Visualizing Sustainability Research in Business and Management (1990–2019) and Emerging Topics: A Large-Scale Bibliometric Analysis

Qiong Jia [1],* , Liyuan Wei [2],* and Xiaotong Li [3]

[1] Department of Management, Hohai University, Nanjing 211100, China
[2] Department of Marketing, Brunel Business School, Brunel University, Brunel University London, Middlesex UB8 3PN, UK
[3] Department of Management, Marketing and Information Systems, The University of Alabama, Huntsville, AL 35899, USA; lixi@uah.edu
* Correspondence: jiaqionghit@163.com (Q.J.); liyuan.wei@brunel.ac.uk (L.W.)

Abstract: While researchers from many disciplines are increasingly interested in studying issues related to sustainability, few studies have presented a holistic view of sustainability from the perspectives of business and management. This bibliometric study quantitatively analyzed a big data set of 30 years of sustainability research (1990–2019), consisting of 37,322 publications and 1,199,398 cited references, visualizing major topics, dynamic evolution, and emerging development. The decade-by-decade in-depth analysis shows a clear shift from a nearly exclusive focus on economic growth and consumption to all three pillars of sustainability, i.e., economic growth, social development, and environmental protection. Highlighting the differences between United Nations' Sustainable Development Goals and the popular research topics from academia, our analysis uncovers research gaps and suggests future research directions for sustainability researchers and practitioners.

Keywords: sustainability; big data; bibliometric analysis; information management; science visualization; CiteSpace

1. Introduction

With the diffusions of internet and other technologies, we all have witnessed transformational development in commerce over the last thirty years. While major technology-driven companies such as Alibaba Group and Amazon have built gigantic ecosystems, many enterprises have been struggling with intense competition and shrinking market share. What leads to such a great difference? Jack Ma, the founder of Alibaba, who is also the first person to be appointed as an advocate of the United Nations' Sustainable Development Goals, provided an opinion in response to this question. According to Jack Ma (2013) [1],

> *"Our challenge is to help more people to make healthy money, 'sustainable money,' money that is not only good for themselves but also good for the society. Business people like me are beginning to pay attention to social issues including the environment, taking action and really treating this issue very seriously."*

Such a sustainability-driven perspective has become increasingly popular among business researchers and practitioners. However, few studies have presented a holistic view of sustainability from the perspectives of business and management. Therefore, a bibliometric analysis of the literature on sustainability can shed fresh light on the implications of sustainability for modern commerce.

For academic research, sustainability has been a fast-developing research area comprising a wide variety of specialties from chemical sciences, engineering, environmental health, social sciences, public policy, and business. Thus, we now have a huge dataset of research articles related to sustainability. Two characteristics of sustainability research make it appropriate to apply automated, computerized methods for a literature review. First, the amount of data to be processed in a literature review is very large. Here the data include not only the textual information contained in each publication, including titles, abstracts, and keywords, but also the network structure formed in the citations and co-citations. Although traditional reviews have provided expert in-depth analyses, they can be used to inherently further explore the underlying networks among the publications and capture the dynamics in the research domain [2–5]. Second, the scholarly research in sustainability is extremely interdisciplinary because of the nature of the subject matter. Traditional reviews that rely on the labor of experts to read and judge the contents will not be able to generate an informed review due to the limits of expertise that is humanly possible. Most of the existing traditional reviews, thus, are limited to narrowly defined topics and aren't applicable to the reviewing of a long, prolific research domain such as sustainability. These characteristics make the data "big data" in that they satisfy the 4Vs: volume, velocity, variety, and veracity [6]. In this paper, we apply a quantitative bibliometric approach to review the research domain of sustainability to complement the existing reviews. Therefore, the first goal of our study aimed to quantitatively survey the intellectual landscape in sustainability academic research and identify thematic patterns, landmark articles, and emerging trends. We focused on original research articles published in leading academic journals in business and management, as well as social sciences closely related to the research and education in business schools, such as economics, psychology, and sociology, to identify the differences between business and social sciences data.

Furthermore, in practice, sustainability is a global goal and a global challenge. The *2030 Agenda for Sustainable Development*, adopted by all United Nations states in 2015, provides a shared blueprint for peace and prosperity for people and the planet. At the heart of the agenda are the 17 Sustainable Development Goals (SDGs 2015), including no poverty; zero hunger; good health and well-being; quality education; gender equality; clean water and sanitation; affordable and clean energy; decent work and economic growth; industry, innovation, and infrastructure; reduced inequalities; sustainable cities and communities; responsible consumption and production; climate action; life below water; life on land; peace, justice and strong institutions; and partnerships for the goals [7]. As the second decade of the 21st century comes to an end, it is time to inspect what the academic research in business, management, and associated social sciences has achieved and what has been learned compared with the practical goals. Such a review will be essential for the continuous closing of the gap between academic research and practices on sustainability. Besides, students in business and management are trained to be future business leaders and, collectively, they can influence if and how soon the SDGs can be achieved [8]. Thus, business schools have great responsibilities in preparing their students to address the complex global socio-economic and environmental challenges [9]. A reflection on the research produced in the business school journals focused on sustainability is useful in recognizing and in pointing out future research and practice directions. Thus, the second aim of this review was to highlight the gap and insights between academic research and practitioners by comparing the bibliometric analysis results with the SDGs goals, and to propose potential topics that are urgently needed by both the industries and society.

The two goals of this study, making a bibliometric analysis and highlighting the gap and insights between academic research and practitioners, are represented in the research framework as shown in Figure 1.
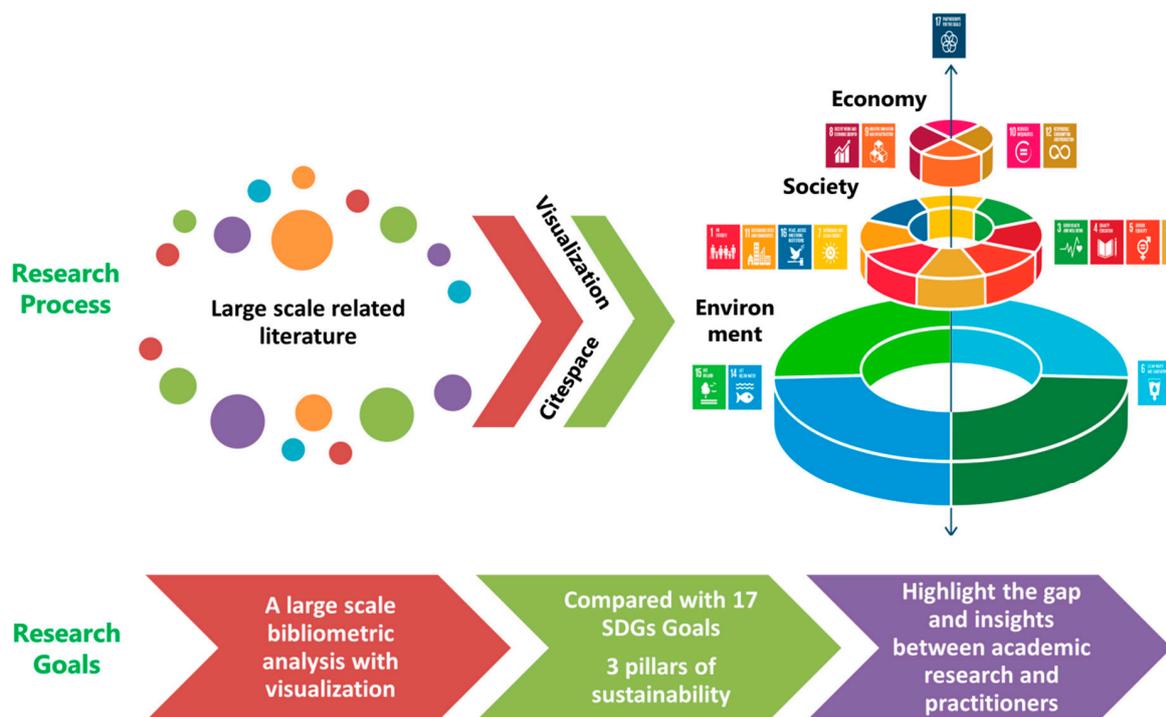
Figure 1. Research framework for the literature review.

Our study makes several contributions. First, it adopts a quantitative, "big data" approach to analyze a large-scale dataset containing 37,322 sustainability-related research articles in 433 top business and management journals, and 1,199,398 cited documents collected from the Web of Science (WoS) Core Collection in the past 30 years (from 1990 to 2019). Compared with existing reviews on sustainability and related topics, our study is among the most comprehensive bibliometric reviews so far. The large dataset allowed us to capture the intellectual landscape of sustainability research and provide a comprehensive portrayal of the knowledge structure of the sustainability domain in the last three decades. Second, this review offers a detailed decade-by-decade analysis to demonstrate how the sustainability research has moved from a rather narrow, economic growth-focused agenda to encompassing all three pillars of sustainability (i.e., economic growth, social development, and environmental protection), and how it has progressed with a rich and diverse set of topics. Third, this paper suggests that business and management fields could offer more solutions to sustainability problems around the world. Business and management research has the potential to create interesting and significant topics that can link the hotspots in the sustainability literature to the United Nations' Sustainable Development Goals (SDGs). Finally, the sustainability-related studies in Sustainability journal are also mapped from 2008 to 2019 to view the extending and potential boundary of the update studies in the journal. Comparing these topics from this journal with the above studied business journals can also provide a broader vision for the journal readers.

The remaining parts of this article are organized as follows. Section 2 summarizes the related review studies. Then, the data and methods are presented in Section 3. The bibliometric analyses and results are listed in Section 4. Based on the results, the research gaps and insights are described in Section 5 and the conclusion is attained in Section 6.

2. Related Work

2.1. Systematic Literature Reviews of Sustainability

Recognizing the responsibilities business schools have in conducting research and educating future business leaders, many scholars have reviewed different aspects of sustainability and sustainable

development. For example, strategic management scholars have examined the research in corporate social responsibility [10]; in behavioral economics, economists have examined if behavioral nudges can lead to green choices [11]; marketing scholars have reviewed the findings on eco-friendly product development [12] and ethical consumption behaviors [13]; operations management focuses on supply chain management [14], smart technologies in manufacturing [15], supply chain collaboration [16], circular economy [17], sustainable transportation systems [18], and sustainability performance evaluation [19]; the human resources discipline focuses on the role of human resources management [20]; and entrepreneurship scholars have examined topics such as social entrepreneurship [21]. Some reviews are interdisciplinary due to the nature of the sustainability-related issues investigated, such as resilience [22], internet use and individual well-being [23], and social and sustainable innovations [24]. The existing reviews present a fragmented view of the many facets inherent in understanding the current research landscape of sustainability. Our bibliometric analysis attempts to provide a bird's eye view across the 22 fields in ABS Academic Journal Guide and to provide a more comprehensive assessment of the literature on sustainability from business and management perspective.

Most of the previous reviews used limited numbers of publications and expert-based judgments to evaluate the literature, extract research themes, and suggest directions for future research. For example, Chen et. al [16] used human experts to read the full text of 174 papers on sustainability and supply chain collaboration, the authors read 1126 long-listed articles, and applied their judgments to select 122 articles for review. These reviews are mostly qualitative and are not suitable for understanding the research landscape of a wide, interdisciplinary domain such as sustainability. They also cannot provide dynamic views to illustrate how a research domain has evolved over a long period of time.

2.2. Large-Scale Bibliometric Review to Identify Specialties

The ability to take stock of a research field or specialty has increased tremendously in the past decade due to the increasing degree of digitalization of research article databases (e.g., Web of Science, Scopus) and the developments in software tools such as CiteSpace [25] and VOSviewer [26]. Such reviews have shed important light on evaluating the productivity of business schools [27], ranking academic journals [28], stocktaking research domains [29], and discovering emerging research trends and technologies [30].

A number of recent bibliometric reviews have examined the sustainability domain. For example, Cullen [3] reviewed published sustainability research that relates to business and management education over the 20 years (1994–2013). Their review showed a nascent rise in the interest in this domain, but their analysis was primarily descriptive. Chabowski, et al. [31] reviewed the sustainability research in marketing by examining 76,342 citations made in 1320 sustainability-focused articles from 36 journals over 51 years (1958–2008). They employed multidimensional scaling and extracted five broad topics as future research directions. Tang et al. [32] reviewed the ten years of publications in the journal *Sustainability* since 2009, when it released the inaugural issue. This present review instead covers a time period of 30 years, a larger selection of academic journals (433 journals), and higher-quality publications on sustainability. The review by Zhu and Hua [2] bears the closest resemblance to this present one. They compiled a dataset of 59,926 records and analyzed them using CiteSpace. Yet, their data sample was different from this present review in two ways. First, they did not impose any restriction on the journals and consequently it was a medley of 32 languages, 49 countries, and 149 research areas. Second, their search keyword was "sustainab* development" only, whereas this review, motivated by the multifaceted nature of sustainability, purposely incorporated the search terms related to the 17 SDGs adopted by the U.N. Therefore, we believe this review defines a more suitable sample of existing sustainability research in business and social sciences fields.

2.3. The Gap between Academic Research and Practice

Most related literature reviews have explored the humongous research to catch the theoretical trends, but ignore deeply analyzing the gap between academic research and practice [33,34]. As

indicated by the empirical evaluation on the usefulness of academic research to practitioners, in particular, business schools' research has limited impact on business practitioners and makes limited contribution for practice, although a number of scholars strive to reduce the research and practice gap [33,34]. Therefore, in this review, centering on the practical 17 SDGs for the sustainability of the U. N., we compared the achieved and untouched topics to find the gap between academic research and practice in Section 5.

3. Data and Method

3.1. Sample

We reviewed sustainability research from 1990 to 2019 from the ISI Web of Science Core Collection database, as adopted by prior research [2,5,35]. Another widely use dataset, Scopus, covers a wider journal range but it is currently limited to recent articles (mainly after 1995) compared with Web of Science [36]. Therefore, we chose the ISI Web of Science Core as the data source. The research articles were collected from academic journals ranked at 4*, 4, and 3 in the Academic Journal Guide 2018, released by the Chartered Association of Business Schools in the U.K. The journals with four stars publish the most original and best executed research papers, and the journals with three stars publish original and well-executed research papers. Although the measurements are different in different countries, these leading journals are generally agreed by scholars in these research fields. "*It is argued that there is no perfect method of assessing journal quality, but that the ABS Academic Journal Quality Guide overcomes some of the failings of established methods*" [37]. The ABS Academic Journal Guide considers a range of indicators and provides wide journal coverage; has high levels of internal and external reliability; is sensitive to small variations in the ratings of journals; and is generally recognized as a reasonable ways of ranking journals within its user community. It provides a list of journals that cover a wide range of 22 disciplines in business school research and education. As such, it allowed us to investigate the research output in an interdisciplinary and refined way. This journal list is widely adopted by business schools and other stakeholders in evaluating the scientific production and dissemination in business and management disciplines in UK [38]. Collectively, 433 journals in all 22 disciplines in business and management were included based on the five measurements including article citation, institution list, peer surveys, citation studies, and derived lists (Appendix A).

To examine the intellectual landscape, the research domain must be defined clearly. This is rather difficult because the field of sustainability is highly interdisciplinary and involves a wide variety of issues. Our dataset was constructed in three steps. First, we searched for the term "sustainable" or "sustainability" in the titles, keywords, and abstracts of published articles. Second, we added a number of descriptive words that are associated with sustainable development from the United Nations' Sustainable Development Goals including "responsible", "clean", "decent", "affordable", "justifiable", "green", "renewable", "ecological", "environmental", "balanced", and "organic." Third, in business and management, sustainability is concerned with the impacts of business operations on society, impacts of business operations on the environment, equality, diversity, consumer protection, health, environmentally sustainable transportation systems, governmental regimes, environmental risks, information security, information resilience, circular economy, government and sustainability regulation, smart cities and homes, social networks, online sharing, economic growth, employment, income, democracy, social justice, social inclusion, crime, and emerging technologies. Thus, these terms were used in search of the articles as well. We restricted the type of research to be articles and reviews as labeled in Web of Science, since they are predominately original research.

