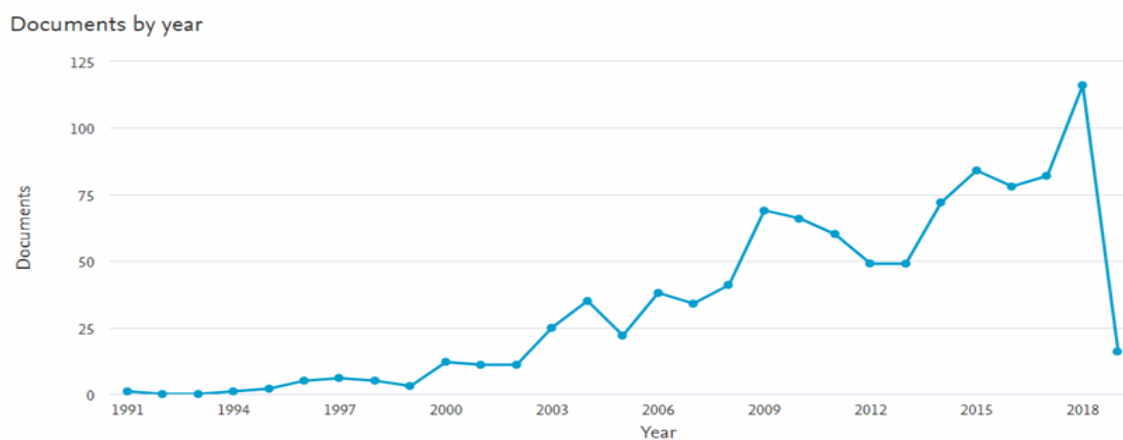


Figure 3. Growth trend of the strategic management for sustainability literature, 1991–2019 ($n = 988$).

The international distribution of the SMS literature is depicted in Figure 4. It presents the top-10 countries and territories that heavily studied and researched about the SMS literature. The majority of the literature was largely stemmed from the developed countries and predominantly from North America (i.e., USA and Canada), Europe (i.e., UK, Italy, Germany, Spain and the Netherlands), and Pacific region (i.e., Australia). In particular, the top-four geographical distribution of the SMS knowledge base was predominant by USA, UK, Canada and Australia. The result is consistent with the recent management literature and the popularity of Anglo-American scholarship in management journals [24,39,44]. Importantly, the interpretation may need a precaution since it does not advocate the greater interest in sustainability in the Anglo-American group but may suggest a scholarly attribute of publication in international management journals. The figure also shows an interesting result since the SMS research from the emerging economies, such as China and Brazil, appear in the list. This may be because of the consequences of the research funding support from the governments and foundations. Data from Scopus further revealed that Chinese government agencies and foundations actually provided the most research funding (41 research grants) during the period of this review (not tabled), consistent with the previous literature [3].

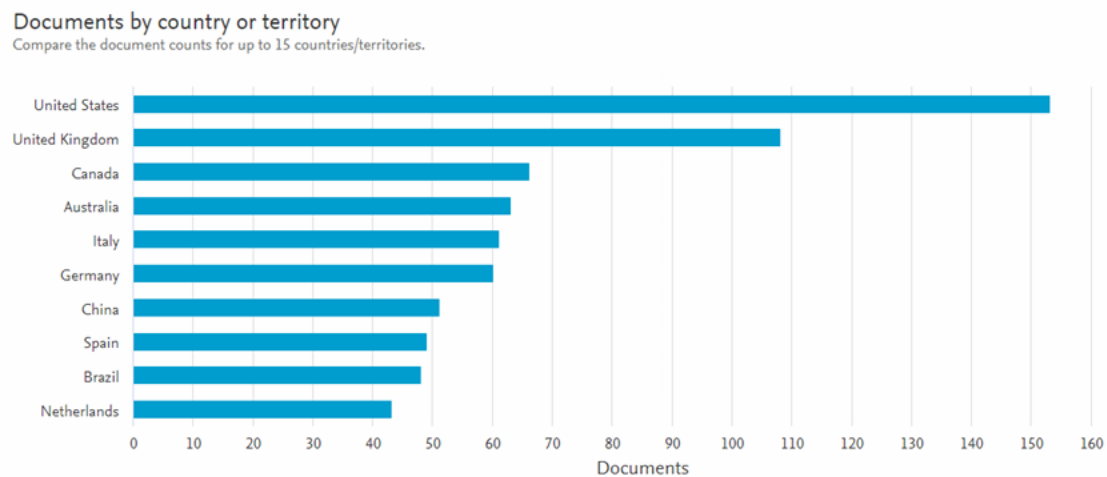


Figure 4. International distribution of the strategic management for sustainability literature, 1991–2019 ($n = 988$).

4.2. Leading Journals, Authors, and Documents of SMS Scholarship

The identification of leading journals, authors, and documents of international scholarship on SMS is the second research inquiry. This review employed three co-citation analyses, particularly journals, scholars, and documents. To identify influential journals, this study included various types of documents. However, the most highly cited sources, with the top-10 citations, in the SMS realm were mainly stem from high-quality journals, as described in Table 1. Table 1 illustrates that all top-10 citations are listed in the first quartile of the Scopus database. The Scopus quartile implies a high inference quality assessment of SMS knowledge base, particularly the first quartile (Q1), as displayed in the table, presents the top end of the spectrum. It therefore reflects the high quality of the publications in the SMS literature. The 10 most highly-cited journals included the total of 5057 Scopus cites and published 135 articles. The distribution of documents across the top-10 journals reflects the breadth, quality and potential scholars in the SMS domain.

Table 1. Top-10 source journals on SMS research, 1991–2019 ($n = 988$).

Rank	Source (Country)	Domain	No. of Documents	Scopus Citations	Scopus Quartile
1	Journal of Cleaner Production (Neth)	Env Science	59	1930	Q1
2	Environmental Science and Policy (Neth)	Geo, Plan & Dev	2	515	Q1
3	Water Resources Management (Neth)	Civil & Struct Eng	11	493	Q1
4	Landscape & Urban Planning (Neth)	Ecology	8	436	Q1
5	Business Strategy and Environment (USA)	Bus & Int'l Man	9	361	Q1
6	Resource, Conservation & Recycling (Neth)	Economics	13	298	Q1
7	Energy (UK)	Building & Const	9	281	Q1
8	Water Resource Research (USA)	Water Sci & Tech	1	272	Q1
9	Journal of Industrial Ecology (USA)	Economics	4	237	Q1
10	Science of Total Environment (Neth)	Env Chem	12	234	Q1

The breadth of the publishing scholarship on the SMS domain is varied. It covers various fields of study, particularly in environmental science, engineer, business and management and economics. It indicates that SMS is broad and multi-disciplinary in general. Table 2 shows co-citation publications.

Table 2. Top-10 journals publishing scholarship on SMS research by co-citation impact.

Rank	Source (Country)	Domain	Scopus Co-Cites	Scopus Quartile
1	Journal of Cleaner Production (Neth) *	Env Science	935	Q1
2	Strategic Management Journal (USA)	Bus & Int'l Man	301	Q1
3	Journal of Business Ethics (Neth)	Arts and Humanities	266	Q1
4	Business Strategy and Environment (USA) *	Business & Int'l Man	259	Q1
5	Academy of Management Review (USA)	Bus, Man and Account	249	Q1
6	Harvard Business Review	Bus, Man and Account	219	Q1
8	Int'l Journal of Production Economic (Neth)	Bus, Man and Account	206	Q1
7	Ecological Economics (Netherlands)	Economics	198	Q1
9	Sustainability (Switzerland)	Geo, Plan & Develp	168	Q1
10	Science (USA)	Hist and Phil of Science	162	Q1

Note: * Appeared in the most cited journal.

When comparing between the top-10 most cited journals (Table 1) with the top-10 most co-citation journals (Table 2), it is found that the first top journal is the same, which is the *Journal of Cleaner Production*, from the Netherlands. This leading journal offers board coverage in various international transdisciplinary fields with the focus on “sustainability”. It also maintains expansive theoretical and practical research scopes with diverse types and levels of organizations (e.g., business corporations, governments, educational institutes, societies, and nation). Moreover, a comparison finding from the two tables suggests that only two journals among the top journals are the same, which are the *Journal of Cleaner Production*, from the Netherlands, and *Business Strategy and the Environment*, from USA. All other journals listed in the tables are also recorded in the first quartile of the Scopus index. Table 2 also suggests that more journals in the field of business and management emerge in the top-10 co-citation sources.

One of the strengths of bibliometric review is the analysis of leading scholars and documents within a field of study. The key scholars contributed to the SMS field are measured by the number of documents published and cited based on the Scopus database, which are reported in Table 3. The analysis indicates that all key SMS scholars are geographically from the developed countries, mainly from Europe (i.e., Sweden, Austria, UK, Netherlands, Germany and Switzerland), followed by North America (i.e., USA and Canada), and Asia (i.e., Japan). Interestingly, other influential scholars are from emerging economies (i.e., Brazil and China). A majority of the leading scholars in the SMS research focused on environmental science, followed by business and management. These dominant research scholars contributed to the SMS field are Baumgartner (5), Robèrt (4), Ny (4) and Liu (4), based on numbers of documents (see Table 3). These leading scholars are not only experts in the environmental science, but also contributors in the areas of business and management.

Next, Table 4 presents an analysis of highly cited Scopus-indexed documents in the SMS scholarship. This table illustrates a slightly different picture than the highly cited authors, as represented in Table 3. The 20 most highly cited SMS articles are dominated by the scholars from the developed countries, mainly from USA and Europe. Interestingly, Table 4 indicates that a few highly cited articles were written by the scholars from emerging economies (e.g., China, Brazil, and Mexico). This reflects a rise of interests and possible emergent research in the SMS field from these fast-developing economies. The highly-cited documents were largely dominated by studies of SMS in environment science, followed by business & management and engineering. The foci of these highly-cited documents center on resource management and strategic planning, from policy to implementation levels. Furthermore, supply chain management for sustainability, covering varied studies from large corporations to SMEs, emerges as another influential subject in the developing field. This mixture supports the conclusion that the SMS knowledge base is indeed a cross-sector literature. In addition, Table 4 shows a balanced composition of the SMS knowledge since the documents covers 11 conceptual papers, seven empirical studies and with only two literature review in the top-20 list [45–65].

