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Towards a Taxonomy for Design Options of Social Networking Technologies in Sustainable Business Models

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Abstract: Social networking technologies such as social media, crowd concepts, or gamification represent key resources for the integration of customers, value network partners, and the community into sustainable business models. However, there is a lack of understanding of how sustainable enterprises apply such technologies. To close this gap, we propose a taxonomy of design options for social networking technologies in sustainable business models. Our taxonomy comprises eight dimensions that deal with relevant questions of the design of social networking technologies. When creating our taxonomy, we built on existing literature and use cases and involved experienced practitioners in the field of sustainable business models for the validation of our taxonomy. In this way, our study contributes to knowledge on the use of social networking technologies in sustainable business models and how such technologies influence the boundaries of sustainable business models. Likewise, we provide practical insights into the use of social networking technologies in sustainable business models.

Keywords: sustainable business models; social media; crowd concepts; gamification; taxonomy



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1. Introduction

Sustainable business models incorporate concepts, principles, and objectives that aim to protect or create natural, social, and economic capital into the proposition, creation, delivery, and capture of value [1]. The stakeholders of a sustainable business model are involved in two different ways. First, as a group that is exposed to the impact of the business model and, second, as a group that contributes to the proposition, creation, delivery, and capture of value. That is why the ecosystems of sustainable business models and the social networks involved have attracted a lot of attention within the last years [2–6]. A key success factor for sustainable business models will be to form, coordinate, and use the ecosystem and its social networks as a source of knowledge, finance, and other resources. Thus, social media, but also crowd concepts [7] and gamification [8]—to which we refer collectively in this paper as “social networking technologies”—will be a very important tool in sustainable business models as they connect people and allow decentralized social interaction, cooperation, and building communities [9–11]. Social network technologies have already proved to be effective in sustainable business models in different fields of application, e.g., social media to communicate about sustainability [12] and for value co-creation [11,13]; crowdsourcing to fund sustainable business and create a first customer base [14]; and gamification to inform about sustainable topics, stimulate sustainable consumption, and train sustainable behavior [15]. However, despite the importance of such technologies, there is still a gap in the existing literature concerning how social networking technologies are applied in sustainable business models [2,11]. A deeper understanding of this topic will make it possible to comprehend how sustainable business models can interact with the social networks in their ecosystems, e.g., in terms of collaborative value creation and to

illuminate the boundaries of sustainable business models. But it will also help managers in enterprises with sustainable business models who do not yet use social networking technologies or who want to advance their use of social networking technologies. The same applies to managers in enterprises with non-sustainable business models who want to innovate their business models towards sustainability.

The objective of this paper is to provide a taxonomy that allows social networking technologies in sustainable business models to be examined in terms of design options for administration, organization, and value generation—and to do so with reference to enterprises, platforms, customers, and society. Thus, the research question of our study is the following: What are the design options for social networking technologies in sustainable business models with respect to administration, organization, and value generation? To answer the research question, we conducted extensive literature research, examined use cases, and ultimately developed a taxonomy. By doing so, we respond to different calls: first, to Neumeyer and Santos [2] as well as to Gregori and Holzmann [11], to examine the impact of digitalization and online sources on sustainable business models, their ecosystems, and their social networks. Second, we reply to Bocken et al. [16] as well as to Foss and Saebi [17], to explain how managers can innovate their business models toward greater sustainability.

The paper is structured as follows. In Section 2 we briefly describe the relevant theoretical foundations of our research. In Section 3 we present the research method used for the development of our taxonomy. The results of the development process and the taxonomy itself with its dimensions and characteristics are presented in Section 4. In Section 5 we discuss the results along with their implications. In Section 6 we summarize the contributions of our study, and address limitations.

2. Theoretical Background

A business model “is the translation of strategic issues, such as strategic positioning and strategic goals into a conceptual model that explicitly states how the business functions” [18]. Thus, a business model has to provide an explanation of the value proposition, i.e., the bundle of products and services of an enterprise that provide value to the customers, on how an enterprise creates and delivers such value to customers as well as on how an enterprise gains economic value [19]. Likewise, from an activity system perspective, a business model should also provide answers to what kind of activities should be performed by whom, i.e., the focal enterprise, partners, suppliers, or customers, and in which way [20].

The interest of academics and practitioners in sustainable business models has grown rapidly in the last years [1,4–6]. In its early development stage, the concept of sustainable business models aimed at promoting the issue of sustainability and improving the economy towards more sustainability [21]. Nowadays, sustainable business models are increasingly considered to provide competitive advantages [22,23] and, as a consequence, organizations seek to innovate their business models towards sustainability [4,24]. This development has led to the emergence of different types of sustainable business models [16,25]. For example, Lüdeke-Freund et al. [25] provide a classification of sustainable business models that builds on the well-established ecological, social, and economic dimensions of sustainability [1]. Business models are classified by their orientation in relation to each of the three dimensions using a three-level scale, resulting in ten different categories, i.e., strong ecological, strong social, strong economic, mainly ecological, mainly social, mainly economic, social-ecological, social-economic, ecologic-economic, and integrative. All these types of business models are long-term oriented, demand a responsible use of natural resources, address social issues within their value-creating ecosystems, and respect the needs of future generations, as addressed in the United Nations Sustainable Development Goals [1,4]. According to Schaltegger et al. [1], a sustainable business model “helps describing, analyzing, managing, and communicating (i) a company’s sustainable value proposition to its customers and all other stakeholders, (ii) how it creates and delivers this value, (iii) and how it captures economic value while maintaining or regenerating natural,

social, and economic capital beyond its organizational boundaries.” Thus, value creation is not restricted to economic value. Rather, it involves the creation of ecological and social value, sharing this value and a spillover of the value into society [21,26–28].

Recent research on sustainable business models advocates a more in-depth investigation of the social interactions with their environments of sustainable business models [2,3,5,29,30]. Comin et al. [5] point out that the collaboration with the stakeholders of sustainable business models should deliver positive results for the sustainable business models in the sense of co-development, co-innovation, and co-creation. For example, Rossignoli and Lionzo [30] as well as Oskam et al. [29], who introduce the term “value-shaping,” provide practical examples for the involvement of different external network partners, such as suppliers and customers in the process of business model development. Neumeyer and Santos [2] focus on networks on the individual level of sustainable business models and analyze the social interactions of different actors in sustainable business models. Their work shows that sustainable entrepreneurs are often part of densely connected social networks and that the embeddedness in social networks is highly important for the advancement of sustainable business models. The aforementioned findings on the environment of sustainable business models lead to the question: What are the boundaries of a sustainable business model [3]? Who is affected by a sustainable business model—and, who affects it?

