



Article

# Social Innovation for Sustainability Challenges

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**Abstract:** Social innovation is concerned with social mobilization and impact, and is increasingly seen as an option to address sustainability challenges. Nevertheless, the concept of social innovation is quite open in character and requires empirical accommodation to establish how it differs from other types of innovation in this setting. This article contributes empirically to the concept of social innovation as it reviews categories of success factors of social innovation against those of five other innovation types (product, service, governmental, organizational, system) in 202 innovation cases that focus on climate action, environment, resource efficiency and raw materials. Statistical analysis with contingency tables is applied to examine the distribution of five kinds of success factors across the innovation types: economic, environmental, political, social, and technological. The results confirm empirically that social innovation is indeed a distinct type of innovation. There are statistically significant differences in the distribution of categories of success factors between social innovation on the one hand and product, service and governance innovation on the other. In addition to the prevalence of social success factors, social innovation is characterized by a lesser emphasis on political and technological success factors.

**Keywords:** social innovation; sustainability challenge; innovation type; success factor; empirical data

## 1. Introduction

Social innovation remains an underdeveloped and to some extent also contested concept [1,2]. Major issues concerning its focus, scope, and transformative potential remain unclear, which is particularly troublesome, as there are pressing needs to develop innovations that reconstruct markets towards sustainability [3–5]. Climate change, in particular, poses a threat to the excessive lifestyles prevalent in current societies, and it has been acknowledged that while technological innovations are required, they are insufficient to address challenges in complex societal systems [5,6]. Accordingly, social innovations have been sought in order to achieve the transformation of existing structures towards low-carbon societies [7]. At the same time, it is somewhat unclear how social innovation should be understood and even whether or not it should be considered a distinct concept [8–11].

Expectations on social innovation transcend those typically attributed to other types of innovation. The impacts, which social innovations target, relate to the social economy, bridging societal divides and strengthening new social practices [6,12,13]. Many social innovations have targeted sustainability challenges such as the prevention and impacts of climate change. Pressing questions relate to concerns on how to reorganize cities, transport systems, and housing to reach dramatic reductions in carbon dioxide emissions, which all constitute sustainability challenges that can be addressed in a variety of ways [14]. These all represent examples of expected impacts for social innovation, which other types of innovation may contribute to, but are usually not expected to address by themselves. Similarly, the kind of economic progress sought for in social innovation differs and, for instance, relates more directly to abolishing poverty rather than seeking economic growth towards the same aim [15].

When compared to other types of innovation, social innovation connects to social values, processes, and impacts. In this respect, the concept of social innovation complements and redefines established innovation typologies, which consider products, services, and processes, amongst others [16]. At times, social innovation has been seen as an alternative to or an extension of technological innovation [9], although this definition is arguably too limited to describe its full and varied scope. Indeed, social innovations are gaining more attention as responses to societal challenges [17,18].

It has been recognized that the concept of social innovation should be developed further in particular through systematic analysis of success factors and empirically demonstrative cases [19,20]. Even though the openness of the concept of social innovation need not necessarily hinder the achievement of accompanying practical aims, systematically developed and tested conceptualizations may contribute to insights, which can be transferred across settings. The empirical analysis may further distinguish social innovation from parallel innovation concepts that perform similar social and critical functions in society. For instance, the concept of disruptive innovation challenges established business practices [21], whereas social innovation is seen to aim at broader structural change and transformation [5,19], and it is only the concept of social innovation, which targets social concerns directly.

This article characterizes social innovation in comparison to other types of innovation based on an analysis of their identified success factors and reviews the results against key conceptualizations of social innovation [9,10]. The applied research design reaches beyond the examination of single or small numbers of case studies and is apt to provide new and comparative knowledge on innovation types at a higher abstraction level. Accordingly, success factors from 202 innovation cases collected in a European database on sustainable innovation are examined against innovation typologies. The Casipedia [22] database includes innovations categorized in the domains of climate action, resource efficiency, raw materials, and the environment. The article theoretically contributes to clarifying the concept of social innovation through empirical accommodation [19], and examines how social innovation is distinct from other types of innovation (e.g., product, service, governance, organizational and systemic innovation). For instance, social innovation cases target climate action more in relation to sustainable lifestyles but less by direct climate change mitigation solutions.