The resultant dataset contained 37,322 published articles as primary citing documents between January 1990 and February 2019. Figure 2 shows the fast increase in the number of research papers published on sustainability relative to the total amount over this period. In 1990 there were only 12 such articles fitting our selection criteria, about 0.098% of the total amount. In 2000, a decade later, it increased to 687 and further to 1717 in 2010, to be 4.39% of all the publications. By 2018, the quantity

of publications on sustainability grew to 3222, to be 10.6% of the total studies, suggesting that the sustainability research has played a more and more important role in business and management research areas. From these publications we generated 1,199,398 secondary documents (i.e., the cited references), which became the basis of document co-citation analysis and clustering. To observe the dynamic evolutions during the past 30 years and detect the evolution over time, we divided the 30 years into three decade-long periods (Table 1) and inspected them closely, as described below in Section 4.
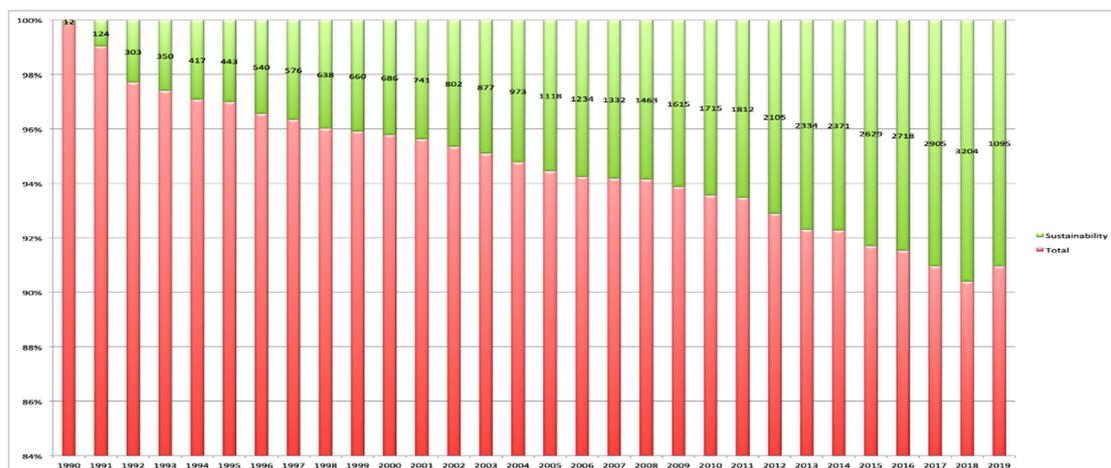

Figure 2. Year-by-year distribution of the publication literature on sustainability relative to all the literature of the selected journals (1990–2019).

Table 1. A summary of the collected datasets of Periods I, II, and III.

Dataset	Duration	Results	Articles	Reviews	References	Authors	Institutions
Period I	1990–1999	4062	3981	81	114,118	7676	1830
Period II	2000–2009	10,848	10,507	341	323,222	22,262	4523
Period III	2010–2019	22,412	21,966	446	762,058	48,963	9511
Period$_{Total}$	1990–2019	37,322	36,454	848	1,199,398	69,994	12,581

Notes: "Results" column means the total number of searched "Articles" and "Reviews" types of literature. "References" column here represents the total unrepeated cited references. "Authors" and their affiliated "Institutions" column count each author and institution only once in the entire pool.

3.2. Analytical Method

This review used two bibliometric methods—document co-citation analysis and dual-map overlay—to study the current research on sustainability published over the past three decades. First, the collections of research papers generated in the steps above were analyzed using document co-citation analysis (DCA). Document co-citation studies a network of co-cited references and describes how two research articles may be linked. They are defined as the "frequency with which two documents are cited together" [39]. The fundamental assumption is that co-citation clusters reveal underlying intellectual structures. For example, Small [39] and Chen [25] are both cited in this paper, thus these two cited references have a co-citation link. With more documents citing these two papers together, the related nature of Small (1973) and Chen (2006) grows stronger. Here, the cited articles are the knowledge base and the citing articles are the research front. The co-citation frequency between two references is calculated based on the number of times that they are cited together in the primary, citing documents.

Such a co-citation analysis serves several functions. First, it maps the relationships between key ideas in a field (Small 1973). The greater the frequency that two papers are co-cited, the stronger relationship there is between the ideas presented in those two works. Second, co-citation analysis identifies landmark articles that are intellectually significant works for a knowledge domain. Landmark
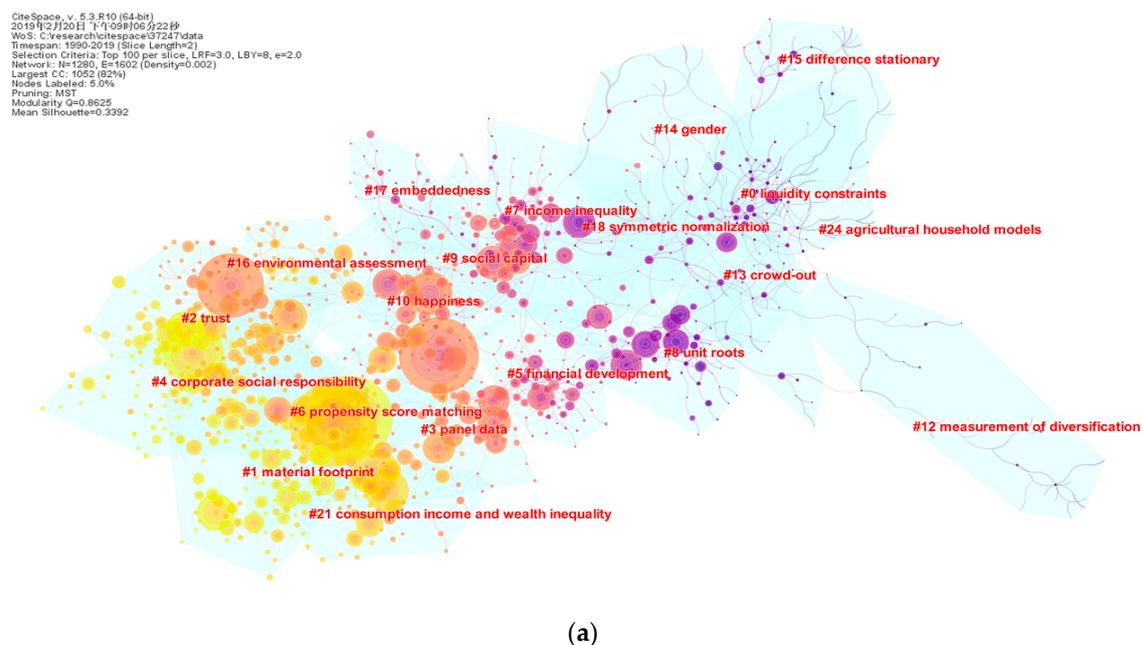
works are important to examine in bibliometric analysis because they not only reveal the significant contributions made to the research domain at a given point of time, but also indicate intellectual turning points dynamically [40].

This review applies the method of bibliometric mapping, an information visualization technique that can quantitatively display the landscape and dynamic aspects of a knowledge domain [25,41,42]. The mapping tool used here was CiteSpace (v.5.3.R10) (http://cluster.cis.drexel.edu/~{}cchen/citespace/. Accessed 10 February 2019), a Java-based application developed by Chaomei Chen [25,40]. CiteSpace visualizes and analyzes trends and patterns in scientific literature, taking advantage of the citation and co-citation records to present the intellectual structure, including the cluster maps and dual-map overlays, as well as bibliographic coupling. Citespace has become one of the most widely used bibliometric mapping tools [43]. It has been used to map various research areas such as social commerce [44], regenerative medicine [45], hospitality [46], and climate change and tourism [47].

4. Bibliometric Analyses and Results

4.1. A Landscape of Thirty Years of Sustainability Research Topics

Figure 3 shows the document co-citation network structure over the 30-year period from January 1990 to February 2019. The modularity Q and the mean silhouette score S are two important metrics that tell us about the overall structural properties of the network. The top 100 most cited studies in every slice were applied to generate the references network in that year. We set the time slice to be two years based on trial experiments results, revealing that a two-year time slice is adequate to represent three or more abundant network clusters, among which there are concise relations, representing a sensible performance [29]. The synthesized network contains 37,322 records with 1,199,398 cited references. The network contains 106 co-citation clusters. The 25 largest connected components include 1280 nodes and 1602 links, which account for 82% of the entire network. In this cluster map, the modularity Q of 0.863 is quite high, suggesting that the specialties in sustainability are distinctly defined in terms of co-citation clusters. The mean silhouette score is 0.339, which is acceptable because of the existing numerous small clusters. The silhouette scores of the major clusters we will emphasize in this review are adequately high, as shown in Table A2 of Appendix A. In generating the network, we used the minimum spanning tree algorithm (MST) to prune it to elucidate the network more concisely.
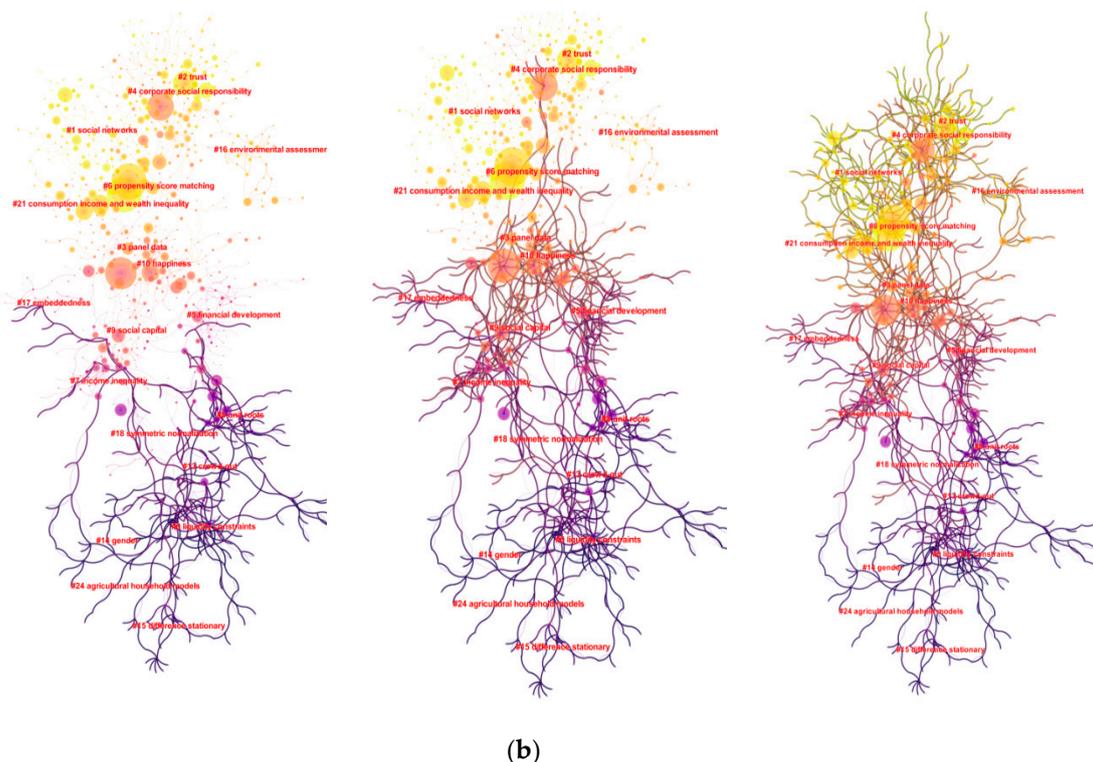

(**a**)

Figure 3. *Cont.*

(**b**)

Figure 3. (**a**) Landscape view of 30 years of sustainability research (1990–2019); (**b**) overlay cluster map in three periods, left to right: 1990–1999, 2000–2009, 2010–2019.

The nodes in the view represent the analyzed subjects (that is, cited references), and the more citations appear, the larger the nodes of frequency. The visualized cluster view represents many useful indicators of the co-citation network. The map can show the formation of knowledge clusters, the association between clusters, and the evolution over time. For example, the connection between nodes represents a co-occurrence (or co-citation) relationship. The color and thickness in the inner circle of the node indicate the frequency (or citations) that occurs in different time periods. The clusters are labeled by noun phrases extracted from the titles, keyword lists, or abstracts of articles that cited the particular cluster. We report the top three labels extracted from keywords using both Latent Semantic Indexing (LSI) [48] and Log Likelihood Ratio (LLR) [49]. Labels extracted by LSI tend to capture implicit semantic relationships across records, whereas those chosen by LLR tend to reflect a unique aspect of a cluster. The areas of different colors indicate the time when co-citation links in those areas appeared for the first time. The change in color from cold to warm tones indicates time changes from early to the more recent. Other nodes with red tree rings are references with citation burst, that is, cited references were suddenly added in the short term [50].

For example, as shown in Figure 3a, the purple-colored areas at the upper right quadrant, including the six labels (#0—liquidity constraints, #12—measurement of diversification, #13—crowd-out, #14—gender, #15—difference stationary, #24—agricultural household modles), represent earlier research hotspots. For instance, the #0—liquidity constraints topic, popular in 1990s, means the restrictions on the use of assets to finance needs for consumption or investment, which relates with consumption and income, playing an important role for macroeconomic outcomes. In the middle, the magenta-colored areas represent more recent research hotspots, including #5—financial development, #7—income inequty, #8—unit roots, #9—social capital, #10—happiness, and #17—embeddedness. The latest research topic hotspots are covered in the yellow areas, including #1—material footprint, #2—trust, #3—panel data, #4—corporate social responsibility, #6—propensity score matching, #16—environmental assessment, #21—consumption income and wealth inequality. A greater number of sudden points can be found in the magenta area and the yellow area, suggesting a reduced homogeneity in clusters and a

proliferation of research topics. Such a developing process can also be clearly viewed by the Figure 3b, just like a process of mycelium cultivation.

4.2. The Decade-By-Decade Analysis

To compare the research topic changes in the sustainability domain, research topics in Periods I, II, and III, defined by the 1990s, 2000s, and 2010s, respectively, were used. Figures 4–6 show the research landscape in the three decades 1990–1999, 2000–2009, and 2010–2019, respectively. Tables 2–4 show the co-citation clusters identified in the network. Each of the largest 6 clusters of these three periods all have more than 100 members. Their silhouette scores indicate a high level of homogeneity within these clusters. For each of the 10-year periods, we focused on the largest topic clusters to illustrate the research fronts in different decades over the 30 years.