Technologies that enable, enlarge, and support social networks are therefore very valuable for sustainable business models [11]. We use the term “social networking technologies” in this paper as a generic term for such technologies that are based on the internet and enable, enlarge, and support (online) social networks. In our sense, this definition includes all kinds of “classic” social media such as social networking sites, blog platforms, microblogging tools, wikis, and so forth [10], but also gamification [8] and crowd concepts [31]. Kaplan and Haenlein [9] define social media as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content.” Social media also enable collaborating and networking within and beyond the boundaries of an organization [32]. In doing so, social media are especially important for business model innovation and thus, have an impact on the performance of an organization [33]. In the context of sustainable business models, social media are frequently used as communication tools to report, explain, and discuss sustainable value creation [12]. Gamification refers to “the use of game design elements in non-gaming contexts” [8]. It leads to an increase in user satisfaction, higher optimism, support of learning processes, facilitation of social interaction, provision of meaning, and behavioral change [34]. Gamified activities such as providing objectives, rewards, and monitoring activities are in many cases incorporated into social network services and move users to continue using the service as well as to recommend the service to others [13,35]. Likewise, gamification helps to link different actors and stakeholders to promote responsible and ethical behavior [15]. The term crowdsourcing describes a participative online activity, in which individuals fulfill different kinds of tasks for organizations or other individuals by bringing in their work, money, knowledge, and experience in exchange for a need being satisfied, such as economic, social recognition, self-esteem, or individual skill development [36]. By this means, crowdsourcers can reduce costs, access specialized skills, and raise the brand visibility [37]. In the same way as gamification, crowd concepts like crowdsourcing, crowdsharing, or crowdfunding are also frequently combined with social network services in order to build social networks that share information [38] and physical resources [39] or mobilize capital [40].

However, despite the high importance of social networking technologies many questions are still unanswered: Are there differences compared to the use of social networking technologies in non-sustainable business models? For example, it is unclear for which purposes social networking technologies are applied in sustainable business models. Communication [12], the creation of engagement [13], and the acquisition of resources [39] are well described. Recent research also indicates that social networking technologies enable

cooperation, build communities, and thus contribute to sustainable business models [11]. Nevertheless, there is still only little knowledge concerning who is involved in social networking technologies in sustainable business models and with respect to how the involved persons contribute to the sustainable business models.

3. Research Process

3.1. Methodological Approach

According to Haas et al. [41], “taxonomies reflect empirical tools for building complex filing systems describing a phenomenon in its defining traits.” In doing so, they are more comprehensive than patterns [42,43], which represent a problem with a corresponding solution or archetypes that comprise specific arrangements of different mechanisms and solutions [16]. Taxonomies are furthermore classification schemes of dimensions and characteristics that explain empirically or conceptually derived grouping systems [44]. Therefore, they are different compared to typologies, which are solely conceptually developed [44]. Taxonomies enable researchers to understand, analyze, and structure a specific field [45]. For these reasons, the development of a taxonomy of design options for social networking technologies in sustainable business models is sensible, as it is a contemporary and multi-variant phenomenon for which little theoretical knowledge is available and that should therefore be studied in its real-life context. We decided to use the development method proposed by Nickerson et al. [44]. Figure 1 gives an overview of our taxonomy development process.

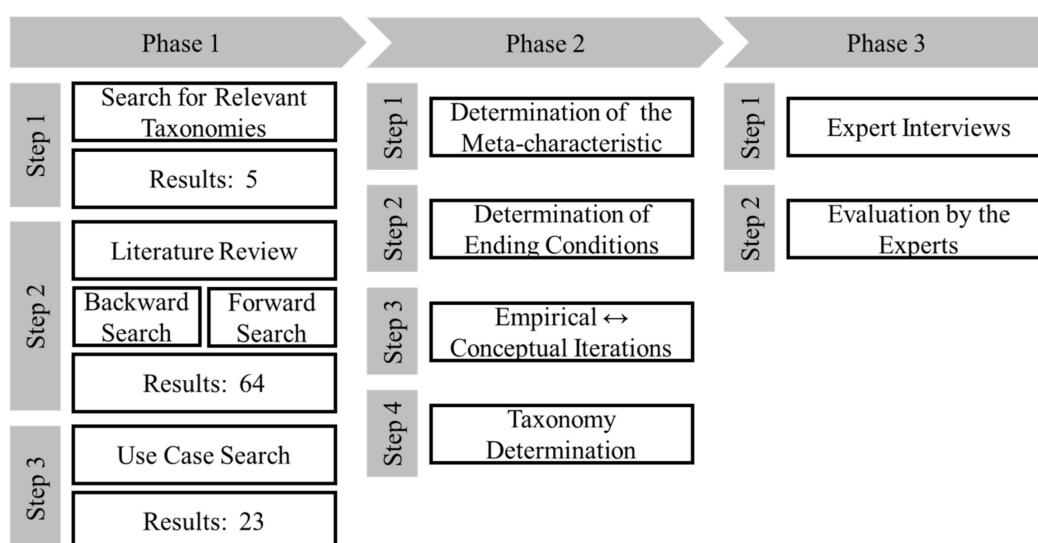


Figure 1. Taxonomy development process based on Nickerson et al. [44].

In the first phase, we conducted an extensive two-part literature review on sustainable business models which incorporate either social media, crowd concepts, or gamification. In addition to the literature review, we identified relevant use cases to better understand how these social networking technologies are applied in real sustainable businesses and to enlarge the database for the development of the taxonomy. Both the reviewed literature and the use cases refer to the application of social networking technologies in different sectors, such as manufacturing, services, agriculture, and consulting.

For the development of the taxonomy itself, in the second phase we first defined the meta-characteristic that guided our development process. Next, we outlined the ending conditions according to Nickerson et al. [44]. Then, based on the first step of our literature review, we created a taxonomy in a conceptual-to-empirical approach. Then we iterated from conceptual-to-empirical to empirical-to-conceptual cycles until the previously defined ending conditions were met.

In the third phase, we cross-checked the results of our taxonomy with experts who run sustainable business models with integrated social networking technologies. For this purpose, we conducted semi-structured interviews that we used to validate our taxonomy.