The upcoming section discusses how theoretical insights into social innovation benefit from the empirical analysis of success factors for innovation. Then the methodological approach of comparing the different types of innovation is argued for and the utilized sustainable innovation database is described with case examples. Results from a quantitative case analysis are presented next and discussed from the perspective of the conceptualization of social innovation. The concluding section of the study discusses the idea that social innovation indeed represents a distinct type of innovation, which is beneficial in considering both its conceptualization and the management of innovation activities.

## 2. The Conceptualization of Social Innovation

The theoretical conceptualization of social innovation is still evolving [1]. Previously, the concept has been examined mainly through frameworks and case studies [8,9]. It is probably the elusive and broad character of the targeted social impacts of the concept, which has prompted such exploratory approaches. Social innovation appears against this background to constitute a boundary concept, which permits interpretive flexibility, yet is sufficiently robust to allow shared interpretations [23,24]. For instance, Pol and Ville [10] follow such a line of thought in their definition of desirable social innovation: instead of providing a definition, which exactly defines what social innovation is, they focus on the actionability of the innovation in question, and consider desirable social innovation to be founded in new ideas and to target a positive impact on the quality and quantity of life. While conceptual flexibility is certainly acceptable for recognizing the phenomenon and using it in scientific discussions, it has its shortcomings, when attempting to apply it as an analytical term across large numbers of innovations.

Mechanisms that contribute to a change in social institutions occur at the individual and group levels. Changes in the institutionalization of societal behaviour then have the potential to achieve systemic transformation [19,25] and, correspondingly, engagement with social objectives and social development constitute key objectives in social innovation [26]. Furthermore, social innovation is comparable with self-organization that is driven by internal dynamics in the markets, often by common concerns [27]. Cajaiba-Santana [9] similarly elaborates that social innovation contributes to new social practices, institutions and systems, and that its ultimate goal is social change while respective actions often take place at the level of collectives or groups. In addition, self-organization is more of a bottom-up approach to solve market challenges than a top-down response to them [1,27].

Accordingly, social innovations are more than simply non-technical enhancements to products [9,28,29]. Indeed, it is the lack of a clear definition of social innovation [2,26] that provides opportunities to carry out explorative and empirical work towards this aim. There is a wide-ranging array of social innovations as Phills et al. [11] has already pointed out: emissions trading, socially responsible investing, fair trade, community-centred planning, habitat conservation plans, charter schools, individual development accounts, international labour standards, microfinance, and supported employment.

Cajaiba-Santana [9] identifies the key roles of agency, institutions and social systems in the conceptual schematics of social innovation processes. This is somewhat in contrast with Pol and Ville [10] who review competing conceptualizations. Furthermore, they suggest that government intervention is needed to encourage the creation of pure (i.e., non-business) social innovations. There is indeed a knowledge gap between the aims attributed to social innovation and the means for achieving them.

The theoretical focus has been on frameworks and qualitative analysis of limited numbers of case studies [9,11], which perhaps highlights the contextual and situational character of social innovation. The difficulties in comparing social innovation with other types of innovation have contributed to scholarly interest in concept and case studies. Conceptual studies then distinguish the particularities of social innovations and case studies bring empirical accommodation to the concept [6,9,19]. While both types of contributions are crucial when characterizing social innovation, the generalizability of their contributions is by no means a straightforward task. Similarly, both approaches might miss out on something that comes forth through larger surveys.

Systematic overviews of the field of social innovations, use of quantitative datasets and long-term analyses are still missing although this shortcoming has been identified [19,30,31]. Nevertheless, a change in this direction is taking place with the emergence of extensive case mapping activities [20,32]. Indeed, both theoretical conceptualization and more practical innovation management would benefit from quantitative comparative empirical studies, which contribute to results that are more readily generalizable. In particular, analysis of the success factors of social innovations would help to bring about a better understanding, development and management of social innovations.

