



Article

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Maria Nijnik ^{1,*}, Tatiana Kluvánková ², Albert Nijnik ³, Serhiy Kopiy ⁴,
Mariana Melnykovich ^{5,6}, Simo Sarkki ⁷, Carla Barlagne ¹, Stanislava Brnkaláková ²,
Leonid Kopiy ⁴, Igor Fizyk ⁴ and David Miller ¹

¹ The James Hutton Institute, Craigiebuckler, Aberdeen AB15 8QH, UK; carla.barlagne@hutton.ac.uk (C.B.); david.miller@hutton.ac.uk (D.M.)

² SlovakGlobe: Slovak Academy of Sciences and Slovak University of Technology, 81243 Bratislava, Slovakia; tana@cetip.sk (T.K.); brnkalakova@ife.sk (S.B.)

³ Environmental Network Ltd., Aboyne AB34, UK; anijnik@yahoo.com

⁴ Ukrainian National Forestry University, Gen. Chupryny Str., 103, 79057 Lviv, Ukraine; s.kopiy@email.ua (S.K.); kop.l@i.ua (L.K.); i.v.fizyk@nuwm.edu.ua (I.F.)

⁵ Swiss Federal Institute for Forest, Snow and Landscape Research, WSL, Zürcherstrasse 111, 8903 Birmensdorf, Switzerland; mariana.melnykovich@wsl.ch

⁶ European Forest Institute, St. Antoni M. Claret, 167, 08025 Barcelona, Spain

⁷ Cultural Anthropology, University of Oulu, Pentti Kaiteran katu 1, FI-90014 Linnanmaa, Finland; simo.sarkki@oulu.fi

* Correspondence: maria.nijnik@hutton.ac.uk

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Abstract: Social innovation is recognised for its potential to turn societal challenges into opportunities and develop sustainable solutions for people and nature. We identify and examine challenges that Ukrainian forestry is facing and apply an “action arena” conceptual approach to explore whether and how social innovation can enhance the sustainable development of forestry. We develop a framework to analyse the reconfiguration of social practices by using research methods that focus on the use of documentation of the institutional contexts and interviewing forest policy experts, as well as stakeholder evaluation of the challenges and ways forward for Ukrainian forestry. We apply the Q-method to identify stakeholder attitudes and examine the role of people in the reconfiguring of social practices and promoting sustainable development of the forest sector. Implications for changing the rules of the game and institutional perspectives on forestry are identified, with examples of social innovation initiatives presented. Results show that to emerge, develop, and be transformative, social innovation must have supporting institutional conditions to create new norms, rules, and social practices. Relevant stakeholders need to envision alternative futures, reshape places, and become more actively engaged in decision-making processes. We identify the key directions for changing the rules of the game and the opportunities that social innovation has to offer.

Keywords: sustainability; institutions; forest governance; stakeholder engagement; social practices; attitudes; perceptions; reconfiguration; transformation

1. Introduction

Forests provide numerous benefits to people. The sustainable use of forests contributes to the well-being of local communities and delivering of UN Sustainable Development Goals [1]. Sustainability is enhanced by suitable rules and regulations. It is improved by market incentives and public policy instruments, but these can overlook the realities and challenges faced by forest-dependent communities [2]. Responses to these challenges can result in civil-society-led initiatives that are

designed to tackle pressing social demands, including those that are traditionally not well addressed by markets or existing public institutions. Social innovation has a potential to enhance society's capacity for turning social and economic challenges into opportunities. It necessarily relies on the voluntary engagement of civil society actors and focuses attention on solutions that create social and environmental benefits, and processes by which these benefits are realised [3–5].

Social innovation manifests itself in new and/or reconfigured social processes and practices, relationships, networks, interactions, and collaborations between people. It promotes the development and uptake of new services and fields of activity, such as social entrepreneurship and social enterprises [6,7]. Social innovations that reconfigure rules in the use and management of forests include changing tenure rights [8], introducing participatory approaches in forestry [9], fostering climate change mitigation [10] and innovative practices to monitor sustainability in using natural assets [11]. An example of such a social innovation is the community ownership-based management of local woodlands in Lochcarron, UK, which creates opportunities for employment, housing, skills enhancement, and preservation of cultural heritage [8]. Other examples of social innovation concern the revitalisation of continuous cover forestry, locally beneficial nature-based tourism, use of non-wood forest products (NWFP), grazing, and game management. These social practices do not necessarily require discontinuing commercial practices, but instead redirect them towards more multi-functional and sustainable forestry systems.

The internationally recognised principles of sustainable forest management (SFM) underpin forestry policies and practices in many countries, including Ukraine. However, the concept of sustainable forestry is wider, with spatial and temporal implications going beyond forests and their direct management. Sustainable forestry is a function of natural, man-made, human, and social capital, and the concept incorporates ecological, economic, and social dimensions [12]. In this paper, we specifically focus on the *social dimension* of sustainability, which concerns socially acceptable equity in the distribution of employment, income, and multiple benefits from forests. The social dimension also concerns social processes and practices that are obliged to turn forest associated human-environmental interactions towards sustainability.