3.2. Literature and Case Search

We reviewed literature in two steps. First, we identified prior literature reviews on existing taxonomies or classifications of sustainable business models that integrate social networking technologies. More precisely, we conducted a keyword search with the search term “(gamification OR crowd OR “social media”) AND (“sustainable business model” OR “social entrepreneurship” OR ecopreneurship) AND (taxonomy OR classification OR typology)”. Research was conducted in the most relevant publication databases (AIS electronic library, EbscoHost, JSTOR, Sage Journals, ScienceDirect, SpringerLink, and Wiley Online Library). These databases cover all leading journals in the categories business administration; management of sustainability; technology, innovation and entrepreneurship, and business information systems [46,47]. To ensure proper quality, the scope was limited to articles from peer-reviewed journals and conferences. This search revealed five relevant taxonomies: Three papers offer taxonomies on sustainable business models rather than on social networking technologies [16,25,48]; another offers a taxonomy that describes the roles of information systems in business model innovation [49]; and the final one focuses on social networks research and its contexts [50]. We differ from these papers in that we do not focus on sustainable business models in general or the application of information systems or social networks in general, but explicitly on the use and design of social networking technologies in sustainable business models.

Second, we conducted an extensive literature review to identify additional potentially relevant literature on sustainable business models that integrate social networking technologies. The search procedure was the same as for identifying existing taxonomies, but this time we only employed the search term, “(gamification OR crowd OR “social media”) AND (“sustainable business model” OR “social entrepreneurship” OR ecopreneurship).” In addition to these first results, further literature was identified in backward (N = 28) and forward search (N = 13) [51]. Figure 2 depicts the search procedure. The search was conducted in June 2020 and yielded a total of 261 publications. Two different researchers independently analyzed the publications in the different sequences of the search. In the case of disagreements, the publication was discussed with a third researcher until an agreement was reached. In the first sequence, the titles, keywords, and abstracts of all results from the database search were screened against formal and content-related criteria. The two formal inclusion criteria were: (a) the language of the publication had to be English or German; and (b) the publication had to be peer-reviewed, either as a journal paper or a conference contribution. The content-related criterion was that the publication had to correspond to the aforementioned definition of a sustainable business model according to Schaltegger et al. [1]. Afterwards, in the second sequence, we applied an in-depth study for all 230 publications of the resulting preliminary sample. For this reason, we read the full text of each publication and analyzed if it (a) really meets our definition of a sustainable business model and (b) if at least one social networking technology (social media, crowd concepts, or gamification) is described as a component of the business model. As a result, we identified 57 publications as our penultimate sample. Based on this penultimate sample, we first conducted a backward search and included six more publications to our penultimate sample. Afterwards, we also conducted a forward search with the enlarged penultimate sample of 63 publications and included one more publication, so that we finally set up a final sample of 64 publications for the data extraction.

In addition to the literature research, we conducted a search for relevant use cases. To this end, we extracted case studies which we found during our literature research and used search engines such as Google, Bing, etc. Since there are numerous use cases of sustainable business models, we used a formal and two content-related criteria for the search. The formal criterion was that sufficient data on the use case is available in order to employ it for

our taxonomy. Thus, a pure investigation of web sites would be insufficient, as it does not reveal enough specific information in most of the cases. The two content-related criteria were: (a) the use case corresponds with the list of sustainable business model archetypes provided by Bocken et al. [16]; and (b) the social networking technologies are an active part of the business model and are not only used for general business activities such as recruiting. Based on these criteria, we finally identified 23 use cases that we also included in our research process. Figure 3 depicts the case search procedure.

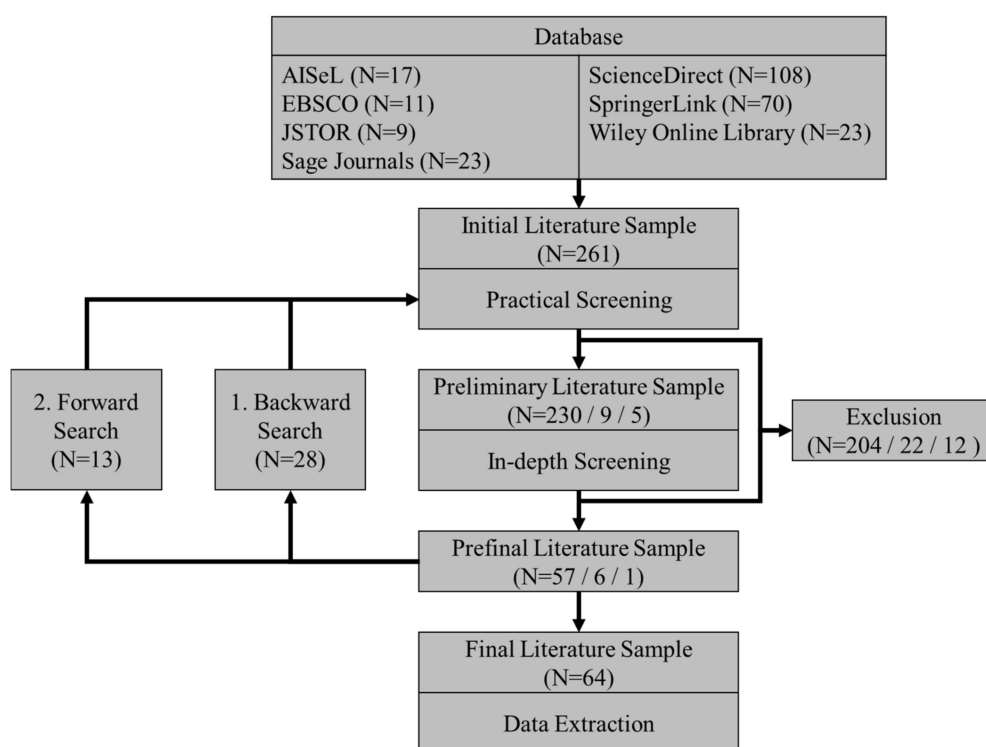


Figure 2. Literature review procedure.

