

Review

Information Technology for Business Sustainability: A Literature Review with Automated Content Analysis

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Abstract: An extremely dynamic and fast-moving environment is pushing enterprises to continuous innovation and change. Managing sustainability in a digitalized environment seems to be of central importance for policy makers, as information technologies (IT), in combination with sustainability objectives, offer a wide range of opportunities for positive change. Through a systematic literature review and the application of automated content analysis, this study aims to provide insights into the latest research in the interdisciplinary field of sustainable business models and information systems. The results of the analysis, combined with a researcher's perspective, suggest that IT, which can be used to achieve sustainability objectives, are already in place and have an infinite number of potential implications in the future. The results suggest that positive economic, social, and environmental changes can be achieved by using IT as long as they are used to identify unsustainable actions and enable positive change. The analysis of research trends revealed a discrepancy between the research in the European Union and the rest of the world and pointed to several avenues for future research.

Keywords: information technology; enterprise; business model; sustainability; business sustainability; sustainable business model; IT; IS; BM; SBM



Citation: Vidmar, D.; Marolt, M.; Pucihar, A. Information Technology for Business Sustainability: A Literature Review with Automated Content Analysis. *Sustainability* **2021**, *13*, 1192. <https://doi.org/10.3390/su13031192>

Academic Editor: Prescott C. Ensign
Received: 30 November 2020
Accepted: 20 January 2021
Published: 23 January 2021

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1. Introduction

Over the last two decades, business models (BM) have become an important research topic. However, it is only in recent years that research has underlined the importance of implementing sustainable development goals through the development and innovation of BM [1]. These so-called sustainable business models (SBM) address sustainability issues by creatively integrating eco-efficient and eco-effective innovations into existing value creation, value delivery, and value capture elements of a BM [2]. Stubbs and Cocklin [3] conceptualized SBM by bringing together fields of organizational sustainability and BM. SBM then quickly gained momentum as a field of research [4,5] and attracted researchers from various disciplines [4,6–10], e.g., environmental sciences, social sciences, engineering, computer science, mathematics, and medicine [1].

To uncover new ways for value creation, value delivery, and value capture elements of BM, several authors see the potential in emerging information technologies (IT) [11]. Chesbrough [12] was the first to point out the link between IT and BM. Subsequently, a number of research papers focused on the role of IT in reshaping BM [2,13–20]. Researchers in the area of information systems (IS) have discussed not only the contributions of IS to business value [21] but also its impact on sustainability [22]. A turning point seems to have occurred in 2010, when several authors argued for the involvement of IS in pursuit of business sustainability [23,24]. The first years of sustainability research in IS focused exclusively on reduced resource consumption (e.g., saving energy, paper, and ink), a small segment of environmental sustainability, now known as the Green IS field [25–27]. This marks an important development in business sustainability that has influenced the way enterprises around the world operate. From early observations, some researchers argued

that Green IS should not only focus on the environmental impacts of corporate performance but at least also on the indirect social and economic impacts [22,28–30].

Nowadays, business environment is extremely dynamic. Digital maturity and the use of digital innovation are crucial for enterprises to successfully navigate pressures from customers, competitors, and policy makers [31–33]. The use of IT to innovate business practices through information, automation, and transformation is well documented [22,34]. Since IT can be used to enable capabilities and improve performance, the combination of IT's capabilities with sustainability objectives represent a potential to create positive changes in terms of economic, environmental, and social benefits [22,23].

Although there has been a growing interest on IT and its role in the emergence and viability of SBM among academics and practitioners in recent years [17,34–36], Nosratabadi et al. [1] argue that the focus is mainly on “sharing economy” cases and that many research topics and methodological approaches remain mainly untouched. Their comprehensive literature review [1] included work published between 2002 and 2017, and since then, several contributions have been made (e.g., [17,35,37–41]) to increase understanding of the impact of IT on SMB. Furthermore, as governing sustainability in a digitalized environment seems to be of central importance for policy makers [42,43], a comprehensive understanding of current knowledge on this topic is required. The present study, therefore, aims to provide insights into the latest research in the interdisciplinary field of SBM and IS and provide further research directions.

In accordance with this study objective, we conducted a systematic literature review using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach [44] and reviewed papers on the role of IT on SBM. The identified papers were analyzed not only manually, but also with the content analysis tool Leximancer which helped to identify and visualize key research themes to provide an understanding of the role of IT in SBM.

Our study has two contributions. First, we provided a comprehensive review of an emerging and rapidly developing interdisciplinary field that integrates the current knowledge about the role of IT in SBM. Second, we identified avenues for future investigation of this increasingly important research area.

The rest of the paper is structured as follows. In the following section, we present the methodology of the literature review. We then present the results and provided contributions to the discussion and further research directions. Finally, we provide concluding remarks and limitations of the study.

2. Methods and Data Collection

2.1. Selection of Papers

To provide an overview of current research, we first conducted a systematic literature search, using the following research terms and combining them with Boolean operators (AND and OR): business model*, sustainab*, information systems, information technolog*, and digit*. Among the publications of interest are scientific journal papers and book chapters from various disciplines. We searched the online database Web of Science.

After we obtained the first search results, we identified a total of 106 papers. Based on the recommendations of Levy and Ellis [45], we performed an additional search as follows: we searched for relevant papers by authors from the list of obtained relevant papers (eight additional papers); we searched for relevant papers by references of the obtained papers (25 additional papers), resulting in a total of 33 additional relevant papers. Based on the PRISMA statement [44], we also included four papers recommended by other sources (e.g., personalized recommendations by Mendeley, ResearchGate, and other publishers).

Following the PRISMA statement [44] and the guidelines of Kitchenham and Charters [46], we carried out an initial screening and quality assessment of the papers obtained through an initial search. Based on the review of the title and abstract, we eliminated 81 papers that were not relevant. A more detailed reading (quality assessment) of the remaining papers followed, which led to the elimination of one more paper.

At the end, we obtained a list of 61 papers, which we further examined to determine the main findings and to identify further research directions. The number of papers that we obtained through the search, assessed, and included in our content analysis is shown in the PRISMA flow diagram in Figure 1.

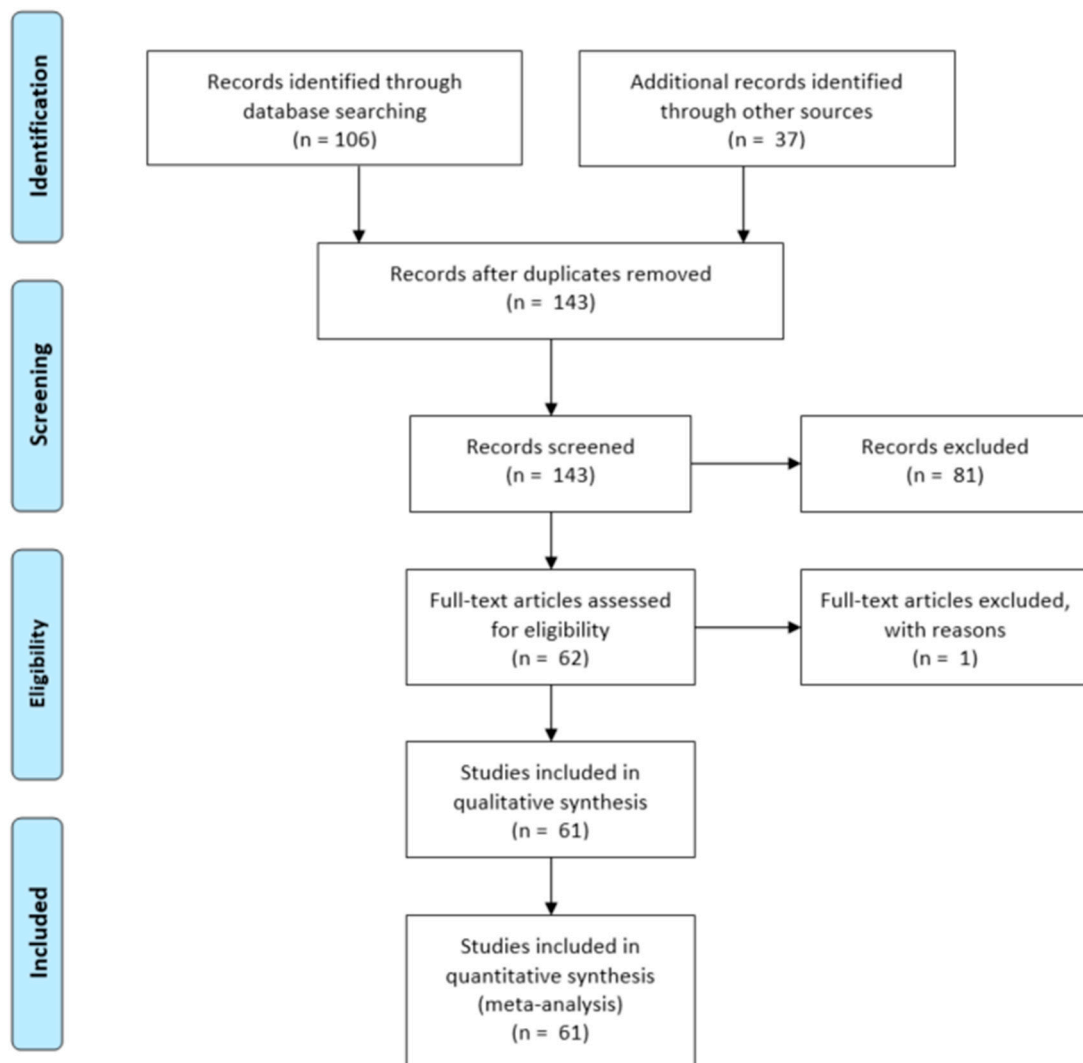


Figure 1. Selection of papers in the PRISMA flow diagram.