The concepts of social innovation [3,7], institutional transformation [13,14], and transitions [12,15,16] focus on the reconfiguration of social processes and practices to offer solutions for it to take place. The *reconfiguration of social practices, in response to societal challenges, which seeks to enhance outcomes on societal well-being and necessarily includes the engagement of civil society actors* is taken as the definition of social innovation [7]. Adaptive social innovation can help in stabilising a disadvantaged group in relation to mainstream society and reduce regional disparities. Transformative social innovation escalates across and can eventually alter or replace existing institutions [17–19]. The conceptualisation of social innovation has advanced since the start of the EU H2020 Social Innovation in Marginalised Rural Areas project, SIMRA [6,7], by its team [3,4,9,20–23] and beyond [5,17,18,24–27]. The SIMRA database of social innovations includes about 450 examples [28]. However, social innovation records associated with post-transition economies are scarce, and the knowledge of social innovations in forestry is limited. Social innovation in Ukrainian forestry has not been analysed in scientific research of an international level, with the exceptions of [4,29,30].

The *purpose of this paper* is to fill this knowledge gap by answering the *questions* of whether or how social innovation can offer transformative opportunities to sustainability in Ukrainian forestry. The paper starts with the presentation of methodology centred around the Analytical Cyclical approach, developed and used to conduct a desk-based literature survey and stakeholder evaluation work, and the Q-method. Then, we present results of the analyses which show that to direct the forest sector towards sustainability it is important to move away from old sets of mental models. It is also important to redesign the institutions that are shaping human-environment interactions. We identified the key directions for changing the rules of the game and examined opportunities that can be offered by social innovation. We finish with a discussion and conclusions.

2. Methodological Approaches

An Analytical Cyclical approach was developed to guide the research process, with empirical evidence derived from a literature survey in combination with use of participatory and analytical tools. The review of the literature included scientific, policy, and “grey” sources in five languages. In parallel, we carried out a stakeholder evaluation of the status and new developments, associated with social innovation and its potential impact, through the eyes of actors, on the ground. The use of a mixed methods approach provided evidence for the corroboration of findings through triangulation. The results obtained from analysing the literature were validated by stakeholders. Those strengths of the approach also gave a voice to forestry stakeholders and experts, and ensured that the findings were grounded in the experiences of participants.

2.1. Background

The forest area in Ukraine amounts to 10.4 million hectares (ha), of which 9.6 million ha are wooded (15.9% of the territory of this country). Most forests are in the western region, especially in the Carpathian Mountains. Forest species composition is diverse and varies across the territory. There are four categories of forests: commercial (37.9%); protective (32.9%); recreational (15.3%); and natural reserves, forests used for scientific, historical, and cultural purposes (13.9%) [31]. The average age of stands is 60 years. Forest land is primarily public, with land under the responsibility of different ‘land holders’ (Figure 1), and with only 0.1% of woodlands in private ownership. However, forest plots can be leased for up to 49 years for recreational, educational, and other non-industrial forms of use [32].

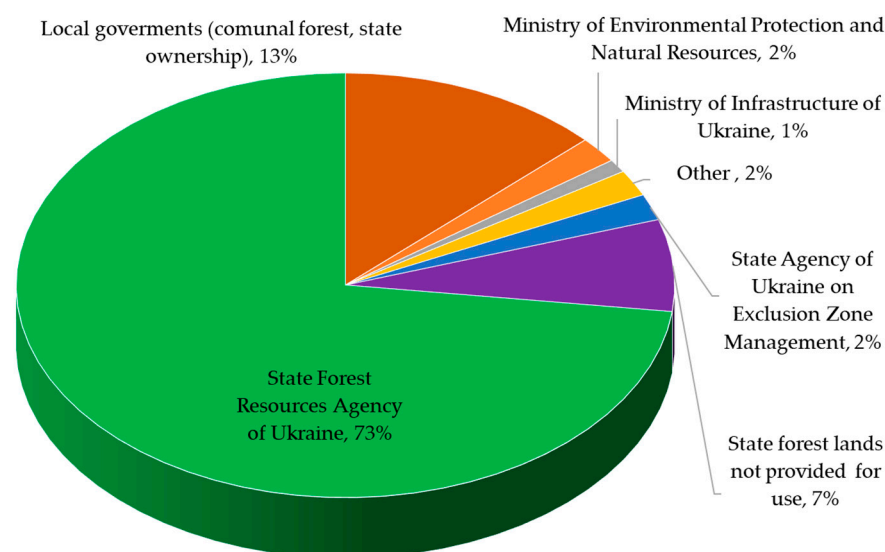


Figure 1. Distribution of forest land among holders (%). Source: Adapted from [31].