While there are meta-studies on success factors of single innovation types, which examine service and project innovations [33,34], there are new quantitative studies that review success factors across innovation types [35] or distinguish between types of social innovation [20]. This article contributes to the empirical characterisation of social innovation by reviewing a large number of case studies on social innovation with uniformly reported case studies on other types of innovations in an international, sustainable innovation database 'Casipedia' [22]. Sustainability in this context considers environmental, economic and social dimensions. The case studies originate from Europe although many of them have a global outreach. This article contributes to the theoretical conceptualization of social innovation in that it aims to abstractify the situational context of each case by relying on a statistical method and examining empirically observed data [36]. The objective of the current study is thus to analyse how types of innovation correspond to kinds of success factors based on the empirical material of 202 innovations. The research design thereby differs from the usual case-study approach [37], where conclusions are drawn based on singled-out cases and with a focus on success factors in specific

contexts. What the method can produce are results of comparative analysis that are more generalizable than individual case studies. Indeed, the accommodation of a significant number of empirical cases is needed to define a satisfactory and comprehensive conceptualization of social innovation.

### 3. Materials and Methods

This study attempts to clarify the concept of social innovation and examine how it differs from other types of innovation. This research design encompasses a review of how different kinds of success factors are associated with different types of sustainable innovations: social, governance, organizational, product, service and systemic innovations. The reviewed success-factor categories are economic, environmental, political, social and technological in character. The upcoming section presents the database of empirical innovation cases and describes the methodology used to examine the association between the types of innovations and kinds of success factors.

Data of the altogether 202 innovation cases from a European database of sustainable innovation, Casipedia [22], is used in the study. These cases all went through a screening review process, in which they were first nominated and briefly described by organizations in 28 European countries. In a succeeding selection stage, two academic organizations joined in to conduct a final selection of cases according to predefined criteria such as sustainability and cross-sectoral linkages, multi-dimensional transformations, degree of public participation and mobilization, deployment and diffusion of innovation as well as a degree of novelty and originality [38]. These cases are evenly distributed across the 28 European countries, as much emphasis was placed on gaining a balanced European coverage. Later, 34 additional and similarly screened cases were added to the database. The database is still open and updatable, but as no screening process is in place any longer, the analysis here is limited to the data that was submitted to the database by December 2015, as all these cases went through the screening process. The database categorizes sustainable innovation cases according to several other criteria, such as key areas, success factors, geographical scope and sectoral relevance.

The database contains seven types of sustainable innovation (social, service, product, governance, organizational, systemic and marketing) relating to the key domains of climate action, resource efficiency, raw materials and the environment. Social innovations form the largest group in the database next to service innovations, thereby providing a comprehensive evidence base against which to carry out a comparative analysis. The definitions used in the database for innovation build on and extend the definition in OECD's widely used Oslo manual [16] (p. 46): An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations. Social innovations transcend these innovation types and are understood in the database as novel solutions that meet social needs more effectively than existing solutions. Moreover, such innovations lead to new or improved capabilities and relationships as well as to the better use of assets and resources. Governance innovations, on the other hand, are seen to include novel forms of citizen engagement, new democratic institutions, new public and user participation in service design and delivery, and the use of public boards to govern particular choices. Systemic innovations, in turn, relate to interconnected innovations, which depend on each other [22,39,40].

The examined empirical data includes six types of innovation cases in the database as the number of marketing-innovation cases was too limited for statistical analysis and as the database did not cover cases of process innovation. The categorization of cases in the database adheres to how sustainable innovation priority areas were identified in the societal challenge of "Climate action, environment, resource efficiency and raw materials" as defined in the European Union's Horizon 2020 framework programme for research and innovation [41]. Table 1 describes how the 202 examined sustainable innovation cases in the Casipedia database relate to the types of innovation and priority areas. It shows that sustainable innovation cases in the database are distributed unevenly across the priority areas, giving the first indication that there may exist differences in objectives between the types of innovation.

Table 1 shows that social and organizational innovations focus especially on sustainable lifestyles, whereas governance innovations particularly address strategic intelligence and citizens' participation. System innovations target eco-innovation and green economy transitions. Service and product innovations are spread more evenly across priority areas, although it is quite striking that product and system innovations do not target strategic intelligence and citizens' participation. In relation to climate change, social innovations target climate action more through sustainable lifestyles but less by direct climate change mitigation innovations. Hence, as shown by the prevalent differences in Table 1, a closer comparison of the different types of innovation is warranted.