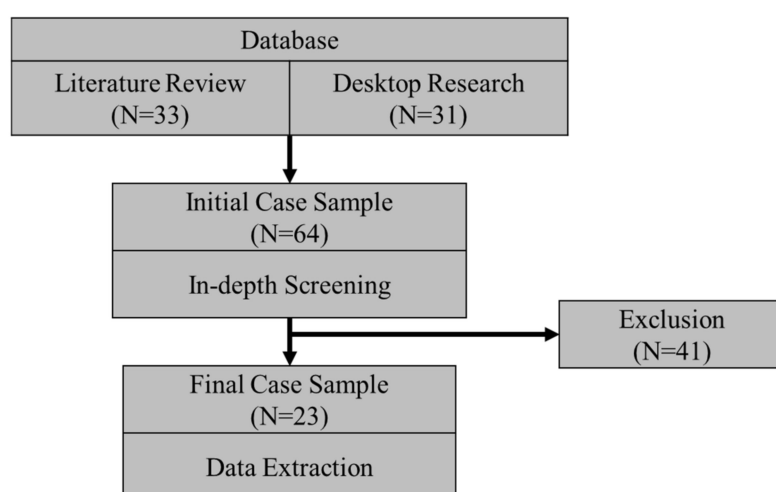


Figure 3. Case search procedure.

3.3. Description of the Interviews

In the last phase of our research process, we conducted semi-structured expert interviews [52] for the evaluation of our taxonomy. According to Gläser and Laudel [53], we define experts as individuals with a high degree of skills in, or knowledge of, a certain

subject, and the qualitative expert interview is an empirical social research method to reveal this knowledge. This kind of qualitative elaboration is reasonable in our case as we explore a topic in a certain context that has not yet been investigated [54]. We identified valid and relevant experts with the help of a survey among exhibitors and participants of a leading exhibition for ethically produced goods in Berlin. As a result, 31 experts became relevant for our research and were invited for interviews. Although the attitude of the sampled group towards our research was generally very positive, only five experts agreed to join our research. The participants are managers and owners or, in one case, social media executives of enterprises with sustainable business models who have at least five years of experience in using social networking technologies in sustainable business models. We were asked to anonymize their data. Therefore, we will not present the detailed figures on turnovers, balance sheets, and numbers of employees. The cases represent typical sustainable enterprises which are set in different contexts, and the experts are very well informed about the use of social media, crowd concepts, and gamification. Therefore, choosing these interviewees is reasonable [54], and the small sample size does not impede the significance [55,56].

Each interview lasted from 60 to 90 min. The interviews were recorded and then systematically analyzed. At the beginning of the interviews, we briefly introduced the topic and tried to create a comfortable situation in order to minimize possible social dissonance [52]. We then asked the interviewees to explain their efforts to integrate social networking technologies. In this way, we were able to assess the knowledge of the experts [54]. Finally, we explained the development process of our taxonomy and discussed its current dimensions and characteristics. Since it does not restrict the analysis but facilitates the integration of the explorative insights, open coding was used for the interpretation of the interviews [57].

4. Results of the Research Process

4.1. Guidelines for the Development Process

Our taxonomy is geared towards researchers in the field of sustainable business models as well as practitioners who want to implement social networking technologies in their sustainable business models. Based on this target group and on our research question, we use design options for social networking technologies in sustainable business models as our meta-characteristic. All dimensions and characteristics must be a consequence of this meta-characteristic. In accordance with Nickerson et al. [44], we also use the following objective ending conditions for the development process: (a) all representative samples have been examined; (b) at least one sample is classified under every characteristic of every dimension; (c) no new dimensions or characteristics were added in the last iteration; (d) no dimensions or characteristics were merged or split in the last iteration; (e) every dimension is unique and not repeated; and (f) every characteristic is unique within its dimension. As we do not want to enlarge our taxonomy with combined characteristics, we refer to other taxonomies [58,59] and allow for non-exclusive characteristics in the different dimensions.

In addition to objective ending conditions, we also use subjective ending conditions. Thus, the development process ends when the taxonomy is determined to be concise, robust, comprehensive, extendable, and explanatory [44].

4.2. Results of the Iterations

We started with an analysis of the related papers, which we found in the first step of our literature review. Lüdeke-Freund et al. [25] provide the latest taxonomy on sustainable business models. They define three dimensions with 11 groups and 45 patterns. Bocken et al. [16] develop nine archetypes of sustainable business models. Yip and Bocken [48] modify these archetypes and describe eight archetypes for sustainable business models in the banking industry. Hanelt et al. [49] offer a taxonomy that describes the roles of information systems in business model innovation. It comprises six dimensions with 15 characteristics that are finally condensed into three specific roles of information systems

in business model innovation. The work of Cao et al. [50] is the most comprehensive in comparison to the others. They developed three different classifications on the following aspects of social networks research: (a) research topics, (b) applied research methods, and (c) research contexts, each with rich characteristics and explanations.

Then, in a first conceptual-to-empirical approach, we extracted the dimensions and characteristics from the taxonomies above [16,25,48–50]. Based on our meta-characteristic, this resulted in 14 dimensions and 46 characteristics. Figure 4 gives an overview of the different dimensions and the changes in the different iterations. Some dimensions describe the broader setting of the social networking technologies [50]: in concrete terms, these are the geographical, national, and cultural settings. Other dimensions describe the context in the narrower sense, such as “type of business model” [25], which explains the addressed orientation of sustainability. Another of these dimensions is the social environment, which refers to the shared values and common beliefs within the targeted social group. In line with the social environment, the users’ “perceived benefits” also represent a dimension. Another group of dimensions describes the purpose of the application. This group includes “intended effect” [50], “business model impact” [49], “value management” [16,49], and “business model relation” [49]. Technology-related dimensions are “application programs”, “network analysis” [50], and “technological process improvements” [48]. The very last dimension, “organizational unit”, refers to the organizational scope [50].

