

Article

# Challenges and Solutions for Non-Timber Forest Product Businesses in Finland—An Application of the SODA Analysis

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**Abstract:** This study aims to present a holistic image of the strategic development needs and potential solutions within the Finnish non-timber forest product (NTFP) business sector and demonstrate a new hybrid methodology for collaborative strategy formulation. The perceived challenges and solutions were collected with the 635 group-working method in a nationwide series of NTFP actor workshops. The analysis applied the Strategic Option Development and Analysis (SODA) approach and the formal network analysis. Business actors emphasised two complex and interrelated aims of development at the core of the business activity: (1) to improve the profitability of the NTFP business and (2) to facilitate the growth of the sector. The present bottleneck is perceived in the raw material acquisition and productising, and many wider development themes, such as business logic and sustainability, received little attention.

**Keywords:** cognitive mapping; 635 group-work; SODA; non-timber forest products

## 1. Introduction

The commercial potential of non-timber forest products (NTFPs) has received increasing interest throughout the world, not only in the developing and emerging economies, where NTFPs are an important means to alleviate poverty and address conservation concerns [1] NTFPs are recognised as an integral part of multifunctional sustainable forest management [2,3] and promoted in various international and national policy agendas [4,5]). Research, development and innovation efforts are also increasing, and thus far, there are some studies on, inter alia, the volumes and economic values of forest resources [6,7], the economic potential of NTFPs for forest owners [3], the development of yield models and their uses in multi-objective forest management [8–10] and factors affecting the market supply of NTFPs [11]. Attention has also been paid to NTFP-related entrepreneurship, value chains and markets [12–14]. However, the research focus has obviously been on raw material harvesting and acquisition, whereas many aspects of the NTFP business, such as sustainability, are still insufficiently known [15].

Despite the increasing research efforts, the business potential of NTFPs is still strongly underutilised. Various challenges that hinder the development of the NTFP sector have been identified in the literature. Studies on the supply chains of NTFPs have revealed bottlenecks (i.e., the key challenges) at specific points of the chain [16,17]. The main challenges of the NTFP sector are “scarcity of raw material (in terms of both quantity and seasonal availability), low market transparency, lack of business and marketing skills, small market size and high production and transport costs” [18]. In addition, micro

and small enterprises typically have insufficient access to resources, such as staff, technology and information, that are needed to engage in long-term business planning and management [19–22]. Further challenges include market inefficiencies for products that are produced in low volumes, especially when both the quantity and quality of the products can vary due to changes in the weather and other production conditions. Unpredictability can also be caused by demand fluctuations because of, e.g., changing trends or the varying availability and prices of substituting products [23]. The small NTFP market is further segmented into even smaller specific markets [24]. The growth of the business is challenging, as the sector attracts limited investments [23]. The sector is typically dominated by micro and small enterprises, which have relatively low production volumes. This, together with the large annual variations in the supply of several NTFPs, has resulted in that, typically, these enterprises only get a part of their total revenues from NTFPs [18,23]. Furthermore, NTFP enterprises are often lifestyle-oriented, i.e., they are micro-sized, focus on risk aversion and aim at a target income level to support the current lifestyle of the owner/manager [25,26]. Growth-oriented companies accept higher risks and make strategic long-term plans [25]. One often-raised challenge for growth is the legislative framework, which varies from country to country and is sometimes considered as unfair. For example, varying national practices due to the EU Novel Food Directive may unequally inhibit the introduction of new products into the markets.

Solutions for the above-mentioned challenges have also been provided. These include a higher degree of technological innovation [23], greater product differentiation and a shift towards higher value-added products [27], as well as the integration of different services with NTFPs, such as recreation or educational services or products that include experiential services, such as guided tours, fairs or events [28]. To intensify raw material production with lower costs, partial semi-cultivation and cultivation have been proposed [24] alongside the development of harvesting technologies. Moreover, business cooperation within and beyond the NTFP sector at all stages of business planning and operations is widely acknowledged as a crucial element to increase business performance [22].

However, an overall picture of the challenges and opportunities is difficult to conceive, even within a country. This is because most of the cited studies concentrate on particular NTFPs or particular aspects of the business and provide tailored solutions from these specific perspectives. The context matters also within the NTFP sector [2], but a holistic view of the challenges and opportunities could be useful, at least at the country level, to guide national NTFP policies. Such a holistic picture can be formulated by a profound data-driven analysis of the wide research materials and/or by the aid of an explicit theoretical view to explain the situation of a business branch and its evolvement.

Gillet et al. [29] applied the forest transition theory (FTT) [30,31] in their study on NTFPs. According to this theory, the forest area and diversity therein are following a specific trend from forest loss and degradation, due to the intensified use of forests by the aid of modern technologies and value-chains, to the turning point and, then, towards reforestation and increasing diversity. The turning point is connected to ecological modernisation, when novel technologies are adopted and the business focus moves from one-dimensional production chain thinking toward value networks and service economies. According to the theory of the service dominant logic (SDL) [32], the value-add in businesses is not anymore based on the physical products, as such, but on the services around them. As an example, Weiss et al. [28] described how SDL logics change the focus of NTFP businesses from the physical products to cultural values, traditions and sustainability lifestyles served alongside the NTFP products, with selling points being picking experiences, crop-production festivals, etc. [22,33]. All examples of SDL to NTFPs are from the global north, consistent with the FTT, predicting how the increasing societal welfare enables environmentally oriented thinking in businesses in the most developed countries. Gillet et al. [29] showed that, in Central Africa, the NTFP cases are still struggling in the early steps of the forest transition curve, where intensifying forest use is diminishing the production potentials of NTFPs, which are used there by fulfilling the basic needs of local people, not on the niche products and services discussed in the global north.

Meinhold and Darr [22] approached the holistic picture by a data-driven analysis and formal international literature review. In this study, we also follow a data-driven approach. The objective of this study is to create a holistic view of the Finnish NTFP sector's challenges and opportunities—as perceived by the NTFP actors—with the aid of a novel hybrid methodology that integrates elements of Strategic Option Development and Analysis (SODA) with the 635 nominal brainstorming technique and the formal network analysis. To achieve the objective, we present the following research questions: (1) What kinds of challenges and solutions perceive the Finnish NTFP actors and (2) how these are interconnected in a hierarchical, causal, means-ends network. We discuss the results against the theories of FTT and SDL. The results and discussion can hopefully serve the NTFP development efforts in Finland and other Nordic countries that have corresponding societal and ecological conditions. The methodological innovation and discussion on it could be useful also beyond the NTFP sector.