Forest management is a task of professional foresters. Forest harvesting plans reflect centralised forest governance inherited from past arrangements [33]. Annual wood increment is 35 million m³, and timber harvesting is approximately 20 million m³, 85% of which is clear cutting [32]. Ukraine has the potential to develop the harvesting of NWFP including berries, mushrooms, game, and honey. It has a significant resource base, traditions, and readiness of people to take jobs linked to NWFP [34]. Recent socio-political and economic changes (e.g., the rise of private enterprises and entrepreneurship, on the supply side) have increased the role of NWFP. On the demand side, NWFP has started to make significant contributions to the well-being of forest-dependent communities, particularly those experiencing low-income generation, unemployment, and labour migration [35].

There is a long tradition in Ukraine of developing its forests. Up to the 1920s, afforestation was episodic. Denudation of the forestlands has come about as a result, first, of the forces related to development and then of an economic system in which little attention was paid to environmental

values [19]. It was only in the 1970s that further degradation was neither tolerated nor warranted, and the setting aside of 10.8% of forest lands and lowered rates of harvest were approved [36]. However, tree-planting was hampered by economic and social conditions, and later, by the policy shift towards encouraging natural regeneration of woodlands [12]. In the 1990s, the forest sector was affected by difficulties of the transition process, including the absence of a well-defined and ensured system of property rights; shortage of investment and of economic incentives; and a shift of actor mentality to short-term problems, e.g., rent-seeking [13].

Today, annual planting on forest land amounts to 50,000 ha [31], with significant practices of reforestation and land reclamation [25]. The area of certified forests, according to the Forest Stewardship Council [37] scheme, is approximately 4.5 million ha and is increasing. Since 2006, the State has legislated the Forest Code [38], produced a State Programme of Forests for 2010–2015, and developed a Strategy for sustainable development and institutional reform of forestry through to 2022 [39]. These sets of rules and regulations identify, in general terms, forestry challenges that include climate change and sustainability. The State Forest Resource Agency is the principal authority with responsibility for forest policy and management [39], with local authorities, small business, and local communities having little influence on forest planning and decision-making [40].

2.2. Analytical Process

We examined the reconfiguration of social practices by using an *Analytical Cyclical process view*, characterised by the following *structuring research themes* (Figure 2). It adapts the co-evolutionary ideas [41–43] and those of complex adaptive system dynamics [44]. A literature survey was conducted across the themes of Fit, Interplay, Social Innovation, Scaling, and Impact, as *sequencing steps* of our research, and validated and integrated with the results received from a survey of expert opinions.

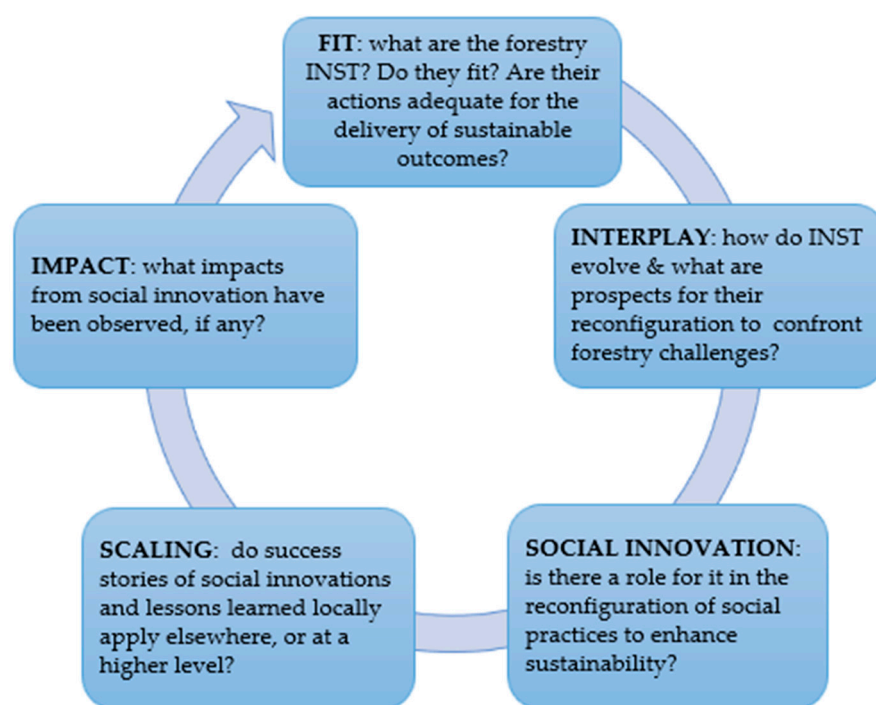


Figure 2. Analytical process with themes to examine the reconfiguration of institutions (INST) and social practices. Source: Authors' elaboration, adapted from Young [45].