Table 3. The top 20 most highly-cited authors publishing on SMS, 1991–2019 ($n = 988$).

Rank	Author	Nation	Focus	Docs	Scopus Citation	Cite per Doc
1	Robert K.	Sweden	Env Science	4	425	106.3
2	Baumgartner R.	Austria	Env Science	5	392	74.8
3	Butler D.	UK	Env Science	3	241	80.3
4	Makropoulos C.	Netherlands	Env Science	2	239	119.5
5	Huisingh D.	USA	Env Science	2	231	115.5
6	Wang H.	China	Engineering	2	213	106.5
7	Ny H.	Sweden	Env Science	4	206	51.5
8	Broman, G.	Sweden	Engineering	3	204	68
9	Liu S.	China	Env Science	4	174	43.5
10	Schaltegger S.	Germany	Business & Man	3	169	56.3
11	Preuss L.	UK	Business & Man	2	141	70.5
12	MacDonald J.	Canada	Env Science	2	122	61
13	Pozzebon M.	Brazil	Business & Man	3	120	40
14	Petrini M.	Brazil	Business & Man	2	188	94
15	Rauter R.	Austria	Business & Man	3	108	36
16	Friedli T.	Switzerland	Business & Man	2	100	50
17	Hinz A.	Switzerland	Business & Man	2	100	50
18	Scherrer-rathje M.	Switzerland	Business & Man	2	100	50
19	Schrettle S.	Switzerland	Engineering	2	100	50
20	Sueyoshi T.	Japan	Decision Science	2	91	45.5

Table 4. The top 20 most highly-cited SMS documents based on Scopus-indexed database.

Rank	Author	Society	Subject Domain	SMS Focus	Type of Paper	Scopus Cites
1	Mcnie, E.	USA	Env Science	Information	Con	499
2	Wagener, T.	UK	Env Science	Resource Man	Con	281
3	Ahern, J.	USA	Env Science	Urban planning	Con	246
4	Iglesias, A.	SPAIN	Env Science	Resource Man	Con	237
5	Robert, K.	SWED	Env Science	Strategy	Con	227
5	He, W.	CHINA	Env Science	Strategy	Con	219
6	Baumgartner, R.	AUSTRIA	Env Science	Industrial policy	Con	204
7	Scholz, R.	SWITZ	Env Science	Strategy	Emp	183
8	Reynolds, M.	MEX	Env Science	Food security	Emp	180
9	Aragón-Correa, J.	SPAIN	Env Science	Strategy	Con	175
10	Makropoulos, C.	UK	Env Science	Resource Man	Emp	161
11	Subramoniam, R.	USA	Env Science	Supply chain	Rev	154
12	Moore, S.	USA	Env Science	Supply chain	Con	154
13	Maxwell, D.	UK	Env Science	Eco design	Con	141
14	Hahn, T.	SPAIN	Management	Corporate Sust	Rev	140
15	Tal, A.	ISRAEL	Chemistry	Resource Man	Con	135
16	Ny, H.	SWED	Env Science	Materials Man	Emp	122
17	Petrini, M.	BRAZIL	Management	Corporate Sust	Emp	119
18	Ceschin, F.	UK	Engineering	Product Man	Emp	114
19	Van Hoey, G.	BELG	Env Science	Eco man	Emp	108
20	Schrettle, S.	SWITZ	Engineering	Supply chain	Emp	107

4.3. Intellectual Configuration of the SMS Scholarship

To answer the third research question, the researchers performed Author Co-Citation Analysis (ACA), using VOSviewer software. The ACA analysis was conducted to further investigate dominant contributors of the SMS research whose publications were cited together in the same articles and suggested how the research community had previously evolved [19,23,66,67]. The VOSviewer software identified 47,354 authors in the co-citation network, derived from the reference lists of the review documents [22]. Using the default threshold of at least 20 co-citations, there were 71 authors displayed on the author co-citation map (see Figure 5).

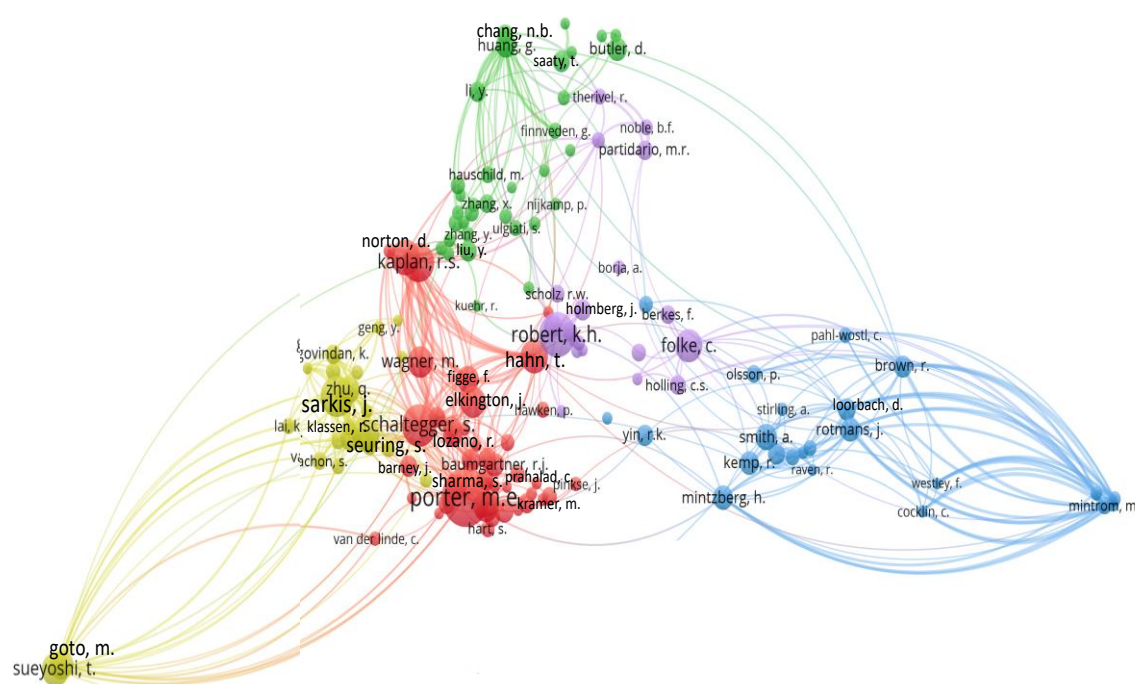


Figure 5. Authors co-citation analysis of strategic management for sustainability literature (Threshold 20 citations, display 71 authors).

Figure 5 depicts the intellectual clustering configuration underlying research in the SMS knowledge base. The author co-citation map presents a variety of nodes with different scholars in various colored clusters. The node size is based on the frequency of co-citations achieved by the particular scholar. The linked lines between nodes represent the number of times a scholar is co-cited by other scholars; therefore, the higher the density of the line, the stronger the link. In the map, authors are congregated into different colored clusters, which represent diverse ‘Schools of Thought’ that cover the knowledge base [22,66,67]. The Schools of Thought suggest collective theoretical perspectives and lines of reasoning shared by groups of scholars [23,68,69].

From Figure 5, the key scholars of the most highly ‘co-cited authors’ includes Porter, Sarkis, Kaplan, Norton, Elkington and Hart from the USA; Mintzberg from Canada, Hahn, Seuring, Wagner and Figge from Europe. These prominent scholars are mainly from the subject area of business and management, particularly the strategy field. Nonetheless, Robert, Schaltegger, Folke and Smith are other leading European authors in environmental science in relation to the SMS literature. Other influential scholars from Asia include Sueyoshi (Japan) from the field of decision science and Zhu (China) from the business and management discipline. The overall ACA analysis provides a broad picture of the dominant contributors of the SMS research and suggests the evolution of the research community. In general, the majority of these world renowned scholars are predominantly from the developed countries, particularly in the Western World, which may suggest their influence on the existing SMS scholarship. The author co-citation map illustrates five different clusters which represent different Schools of Thought (see Table 5). Those scholars in the same colored groups present similar natures of their studies [42]. In this study, the Schools of Thought were grouped in the same colored cluster, as indicated in Table 5. Table 5 provides a summary of five Schools of Thought in the Strategic Management for Sustainability (SMS) literature with details of its diverse colored clusters, names of the clusters and numbers of contributed scholars in each cluster. Detailed analysis and interpretation of each cluster are explained subsequently.

Table 5. Schools of thought in the SMS literature.

Cluster	Name	Number of Scholars
Cluster 1 (Red)	<i>Corporate sustainability strategy</i>	35
Cluster 2 (Green)	<i>Sustainable waste management</i>	18
Cluster 3 (Purple)	<i>Strategic sustainability systems</i>	9
Cluster 4 (Blue)	<i>Strategic sustainability management and entrepreneurship</i>	5
Cluster 5 (Yellow)	<i>Sustainability assessment strategy</i>	4

Cluster 1 is the biggest cluster in red color, including 35 scholars. Among those, Michel E. Porter [13,15,70] is the most highly co-cited author. Additional world renowned scholars in the sustainability concepts contributed to this cluster include Elkington [71,72] of the ‘triple- bottom-line’ concept, Prahalad and Hart [73] of the ‘bottom of the pyramid’ concept, plus Baumgartner [74,75] of corporate sustainability. This School of Thought is related to the resource based view for sustainable competitiveness. In addition, Hahn appears as another leading researcher in the cluster. Hahn and his colleagues [8,26,59,76] put an emphasis on the notion of ‘tensions’ in corporate sustainability and call for a concurrent integration of economic, environmental and social dimensions without dismissing one over any other. His work is emerging as a major theme in today’s literature. Located on the top left region of this cluster are Kaplan and Norton, who are the other dominant scholars in this cluster. Their key influential concept of the balance scorecard and performance measurement becomes the fundamental corporate ideology that influences many scholars and practitioners to date. This cluster also shows Figge [26], Schaltegger and Wagner [77,78] as the important scholars, who contribute to the research studies relating to the balance scorecard and sustainability performance for business competitiveness. With the association with corporate strategy and sustainability, the School of Thought in this cluster is thus named, “*Corporate sustainability strategy*”.