## 2. Materials and Methods

### 2.1. The Finnish NTFP Sector

In Finland, the timber industry has a long tradition and a strong economic importance. The NTFP-based businesses, particularly the internationally oriented part of it, has a shorter history, despite the deep-rooted and multifaceted culture of forest resource use by households [18]. Today, there are approximately 750 enterprises listed in the natural products sector in Finland [34]. Micro-enterprises account for about 90 percent of these companies. The largest companies buy, process and sell wild berries (mainly *Vaccinium myrtillus* and *Vaccinium vitis-idaea*). The turnover of the NTFP sector has been growing during the recent years, and new companies have been established. In 2017, the unadjusted turnover was about 530 million euros [34], mainly due to increasing exports, particularly to Asian countries.

Most raw materials used by the NTFP sector are growing wild in forests. Finland is a country where public access rights (so-called “everyman’s rights”) are exceptionally wide. It means that people are allowed to collect wild berries (most important being *Vaccinium vitis-idaea* L. 1753, *Vaccinium Myrtillus* L. 1753, *Vaccinium oxycoccos* L. 1753, *Rubus chamaemorus* L. 1753 and *Empetrum nigrum* L.); mushrooms (e.g., *Boletus edulis* Bull. 1782, *Boletus pinophilus* Pilát & Dermek (1973), *Lactarius rufus* (Scop.) Fr., *Cantharellus cibarius* Fr. (1821) and *Craterellus tubaeformis* (Fr.) Quél. 1888) and many herbs (e.g., *Urtica dioica* L., *Chamaenerion angustifolium* (L.) Scop., *Trifolium repens* L. and *Trifolium pratense* L. and *Filipendula ulmaria* (L.) Maxim.) in all forest areas, and this right includes not only natives but, also, foreigners [35]. In fact, during the past 15 years, foreign pickers have been annually and actively invited to Finland to pick wild berries. Today, commercial berry-picking is primarily done by these foreign pickers, which are mainly from Thailand [11]. Some NTFPs are excluded from the everyman’s rights (e.g., pakuri (*Inonotus obliquus*), birch sap, pine and spruce resin, spruce shoots and birch leaves). Due to this, only forest owners can use these NTFPs or can rent out the collecting right to an outsider [36]. For example, an increasing number of forest owners have rented out their birch stands for sap production purposes to companies in recent years. As a result, the production of birch sap has increased, and the export of this Finnish tree water has developed considerably. Additionally, game can be considered as a NTFP. Some game species (in particular, moose) have commercial value, but they are typically considered in a different context than the above-listed NTFPs. In addition, the focus of this study is on the tangible forest products and services based on these, which also largely excludes considerations related to forests’ amenity values (e.g., nature tourism) from the scope of this study.

### 2.2. Data Collection

Data for this study were collected in three regional workshops where Finnish NTFP actors created ideas for the development of the sector. The workshops were held in Joensuu, Seinäjoki and Rovaniemi—i.e., in the Southwestern, Southeastern and Northern parts of the country—in the spring of 2016. In total, 39 people participated in these three workshops. They represented five different educational and two research organisations, three public business and rural development support

organisations, seven enterprises and a co-op on different NTFPs, a forest-related company and a public forestry organisation and two municipalities and associations (4H youth education associations and a local LEADER-association for rural development).

In the workshops, the 635 method was used to effectively capture a wide picture of the standpoints and the development of the sector. This method is a silent, structured brainstorming technique for a group of people [37,38] and has been designed for collecting a large number of ideas within a short period of time, which is why we applied this approach in our study. As a nominal group work method, 635 aims to integrate the best elements of the individual's focused thinking and the group's joint development of ideas. In the ideal version of the method, there are six participants per group, each producing three ideas first on a worksheet within 5 min [37,38]. After this, the sheets are forwarded to the next participant for new three ideas in 5 min). These cycles are repeated six times, resulting in 108 ideas within 30 min. In this study, an adapted procedure was used. In the first round, the participants were asked to write down three challenges, problems or obstacles that restrict NTFP businesses or entrepreneurship. NTFP was not strictly defined in the workshop but remained consciously open for participants to address all kinds of issues they felt relevant in the context. In the following rounds, the participants were asked to innovate solutions for these challenges. This methodological adjustment enabled us to better identify the causal relationships between the raised concepts. Altogether, we had eight groups in the three workshops. The group sizes varied somewhat around the average of five participants. These groups produced, altogether, 111 challenges and 627 solution proposals.

### 2.3. SODA and its Application

Various approaches have been recommended for supporting strategic decision processes (see reviews from [39–42]). An approach called “strategic options and development analysis” (SODA) [43–45] has recently received increasing attention as a theoretical frame and approach in complex and fuzzy strategy creation processes [46,47]. In SODA, people's conceptual ideas regarding the decision situation are recorded and visualised in a causal map (CM) that shows the concepts and their causal interconnections by arrows from means to ends [45,48].

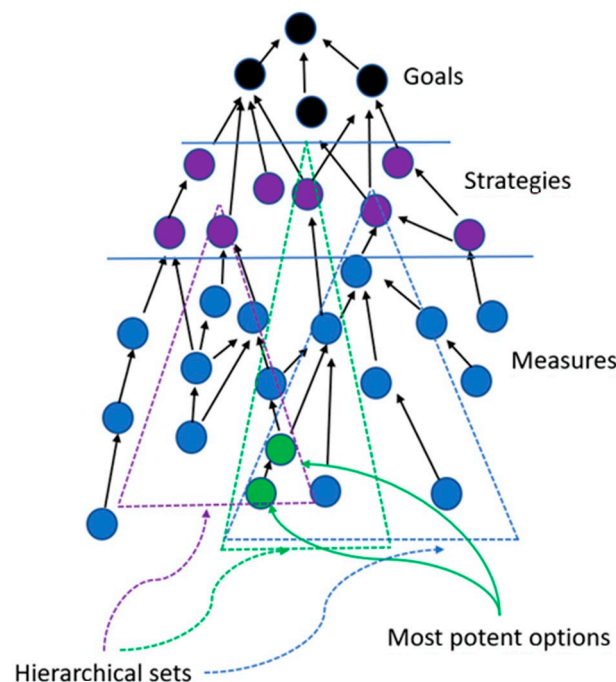
Unlike in the typical concept mapping, concepts are presented in action terms i.e., as sentences that begin with a verb in the infinitive or imperative mood (e.g., “(to) respond on climate change”). Such modified concepts are called “constructs” in SODA. In the SODA process, CMs are first drawn with individual participants who are inquired to raise the issues most relevant to the problem, which are then conceptualised and drawn on a map. After confirmation by the original informants, individual maps are then merged into a joint map by the researcher(s). The joint map is validated and improved in common workshops.