2.2. Analysis

While adapting the analysis process to material and research questions is challenging, immersing yourself in the data can bring many interesting points that would otherwise remain uninvestigated [47,48]. Since the available knowledge on our topic of interest is limited [49], we used qualitative content analysis to describe the phenomenon under investigation. This approach enables researchers to analyze textual material, regardless of its origin [48,50], with the aim of creating categories [50].

First, we used Tableau software [51] to analyze the number of papers per year, the journals in which they were published, and the authors' place of affiliation, to see if there are countries where research is more concentrated. Then, we continued with content analysis, combining two perspectives—that of a software program capable of quantifying and analyzing large amounts of data, and that of a human researcher capable of taking a broader perspective while looking at what is missing in the picture.

To analyze large amounts of text, we first used an automated approach to content analysis, which was performed with Leximancer [52]. The Leximancer software for automated content analysis (text analysis) that we used for our research applies Bayesian learning algorithm to break down large amounts of text into a conceivable number of relationships and categories [52,53]. From concepts and relationships, Leximancer creates “concept maps” that visualize relationships between concepts and aggregate concepts with related meanings into themes [53,54].

To ensure better results of the automated text analysis, all pdf files were first converted into text files. In addition, all unnecessary texts not related to the content were deleted, e.g., authors and their affiliation, journal name, chapter titles, tables, and captions. These files were then imported into the content analysis software Leximancer. Through several iterations of text analysis with Leximancer, we adjusted the settings of the word processor; we added standard English “stopwords” (list of common words excluded from analysis), to which we added some words, e.g., Table A1 and Figure 4. We also used the function “merge word variants”, which combines concepts that have the same stems into one concept. In our case, this means that singular and plural words (e.g., model and models) are treated as one concept. We did not find any complex stemming in the results of this analysis. The results provided by Leximancer helped us to identify the main concepts, which we further elaborated through the researchers standpoint.

The results of the content analysis are presented in the following sections.

3. Results

3.1. Field Evolution by Numbers

The literature search led to a classification of 61 papers. An analysis on an annual basis showed that the maximum number of papers was published in 2018 (Figure 2).

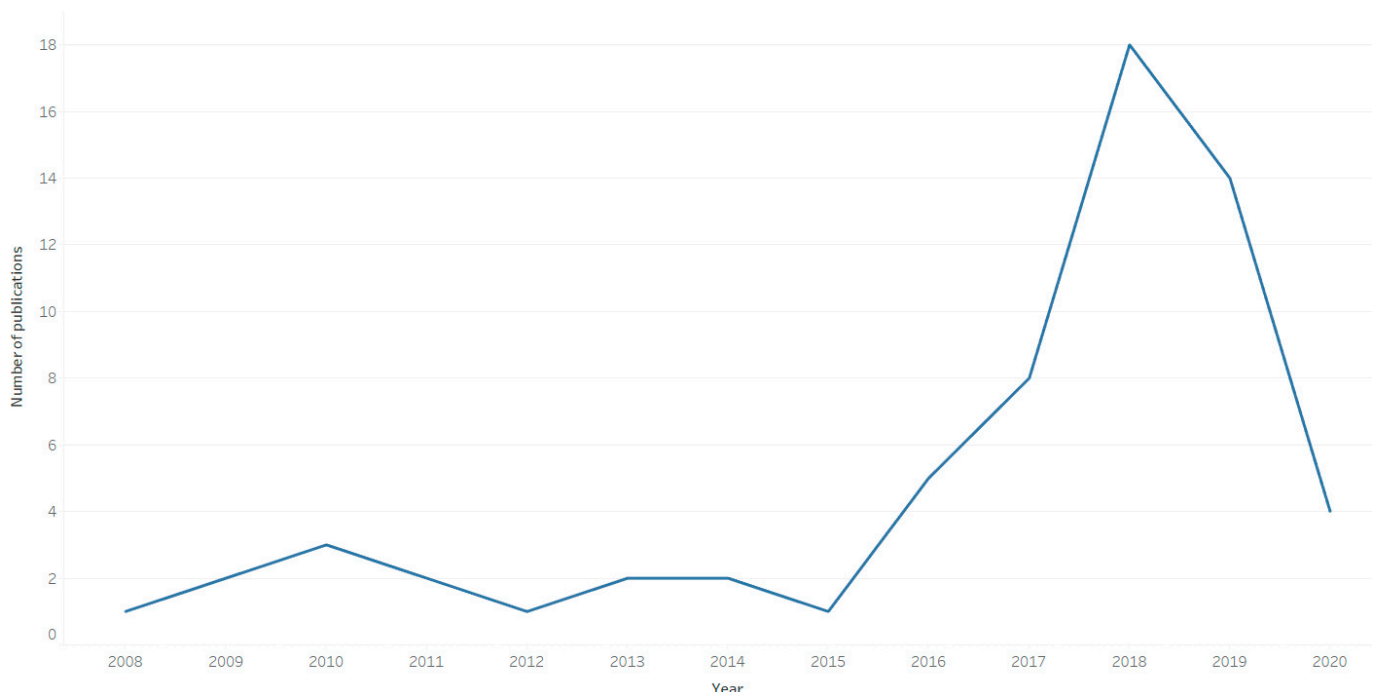


Figure 2. Number of papers per year.

The papers were also analyzed to find out in which journals they had been published over the years. Figure 3 shows that papers were published in 28 journals, the majority in the *Journal of Cleaner Production* and journal *Sustainability*.

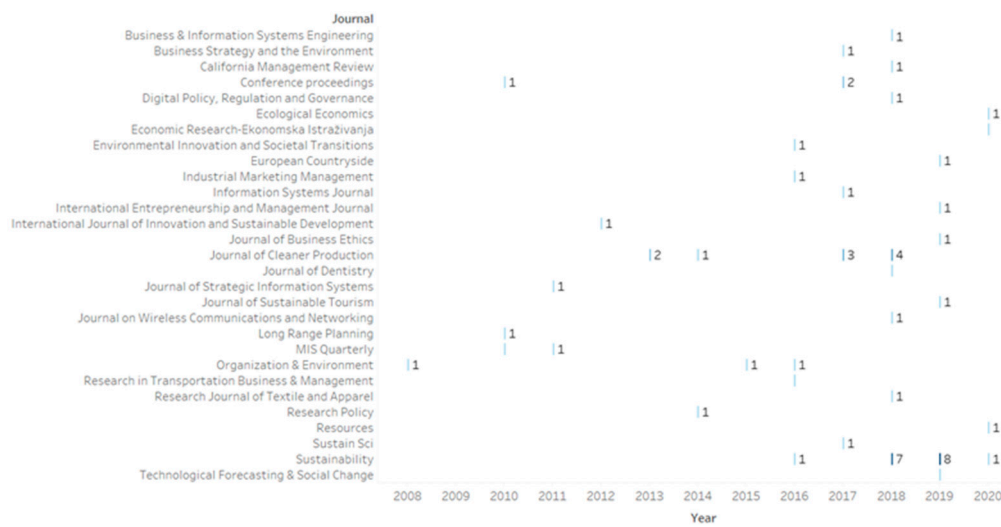


Figure 3. Number of publications per journal and year.

The classification in Figure 4 indicates that 31 publications were theoretical, 23 qualitative, while only three were mixed methods and two quantitative. The remaining two publications are book chapters where no specific approach was applied. All included papers, methodologies as they were stated by the authors, and assigned methodological categories are listed in Table A1 in the Appendix A.