Cluster 2 in green color consists of 18 scholars. A majority of scholars from this School of Thought are from China. The group of scholars mainly focus their research on “*Sustainable waste management*”, hence the name becomes the focal School of Thought in this cluster. Influential scholars in this cluster are such as Chang [79,80], Zhang, X. [80–82], Zhang, Y. [83,84] and Finnveden [85].

In Cluster 3, the purple cluster includes Robèrt [49,86], Holmberg [87], Broman [61,86], Ny [61] and Wackernagel [87]. The biggest node represents the most influential scholar is Robèrt [49,86]. The studies of the scholars in this cluster mainly center on defining sustainability in the strategic, macro-level views as systems and frameworks. The cluster addresses a variety of concepts, frameworks, tools and applications for sustainability. It also focuses on a corporate sustainability adoption and adaptation in order to obtain the competitive advantage. This cluster is also grounded in research on transition management for sustainability. The transition involves the aspects on socio-ecological sustainability, socio-technological sustainability, and socio-environmental sustainability. The leading scholars in this School of Thought are Loorbach [88–91], Kemp [90,91], Rotman [89,91,92], Butler [55], and Smith [93,94]. In sum, this School of Thought is called “*Strategic sustainability systems*”.

Cluster 4 is in blue, located on the right hand region of the network visualization map. The dominant researchers in this cluster are Mintzberg [11,12,95–97], Mintrom [98], Huitema [99], Meijer [100,101], and Sabatier [102]. Among those, Mintzberg [11,12,95–97] is a leading scholar with the emphasis on general management. Mintrom [98] also appears as an emergent key scholar, who expands the general management knowledge to include sustainable entrepreneurship. Therefore, this cluster represents the integration of the knowledge in the management and entrepreneurship areas and is now called, “*Strategic sustainability management and entrepreneurship*”.

The last cluster or cluster 5 appears in yellow at the lower left hand corner. It consists of a group of scholars, who contribute to the knowledge of corporate performance in relation to the sustainable supply chain. They are Seuring [103–107], Sarkis [34,107,108], Vachon [109–111] and Klassen [109,112]. In addition, Sueyoshi and Goto [113–119] are the contributing scholars who have collaboratively

worked in the research field of Data Envelopment Analysis (DEA) to assess environmental sustainability development. Their works focused on assessment, this School of Thought is thus named, “*Sustainability assessment strategy*”.

4.4. Contemporary Foci in the SMS Literature

As noted earlier, a series of co-word analyses were conducted to identify contemporary foci in the SMS literature. In contrast with co-citation analysis in which relationships are inferred indirectly, co-word analysis is based on the actual content of documents [23]. In VOSviewer, co-word analysis was set to ‘All Keywords’ with a threshold of at least 15 citations or cases of co-occurring keywords in conjunction with a thesaurus file that disambiguated similar keyword terms (e.g., strategic plan, strategic planning, strategic plan). After deselecting 3 keywords (article, priority journal, human), the VOSviewer yielded a co-word map consisting of 135 keywords representing different topics in the SMS knowledge base. Figure 6 depicts our contemporary foci in the SMS literature in detail.

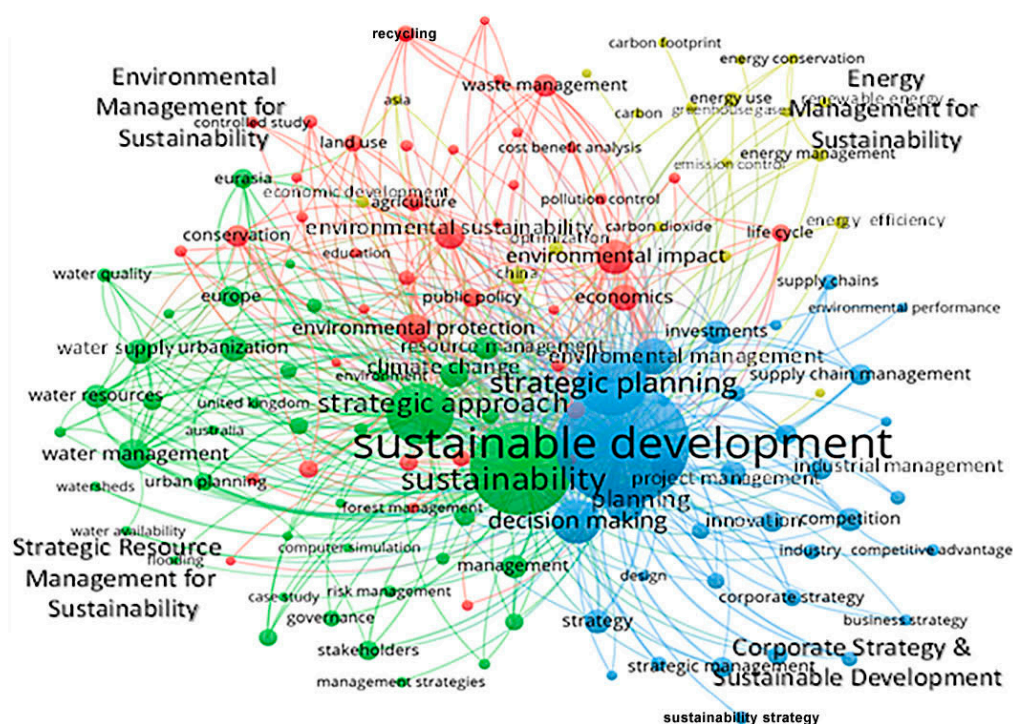


Figure 6. Co-word map for the literature on strategic management for sustainability (threshold 15 citations, display 135 keywords).

The size of the nodes on the co-word map suggested that the most frequent topics in the SMS literature were ‘sustainable development’ (698), ‘sustainability’ (462), ‘strategic planning’ (264), ‘strategic approach’ (247), ‘decision making’ (149), ‘environmental management’ (114), ‘planning’ (111), ‘environment impact’ (102), ‘water management’ (86), ‘environmental protection’ (82), ‘economic and social effects’ (80), ‘environmental sustainability’ (72), ‘economics’ (68), ‘urbanization’ (63), ‘water supply’ (62), ‘water resources’ (56), ‘project management’ (56), ‘investment’ (56), ‘competition’ (56), ‘waste management’ (54), ‘innovation’ (50).

Key themes within the SMS literature can also be identified from the co-word map (see Figure 6) in a manner similar to the previous author co-citation analysis. More specifically, four themes can be synthesized from the colored clusters of keywords grouped together by co-occurrence in documents located in our review database.

The blue cluster comprises 34 keywords with a suggesting theme of ‘Corporate Strategy and Sustainable Development’. Key topics within this theme include sustainable development, strategic

planning, decision-making, planning, environmental management, innovation and a variety of strategy-related topics. The size and coherence of the nodes in this cluster as well as the density of links to the other clusters imply the importance of this theme within the SMS literature.

The green cluster suggests the theme of ‘Strategic Resource Management for Sustainability’. This is the most influential theme in this cluster, based on the number of keywords (41), the number of large nodes and the density of links to other clusters. Other related keywords in this theme include sustainability, strategic approach, climate change, resource management, water management, water supply and management and urbanization.

The yellow cluster consists of a variety of less frequently occurring topics, which are associated with energy-related topics. The topics cover energy conservation, energy management, energy use, energy efficiency, carbon footprint, greenhouse gases, carbon dioxide and emission control. Therefore, this cluster is named, ‘Energy Management for Sustainability’. This is the smallest cluster in the co-word map.

In the red cluster, frequently occurring keywords include environmental sustainability, environmental impact, environmental protection, conservation, land use, waste management, economics, public policy, and agriculture. With the emphasis on the environment-related subjects, the cluster is grouped into a theme of ‘Environmental Management for Sustainability’. Although this theme is consisting of 41 keywords, the nodes are smaller than those appeared in the green cluster. As such, the smaller nodes may suggest somewhat lower levels of the influence in the SMS literature. Moreover, the nodes in this cluster are more dispersed and appear to intermingle with other keywords associated in the green and yellow clusters. The overlay implies how these themes may be closely related or interlinked to strategic management of environment, resources, and energy for sustainability.

Following the co-wording frequency analysis of the SMS scholarship, the researchers employed VOSviewer to create a temporal overlay visualization of a keyword co-occurrence map (see Figure 7). The temporal co-occurring keyword analysis provides a graphic map that illustrates importance of emergent topics (based on sizes of nodes) across a time span (based on diverse colors of nodes). The bigger the size of a node entails its relative interest in a topic and displays as a co-occurring word. The diverse colors suggest different periods of time in which varied topic appear. For this analysis, different settings were used in VOSviewer so as to reveal a broader set of topics. Using VOSviewer, the threshold was set at 10 occurrences with a hope to reveal a broader perspective of co-occurring topics. The result displayed 242 keywords, and we deselected three irrelevant keywords (i.e., article, priority journal and human) from the analysis.

Next, Figure 7 displays a contemporary graphical overlay of diverse colored nodes that represent varied topics across the different time span. Specifically, the dark blue nodes signify the earliest publications in the SMS knowledge base in the early to late 2000s, while the green shades from dark green to light green nodes represent the SMS literature during the early 2010s. In addition, the lightest green to yellow nodes are associated with recent studies and emerged as the research frontier in the SMS literature. The earliest SMS literature tended to focus on the topics of environmental science, water and waste management, and later the concept of the industrial ecosystem. Moreover, other topics related to environmental strategy and energy management/policy (i.e., energy utilization, energy efficiency, renewable energy, carbon footprint and emission control) appeared in the early literature. These reflected interests in exploring approaches to minimizing environmental degradation and reducing the wasteful use of natural resources through more effective planning. Early scholarship in the SMS literature applied Porter’s competitive advantage concept to ecological and economical sustainability [13,15,70]. Hart’s [120,121] resource-based model seemed to affect the conceptual adoption of long-term sustainable strategy in organizations.

three key areas of environmental science, strategic business management, and engineering. It is not limited to the traditional studies in green/ecological/environmental strategic management and sustainability since these studies are contributed to almost 64% of all documents [126]. In the recent times, the review found that the contemporary SMS knowledge was increasingly linked to business and management. Built on the preceding literature review of Engert et al. [25], our review paper provided further insights of the most recent publication and included a much larger samples ($n = 988$) than that of the Engert's review ($n = 114$). The paper also employed the more modern sophisticated scientific bibliometric review method than the previous studies using the science mapping to extend our knowledge in the emergent field of SMS. This paper may be considered as the most up-to-date systemic research review that covers all relevant SMS topics in the existing literature, using the largest research database of Scopus.