4.2.1. Period I (1990–1999)

Figure 4 shows a landscape view of research output in the 1990's in the field of sustainability. Same as in the 30-year total document database analysis on the 30-year documents base, the top 100 most cited works each year were applied to generate the references network in that year. The synthesized network contains 4,062 records with 114,118 references. The network contains 52 co-citation clusters, with 522 nodes and 577 links. The largest connected components include 373 nodes, which account for 71.5% of the entire network. In this cluster map, the relatively high modularity Q of 0.858 suggests the clustering is reasonable. The mean silhouette score of 0.448 suggests that the homogeneity of these clusters, on average, is moderate. The largest 11 clusters all have more than 20 members each as shown in Table 2.
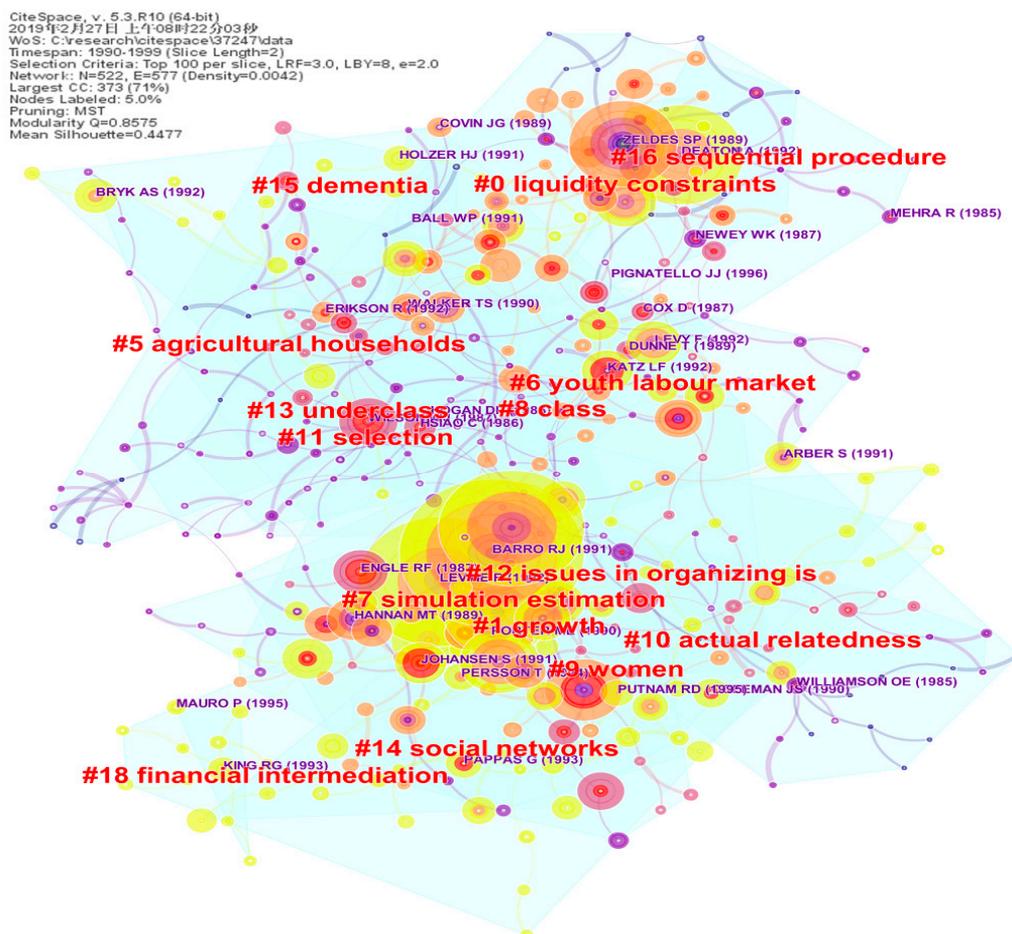

Figure 4. Landscape view of sustainability research in Period I (1990–1999).

Table 2. Key labels as sustainability research topics in Period I (1990–1999).

Cluster ID	Size	Silhouette	Mean (Year)	Label (LSI)	Label (LLR)
0	52	0.876	1989	consumption; permanent income; social security	liquidity constraints (30.56, 10^{-4}); dynamic programming (21.77, 10^{-4}); saving (21.77, 10^{-4})
1	47	0.987	1990	economic growth; economic development; stochastic growth models	growth (24.28, 10^{-4}); endogenous growth (21.96, 10^{-4}); unit roots (21.56, 10^{-4})
5	29	0.997	1987	innovation; job mobility; scale	agricultural households (8.68, 0.005); self-selection (8.68, 0.005); diseconomies of scale (8.68, 0.005)
6	29	0.987	1989	unmeasured heterogeneity; competing risks; time-varying coefficients	youth labor market (25.09, 10^{-4}); returns to education (25.09, 10^{-4}); selection bias (17.63, 10^{-4})
7	26	0.961	1990	monte carlo methods; moments; symmetric normalization	simulation estimation (12.4, 10^{-3}); symmetric normalization (12.4, 10^{-3}); intertemporal labor force participation (12.4, 10^{-3})
8	25	0.914	1987	employment characteristics; women's health; social roles	class (18.58, 10^{-4}); paid employment (18.58, 10^{-4}); employment characteristics (18.58, 10^{-4})
9	25	0.922	1994	socioeconomic status; social class; avoidable mortality	women (15.17, 10^{-4}); UK (15.17, 10^{-4}); mortality (12.23, 10^{-3})
10	24	0.978	1986	information system problems; description; information system view	actual relatedness (28.88, 10^{-4}); measurement of diversification (28.88, 10^{-4}); corporate strategy (17.24, 10^{-4})
11	23	0.998	1987	home; work; work arrangements	selection (8.06, 0.005); alternative work arrangements (8.06, 0.005); employment relations (8.06, 0.005)
12	20	0.882	1989	issues; structure; centralization decentralization	issues in organizing is (15.25, 10^{-4}); IS centralization decentralization (15.25, 10^{-4}); structure of the is function (15.25, 10^{-4})
13	20	0.954	1986	flexibility; stratification; unemployment	underclass (22.36, 10^{-4}); employment histories (22.36, 10^{-4}); stratification (22.36, 10^{-4})

Note: Clusters #2 to #4 were pruned and not reported in the CiteSpace output due to their extremely low centrality.

Figure 4 consists of two rather concentrated sections in its upper and lower parts, respectively. Occupying the upper part is the largest cluster in this period, focusing on household consumption and economic security as represented in "consumption", "liquidity constraints", and "permanent income" [51]. The next largest cluster is concerned with economic growth in macroeconomics [52], followed by the third largest cluster concentrating on topics such as job mobility, innovation, and labor markets, such as agriculture and the youth labor market [53]. They are clustered in the bottom of Figure 4. For this period, the research, represented in the publications in the ABS Academic Journal Guide 2018 prestigious journals, have mostly involved the economic factor as the single pillar of sustainability.

4.2.2. Period II (2000–2009)

Research topics in the first decade of the 21st century are presented in a clustered landscape view in Figure 5. Again the 10-year period is sliced at two years and the top 100 most cited studies in each slice were employed to generate the references network in that slice, containing 10,848 records with 323,222 references. Fifty-two clusters were formed, with the largest connected components consisting of 347 nodes out of 430 nodes, accounting for 80.7% of the entire network. The modularity Q of 0.824 is relatively high, suggesting that the network is reasonably divided into loosely coupled clusters.

The cluster map has a moderate mean silhouette score of 0.366, indicating the existence of numerous small clusters. We again focus on the largest clusters to understand the research landscape in this period, summarized in Table 3.
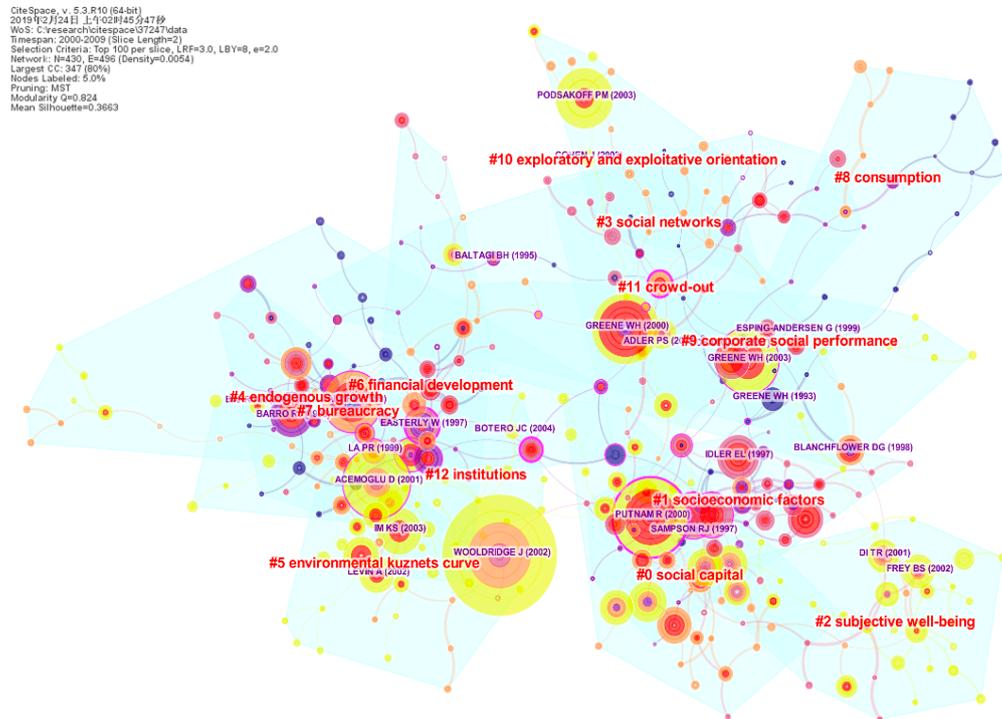

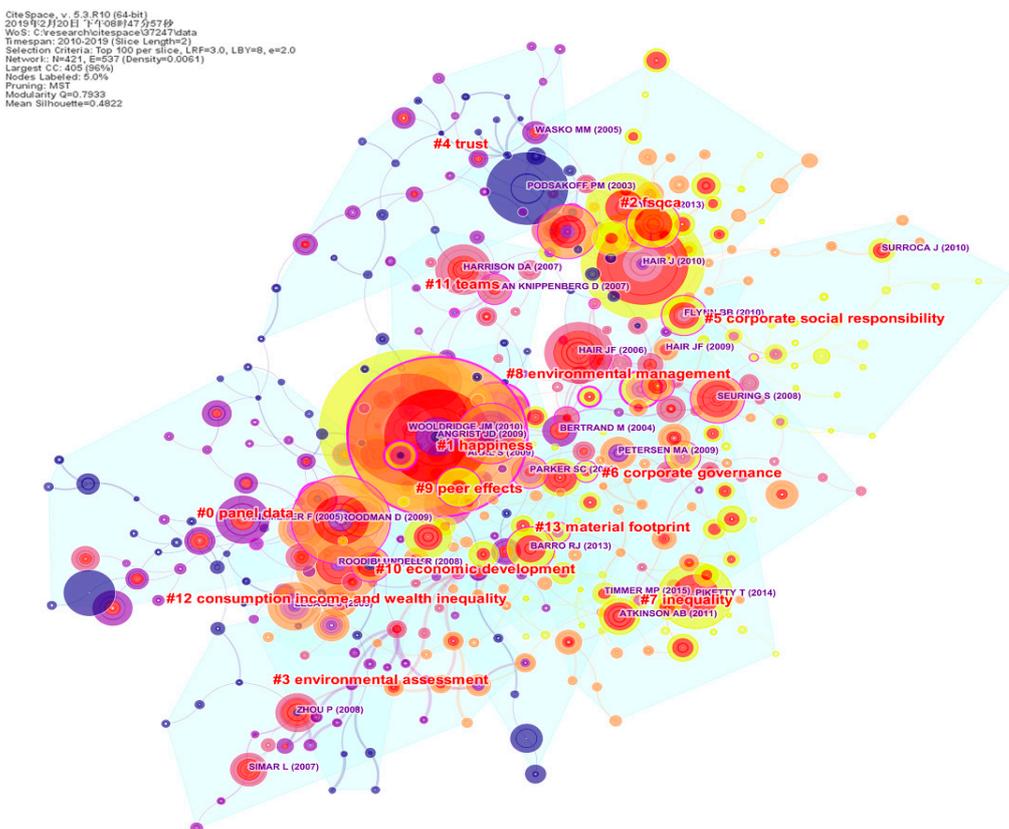**Figure 5.** Landscape view of sustainability research in Period II (2000–2009).

Figure 6. Landscape view of sustainability research in Period III (2010–2019).

Table 3. Key labels as sustainability research topics in Period II (2000–2009).

Cluster ID	Size	Silhouette	Mean (Year)	Label (LSI)	Label (LLR)
0	42	0.954	2001	social capital; food security; health insurance	social capital (108.37, 10^{-4}); multilevel modelling (53.34, 10^{-4}); USA (50.92, 10^{-4})
1	35	0.971	1997	income inequality; alcohol dependence; social capital	socioeconomic factors (94.6, 10^{-4}); income inequality (83.78, 10^{-4}); health status (47.69, 10^{-4})
2	31	0.95	2002	subjective well-being; spatial amenities; geographical information systems	subjective well-being (124.24, 10^{-4}); happiness (91.65, 10^{-4}); quality of life (39.72, 10^{-4})
3	31	0.95	1997	social capital; self-rated health; network data	social networks (45.06, 10^{-4}); alliances (34.66, 10^{-4}); networks (33.72, 10^{-4})
4	31	0.958	1997	convergence; spatial dependence; dynamic panels	endogenous growth (32.01, 10^{-4}); multiple equilibria (22.98, 10^{-4}); ces (22.98, 10^{-4})
5	28	0.969	2002	economic growth; economic development; foreign aid	environmental Kuznets curve (28.02, 10^{-4}); democratization (22.66, 10^{-4}); democracy (19.7, 10^{-4})
6	26	0.973	1999	economic growth; natural disasters; currency crises; international trade	financial development (63.79, 10^{-4}); economic growth (48.39, 10^{-4}); banks (23.91, 10^{-4})
7	24	0.946	1998	economic growth; financial development; legal system	bureaucracy (29.94, 10^{-4}); active labor market policy (23.93, 10^{-4}); growth (14.68, 10^{-3})
8	21	0.967	1996	consumption; incomplete markets; buffer stock	consumption (41.27, 10^{-4}); excess sensitivity (35.6, 10^{-4}); hand-to-mouth consumers (27.46, 10^{-4})
9	21	0.837	2000	corporate social performance; performance; differentiation	corporate social performance (40.52, 10^{-4}); business performance (23.11, 10^{-4}); demographic transition (23.11, 10^{-4})
10	20	0.953	2001	structural equation modeling; information privacy threats; responses; ethical issues	exploratory and exploitative orientation (22.3, 10^{-4}); behavioral integration (22.3, 10^{-4}); ambidexterity (22.3, 10^{-4})
11	20	0.979	1995	entrepreneurship; performance; firm growth	crowd-out (28.56, 10^{-4}); Medicaid (28.56, 10^{-4}); environmental amenities (14.25, 10^{-3})
12	17	0.938	2003	institutions; political instability; capital accumulation	institutions (45.4, 10^{-4}); corruption (18.62, 10^{-4}); concentration (17.89, 10^{-4})

Although the period continues to demonstrate a strong dominance of economics in the publications in the ABS Academic Journal Guide selected journals consistent with previous findings in Azar [54], the largest clusters show remarkable shift from the previous decade. In particular, three of the largest clusters (Clusters #0, #1, and #3) are characterized by research on socioeconomic factors and social capital and how social network factors affect individual health [55]. Research in psychology [56] and management [57] have become prominent in informing the research in this decade, especially in providing methods and conceptualization in understanding the effects of social factors. Cluster #2 represents an interesting shift to subjective well-being and happiness [58] and not just the income and consumption of individuals and households, as in Period I. These research topics form the large concentration of clusters on the right-hand side of Figure 5.

The left-hand side of Figure 5 shows that topics related to economic growth continue to be a large mass of clusters but their prominence has reduced (Clusters #4, #6 and #7). The attention of economists in this decade converges with the clusters on the right-hand side. Instead of focusing on general equilibrium in macroeconomics and stable economic growth, at the beginning of the 21st century, economists were looking into inequality and its various causes and consequences in economic

growth such as income inequality-induced health inequality [59] and imbalance in world economic growth caused by ethnic division [60]. Institutional factors that may affect cross-nation differences in economic growth and stability, such as democracy [61], have gained attention. In summary, the research published in these ABS Academic Journal Guide prestigious journals in Period II has been enriched to incorporate a second pillar of sustainability, namely, social sustainability.

Table 4. Key labels as sustainability research topics in Period III (2010–2019).