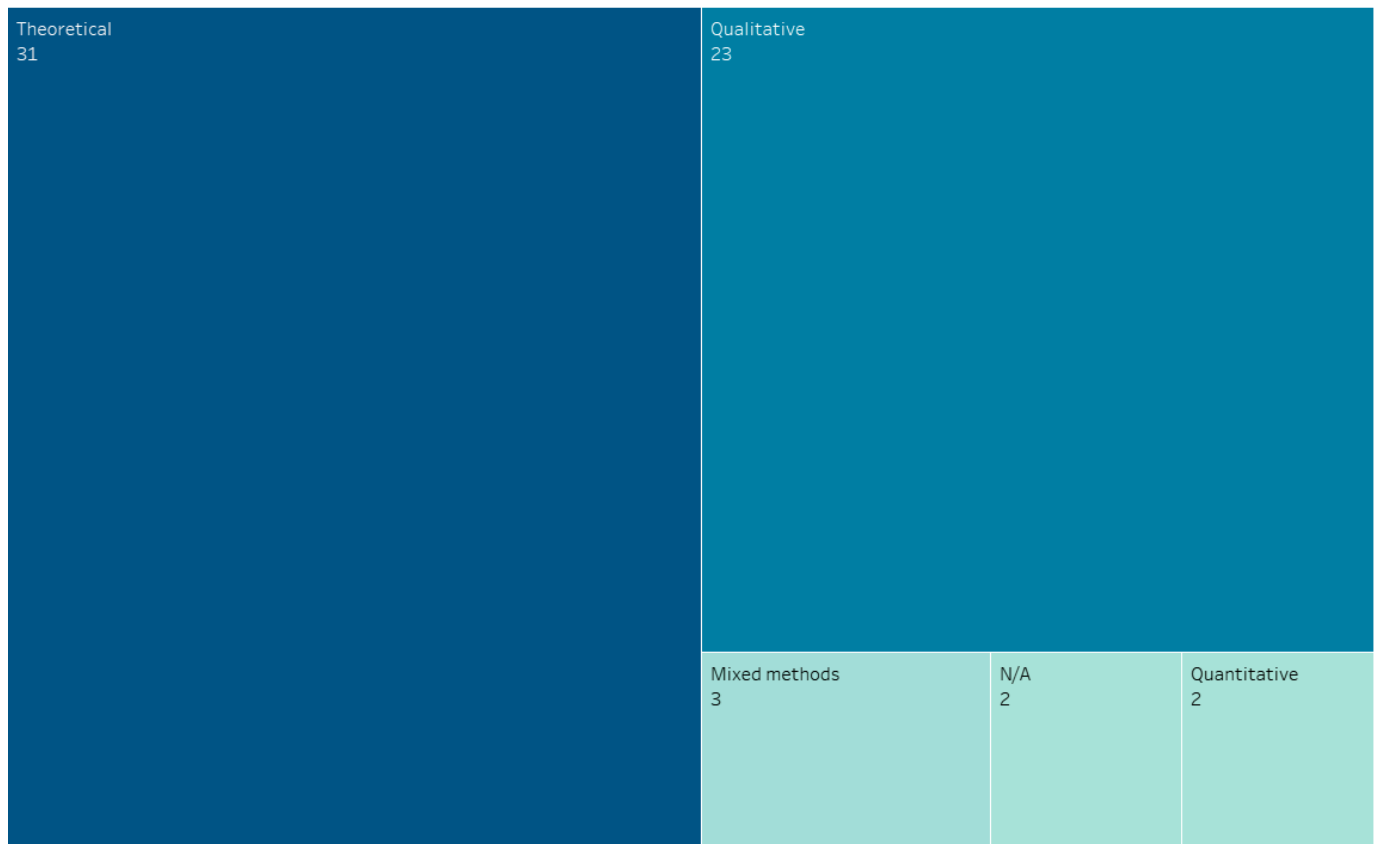


Figure 4. Article distribution by approach.

Further analysis revealed that the majority of research was conducted in European countries (Figure 5). Nevertheless, we found there are not only collaborations between

authors within one country but also between different European countries, or the collaboration involves at least one researcher from outside of Europe (e.g., United States of America (USA), Canada, and Australia) (Figure 5).

Number of articles per country



Figure 5. Number of corresponding authors per country.

3.2. Results of Content and Thematic Analysis

By analyzing 61 papers with Leximancer, we identified 14 themes (Figure 6). Themes identified by the analysis (as shown in Figure 6; the order is descending by the number of matches from the analyzed text) are “business”, “sustainability”, “value”, “process”, “research”, “support”, “use”, “products”, “customers”, “effects”, “information”, “study”, “future”, and “people”.

With the help of Leximancer, we also obtained a “concept map”, which is shown in Figure 7. The concept map consists of themes (colored circles) and concepts that form each theme (text within the themes in black letters). The importance of themes is shown by color as a “heat map” (the brighter the theme, the more often it was found in the analyzed text) and size (the larger the theme, the more concepts were combined into it) [53,54]. The concept map also shows which themes are overlapping, e.g., in our case “business” and “sustainability”; which concepts are shared between two themes, e.g., in our case concept “innovation” lies in the overlap of themes “business” and “sustainability”; and

which relationships between the concepts maintain relationships between the themes, e.g., (“business”) “model”–“innovation”–“sustainability”.

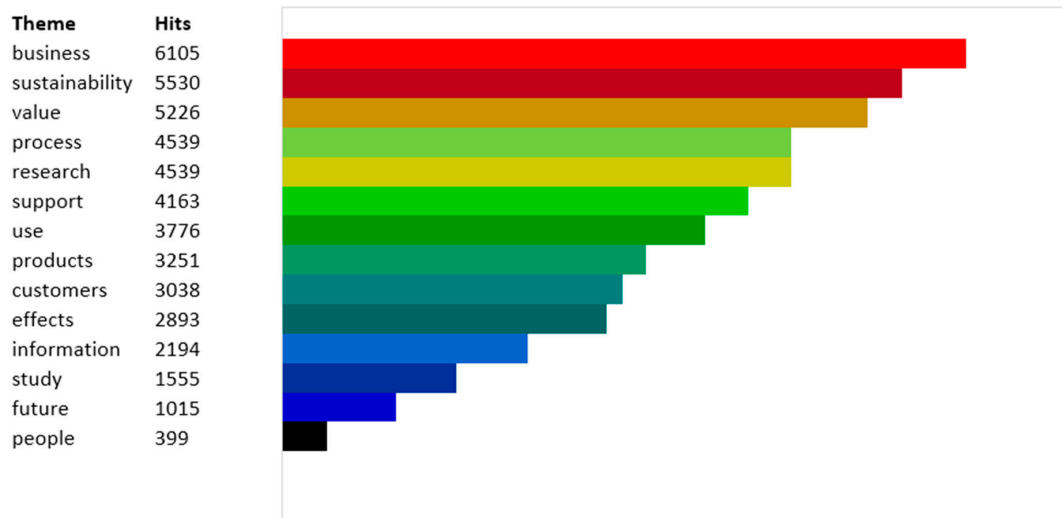


Figure 6. Identified themes.