Importantly, this bibliometric review of the international research answers the four research questions it set out to investigate and advances intellectual insights into the pattern, landscape, and composition of the body of knowledge in the SMS realm. The findings may provide several scholarly benefits as well as broaden our understanding of the SMS knowledge base in the existing literature, as discussed in sequence.

First and foremost, the review advances knowledge into size, growth trend and geographic distribution of scholarship on SMS. The SMS field has gained popularity over the past three decades since its inception of the first article in 1991. This study found a growing numbers of the literatures on SMS, from a few publications in the early 1990s to almost 1000 documents, or 988 to be exact, in the Scopus database by February 2019 (see Figure 2). The majority of the SMS knowledge base from scholarly attribute of publication in international management journals is largely stemmed from the developed countries and predominantly from North America (i.e., USA and Canada), Europe (i.e., UK, Italy, Germany, Spain and the Netherlands), and Pacific region (i.e., Australia). The top-four geographical distribution of the SMS knowledge base was predominant by Anglo-American scholarship from USA, UK, Canada and Australia in management journals, consistent with the topical management literature [24,39,44] (see Figure 3). This review suggests an imbalance in the knowledge base on of the SMS since most studies were mainly derived from the developed societies. This paper thus calls for more future SMS literature from other developing countries, given the relevance of SDGs for developing countries [127,128]. It is critical that the SMS knowledge should be evenly distributed across diverse geographies and contexts.

Importantly, the paper suggests that the emergent trends on the SMS knowledge base focus on the three influential interdisciplinary modes of inquiry for sustainability (i.e., environmental science, engineering, plus business management and accounting). The finding is also in-line with the previous literature that the SMS field has been evolved. The SMS evolution started from the ecological/environmental or green movement at the strategic, macro-level view of sustainability management [123,127], then included issues related to social responsibility [25,129–131], and later linked to organizational strategies and business and management for sustainability [15,25,70,78,132,133].

The review also presents the intellectual structure or configuration underlying published research in the SMS knowledge base by employing the Author Co-Citation Analysis (ACA) of VOSviewer. The ACA produced a science mapping of the network visualization map (see Figure 5). The visual science mapping suggests five emergent clustering themes or Schools of Thought in SMS (see Table 5). Firstly, the largest and most influential SMS School of Thought, namely “*Corporate sustainability strategy*,” greatly contributes to the growing literature in the areas of strategic management. The influential authors are Porter [13,15,70], Elkington [71,72], Baumgartner [74,75], Figge [26], Schaltegger and Wagner [77,78], Prahalad and Hart [73], Hahn [8,59,76]. Several prominent concepts for corporate sustainability [51,74,75] include the ‘triple- bottom-line’ [71,72], ‘bottom of the pyramid’ [73], and sustainable competitive strategies [103–107]. The second School of Thought focuses on “*Sustainable waste management*”, comprising the influential scholars, such as Chang [79,80], Zhang, X. [80,81], Zhang, Y. [83,84] and Finnveden [85]. The third School of Thought is called “*Strategic sustainability*

systems”, which defines sustainability in the strategic, macro-level views as systems and frameworks and addresses a variety of concepts, frameworks, tools and applications for sustainability. Moreover, the key scholars consist of Robèrt [49,86], Holmberg [87], Broman [61,86], Ny [61], Wackernagel [87], Folke [134,135], Loorbach [88,89], Kemp [90,91,136,137], Rotman [89,91,92], Butler [55], and Smith [93,94]. Next, Mintzberg [11,12,95–97], Mintrom [98] and Huitema [99] are the dominant authors in the fourth School of Thought. It represents the integration of the knowledge areas of general management and sustainable entrepreneurship, and is thus called, “*Strategic sustainability management and entrepreneurship*”. The last School of Thought contributes to the knowledge of assessment strategy, and is generally named, “*Sustainability assessment strategy*”. The clustering group of scholars cover Seuring [103–107], Sarkis [34,107,108], Vachon [109–111], Klassen [109,112], Sueyoshi and Gota [115–119].

Lastly, this review reveals further intellectual insights into the contemporary foci of the SMS knowledge base using the Vosviewer’s co-word map (see Figure 6). The contemporary foci of the SMS literature centered on the following four main topics: (1) Corporate Strategy and Sustainable Development, (2) Strategic Resource Management for Sustainability, (3) Energy Management for Sustainability, and (4) Environmental Management for Sustainability. Our study also reports the evolution and the emergent trend in the SMS literature (see Figure 7). From the early 2000s, the SMS scholarship tended to focus on the green movement, including the themes of environmental science, environmental strategy and energy management and policy. The Porter’s competitive advantage strategy and concepts for ecological and economical sustainability [13,15,70] had been influential in the early SMS knowledge base. Moreover, the resource-based model of Hart [120,121] seemed to shape the conceptual adoption of long-term sustainable strategy formulation and implementation in firms. In the latter years from the 2010s to present, the increasing interests in the recent SMS studies have been expanded to link with the business and management field. The overarching themes of sustainable development, sustainability, plus strategic approach and planning have been dominating the SMS scholarship. The latest emerging topics center on corporate sustainability, supply chain management, corporate strategy, information management, adaptive management and governance approach.

In total, the findings advance our currently-limited understanding with regard to the evolution and the emergent research frontier of the SMS knowledge base. Moving beyond the beginning attention to the macro-level green movement, the recent SMS trend has been reoriented to develop the interdependencies across diverse multidisciplinary fields of the sustainability sciences and business management areas, particularly with the key focus on the sustainability-focused strategy in the corporate setting. The latest SMS literature reflects the promising trend for further collaboration within our integrated ecosystems.

5.2. Practical Implication

Going beyond the intellectual insights, this paper provides practical and managerial implications that may benefit various stakeholders, such as business practitioners, policy-makers and scholars alike. Responding to the recent trend of the linkage between the contemporary SMS knowledge and corporate strategy, the SMS framework should be conceptualized further as a business model. In the literature, a business model can strategically help organizations create long-term values, drive business performance, as well as achieve sustainable development and sustainability [30–32]. Linking to the review, this paper suggests that our conceptual model of SMS (see Figure 1) lays the fundamental groundwork for our newly proposed SMS business model (see Figure 8). Figure 8 illustrates the process and impact of our proposed SMS business model. It may be an alternative business model for SMS, which can demonstrate how organizations can strategically take an integrative view of the SMS process and impact to concurrently and systematically create long-term values for all stakeholders and the society in harmony, as describe in sequence. At the macro-level, external influences from policies and pressures from the global movements, market demands and changes, or pressure from institutional policies (e.g., UN SDGs) can have great impacts on overall organizational strategies. These external factors can affect how organizations internally make decisions, plan and consider

integrating sustainability-oriented strategies to care for all three sustainability-oriented dimensions (i.e., environmental protection, social responsibility, and economic performance) plus stakeholder engagement. When organizations simultaneously embrace and embed sustainability-oriented strategies into their integrative strategy formulation and execution, they may gain benefits from sustainability outputs (i.e., sustainable competitive advantage, performance impact, and triple-bottom-line benefit) as well as achieving sustainability outcomes (i.e., balance, resilience and sustainable development). Our proposed business model for SMS is also in-line with previous studies [7,8,13,14,16,17,25,76], which put emphasis on the systematic integration view and sustainability strategies as the sources of sustainable competitive advantages. In general, organizations can create net positive impacts onto the society at large and everyone profits at the end.

Strategic Management for Sustainability (SMS) Business Model

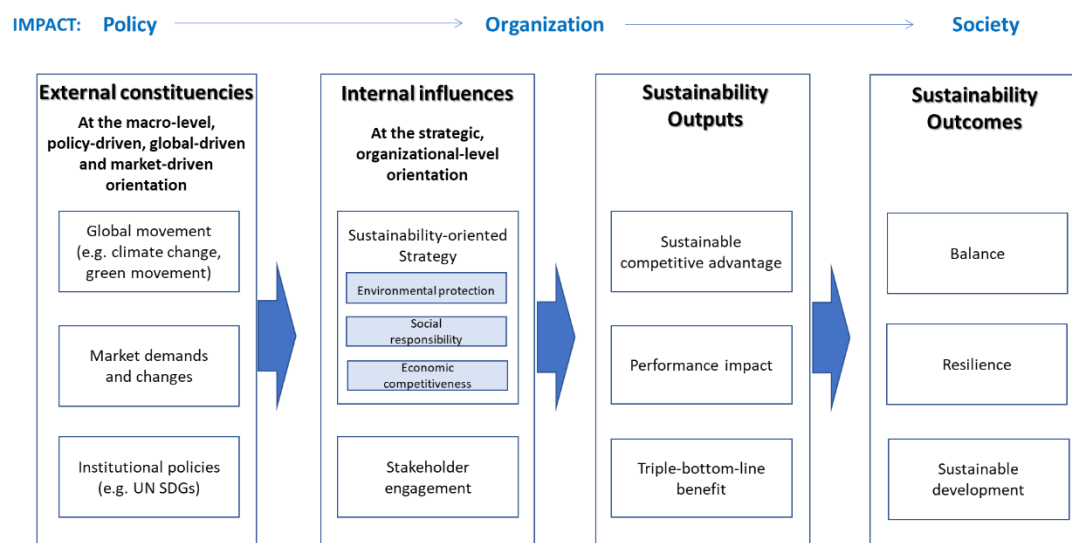


Figure 8. Proposed strategic management for sustainability (SMS) business model.