Cluster ID	Size	Silhouette	Mean (Year)	Label (LSI)	Label (LLR)
0	48	0.92	2006	economic growth; political instability; general practitioner	panel data (66.86, 10^{-4}); granger-causality (48.94, 10^{-4}); panel unit root and cointegration tests (48.94, 10^{-4})
1	45	0.969	2007	propensity score; impact assessment; agricultural biotechnology	happiness (99.21, 10^{-4}); propensity score matching (97.25, 10^{-4}); health insurance (62.08, 10^{-4})
2	39	0.965	2010	social media; social networks; data mining	fsqca (80.66, 10^{-4}); big data (64.85, 10^{-4}); strategic flexibility (37.12, 10^{-4})
3	34	0.983	2009	data envelopment analysis; production uncertainty; systems dynamics	environmental assessment (477.06, 10^{-4}); data envelopment analysis (329.47, 10^{-4}); dea (267.94, 10^{-4})
4	30	0.981	2004	social networks; information exchange; post implementation	trust (78.93, 10^{-4}); reciprocity (55.4, 10^{-4}); self-disclosure (50.35, 10^{-4})
5	29	0.946	2012	corporate social responsibility; diffusion; innovations	corporate social responsibility (91.94, 10^{-4}); sustainability (48.65, 10^{-4}); stakeholders (41.84, 10^{-4})
6	28	0.874	2010	corporate governance; tax avoidance; tax planning	corporate governance (52.09, 10^{-4}); gender (37.96, 10^{-4}); board diversity (36.97, 10^{-4})
7	26	0.963	2011	institutions; human capital; political economy	inequality (31.22, 10^{-4}); skills (18.05, 10^{-4}); heterogeneous agents (18.05, 10^{-4})
8	26	0.98	2007	supply chain management; corporate social responsibility; bottom line	environmental management (109.78, 10^{-4}); supply chain management (86.76, 10^{-4}); sustainability (57.82, 10^{-4})
9	25	0.888	2007	social networks; network analysis; malware defense	peer effects (36.33, 10^{-4}); contagion (30.54, 10^{-4}); homophily (25.24, 10^{-4})
10	25	0.939	2011	human capital; institutions; political economy; natural resources	economic development (41.74, 10^{-4}); human capital (23.74, 10^{-4}); development (23.34, 10^{-4})
11	20	0.764	2007	environmental assessment; data envelopment analysis; petroleum industry	teams (30.18, 10^{-4}); team performance (24.14, 10^{-4}); job security (18.1, 10^{-4})
12	18	0.907	2006	economic growth; pre-colonial societies; long-term political development;	consumption income and wealth inequality (43.21, 10^{-4}); wage dynamics (43.21, 10^{-4}); inequality over the life cycle (43.21, 10^{-4});
13	12	0.903	2012	input–output analysis; material footprint; coefficient approach	material footprint (67.75, 10^{-4}); input–output analysis (54.15, 10^{-4}); material flow accounting (27.02, 10^{-4})

4.2.3. Period III (2010–2019)

To analyze the research topics in Period III, we again generated the cluster map by identifying the top 100 articles of each subsequent 2-year long slice. The modularity Q is 0.793 and the mean silhouette is 0.482. The generated network contains 405 nodes out of the total of 421, roughly 96.2%. The research topics have greatly diversified visibly (Figure 6) and there is no clear division among

the clusters. The cluster labels summarized in Table 4 confirm the interdisciplinary nature of this period of business research. The largest cluster (Cluster #0) builds on econometric methods such as panel data analysis [62,63], estimation of nonlinear models, and generalized method of moments estimation [64]. The interesting new development is evident in the center of Figure 6, where it shows the second largest cluster (Cluster #1) "happiness". This cluster includes a number of research papers which employ methods such as propensity score matching to draw causal inference [65] and apply them to assessing the effects of policy interventions and other treatments of interest on happiness and subjective well-being [66]. Cluster #2 demonstrates the change in technology and the research interests shifting to social media [67], innovation [68], and big data [69].

4.3. Timeline

Table 5 juxtaposes the top 10 topics in the sustainability field from each of the three periods to highlight the shifts in focus. The three pillars of sustainability framework suggests that sustainability comprises not just economic development, but also social development and environmental protection. The three decades showed a clear shift from a nearly exclusive focus on economic growth and consumption to all three pillars. For the period I, the leading studies have mostly involved the economic factor as the single pillar of sustainability; Period II was enriched to incorporate a second pillar of sustainability, namely, social sustainability; in Period III, emerging topics such as environmental assessment, environmental management, and corporate social responsibility have played important roles in the third pillar of sustainability, namely environment.

Table 5. Research topics (10 largest clusters) in Period I, II, and III.

	Period I (1990–1999)	Period II (2000–2009)	Period III (2010–2019)
Clusters size	52	61	106
Selection (%)	57.47%	80.7%	78.38%
Cluster 1	liquidity constraints (9.96%)	social capital (9.76%)	panel data (11.4%)
Cluster 2	growth (9%)	socioeconomic factors (8.13%)	happiness (10.69%)
Cluster 3	agricultural households (5.56%)	subjective well-being (7.21%)	fuzzy-set qualitativecomparative analysis (fsqca) (9.26%)
Cluster 4	youth labour market (5.56%)	social networks (7.21%)	environmental assessment (8.08%)
Cluster 5	simulation estimation (4.98%)	endogenous growth (6.5%)	trust (7.13%)
Cluster 6	class (4.79%)	environmental kuznets curve (6.05%)	corporate social responsibility (6.89%)
Cluster 7	women (4.79%)	financial development (5.58%)	corporate governance (6.65%)
Cluster 8	actual relatedness (4.60%)	bureaucracy (4.88%)	inequality (6.18%)
Cluster 9	selection (4.41%)	consumption (4.88%)	environmental management (6.18%)
Cluster 10	issues in organizing IS (3.83)	corporate social performance (4.65%)	peer effects (5.94%)

Figures 7–9, respectively, visually present the timeline views of research topics year by year in each of the 10-year periods studied in this review, where each cluster is arranged on a horizontal timeline. The direction of time points to the right in the timeline view, hence the color runs from cold (distant past) to warm (recent past). The clusters labeled with descending size are placed vertically on the right side. Each year the top 100 most cited references in each slice are shown along each of the timelines. From the figures, it is easy to inspect the temporal patterns of how the clusters of co-cited references

evolved over time by extracting the year-by-year labels identified by the LSI method. The timeline on the top is the largest cluster (Cluster #0). Each node represents a cited reference. The tree rings represent citations received by the reference over the years (inside out). The purple ring of a node indicates its strong betweenness centrality. The red rings indicate a period of citation burst. Labels show representative terms used by articles that cited a cluster in a particular year. The red core of a node indicates there was a citation burst in earlier years of the period. The co-citation links appended in the year of the corresponding color are displayed by the colored curves [70].
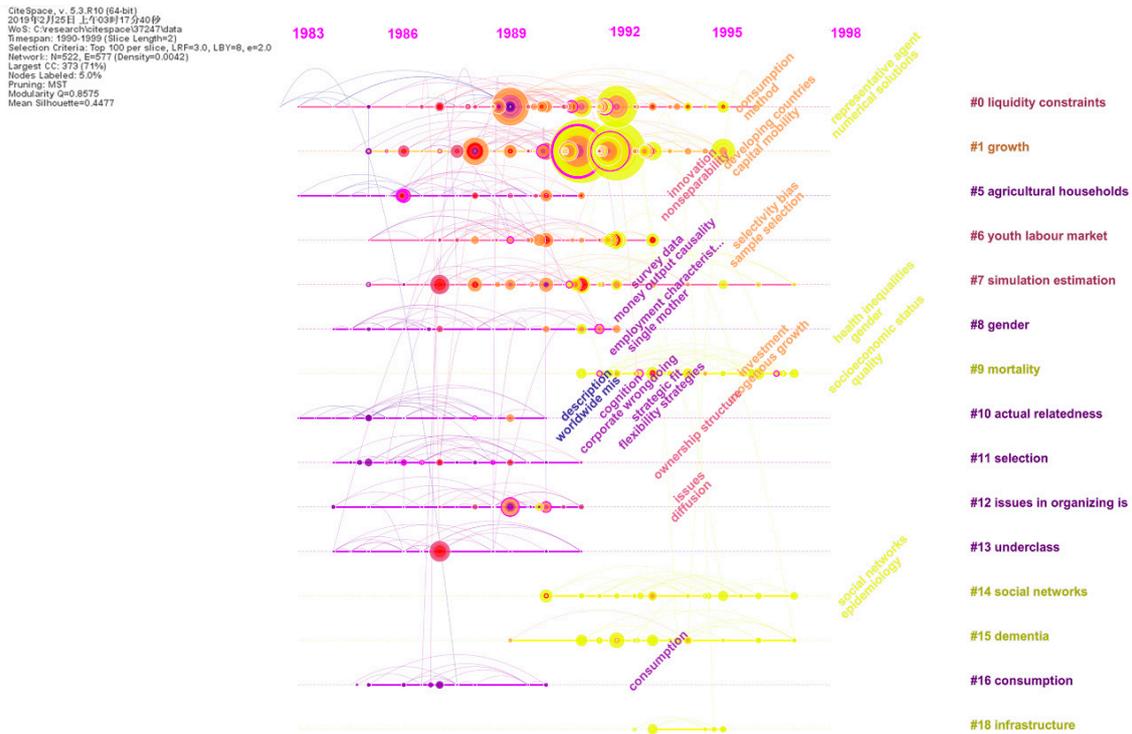

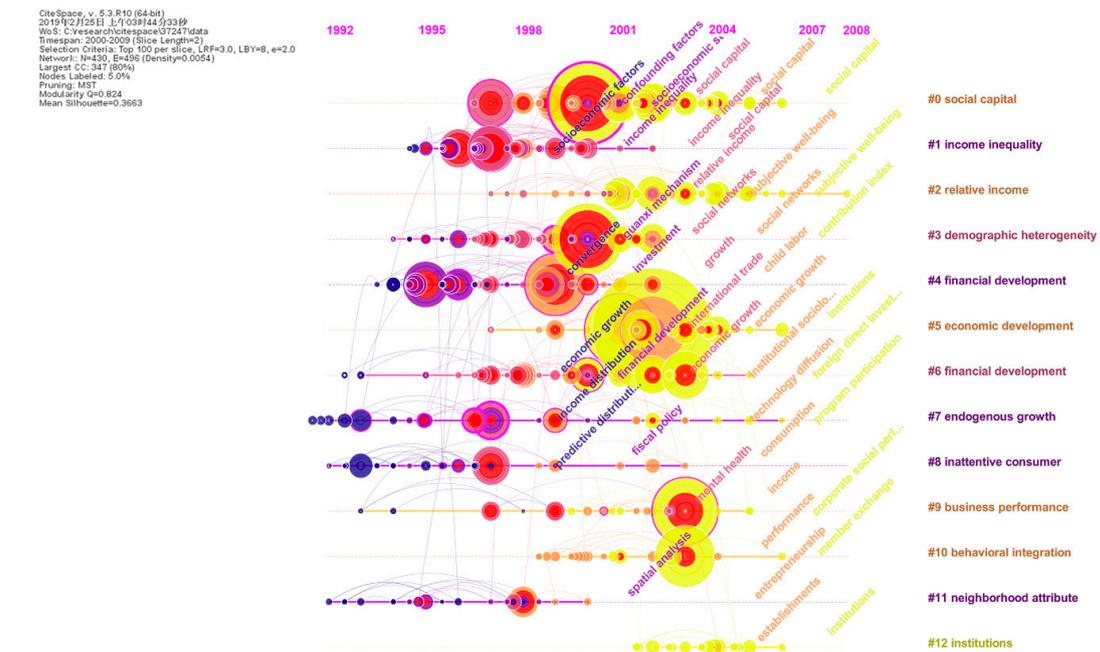**Figure 7.** Timeline view of research topics year by year (Period I).

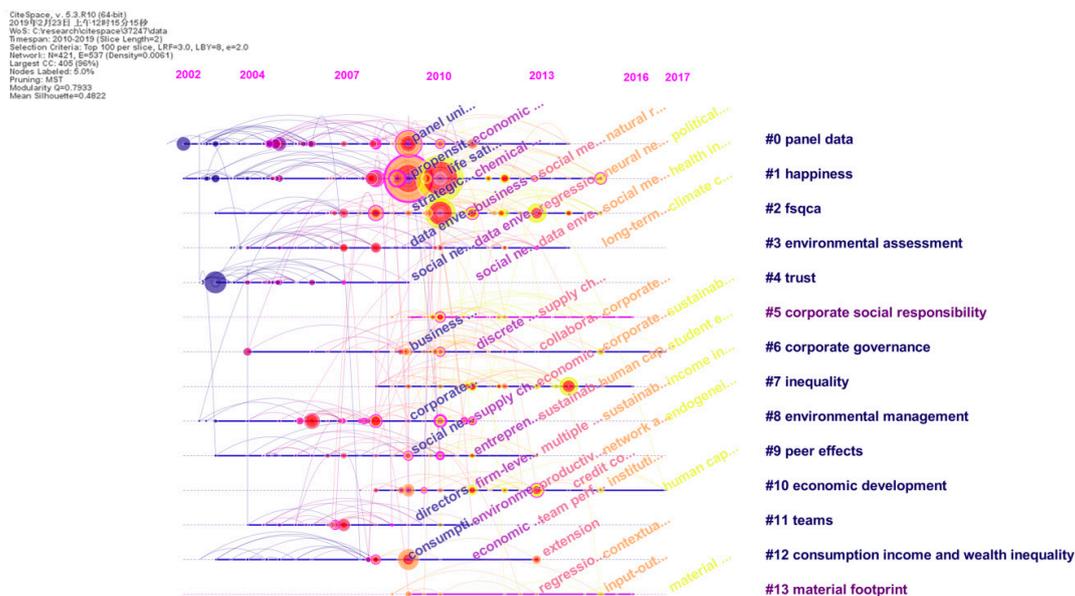**Figure 8.** Timeline view of research topics year by year (Period II).

Figure 9. Timeline view of research topics year by year (Period III).

From the first 10-year period to the blue-colored areas of the second one, there is significant change in the topics that qualify as a citation burst, especially the social capital and various kinds of inequality that have taken up much attention of scholars. There were many more hotspots in Period II, indicating a time of transition. In the last 10-year period in our data, happiness has become a new research hotspot. Environmental assessment and environmental management (especially in supply chain management) have gained prominent positions. The topics of inequality repeatedly appear in multiple clusters (Clusters #3 and #8). The shift from economic to societal to environmental nearly perfectly affirms the "three pillars" framework of sustainability.

The duration, sustainability, and activeness for a cluster to remain interesting are shown in Table 6. For example, happiness research had remained active for 14 years, but this topic has become relatively quiet since 2015. In contrast, corporate governance, with a similar longevity of 14 active years, is still active, although its prime time was until 2017. Inequality and economic growth are evergreen research topics and this bibliometric analysis confirms that they will remain active as the cornerstones of sustainability. Corporate social responsibility (CSR) as a research topic became active in 2009 [71] and has remained active. Figure 10 presents a micro-targeted view of cluster #5, corporate social responsibility, which shows the evolution of this topic and the articles that the citation burst is associated with.

Figure 10. Burst nodes of Cluster #5, corporate social responsibility (Period III).

Table 6. Temporal properties of major clusters in Period III.

Cluster	Size	From	To	Duration	Median	Sustainability	Activeness	Theme
0	48	2002	2014	13	2008	+++++	Inactive	panel data
1	45	2002	2015	14	2008	++++++	Inactive	happiness
2	39	2003	2015	13	2009	+++++	Inactive	fsqca
3	34	2003	2014	12	2008	++++	Inactive	environmental assessment
4	30	2003	2009	7	2006		Inactive	trust
5	29	2009	2016	8	2012		Active	corporate social responsibility
6	28	2004	2017	14	2010	++++++	Active	corporate governance
7	26	2008	2016	9	2012		Active	inequality
8	26	2003	2011	9	2007		Inactive	environmental management
9	25	2003	2013	11	2008	+++	Inactive	peer effects
10	25	2008	2017	10	2012		Active	economic development
11	20	2004	2011	8	2007		Inactive	teams
12	18	2003	2013	11	2008	+++	Inactive	consumption income and wealth inequality
13	12	2009	2015	7	2012		Inactive	material footprint

4.4. Business Research in the Journal of Sustainability

The core value of *Sustainability* journal is openness to diversity based on a variety of disciplinary lenses about sustainability. Here, we also map the 955 related articles in the journal from 2009 to 2019 and find some interesting points for reference, as shown in Figure 11 and Table 7. The topics with the orange color are closely interconnected with and transformed from the topics of the yellow color gradually. The business model innovation has been the most outstanding topic [72], followed by topics of circular economy [73] and group decision making. Sustainability in developing countries has been paid more attention and strategic orientation for the management in sustainability has been proposed. The classic topics like corporate responsibility and family firms are still developing. The OHSAS 18001 Certification Scheme, an occupational health and safety standard (OH&S) designed to enable organizations to control risks and improve performance in the area of OH&S, has been recently increasing in promotion. It is noticeable that these more specified topics extracted from the journal of *Sustainability* are same as the topics we refined from the past few decades, such as social responsibility, while also different from many topics, such as panel data, happiness, environmental assessment, and so on. These nonoverlapping topics can shed light on the readers and scholars of the potential extended research topics of business and management for sustainability in the journal.