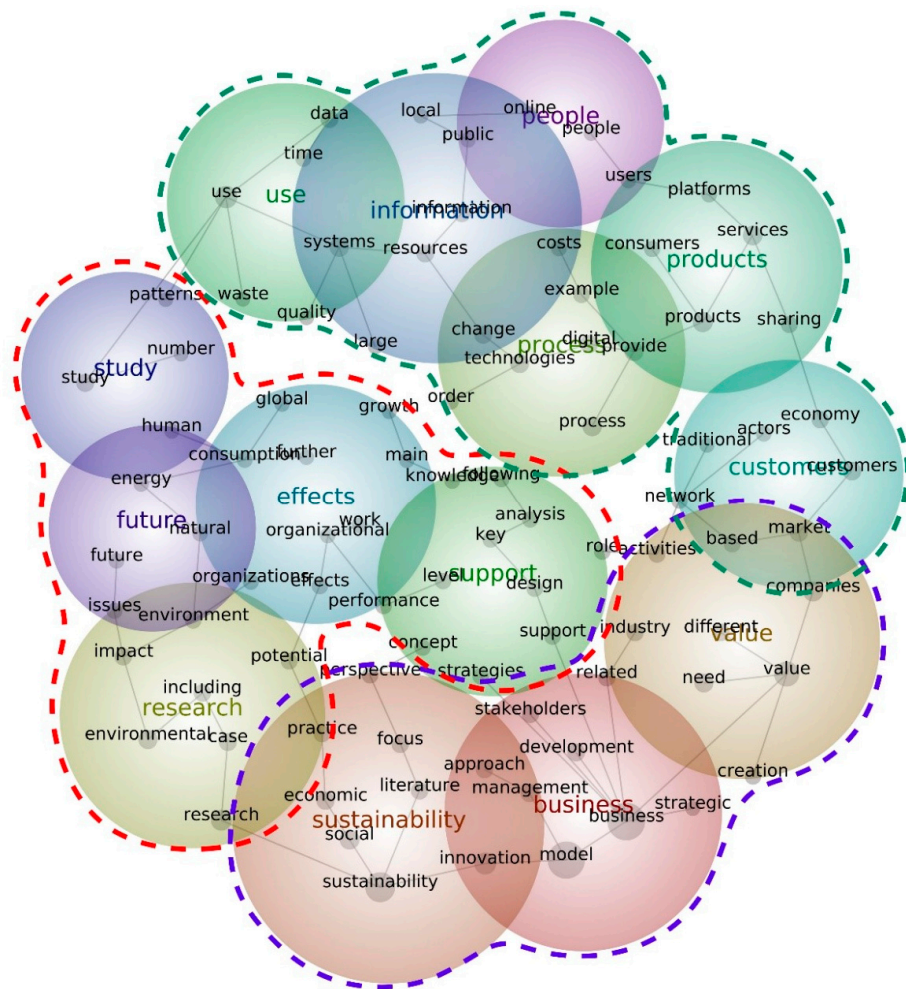


Figure 7. Leximancer concept map.

Based on our knowledge, understanding of the field, and the observations from the concept map (Figure 7), we identified the following 3 theme clusters:

The 1st cluster, which we named “Sustainable business”, consists of themes “sustainability”, “business”, and “value”. This cluster is marked with a violet dotted line. This cluster is related to value creation through SBM.

The 2nd cluster, which we named “Value creation and delivery”, consists of “information”, “use”, “people”, “process”, “products”, and “customers” themes. This cluster is marked with a green dotted line. The cluster is related to value creation and delivery with the use of IT in the business processes and in service and product design for the customers.

The 3rd cluster, which we named “Research”, consists of “research”, “future”, “study”, “effects”, and “support” themes. This cluster is marked with a red dotted line and presents current research results and future research directions in the field of business sustainability IT.

Each cluster is thematically related to the other two clusters. The 1st cluster “Sustainable business” is connected to the 2nd cluster “value creation and delivery” through the intersection of themes “value” and “customer”. More precisely, the concept “value” is connected through the concept “companies” to the concept “market”. This connection can be understood as follows: “value”, created by the enterprises (“companies”), is provided to the “customers” in the “market”. The second connection between these two clusters is through the “network” and “market”-“based” “activities”. These connections illustrate that “activities” of companies are “networked” with business partners in the “market” (ecosystem). From the broader perspective, we can also see that IT and other technologies play an important role in SBM. By using IT enterprises, we are able to collect and process a large amount of customer and other data. For instance, customer data can help identify customer needs and wants, and these insights can be used to provide value added to products and services for them. Furthermore, the production data and data from business processes can help to monitor day-to-day business tasks and processes and thus help to identify critical processes that present a threat to the environment. With this kind of knowledge, enterprises can more easily approach developing SBM.

The 2nd cluster “value creation and delivery” is connected to the 3rd cluster “research” through the themes “use”, “patterns”, and “study”. From Figure 7, we may notice that there are not many interrelations between these two clusters. However, it is important to emphasize that the 2nd cluster also includes the use of IS in the process of value creation and delivery. Therefore, these results are not so surprising and as such support previous findings, which indicate that the multidisciplinary research of impact of IS and IT on BM and sustainability is still in its infancy.

Figure 7 shows that there are more connections between the 3rd cluster “research” and 1st cluster “sustainable business”. There are five paths of connections, each indicating research on BM and sustainability. The 1st path is “sustainability”, “research”, “case”, and “environment”. This is aligned with previous research, which confirms that environmental perspective was the first focus in multidisciplinary investigation of sustainability, BM, and IS. The 2nd path is through “social”, “economic”, “practice”, and “potential”, “effects”. This path shows that from a triple bottom line perspective of sustainability, research and actions should go beyond the economic perspective and should also include (previously already mentioned) environmental and social perspectives. The 3rd path illustrates a connection between “sustainability”, “literature”, “focus”, “perspective”, and “concept”. The 4th path shows a connection between “business model” and “strategies”, and the 5th a connection between “business model” and “support”. These three paths (the 3rd, 4th, and 5th) indicate that previous research was focused on the literature review and investigation of cases (which can also be seen in Figure 4 and Table A1). Furthermore, the focus was more on the multidisciplinary field of BM and sustainability (as an important strategy and urgent need of future development of enterprises), with observable lack of IS (and IT) perspective.

In the next paragraphs, we present each cluster in detail.

3.2.1. 1st Cluster: Sustainable Business

The “sustainable business” cluster is the underlying theme of analyzed materials and represents the relationships between sustainability, BM, and value.

The text analysis showed that the strongest relationship in the analysis is between concepts “model” and “business”. Concepts “business” and “model” are closely and directly connected; the strength marked in Leximancer is 5/5, as we anticipated based on the selected literature. Due to the nature of analyzed material dealing with BM, it can be assumed that in most cases this is a single concept—“business model” (BM). We confirmed that “BM” is used as one concept in most cases by examining the literature matches report. Therefore, we use “BM” as one concept throughout this paper.

“Business” and “sustainability” are the themes with the most hits from the investigated literature, closely followed by the theme “value” (Figure 6). Furthermore, the concept map (Figure 7) shows that themes “business” and “sustainability” overlap. Three concepts are shared between both themes, namely, “innovation”, “management”, and “approach”. If we take a closer look, two paths connect themes “business” and “sustainability”.

The first path, which connects the themes “business” and “sustainability”, leads through the concepts “BM”, “innovation”, and “sustainability” and confirms that innovation of BM can lead to sustainability [14,15,34,40,55–57]. This path is also linked to the concept “value” (“value”–“BM”–“innovation”–“sustainability”), which indicates that value is used as a focal point of a BM concept by various authors [55,58–61] and in various BM frameworks [10,59,62,63]. Furthermore, it suggests that BM innovation could be the key initiator of business sustainability [2,9,55]. This indicates that when innovating BM, not only economic value but also social and environmental benefits should be taken into consideration and shared with multiple stakeholders [3,8,61,64,65].

The second path, which links the themes “business” and “sustainability”, is through the concepts “BM”, “management”, and “approach”. The entire path is classified under the theme “business”, but the two concepts “management” and “approach” are shared between the two themes “business” and “sustainability”. This is consistent with the observations of other researchers. For example, Jabłonski [66] stated that there are common approaches when it comes to managing BM for sustainability, including balancing stakeholders’ needs and ensuring economic, environmental, and social benefits. If stakeholders value social and environmental outcomes, the value creation process should reflect this [3,61]. However, Schaltegger et al. [15] noted that business practices that lead to sustainability do not just happen, but need to be designed and deliberately and actively managed. In this cluster, the value represents a link that connects strategic goals of moving towards SBM using value creation and delivery processes that are represented in the 2nd cluster.

3.2.2. 2nd Cluster: Value Creation and Delivery

Cluster “value creation and delivery” represents the use of IS and IT in (business) processes to create value added products and services for customers. More close observation of the 2nd cluster indicates the interplay of “people” using “information” (“systems” and “technologies”) in various “processes” to generate and provide value added “products” (and “services”) with a particular focus on “customers” via (also online) “environment” (“sharing”, “economy, and “platforms”). In this cluster, we noticed two pairs of concepts that are strongly connected and, in most cases, represent one concept. The first two concepts are “digital” and “technologies” (in a theme “process”), which, based on the strength of connections as well as in-depth investigation of the literature, represent one concept, “digital technologies”. The second pair of concepts is “information” and “systems” (in the theme “information”). Additionally, in this case, based on the in-depth literature review, we understand these two concepts as a single concept “information systems”.

Although we could not identify a separate theme that would include all technological (IT and IS) aspects (see Figure 7), deeper observation of the whole cluster includes a plethora of concepts related to IT and IS, for example: “digital”, “technologies”, “platforms”, “online”, “information”, “systems”, and “data”. This could be explained by the fact that

technology nowadays plays a strategic role in business. However, it is no longer considered as a separate part, but is strongly interwoven with every area and process in enterprises.