Within the theme of *Fit* (Figure 2) an analysis was undertaken of the extent and performance of institutions, taking account of the characteristics they seek to govern (e.g., social-ecological systems [46]). We considered the resource use associated with decision-making and whether social processes and practices are putting Ukrainian forestry on a path to sustainability.

Interplay has looked at the interconnected systems, examining the co-existence and inter-links of institutional elements. This was important because governance systems often consist of parallel, overlapping, and nesting institutions [47]. *Social Innovation* often emerges from the need to correct governance and market failures (e.g., address misfits) and create new practices to enhance sustainability. Social innovation can lead to new institutions, improve or critique the prevailing institutions to promote a change.

Scaling occurs when a social innovation goes up (vertically) to a larger scale change, e.g., via a wave of individual initiatives in the same niche [19]. Social innovation may also scale out (horizontally) from one locality to another. *Impacts* are understood as the effects created which sometimes may change institutions. In such cases, the overall fit or interplay, or both, will change. However, if pursued changes did not happen, it is likely that motivations for changes remain, giving birth to new ideas and collective actions.

2.3. Survey of Opinions of Experts

A survey of the opinions of experts was based on semi-structured interviews, and then subject to a discourse analysis. This research component was designed to understand the *causality, design, performance, and impact* of institutional reconfiguration, from the perspectives of experts. A shortened version of the questionnaire is provided in Appendix A. It was translated into Ukrainian and analysed in line with the analytical process and steps, shown in Figure 2. Four experts from Ukraine were interviewed. The first expert was a forest policy actor at the national level (as forest governance in Ukraine is predominantly by the authority type). The second expert was a forest scientist providing understanding of the contexts and peculiarities of forestry development. The third and fourth experts represented the forestry community of practice at the regional and local levels, at which forest management is largely implemented.

2.4. Attitudes of Forestry Actors: Application of Q-Method

The research applying the Analytical Cyclical approach was complemented by the Q-method examination of the attitudes of forestry stakeholders to changes in social practices with respect to sustainability in forestry. The *Q-method* [48] combines qualitative and quantitative tools [49,50] and incorporates elements of behavioural studies into action research. It enables an explanation of attitudes and perceptions. In line with the remit of this study, 24 statements were derived through a concurrence analysis, structured, and included in a questionnaire. The key statements can be seen in Figure 3. To be resource efficient c.f. [51,52], we drew on secondary sources of literature.

Respondents were asked to sort the statements at a scale from +3 through to −3. The scale obliges respondents to identify with what they agree or disagree and judge the statements in relation to each other. The sorting grid looked like: −3 (2); −2 (3); −1 (4); 0 (6); +1 (4); +2 (3); +3 (2) (the first figure stands for the value of the column and the second shows the column size). The results are processed in a Q-sort (i.e., a formal model of individual's attitudes). Then, it is correlated with every other Q-sort, and the inter-correlation matrix is analysed using a *Principle Component Analysis* (PCA).

The correlation analysis compares the views to find differences and similarities, and categorises correlated respondents' views under factors, creating new uncorrelated choice variables. These factors capture the essence and variety of individual perspectives (i.e., the individual Q-sorts). Because the factors are associated with respondents, the technique links the attitudinal diversity to individual characteristics of the people interviewed [53].