Table 7. Key labels as business research topics in journal of Sustainability (2009–2019).

Cluster ID	Size	Silhouette	Mean (Year)	Label (LSI)	Label (LLR)
0	63	0.829	2014	business model innovation; equipment maintenance; digitalization;	business model innovation (15.82, 10^{-4}); business models (7.17, 0.01); business model (6.4, 0.05);
1	41	0.875	2015	circular economy; green economy; bibliometric analysis;	circular economy (11.2, 10^{-3}); eco-innovation (8.33, 0.005); circular business models (8.33, 0.005);
2	38	0.856	2013	circular economy; green economy; resource efficiency;	group decision making (5.11, 0.05); biaxially oriented polypropylene plastic film (5.11, 0.05); uncertainty modeling (5.11, 0.05);

Table 7. *Cont.*

Cluster ID	Size	Silhouette	Mean (Year)	Label (LSI)	Label (LLR)
3	35	0.838	2012	green supply chain management; supply disruption risk; performance;	strategic orientation (9.48, 0.005); green supply chain management (7.93, 0.005); institutional pressures (4.72, 0.05);
4	26	0.927	2013	waste management; municipal solid waste; benefits; rural district municipalities;	developing countries (9.42, 0.005); municipal solid waste (9.11, 0.005); waste management (7.4, 0.01);
5	22	0.973	2013	corporate social responsibility; executive compensation; csr contract; csr-contingent compensation;	corporate social responsibility (14.52, 10^{-3}); quality management (9.64, 0.005); stakeholder theory (9.64, 0.005);
6	22	0.917	2012	audit scheme; environmental management systems; organizational environmental performance;	ohsas 18001 (6.29, 0.05); fashionable products (6.29, 0.05); eco-management and audit scheme (emas) (6.29, 0.05);
8	16	0.93	2011	co-management; participation; collaboration agreements;	co-management (9.25, 0.005); bottom-up participation (4.61, 0.05); south Africa (4.61, 0.05);
10	10	0.962	2013	stocks; flows; waste management;	transition management (10.77, 0.005); strategic planning (5.36, 0.05); collaborative landscape planning (5.36, 0.05);
12	9	0.99	2013	Italian territory; sustainability integration; sustainability control systems;	family firms (12.5, 10^{-3}); sustainability control systems (scss) (6.21, 0.05); family firm (6.21, 0.05);

Note: Clusters #7,#9,#11, were pruned and not reported in the CiteSpace output due to their extremely low centrality.
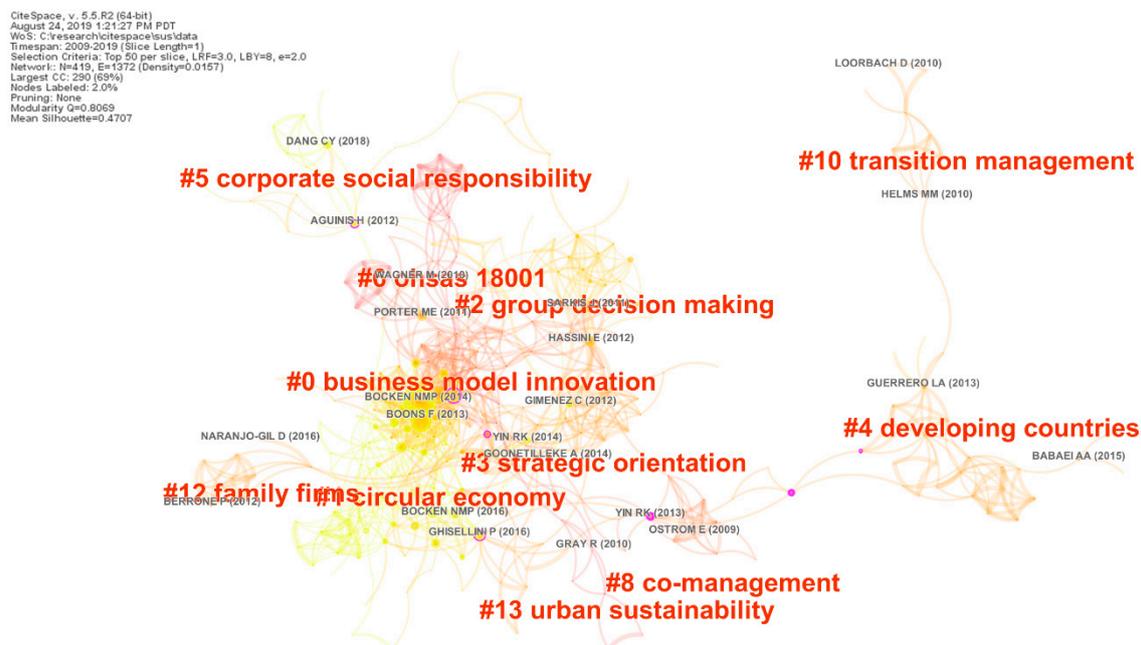

Figure 11. Landscape view of business research in journal of *Sustainability* from 2008 to 2019.

5. Research Gaps and Insights

In Table A3 (Appendix A), we compared and listed the differences between goals of the practitioners (e.g., SDGs of the UN) and the research directions taken by academia in order to understand if research

has caught up with fulfilling practical needs and postulate the reasons why research work have (or have not) adequately done so. These insights could then be used to synthesize the research gaps and best practices for sustainability researchers and practitioners.

We find that there is one category of goals to which the business and management scholars have paid attention, but it needs to be further explored in correlation with current circumstances; while another category of goals are still to be explored further with consideration of the compatible interesting research points. Category I goals that scholars have been gradually considering include various research topics on goals more related with business and management, such as good health and well-being; decent work and economic growth; industry, innovation, and infrastructure; sustainable cities and communities; reduced inequalities; and responsible consumption and production. While category II demonstrates some goals more about natural science that still need to be further explored from business and management perspectives, such as clean water and sanitation, affordable and clean energy, climate action, life below water, and life on land. One obvious reason for the lack of studies in category II is that the cross-disciplinary barriers between business management and these domains, such as hydraulic engineering, energy production, climatology, marine science, biology, and geography, are higher. However, sustainability intrinsically refers to the fusion of these different specialties; closer multidisciplinary cooperation in academic areas has been a trend that can break these cross-discipline barriers. The tricky point is how to break the boundaries and fill up the gap by exploring the valuable research questions and providing solutions from the perspectives of business and management. To deal with this, following the clues of these sustainable development goals, we first classified the related topics in three different periods that have contributed to these goals, as shown in Table A3 (Appendix A), in order to find the research gap. Then, these research gaps for the goals were further explored through the latest enlightening literature from the influential journals in recent years, which led to new insights in the following subsections. Besides, another perspective to link the multidisciplinary sustainability problem with business and management is the innovative consideration of applying the management theories or approaches to provide sustainable solutions. For example, to achieve the SDGs in Category II that could be seen as out of the reach of firms (and for this reason not much explored by the business and management literature), we can consider this through firms' efforts to establish partnerships to enhance policy dialogue and coordination to achieve sustainability targets. Such an innovative perspective can be applied for each of the SDGs to generate meaningful studies.

As Table A3 (Appendix A) shows, the main topics explored by Citespace in each period have been enlisted. Each topic belongs to a cluster, as shown in Tables 2–4, denoted as cluster numbers in the parentheses. The smaller the cluster number, the more attractions on this topic in the specific period. For instance, in Table A3, the food security (0) topic is mined in Period II, related with the zero hunger goal. This food security has been one of the most concerned topics for scholars in Period II.

5.1. Good Health and Well-Being

Ensuring healthy lives and promoting well-being at all ages is essential to sustainable development. Currently, health care has been a fast-growing research area attracting more scholars in the business and management area, especially in operations research and information science. The following practical objectives can enlighten the scholars: mortality ratio, diseases, traffic safety, sexual and reproductive healthcare services, health financing, health workforce management, and health risks management. All these proposed topics can be viewed from different perspectives based on the demands of stakeholders, as shown in Table 8. It is also worth noting that few studies on traffic safety have been published in these influential journals in recent years. With numerous fatal tragedies caused by road and air traffic safety problems, the related traffic safety topics cannot be overemphasized with topics such as traffic control policy, aviation safety, human–machine interaction, self-driving safety, and so on.

Table 8. Research gap, enlightening literature, and insights for the good health and well-being goal.

Gap	Enlightening Literature	Insights
Mortality ratio		
	➢ ICU admission control [74];	• Hospital operation management;
	➢ Death related media information [75]	• Media information utilization;
Diseases		
	➢ Online physician ratings [76];	• Online and offline health care;
	➢ Social network and HIV [77]	• Social network and major diseases;
	➢ Spanish Flu and the formation of retail cooperatives [78]	• Online medical community;
Traffic safety	/	
		• Traffic control policy, aviation safety, human-machine interaction, self-driving safety,
Sexual and reproductive health-care services		
	➢ e-Health in rural India [79];	• Health care services with digital technology;
	➢ HIV Infant diagnosis supply chain [80]	• Health care service supply chain;
Health financing		
	➢ Household insurance choice [81]	• Insurance;
		• Crowdfunding;
Health workforce management		
	➢ Workplace stressors and mortality and health cost [82];	• Health workforce management considering stress, efficiency and productivity;
Health risks management		
	➢ Health information technology [75]	• Health risk management with IT; emergency management;

5.2. Decent Work and Economic Growth

As the fundamental part of the three pillars of sustainability, economic growth is the most prosperous research area. Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs that stimulate the economy without harming the environment. Up to now, there has been abundant literature about the goals of decent work and economic growth. In measuring the gap between the status quo and the goal, as shown in Table 9, several topics can be studied, including decent job creation; entrepreneurship; the formalization and growth of micro-, small-, and medium-sized enterprises; safe and secure working environments; and sustainable tourism that creates jobs and promotes local culture and products. Among these topics, the decent job creation and entrepreneurship topics are both related with new economic forms such as "gig economy" or "sharing economy". Besides, the innovative ways for employment, such as self-employment, and financing, such as crowdfunding, also spring up with the development of IT technology. Further, more attention can be put on the topic "all women and men receive equal pay for work of equal value", dealing with the existing gender income gap, for whichmore approaches are still waiting to be proposed. These provide interesting insights for future research in the related topics. Finally, the sustainable tourism that creates jobs and promotes local culture and products is also an interesting topic that is worthy of further exploration.

Table 9. Research gap, enlightening literature, and insights for decent work and economic growth.

Gap	Enlightening Literature	Insights
Decent job creation, employment	➢ Online labour market [83]; ➢ Self-employment [84]; ➢ CEOs [85], newcomers [86]; ➢ Third party employment branding and Human capital outcomes [87]; ➢ Sustainable HRM [88]	• AI technology effects on job creation; • Online labour market effect and operation; • Self-employment; • Different level jobs; • Policies or competitions for promoting human capital outcomes; • Insurances for unemployment;
Entrepreneurship, The formalization and growth of micro-, small- and medium-sized enterprises	➢ Gig economy and entrepreneur activity [89]; ➢ Entrepreneurial choice process to the foundations of entrepreneurial strategy [90]; ➢ Junior stock exchanges and entrepreneurship [91] ➢ Entrepreneurship, innovation, and political competition for sharing economy create value [92]; ➢ Crowdfunding [93]; Angel investments [94]; ➢ Entrepreneurship in developing countries [95] ➢ SME offshore and reshore decisions	• Gig economy; • Multiple financing methods for entrepreneurship; • Positive or negative factors influencing entrepreneurship; • Connection with innovation and new economic form such as sharing economy; • Developing countries • Trade war
labor rights, safe and secure working environments	➢ Employment protection and takeover [96]; ➢ Workplace mistreatment [97], workplace loneliness [98], workplace friendship [99]	• Labor rights during transformation; • Improvement for both external (workplace surroundings) and internal (psychological) working environment for safety.
Sustainable tourism	➢ Brand tourism effect [100]	• Sustainable tourism that creates jobs and promotes local culture and products
Developing countries/emerging markets	➢ Emerging countries such as China and India [101]; ➢ Multinational enterprises (MNE) [102] ➢ Intermediaries [103]	• Trade aid to the undeveloped countries; • New phenomenon in emerging markets;

5.3. Industry, Innovation, and Infrastructure

This goal is to build resilient infrastructure, promote sustainable industrialization, and foster innovation. The past few decades have witnessed a great progress of industry, innovation, and infrastructure—which are crucial to achieving sustainable development and empowering communities in many countries. For the next phase, as shown in Table 10, we pursue the sustainable and resilient infrastructure, industrialization, clean technologies, improvement of the ICT in undeveloped countries, and promote innovation by increasing the R&D workers. Technological progress is the foundation of efforts to achieve environmental objectives, such as increased resource and energy-efficiency. Without technology and innovation, industrialization will not happen, and without industrialization, development will not happen. There needs to be more investment in high-tech products, such as 5G, AI, deep learning, self-driving, and blockchain, that dominate the manufacturing productions in order to increase efficiency and a focus on mobile cellular services that increase connections between people.

Table 10. Research gap, enlightening literature, and insights for the growth in industry, innovation, and infrastructure goal.

Gap	Enlightening Literature	Insights
Infrastructure	➢ Incentives for changing people's daily routines on Subways [104] ➢ Cloud infrastructure services [105] ➢ IT infrastructure flexibility on mergers and acquisitions [106] ➢ CSR and green IT adoption [107]	• Resilient IT infrastructure; • New IT technology such as 5G, AI, Deep learning, self-driving, and Blockchain establishment and application
Sustainable industrialization	➢ Knowledge transfer and industrialization [108] ➢ Social enterprises addressing social and environmental problems (Wry and York, 2017)	• Balance between industrialization development and environment protection
Clean and environmentally technologies	➢ Electric vehicles with battery switch station [109] ➢ Solar photovoltaic industry [110]	• Renewable energy industry emerge such as Electric vehicles, Solar industry and so on.
Innovation and increasing R&D workers	➢ Academic scientist mobility for industrial innovation [111]	• R&D workers
Information and communication technology	➢ Internet use and mobile [112] ➢ Digital service innovation and bridging the service divide [113] ➢ Sustainability of polycentric information commons [114] ➢ Ecosystem of software platform [115] ➢ ICT in developing country (India) [116]	• ICT in undeveloped area; • Sustainable IT; • Mobile and Internet; • Sustainable platform ecosystem;

5.4. Reduced Inequalities (Goal 10) and Gender Inequalities (Goal 5)

The unbalanced development widely exists within and across countries, therefore, the reducing economic inequality goal is set to reduce inequality that persists and the large disparities that remain regarding access to health and education services and other assets. Another goal for inequalities is gender inequality. This goal is set to achieve gender equality and empower all women and girls.

As represented in Table 11, reducing gender inequality has been studied with consideration of firm role [117], training [118], start funding [96], CSR [119], and hiring [120]. More inequalities exist in age, disability, race, ethnicity, origin, religion, economic, or other status and the research gap still exists in enhancing the use of enabling technology, in particular information and communications technology, to promote the empowerment of women and end gender discrimination, such as the online labor market [121] and crowdfunding [93].

Table 11. Research gap, enlightening literature and insights for reduced inequalities (Goal 10) and gender inequalities (Goal 5).