Further observation of the cluster “value creation and delivery” shows that themes “products” and “information” overlap most with other themes (“use”, “people”, “process”, and “customer”) in this cluster. Theme “products” consists of constructs “products”, “services”, “consumers”, “sharing”, and “platforms”. This indicates that these concepts are very closely related to a product (and service) or value proposition. The literature suggests that proposed value today often consist of bundles of these concepts [34,38,57,67–69]. In the context of IT, products are bundled with smart sensors and/or digital services and are provided via digital platforms. If not, these products are considered to be of limited use by customers [57,67]. The direct connections between theme “products” and themes “customers”, “processes”, and “people” indicate that customers and users are directly involved in the development of products and services through the processes which are supported by different IT [68,70].

Theme “information” consists of concepts “information systems”, “large”, “resources”, “change”, “public”, “local”, and “online”. This suggests that there are various (“large” numbers of) “information systems” that use different “resources” to process “information” from online “public” (e.g., open data, Internet) and local “data” (IS within enterprise). The direct connection between theme “information” and themes “use”, “processes”, and “people” implies that “data” are generated through the “use” of “information systems” (and technologies) by “people” (“users”) to support and streamline different business “processes”. The implication of the use of “information systems” and “technologies” is “digital”-ization of “processes”, which leads to optimization, more precisely to shorter “time” and increased “quality” of business operations (“processes”), reduced “waste” of “resources” and overall “cost” reduction (e.g., [34,35]).

Even though themes “information” and “products” are not directly connected, the connections between them through the themes “people” and “process” imply (a) “information” as a “resource” generated and used by “people” consuming “products” and related “services” on digital “platforms” [34,35] and (b) “information” as a “resource” that helps successfully incorporate “information systems” and “technologies” into enterprise “processes” with an aim to deliver innovative “products” and “services” via online experiences (“platforms”) [35,67].

3.2.3. 3rd Cluster: Research

The cluster “research” represents the state of research until early 2020, future sustainability issues and organizational effects as presented in the analyzed materials, as well as the support that research can offer to enterprises.

In addition to the economic and social dimensions of sustainability, which are included with the theme “sustainability”, the environmental dimension is included with the theme “research”. This shows that the state of research and literature on business sustainability has historically been significantly oriented towards the environmental dimension of sustainability [24,30,71,72].

The themes “research” and “sustainability” are directly connected by the concepts “sustainability”, “research”, and “case”, pointing to the body of knowledge that consists mainly of qualitative research case studies located in different businesses [56,57,67,68]. Theme “research” is also linked to the theme “future” through the concepts “future”, “issues”, “impact”, and “environmental”, which refer to either (a) research regarding resolving environmentally unsustainable practices in order to prevent negative consequences in the future [56] or (b) research determining scope and severity of future issues that may arise from environmentally unsustainable practices [7].

On the other side of the cluster, there is a theme “study”. Theme “study” overlaps with the theme “future” and connects to the theme “use” (included in the cluster value creation and delivery). It appears that theme “study” in this case is related to research

on how the use of IT-enabled sustainable solutions help enterprises achieve sustainable objectives [34,35,38,67].

4. Discussion and Further Research Directions

The aim of our study was to provide a comprehensive review of an emerging and rapidly developing interdisciplinary field and to integrate current knowledge on the role of IT in SBM. To this end, we conducted a systematic literature review of 61 papers related to the role of IT in SBM using the content analysis tool Leximancer. Based on the analysis, we identified 14 themes interrelated through various concepts (key words). Observations of the visual results, provided by Leximancer (Figure 7) helped us to gain deeper insights into the current body of knowledge in this interdisciplinary field, provide an interpretation according to our understanding (human perspective), and suggest avenues for future research.

In the remainder of this chapter, we discuss the scope and outlets of current publications and results. Furthermore, we provide avenues for future research.

4.1. Discussion of Scope and Outlets of Current Publications

The results of our literature review on IT, BM, and sustainability show that the number of contributions has been increasing in recent years. Even though the number of papers published in 2019 was lower than that of 2018, we expect the trend towards more quality and quantity of research in this interdisciplinary field to continue. At least, and above all, this can be said for the European Union (EU), where the European Commission (EC) is pushing the agenda for research on digitalization and sustainability. EC Agenda states that competitiveness in the coming years will depend on the sustainability and the ability to exploit IT [42]. However, this research should not be limited to the EU, as digitalization and sustainability are global matters that should concern enterprises and policy makers worldwide [73].

Figure 5 (number of corresponding authors per country) shows that the majority of authors of published papers are based in the EU, where policy makers and enterprises in general have a strong interest in sustainability issues. It is worrying that this could be a result of a different corporate governance structure. Most EU enterprises are governed by a two-tier board system of corporate governance [74]. A dual structure of management and supervisory board that have different roles creates opportunities for different types of values (e.g., economic, environmental, and social), while a unitary board system consisting of a single board of directors, as is common in the USA, tends to outweigh social and environmental concerns in favor of economic gains [74,75]. This is consistent with Stubbs and Cocklin [3] who argue that absentee shareholders (shareholders who are not involved in a community in which the enterprise operates) tend to focus on economic rather than social and environmental benefits.

The findings in Figure 3 (number of publications per journal and year) are supported by Parida et al. [17], who note the debate on sustainability has moved from journals on environmental management to journals on strategic management and entrepreneurship, where sustainability, innovation, and competitiveness are now the central issues. It is also notable that many journals from the IS discipline in recent years have organized Special Issues on the emerging theme of sustainability [76–78], where the central point of investigation was related to the use of IT, digitalization, and digital transformation for innovation or development of SBM.

4.2. Discussion of Findings

The IS discipline has more than five decades of evolution (Davis, 2006). A historical view of development of the field shows that the early phase of investigation was related to electronic data interchange between organizations (up to the 1980). This era was followed by electronic business, which was enabled by a wider use of the Internet (1990 to 2005). From 2005 on (up to 2011), research was focused on electronic interactions between all stake-

holders in society. The last decade (from 2011 on) was dedicated to digital transformation, which is the result of new emerging technologies (e.g., social, mobile, analytics, artificial intelligence, cloud and high performance computing, Internet of Things, and robotics) and their impact on enterprises, organizations, individuals, and society [54]. In the business context, digital transformation refers to a process of redesign or innovation of BM as a result of the adoption and use of IT, which create digital capabilities [54,79]. However, in the last decade, there has also been an emerging need for another transformation—so-called sustainability transformation [35]. IT and digital transformation bring enormous opportunities to respond to this emerging need pursued not only by evidence from the environment, and expectations from citizens and customers, but also as a formal demand from governments [80,81].

It is evident that IT have become a main component of innovation and new, changed ways of value generation, delivery, and resource distribution [40,82,83]. Our findings suggest that processes coupled with digital capabilities and IT can lead to savings not only in terms of costs but also in general resource use and distribution. In addition, innovative, digital BM show that data (e.g., time and patterns of use, generated waste) automatically provided by users via IT can help identify excessive resource use and waste, e.g., excessive fuel use and need for maintenance in car sharing [34,35]. Furthermore, by changing BM in a way that charges for access to products instead of ownership [35] (e.g., car sharing), ownership is left in the hands of enterprises. Ownership provides an incentive for enterprises to create high quality products, cause less waste through the use of products, and positively influence economic and environmental sustainability [8]. Taking ownership of products out of business transactions provides lower entry costs for users; social sustainability is improved by enabling people to pay only for the actual use of products [57], and larger customer pools for products with higher added value (e.g., higher quality and sustainably sourced) are created.

According to Yang, Evans, Vladimirova, and Rana [59], identifying uncaptured value through data on waste and resource use can lead to new value opportunities and improved sustainability. Value uncaptured can be transformed into value captured faster than new value can be created (by creating products out of wasted resources or by charging for previously free services). For example, through online business processes and the online presence of products and users (e.g., websites, digital platforms, and social media), data are collected [35]. These data enable continuous business model innovation (BMI), iterative development of solutions, and rapid validation of business viability, saving time and resources in the process [59,64]. In addition, our results suggest that environmental effects, such as the reduction in waste and resource use of enterprises, can be realized through customer needs if appropriate BM is used [34]. This implies that innovative, potential SBM are enabled by the use of IT.

Existing studies are focused either on the business perspective or the customer perspective. The business perspective attempts to capture individual experiences of enterprises and provide a deeper understanding of how enterprises use IT and tackle sustainability issues. The customer perspective attempts to investigate customer use of resources or their motivation to use IT with the aim of achieving sustainable goals. Research topics include the role of customers and motivating customers by rewarding sustainable behavior. The latter is based on innovative BMs that are designed to achieve environmental and social goals, including lower resource consumption, less negative effects for the environment, inclusive models that reduce the entry price of resources by allowing customers to pay for use rather than ownership, or sharing savings with the enterprise. The customer perspective, including how to engage customers in sustainable business activities, is related to this research and is an important issue in itself [35,67].