The SODA analysis applies a visual-qualitative analysis of the hierarchical maps and some simple formal network analysis procedures to finalise CMs and to draw joint conclusions from the map. At its best, the final map visualised for the workshop shows (1) the ultimate aims of the development, (2) the strategic (central) development areas and (3) the most potential measures that can be used to implement the strategies and to achieve the aims (Figure 1).

The following algorithms have been proposed by the original authors of SODA to aid mapping and analysis [45,49] and have been applied in this study. The algorithms HEADS and TAILS find constructs that have only incoming or outgoing arrows (i.e., have zero out- or in-degree measures) and that, therefore, depict ultimate aims and the most detailed measures in the map, respectively. The DOMAIN analysis calculates the centrality of the constructs as a sum of in-degree and out-degree measures. The most central constructs, as well as the constructs just below the HEADS in the hierarchy, may serve as starting points in the discussion on the strategic options. When strategic options are defined, the HIESET analysis is used to further analyse the hierarchical causal structure below them. It locates all those constructs into the same set that are leading to the same strategic option. Qualitative-visual analysis of those sets increases understanding on the causal interdependencies of the decision problem.

Finally, the POTENT analysis calculates how many hierarchical sets a particular construct belongs to. Constructs belonging to many hierarchical sets are worth of being studied more closely, as they have influences on many strategic options and can thus serve as the most potential concrete action measures in the situation.

The SODA theory and the associated CM method have been developed especially for enhancing complex multiobjective, participatory, decision-making problems [50]. According to the original ideas of CM and SODA, the construction of the mental map is an iterative collaborative process. However, this ideal model is difficult to follow in cases where there is a large group of equally involved participants. For example, individual interviews and meetings with all participants were impossible to organise in our NTFP workshops. Problems in group dynamics, such as domination, can also hamper equal communication in ad hoc meetings, especially when the participants represent different and competing interests.



**Figure 1.** Strategic options and development analysis (SODA) applies causal mapping to consistently and transparently search development goals, strategies and the most potential individual development measures from the network of causally interlinked constructs adapted from [45,51].

Considering the above-mentioned challenges, we applied SODA and CM in the form of a “hybrid-methodology”, which is suitable for large groups and aims to alleviate the possible problems in the group dynamics. The methodology integrates (1) a nominal group technique, adapted from the 635 technique [37], which inquires actors’ perceptions effectively without domination in workshops but still catalyses the creative “riding further” of the others’ responses. This also informs about the causal relations between the constructs; (2) the SODA analysis of ultimate aims, strategic options and potential measures and (3) a formal network analysis to draw a merged map based on the data from the three workshops. The exact application of SODA and the formal network analysis in the analysis of the 635 data are explained in the following Section 2.3.

#### 2.4. Data Analysis

The 111 challenges and the 627 solution proposals from the three workshops were first coded into constructs, i.e., changed into action-oriented sentences starting with a verb in the infinitive form. The participants were not obliged to use this exact form of expression in the 635 group work. The aim of the coding was to make the vast richness of the data understandable and coherent but without



losing any essential information. The challenges and the solutions were processed simultaneously, because the nature of the construct depends on the particular context in which it was raised in the sheet, i.e., on the location of the construct in the causal hierarchy of all the constructs. For example, one challenge raised in the workshops was “low degree of productising”. This was turned into the activity construct “to increase degree of productising”. The same issue was listed in another 635 sheet as a solution for the challenge “the resources are scattered because NTFP-business is not a mass production business” in the upper hierarchy level. Causal links between the constructs were created based on the challenge-solution information. The qualitative coding produced altogether 448 constructs and 706 links between constructs (Supplementary materials).

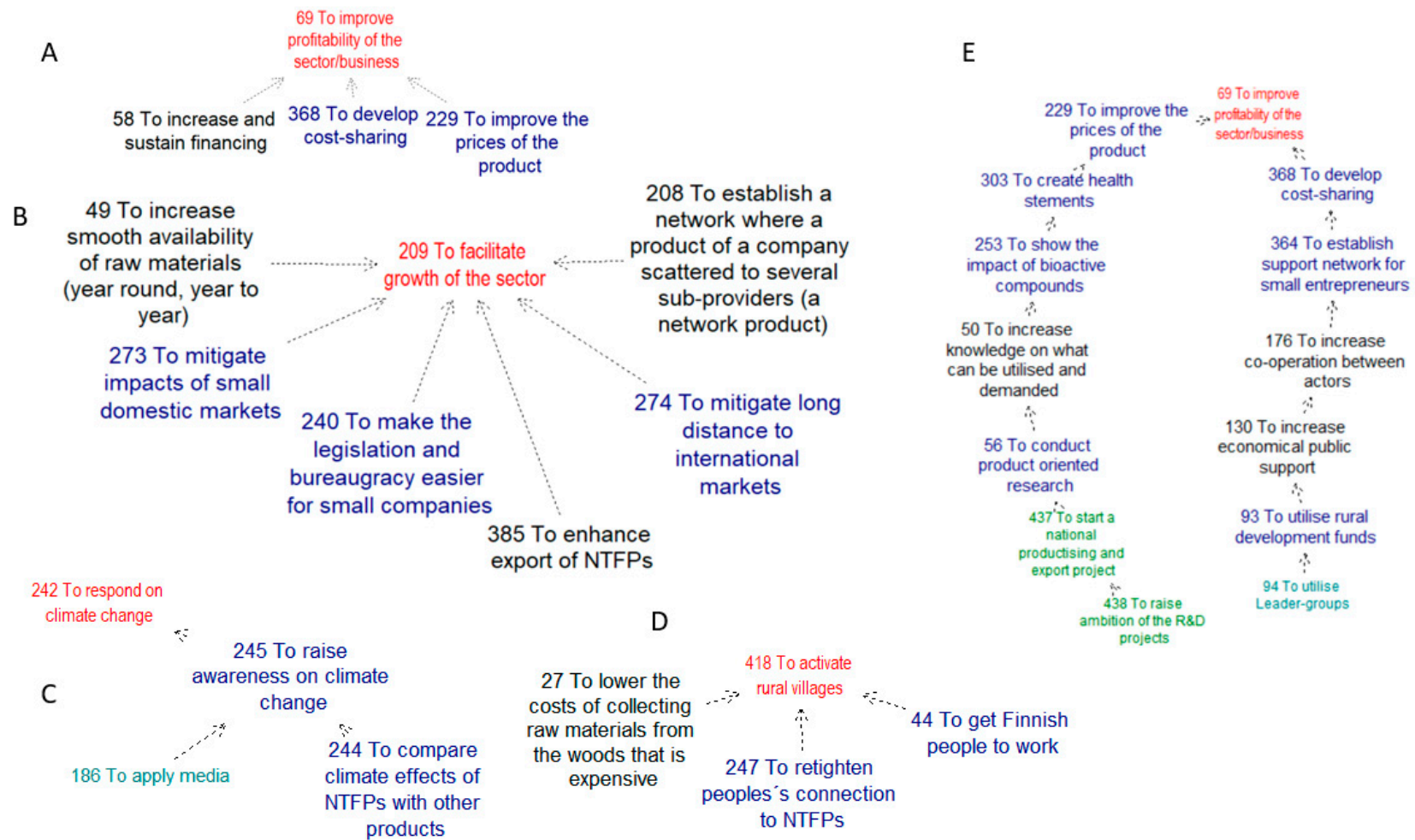
Many applications can be used to visualise and analyse causal maps in the SODA process. The Decision Explorer [49] software was used in this study to both visualise and quantify calculations. We applied HEADS, DOMAINS, HIESET and POTENT analyses (see definitions in Section 2.2). In our data, hierarchical sets below the ultimate aims were strongly interlinked, and thus, it was not reasonable to search for strategic options from the second level of the hierarchical map, as proposed by SODA developers and appliers [47]. Instead, we applied the most central concepts by DOMAINS as seeds in the POTENT analysis.