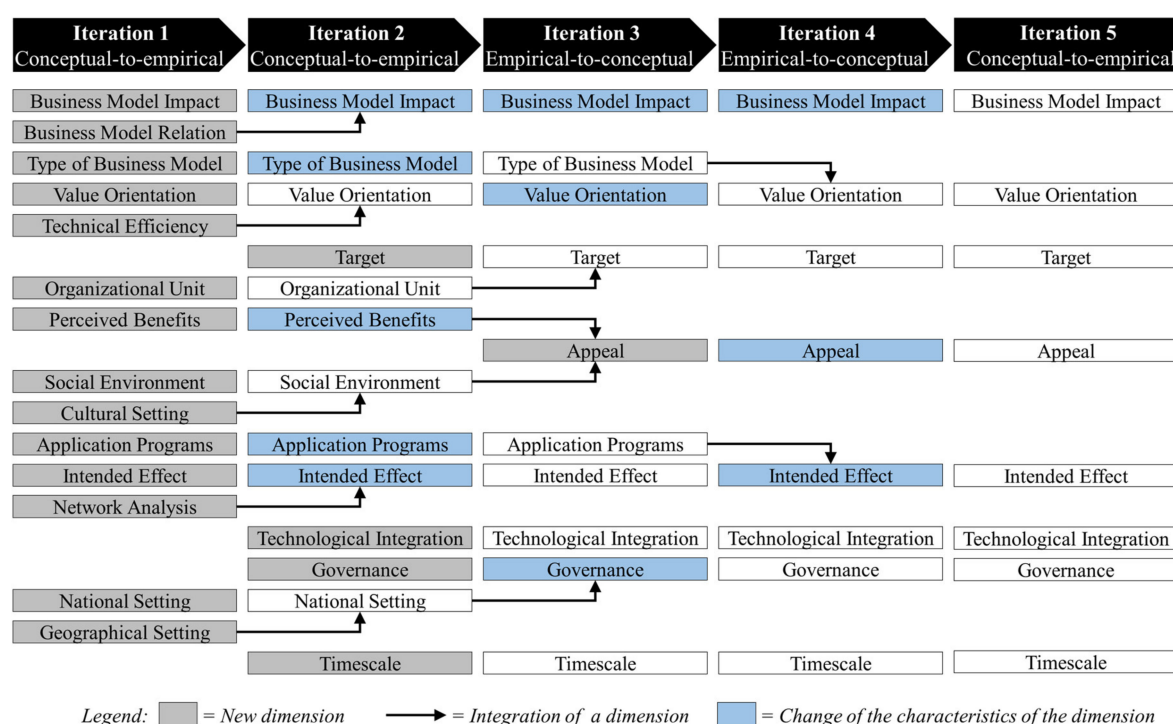


Figure 4. Development of the dimensions per iteration.

The first iteration neither fit our meta-characteristic nor met our objective and subjective ending conditions. Therefore, in a second iteration we again applied a conceptual-to-empirical approach to obtain a clearer perspective on our dimensions and their characteristics. For this purpose, we used literature that we identified in the second step of our literature review. After reviewing the literature and focusing on our meta-characteristic, we merged several previous dimensions and added the new dimensions “target”, “technological integration”, “time scale”, and “governance.”

Still, the second iteration did not meet all our objective and subjective ending conditions. So we started a third iteration. This time, we chose an empirical-to-conceptual approach to prove whether our consolidated version of the taxonomy meets the criteria

in reality. Based on this iteration, we again merged a few of the previous dimensions, introduced the new dimension “appeal”, and changed characteristics.

The fourth iteration was again empirical-to-conceptual, because we did not conceive of our taxonomy as exhaustive in regard to reality. As a result of this iteration, we merged some dimensions and added some characteristics.

In the fifth and final iteration, we conducted a conceptual-to-empirical approach because we wanted to cross-check our empirical findings with existing literature. After this iteration, all identified literature and use cases were examined. No new dimensions or characteristics were added, nor did we merge or split dimensions or characteristics in the last iteration. Every dimension is unique, just as every characteristic within every dimension. All objective ending conditions are thus met. For us, the same applies for the subjective ending conditions, as we perceive the taxonomy to be concise, robust, comprehensive, extendable, and explanatory. Thus, we stopped our development process at that point.

4.3. Taxonomy Dimensions

During the five iterations, we analyzed 69 relevant papers and 23 use cases. To ensure the highest possible data quality, three different researchers examined all use cases independently. In cases of disagreement, the use case in question was analyzed again and then discussed in the researcher group. Finally, we compiled a taxonomy with eight dimensions and 27 characteristics (cf. Table 1). In the following, we explain the different dimensions and how they were derived.

Table 1. Taxonomy for design options of social networking technologies in sustainable business model.

Dimension (D _i)	Characteristics (C _{ij})				
Business Model Impact (D ₁)	Establish (C _{1,1})	Enable (C _{1,2})	Extend (C _{1,3})	Innovate (C _{1,4})	Terminate (C _{1,5})
Value Management (D ₂)	Value Proposition (C _{2,1})	Value Communication (C _{2,2})	Value Creation & Delivery (C _{2,3})		Value Capture (C _{2,4})
Target (D ₃)	Customers (C _{3,1})	Community (C _{3,2})	Organization Members (C _{3,3})		Value Network Partners (C _{3,4})
Appeal (D ₄)	Intrinsic Motivation (C _{4,1})			Extrinsic Motivation (C _{4,2})	
Intended Effect (D ₅)	Mindset (C _{5,1})	Performance (C _{5,2})	Relationship (C _{5,3})	Emotions (C _{5,4})	Knowledge (C _{5,5})
Technological Integration (D ₆)	Not Integrated (C _{6,1})		Partially Integrated (C _{6,2})	Fully Integrated (C _{6,3})	
Governance (D ₇)	Internal (C _{7,1})			External (C _{7,2})	
Timescale (D ₈)	Temporary (C _{8,1})			Indefinite (C _{8,2})	

4.3.1. Business Model Impact

This dimension answers the question of how the social networking technologies can influence the entire business model. We use the characteristic “establish” when the social networking technologies are used to realize a business model. Bocken [14], for example, describes the use of crowdfunding for the foundation of sustainable start-ups, e.g., [60,61]. “Enable” means that social networking technologies form the backbone of the business model in the sense of a digital business model, e.g., [62,63]. The characteristic “extend”

describes the approach to enlarging an existing business model with the support of social networking technologies, e.g., [64,65]. Furthermore, social networking technologies can be used to “innovate”, e.g., [66] or “terminate”, e.g., [67] sustainable business models [3].

4.3.2. Value Management

Sustainable business models generate not only economic value but also ecological and social value [16]. Following Schaltegger et al. [1], we distinguish in our taxonomy between the influence of social networking technologies on different aspects of sustainable value generation and use the characteristics “value proposition”, e.g., [68–70], “value communication” [64,65], “value creation & delivery”, e.g., [66,71,72] and “value capture”, e.g., [63,73,74].