Moreover, the review implies the importance of leadership for SMS. The leadership challenges for achieving sustainability lie in organizational leadership abilities and strategic foresights [24,138,139] to move away from a sole focus on economic performance and profit-maximization [17,24] as well as go beyond the paradoxical tensions [8,59,76]. The authors wish to put forward that leaders, executives and all individuals at diverse levels of organizations will need to change their thinking and actions to be more strategic with long-term orientation, focus on managing change and put emphasis on resilience. They will be required to put the topic of sustainability into their strategic agenda and business practices in order to willingly earn the social license to operate. Moreover, they will need to consider for greater responsibility to enhance moral and ethical conducts plus take care of their stakeholder engagement in all integrative systems and activities in firms. Our call for sustainability-oriented or sustainable leadership are aligned with the previous literature [7,8,17,24,138,139]. Above all, we suggest that leaders and executives should aim at developing a systematic and simultaneous integration of SMS strategies into the strategic organizational agenda for all-inclusive SMS planning, systems and processes to create significant impacts on their organizations, our society and the planet.

In practice, it is recommended that modern organizational leaders, business practitioners and entrepreneurs focus on strategic, visionary thinking into their genuine actions by reorienting their sustainability strategies to a more holistic and systematic perspective. One of the most provident strategies for gaining sustainable outputs (i.e., create competitive advantage, performance impact, triple-bottom-line benefit) and sustainability outcomes suggests a concurrent integration of the whole corporate strategies, systems and processes in concert. Moreover, they can undertake their corporate

strategies beyond the traditional emphases on the green strategic management movement with narrowly focuses on ecological or environmental protection to achieve sustainability. They can also take social responsibility into account and engage all stakeholders (i.e., customers, employees, suppliers, governmental bodies and NGOs), when contributing their businesses to their communities and the society as a whole. Simultaneously, they can stay ahead of the game by factoring in economic competitiveness beyond the shareholder-orientation or profit-maximization strategies. Therefore, we propose that organizations should consider interactively incorporate our proposed SMS business model in their systematic strategic planning and execution to deliberately manage associated environmental, social and economic opportunities and risks in business to achieve corporate sustainability and resilience in the long run. Overall, we suggest that adopting these multiple orientations into their corporate strategic management and systems may reshape their business operations at all levels towards a more meaningful achievement, sustainable competitive advantage and improved corporate performance in the long run. From a longer-term perspective, organizations should strategically plan and holistically implement all three dimensions into the systems in chorus to foster the firms' resilience, or its ability to withstand shocks and adaptability to uncertainties in the environment. In addition, the most recent reports from Intergovernmental Panel on Climate Change (IPCC), Stockholm Resilience Institute and Sustainable Development Solutions Network (SDSN) address various key issues and challenges in achieving sustainable development and sustainability [4–6]. If corporations and organizations keep causing harm, continue doing their businesses as usual and continuously create more problems from the polluted environment, social irresponsibility and corrupted economy, we may not have tomorrow to live in. Indeed, businesses and everyone in the society (i.e., governments, educational institutes and diverse stakeholders) together play strategic roles and responsibilities to develop and improve sustainability. The authors hope that this paper will possibly be a starting point for better understanding about the SMS topic and more meaningful applications in the future.

For policy-makers, this review presents a strategic outlook to an emergent trend in SMS and an urgent call for a more sustainable future. They may strategically think and invest resources to enact laws or enforce policies to support institutes and organizations by considering all relevant factors that may help constitute a more sustainable SMS business model, as suggested in our proposed business model (see Figure 8). They can further foster and cultivate SMS-oriented institutes and organizations since they are the strategic drivers of sustainable development and sustainability in all nations and key contributors to the UN SDGs in the hope of benefiting our World all together.

For academe, scholars may benefit from the cutting-edge intellectual findings and useful insights that may grow our understanding in the SMS knowledge base. This review offers the latest trend and relevant research landscape using the advanced systematic, bibliometric approach in the SMS international scholarship that has not been done thus far. The findings entail the retrospective as well as address ways forward. The authors hope to set the groundwork for future research. Various future research opportunities are suggested in the later section (Section 5.4 Suggestions for Future Research).

Lastly, the authors hope that our review study will not only contribute to the literature in a retrospective but call for more serious or advanced future SMS-oriented leadership and management actions to take care of our planet today and for future generations. All unsustainable problems are challenging us and will need sustainable solutions. Furthermore, we would like to highlight the importance of a radical transformation, strong synergy and strategic partnership among all parties to integrate holistic systems and processes that strive and thrive for sustainability at all levels in the society. We will need strategic foresight and paradigm shifts from diverse stakeholders to create a more sustainable future.

5.3. Limitations

This review paper strove for the highest quality, yet some limitations are needed to be addressed. The bibliometric review of international research uses a science mapping method that offers insights into quantitative, analytical structure of a knowledge base. Yet, the review did not examine the findings

of different studies and therefore is not designed to replace other analytical reviews that synthesize the results of studies. We elaborated our methodology and PRISMA steps in Section 3 for Materials and Methods (see Figure 2). Our methodology might be limited by our choices of keywords and the inclusion of the resulting articles appeared in this study. It is worth noting that other relevant research articles might be excluded by the methodological constraint and could possibly affect discussion and interpretation of our findings. We would like to suggest that further studies should expand choices of keywords to include what could be relevant in the future. In this study, the paper covered all types of documents in one of the most coverage and largest database from Scopus. However, it did not cover the entire existing literature outside the Scopus database and might possibly exclude other relevant literature in the field.

Although the topic of strategic management for sustainability (SMS) has been growing in interests as an emergent multidisciplinary field, no consensus on its conceptual and operational definitions of the construct had been clearly defined with definite boundaries. Hence, the review calls for more studies to further examine SMS, from both theoretical perspectives and empirical evidence. This paper also indicates that the amount of international documents on the SMS scholarship has increasingly published in the recent years but are still limited and predominated by the developed countries.

Nonetheless, the documents included in this study are only in English language, emerging knowledge from the non-English literature or the “Nonwestern” countries [124] may be excluded in this study. This paper thus suggests that international authors from diverse countries and contexts should further produce high-quality articles to enhance the currently-lacking SMS knowledge in the global stance. Despite the robustness of the bibliometric analysis, co-citation analysis may be interpreted with caution, subjected to scholars’ knowledge of the literature and their sense-making of the outputs of co-citation analyses [23]. This paper acknowledged these limitations for future improvement. In total, this review offers the most up-to-date analysis of the knowledge base on SMS and serves as a starting point against which scholars can benchmark in future research studies.

5.4. Suggestions for Future Research

Several prospective research opportunities can be raised to improve the addressed limitations and constraints in this review paper. Future researchers may advance this review by including additional data from other databases, such as Web of Science and/or Proquest, to enhance the widest coverage of all possible literature in the SMS knowledge. Upcoming studies may expand the current discussion using different databases or sources. Additional choices of relevant keywords regarding SMS may be included to expand the scope of research. This paper focuses primarily on international research; data based on other specific regional orientations or emerging economies may offer further insights. The authors also foster future comparisons. It would be interesting to see prospective researchers employ our proposed SMS business model in their future studies and discover what and how the SMS business model may work in an actual organizational setting. Future scholars may replicate the systemic bibliometric review approach and the science-mapping methodology used in this paper. Other relevant fields of research may use this sophisticated scientific bibliometric review as a potential guideline for replication to expand our limited understanding and knowledge base in the literature.

Furthermore, future studies may explore possibilities that address the challenges and opportunities to integrate aspects of environmental, technology, sustainability science, social-ecological systems approach and resilience thinking, as suggested by Stockholm Resilience Centre (2018) [5]. Forthcoming studies may further address the increasing associated risks (e.g., desertification, flooding, land degradation and food security) and effects of the climate change, as found to be a consistent topic with our co-occurring keyword map. Prospective scholars may want to explore and propose opportunities for solutions to mitigate the risks that impacts on human and ecosystem health, as suggested by IPCC [4]. In the future, researchers may want to study how organizations or institutes interconnect and collaborate in networking groups to transform and manage their strategic sustainability-oriented systems and processes in practice, as demonstrated in the SDSN report [6]. The suggested prospective

research may provide us further insights about what and how SMS can be practiced in the real world. Future research findings may be useful for advanced business cases for sustainability.

Largely, our bibliometric review and proposed strategic management for sustainability (SMS) business model could lay the possible groundwork for further studies. As well, future studies may build on our methodological constraints, expand our findings to make it more meaningful and suggest plausible ways forward for a more sustainable future.

6. Conclusions

The bibliometric review of the international research on strategic management for sustainability (SMS) is the first, comprehensive systematic examination and review in this topic. The review offers intellectual analyses, provides an insightful interpretation and a pragmatic perspective. It also proposes an alternative strategic management for sustainability business model that may be useful in the future. This scientific review presents not only a retrospective over the 30 years, but also a strategic foresight and forward-thinking outlook in the emergent, multidisciplinary field of strategic management for sustainability.

In sum, this study addresses challenges and pathways for transforming strategic management paradigms beyond the conventional business as usual and more potential resolutions beyond sustainability paradoxes to enhance sustainability in the business sector and our society. At present, organizations and corporations can no longer continue their businesses as usual with the focuses on self-interests and greed that may cause intentional or unintentional harms to others and our planet. As we move forward, we can no longer ignore the alarming trends of the climate change and other ecological and social problems, as addressed in various international reports (i.e., IPCC, SDSN, and SRC). We will need to act now and take opportunities to redirect our attention towards sustainable solutions and go beyond conflicting arguments and discourse. It is about time to ring a bell and put a wake-up call for everyone to think differently and take a greater responsibility to make changes.

The authors would like to put forward that our proposed integrative, systematic strategic management for sustainability will be required for future transformation to balance the needs among the paradoxes of environmental protection, social responsibility, and economic performance. Leaders and executives from all sizes of organizations will need to shift their strategies and leadership paradigms towards sustainability orientation from strategic planning, systematic management, concurrent system integration and ethical process implementation.

At the end, businesses are interconnected to the society and other larger parts of our ecosystems from all walks of life to our nature and planet. Understanding reciprocity and unified relationships among all will be respected. Changing their strategic management paradigms for sustainability and resilience are also required at all levels of the society. Furthermore, strategic collaboration and synergistic partnership among various stakeholders (i.e., government bodies, universities and research institutes, businesses, NGOs and civil society) are much needed to advance sustainability practices to help create a more sustainable future altogether.

Author Contributions: S.S. conceptualized the study, collected the document database, conducted data analyses, developed the proposed SMS business model, prepared and finalized the manuscript. P.P. participated in data collection, analysis and preparation of the manuscript. All authors have read and agreed to the published version of the manuscript.