**Table 1.** Examined sustainable innovations by type and priority area, %.

Innovation Types (n)	Resource Efficient Sustainable Lifestyles	Climate Action by Sustainable Lifestyle	Eco-Innovation and Green Economy Transition	Climate Change Mitigation Solutions	Strategic Intelligence and Citizens' Participation	Eco-Solutions to Reduce Raw Materials Use
Social (48)	73	60	17	19	35	21
Governance (25)	32	32	40	40	64	12
Organizational (22)	55	36	32	41	27	27
Product (38)	34	29	32	47	3	39
Service (48)	44	42	40	31	19	19
System (16)	31	25	56	38	0	19

Source: Compiled from Casipedia [20] by the authors.

In order to examine in greater detail how social innovations differ from other types of innovations, we look at their very foundation, i.e., factors of success. Success factors are here defined as issues that are critical for the initiation, realization or success of innovation cases. The reviewed success factors are categorized in the database to economic, environmental, social, political or technological kinds. The database includes also ethical and spatial success factors, but these are not included in the statistical analysis as their numbers are too small.

In the database, economic success factors refer to efficient use of money and to lower prices as well as to gain savings or profits. These success factors also relate to new business models and increased competitiveness, as well as securing funding in the form of subsidies, grants or investments. Environmental success factors relate to waste and emissions as well as a reduction in resource use (efficiency) and in harmful activities (e.g., transport). Political success factors deal with the involvement of authorities (in particular local authorities), local political will and support as well as securing the access to or the availability of critical resources. Social success factors include the empowerment of citizens and residents as well as social inclusion (employment of or housing for disadvantaged people) accounting for families, youngsters and children. These are mainly associated with social interaction and community involvement (such as cooperation with schools) and social acceptance. Technological success factors are connected with new technical solutions and processes, especially with low-energy and green technologies. These success factors relate to issues of usability and to the creation of sufficient technological base for the innovation. They also refer to knowledge sharing via technological platforms.

Examples of social innovation cases and their success factors derived from the database demonstrate the wide scope of the analysis:

- Real Pearl Foundation—Against fuel poverty with biomass briquettes, Hungary [42]. The innovation enables the production of biomass briquettes that are affordable for heating by poor communities. The raw material for the briquettes comes from paper waste and agricultural by-products so it is a low-carbon solution. Local workers also gain social benefits by being employed in the project. Economic success factor: Availability of cheap, low-carbon inputs for production of briquettes (agricultural by-products and paper waste).
- Earthship Brighton, United Kingdom [43]. Earthship Brighton was the Low Carbon Trust's first project and was the first Earthship to be built in England. The project was built as a community



centre in Brighton, UK. This demonstration project provides jobs for local workers and enables people to experience a novel eco-building and be inspired to respond to climate change at home and work. Environmental success factor: The demonstration of innovative, low cost, low carbon, low impact housing of the future.

- Transition Now, Denmark [44]. Transition Now (Omstilling Nu) is a network and a project platform that works to create a transition to a sustainable future society. The network provides an opportunity for open interdisciplinary dialogue related to new sustainable solutions. It includes various activities (e.g., large scale seminars, monthly debate cafés and guidelines for citizens) focused on how to move towards a sustainable society. Political success factor: The creation of political awareness and action towards a sustainable transition of society.
- International (Eastern Europe and the Balkans) web platform for carpool based in Bulgaria [45]. Aha! Car is the Eastern Europe International web platform for carpool. A trip is “shared” when a driver provides transportation to one or more passengers without direct financial gains. The company is a community-powered collaborative consumption start-up. Social success factor: Carpooling offers a commuter option to complement other methods of transportation favouring the creation of social networks.
- Sharing Torino, Italy [46]. This is a temporary social housing initiative in Turin established to meet needs for temporary rental properties at controlled costs. It is characterized by high energy efficiency solutions with low environmental impacts (e.g., solar panels or recycled materials). It mixes business objectives and social commitment. Technological success factor: New technologies in the management of energy, water and recycling process.

The analysis of the success factors of each innovation type is conducted with contingency tables. These are used to examine how observed success factors relate to examined types of innovations. This methodology provides two analytical opportunities as it firstly brings together observed success factors across the examined types of innovations, and secondly offers a statistical procedure for assessing the outcome. This methodology has been applied towards similar aims when surveying urban climate change experiments across 100 cities [47], and when analysing the critical issues of climate governance experiments [35]. The methodology is appropriate when the aim is to compare categorical variables such as types of innovations and kinds of success factors.