In addition to the Decision Explorer software, we used the NetDraw network analysis software [52] to complete the visualisation and analysis of CMs see, [53]. At this stage, to simplify the visual presentation, we included only aims (HEADS, 4), strategic options (44) and the most potential measures (23), as described above, in the map. The overall causal map was presented in a two-dimensional visual presentation, where location coordinates of the constructs were calculated by the default graph theoretic layout (based on geodesic distances) provided by NetDraw. Such a mapping procedure shows the overall structure of the map better than CM, which focuses only on links between constructs and not on the explicit location of constructs in the map of all the constructs.

### 3. Results

#### 3.1. Ultimate Aims

We identified four head constructs and 137 tail constructs from the causal map of 448 constructs and 706 links. The density of the map was 0.0035, and the average degree of constructs was 1.57. Below, we do not present the entire map but concentrate on its main contents. All constructs and links between them can be found in Supplementary Materials. The four head constructs depict the ultimate aims of NTFP sector developments, which are: (A) to improve the profitability of the sector/business, (B) to facilitate the growth of the sector, (C) to respond to climate change and (D) to activate rural villages (Figure 2). The ultimate aims A and B (profitability and growth of the sector) were commonly mentioned by the workshop participants, whereas the aims C and D were mentioned only occasionally.



**Figure 2.** The four ultimate aims and related measures of the development of the non-timber forest products (NTFPs) sector. In graphs (A–D), the causal chains are presented in depth 1, i.e., including only constructs leading directly to the aim (A,B,D), or in depth 2, i.e., including also constructs having two steps to the aim (C). Graph (E) presents two examples of causal chains from tails to the head “to improve the profitability of the sector/business”. Red colour depicts constructs that were, according to the analysis aims of the development, black refers to strategic options (Table 1) and green to the potent action measures (Table 2). Constructs in blue are in standard style and in light green are tail constructs in the map.

For the aim “to improve the profitability of the sector”, a diverse set of solutions was provided. These concerned the three dimensions of profitability—prices and costs of the products and cost-sharing in investments (A). More precisely, the constructs around this aim called for shorter value chains between the local production and the end markets, novel business models and networks between entrepreneurs, as well as new approaches for the productising and pricing of raw materials. Various causal chains starting from the tail constructs could be identified. Two of these are presented in (E). The first chain depicts a sequence of measures from ambitious development projects to knowledge building on the different nutritional functionalities of NTFP products to the possibility of using this information in building health statements, which are supposed to increase the demand and prices of products and, thus, to improve the profitability of the sector. The second chain shows how costs can be lowered by developing cost-sharing through the establishment of cooperative support networks for small-scale entrepreneurs with the aid of public funding (e.g., from the EU’s LEADER project).

The key challenges that inhibit the growth of the sector were the smooth availability of raw materials, small domestic markets, long distances to larger markets and the lack of consistent and planned cooperation networks throughout the value chain. Furthermore, certain problems in the legislation and bureaucracy were seen as challenges, particularly those that hampered the introduction of new food products into the markets (Figure 2B).