Funding: Thailand Sustainable Development Foundation, Bangkok, Thailand provided a grant to fund this research.

Acknowledgments: The authors would like to thank the Editors and all reviewers for their valuable comments and intellectual advices for improving this paper. We also thank Philip Hallinger for his support.

Conflicts of Interest: The authors declared no conflict of interest.

References

1. Brundtland, G.H. *Our Common Future* 1987; World Commission on Environment and Development: Brussels, Belgium, 2010.
2. The World Commission on Economic Development. *El Desarrollo Sostenible, Una Guía Sobre Nuestro Futuro Común: El Informe De La Comisión Mundial Sobre el Medio Ambiente y el Desarrollo*; Oxford University Press: Oxford, UK, 1987.
3. Hassan, S.; Haddawy, P.; Zhu, J. A bibliometric study of the world's research activity in sustainable development and its sub-areas using scientific literature. *Scientometrics* **2014**, *99*, 549–579. [[CrossRef](#)]
4. Intergovernmental Panel for Private Change. In *IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse gas fluxes in Terrestrial Ecosystems*; IPCC: Geneva, Switzerland, 2019.
5. Stockholm Resilience Centre Annual. In *Annual Report*; Stockholm Resilience Centre: Stockholm, Sweden, 2018.
6. Sustainable Development Solution Networks. In *SDSN Networks in Action*; SDSN: New York, NY, USA, 2019.
7. Bansal, P.; Song, H.C. Similar but not the same: Differentiating corporate sustainability from corporate responsibility. *Acad. Manag. Ann.* **2017**, *11*, 105–149. [[CrossRef](#)]
8. Hahn, T.; Pinkse, J.; Preuss, L.; Figge, F. Tensions in corporate sustainability: Towards an integrative framework. *J. Bus. Ethics* **2015**, *127*, 297–316. [[CrossRef](#)]
9. Bracker, J. The historical development of the strategic management concept. *Acad. Manag. Rev.* **1980**, *5*, 219–224. [[CrossRef](#)]
10. Ansoff, H.I. *Corporate Strategy*; McGraw Hill: New York, NY, USA, 1965.
11. Mintzberg, H. Patterns in Strategy Formation. *Manage. Sci.* **1978**, *24*, 934–948. [[CrossRef](#)]
12. Mintzberg, H. *The Structuring of Organizations*; Prentice-Hall: Engle-Wood Cliffs, NJ, USA; New York, NY, USA, 1989.
13. Porter, M.E.; Kramer, M.R. The link between competitive advantage and corporate social responsibility. *Harv. Bus. Rev.* **2006**, *84*, 78–92.
14. Schendel, D.; Hofer, C.W. *Strategic Management: A New View of Business Policy and Planning*; Little Brown: Boston, MA, USA, 1979.
15. Porter, M.E.; Kramer, M.R. The big idea: Creating shared value, rethinking capitalism. *Harv. Bus. Rev.* **2011**, *89*, 62–77.
16. Epstein, M.J. *Making Sustainability Work: Best Practices in Managing and Measuring Corporate Social, Environmental and Economic Impacts*; Greenleft Publishing Limited: Sheffield, UK, 2018.
17. Suriyankietkaew, S. Taking the long view on resilience and sustainability with 5Cs at B. Grimm. *Glob. Bus. Organ. Excel.* **2019**, *38*, 11–17. [[CrossRef](#)]
18. Ferreira, J.J.M.; Fernandes, C.I.; Ratten, V. A co-citation bibliometric analysis of strategic management research. *Scientometrics* **2016**, *109*, 1–32. [[CrossRef](#)]
19. Nerur, S.P.; Rasheed, A.A.; Natarajan, V. The intellectual structure of the strategic management field: An author co-citation analysis. *Strateg. Manag. J.* **2008**, *29*, 319–336. [[CrossRef](#)]
20. Renaud, A.; Walsh, I.; Kalika, M. Is SAM still alive? A bibliometric and interpretive mapping of the strategic alignment research field. *J. Strateg. Inf. Syst.* **2016**, *25*, 75–103. [[CrossRef](#)]
21. Vogel, R.; Güttel, W.H. The dynamic capability view in strategic management: A bibliometric review. *Int. J. Manag. Rev.* **2013**, *15*, 426–446. [[CrossRef](#)]
22. Van Eck, N.J.; Waltman, L. Citation-based clustering of publications using CitNetExplorer and VOSviewer. *Scientometrics* **2017**, *111*, 1053–1070. [[CrossRef](#)] [[PubMed](#)]
23. Zupic, I.; Čater, T. Bibliometric methods in management and organization. *Organ. Res. Methods* **2015**, *18*, 429–472. [[CrossRef](#)]
24. Hallinger, P.; Suriyankietkaew, S. Science mapping of the knowledge base on sustainable leadership, 1990–2018. *Sustainability* **2018**, *10*, 4846. [[CrossRef](#)]
25. Engert, S.; Rauter, R.; Baumgartner, R.J. Exploring the integration of corporate sustainability into strategic management: A literature review. *J. Clean. Prod.* **2016**, *112*, 2833–2850. [[CrossRef](#)]
26. Figge, F.; Hahn, T.; Schaltegger, S.; Wagner, M. The sustainability balanced scorecard—linking sustainability management to business strategy. *Bus. Strateg. Environ.* **2002**, *11*, 269–284. [[CrossRef](#)]

27. Radomska, J. The concept of sustainable strategy implementation. *Sustainability* **2015**, *7*, 15847–15856. [[CrossRef](#)]
28. Stead, J.G.; Stead, W.E. The coevolution of sustainable strategic management in the global marketplace. *Organ. Environ.* **2013**, *26*, 162–183. [[CrossRef](#)]
29. Stead, J.G.; Stead, W.E. *Sustainable Strategic Management*; Routledge: New York, NY, USA, 2014.
30. Zott, C.; Amit, R.; Massa, L. The business model: Recent developments and future research. *J. Manag.* **2011**, *37*, 1019–1042.
31. Teece, D.J. Business models, business strategy and innovation. *Long Range Plan.* **2010**, *43*, 172–194. [[CrossRef](#)]
32. Evans, S.; Vladimirova, D.; Holgado, M.; Van Fossen, K.; Yang, M.; Silva, E.A.; Barlow, C.Y. Business model innovation for sustainability: Towards a unified perspective for creation of sustainable business models. *Bus. Strateg. Environ.* **2017**, *26*, 597–608. [[CrossRef](#)]
33. Linnenluecke, M.K.; Griffiths, A. Firms and sustainability: Mapping the intellectual origins and structure of the corporate sustainability field. *Glob. Environ. Chang.* **2013**, *23*, 382–391. [[CrossRef](#)]
34. Fahimnia, B.; Sarkis, J.; Davarzani, H. Green supply chain management: A review and bibliometric analysis. *Int. J. Prod. Econ.* **2015**, *162*, 101–114. [[CrossRef](#)]
35. Mongeon, P.; Paul-Hus, A. The journal coverage of Web of Science and Scopus: A comparative analysis. *Scientometrics* **2016**, *106*, 213–228. [[CrossRef](#)]
36. Falagas, M.E.; Pitsouni, E.I.; Malietzis, G.A.; Pappas, G. Comparison of PubMed, Scopus, web of science, and Google scholar: Strengths and weaknesses. *FASEB J.* **2008**, *22*, 338–342. [[CrossRef](#)]
37. Moher, D.; Liberati, A.; Tetzlaff, J.; Altman, D.G. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Ann. Internal Med.* **2009**, *151*, 264–269. [[CrossRef](#)]
38. Osareh, F. Bibliometrics, citation analysis and co-citation analysis: A review of literature I. *Libri* **1996**, *46*, 149–158. [[CrossRef](#)]
39. Hallinger, P. Science mapping the knowledge base on educational leadership and management from the emerging regions of Asia, Africa and Latin America, 1965–2018. *Edu. Manag. Adm. Leadersh.* **2019**. [[CrossRef](#)]
40. Van Eck, N.J.; Waltman, L. Visualizing bibliometric networks. In *Measuring Scholarly Impact*; Springer: Cham, Switzerland, 2014; pp. 285–320.
41. Chen, C.; Ibekwe-SanJuan, F.; Hou, J. The structure and dynamics of cocitation clusters: A multiple-perspective cocitation analysis. *J. Am. Soc. Inf. Sci. Technol.* **2010**, *61*, 1386–1409. [[CrossRef](#)]
42. Boyack, K.W.; Klavans, R. Co-citation analysis, bibliographic coupling, and direct citation: Which citation approach represents the research front most accurately? *J. Am. Soc. Inf. Sci. Technol.* **2010**, *61*, 2389–2404. [[CrossRef](#)]
43. Cobo, M.J.; López-Herrera, A.G.; Herrera-Viedma, E.; Herrera, F. Science mapping software tools: Review, analysis, and cooperative study among tools. *J. Am. Soc. Inf. Sci. Technol.* **2011**, *62*, 1382–1402. [[CrossRef](#)]
44. Hallinger, P. Science mapping the knowledge base on educational leadership and management in Africa, 1960–2018. *Sch. Leadersh. Manag.* **2018**, *39*, 537–560. [[CrossRef](#)]
45. McNie, E.C. Reconciling the supply of scientific information with user demands: An analysis of the problem and review of the literature. *Environ. Sci. Policy* **2007**, *10*, 17–38. [[CrossRef](#)]
46. Wagener, T.; Sivapalan, M.; Troch, P.A.; McGlynn, B.L.; Harman, C.J.; Gupta, H.V.; Kumar, P.; Rao, P.S.C.; Basu, N.B.; Wilson, J.S. The future of hydrology: An evolving science for a changing world. *Water Resour. Res.* **2010**, *46*. [[CrossRef](#)]
47. Ahern, J. From fail-safe to safe-to-fail: Sustainability and resilience in the new urban world. *Landsc. Urban Plan.* **2011**, *100*, 341–343. [[CrossRef](#)]
48. Iglesias, A.; Garrote, L.; Flores, F.; Moneo, M. Challenges to manage the risk of water scarcity and climate change in the Mediterranean. *Water Resour. Manag.* **2007**, *21*, 775–788. [[CrossRef](#)]
49. Robèrt, K.-H. Tools and concepts for sustainable development, how do they relate to a general framework for sustainable development, and to each other? *J. Clean. Prod.* **2000**, *8*, 243–254. [[CrossRef](#)]
50. He, W.; Li, G.; Ma, X.; Wang, H.; Huang, J.; Xu, M.; Huang, C. WEEE recovery strategies and the WEEE treatment status in China. *J. Hazard. Mater.* **2006**, *136*, 502–512. [[CrossRef](#)]
51. Baumgartner, R.J.; Ebner, D. Corporate sustainability strategies: Sustainability profiles and maturity levels. *Sustain. Dev.* **2010**, *18*, 76–89. [[CrossRef](#)]