In this study, contingency tables are used to analyse if the observed success factors are distributed evenly across the case sample, or if there are statistically significant differences in their distribution. The method examines frequency distributions and is suitable for analysing variables that are qualitatively different. The statistical significance of differences of the frequency distribution of the independent, categorical variables of success factors is analysed with the Pearson’s chi-squared ( $\chi^2$ ) test, which reviews how the counts in the rows are distributed against the categories in the columns [48–50]. The method further provides an expected count for each cell in the contingency table, which provides an outlook of over- or under-representation of that particular variable in comparison to the other kinds of success factors and types of innovations. Further, pairwise analysis of success factors between innovation types is used to provide a more detailed account of differences.

#### 4. Results

This research has been designed to reveal how the success factors of social innovations related to those of other types of innovations. The results are based in a comparison of a large number of social innovation cases against governance, organizational, product, service and systemic innovation cases [16,51]. A contingency-table analysis of the success factors indeed shows that statistically significant differences can be observed between the distribution of kinds of success factors across different types of innovations.

Table 2 presents the results of the contingency analysis of kinds of success factors (in columns) and kinds of innovations (in rows). Each cell in the contingency table shows the observed counts of a success

factor for each type of innovation and its expected count. Individual  $\chi^2$  values are displayed for each count, with high  $\chi^2$  values accounting for great differences between the observed and expected counts. As each innovation can have more than one independent factor of success, there are 553 observed success factors distributed across 202 cases. Statistically significant differences between how the success factors are distributed across the innovation types could be observed at the 0.01 level ( $\chi^2 = 43.556$ ,  $df = 20$ ,  $p = 0.002$ ). This indicates that the distribution of success factors across types of innovations does not occur due to random variation, and accordingly, the results merit closer examination.

**Table 2.** Success factors of different types of innovation.

Innovation Type	Success Factor					Total
	Economic	Environmental	Political	Social	Technological	
Social	24 (28) <i>0.56</i>	30 (28) <i>0.22</i>	10 (15) <i>1.58</i>	44 (29) <i>7.42</i>	11 (19) <i>3.61</i>	119
Governance	17 (18) <i>0.10</i>	16 (18) <i>0.23</i>	17 (10) <i>5.43</i>	18 (19) <i>0.07</i>	10 (13) <i>0.57</i>	78
Organizational	13 (13) <i>0.01</i>	10 (13) <i>0.50</i>	7 (7) <i>0.01</i>	17 (13) <i>1.04</i>	7 (9) <i>0.36</i>	54
Product	27 (24) <i>0.45</i>	26 (23) <i>0.29</i>	7 (13) <i>2.49</i>	12 (25) <i>6.64</i>	29 (16) <i>9.60</i>	101
Service	39 (36) <i>0.35</i>	32 (35) <i>0.25</i>	21 (19) <i>0.25</i>	35 (37) <i>0.12</i>	24 (25) <i>0.01</i>	151
Systemic	10 (12) <i>0.26</i>	14 (12) <i>0.51</i>	7 (6) <i>0.09</i>	10 (12) <i>0.43</i>	9 (8) <i>0.09</i>	50
<b>Total</b>	130	128	69	136	90	553

$\chi^2 = 43.556$ ,  $df = 20$ ,  $p$ -value = 0.002 (Observed counts, expected counts are displayed in parenthesis, individual  $\chi^2$  values are displayed in italics).

The contingency table analysis shows that differences in the distribution of success factors come forth especially in cases of social, product and governance innovation. Concerning social innovations, reviewing observed against expected counts shows that social success factors were over-represented, whereas political and technological factors were under-represented in the distribution. The emergence of social success factors relate closely to the very definition of social innovation, and hence the low numbers of technological and, in particular, political success factors characterize social innovation better empirically. Product innovations form a counterpart for social innovations as they depict strong under-representation of social and strong over-representation of technological success factors. Governance innovations, in turn, show an over-representation of political success factors. These political success factors were under-represented in cases on social and product innovation. Interestingly, economic or environmental success factors are quite equally represented across all types of innovation.

Accordingly, the overall analysis shows that the success factors of examined cases of social innovation were more social, less political and less technological in relative character. To gain further insights, pairwise analyses of the distribution of success factors across types of innovation were conducted and their results are presented in Table 3. The pairwise analysis shows statistically significant differences between the distribution of success factors across social and product innovation cases at the 0.0001 level. Differences at the 0.05 level could be observed between social and governance cases and social and service innovation cases.