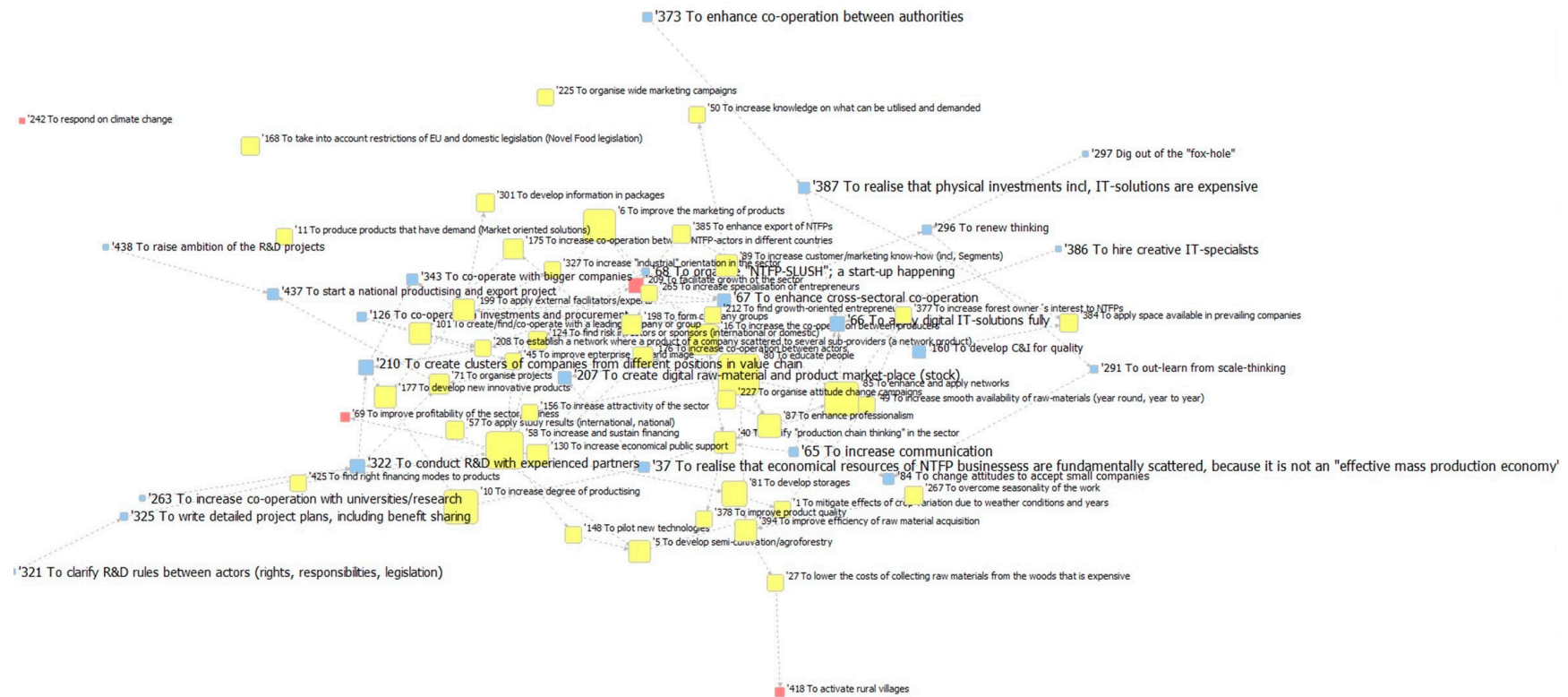
The ultimate aim to respond to climate change was mentioned in four cases only. All these comments regarded climate change as an opportunity for the NTFP sector. The carbon footprint of NTFPs is generally considered low compared to products from monocultural agrosystems and to agricultural products in general. Thus, the practical measures proposed for this aim included awareness-building among citizens and NTFP-producers on the positive effects of NTFPs on climate change (Figure 2C). No concerns over climate change or proposals on how to minimise the carbon emissions of the NTFP value chains were present.

The aim “to activate rural villages” was mentioned only a few times in the workshops. This aim was located close to the measures that stressed the smooth availability of raw materials for businesses by the involvement of local people. They were seen as an alternative to foreign pickers, who nowadays collect most of the marketed wild berries in Finland. Other proposed measures included awareness-building on the positive effects of NTFPs on rural areas and many suggestions of how to lower raw material acquisition costs, such as integrating NTFP acquisitions with large material flows of timber or releasing some bottlenecks of the raw material chain from the forest (for example, prohibitions on the use of all-terrain vehicles (ATVs) in the forests) (Figure 2D).

### 3.2. Strategic Options

In SODA, strategic options are found among the constructs that are located near the ultimate aims in the hierarchy of all the constructs. In our study, we searched for strategic options by calculating the centrality measures of constructs (DOMAIN analysis). A high degree of centrality of the constructs in the map gives an overview on what types of measures were regarded either as a solution to many challenges (out-degree centrality) or as a challenge that can or needs to be solved by many different solutions (in-degree centrality). We selected the 44 most central constructs as strategic options. It was not a surprise that these central constructs included abstract measures, such as “to educate people”, “to enhance and apply networks” and “to increase cooperation between producers”. All these measures were among the most central constructs in the map by the sum of the in-degree and out-degree (Table 1). As measures for development, they were related to the ultimate aims “to improve the profitability of the sector” and “to facilitate the growth of the sector.” More concrete strategic options were located close to these central but generic constructs (Figure 3).





**Figure 3.** Overview of the challenges and solutions within the Finnish NTFP sector. Development aims (orange), strategic options (yellow) and the most potential measures (blue) of the NTFP sector. Links between the constructs presented in the figure are depicted in the dotted arrows. The size of the symbol depicts the centrality of the construct by the sum of the in-degree and out-degree (= DOMAIN analysis of Decision explorer [49] as described in Section 2.3. The size of the label texts of the most potential constructs (POTENT analysis) depicts the number of hierarchical sets influenced by them (the larger the font, the higher the influence). The location of the constructs depicts the closeness of the constructs in the network of all 448 constructs by the geodesic layout of NetDraw software [52].

**Table 1.** Top 44 constructs and their degree values that depict the number of links associated with a construct (DOMAIN analysis of decision explorer software [49] as described in Section 2.3) Cells in bold font indicate constructs that served most often as means (over 60% more often than as ends), and constructs in underlined italics indicate the position as an end (as an end over 40% more often than as a mean). NTFP: non-timber forest product.

ID and Label of the Construct	Out-Degree	In-Degree	Sum
80 To educate people	14	8	22
58 To increase and sustain financing	9	11	20
85 To enhance and apply networks	13	5	18
10 To increase degree of productising	9	9	18
6 To improve the marketing of products	5	12	17
16 To increase the cooperation between producers	10	6	16
81 To develop storages	4	9	13
87 To enhance professionalism	2	9	11
5 To develop semi-cultivation/agroforestry	6	5	11
101 To create/find/cooperate with a leading company or group	7	3	10
199 To apply external facilitators/experts	7	3	10
40 To clarify “production chain thinking” in the sector	6	4	10
89 To increase customer/marketing know-how (incl, Segments)	6	4	10
130 To increase economical public support	5	5	10
177 To develop new innovative products	2	8	<u>10</u>
394 To improve efficiency of raw material acquisition	2	8	<u>10</u>
175 To increase cooperation between NTFP-actors in different countries	6	3	9
176 To increase cooperation between actors	6	3	9
71 To organise projects	4	5	9
198 To form company groups	3	6	9
57 To apply study results (international, national)	8	0	8
227 To organise attitude change campaigns	5	3	8
168 To take into account restrictions of EU and domestic legislation (Novel Food legislation)	4	4	8
124 To find risk investors or sponsors (international or domestic)	3	5	8
384 To apply space available in prevailing companies	3	5	8
267 To overcome seasonality of the work	2	6	8
301 To develop information in packages	2	6	8
385 To enhance export of NTFPs	2	6	8
45 To improve enterprise size and image	1	7	<u>8</u>
265 To increase specialisation of entrepreneurs	5	2	7
11 To produce products that have demand (Market oriented solutions)	4	3	7
212 To find growth-oriented entrepreneurs	4	3	7
50 To increase knowledge on what can be utilised and demanded	3	4	7
148 To pilot new technologies	3	4	7
208 To establish a network where a product of a company scattered to several sub-providers (a network product)	3	4	7
27 To lower the costs of collecting raw materials from the woods that is expensive	2	5	7
156 To increase the attractiveness of the sector	2	5	7
225 To organise wide marketing campaigns	2	5	7
378 To improve product quality	2	5	7
1 To mitigate effects of crop variation due to weather conditions and years	1	6	<u>7</u>
49 To increase the smooth availability of raw materials (year-round and year-to-year)	1	6	<u>7</u>
327 To increase “industrial” orientation in the sector	1	6	<u>7</u>
377 To increase forest owner’s interest to NTFPs	1	6	<u>7</u>
425 To find right financing modes to products	1	6	<u>7</u>