Gap	Enlightening Literature	Insights
All women and men equal pay for work of equal value	➢ Firm role [117]; ➢ Training [118]; ➢ Gender gap in start funding [96] ➢ Gender diversity and CSR [119] ➢ Hiring preferences in online labor markets [120]	• Gender gap under different circumstances; • Ways to reduce the gender gap such as internship and training;
Inequalities in age, disability, race, ethnicity, origin, religion or economic or other status	➢ Racial bias and interaction [121] ➢ Team performance and racial bias [122]	• Inequalities in different aspects besides race, such as age, disability, ethnicity, origin, religion or economic or other status.
Income inequality	➢ Technology innovation and executive pay inequality [123] ➢ Race bias in Crowdfunding [93] ➢ Double standards [124]	• Income inequality under IT context.

5.5. Peace, Justice, and Strong Institutions

Since the beginning of the new millennium, there has been a development of multipolarization of the world, economic globalization, informatization, and cultural diversification, and despite the fact that the trend of peaceful development is strong, ethnic conflicts and cross-border disputes are still frequent; extremism and terrorism is unpredictable; information crimes are rampant; the damage to peace is more uncertain in breadth and depth than ever before; and the sources of threats are more complex and diverse than ever. As shown in Table 12, there are several potential points that can be further explored, and the influence of political factors on stakeholders in business management, considering the potential political risk and uncertainty context, and the new forms of crimes through high-tech or social networks are impeding questions. The dark side of the new media through technology, such as cyberbullying, addictive use, trolling, online witch hunts, fake news, and privacy abuse, are interesting points that merit exploration.

Table 12. Research gap, enlightening literature, and insights for the peace, justice, and strong institutions goal.

Gap	Enlightening Literature	Insights
The influence of political factors on stakeholders in business management	➢ Political ideology shape consumer's preferences for differentiation [125,126] ➢ Managers' political ideology [127] ➢ State ownership and firm innovation [101]	• Promote and enforce non-discriminatory policies; • Customers' preferences affected by politics; • Managers' decision making influenced by politics; • Public relations of enterprises
Political risk and uncertainty	➢ Justice under uncertainty [128] ➢ Legitimacy-based view of political risk [129]	• Political instability effects on business; • More efficient and transparent regulations put in place • realistic government budgets;
Crime	➢ Craigslist's impact on prostitution trends [130] ➢ Market government Corruption [131–135] ➢ Cybercrime [136]	• New crime forms through high-tech; • Corruption and bribery network; • Reduce all forms of violence and related death rates; • Strengthen the recovery and return of stolen assets and combat all forms of organized crime;

5.6. Natural-Environmental Goals

As we mentioned before, because of the cross-discipline barriers, the category II for some goals, such as clean water and sanitation, affordable and clean energy, climate action, life below water, and life on land, haven't been sufficiently explored from a business perspective. Based on the extant literature, we probe into this from three points, i.e., environmental management policy, climate change influence, and business in new energy industries, as Table 13 shows. First, government plays an important role in the environmental management process. In agreement with the last partnership of goals, the cross-sector partnerships and endeavors for implementing environmental protection policies are worth being studied. Then, with environmental degradation such as climate change, the emergency management plans for dealing with natural disasters is also an important spot. Finally, the renewable energy operation management issues such as storage, use, and pricing, are all potential research topics for logistics and supply chain management.

Table 13. Research Gap, enlightening literature and insights for natural-environmental goals.

Gap	Enlightening Literature	Insights
Environmental Management Policy	• Cross-sector government partnerships [137] • Transnational climate policy [138] • Natural disasters [139]	• Cross-organizational cooperation; • Climate change solutions • Non-profit organization management for environmental protection; • Emergency management for natural disasters;
Natural-Environmental and business strategy	• Climate change effect on supply chain [140] • Corporate attention on issues [141] • Corporate environmental initiatives deteriorate [142] • Stakeholder engagement for sustainability [143]	• Corporate and government social responsibility; • Business sustainable strategic decision related with environment
Operation for Energy Storage, Utilization and Investment	• Renewable Energy in Day-Ahead Electricity Markets [144] • Supplier's Energy Efficiency Gap [145] • Control of Energy Storage with Market Impact [146] • Renewable Energy Investment [147]	• Optimization the (renewable) energy location, storage, and investment using modeling methods

6. Conclusions

Due to the fact that the notion of sustainability is multifaceted, the United Nations charted a total of 17 Sustainable Development Goals for 2030. Academic research on sustainability, as a result, naturally involves multiple disciplines in business, management, and social sciences. Focusing on the large-scale literature from high-quality journals ranked by ABS Academic Journal Guide 2018, our study retrieved sustainability-related articles from Web of Science for analysis and visualization.

We found that the body of research in business and management has evolved greatly when it comes to sustainability. A closer look at the decade-by-decade evolution indicates that research topics have moved from a dominant focus on economic growth to incorporating social factors such as social capital and social networks, and further to paying more attention to a much wider range of issues, especially those related to environment and ecology. Interestingly, happiness has become a new research hotspot in the last 10-year period in our data. Besides, some evergreen topics such as corporate governance, inequality and economic growth, and corporate social responsibility, are likely

to remain active in the future. Moreover, environmental assessment and environmental management (especially in supply chain management) have gained noticeable positions. In all, this pattern of evolution corresponds to the three pillars of sustainability: economic, societal, and environmental sustainability, gradually emphasizing more of the importance of the environmental aspect.

In addition, we discussed the emerging topics in the sustainability research field and mining of the research gaps and insights following the Sustainable Development Goals. We compared and listed the differences between goals of the practitioners (e.g., SDGs of the UN) and the research directions taken by academia in order to understand if academic work has caught up with fulfilling practical needs, and postulate the reasons on why research works have (or have not) been done adequately. Seven goals related to business and management were further mined from recent prestigious journal publications to provide the innovative and significant perspectives (as shown in Tables 8–13) for future research and industrial practices. (1) For the goal of good health and well-being, popular research topics include hospital operation management to reduce mortality ratio, online and offline health care for treating diseases, traffic safety, digital technology to improve sexual and reproductive health-care, health workforce management, health financing, and health risks management. (2) There are abundant innovative research points for pursuing decent work and economic growth. Examples include AI technology effects on job creation, online labor market, gig economy, sustainable tourism, emerging markets, and so on. (3) To achieve the growth of the industry, innovation, and infrastructure goal, more studies considering resilient IT infrastructure, new IT technology, and sustainable platform ecosystems are highly needed. (4) With limited amounts of studies on inequalities, it is still urgent to study how to reduce inequalities in age, disability, race, ethnicity, origin, religion, economic, or other statuses under different business circumstances, especially within the information technology innovations context. (5) The goal of peace, justice, and strong institutions shows significant potential for exploration. Many interesting points can be interrelated and explored, such as promoting and enforcing nondiscriminatory policies, customers' preferences affected by politics, managers' decision making influenced by politics, political risk and uncertainty considerations, crime and high-tech, and privacy concerns. (6) The potential research gaps in sustainable consumption and production include: sustainable consumers' behaviors and characteristics in new technological environments such as online platform; supply chain sustainability; and sustainable behavior stimulating policies. (7) The significance and importance of environment-related studies can never be overemphasized from the perspective of business and management. For example, the effective environmental policies such as cross-organizational cooperation, transnational climate policy, nonprofit organization management, and emergency management for disasters can be further explored; the relations between corporate and environmental sustainability, the operations research for renewable energy storage, utilization, and investment are also significant research directions for both society and enterprises. To sum up, for scholars, these topics are like treasures waiting to be discovered, especially for business and management researchers who are interested in multidisciplinary issues related to sustainability. For practitioners, these topics reveal the existing or potential threats and problems for business practice. The employees, employers, entrepreneurs, governmental officials, and the stakeholders, everyone can attempt to explore the ways to take responsibility to take action for sustainability. Served for soliciting the valued opinions of future studies, these topics also illuminate what the practitioners can do to facilitate sustainable development to attain the SDGs, for example, encouraging the policies for reducing bias and inequalities, adapting new information technologies appropriately, taking green consumption, development to control emissions and pollution levels, and so on. Therefore, both the academics and practitioners can use the insights from our analyses to synthesize the current research gaps and best practices.

Although our sample selection process only includes leading ABS journals, it may not affect the generality of our findings. Most journals with a sustainability focus have been selected. As mentioned before, the gap between academic research and practice is evident in business research, and the top tier journals are no exception, which may have more significant fallibility because of its leading effect. Future research can extend the journal scope to be wider to have a more comprehensive coverage. A limitation may be the time lag present in the sampled research articles. Future research can also investigate the evolution of these latest sustainability-related insights and perspectives in different countries or regions.

Author Contributions: Conceptualization, Q.J. and L.W.; Methodology, Data Curation and Software, Q.J.; Writing—Original Draft Preparation, L.W.; Review & Editing, X.L.

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

Appendix A

Table A1. Chartered Association of Business Schools (CABS) Academic Journal Guide (AJG 2018): 22 disciplines and distribution of 433 journals ranked at 4*, 4, and 3 (https://charteredabs.org/academic-journal-guide-2018/).

Discipline	4 *	4	3	Discipline Total	Discipline	4 *	4	3	Discipline Total
Accounting	4	2	21	27	Business and economic history	0	2	5	7
Economics, econometrics, and statistics	6	17	67	90	Entrepreneurship and small business management	0	3	5	8
Finance	3	5	29	37	General management, ethics, gender, and social responsibility	4	4	12	20
Human resources management and employment studies	0	5	9	14	Information management	2	2	17	21
Innovation	1	1	2	4	International business and area studies	1	1	7	9
Management development and education	0	1	3	4	Marketing	6	2	12	20
Operations and technology management	1	2	9	12	Operations research and management science	2	3	22	27
Organizational studies	1	4	4	9	Psychology (General)	1	8	12	21
Psychology (Organizational)	1	6	13	20	Public sector and health care	1	2	11	14
Regional studies, planning, and environment	0	2	12	14	Sector studies	0	5	10	15
Social sciences	3	6	27	36	Strategy	1	0	3	4

Table A2. Cluster labels of sustainability research over 30 years (1990–2019).

Cluster ID	Size	Silhouette	Mean (Year)	Label (LSI)	Label (LLR)
0	88	0.943	1988	consumption; permanent income; time aggregation	liquidity constraints (50.57, 10^{-4}); consumption (40.69, 10^{-4}); dynamic programming (40.35, 10^{-4})
1	82	0.835	2010	social networks; network analysis; malware propagation trajectory	material footprint (50.97, 10^{-4}); input-output analysis (40.76, 10^{-4}); social networks (37.23, 10^{-4})
2	81	0.99	2007	social networks; information exchange; post-implementation	trust (89.09, 10^{-4}); fsqca (77.15, 10^{-4}); big data (64.51, 10^{-4})
3	78	0.943	2004	economic growth; political instability; general practitioner	panel data (72.09, 10^{-4}); institutions (49.7, 10^{-4}); corruption (48.25, 10^{-4})
4	77	0.917	2009	corporate social responsibility; diffusion; developing country	corporate social responsibility (214.33, 10^{-4}); sustainability (202.14, 10^{-4}); supply chain management (149.6, 10^{-4})

Table A2. *Cont.*

Cluster ID	Size	Silhouette	Mean (Year)	Label (LSI)	Label (LLR)
5	67	0.95	1997	economic growth; economic development; foreign aid	financial development (119.93, 10^{-4}); economic growth (87.29, 10^{-4}); growth (60.82, 10^{-4})
6	54	0.901	2007	propensity score; impact assessment; agricultural biotechnology	propensity score matching (108.93, 10^{-4}); health insurance (58.83, 10^{-4}); impact assessment (56.82, 10^{-4})
7	54	0.943	1997	income inequality; inequality indices; relative poverty	income inequality (133.46, 10^{-4}); socioeconomic factors (96.32, 10^{-4}); mortality (48.01, 10^{-4})
8	54	0.995	1991	endogenous growth; applied general equilibrium; strategic trade policy	unit roots (80.87, 10^{-4}); Monte Carlo simulation (66.11, 10^{-4}); endogenous growth (44.53, 10^{-4})
9	53	0.944	2001	social capital; preferences; effects	social capital (194.36, 10^{-4}); self-rated health (91.38, 10^{-4}); USA (88.39, 10^{-4})
10	52	0.898	2002	subjective well-being; aspiration level; interdependent preferences	happiness (210.37, 10^{-4}); subjective well-being (171.44, 10^{-4}); life satisfaction (56.47, 10^{-4})
12	46	1	1986	home; supplemental work; work; organizational design; alternative work arrangements	measurement of diversification (48.03, 10^{-4}); actual relatedness (48.03, 10^{-4}); corporate strategy (28.75, 10^{-4})
13	43	0.909	1990	unmeasured heterogeneity; competing risks; time-varying coefficients	crowd-out (37.57, 10^{-4}); youth labor market (37.57, 10^{-4}); returns to education (37.57, 10^{-4})
14	43	0.948	1988	employment characteristics; women's health; quality; role	gender (46.99, 10^{-4}); social roles (40.13, 10^{-4}); paid employment (32.67, 10^{-4})
15	38	0.975	1988	scale; self-selection; agency theory; diseconomies	difference stationary (23.14, 10^{-4}); trend stationary (23.14, 10^{-4}); trend (23.14, 10^{-4})
16	37	0.999	2009	data envelopment analysis; production uncertainty; Russell-type measure	environmental assessment (600.81, 10^{-4}); data envelopment analysis (362.85, 10^{-4}); dea (323.56, 10^{-4})
17	35	0.994	1995	social networks; models; autologistic models; pseudo-likelihood estimation; social capital	embeddedness (55.28, 10^{-4}); strategic alliances (39.09, 10^{-4}); work team effectiveness (38.05, 10^{-4})
18	35	0.95	1994	symmetric normalization; employment equations; method; dynamic panel data; Monte Carlo methods	symmetric normalization (18.49, 10^{-4}); intertemporal labor force participation (18.49, 10^{-4}); generalized method of moments (18.49, 10^{-4})
21	28	0.951	2006	productivity; real appreciation; competitive pressure	consumption income and wealth inequality (39.1, 10^{-4}); wage dynamics (39.1, 10^{-4}); inequality over the life cycle (39.1, 10^{-4})

Note: Clusters #11, #19, and #20 were pruned and not reported in the CiteSpace output due to their extremely low centrality.

Table A3. Goals of SDGs and related topics studied in the past three periods.

	Goals	Implication	Period I	Period II	Period III
1	No poverty	End poverty in all its forms everywhere	Relative poverty		
2	Zero hunger	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture		food security (0);	
3	Good health and well-being	Ensure healthy lives and promote well-being for all at all ages	Women's health (8); avoidable mortality (9)	health insurance (0); alcohol dependence (1); health status (1); subjective well-being (2); happiness (2); quality of life (2) spatial amenities (2); self-rated health (3); Medicaid (11)	happiness (1); health insurance (1)
4	Quality education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	returns to education (6)	Institutions (12);	institutions (9,10); human capital (7,10); skills (9);
5	Gender equality	Achieve gender equality and empower all women and girls	Women's health (8); social roles (8); women (9)		gender (6);
6	Clean water and sanitation	Ensure available and sustainable management of water and sanitation for all		environmental amenities (11);	environmental assessment (3,11); environmental management (8); material footprint (13)
7	Affordable and clean energy	Ensure access to affordable, reliable, sustainable, and modern energy for all			natural resources (10) petroleum industry (11)

Table A3. *Cont*.