4.3.3. Target

In our taxonomy, we define the dimension “target” as the group of human communicators addressed. The most frequent target is “customers”, e.g., [64,65,75], which includes value co-creation. Social networking technologies enable an intensive interaction and a better understanding of the customers’ personalities [76]. The characteristic “community”, e.g., [68,73] represents the general public, which is particularly relevant for socially sustainable enterprises, as the community should benefit from the efforts of the enterprise [25]. Further characteristics are “organization members”, e.g., [61,64] and “value network partners” [77], mostly in the sense of attempts to increase efficiency or enable co-creation [29].

4.3.4. Appeal

Since individuals in the above-mentioned target groups differ, we introduced the dimension “appeal”, which relates to the motivation of participants to use social networking technologies. We discovered much “intrinsic” motivation in the case of sustainable business models. For example, the enterprise Threadless [78] invites artists to design woven goods, prints, and accessories that are scored by an online community of customers and finally produced when they are top-scored. We also found literature and use cases in which the users participated in the social networking technologies because of “extrinsic” motivation. An example of a predominantly instrumental motivation is the use case JustPark [62], which matches drivers with parking spaces via its website and mobile application.

4.3.5. Intended Effect

The dimension “intended effect” explains the effects of social networking technologies and consists of the characteristics “mindset”, “performance”, “relationship”, “emotions”, and “knowledge”. These effects are caused by the two key elements of social media: self-disclosure and social presence [9]. Mindset refers to an intended impact on the cognitive belief system, attitudes, and behavior of users with regard to sustainability, e.g., [73,75]. Further, we used the characteristic “performance” to describe the capability of fulfilling an operative task within the business model, e.g., [63,78]. “Relationship” refers to the most salient aspect of social networking technologies: the creation of networks. The use case, The IOU project, depicts this aspect. The apparel platform offers handicraft products from emerging regions and enhances the product by linking end buyers with producers [72]. With reference to the same use case, it also becomes obvious that social networking technologies create emotions, which is another characteristic. The last characteristic in this dimension is “knowledge”, which includes both [38] the acquisition, e.g., [68,79] of knowledge and the creation of new knowledge, e.g., [67,80].

4.3.6. Technological Integration

Social networking technologies generate much data and should generally be aligned with the IT environment of an enterprise [81]. Technical integration is therefore an important aspect. In order to capture this aspect, we defined the characteristics “not integrated”,

“partially integrated”, and “fully integrated”. In our view, social networking technologies are not integrated if there is no interface between the existing IT environment and the social networking technologies and no data exchange takes place. Likewise, “partially integrated” represents an existing interface and a partial data exchange. We use the characteristic “fully integrated” when the technology is completely integrated into the IT environment [9].

4.3.7. Governance

Social networking technologies can generally be applied as a service of an external provider or as a self-developed application [9]. If the technology is sourced as a service, the service provider has the competence to determine the technological configuration and the regulatory framework, which applies, e.g., with regard to data security and data protection [76]. For this reason, we defined the characteristics “internal” and “external”. “Internal” refers to the autonomy to define the technological configuration and the regulatory framework, while “external” points to a dependence upon external providers in terms of technological configuration and the regulatory framework.

4.3.8. Timescale

This dimension refers to the planned application period. We distinguish between the characteristics “temporary” and “indefinite”. Most of the applied social networking technologies are planned to be applied indefinitely. Especially in project environments, we generally identified a rather temporary use of social networking technologies. Social networking technologies are also used temporarily in non-project-related environments, e.g., in the foundation phase of sustainable start-ups [14]. However, it is possible that the temporary applications become indefinite. Gupta and Bose give the example of Wishberry [82], an Indian platform for crowdfunding creative artists, which first used crowdfunding in a campaign and later established it as a core application [83].

5. Discussion and Implications

5.1. Configurations of Social Networking Technologies in Sustainable Business Models

The starting point for our taxonomy was related classifications of Cao et al. [50] and Hanelt et al. [49]. Both classifications address social networking technologies in general and do not specifically focus on sustainability or sustainable business models. Thus, our taxonomy partially intersects with the aforementioned classifications. The dimensions “appeal” and “intended effect” do not significantly differ from the findings of Cao et al. [50]. However, different dimensions and the changes in the characteristics represent features of the use of social networking technologies in sustainable business models. For example, with the exception of the characteristic “enable”, all characteristics of the dimension “business model impact” also apply to non-sustainable business models. This indicates that sustainable business models frequently originate from the different social networking technologies, because they bring together people with the same specific interests and help them form a basic organization [71,80,82,84]. Likewise, there are numerous sustainable business models that are based on the different social networking technologies [62,63,70,85]. These two kinds of impact on business models emphasize the importance of social networking technologies for sustainable business models. Social networking technologies are used in sustainable business models not only as a source of data with respect to the decision to establish, extend, innovate, or terminate a business model [86,87]; in a considerable number of cases they are the technological backbone that is essential for the existence of the sustainable business model.

The importance of social networking technologies becomes likewise apparent with regard to the dimensions “value management” and “target”. The influence of social networking technologies on the different aspects of value design as proposed by Schaltegger et al. [1] is only superficially explained in the related classifications. For example, Cao et al. [50] only mention the concept of value co-creation [88] when they describe the advantages of social media. Hanelt et al. [49] name value co-creation as well and outline an enhanced

value proposition and value capture because of social media in the case of automobile manufacturers. However, they come to the conclusion that the impact on the value architecture is in general rather low. The effects of social networking technologies on sustainable business models seem to be more versatile. Social networking technologies are used in different phases of value management and address different kinds of participants. In the case of value capture, all social networking technologies are used to charge fees from customers [63,69], solicit different kinds of donations [15,73,74] from the community, and attract funding through which the funders become value network partners [60,61]. Especially social media, but also gamification are also common communication tools to explain and report the specific creation of sustainable value [12]. This facet is highly important in sustainable business models that emphasize the social value creation. Here, the corresponding social networking technologies are often used to address the community, which is perceived as a participant and beneficiary of the sustainable business model [67,79]. Especially in sustainable business models that are enabled by one of the social network technologies, value creation and delivery are affected by social networking technologies [62,63,89]. Social networking technologies likewise enable the cooperative participation of consumers and producers in value creation in the sense of value co-creation [90]. This includes, for example, crowdsourcing-oriented do-it-yourself and do-it-together design strategies that contribute to more sustainable innovative value creation [91]. Fundamental pillars for the different types of value co-creation are trust creation, collective sense-making, and the development of social capital [28,88]. Against this background, it has to be considered that the various stakeholders of sustainable business models have different conceptions of what sustainable values are and how they should be created [27]. In view of the subjective perception of sustainability and sustainable value creation, sustainable business models need to be explained and discussed with regard to sustainable value creation in order to integrate stakeholders into the value creation [4,92]. All the different social networking technologies provide a virtual space for this kind of social interaction and can help to build relationships between customers, organization members, and value network partners [72,75,93]. This leads to mutual cooperation and fosters a more holistic sustainable value creation because people get involved in a sustainable business model that does justice to their perception of sustainability [72].