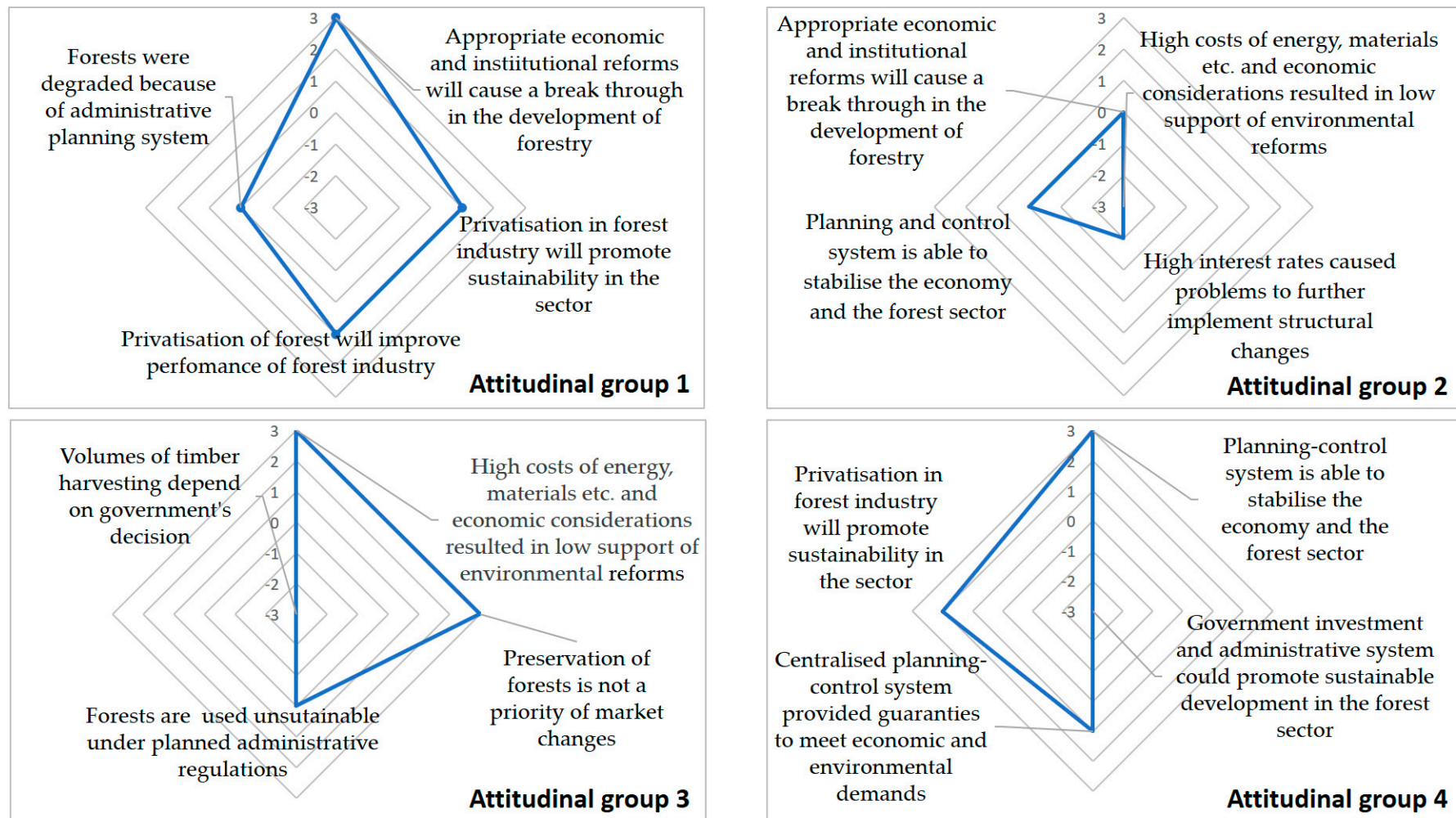


Figure 3. Institutional and sustainability-related distinguishing statements across the attitudinal groups identified. Source: Authors' elaboration.

The Q-method enables the capturing of the variety of attitudes, and structures them in a way that different “common discourses” emerge [52]. Thus, the resulting factors are associated with the prevailing attitudes and perceptions [30,51]. Then, based on a series of outputs, the distinguishing statements for each attitudinal group are analysed and an interpretation of the social discourses uncovered by the quantitative analysis is produced. This enables an understanding to be gained of prevailing attitudes and perceptions, and a comparison of the differences and similarities identified amongst the groups of attitudes.

The Q-method was applied to analyse attitudes of forest managers from all five forest zones. Three forest managers per zone were interviewed. Co-authors translated the questionnaire into Ukrainian and approached respondents, providing background information and explaining the purpose and technique of this study. Stakeholder engagement can already be considered as an element of social innovation, as stakeholder evaluation forms a basis for capacity building and participatory decision-making [47].

3. Results

3.1. Heterogeneity of Stakeholder Attitudes: Results of Using the Q-Method

The results of Q-method application received through factors extraction (PCA), their Varimax rotation, and interpretation revealed four types of stakeholder attitudes towards institutional changes and sustainability in forestry (i.e., four factors provided the best representation of distinctive types of attitudes, as shown in Table 1).

Table 1. Factor loadings for attitudinal diversity of forestry stakeholders across forestry zones.

Zonal Representation of Individual		Loadings Across Factors			
Q-sorts		1	2	3	4
1 Polissja (Woodlands)		0.6480X	0.1471	0.1470	−0.1341
2 Polissja (Woodlands)		0.8235X	0.1735	−0.1131	−0.3967
3 Polissja (Woodlands)		−0.5317	0.1552	−0.0324	0.6305X
4 Wooded Steppe		0.1498	0.8040X	−0.0318	0.2544
5 Wooded Steppe		0.8399X	−0.0683	−0.0308	−0.1953
6 Wooded Steppe		−0.0169	0.8225X	0.0962	−0.1423
7 Steppe		0.1171	0.2507	0.8564X	−0.1007
8 Steppe		−0.6697	−0.2044	0.2210	0.5239X
9 Steppe		0.4101	0.2974	−0.1134	−0.7524
10 Carpathians		−0.1453	−0.1527	0.7240X	0.3210
11 Carpathians		0.7462X	0.0399	−0.1155	−0.4758
12 Carpathians		−0.0482	0.4121	0.0821	0.8307X
13 Crimea		−0.5444	−0.1900	0.1356	0.6677X
14 Crimea		0.8580X	−0.0907	0.0998	0.0598
15 Crimea		−0.1656	0.4309	−0.4566	0.5950X
Percentage of variation explained		29	13	11	22

Explanation: An individual's loading (with X indicating a defining sort) is a correlation coefficient indicating the extent to which each individual Q-sort is similar/dissimilar to the composite factor array. A positive loading indicates that an individual shares an outlook with others, whilst a negative loading is a sign of rejection of the perspective. Numbers in the bottom row of the table show the variance (%) in the total dataset of individual Q-sorts, as explained by the factors.