Differences in the distribution of success factors between social and product innovation were statistically significant at the 0.001 level ( $\chi^2 = 26.079$ ,  $df = 4$ ,  $p = 0.000$ ). This result further confirms that social innovation should be considered as something very distinct from product innovation particularly concerning the former's over-representation of social and under-representation of technological success factors. Similarly, governance innovation should be considered distinct from social innovation as

the former shows statistically significant differences in the distribution at the 0.05 level ( $\chi^2 = 10.127$ ,  $df = 4$ ,  $p = 0.038$ ). When compared, social factors were over- and political under-represented in social innovations. Finally, statistically significant differences in success factor distribution were observed at the 0.05 level ( $\chi^2 = 9.737$ ,  $df = 4$ ,  $p = 0.045$ ) between social and service innovations. This also supports the previously identified characterisation of social innovations. Over-representation of social success factors was combined with under-representation of technological and political ones, respectively. By contrast, no statistically observed differences in the distribution of success factors could be observed between social and organisational nor between social and systemic innovation, which indicates—albeit does not validate—possible similarities between the types.

**Table 3.** Pairwise analysis of the success factors in relation to social innovation, observed and expected counts (displayed in parenthesis).

Compared Innovation Types	Success Factor					Parameters		
	Economic	Environmental	Political	Social	Technological	$\chi^2$	Degrees of Freedom	$p$ -Value
<b>Social Product</b>	24 (28) 27 (23)	30 (30) 26 (26)	10 (9) 7 (8)	44 (30) 12 (26)	11 (22) 29 (18)	26.079	4	0.000
<b>Social Governance</b>	24 (25) 17 (16)	30 (28) 16 (18)	10 (16) 17 (11)	44 (37) 18 (25)	11 (13) 10 (8)	10.127	4	0.038
<b>Social Service</b>	24 (28) 39 (35)	30 (27) 32 (35)	10 (14) 21 (17)	44 (35) 35 (44)	11 (15) 24 (20)	9.737	4	0.045
<b>Social Systemic</b>	24 (24) 10 (10)	30 (31) 14 (13)	10 (12) 7 (5)	44 (38) 10 (16)	11 (14) 9 (6)	6.658	4	0.155
<b>Social Organisational</b>	24 (25) 13 (12)	30 (28) 10 (12)	10 (12) 7 (5)	44 (42) 17 (19)	11 (12) 7 (6)	2.582	4	0.630

In conclusion, the results provide insights on how social innovation compares to other types of innovation in terms of success factors. The next section discusses how the results support the influential conceptual model of the social innovation process as proposed by Cajaiba-Santana [9], while they do not correspond well to the conceptualisations discussed by Pol and Ville [10]. The results are also discussed against the definitions of the types of innovation.

## 5. Discussion

This article has addressed the conceptualisation of social innovation [9,10], and its research design has relied on an empirical and quantitative comparison of social innovation against other types of innovations. The main contribution of the article is that it empirically accommodates the conceptualisation of social innovation in a way that reaches beyond the examination of small numbers of case studies and thereby produces new knowledge at a more general level.

Contingency-table analysis with data from 202 cases on sustainable innovation targeting climate action, resource efficiency, raw materials and the environment found statistically significant differences in the distribution of success factors across the examined types of innovation. A first finding was that social innovation indeed differs from product, governance and service innovations in terms of success factors. This result empirically confirms the notion that social innovation indeed establishes a distinct form of innovation [1,12], and that its systemic examination may contribute to insights, which can be reapplied and transferred across settings.

Secondly, positioning the results against the identified knowledge gap in the conceptual framing of social innovations provides further empirical accommodation. In fact, it can be determined that the results relate better to the conceptual framework of Cajaiba-Santana [9] than the conceptions brought forth by Pol and Ville [10]. More specifically, as the social innovation process proposed by Cajaiba-Santana [9] is built on agency, institutions and social systems, the results support this conceptualisation as it also accentuates the role social success factors (social systems and agency), while



also downplaying the roles of technological and political success factors (as enabling and constraining institutions). In this respect, Cajaiba-Santana's model not only appears to effectively reflect the key features of social innovation processes that could be determined here empirically but also succeeds in leaving out factors with lesser meaning for social innovation.