Education was demanded to change attitudes towards increasing the cooperation among actors and to improve the image of the NTFP business. Both are important means to support the growth of the companies. The efficiency of raw material acquisition should also be emphasised in education, as it is essential in lowering acquisition costs and in mitigating the adverse effects of weather-induced crop variations. Educational interventions were also demanded for the development of storages and near-to-site pretreatment facilities, which were mentioned as measures to ensure the smooth flow of raw materials to companies. Two other strategic themes of education were the increase of customer and marketing knowhow and the enhancement of “professionalism” in the sector. The latter theme was based on the idea that many prevailing NTFP enterprises do a hobby-like “lifestyle” activity more than a real business. This hobbyist attitude was also seen, among other things, as a reason for the uneven availability of raw materials.

The central constructs “networks” and “cooperation” were strongly linked in the map. More effective networking, both between the national and with the foreign NTFP actors, was called for. Ambitious, joint development projects could improve the production chain-thinking within the sector, which, in turn, could increase professionalism and improve product supply and quality. Another measure that could contribute to the smooth availability of raw materials was the enhancement of forest owners’ interests in NTFPs. Based on our analysis, this requires an intensified networking between forest owners, forest professionals and NTFP suppliers.

“To increase and sustain financing”, “to increase the degree of productising” and “to improve the marketing of products” were also among the most central concepts, but they were presented more often as ends of the development than as measures. The first one is obviously a strategic development challenge for the emerging growth-oriented companies. Launching new technologies and increasing the size and image of the companies require the incorporation of new financing forms. The same applies to the development of storages, which are necessary for raw material acquisitions from sparsely populated rural areas. Strategic solutions for the financing challenge included the search for new financing modes, such as domestic and foreign risk investors and sponsors or new public funding mechanisms. In this search, the overall attractiveness of the sector is essential, as is the strategic partnership with a few growth-oriented or leading partners. Company groups are more attractive for investors than individual companies. The increase and improvement in productising aim, as strategic options, at the products that are in demand. This calls for detailed knowledge on customer segments and for novel innovative products for these segments. Cooperation between producers and hiring external facilitators were seen as solutions for innovations. “To apply the study results (international and national)” was the only tail construct (serving only as a solution) among the most central constructs (seven or more links). This indicates that the NTFP sector is just developing in Finland, and NTFP actors call for support for their businesses from the research.

### 3.3. *The most Potential Constructs*

In SODA, the most potential action proposals are those that are linked to many strategic options and are thus supposed to have a wide influence on strategies and aims. The descending list of the most potential constructs (Table 2) informs developers very broadly just “to increase communication” and “to enhance cooperation between authorities”. The next most potential measures after these generic ones indicated frustration among the NTFP actors on the authorities’ inconsistent decisions and guidance for the sector. A call for project cooperation with universities and research organisations is regarded as a potential measure that would help, e.g., “to apply digital solutions fully” by “hiring creative IT specialists”. Projects and innovative IT solutions were seen as measures for developing strategic partnerships and enhancing work division in the supply chains and value networks. An interesting and potential idea was “to organise an “NTFP-SLUSH: a start-up happening”, which brings together investors and companies of different sizes. Such ideas have created a lot of start-ups in the IT sector in Finland. Additionally, a measure “to create digital raw material and product marketplace (stock)”

could—based on its position in the map—solve many challenges related to both the growth and the profitability of the sector; i.e., it could have a wide influence.

Interestingly, a call for “realising that economical resources of NTFP businesses are fundamentally scattered, because it is not an effective mass production economy” and, also, “renewing thinking” and “digging out of the fox hole” were calculated into the list of the most potential measures (a presence in at least seven hierarchical sets was required). To some extent, these critical voices were linked to the dominant rhetoric-taking companies’ growths self-evidently as an aim of development measures of the sector. These unorthodox voices called for “attitude changes to accept small companies”.

**Table 2.** Top 23 potential measures in descending order of value by the POTENT analysis of decision explorer software [49]. The value indicates to how many hierarchical sets, leading to each strategic SLUSH: not-for-profit movement originally founded to change attitudes toward entrepreneurship in IT sector (<https://www.slush.org/about-slush/>).

Construct With ID	Number of HIESETS
37 To realise that economical resources of NTFP businesses are fundamentally scattered, because it is not an “effective mass production economy”	13
65 To increase communication	13
373 To enhance cooperation between authorities	13
387 To realise that physical investments, incl. IT solutions, are expensive	12
66 To apply digital IT solutions fully	11
263 To increase cooperation with universities/research	11
321 To clarify R&D rules between actors (rights, responsibilities, legislation)	11
322 To conduct R&D with experienced partners	11
325 To write detailed project plans, including benefit sharing	11
386 To hire creative IT specialists	11
68 To organise “NTFP-SLUSH”: a start-up happening	10
207 To create digital raw material and product marketplace (stock)	10
210 To create clusters of companies from different positions in value chain	10
67 To enhance cross-sectoral cooperation	9
160 To develop C&I for quality	8
84 To change attitudes to accept small companies	7
126 To cooperate in investments and procurement	7
291 To out-learn from scale-thinking	7
296 To renew thinking	7
297 Dig out of the “fox hole”	7
343 To cooperate with bigger companies	7
437 To start a national productising and export project	7
438 To raise ambition of the R&D projects	7