Based on the analysis of the modelling outputs, the distinguishing statements for each group (shown in Figure 3) were qualitatively analysed. This enabled an explanation of the substance of the prevailing attitudes to be identified. The interpretation of the social discourses uncovered revealed that respondents belonging to the *first attitudinal group* (factor 1) shared a belief in radical reforms. They support privatisation in the forest industry, believe in markets, and that with institutional changes natural resources will become more valuable and sustainability will be enhanced. To provide

a shorthand identification of the sense of the perspective, each factor was given a meaningful label. We name the first attitudinal group *Radical market promoters towards green growth*.

Stakeholders, belonging to the *second group* argue that relatively high interest rates and costs of energy do not cause sizeable problems to structural changes or policy reforms. This attitudinal group, labelled as *Opportunists with market-driven orientation*, is not in favour of a command-and-control type of forest governance. It is likely to support pro-market changes but considers sustainability issues to be of minor importance.

For the *third attitudinal group*, financial problems are a reason for poor support of environmental, and forest policy reforms. However, respondents belonging to this attitudinal group do not consider the preservation of forest as a priority of market changes. They deny that timber harvesting volumes depend on government decisions, but seem to be supportive of the authority type of governance. They are interested in environmental issues and, therefore, are labelled as *Environmental stewards*, but do not have a clear perception of sustainability in forestry.

The *fourth attitudinal group* is of *Command-and-control economy supporters* who have a strong command-and-control economy orientation and are in favour of the authority type of forest governance. They support their position by citing the environmental and other problems that arose since the transition started.

Stakeholder perceptions *somewhat differ across the territory*. Respondents from the Polissja and Carpathian regions are more in support of radical reforms towards a market economy. In the Carpathians, attention is also given to sustainable development of forestry. This could be explained by high values of forest in this region and its richness in biodiversity. The attitudes of respondents from the Wooded Steppe and Steppe reflect their preoccupation exclusively with forest protection and ecological sustainability. This is likely to be because forestry comprises only a small proportion of the regional economies, while environmental problems here are acute.

The attitudinal diversity appeared to be somewhat dependent on the age of respondents and their work experience, societal position, and salary level, but not on gender. The results provided insights into understanding the attitudinal heterogeneity and diversity of perceptions. These findings can be useful for identifying potential conflicts (e.g., between stakeholder interests) to avoid and manage them, and/or for assisting decision-makers with the incorporation of stakeholder perceptions into forest policy design. The findings provide indications of why certain governmental policies are supported by some people but unfavourably received by others, and why social innovation may not scale up/out. Overall, the *results imply that attitudes of Ukrainian forestry actors are very diverse* (Figure 3). Therefore, while social innovations are emerging, their development and spread will face challenges.

3.2. Examples of Social Innovation

We illustrate the emergence of social innovation on the following examples coming from the Carpathian region, which relate to the challenges in Ukrainian forestry of illegal logging, lack of participatory forest governance, and unsustainable tourism [29,54,55]. A socially innovative campaign of the *Forest Watch* [56] was initiated to stop illegal activities in forests. The idea is to empower volunteers to monitor and control forest harvesting. Volunteers are from different backgrounds, all concerned with an increase in illegal logging. The volunteers are trained on how to inspect forest activities, where to report illegal loggings, and how to react in challenging situations. They learn about sustainable forest management and monitoring, about legislation and documentation, and how to evaluate the state of trees and calculate the amount of harvested wood. The training is provided by practitioners and scientists experienced in forestry. This initiative aims to *fight illegal logging* and to raise the *awareness of communities* on how their activities could help in managing the forest sustainably.

The *FORZA project* was initiated in mountain areas affected by floods, caused by clear-cut loggings. Those practices have generated criticism from civic society actors [57]. The project, involving a range of stakeholders, was initiated in the villages of Nyzhny Bystryi and Bohdan. Forestry administration and foresters are accustomed to top-down planning procedures but did not have experience to

participate in consultation processes. Therefore, the two-level concept, which combines participatory Community Development Plans with regional Forest Management Planning, is deemed to be *socially innovative* [22,58]. The initiative demonstrates how participatory forest planning and governance could expect to improve the environmental situation [22].