There is no indication that a particular type of IT could be most beneficial for SBM, which suggests that SBM are evolving in line with IT advancements [17,41]. Enterprises invested in continuous BMI strive to embed state-of-the-art IT that are compatible with their existing processes, technologies, strategies, and objectives [41]. It is evident that in

the future, new technologies will continue to emerge, and digital transformation will be an ongoing process in every enterprise and society. Digital transformation should be used as an enabler for the transformation of enterprises towards designing more responsible BMs, which in addition to economic also consider environmental and social dimensions of BM.

4.3. Future Research Directions

In the last decade, the importance of the sustainability perspective has already been raised by researchers in different disciplines. For example, Seidel et al. [84] urged IS researchers to integrate sustainability as an essential part of their research. Although it is evident that continuous digitalization and digital transformation of BM provide enormous opportunities for development of SBM [17,41], the interdisciplinary field of research in this area is still at its early stage of development. Researchers are still searching for a deeper understanding of how enterprises achieve sustainability objectives with the use of IT [17,66,85].

Our analyses show that in most cases, the focus of previous research was towards the effects of IT on organizational performance and work (business processes and operations) [34,57]. Another relatively well-represented focus is towards environmental sustainability [26,30,86,87]. Furthermore, our results suggest that future research should continue to focus on sustainable consumption of resources (re-use and circular economy), especially natural (e.g., water and energy), and on environmental perspectives of sustainability. Moreover, current research and practice in SBM have to date paid little attention to customer (human–social perspective) needs and their integration with IT to generate sustainable business value [64].

Results of our study support suggestions of previous research, emphasizing the need for deeper exploration of the emerging field of SBM [4,5,8], with particular focus on the impacts of IT on achieving sustainability goals [23,34,86]. In the future, interdisciplinary research on sustainability and IS will be needed for further investigation of this dynamic and fast evolving field [17,22,66,71,84,85].

Our results suggest that existing research is mainly of a qualitative nature [1,4,34,57], namely, case studies conducted in different enterprises. As the field of research is still in its early phase and of a multidisciplinary nature (and as such of higher complexity), case studies will remain an important research method. For the purpose of generalization of research results, a multimethod approach, the pursuit of novel data sources, methods, and tools to experiment with ways to reach sustainability objectives will be needed [1,4,34]. In addition, as current research from an enterprise perspective is based mostly in the EU, more research is needed to identify if there is a correlation between sustainability efforts and management system (one-tier vs. two-tier) on an organizational and national level.

With the rapid development of digital transformation and the urgent need for sustainability transformation, this interdisciplinary field will be extremely dynamic in the future from the perspective of its evolution and research opportunities.

5. Conclusions and Limitations

The momentum of digital transformation and the rapid pace of digitization, coupled with the need for more sustainability in business, provide substantial opportunities for creating new value propositions as well as new BM [41]. Many emerging SBM are fully digitalized and heavily driven by widespread use of IT [34,67].

It is evident that unsustainable BM, driven only by economic value, has already caused observable damage to our environment as well as in society. However, in recent years, policy makers of many countries have put sustainability at the top of their agendas for future development [88,89]. For example, the European Commission (EC) [42] has already emphasized that future competitiveness will depend on the ability to exploit the opportunities of IT to move towards sustainability and resource-efficiency. Another important achievement from the policy and law perspective is related to obligatory reporting of sustainability practices for large enterprises. Namely, from 2018, large public-listed enterprises

in the EU have to provide public reports about the environmental and social effects of their business practices on their employees and society [80,81]. Therefore, we may say that the overall performance of enterprises is nowadays already measured from the sustainability perspective, which includes economic but also social and environmental perspectives at least in large enterprises. However, to ensure that sustainability will become an integral part of daily business and of our lives, many regulations and (behavioral) changes will have to be implemented in the future.

Nowadays, IT are an integral part of enterprise strategy. Its role is represented in IT or digital strategy, which must be aligned with business strategy [90]. As such, IT supports operations of practically all elements of BM. The momentum of digital transformation and the rapid pace of digitalization, coupled with the need for more sustainability, provide substantial opportunities for creating new value propositions as well as new BM [41].

It is evident that the implementation of IT only to achieve higher efficiency and competitive advantage is insufficient. Much more responsible, and less exploitative, economic and BM practices are needed for the overall benefit of human beings, societies, and our natural resources and environment [54]. In the future, IT will have to be used to design solutions and BMs aligned with sustainability goals. For example, solutions will have to be made to address different societal challenges, where IT can provide new value-added services. In the context of demographic challenges, digital (care) services for the elderly, e-inclusion of the elderly, digital health solutions for citizens, etc. will have to be further designed. In the context of consumption, better planning and monitoring of food production according to the real needs, fair distribution, less waste, and other solutions can be developed. In recent years, we have observed heavy pressures on various tourism destinations and points of interest around the world. As this type of, to date, in many cases, only economically driven, BM has already caused damage in the natural environment, it is obvious that new solutions are needed to regulate (over) tourism in the future and protect natural and cultural heritage. New solutions can be related to virtual reality, mobile apps that will alert and redirect tourist to less populated points of interest, co-creation of new itineraries by providers and tourists, etc.

Since March 2019, the world has also faced the COVID-19 pandemic. While scientists provided the vaccine in only 9 months, IT played another important role in enterprises. In some industries, those enterprises, which were able to provide their employees remote access to the IS from their homes, were able to continue their business operations. On the other hand, many enterprises, which were in an earlier stage of digitalization, had to close their businesses. The momentum of the COVID-19 pandemic crises has pointed to the importance of IT like never before. In this time, many enterprises increased investments in IT and moved to digital business faster than ever before. This movement should be, from now on, permanent and continuous.

We may conclude that the results of our study provide insights into past research in the multidisciplinary field of IS and management, with particular focus on the impact of IT on SBM. Our results revealed that this multidisciplinary field of research is relatively young, however fast evolving in the last decade. New technologies will create new opportunities for digital transformation and design of digital solutions, services, models, and societies. However, these solutions will have to be created according to sustainability goals. To achieve these goals, the collaboration of all stakeholders in society will be needed (governments, enterprises, researchers, IT providers, etc.). In addition, researchers from different disciplines will have to cooperate and take an active role in these endeavors.

Although the approach with which we combined the strengths of IT and the human mind to analyze large amounts of data has its advantages, it also has shortcomings. First, the content analysis tool did not provide a definitive answer through analysis, but only a starting point. It is up to the researcher to provide a meaningful discussion supported by the literature, move from description and patterns to interpretation, determine the underlying meanings of concepts and relationships identified, and observe the gaps in the process—something that software cannot do. In other words, it is possible the results provided by the

content analysis tool influenced our final judgements. In addition, Leximancer identifies single words as concepts, which means that multiword concepts cannot be identified, but are broken down into single word concepts and even placed under different themes (e.g., BM, IS, IT, and SBM). Although there are instances where it is possible to conclude that such a multiword concept is involved (e.g., overlapping concepts business and model and information systems), we found that this is a problem for content analysis in the field of information systems, as two main concepts, “information systems” and “information technology”, cannot be identified. In addition, the authors frequently used the acronyms “IS” and “IT” in the articles analyzed, which cannot be treated separately from the English words “is” and “it” in Leximancer. Thus, in our content analysis, IS and IT are reflected in the results through concepts such as “information”, “systems”, and “technologies” as well as other related concepts, such as “digital”, “data”, and “platforms”. Since our aim was to provide insight into the extent and ways IT and IS are involved in SBM, there may be variations in the results provided by Leximancer. However, this also represents an opportunity for further investigation in the field.

Author Contributions: Conceptualization, D.V. and A.P.; methodology, D.V.; software, D.V. and M.M.; validation, D.V., M.M. and A.P.; formal analysis, D.V.; investigation, D.V.; resources, D.V.; data curation, D.V. and M.M.; writing—original draft preparation, D.V.; writing—review and editing, D.V., M.M. and A.P.; visualization, D.V. and M.M.; supervision, A.P.; funding acquisition, D.V. and A.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research was supported by the Slovenian Research Agency: Program No. P5-0018—Decision Support Systems in Digital Business and postgraduate research funding for Young Researchers No. 1000-20-0552.

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

Appendix A

All the selected papers that were identified and analyzed in the review with Leximancer are listed in Table A1. Table A1 includes 61 papers published from 2008 to 2020. Papers are listed in descending order by year of publishing.

Table A1 includes 6 columns: authors; year—year when a paper was published; title—full title of paper (book chapter titles are followed by book title); journal—title of journal in which paper was published (book chapters and conference papers are marked as such); type of paper (as stated by authors)—type of paper or methodological approach as authors described it in each paper; and assigned methodological category. We assigned one of four methodological categories to each paper for clarity and in order to be able to visually present the methodological approach. We categorized all papers except book chapters (marked N/A) into four methodological categories.