52. Scholz, R.W.; Lang, D.J.; Wiek, A.; Walter, A.I.; Stauffacher, M. Transdisciplinary case studies as a means of sustainability learning: Historical framework and theory. *Int. J. Sustain. High. Educ.* **2006**, *7*, 226–251. [\[CrossRef\]](#)
53. Reynolds, M.; Foulkes, J.; Furbank, R.; Griffiths, S.; King, J.; Murchie, E.; Parry, M.; Slafer, G. Achieving yield gains in wheat. *Plant Cell Environ.* **2012**, *35*, 1799–1823. [\[CrossRef\]](#) [\[PubMed\]](#)
54. Aragón-Correa, J.A.; Rubio-Lopez, E.A. Proactive corporate environmental strategies: Myths and misunderstandings. *Long Range Plan.* **2007**, *40*, 357–381. [\[CrossRef\]](#)
55. Makropoulos, C.K.; Natsis, K.; Liu, S.; Mittas, K.; Butler, D. Decision support for sustainable option selection in integrated urban water management. *Environ. Model. Softw.* **2008**, *23*, 1448–1460. [\[CrossRef\]](#)
56. Subramoniam, R.; Huisingh, D.; Chinnam, R.B. Remanufacturing for the automotive aftermarket-strategic factors: Literature review and future research needs. *J. Clean. Prod.* **2009**, *17*, 1163–1174. [\[CrossRef\]](#)
57. Moore, S.B.; Manring, S.L. Strategy development in small and medium sized enterprises for sustainability and increased value creation. *J. Clean. Prod.* **2009**, *17*, 276–282. [\[CrossRef\]](#)
58. Maxwell, D.; Sheate, W.; Van Der Vorst, R. Functional and systems aspects of the sustainable product and service development approach for industry. *J. Clean. Prod.* **2006**, *14*, 1466–1479. [\[CrossRef\]](#)
59. Figge, F.; Hahn, T. The cost of sustainability capital and the creation of sustainable value by companies. *J. Ind. Ecol.* **2005**, *9*, 47–58. [\[CrossRef\]](#)
60. Tal, A. Seeking sustainability: Israel's evolving water management strategy. *Science* **2006**, *313*, 1081–1084. [\[CrossRef\]](#)
61. Ny, H.; MacDonald, J.P.; Broman, G.; Yamamoto, R.; Robért, K.H. Sustainability constraints as system boundaries: An approach to making life-cycle management strategic. *J. Ind. Ecol.* **2006**, *10*, 61–77. [\[CrossRef\]](#)
62. Petrini, M.; Pozzebon, M. Managing sustainability with the support of business intelligence: Integrating socio-environmental indicators and organisational context. *J. Strateg. Inf. Syst.* **2009**, *18*, 178–191. [\[CrossRef\]](#)
63. Ceschin, F. Critical factors for implementing and diffusing sustainable product-Service systems: Insights from innovation studies and companies' experiences. *J. Clean. Prod.* **2013**, *45*, 74–88. [\[CrossRef\]](#)
64. Van Hoey, G.; Borja, A.; Birchenough, S.; Buhl-Mortensen, L.; Degraer, S.; Fleischer, D.; Kerckhof, F.; Magni, P.; Muxika, I.; Reiss, H. The use of benthic indicators in Europe: From the Water Framework Directive to the Marine Strategy Framework Directive. *Mar. Pollut. Bull.* **2010**, *60*, 2187–2196. [\[CrossRef\]](#) [\[PubMed\]](#)
65. Schrettle, S.; Hinz, A.; Scherrer-Rathje, M.; Friedli, T. Turning sustainability into action: Explaining firms' sustainability efforts and their impact on firm performance. *Int. J. Prod. Econ.* **2014**, *147*, 73–84. [\[CrossRef\]](#)
66. McCain, K.W. Mapping authors in intellectual space: A technical overview. *J. Am. Soc. Inf. Sci.* **1990**, *41*, 433–443. [\[CrossRef\]](#)
67. Small, H. Visualizing science by citation mapping. *J. Am. Soc. Inf. Sci.* **1999**, *50*, 799–813. [\[CrossRef\]](#)
68. Pilkington, A.; Meredith, J. The evolution of the intellectual structure of operations management—1980–2006: A citation/co-citation analysis. *J. Oper. Manag.* **2009**, *27*, 185–202. [\[CrossRef\]](#)
69. White, H.D.; McCain, K.W. Visualizing a discipline: An author co-citation analysis of information science, 1972–1995. *J. Am. Soc. Inf. Sci.* **1998**, *49*, 327–355.
70. Porter, M.E. *Michael, E. Porter on Competition and Strategy*; Harvard Business School Press: Boston, MA, USA, 1991.
71. Elkington, J. *Cannibals with Forks: The Triple Bottom Line of Sustainability*; New Society Publishers: Gabriola Island, UK, 1998.
72. Elkington, J. Enter the triple bottom line. In *The Triple Bottom Line*; Routledge: London, UK, 2013; pp. 23–38.
73. Prahalad, C.; Hart, S.L. Strategies for the bottom of the pyramid: Creating sustainable development. *Ann. Arbor.* **1999**, *1001*, 48109.
74. Baumgartner, R. Corporate sustainability performance: Methods and illustrative examples. *Int. J. Sustain. Dev. Plan.* **2008**, *3*, 117–131. [\[CrossRef\]](#)
75. Baumgartner, R.J. Managing corporate sustainability and CSR: A conceptual framework combining values, strategies and instruments contributing to sustainable development. *Corp. Soc. Responsib. Environ. Manag.* **2014**, *21*, 258–271. [\[CrossRef\]](#)
76. Hahn, T.; Figge, F.; Pinkse, J.; Preuss, L. Trade-offs in corporate sustainability: You can't have your cake and eat it. *Bus. Strateg. Environ.* **2010**, *19*, 217–229. [\[CrossRef\]](#)
77. Schaltegger, S.; Wagner, M. Integrative management of sustainability performance, measurement and reporting. *Int. J. Acc. Audit. Perform. Eval.* **2006**, *3*, 1–19. [\[CrossRef\]](#)

78. Schaltegger, S.; Wagner, M. Managing and measuring the business case for sustainability: Capturing the relationship between sustainability performance, business competitiveness and economic performance. In *Managing the Business Case for Sustainability*; Routledge: London, UK, 2017; pp. 1–27.
79. Chang, N.-B.; Davila, E.; Dyson, B.; Brown, R. Optimal design for sustainable development of a material recovery facility in a fast-growing urban setting. *Waste Manag.* **2005**, *25*, 833–846. [[CrossRef](#)] [[PubMed](#)]
80. Chang, N.-B.; Pires, A. *Sustainable Solid Waste Management: A Systems Engineering Approach*; John Wiley & Sons: Hoboken, NJ, USA, 2015.
81. Zhang, X.; Deng, S.; Zhang, Y.; Yang, G.; Li, L.; Qi, H.; Xiao, H.; Wu, J.; Wang, Y.; Shen, F. Emergy evaluation of the impact of waste exchanges on the sustainability of industrial systems. *Ecol. Eng.* **2011**, *37*, 206–216. [[CrossRef](#)]
82. Zhang, X.H.; Deng, S.; Jiang, W.; Zhang, Y.; Peng, H.; Li, L.; Yang, G.; Li, Y. Emergy evaluation of the sustainability of two industrial systems based on wastes exchanges. *Resour. Conserv. Recycl.* **2010**, *55*, 182–195. [[CrossRef](#)]
83. Su, S.; Jiang, Z.; Zhang, Q.; Zhang, Y. Transformation of agricultural landscapes under rapid urbanization: A threat to sustainability in Hang-Jia-Hu region, China. *Appl. Geogr.* **2011**, *31*, 439–449. [[CrossRef](#)]
84. Zhang, Y.; Li, Y.; Jiang, L.; Tian, C.; Li, J.; Xiao, Z. Potential of perennial crop on environmental sustainability of agriculture. *Procedia Environ. Sci.* **2011**, *10*, 1141–1147. [[CrossRef](#)]
85. Finnveden, G.; Ekvall, T.; Arushanyan, Y.; Bisailon, M.; Henriksson, G.; Gunnarsson Östling, U.; Söderman, M.; Sahlin, J.; Stenmarck, Å.; Sundberg, J. Policy instruments towards a sustainable waste management. *Sustainability* **2013**, *5*, 841–881. [[CrossRef](#)]
86. Robèrt, K.H.; Broman, G.; Waldron, D.; Ny, H.; Byggeth, S.; Cook, D.; Johansson, L.; Oldmark, J.; Basile, G.; Haraldsson, H.V. *Strategic Leadership towards Sustainability*; Department of Mechanical Engineering at BTH: Blekinge, Sweden, 2004.
87. Holmberg, J.; Lundqvist, U.; Robèrt, K.-H.; Wackernagel, M. The ecological footprint from a systems perspective of sustainability. *Int. J. Sustain. Dev. World Ecol.* **1999**, *6*, 17–33. [[CrossRef](#)]
88. Loorbach, D. Transition management for sustainable development: A prescriptive, complexity-based governance framework. *Governance* **2010**, *23*, 161–183. [[CrossRef](#)]
89. Loorbach, D.; Rotmans, J. Managing transitions for sustainable development. In *Understanding Industrial Transformation*; Springer: Netherland, 2006; pp. 187–206.
90. Kemp, R.; Loorbach, D. *Governance for Sustainability through Transition Management*; Open Meeting of Human Dimensions of Global Environmental Change Research Community: Montreal, QC, Canada, 2003; p. 2003.
91. Kemp, R.; Loorbach, D.; Rotmans, J. Transition management as a model for managing processes of co-evolution towards sustainable development. *Int. J. Sustain. Dev. Ecol.* **2007**, *14*, 78–91. [[CrossRef](#)]
92. Rotmans, J.; Kemp, R.; Van Asselt, M. More evolution than revolution: Transition management in public policy. *Foresight* **2001**, *3*, 15–31. [[CrossRef](#)]
93. Smith, A.; Raven, R. What is protective space? Reconsidering niches in transitions to sustainability. *Res. Policy* **2012**, *41*, 1025–1036. [[CrossRef](#)]
94. Smith, A.; Voß, J.-P.; Grin, J. Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges. *Res. Policy* **2010**, *39*, 435–448. [[CrossRef](#)]
95. Mintzberg, H. Strategy-making in three modes. *Calif. Manag. Rev.* **1973**, *16*, 44–53. [[CrossRef](#)]
96. Mintzberg, H. The strategy concept I: Five Ps for strategy. *Calif. Manag. Rev.* **1987**, *30*, 11–24. [[CrossRef](#)]
97. Mintzberg, H. *Crafting Strategy*; Harvard Business Review: Boston, MA, USA, 1987.
98. Mintrom, M. Policy entrepreneurs and the diffusion of innovation. *Am. J. Political Sci.* **1997**, 738–770. [[CrossRef](#)]
99. Huitema, D.; Mostert, E.; Egas, W.; Moellenkamp, S.; Pahl-Wostl, C.; Yalcin, R. Adaptive water governance: Assessing the institutional prescriptions of adaptive (co-) management from a governance perspective and defining a research agenda. *Ecol. Soc.* **2009**, *14*, 26. [[CrossRef](#)]
100. Meijer, I.; Hekkert, M.P. Managing uncertainties in the transition towards sustainability: Cases of emerging energy technologies in the Netherlands. *J. Environ. Policy Plan.* **2007**, *9*, 281–298. [[CrossRef](#)]
101. Meijer, I.; Koppenjan, J.; Pruyt, E.; Negro, S.; Hekkert, M. The influence of perceived uncertainty on entrepreneurial action in the transition to a low-emission energy infrastructure: The case of biomass combustion in The Netherlands. *Technol. Forecast. Soc. Chang.* **2010**, *77*, 1222–1236. [[CrossRef](#)]