### 3.4. Overview of the Key Findings

The two most often repeated ultimate aims: “to improve the profitability of the sector/businesses” and “to enhance the growth of the sector” were close and tightly linked to each other through many strategic aims and potential measures (Figure 3). The most central strategic development options to reach these aims included “to educate people”, “to increase and sustain financing”, “to enhance and apply networks” and “to increase degree of productising”. Regarding the development measures, the analysis emphasised rather generic actions related to communication, cooperation and networking. The strategic options of networking and partnership were seen central for improving profitability. Potential measures related to these strategic options included out-of-box thinking and creativity, especially in IT solutions. A need to increase, innovate and sustain financing was also a central strategy of the development, but not many concrete measures were proposed. Interestingly, several arguments about the need to change the way of thinking regarding the company size made this construct also a central part of our map. Based on this idea, the acceptance of the small scale as an ultimate nature of

the NTFP sector might catalyse positive developments towards the profitability, improved image and balanced rural development.

#### 4. Discussion

##### 4.1. What Kinds of Challenges and Solutions Perceive the Finnish NTFP Actors?

Most of the findings from this study have been reported in previous studies from different ecological and societal contexts (Table 3), indicating that most challenges and solutions of the NTFP sector are rather universal.

**Table 3.** Summary of challenges and solutions for the NTFP sector in Finland (research question 1). Headings adapted from [22], according to the results of this study. Referred previous studies are presented in brackets. The most central (Cent) and potential (Potent) constructs in this study are also indicated.

<b>(Business) Business Planning</b>	<b>(Business) Product Development, Processing and Marketing</b>	<b>(Business) Enabling Institutional Framework</b>
Micro and small enterprises (Cent) ([11] [20]; [21], [22])	Small market size (Cent) [18]	Varying legislative frameworks (Cent) [54], [22]
Lack of business and marketing skills (Cent) [18]	Segmentation of markets (Cent) [24]	Challenges and inconstancies of bureaucracy and legislation on innovation, export of nutrients and on other functions (Cent)
Inability to business planning and management (Cent) ([11]; [20]; [21], [22])	Low market transparency [18]	
Strengthening expertise and business skills (Potent)	Low degree of processing (Cent)	
Business cooperation within and beyond NTFP sector (Cent) [22]	Product differentiation [27]	
Business and project planning (Cent)	Product development (incl. services) (Cent)	
Outlearn from large scale-thinking (Potent)	Shift towards higher value-added products (Potent) [27]	
	Criteria and indicators (Potent) [15]	
	Unpredictability by demand fluctuations [23]	
<b>(Resources) Raw Material Acquisition</b>	<b>(Resources) Financial Investments</b>	<b>(Resources) Knowledge Acquisition and Cooperation</b>
Scarcity of raw materials (in terms of both quantity and seasonal availability) (Cent) [18]	Lack of financial investment (Cent) [23]	Information and knowledge on harvesting, production, products and raw materials (Cent and potent)
Inconsistent, varying volumes and quality [18]	“NTFP-SLUSH happening” (Potent)	Research (Cent and potent)
High production and transportation costs (Cent) [18]		Information on markets/customer/demand (Cent)
Underdeveloped collection networks and supply chains of raw-materials (Cent)		Education/Training on established actors (Cent)
Technological innovations in harvesting (Cent) [24]		Distribution of knowledge and information (Cent)
Semi-cultivation and cultivation (Cent) [24]		Cooperation to improve knowledge/information base (Cent)
Development of storages (Potent)		Enhancement of peoples’ awareness in the NTFP sector (Cent)

The only challenges emphasised in previous studies that did not receive central attention in this study were the transparency of NTFP businesses [18] and the unpredictability of business by demand fluctuations [23]. Implicitly, the proposed potential measure of developing Criteria and Indicators (C&I) responds to the challenge of openness. The call for C&I may also originate from the worries about the sustainability of the gradually growing business sector [15].



#### *4.2. How Challenges and Solutions on These Are Interconnected in a Hierarchical, Causal, Means-Ends Network?*

The bottleneck model of the NTFP supply chain development [16,17] describes well our key findings regarding the second research question about hierarchical structure among the raised concepts. Actors of the NTFP sector tend to consider that the NTFP resources of our forests are almost infinite, and, on the other hand, global markets are enormous compared to the present production volumes. A global bottleneck is the raw material acquisition because of underdeveloped collection networks and technologies in supply chains. The next phase of the production chain, i.e., product development and marketing, was also emphasised as a challenge in our analysis, similarly to many reviewed studies.

However, our workshop approach induced more solutions for the given bottleneck challenges than the previous studies. This is especially the case for solutions related to education and networking. Education and knowledge acquisition from different perspectives (research, distribution and awareness building) turned out as strategic options and potential solutions for many problems of the sector. Information sharing is needed for raw material producers to introduce possibilities and to enable strategic networking and partnerships with the first-order producers and companies in international trade. Educational efforts are needed, especially to improve the business-planning skills of small-scale entrepreneurs. Business modelling and product development are matured actions of companies acting in international sales, but service models that intermediate between primary production and product development do not exist. Such new, service-oriented business models may be raw material procurement services, mobile storages with freezing and drying facilities, the premature manufacturing of raw materials close to the harvesting sites and web-based markets for raw materials. Criteria and Indicators (C&I) are called for to ensure smooth procurement chains and a high quality of end products. In the “enabling the institutional framework” [22], bureaucracy to regulate new food-stuff products to enter markets is not enabling but radically hindering the development of the sector.

It is noteworthy that, in addition to economic considerations, none of the sustainability dimensions were mentioned by name in our data, indicating that ecological, social or cultural sustainability were not seen as essential challenges for the NTFP sector. Vice versa, the NTFP chain was regarded as intrinsically sustainable. In our study, the clearest link to ecological sustainability was found in the raised challenges relating to climate change and one’s weakening relationship with nature, presenting also a cultural aspect. In addition, ecological sustainability was present in marginal solutions that raised the need to enhance forest conservation and highlighted the importance of resting years for harvested sites. The underlying reasons for the association between NTFPs and positive ecological sustainability include the well-known fact that the production potential of Finnish forests is significantly higher than the current uses of forest resources [15,55]. Furthermore, those who mentioned climate change in the workshops did it in connection with the aim to enhance the growth of the sector, signalling that climate change is regarded as an unquestioned business strength of the sector. Similarly, constructs focusing on the nature relationship entailed an idea that the sector would directly benefit by tightening urban people’s relationships with nature. The clearest references to strong sociocultural sustainability concerned the vitalisation of local communities (work for local people and activation of peripheral villages), but the closest strategic options related to the aim to activate rural villages are the ones related to raw material acquisitions and the overall image of the sector, indicating that those aspects of social sustainability are instrumentally viewed as prerequisites for the businesses and not as core strengths of the sector. Furthermore, we also found some statements that seemed to possibly conflict social and cultural sustainability. These were prominently related to the negative attitude towards small hobby-like enterprises and to the idea that the everyman’s right poses a problem for the business sector.