The *Free Svydovets* [59] movement was launched as a response to potential threats to the Svydovets Massif—a unique area with the last remnants of primeval beech forests. This social initiative started when a group of “oligarchs” announced the construction of a ski resort in the area with a capacity of up to 28,000 visitors, in 60 hotels (120 restaurants, 33 ski lifts, 230 km of ski trails, a mall, a bank, an airport). A group of local activists, together with environmental NGOs, scientists, and local small-scale entrepreneurs, started to oppose the proposal as potentially damaging to the valuable forests.

3.3. Summary of Results from Using of the Analytical Cyclical Approach

The results from using the Analytical Cyclical approach are summarised in Table 2.

Table 2. A summary of key results of using the Analytical Cyclical approach.

Theme	What’s Been Revealed
Misfit and Interplay	A misfit between the sustainability ideas and on-the-ground requirements; non-fit for purpose laws and regulations, e.g., price, fiscal, and tax; their lack of clarity and transparency; institutional failure and implementation deficit (e.g., a gap between policy goals and their realisation; distributional malfunction); lack of harmonisation between short- and long-term planning; vertical and horizontal misfits (e.g., between strategies, programmes and plans; local, regional, and national governance levels); shortage of adequate policy instruments/incentives; mismatches between resources required and available (e.g., financial, human, social, digital); institutional rigidity; excessively centralised and authority type of governance; temporal misfits and <i>path dependencies</i> ; lack of spatial and sectoral integration.
Social Innovation	Social innovations (SI) are developing (Section 3.2) and, potentially, there can be a role for SI to make a change.
Scaling	No evidence of scaling up and out. The <i>reasons</i> for why success stories do not apply more widely lie in the <i>institutional settings that are unsupportive</i> for SI to emerge and develop. The role of actors with their competencies is crucial, but the level of development of social capital and <i>competencies</i> is inadequate. The heterogeneity of stakeholder attitudes (Section 3.1) makes scaling up challenging.
Impact	<i>Social impacts</i> are becoming visible; development of <i>governance and environmental impacts</i> is anticipated. <i>Economic and wider impacts</i> could be foreseen subject to supportive institutional conditions, financial support, adequate social capital and competencies of actors, including social innovation leaders.

Source: Authors’ elaboration, with SI standing for “social innovation”.

The experts highlighted that, at the stage of forestry development (which is often considered as post-productive [60]), the role of “good institutions” [61] in controlling the tenure, management, delivery and use of public “goods” is becoming increasingly important, along with wider *end-user engagement*. In addition to the examples analysed in this paper, experts mentioned new social initiatives relating to museums of forests, educational centers, public events, and the involvement of residents in forest planting. However, it is likely that these cases do not meet the definition or criteria of social innovation [7,23], and their success is limited. However, in Ukraine, where there are budget and institutional deficiencies to provide adequate public support for forestry, while markets do not function properly, social innovation is seen as a prospective way forward.

3.4. Impacts of Social Innovation

The *social impacts* are becoming visible in all three social initiatives through: (i) the improvement and creation of new *social relations*; (ii) positive changes in flows of *information and raised awareness* in civil society, e.g., regarding sustainable forestry, the rights of using resources; (iii) *widening the*

networks of people sharing similar beliefs and strengthening collaborative links of innovators with others involved (e.g., NGOs, scientists) through the information exchange and knowledge sharing platforms (inside and outside the region, and the country); (iv) development of *local knowledge* and sense of identity; (v) cooperation and establishment of new partnerships; and (vi) provision of *new opportunities* for the communities of places, practices, and interests to play a more active role in society.

The *governance impacts* are less explicit but anticipated through: (i) the changing of a “business-as-usual institutional action arena” towards *participatory decision-making* and empowering civil society actors by means of their engagement and knowledge sharing; (ii) increasing demand in participatory forest management from active members of civil society; (iii) building of *capacities and advancing competencies* of the innovators; (iv) promoting *participatory forest governance* (FORZA), opposing unsustainable development of tourism (*Free Svydovetz*); and (v) establishment of *collaborative platforms*, programmes of action, and planning of next steps (e.g., in the combating of illegal logging, *Forest Watch*). This initiative establishes a dialogue with conservationists, environmental inspectors, police, authorities, and forestry enterprises, at a local and national level. It engages local communities, and develops a network of activists, comprising representatives of local people, tourists, media, NGOs, and authorities, working voluntarily to monitor and protect the forest from illegal cutting.

If the social innovation manages to eliminate the shadow economy in its locality, it will also create *economic impact* and *wider, societal impact*. The *Free Svydovets* [59] group believes that the construction and running of a large scale resort may have catastrophic consequences for the environment and communities, as these are heavily dependent on forest ecosystem services for water purification, flood prevention, sheep grazing, and habitats for the growth of berries and mushrooms. The initiative contributes to preserving the environment and maintaining traditional ways of farming and natural resource use, with the development of small-scale rural tourism (e.g., eco-tourism, gastronomy tourism, ethno-tourism), traditional crafts and developing sustainable agriculture and agro-forestry. The initiative also fights against corruption, nepotism and uncertainty often associated with the forest use and environmental governance in Ukraine.