102. Sabatier, P.; Mazmanian, D. The implementation of public policy: A framework of analysis. *Policy Stud. J.* **1980**, *8*, 538–560. [\[CrossRef\]](#)
103. Seuring, S. Supply chain management for sustainable products—insights from research applying mixed methodologies. *Bus. Strateg. Environ.* **2011**, *20*, 471–484. [\[CrossRef\]](#)
104. Seuring, S. A review of modeling approaches for sustainable supply chain management. *Decis. Support Syst.* **2013**, *54*, 1513–1520. [\[CrossRef\]](#)
105. Seuring, S.; Müller, M. From a literature review to a conceptual framework for sustainable supply chain management. *J. Clean. Prod.* **2008**, *16*, 1699–1710. [\[CrossRef\]](#)
106. Seuring, S.; Müller, M. Core issues in sustainable supply chain management—a Delphi study. *Bus. Strateg. Environ.* **2008**, *17*, 455–466. [\[CrossRef\]](#)
107. Seuring, S.; Sarkis, J.; Müller, M.; Rao, P. Sustainability and Supply Chain Management—An Introduction to the Special Issue. *J. Clean. Prod.* **2008**, *16*, 1545–1551. [\[CrossRef\]](#)
108. Sarkis, J. A strategic decision framework for green supply chain management. *J. Clean. Prod.* **2003**, *11*, 397–409. [\[CrossRef\]](#)
109. 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. [\[CrossRef\]](#)
110. Vachon, S.; Halley, A.; Beaulieu, M. Aligning competitive priorities in the supply chain: The role of interactions with suppliers. *Int. J. Oper. Prod. Manag.* **2009**, *29*, 322–340. [\[CrossRef\]](#)
111. Vachon, S.; Mao, Z. Linking supply chain strength to sustainable development: A country-level analysis. *J. Clean. Prod.* **2008**, *16*, 1552–1560. [\[CrossRef\]](#)
112. Klassen, R.D.; Vereecke, A. Social issues in supply chains: Capabilities link responsibility, risk (opportunity), and performance. *Int. J. Prod. Econ.* **2012**, *140*, 103–115. [\[CrossRef\]](#)
113. Sueyoshi, T. Extended DEA-discriminant analysis. *Eur. J. Oper. Res.* **2001**, *131*, 324–351. [\[CrossRef\]](#)
114. Sueyoshi, T. Mixed integer programming approach of extended DEA-discriminant analysis. *Eur. J. Oper. Res.* **2004**, *152*, 45–55. [\[CrossRef\]](#)
115. Sueyoshi, T.; Goto, M. Slack-adjusted DEA for time series analysis: Performance measurement of Japanese electric power generation industry in 1984–1993. *Eur. J. Oper. Res.* **2001**, *133*, 232–259. [\[CrossRef\]](#)
116. Sueyoshi, T.; Goto, M. DEA approach for unified efficiency measurement: Assessment of Japanese fossil fuel power generation. *Energy Econ.* **2011**, *33*, 292–303. [\[CrossRef\]](#)
117. Sueyoshi, T.; Goto, M. DEA radial measurement for environmental assessment and planning: Desirable procedures to evaluate fossil fuel power plants. *Energy Policy* **2012**, *41*, 422–432. [\[CrossRef\]](#)
118. Sueyoshi, T.; Goto, M. DEA environmental assessment of coal fired power plants: Methodological comparison between radial and non-radial models. *Energy Econ.* **2012**, *34*, 1854–1863. [\[CrossRef\]](#)
119. Sueyoshi, T.; Goto, M.; Ueno, T. Performance analysis of US coal-fired power plants by measuring three DEA efficiencies. *Energy Policy* **2010**, *38*, 1675–1688. [\[CrossRef\]](#)
120. Hart, S.L. A natural-resource-based view of the firm. *Acad. Manag. Rev.* **1995**, *20*, 986–1014. [\[CrossRef\]](#)
121. Hart, S.L. Beyond greening: Strategies for a sustainable world. *Harv. Bus. Rev.* **1997**, *75*, 66–77.
122. Partidario, M.R. A strategic advocacy role in SEA for sustainability. *J. Environ. Assess. Policy Manag.* **2015**, *17*, 1550015. [\[CrossRef\]](#)
123. Dillon, P.S. Implications of industrial ecology for firms. In *The Greening of Industrial Ecosystems*; National Academy Press: Washington, DC, USA, 1994; pp. 201–207.
124. Richards, D.J.; Allenby, B.R. *The Greening of Industrial Ecosystems*; National Academies Press: Washington, DC, USA, 1994.
125. Shrivastava, P. The role of corporations in achieving ecological sustainability. *Acad. Manag. Rev.* **1995**, *20*, 936–960. [\[CrossRef\]](#)
126. Cullen, J.G. Educating business students about sustainability: A bibliometric review of current trends and research needs. *J. Bus. Ethics* **2017**, *145*, 429–439. [\[CrossRef\]](#)
127. Sachs, J.D. From millennium development goals to sustainable development goals. *Lancet* **2012**, *379*, 2206–2211. [\[CrossRef\]](#)
128. Griggs, D.; Stafford-Smith, M.; Gaffney, O.; Rockström, J.; Öhman, M.C.; Shyamsundar, P.; Steffen, W.; Glaser, G.; Kanie, N.; Noble, I. Policy: Sustainable development goals for people and planet. *Nature* **2013**, *495*, 305. [\[CrossRef\]](#)

129. Dyllick, T.; Hockerts, K. Beyond the business case for corporate sustainability. *Bus. Strateg. Environ.* **2002**, *11*, 130–141. [[CrossRef](#)]
130. Van Marrewijk, M. Concepts and definitions of CSR and corporate sustainability: Between agency and communion. *J. Bus. Ethics* **2003**, *44*, 95–105. [[CrossRef](#)]
131. Van Marrewijk, M.; Werre, M. Multiple levels of corporate sustainability. *J. Bus. Ethics* **2003**, *44*, 107–119. [[CrossRef](#)]
132. Schaltegger, S.; Wagner, M. *Managing the Business Case for Sustainability: The Integration of Social, Environmental and Economic Performance*; Routledge: New York, NY, USA, 2017.
133. Bonn, I.; Fisher, J. Sustainability: The missing ingredient in strategy. *J. Bus. Strategy* **2011**, *32*, 5–14. [[CrossRef](#)]
134. Folke, C.; Biggs, R.; Norstrom, A.V.; Reyers, B.; Rockstrom, J. Social-ecological resilience and biosphere-based sustainability science. *Ecol. Soc.* **2016**. [[CrossRef](#)]
135. Folke, C.; Carpenter, S.; Elmqvist, T.; Gunderson, L.; Holling, C.S.; Walker, B. Resilience and sustainable development: Building adaptive capacity in a world of transformations. *J. Hum. Environ.* **2002**, *31*, 437–441. [[CrossRef](#)] [[PubMed](#)]
136. Kemp, R.; Parto, S.; Gibson, R.B. Governance for sustainable development: Moving from theory to practice. *Int. J. Sust. Dev.* **2005**, *8*, 12–30. [[CrossRef](#)]
137. Kemp, R.; Schot, J.; Hoogma, R. Regime shifts to sustainability through processes of niche formation: The approach of strategic niche management. *Technol. Anal. Strateg. Manag.* **1998**, *10*, 175–198. [[CrossRef](#)]
138. Suriyankietkaew, S.; Kantamara, P. Business ethics and spirituality for corporate sustainability: A Buddhism perspective. *J. Manag. Spiritual. Relig.* **2019**, *16*, 264–289. [[CrossRef](#)]
139. Suriyankietkaew, S.; Avery, G.C. Sustainable leadership practices driving financial performance: Empirical evidence from Thai SMEs. *Sustainability* **2016**, *8*, 327. [[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/>).