The conceptions of social innovation as presented by Pol and Ville [10], in turn, consider institutional change, social purposes, the public good and non-market needs. The results of the empirical analysis neither support nor question these conceptions. Impact-oriented conceptualisations would indeed require a different empirical approach and still be at risk for categorising the case sample rather than describing their underlying, unifying relationships. The results challenge the claim that government intervention is required to encourage the creation of pure social innovations because political success factors did not have a prominent role in the examined empirical cases on social innovation. Further research on the issue is nonetheless warranted, as not all examined cases constitute pure social innovations in the sense that Pol and Ville [10] describe, and that governance innovations might in some circumstances address some of the expectations set for social innovations.

The results further support the idea that social innovation is distinct from other types of innovation due to its forms of collaboration [12]. Indeed, and not surprisingly, the role of social success factors is much more prevalent in social innovation than in other examined types of innovation. Similarly, political success factors are particularly relevant in governance innovation [40]. Furthermore, the results are in line with the definition of product innovations (goods or services) in the Oslo innovation manual [16], which emphasises the linkage between product and technological innovation, in that the results show that technological success factors are strongly over-represented in product innovations and over-represented in service innovations when compared to social innovations.

Furthermore, the results do not question the possibility that social innovations could contain similar elements as organisational and systemic innovation [12]. Systemic innovations target systemic change as do social innovations. This is because many of the social innovation cases, to a large degree, target sustainability challenges, which require thorough systemic changes in society to become realised. Organisational innovations, by definition, highlight the role of organising activities between and with people, which is similar to social innovation. Research shows that engaging publics can bring forth novel and disruptive ideas [52] and thus social innovations could well be considered potentially disruptive also in the light of the empirical findings. These findings indeed support the idea that disruptive [21] and social innovations can perhaps be advanced through similar means. Additionally, the prevalence of social innovation cases in a database that focuses specifically on sustainable innovation including climate actions suggests that social innovation for its part also accomplishes sustainability and helps to target climate change [14].

The marketing implications of the results hold that social innovation is related to social impacts more than business activities [10]. This allows making use of alternative or even non-profit marketing models, which rely on social capital. Networks of people acting in new ways may be the very essence of the innovation, whereas the underlying business arrangements are simply a way to ensure the provision of services. Indeed, it is useful to be able to differentiate social innovation from other forms of innovation as well as from business as usual. This is, however, a highly complex task as there is so much variety in what is targeted with innovation. Definitions typically consider novelty and significant improvements but leave out contexts and scopes [10,16]. In the realm of social innovation, this would highlight the quest for new or significantly better ways of achieving social impacts. Such innovation activities would need then not only take into account the factors contributing to social innovation but also be assessed according to the social impacts they contribute to.

## 6. Limitations and Future Research

While the empirical considerations for over two hundred innovations provide a grounded empirical accommodation for the concept of social innovation, there are some limitations in the interpretation of the findings. It should be considered that the study has not examined marketing and

process innovations, the successes of the examined innovations nor to which degree success factors have contributed to a particular innovation. These limitations derive from the data in the Casipedia database [22]. Assessing successes of innovations would require quite a different research design and development of metrics for the indicators of success. It would also call for reselection of the period of assessment, i.e., the determination of when an innovation stage ends.

A further issue to be recognised is that the study has not examined the success factors qualitatively. Each factor can include quite a variety of more detailed activities. For instance, economic success factors include both subsidies for product development as sales of an innovation, which relate to different stages and modes of business. Hence, the results of this article should be examined at a level of abstraction, which corresponds to the conceptualisation of social innovation.

The examined cases of innovation all relate to the domain of climate change and sustainable development. It is, therefore, an open question to which degree the results can be generalised to other fields. While it can be argued that the economic, environmental and social dimensions of sustainability are relevant to many if not all innovations, further studies are required to establish this empirically.

Finally, cases attributed to a particular innovation typology may include elements from more than one type of innovation [40], whereas the cases in the database were examined according to their main type of innovation. While this is not likely to have affected the key results of the analysis, it can be argued that an examination of only non-overlapping types of innovation cases could contribute to clearer results albeit at the expense of neglecting the full scope of innovations in real-life settings.

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