All these approaches to employ social networking technologies in order to involve customers, organization members, value network partners, as well as the community in general in different phases of the value management finally provide a “blended value proposition” [11] that combines sustainable value creation with the advantages of digital technologies, e.g., efficient solutions that make sustainable business models accessible, more feasible, and more convenient [60,68,79]. Therefore, social networking technologies provide tremendous opportunities to foster sustainable business models and to reach out to new customers, value network partners, and the community in general. However, despite all these advantages of social networking technologies, such technologies travel with certain risks. Especially when social networking technologies are applied in already existing sustainable business models, where they lead to an increase of participants and decentralization, they can cause conflicts between the different stakeholders. For example, especially social media and gamification are associated with characteristics such as fun, experimentation, and risk-taking, which may contradict the existing values of the stakeholders and bring interests into conflict [10]. However, such conflicts can certainly be fruitful for the development of the business model as well as for the individuals involved, because conflicts can help them scrutinize existing value positions and lead to an expansion of consciousness [94]. Membership in various social networks could even intensify this effect. Concomitantly, increasing decentralization and the integration of more and more participants in more and more networks can pose a threat to sustainable business models: The (temporary) membership in an increasing number of networks challenges the participants and evokes the negative aspects of a “saturated self” [94], such as shallowness, alienation, and a loss of commitment and authenticity. The integration of such negatively

saturated stakeholders into the value management of a sustainable business model could seriously impair its existence.

Another obstacle to the use of social networking technologies arises from the administration of the technologies. The dimensions “technological integration”, “governance”, and “timescale” represent the administrative aspects. Since the analysis of the reviewed cases only provides limited insights into these aspects, our findings are essentially based on the results of the literature review and insights from the experts we interviewed. In most of the cases, social networking technologies seem to be sourced and not or, at most, partially, integrated. Possible reasons are presented by Expert C: *“We have decided to use the classical applications of the major providers. Almost everyone uses these applications and is therefore familiar with them. Furthermore, the development of our own applications would be too complicated for us. We do not have the necessary know-how or would have to hire someone specially for this.”* Bygstad [81] calls the resulting technological infrastructure “lightweight IT”. The most prominent advantage of lightweight IT is its modularity, which enables a flexible and agile digital infrastructure that can easily be aligned with the requirements of the business model and its stakeholders. Expert B provides an example of how and why social networking technologies are used for the communication with value network partners: *“Our suppliers are very small companies that do not use sophisticated IT tools. Therefore, we send the orders via email in most of the cases. But if we need a quick reply or if we want to accelerate the whole process, we send WhatsApp messages. This is somewhat more personal and also corresponds to the friendly relationships we have with our suppliers.”* The example shows how social networking technologies, such as social media in this case, can be part of a very effective and efficient lightweight IT in sustainable business models. However, despite the existence of different theoretical approaches for the design and adoption of social networking technologies in the sense of a lightweight IT [95,96], the practical application of the theory constitutes a serious impediment, according to the experts: *“We have often thought about making more use of the data from our social networks and also taking the customers more with us in what we do. But this is not feasible manually. We would have to introduce professional tools and network them with the corresponding applications”* (Expert C). Data protection is another issue in regard to the administration of social networking technologies, especially social media: *“The topic of data protection has become very important. Customers are increasingly asking how we implement the legal requirements and which concrete measures we apply beyond that”* (Expert D). Expert A mentions in the context of data protection the high importance of trust when using social networking technologies: *“Most of our customers are regular customers who trust us and the other members [of the social networking technologies]. Data protection therefore plays a secondary role for them. However, this does not mean that we do not deal with the issue.”* This statement conforms with research on the positive influence of community members on trust of users in social media platforms [97]. Nevertheless, data protection is a challenge in lightweight IT [81] and thus in most social networking technologies. An inappropriate handling of data protection could lead to a loss of trust among customers, organization members, value network partners, and the community. Furthermore, in cases where social networking technologies are directly involved in value creation, insufficient data protection could also lead to the disclosure of highly relevant data and thus possibly even jeopardize the existence of the business model.

5.2. Implications for Theory and Practice

The aforementioned findings contribute to the theory on sustainable business models in different ways. We provide a systematic overview on how social networking technologies can be applied in sustainable business models. In doing so, we offer analytical guidance for future research on the digitalization of sustainable business models [11] and the interactions of sustainable business models, its ecosystems, and its social networks [2]. Furthermore, our findings shed light on the impact of social networking technologies, i.e., social media, gamification, and crowdsourcing, on sustainable business models [11] and its social networks. First, we show how social networking technologies influence sustainable

business models and the involved people in terms of business model development, value management, and stakeholder integration. Thus, our results supplement the knowledge on what practices are operationalized to realize sustainable business models [5]. This will help to better understand other network-oriented concepts and to develop them. A concrete field of application could be the concept of value shaping [29]. Our taxonomy could be the starting point to integrate more and other kinds of networks into the different stages of the value shaping process. In this context, our research also reveals a need for further investigation on data protection in the case of value co-creation that is based on social networking technologies, especially social media. Another field of application for our taxonomy could be to overcome tensions in the collaborative development of sustainable business models [98], because it helps to design communication structures between different stakeholders in such a way that common goals can be achieved.

Second, our findings indicate that the involvement in different social networks influences the attitude of individuals towards sustainability. The analysis of the cases reveals that there was a positive influence on individuals. However, referring to Gergen [94] and his concept of the saturated self, it also seems to be possible that social networking technologies negatively influence individuals. Social networking technologies, such as social media and gamification but also crowdsourcing expose people to a variety of opinions, values, and attitudes. On the one hand, this would enable people to understand the position of others and to permanently question their own point of view with regard to a holistically correct perspective. On the other hand, it is possible that such an exposure could overwhelm people and thus lead to shallowness, alienation, and a loss of commitment. This would be an addition to the known disadvantages of digitalization in sustainable business models [11]. However, future research is necessary to shed light on how the involvement in multiple social networking technologies influences the attitude and the values towards sustainable business models.