Thus, according to our results, service-oriented business models, networks and the sustainability of NTFPs are insufficiently understood and applied as a genuine development orientation. Similarly, services and strong sustainability received little attention also in data-driven previous studies, drawing a holistic picture of the NTFP sector. In any case, from the view of the forest transition theory, sustainability and services may be the main strengths and features of the mature future NTFP sector in

rural areas, but related development efforts [28,33,56,57] require a self-critical analysis of the business logic and sustainability aspects of the sector. A nicely phrased call “to dig out of the fox hole” or to “out-learn from (large)-scale thinking” weakly signals the emerging strong sustainability and service orientation of the sector.

#### 4.3. Methodological Considerations

Cause-consequence relations of actions in the NTFP sector have been considered previously [18], even if the methodologies applied did not explicitly capture the causal relationships. In our workshop approach, the use of the hybrid methodology resulted in a diverse and long list of challenges and solutions. Nuanced and peer-validated solutions were coproduced equally in silent group work sequences. The applied methodology turned out to be promising but needs to be further developed. In this study, most participants of the workshops had a business orientation toward the NTFP sector, and, for example, forest owners were not particularly invited to the workshops, nor environmental non-governmental organisations. The results of workshop-based studies are heavily dependent on the participant profile and are not, as such, statistically representative. For example, even though we can assume that many of the participants were also forest owners (in Finland, forests are dominantly owned by private families), the picture on the challenges and solutions of the NTFP sector would possibly be different if similar workshops had been organised with forest owners and their representatives.

When reviewing the results of this study, some can, with good arguments, argue that the findings were rather predictable. This is probably a common shortcoming of whatever data-driven study attempting to create an overall picture of the perceptions over the issue. The 635 method managed to capture information rather well of the causal relationship between concepts (in the form of challenges and solutions) and enabled a consistent and transparent mapping of the hierarchical structure of large qualitative data. The method produced a large amount of data. Nuances may easily be holed up behind generalisations in a typical qualitative coding exercise, with the key challenge for the analysis being how to structure the data to capture the most essential findings behind the details. For this purpose, the concepts and applications of the SODA-approach and the formal social network analysis were used here. This approach enabled us to construct a nuanced map over the hierarchical structure in the large qualitative data. Anyhow, in this rather large data, general and frequently repeated challenges and solutions—such as, “to educate people”—received dominant positions in the middle of the causally linked hierarchical sets, and, in doing so, they merged the hierarchical sets above them. Therefore, we used the most central concepts in our data (found by DOMAIN) as the starting point in the HIESET, in contrast to what has been proposed in previous SODA studies [47]. Thus, further methodological development is needed, particularly on how to inquire more detailed information on challenge-solution interconnections in the 635 setting.

Another critical point of the data collection methodology of this study is that it did not encourage participants’ thoughts towards systemic change challenges of business sectors. To overcome this shortcoming, brainstorming elements can be easily integrated into the 635 workshops, but then, the results do not describe the present perceptions anymore. The methodology demonstrated in this paper is most useful in research where the aim is to transparently map an overall understanding of an emerging business sector. From the practitioners’ and policymakers’ point of view, possibly the most important and handy findings are those constructs that hold direct action power, i.e., those that are detailed recommendations and valued in the potent measures (Table 2). For the policymakers and scientists, constructs in the upper hierarchy levels, such as perceived aims and strategic options, may be more interesting, as well as the overall big picture, including constructs missing from the map, such as sustainability and service-related challenges in this study.

It must be noted that, in this study, each expert participated only in a single workshop. As such, this process does not follow the original idea of SODA [43–45]. Especially “ownership”, as a central feature of SODA—the idea that informants jointly validate and approve the map—was not achieved in our methodology. Thus, for the development-oriented processes, we recommend another workshop

where the results of the SODA and network analyses are reflected, adapted and validated by the key informants. The methodology demonstrated in this study serves as a cost-effective mixed-method research tool for a qualitative, data-driven analysis on the perceptions of a large group of people.

## 5. Conclusions

Our results clearly indicate that the NTFP sector is a premature business area, where the bottlenecks and related development challenges are based on the raw materials and first-order product developments. Solutions, proposed by NTFP experts and entrepreneurs, call for ambitious projects and improved cooperation and strategic partnerships between actors, as well as for learning from other, more established, business sectors. When raw material production and carefully developed project and service portfolios among entrepreneurs have been organised, more focus needs to be put on the end-product marketing, image building and financial cooperation arrangements.

The small number of perceived challenges related to the services and the sustainability issues may also be typical for the premature business area, according to the grand transition theory [58] and its application of the forest transition theory, which explains the transition from degradation along modernisation via the transition point toward a more equitable and sustainable post-modern society featured by service economies. The NTFPs and their uses are often associated with ecological, social and cultural sustainability. In this study, such an idea of axiomatically sustainable NTFP businesses led to the weak consideration of sustainability: the challenges and solutions proposed by the Finnish experts and entrepreneurs focus almost solely on achieving and securing economic viability and growth by the aid of streamlining NTFP value chains, according to the typical view of modernisation. As aspects of social and cultural sustainability, NTFPs are recognised as an important part of the rural folklore in Finland and in many other countries. The related business activities allow for the exploitation of regional strengths and, thus, serve sustainable living and employment opportunities across the country. The questions and worries arising from our results are related to how premature NTFP businesses could step directly to a post-modern service-dominant economy without a potential sustainability degradation phase. Such a development path would probably emphasise different challenges and solutions for the NTFP sector than those found in this study.

**Supplementary Materials:** The following are available online at <http://www.mdpi.com/1999-4907/11/7/753/s1>, Table S1: List of constructs and links on the challenges and solutions of NTFP-sector in Finland according to the nation-wide workshop data with NTFP-experts.

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