The assigned methodological categories are: theoretical (literature reviews, introduction to Special Issue, editorial, overview, framework development, and scientometric analysis), qualitative (case study, experimental design, and framework development based on or tested with case studies), quantitative (survey), mixed methods (combination of qualitative and quantitative—usually case study and survey, also when preceded by a literature review).

Table A1. Selected papers that were analyzed in the review.

Authors	Year	Title	Journal	Type of Paper (as Stated by Authors)	Assigned Methodological Category
Bocken, Nancy, Lisa Smeke Morales, and Matthias Lehner	2020	“Sufficiency Business Strategies in the Food Industry—The Case of Oatly”	<i>Sustainability</i>	Literature and practice review, case study	Qualitative
ElMassah, Suzanna, and Mahmoud Mohieldin	2020	“Digital Transformation and Localizing the Sustainable Development Goals (SDGs)”	<i>Ecological Economics</i>	Case study	Qualitative
Buda, Gabriella, Barbara Pethes, and Jozsef Lehota	2020	“Dominant Consumer Attitudes in the Sharing Economy—A Representative Study in Hungary”	<i>Resources</i>	Survey	Quantitative
Gil-Gomez, Hermenegildo, Vicente Guerola-Navarro, Raul Oltra-Badenes, and José Antonio Lozano-Quilis	2020	“Customer Relationship Management: Digital Transformation and Sustainable Business Model Innovation”	<i>Economic Research-Ekonomiska Istraživanja</i>	Literature review	Theoretical
Bocken, Nancy	2019	“Sustainable Consumption through New Business Models: The Role of Sustainable Entrepreneurship” In <i>Sustainable Entrepreneurship: Discovering, Creating and Seizing Opportunities for Blended Value Generation</i> , edited by A. Lindgreen, F. Maon, and C. Vallaster.	Book chapter	Book chapter—exploration through illustrative cases	N/A
Delgado-de Miguel, Juan-Francisco, Tamar Buil-López Menchero, Miguel-Ángel Esteban-Navarro, and Miguel-Ángel García-Madurga	2019	“Proximity Trade and Urban Sustainability: Small Retailers’ Expectations Towards Local Online Marketplaces”	<i>Sustainability</i>	Semi-structured in-depth interviews	Qualitative
Ievoli, Corrado, Angelo Belliggiano, Danilo Marandola, Pierluigi Milone, and Pierluigi Ventura	2019	“Information and Communication Infrastructures and New Business Models in Rural Areas: The Case of Molise Region in Italy”	<i>European Countryside</i>	Case study	Qualitative
Ockwell, David, Joanes Atela, Kennedy Mbeva, Victoria Chengo, Rob Byrne, Rachael Durrant, Victoria Kasprócz, and Adrian Ely	2019	“Can Pay-As-You-Go, Digitally Enabled Business Models Support Sustainability Transformations in Developing Countries? Outstanding Questions and a Theoretical Basis for Future Research”	<i>Sustainability</i>	Literature review, workshops, interviews	Qualitative
Olah, Judit, Nicodemus Kitukutha, Hossam Haddad, Miklos Pakurar, Domician Mate, and Jozsef Popp	2019	“Achieving Sustainable E-Commerce in Environmental, Social and Economic Dimensions by Taking Possible Trade-Offs”	<i>Sustainability</i>	Literature review and case study	Qualitative
Vorraber, Wolfgang, and Matthias Müller	2019	“A Networked Analysis and Engineering Framework for New Business Models”	<i>Sustainability</i>	Framework development, case study	Qualitative

Table A1. Cont.

Authors	Year	Title	Journal	Type of Paper (as Stated by Authors)	Assigned Methodological Category
Dumitriu, Dan, Gheorghe Militaru, Dana Corina Deselnicu, Andrei Niculescu, and Mirona Ana-Maria Popescu	2019	"A Perspective Over Modern SMEs: Managing Brand Equity, Growth and Sustainability Through Digital Marketing Tools and Techniques"	<i>Sustainability</i>	Survey	Quantitative
Denuwara, Navodya, Juha Maijala, and Marko Hakovirta	2019	"Sustainability Benefits of RFID Technology in the Apparel Industry"	<i>Sustainability</i>	Literature review	Theoretical
Freudenreich, Birte, Florian Lüdeke-Freund, and Stefan Schaltegger	2019	"A Stakeholder Theory Perspective on Business Models: Value Creation for Sustainability"	<i>Journal of Business Ethics</i>	Framework development	Theoretical
Gössling, Stefan, and Michael Hall	2019	"Sharing versus Collaborative Economy: How to Align ICT Developments and the SDGs in Tourism?"	<i>Journal of Sustainable Tourism</i>	Discourse analysis and literature review	Theoretical
Jose, Charbel, Chiappetta Jabbour, Ana Beatriz Lopes De Sousa Jabbour, Joseph Sarkis, and Godinho Filho	2019	"Unlocking the Circular Economy through New Business Models Based on Large-Scale Data: An Integrative Framework and Research Agenda"	<i>Technological Forecasting and Social Change</i>	Framework development	Theoretical
Parida, Vinit, and Joakim Wincent	2019	"Why and How to Compete through Sustainability: A Review and Outline of Trends Influencing Firm and Network-Level Transformation"	<i>International Entrepreneurship and Management Journal</i>	Literature review, introduction to Special Issue	Theoretical
Parida, Vinit, David Sjödin, and Wiebke Reim	2019	"Reviewing Literature on Digitalization, Business Model Innovation, and Sustainable Industry: Past Achievements and Future Promises"	<i>Sustainability</i>	Literature review, introduction to Special Issue, framework development	Theoretical
Moro Visconti, Roberto, and Donato Morea	2019	"Big Data for the Sustainability of Healthcare Project Financing"	<i>Sustainability</i>	Simulations based on empirical cases	Qualitative
Bouwman, Harry, Shahrokh Nikou, Francisco J Molina-Castillo, and Mark De Reuver	2018	"The Impact of Digitalization on Business Models"	<i>Digital Policy, Regulation and Governance</i>	Survey and case study	Mixed methods
Jabłonski, Marek	2018	"Value Migration to the Sustainable Business Models of Digital Economy Companies on the Capital Market"	<i>Sustainability</i>	Mixed methods (survey and analysis of available documents)	Mixed methods
Yip, Angus W. H., and Nancy Bocken	2018	"Sustainable Business Model Archetypes for the Banking Industry"	<i>Journal of Cleaner Production</i>	Literature and practice review, semi-structured interviews, survey	Mixed methods

Table A1. Cont.

Authors	Year	Title	Journal	Type of Paper (as Stated by Authors)	Assigned Methodological Category
Lüdeke-Freund, Florian, René Bohnsack, Henning Breuer, and Lorenzo Massa	2018	“Research on Sustainable Business Model Patterns: Status Quo, Methodological Issues, and a Research Agenda” In Sustainable Business Models, edited by A. Aagaard.	Book chapter	Book chapter	N/A
Bertola, Paola, and Jose Teunissen	2018	“Fashion 4.0. Innovating Fashion Industry through Digital Transformation”	<i>Research Journal of Textile and Apparel</i>	Positioning essay enriched by case studies	Qualitative
Bressanelli, Gianmarco, Federico Adrodegari, Marco Perona, and Nicola Saccani	2018	“Exploring How Usage-Focused Business Models Enable Circular Economy through Digital Technologies”	<i>Sustainability</i>	Framework development based on literature and case study	Qualitative
Hildebrandt, Björn, Andre Hanelt, and Sebastian Firk	2018	“Sharing Yet Caring: Mitigating Moral Hazard in Access-Based Consumption through IS-Enabled Value Co-Capturing with Consumers”	<i>Business and Information Systems Engineering</i>	Quasi-experimental research design based on a case study	Qualitative
Piscicelli, Laura, Geke D S Ludden, and Tim Cooper	2018	“What Makes a Sustainable Business Model Successful? An Empirical Comparison of Two Peer-to-Peer Goods-Sharing Platforms”	<i>Journal of Cleaner Production</i>	Case study	Qualitative
Pohludka, Michal, Hana Stverkova, and Beata Ślusarczyk	2018	“Implementation and Unification of the ERP System in a Global Company as a Strategic Decision for Sustainable Entrepreneurship”	<i>Sustainability</i>	Case study	Qualitative
Rajala, Risto, Esko Hakanen, Juri Matilla, Timo Seppälä, and Mika Westerlund	2018	“How Do Intelligent Goods Shape Closed-Loop Systems?”	<i>California Management Review</i>	Case study	Qualitative
Bieser, Jan C. T., and Lorenz M. Hilty	2018	“Assessing Indirect Environmental Effects of Information and Communication Technology (ICT): A Systematic Literature Review”	<i>Sustainability</i>	Literature review	Theoretical
Brenner, Barbara	2018	“Transformative Sustainable Business Models in the Light of the Digital Imperative—A Global Business Economics Perspective”	<i>Sustainability</i>	Framework development based on literature and practice review	Theoretical
Camacho-Otero, Juana, Casper Boks, and Ida Nilstad Pettersen	2018	‘Consumption in the Circular Economy: A Literature Review’	<i>Sustainability</i>	Literature review	Theoretical

Table A1. Cont.