	Goals	Implication	Period I	Period II	Period III
8	Decent work and economic growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all	permanent income (0); economic growth (1); job mobility (5); scale (5); youth labor market (6); intertemporal labor force participation (7); employment characteristics (8) work arrangements (11) unemployment (13)	socioeconomic factors (1); income inequality (1); endogenous growth (4); multiple equilibria (4); ces (4); economic growth (5,6); economic development; foreign aid (5); environmental Kuznets curve (5); international trade (6); currency crises (6); financial development (6,7); banks (6); active labor market policy (7); crowd-out (11)	economic growth (0,10, 12); tax avoidance; tax planning (6); political economy (7,10); peer effects (9); contagion (9); homophily (9);
9	Industry, innovation and infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation	innovation (5); information system problems (10); information system view (10); issues in organizing is (12); is centralization decentralization (12); structure of the is function (12)	corporate social performance (9); business performance (9); demographic transition (9); differentiation (9); entrepreneurship; performance; firm growth (11)	general practitioner (0); strategic flexibility (2); post implementation (4; corporate social responsibility; diffusion; innovations (5); stakeholders (5); sustainability (5); corporate governance (6); malware defense (9)
10	Reduced inequalities	Reduce inequality within and among countries	social class (9); underclass (13)	social capital (0,1,3); democratization (5); democracy (5); legal system (7)	board diversity (6); inequality (7); wage dynamics (12); inequality over the life cycle (12);
11	Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient, and sustainable	home (11)	social networks (3); alliances (3); networks (3); bureaucracy (7);	social media (2); social networks (2,4,9); information exchange; trust (4); reciprocity (4); self-disclosure (4) heterogeneous agents (9); team (11); pre-colonial societies; (12)

Table A3. *Cont*.

	Goals	Implication	Period I	Period II	Period III
12	Responsible consumption and production	Ensure sustainable consumption and production patterns	consumption (0);	consumption (8); incomplete markets (8); buffer stock (8); excess sensitivity (8); hand-to-mouth consumers (8)	production uncertainty (3); systems dynamics (3); supply chain management; corporate social responsibility, sustainability (8); consumption income and wealth inequality (12)
13	Climate action	Take urgent action to combat climate change and its impacts		natural disasters;	
14	Life below water	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development			
15	Life on land	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity			agricultural biotechnology (1)
16	Peace, Justice and strong institutions	Promote peaceful and inclusive societies for sustainable development; provide access to justice for all; and build effective, accountable, and inclusive institutions at all levels.	social security (0);	information privacy threats; responses; ethical issues (10); political instability; capital accumulation(12); corruption (12);	job security (12); political instability (0); long-term political development (12);
17	Partnerships for the goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development			

References

1. Ma, J. Jack Ma on Taking Back China's Blue Skies. Harvard Business Review. 2013. Available online: https://hbr.org/2013/11/jack-ma-on-taking-back-chinas-blue-skies (accessed on 09 August 2019).

2. Zhu, J.; Hua, W. Visualizing the knowledge domain of sustainable development research between 1987 and 2015: A bibliometric analysis. *Scientometrics* **2017**, *110*, 893–914. [CrossRef]

3. 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]

4. Martínez-Jurado, P.J.; Moyano-Fuentes, J. Lean management, supply chain management and sustainability: a literature review. *J. Clean. Prod.* **2014**, *85*, 134–150.

5. Klewitz, J.; Hansen, E.G. Sustainability-oriented innovation of SMEs: a systematic review. *J. Clean. Prod.* **2014**, *65*, 57–75. [CrossRef]

6. Goes, P.B. Big data and is research. *MIS Q.* **2014**, *38*, iii–viii.

7. Sustainable develop goals. Available online: https://sustainabledevelopment.un.org/?menu=1300 (accessed on 01 August 2018).

8. Brundiers, K.; Wiek, A. Do we teach what we preach? An international comparison of problem-and project-based learning courses in sustainability. *Sustainability* **2013**, *5*, 1725–1746. [CrossRef]

9. Painter-Morland, M.; Sabet, E.; Molthan-Hill, P.; Goworek, H.; de Leeuw, S. Beyond the curriculum: Integrating sustainability into business schools. *J. Bus. Ethics* **2016**, *139*, 737–754. [CrossRef]

10. Pisani, N.; Kourula, A.; Kolk, A.; Meijer, R. How global is international csr research? Insights and recommendations from a systematic review. *J. World Bus.* **2017**, *52*, 591–614. [CrossRef]

11. Schubert, C. Green nudges: Do they work? Are they ethical? *Ecol. Econ.* **2017**, *132*, 329–342. [CrossRef]

12. Katsikeas, C.S.; Leonidou, C.N.; Zeriti, A. Eco-friendly product development strategy: Antecedents, outcomes, and contingent effects. *J. Acad. Market. Sci.* **2016**, *44*, 660–684. [CrossRef]

13. García-de-Frutos, N.; Ortega-Egea, J.M.; Martínez-del-Río, J. Anti-consumption for environmental sustainability: Conceptualization, review, and multilevel research directions. *J. Bus. Ethics* **2016**, *148*, 411–435. [CrossRef]

14. Fahimnia, B.; Sarkis, J.; Davarzani, H. Green supply chain management: A review and bibliometric analysis. *Int. J. Prod. Econ.* **2015**, *162*, 101–114. [CrossRef]

15. Strozzi, F.; Colicchia, C.; Creazza, A.; Noè, C. Literature review on the 'smart factory' concept using bibliometric tools. *Int. J. Prod. Res.* **2017**, *55*, 6572–6591. [CrossRef]

16. Chen, L.; Zhao, X.; Tang, O.; Price, L.; Zhang, S.; Zhu, W. Supply chain collaboration for sustainability: A literature review and future research agenda. *Int. J. Prod. Econ.* **2017**, *194*, 73–87. [CrossRef]

17. Jabbour, A.B.L.D.S.; Jabbour, C.J.C.; Filho, M.G.; Roubaud, D. Industry 4.0 and the circular economy: A proposed research agenda and original roadmap for sustainable operations. *Ann. Oper. Res.* **2018**, *270*, 273–286.

18. Centobelli, P.; Cerchione, R.; Esposito, E. Environmental sustainability in the service industry of transportation and logistics service providers: Systematic literature review and research directions. *Transp. Res. Part D Transp. Environ.* **2017**, *53*, 454–470. [CrossRef]

19. Thies, C.; Kieckhäfer, K.; Spengler, T.S.; Sodhi, M.S. Operations research for sustainability assessment of products: A review. *Eur. J. Oper. Res.* **2019**, *274*, 1–21. [CrossRef]

20. De Stefano, F.; Bagdadli, S.; Camuffo, A. The hr role in corporate social responsibility and sustainability: A boundary-shifting literature review. *Hum. Resour. Manag.* **2018**, *57*, 549–566. [CrossRef]

21. Hall, J.; Matos, S.; Sheehan, L.; Silvestre, B. Entrepreneurship and innovation at the base of the pyramid: A recipe for inclusive growth or social exclusion? *J. Manag. Stud.* **2012**, *49*, 785–812. [CrossRef]

22. Xu, L.; Kajikawa, Y. An integrated framework for resilience research: A systematic review based on citation network analysis. *Sustain. Sci.* **2017**, *13*, 235–254. [CrossRef]

23. Castellacci, F.; Tveito, V. Internet use and well-being: A survey and a theoretical framework. *Res. Policy* **2018**, *47*, 308–325. [CrossRef]

24. Adams, R.; Jeanrenaud, S.; Bessant, J.; Denyer, D.; Overy, P. Sustainability-oriented innovation: A systematic review. *Int. J. Manag. Rev.* **2016**, *18*, 180–205. [CrossRef]

25. Chen, C. Citespace ii: Detecting and visualizing emerging trends and transient patterns in scientific literature. *J. Am. Soc. Inf. Sci. Technol.* **2006**, *57*, 359–377. [CrossRef]

26. Van Eck, N.J.; Waltman, L. Software survey: Vosviewer, a computer program for bibliometric mapping. *Scientometrics* **2009**, *84*, 523–538. [CrossRef]

27. Wu, D.; Li, M.; Zhu, X.; Song, H.; Li, J. Ranking the research productivity of business and management institutions in asia–pacific region: Empirical research in leading abs journals. *Scientometrics* **2015**, *105*, 1253–1272. [CrossRef]

28. Lowry, P.B.; Moody, G.D.; Gaskin, J.; Galletta, D.F.; Humpherys, S.L.; Barlow, J.B.; Wilson, D.W. Evaluating journal quality and the association for information systems senior scholars' journal basket via bibliometric measures: Do expert journal assessments add value? *MIS Q.* **2013**, *37*, 993–1012. [CrossRef]

29. Randhawa, K.; Wilden, R.; Hohberger, J. A bibliometric review of open innovation: Setting a research agenda. *J. Prod. Innovat. Manag.* **2016**, *33*, 750–772. [CrossRef]

30. Daim, T.U.; Rueda, G.; Martin, H.; Gerdsri, P. Forecasting emerging technologies: Use of bibliometrics and patent analysis. *Technol. Forecast. Soc.* **2006**, *73*, 981–1012. [CrossRef]

31. Chabowski, B.R.; Mena, J.A.; Gonzalez-Padron, T.L. The structure of sustainability research in marketing, 1958–2008: A basis for future research opportunities. *J. Acad. Market. Sci.* **2011**, *39*, 55–70. [CrossRef]

32. Tang, M.; Liao, H.; Wan, Z.; Herrera-Viedma, E.; Rosen, M. Ten years of sustainability (2009 to 2018): A bibliometric overview. *Sustainability* **2018**, *10*, 1655. [CrossRef]

33. Carter, C.R. Knowledge production and knowledge transfer: Closing the research-practice gap. *J. Supply Chain Manag.* **2008**, *44*, 78. [CrossRef]

34. Wilkinson, B.R.; Durden, C.H. Inducing structural change in academic accounting research. *Crit. Perspect. Account.* **2015**, *26*, 23–36. [CrossRef]

35. Li, K.; Rollins, J.; Yan, E. Web of science use in published research and review papers 1997-2017: A selective, dynamic, cross-domain, content-based analysis. *Scientometrics* **2018**, *115*, 1–20. [CrossRef] [PubMed]

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] [PubMed]

37. Morris, H.; Harvey, C.; Kelly, A. Journal rankings and the abs journal quality guide. *Manag. Decis.* **2009**, *47*, 1441–1451. [CrossRef]

38. Mingers, J.; Yang, L. Evaluating journal quality: A review of journal citation indicators and ranking in business and management. *Eur. J. Oper. Res.* **2017**, *257*, 323–337. [CrossRef]

39. Small, H. Co-citation in the scientific literature: A new measure of the relationship between two documents. *J. Am. Soc. Inform. Sci.* **1973**, *24*, 265–269. [CrossRef]

40. Chen, C. Searching for intellectual turning points: Progressive knowledge domain visualization. *Proc. Natl. Acad. Sci. USA* **2004**, *101*, 5303–5310. [CrossRef]

41. Small, H. Visualizing science by citation mapping. *J. Am. Soc. Inf. Sci.* **1999**, *50*, 799–813. [CrossRef]

42. 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]

43. Pan, X.; Yan, E.; Cui, M.; Hua, W. Examining the usage, citation, and diffusion patterns of bibliometric mapping software: A comparative study of three tools. *J. Informetr.* **2018**, *12*, 481–493. [CrossRef]

44. Cui, Y.; Mou, J.; Liu, Y. Knowledge mapping of social commerce research: A visual analysis using citespace. *Electron. Commer. Res.* **2018**, *18*, 837–868. [CrossRef]

45. Chen, C.; Dubin, R.; Kim, M.C. Emerging trends and new developments in regenerative medicine: A scientometric update (2000–2014). *Expert Opin. Biol. Ther.* **2014**, *14*, 1295–1317. [CrossRef] [PubMed]

46. Li, X.; Ma, E.; Qu, H. Knowledge mapping of hospitality research—A visual analysis using citespace. *Int. J. Hospital. Manag.* **2017**, *60*, 77–93. [CrossRef]

47. Fang, Y.; Yin, J.; Wu, B. Climate change and tourism: A scientometric analysis using citespace. *J. Sustain. Tour.* **2017**, *26*, 108–126. [CrossRef]

48. Deerwester, S.; Dumais, S.T.; Furnas, G.W.; Landauer, T.K.; Harshman, R. Indexing by latent semantic analysis. *J. Am. Soc. Inform. Sci.* **1990**, *41*, 391–407. [CrossRef]

49. Dunning, T. Accurate methods for the statistics of surprise and coincidence. *Comput. Ling.* **1993**, *19*, 61–74.

50. Ping, Q.; He, J.; Chen, C. How many ways to use citespace? A study of user interactive events over 14 months. *J. Assoc. Inf. Sci. Technol.* **2017**, *68*, 1234–1256. [CrossRef]

51. Zeldes, S.P. Consumption and liquidity constraints: An empirical investigation. *J. Polit. Econ.* **1989**, *97*, 305–346. [CrossRef]

52. Barro, R.J. Economic growth in a cross section of countries. *Q. J. Econ.* **1991**, *106*, 407–443. [CrossRef]

53. Katz, L.F.; Murphy, K.M. Changes in relative wages, 1963–1987: Supply and demand factors. *Q. J. Econ.* **1992**, *107*, 35–78. [CrossRef]

54. Azar, O.H. The impact of economics on management. *J. Econ. Behav. Organ.* **2008**, *68*, 667–675. [CrossRef]

55. Idler, E.L.; Benyamini, Y. Self-rated health and mortality: A review of twenty-seven community studies. *J. Health Soc. Behav.* **1997**, *38*, 21–37. [CrossRef] [PubMed]

56. Podsakoff, P.M.; MacKenzie, S.B.; Lee, J.Y.; Podsakoff, N.P. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *J. Appl. Psychol.* **2003**, *88*, 879–903. [CrossRef] [PubMed]

57. Adler, P.S.; Kwon, S.-W. Social capital: Prospects for a new concept. *Acad. Manag. Rev.* **2002**, *27*, 17–40. [CrossRef]

58. Frey, B.S.; Stutzer, A. What can economists learn from happiness research? *J. Econ. Lit.* **2002**, *40*, 402–435. [CrossRef]

59. van Doorslaer, E.; Wagstaff, A.; Bleichrodt, H.; Calonge, S.; Gerdtham, U.-G.; Gerfin, M.; Geurts, J.; Gross, L.; Häkkinen, U.; Leu, R.E.; et al. Income-related inequalities in health: Some international comparisons. *J. Health Econ.* **1997**, *16*, 93–112. [CrossRef]

60. Alesina, A.; Baqir, R.; Easterly, W. Public goods and ethnic divisions. *Q. J. Econ.* **1999**, *114*, 1243–1284. [CrossRef]

61. Acemoglu, D.; Robinson, J.A. A theory of political transitions. *Am. Econ. Rev.* **2001**, *91*, 938–963. [CrossRef]

62. Im, K.S.; Pesaran, M.H.; Shin, Y. Testing for unit roots in heterogeneous panels. *J. Econ.* **2003**, *115*, 53–74. [CrossRef]

63. Roodman, D. A note on the theme of too many instruments. *Oxf. B Econ. Stat.* **2009**, *71*, 135–158. [CrossRef]

64. Windmeijer, F. A finite sample correction for the variance of linear efficient two-step gmm estimators. *J. Econom.* **2005**, *126*, 25–51. [CrossRef]

65. Dehejia, R.H.; Wahba, S. Propensity score-matching methods for nonexperimental causal studies. *Rev. Econ. Stat.* **2002**, *84*, 151–161. [CrossRef]

66. Ferrer-i-Carbonell, A. Income and well-being: An empirical analysis of the comparison income effect. *J. Public Econ.* **2005**, *89*, 997–1019. [CrossRef]

67. Kaplan, A.M.; Haenlein, M. Users of the world, unite! The challenges and opportunities of social media. *Bus. Horizons* **2010**, *53*, 59–68. [CrossRef]

68. Teece, D.J.; Pisano, G.; Shuen, A. Dynamic capabilities and strategic management. *Strat. Manag. J.* **1997**, *18*, 509–533. [CrossRef]

69. Boyd, D.; Crawford, K. Critical questions for big data. *Inf. Commun. Soc.* **2012**, *15*, 662–679. [CrossRef]

70. Chen, C. Science mapping: A systematic review of the literature. *J. Data Inf. Sci.* **2017**, *2*, 1–40. [CrossRef]

71. Chatterji, A.K.; Levine, D.I.; Toffel, M.W. How well do social ratings actually measure corporate social responsibility? *J. Econ. Manag. Strat.* **2009**, *18*, 125–169. [CrossRef]