Third, we contribute to the research on how different institutional logics [99] act on sustainable business models [100–102]. Gregori and Holzmann [11] report on how digital logics influence sustainable business models in terms of a blended value proposition and scalability. The findings of our study are in accord with the positions of Gregori and Holzmann and provide further examples of blended value propositions. Moreover, our work prepares the ground for explanations on how different logics can become relevant for an organization and how organizational logics are shaped by the interaction of organizations and social networks. In this context, because all different social networking technologies are supposed to enable social interaction, it would be interesting to know whether social network technologies can be a gateway for logics that threaten the business model, such as purely commercial logic of value [101]. This kind of future research could also examine whether sustainable companies can build up a resistance to such logics and to what extent social network technologies improve or weaken this resistance.

Fourth, we add to an emerging stream of research in the field of boundaries of sustainable business models [2,3,103–106]. Our work contributes to the knowledge on how digitalization and online sources act on the boundaries of sustainable business models and how they enlarge the ecosystems [2]. Moreover, our taxonomy offers the possibility for a more multifaceted view on boundaries. Neumeyer and Santos [2] provide an overview of different types of organizational and individual boundaries in the case of sustainable business models. However, with regard to the ecosystem of a sustainable business model, boundaries are mostly determined by who is affected in the context of value proposition, value creation, and delivery and value capture. [3,105]. This perspective certainly captures the most essential aspect of a sustainable business model, but we argue that a consideration of further perspectives would be fruitful for the development of sustainable business models in general. Our findings set out reasons to consider further perspectives and consequently to allow for different simultaneous boundaries of sustainable business models. For example, the reasons why people are interested in a sustainable business model could be a determining factor for involving them in the innovation of the business model. Similarly,

the handling of data protection regulations could determine the willingness of customers to participate in value co-creation approaches. These two examples show how different perspectives can mark independent boundaries of sustainable models. The resulting multi-dimensional approach to boundaries can help researchers and practitioners cope with the dynamic and complex nature of the ecosystem. Thus, we advocate a perspective-related treatment of boundaries. Nevertheless, our results are only a starting point for a consideration of boundaries as a dynamic, perspective-related construct, because they only present a selection of possible perspectives for boundary-setting. For example, Gregori and Holzmann [11] show that technical properties can be a determinant for the boundaries of sustainable business models as well. Therefore, we recommend further research in this area.

In addition to the contributions to the theory on sustainable business models, our work also provides implications for practitioners. The taxonomy helps managers of sustainable business models who have not yet applied social networking technologies as well as managers who want to innovate their business models towards sustainability in terms of how to design and embed social networking technologies into their business models. Practitioners can utilize the identified design options to adapt social networking technologies to their specific context. Our taxonomy provides a starting point to clarify who should be connected to the business model with social networking technologies in which way, for which purposes and in which administrative framework. In this way, our work helps to improve the implementation of social networking technologies and to avoid failures [107]. However, our taxonomy does not provide an answer to which specific social networking technology is most appropriate for a particular purpose.

With regard to sustainable business model innovation, our findings can be used to create digital tools to support the interaction with external stakeholders [4,105] and approaches to consumer behavior [77]. Nevertheless, practitioners, especially social entrepreneurs with limited resources, need to build up more knowledge about social networking technologies, as the demands in terms of application, technology, and administration are diverse. A possible solution could be to cooperate with other companies in order to bundle existing resources and exchange experiences in handling social networking technologies.

6. Conclusions

The objective of this article is to offer a deeper understanding about the key elements to be considered when applying social networking technologies in sustainable business models. Consequently, we developed a taxonomy with design options of social networking technologies in sustainable business models. By analyzing 69 papers and 23 use cases in addition to the help of expert interviews, we have identified eight dimensions with a total of 27 characteristics. Our findings will help researchers to better understand how digitalization, especially social networking technologies, are applied in sustainable business models and how the application in sustainable business models differs compared to the application in non-sustainable business models. We also contribute to the literature on sustainable business models. Our work reveals the need for further research on how membership in social networking technologies influences members' attitudes towards sustainability issues and the importance of data protection policies in the use of social networking technologies in value co-creation. We also prepare the ground for explanations regarding how different logics can become relevant for an organization. The most significant contribution of our work is that our results provide a starting point for considering a multidimensional approach to determine the boundaries of sustainable business models. Moreover, our work provides implications for practitioners seeking to prepare for and implement social networking technologies in their business models.

This article has limitations that justify further research. The literature and use cases that we analyzed represent the state of the art in our eyes. Nevertheless, the reviewed literature and cases are only an excerpt from the rapidly developing reality of social networking technologies and sustainable business models. For the development of our

taxonomy, we have rigorously applied the process proposed by Nickerson et al. [44] and have focused on our meta-characteristic and on the defined objective and subjective ending conditions through the various iterations. In this way, and based on the results of our expert interviews, we consider our taxonomy to be concise, robust, comprehensive, extendable, and explanatory. Nevertheless, we have not used the proposed objective ending condition, mutual exclusivity. Our taxonomy therefore allows multiple assignments within several dimensions. One could argue that this decision hinders the comprehensiveness and exhaustiveness. We argue that our procedure does not violate the taxonomy properties. Instead, the taxonomy would be inflated and not more concise if we introduced multiple combinations as separate characteristics in order to meet mutual exclusivity [58,59].

Future research could extend and improve our proposed taxonomy. This could be done by applying qualitative and quantitative approaches for more in-depth investigations of cases. Such research could examine the various social networking technologies separately. For example, it would be interesting to identify patterns in terms of how beneficial each technology is with respect to different characteristics or different constellations of the characteristics of our taxonomy. In consequence, another approach to improve our taxonomy could be to focus on the different archetypes of sustainable business models [16] and to investigate how social networking technologies can be applied as patterns in these different archetypes in accordance with our taxonomy. Likewise, different characteristics of our taxonomy could be further subdivided in the sense of a classification. For example, value network partners could be distinguished from each other in terms of their affiliation to primary and secondary value creation processes [43]. Future research could also apply our implications to the influence of social networking technologies on participants' attitudes towards sustainability, the occurrence of different logics, and boundary setting, and contextualize them with adequate theories. For example, it would be helpful for researchers and practitioners to understand how the use of social networking technologies changes organizations in the medium and long term with respect to various aspects, such as the perception of sustainability, corporate culture, or innovation adaptation.

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