Authors	Year	Title	Journal	Type of Paper (as Stated by Authors)	Assigned Methodological Category
Dentchev, Nikolay, Romana Rauter, Lára Jóhannsdóttir, Yuliya Snihur, Michele Rosano, Rupert Baumgartner, Timo Nyberg, Xingfu Tang, Bart van Hoof, and Jan Jonker	2018	“Embracing the Variety of Sustainable Business Models: A Prolific Field of Research and a Future Research Agenda”	<i>Journal of Cleaner Production</i>	Overview—an introduction to the Special Issue	Theoretical
Jin, Yuran, and Shoufeng Ji	2018	“Mapping Hotspots and Emerging Trends of Business Model Innovation under Networking in Internet of Things”	<i>Journal on Wireless Communications and Networking</i>	Scientometric analysis	Theoretical
Shetty, Vivek, John Yamamoto, and Kenneth Yale	2018	“Re-Architecting Oral Healthcare for the 21st Century”	<i>Journal of Dentistry</i>	Overview (methodology not stated in the paper)	Theoretical
Geissdoerfer, Martin, Doroteya Vladimirova, and Steve Evans	2018	“Sustainable Business Model Innovation: A Review”	<i>Journal of Cleaner Production</i>	Literature review	Theoretical
Mountean, Mihaela	2018	“Business Intelligence Issues for Sustainability Projects”.	<i>Sustainability</i>	Multi-dimensional data modeling	Theoretical
Baldassarre, B., G. Calabretta, Nancy Bocken, and T. Jaskiewicz	2017	“Bridging Sustainable Business Model Innovation and User-Driven Innovation: A Process for Sustainable Value Proposition Design”	<i>Journal of Cleaner Production</i>	Research through design	Qualitative
Hanelt, Andre, Sebastian Busse, and Lutz M. Kolbe	2017	“Driving Business Transformation toward Sustainability: Exploring the Impact of Supporting IS on the Performance Contribution of Eco-Innovations”	<i>Information Systems Journal</i>	Case study	Qualitative
Moreno, Mariale, Christopher Turner, Ashutosh Tiwari, Windo Hutabarat, Fiona Charnley, Debora Widjaja, and Luigi Mondini	2017	“Re-Distributed Manufacturing to Achieve a Circular Economy: A Case Study Utilizing IDEF0 Modeling”	<i>Conference proceedings</i>	Case study	Qualitative
Yang, M, S Evans, D Vladimirova, and P Rana	2017	“Value Uncaptured Perspective for Sustainable Business Model Innovation”	<i>Journal of Cleaner Production</i>	Framework development, case study	Qualitative
Evans, Steve, Doroteya Vladimirova, Maria Holgado, Kirsten Van Fossen, Miyang Yang, Elisabete A. Silva, and Claire Y. Barlow	2017	“Business Model Innovation for Sustainability: Towards a Unified Perspective for Creation of Sustainable Business Models”	<i>Business Strategy and the Environment</i>	Literature review	Theoretical

Table A1. Cont.

Authors	Year	Title	Journal	Type of Paper (as Stated by Authors)	Assigned Methodological Category
Lüdeke-Freund, Florian, and Krzysztof Dembek	2017	“Sustainable Business Model Research and Practice: Emerging Field or Passing Fancy?”	<i>Journal of Cleaner Production</i>	Analysis of emerging research field	Theoretical
Pagoropoulos, Aris, Daniela C. A. Pigosso, and Tim C. McAloone	2017	“The Emergent Role of Digital Technologies in the Circular Economy: A Review”	<i>Conference proceedings</i>	Literature review	Theoretical
Seele, Peter, and Irina Lock	2017	“The Game-Changing Potential of Digitalization for Sustainability: Possibilities, Perils, and Pathways”	<i>Sustain Sci</i>	Editorial, introduction to Special Issue	Theoretical
Bocken, Nancy, and S. W. Short	2016	“Towards a Sufficiency-Driven Business Model: Experiences and Opportunities”	<i>Environmental Innovation and Societal Transitions</i>	Case study	Qualitative
Breidbach, Christoph F., and Paul P. Maglio	2016	“Technology-Enabled Value Co-Creation: An Empirical Analysis of Actors, Resources, and Practices”	<i>Industrial Marketing Management</i>	Case study	Qualitative
Heiskala, Mikko, Jani-Pekka Jokinen, and Markku Tinnilä	2016	“Crowdsensing-Based Transportation Services—An Analysis from Business Model and Sustainability Viewpoints”	<i>Research in Transportation Business and Management</i>	Case study	Qualitative
Davidsson, Paul, Banafsheh Hajinasab, Johan Holmgren, Åse Jevinger, and Jan Persson	2016	“The Fourth Wave of Digitalization and Public Transport: Opportunities and Challenges”	<i>Sustainability</i>	Analysis of literature and explorative studies	Theoretical
Schaltegger, Stefan, Erik G Hansen, and Florian Lüdeke-Freund	2016	“Business Models for Sustainability: Origins, Present Research, and Future Avenues”	<i>Organization and Environment</i>	Editorial, introduction to Special Issue	Theoretical
Upward, Anthony, and Peter H. Jones.	2015	“An Ontology for Strongly Sustainable Business Models: Defining an Enterprise Framework Compatible with Natural and Social Science”	<i>Organization and Environment</i>	Framework development	Theoretical
Bocken, Nancy, S. W. Short, P. Rana, and S. Evans	2014	“A Literature and Practice Review to Develop Sustainable Business Model Archetypes”	<i>Journal of Cleaner Production</i>	Literature and practice review	Theoretical
Bohnsack, René, Jonatan Pinkse, and Ans Kolk	2014	“Business Models for Sustainable Technologies: Exploring Business Model Evolution in the Case of Electric Vehicles”	<i>Research Policy</i>	Content analysis	Theoretical

Table A1. Cont.

Authors	Year	Title	Journal	Type of Paper (as Stated by Authors)	Assigned Methodological Category
Boons, Frank, and Florian Lüdeke-Freund	2013	“Business Models for Sustainable Innovation: State-of-the-Art and Steps towards a Research Agenda”	<i>Journal of Cleaner Production</i>	Literature review	Theoretical
Boons, Frank, Carlos Montalvo, Jaco Quist, and Marcus Wagner	2013	“Sustainable Innovation, Business Models and Economic Performance: An Overview”	<i>Journal of Cleaner Production</i>	Overview—an introduction to the Special Issue	Theoretical
Schaltegger, Stefan, Florian Lüdeke-Freund, and Erik G Hansen	2012	“Business Cases for Sustainability The Role of Business Model Innovation for Corporate Sustainability”	<i>International Journal of Innovation and Sustainable Development</i>	Framework development	Theoretical
Dao, Viet, Ian Langella, and Jerry Carbo	2011	“From Green to Sustainability: Information Technology and an Integrated Sustainability Framework”	<i>Journal of Strategic Information Systems</i>	Framework development	Theoretical
Elliot, Steve	2011	“Transdisciplinary Perspectives on Environmental Sustainability: A Resource Base and Framework for IT-Enabled Business Transformation”	<i>MIS Quarterly</i>	Literature review and framework development	Theoretical
Doz, Yves L, and Mikko Kosonen	2010	“Embedding Strategic Agility A Leadership Agenda for Accelerating Business Model Renewal”	<i>Long Range Planning</i>	Proposition of actions for renewal and transformation of business models based on practice review	Qualitative
Lüdeke-Freund, Florian	2010	“Towards a Conceptual Framework of ‘Business Models for Sustainability’”	<i>Conference proceedings</i>	Framework development	Theoretical
Melville, Nigel P.	2010	“Information Systems Innovation for Environmental Sustainability”	<i>MIS Quarterly</i>	Development of research agenda and framework	Theoretical
Stubbs, Wendy, and Chris Cocklin	2008	“Conceptualizing a ‘Sustainability Business Model’”	<i>Organization and Environment</i>	Case study, framework development	Qualitative

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