72. Bocken, N.M.P.; Short, S.W.; Rana, P.; Evans, S. A literature and practice review to develop sustainable business model archetypes. *J. Clean. Prod.* **2014**, *65*, 42–56. [CrossRef]

73. Ghisellini, P.; Cialani, C.; Ulgiati, S. A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. *J. Clean. Prod.* **2016**, *114*, 11–32. [CrossRef]

74. Kim, S.H.; Chan, C.W.; Olivares, M.; Escobar, G. Icu admission control: An empirical study of capacity allocation and its implication for patient outcomes. *Manag. Sci.* **2015**, *61*, 19–38. [CrossRef]

75. Huang, Z.Q.; Huang, X.; Jiang, Y.W. The impact of death-related media information on consumer value orientation and scope sensitivity. *J. Market. Res.* **2018**, *55*, 432–445. [CrossRef]

76. Lu, S.F.; Rui, H.X. Can we trust online physician ratings? Evidence from cardiac surgeons in florida. *Manag. Sci.* **2018**, *64*, 2557–2573. [CrossRef]

77. Chan, J.; Ghose, A. Internet's dirty secret: Assessing the impact of online intermediaries on hiv transmission. *MIS Q.* **2014**, *38*, 955–976. [CrossRef]

78. Rao, H.; Greve, H.R. Disasters and community resilience: Spanish flu and the formation of retail cooperatives in norway. *Acad. Manag. J.* **2018**, *61*, 5–25. [CrossRef]

79. Venkatesh, V.; Rai, A.; Sykes, T.A.; Aljafari, R. Combating infant mortality in rural india: Evidence from a field study of ehealth kiosk implementations. *MIS Q.* **2016**, *40*, 353–380. [CrossRef]

80. Jonasson, J.O.; Deo, S.; Gallien, J. Improving hiv early infant diagnosis supply chains in sub-saharan africa: Models and application to mozambique. *Oper. Res.* **2017**, *65*, 1479–1493. [CrossRef]

81. Koijen, R.S.J.; Van Nieuwerburgh, S.; Yogo, M. Health and mortality delta: Assessing the welfare cost of household insurance choice. *J. Finance* **2016**, *71*, 957–1010. [CrossRef]

82. Goh, J.; Pfeffer, J.; Zenios, S.A. The relationship between workplace stressors and mortality and health costs in the united states. *Manag. Sci.* **2016**, *62*, 608–628. [CrossRef]

83. Leung, M.D. Learning to hire? Hiring as a dynamic experiential learning process in an online market for contract labor. *Manag. Sci.* **2018**, *64*, 5651–5668. [CrossRef]

84. Nicolaou, N.; Patel, P.C.; Wolfe, M.T. Testosterone and tendency to engage in self-employment. *Manag. Sci.* **2018**, *64*, 1825–1841. [CrossRef]

85. Wiersema, M.F.; Nishimura, Y.; Suzuki, K. Executive succession: The importance of social capital in ceo appointments. *Strat. Manag. J.* **2018**, *39*, 1473–1495. [CrossRef]

86. Zhu, J.; Tatachari, S.; Chattopadhyay, P. Newcomer identification: Trends, antecedents, moderators, and consequences. *Acad. Manag. J.* **2017**, *60*, 855–879. [CrossRef]

87. Dineen, B.R.; Allen, D.G. Third party employment branding: Human capital inflows and outflows following "best places to work" certifications. *Acad. Manag. J.* **2016**, *59*, 90–112. [CrossRef]

88. Li, S.L.; Sun, F.; Li, M.Z. Sustainable human resource management nurtures change-oriented employees: Relationship between high-commitment work systems and employees' taking charge behaviors. *Sustainability* **2019**, *11*, 3550. [CrossRef]

89. Burtch, G.; Carnahan, S.; Greenwood, B.N. Can you gig it? An empirical examination of the gig economy and entrepreneurial activity. *Manag. Sci.* **2018**, *64*, 5497–5520. [CrossRef]

90. Gans, J.S.; Stern, S.; Wu, J. Foundations of entrepreneurial strategy. *Strat. Manag. J.* **2019**, *40*, 736–756. [CrossRef]

91. Eberhart, R.N.; Eesley, C.E. The dark side of institutional intermediaries: Junior stock exchanges and entrepreneurship. *Strat. Manag. J.* **2018**, *39*, 2643–2665. [CrossRef]

92. Paik, Y.; Kang, S.; Seamans, R. Entrepreneurship, innovation, and political competition: How the public sector helps the sharing economy create value. *Strat. Manag. J.* **2019**, *40*, 503–532. [CrossRef]

93. Younkin, P.; Kuppuswamy, V. The colorblind crowd? Founder race and performance in crowdfunding. *Manag. Sci.* **2018**, *64*, 3269–3287. [CrossRef]

94. Lerner, J.; Schoar, A.; Sokolinski, S.; Wilson, K. The globalization of angel investments: Evidence across countries. *J. Financ. Econ.* **2018**, *127*, 1–20. [CrossRef]

95. McKenzie, D.; Woodruff, C. Business practices in small firms in developing countries. *Manag. Sci.* **2017**, *63*, 2967–2981. [CrossRef]

96. Dessaint, O.; Golubov, A.; Volpin, P. Employment protection and takeovers. *J. Financ. Econ.* **2017**, *125*, 369–388. [CrossRef]

97. Li, X.X.; McAllister, D.J.; Ilies, R.; Gloor, J.L. Schadenfreude: A counternormative observer response to workplace mistreatment. *Acad. Manag. Rev.* **2019**, *44*, 360–376. [CrossRef]

98. Ozcelik, H.; Barsade, S.G. No employee an island: Workplace loneliness and job performance. *Acad. Manag. J.* **2018**, *61*, 2343–2366. [CrossRef]

99. Pillemer, J.; Rothbard, N.P. Friends without benefits: Understanding the dark sides of workplace friendship. *Acad. Manag. Rev.* **2018**, *43*, 635–660. [CrossRef]

100. Bellezza, S.; Keinan, A. Brand tourists: How non-core users enhance the brand image by eliciting pride. *J. Consum. Res.* **2014**, *41*, 397–417. [CrossRef]

101. Hu, H.W.; Cui, L.; Aulakh, P.S. State capitalism and performance persistence of business group-affiliated firms: A comparative study of china and india. *J. Int. Bus. Stud.* **2019**, *50*, 193–222. [CrossRef]

102. Boone, C.; Lokshin, B.; Guenter, H.; Belderbos, R. Top management team nationality diversity, corporate entrepreneurship, and innovation in multinational firms. *Strat. Manag. J.* **2019**, *40*, 277–302. [CrossRef]

103. Armanios, D.E.; Eesley, C.E.; Li, J.; Eisenhardt, K.M. How entrepreneurs leverage institutional intermediaries in emerging economies to acquire public resources. *Strat. Manag. J.* **2017**, *38*, 1373–1390. [CrossRef]

104. Yang, N.; Lim, Y.L. Temporary incentives change daily routines: Evidence from a field experiment on singapore's subways. *Manag. Sci.* **2018**, *64*, 3365–3379. [CrossRef]

105. Retana, G.F.; Forman, C.; Narasimhan, S.; Niculescu, M.F.; Wu, D.J. Technology support and post-adoption it service use: Evidence from the cloud. *MIS Q.* **2018**, *42*, 25. [CrossRef]

106. Benitez, J.; Ray, G.; Henseler, J. Impact of information technology infrastructure flexibility on mergers and acquisitions. *MIS Q.* **2018**, *42*, 25–43. [CrossRef]

107. Paton-Romero, J.D.; Baldassarre, M.T.; Piattini, M.; de Guzman, I.G.R. A governance and management framework for green it. *Sustainability* **2017**, *9*, 1761. [CrossRef]

108. Mostafa, R.; Klepper, S. Industrial development through tacit knowledge seeding: Evidence from the bangladesh garment industry. *Manag. Sci.* **2018**, *64*, 613–632. [CrossRef]

109. Avci, B.; Girotra, K.; Netessine, S. Electric vehicles with a battery switching station: Adoption and environmental impact. *Manag. Sci.* **2015**, *61*, 772–794. [CrossRef]

110. Kapoor, R.; Furr, N.R. Complementarities and competition: Unpacking the drivers of entrants' technology choices in the solar photovoltaic industry. *Strat. Manag. J.* **2015**, *36*, 416–436. [CrossRef]

111. Kaiser, U.; Kongsted, H.C.; Laursen, K.; Ejsing, A.K. Experience matters: The role of academic scientist mobility for industrial innovation. *Strat. Manag. J.* **2018**, *39*, 1935–1958. [CrossRef]

112. Xu, J.; Forman, C.; Hu, Y.J. Battle of the internet channels: How do mobile and fixed-line quality drive internet use? *Inf. Syst. Res.* **2019**, *30*, 65–80. [CrossRef]

113. Srivastava, S.C.; Shainesh, G. Bridging the service divide through digitally enabled service innovations: Evidence from indian healthcare service providers. *MIS Q.* **2015**, *39*, 245–267. [CrossRef]

114. Mindel, V.; Mathiassen, L.; Rai, A. The sustainability of polycentric information commons. *MIS Q.* **2018**, *42*, 607–631. [CrossRef]

115. Song, P.J.; Xue, L.; Rai, A.; Zhang, C. The ecosystem of software platform: A study of asymmetric cross-side network effects and platform governance. *MIS Q.* **2018**, *42*, 121–142. [CrossRef]

116. Venkatesh, V.; Bala, H.; Sambamurthy, V. Implementation of an information and communication technology in a developing country: A multimethod longitudinal study in a bank in india. *Inf. Syst. Res.* **2016**, *27*, 558–579. [CrossRef]

117. Cobb, J.A. How firms shape income inequality: Stakeholder power, executive decision making, and the structuring of employment relationships. *Acad. Manag. Rev.* **2016**, *41*, 324–348. [CrossRef]

118. Ranganathan, A. Train them to retain them: Work readiness and the retention of first-time women workers in india. *Adm. Sci. Q.* **2018**, *63*, 879–909. [CrossRef]

119. Mun, E.; Jung, J. Change above the glass ceiling: Corporate social responsibility and gender diversity in japanese firms. *Adm. Sci. Q.* **2018**, *63*, 409–440. [CrossRef]

120. Chan, J.; Wang, J. Hiring preferences in online labor markets: Evidence of a female hiring bias. *Manag. Sci.* **2018**, *64*, 2973–2994. [CrossRef]

121. Zhang, L.T. A fair game? Racial bias and repeated interaction between nba coaches and players. *Adm. Sci. Q.* **2017**, *62*, 603–625. [CrossRef]

122. Zhang, L. Who loses when a team wins? Better performance increases racial bias. *Organ. Sci.* **2019**, *30*, 40–50. [CrossRef]

123. Frydman, C.; Papanikolaou, D. In search of ideas: Technological innovation and executive pay inequality. *J. Financ. Econ.* **2018**, *130*, 1–24. [CrossRef]

124. Botelho, T.L.; Abraham, M. Pursuing quality: How search costs and uncertainty magnify gender-based double standards in a multistage evaluation process. *Adm. Sci. Q.* **2017**, *62*, 698–730. [CrossRef]

125. Ordabayeva, N.; Fernandes, D. Better or different? How political ideology shapes preferences for differentiation in the social hierarchy. *J. Consum. Res.* **2018**, *45*, 227–250. [CrossRef]

126. Jung, K.; Garbarino, E.; Briley, D.A.; Wynhausen, J. Blue and red voices: Effects of political ideology on consumers' complaining and disputing behavior. *J. Consum. Res.* **2017**, *44*, 477–499. [CrossRef]

127. Gupta, A.; Briscoe, F.; Hambrick, D.C. Evenhandedness in resource allocation: Its relationship with ceo ideology, organizational discretion, and firm performance. *Acad. Manag. J.* **2018**, *61*, 1848–1868. [CrossRef]

128. Cettolin, E.; Riedl, A. Justice under uncertainty. *Manag. Sci.* **2017**, *63*, 3739–3759. [CrossRef]

129. Stevens, C.E.; Xie, E.; Peng, M.W. Toward a legitimacy-based view of political risk: The case of google and yahoo in china. *Strat. Manag. J.* **2016**, *37*, 945–963. [CrossRef]

130. Chan, J.; Mojumder, P.; Ghose, A. The digital sin city: An empirical study of craigslist's impact on prostitution trends. *Inf. Syst. Res.* **2019**, *30*, 219–238. [CrossRef]

131. Sartor, M.A.; Beamish, P.W. Host market government corruption and the equity-based foreign entry strategies of multinational enterprises. *J. Int. Bus. Stud.* **2018**, *49*, 346–370. [CrossRef]

132. Aven, B.L. The paradox of corrupt networks: An analysis of organizational crime at Enron. *Organ. Sci.* **2015**, *26*, 980–996. [CrossRef]

133. den Nieuwenboer, N.A.; da Cunha, J.V.; Trevino, L.K. Middle managers and corruptive routine translation: The social production of deceptive performance. *Organ. Sci.* **2017**, *28*, 781–803. [CrossRef]

134. Sampath, V.S.; Gardberg, N.A.; Rahman, N. Corporate reputation's invisible hand: Bribery, rational choice, and market penalties. *J. Bus Ethics* **2018**, *151*, 743–760. [CrossRef]

135. Vadera, A.K.; Pratt, M.G. Love, hate, ambivalence, or indifference? A conceptual examination of workplace crimes and organizational identification. *Organ. Sci.* **2013**, *24*, 172–188. [CrossRef]

136. Hui, K.L.; Kim, S.H.; Wang, Q.H. Cybercrime deterrence and international legislation: Evidence from distributed denial of service attacks. *MIS Q.* **2017**, *41*, 497–523. [CrossRef]

137. York, J.G.; Vedula, S.; Lenox, M.J. It's not easy building green: The impact of public policy, private actors, and regional logics on voluntary standards adoption. *Acad. Manag. J.* **2018**, *61*, 1492–1523. [CrossRef]

138. Hu, Z.L.; Cao, J.; Hong, L.J. Robust simulation of global warming policies using the dice model. *Manag. Sci.* **2012**, *58*, 2190–2206. [CrossRef]

139. Dutta, S. Creating in the crucibles of nature's fury: Associational diversity and local social entrepreneurship after natural disasters in california, 1991–2010. *Adm. Sci. Q.* **2017**, *62*, 443–483. [CrossRef]

140. Brusset, X.; Bertrand, J.L. Hedging weather risk and coordinating supply chains. *J. Oper. Manag.* **2018**, *64*, 41–52. [CrossRef]

141. Bansal, P.; Kim, A.; Wood, M.O. Hidden in plain sight: The importance of scale in organizations' attention to issues. *Acad. Manag. Rev.* **2018**, *43*, 217–241. [CrossRef]

142. Wright, C.; Nyberg, D. An inconvenient truth: How organizations translate climate change into business as usual. *Acad. Manag. J.* **2017**, *60*, 1633–1661. [CrossRef]

143. Ferraro, F.; Beunzab, D. Creating common ground: A communicative action model of dialogue in shareholder engagement. *Organ. Sci.* **2018**, *29*, 1187–1207. [CrossRef]

144. Sunar, N.; Birge, J.R. Strategic commitment to a production schedule with uncertain supply and demand: Renewable energy in day-ahead electricity markets. *Manag. Sci.* **2019**, *65*, 714–734. [CrossRef]

145. Nguyen, J.; Donohue, K.; Mehrotra, M. Closing a supplier's energy efficiency gap through assessment assistance and procurement commitment. *Manag. Sci.* **2019**, *65*, 122–138. [CrossRef]

146. Cruise, J.; Flatley, L.; Gibbens, R.; Zachary, S. Control of energy storage with market impact: Lagrangian approach and horizons. *Oper. Res.* **2019**, *67*, 1–9. [CrossRef]

147. Kok, A.G.; Shang, K.; Yucel, S. Impact of electricity pricing policies on renewable energy investments and carbon emissions. *Manag. Sci.* **2018**, *64*, 131–148. [CrossRef]