The *environmental impacts* are anticipated in all of the analysed cases, e.g., by placing the management and use of natural assets on a sustainable pathway, *reducing vulnerability* of risks from natural hazards and losses from the decreased provision of ecosystem services. However, success stories will depend on supportive institutional and financial conditions, social capital, level of engagement, and on the knowledge, competencies, and capabilities of actors.

4. Discussion

4.1. Emergence and Development of Social Innovation

Eichler and Schwarz [62] illustrate a difference between social innovations observed in developing and developed countries. However, what about post-transition economies? This study revealed several social initiatives in Ukrainian forestry. For these initiatives to develop, it is crucial to create a supportive environment shaped by the interaction of favourable *politico-normative, socio-ecological, and socio-economic contexts* [19]. These contexts are complex and dynamic, and intertwined with factors that often hinder the development of social innovations. Moreover, each social innovation is context specific and features individual characteristics in their combinations described by the dimensions of *actors and knowledge*, growth and expansion, forms of viability and depth of change [19]. The roles of actors, with their knowledge, capabilities, and capacity to/for changes is crucial for social innovations, together with the roles of competent and inspired *leaders* [63]. However, the capacity to change is personified in codes of human behaviour. A new order must prove to be more desirable and effective than the old one. Consequently, the development of social innovation could be more complicated than the re-organising or establishing of new agencies.

To innovate, actors make decisions, interact, learn, and adjust. Their capabilities and *competencies* (i.e., cognitive, motivational, organisational, communicative, etc., including reciprocity, motivation,

commitment, and trust) are important for innovation to take place [19]. Capability development leads to changes in the belief systems of actors, and their cultural precepts [4], whilst the knowledge developed and conveyed, both internally and externally, provides actors with operational flexibility at the same time as innovating socially. The concepts of knowledge and *social learning* are linked with the concept of social capital. *Social capital* (bonding, bridging, and linking) [64,65] develops through social networks underpinned by shared norms, values, and competencies that facilitate co-operation [66]. To be socially innovative, social practices need to be undertaken by actors having the capacities to value knowledge, and assimilate, advance, and apply it as appropriate [67]. Building *trust* that promotes co-operation is crucial, especially where social capital has been eroded by the authority and grey networks (e.g., as in some post-transition countries) [68].

In Ukraine, the development of social innovation is slowed down by a number of factors: (i) unfavourable contexts associated with path dependencies; (ii) the rigidity of institutions and governance failures; (iii) inadequate social capital and historically low communication and reciprocity among actors; (iv) inadequate competencies and capabilities of actors to initiate and develop changes and their low motivation, commitment, and trust. Lack of trust is a common feature in post-transition countries [41]. In Ukraine, levels of trust in political and civil institutions used to be among the lowest in comparison with other countries [13,69]. The situation has improved; however, most people still do not have trust in parliament (28% of participating in the pool) and government (32%) [70,71]. La Porta et al. [72] found a positive relationship between trust and government performance, based on which we suggest that the lack of trust holds back the development of social innovations.

The reconfiguration of social practices in response to societal challenges is going on in Ukrainian forestry irrespective of challenges faced. It often proceeds towards sustainability. However, in some cases, instead of social innovations (i.e., that seek to enhance outcomes for societal well-being), the reconfiguration takes the forms of *politonomy* and shadow economy. As with the emergence of social innovation, such reconfiguration may even involve the engagement of civil society actors. However, under the generally unsupportive institutional settings and unfavourable conditions (e.g., the lack of financial resources), the important criterion of social innovation to seek the enhancement of outcomes on societal well-being [7] commonly remains unfulfilled. In *conceptual terms*, this poses a largely *unexplored challenge* of the reconfiguration of social practices being used to drive the self-interest of a few. We agree with Bock [5] in asserting that results of the reconfiguration of social practices in response to societal challenges should necessarily be socially acceptable, ethically appropriate, and seeking to lead to a better society with more equality, social inclusion, social justice, and environmental sustainability.

4.2. Spreading of Social Innovation

Social innovations can play a role in the co-evolution of institutions and environment, especially if they spread from local initiatives to more general social practices. However, although many forest professionals recognise the need for societal changes, they have poor knowledge of sustainable forest management principles, relevant legislation in this country, and forestry developments elsewhere in the world [73]. This emphasises the importance of organising new professional courses for foresters at all levels to enable them to gain a better understanding of the challenges being faced by the sector, and the capability to respond.

The experts interviewed highlighted that policy reforms need to be linked into the way that larger scale systems effect smaller governance arrangements, and vice versa. *Nested governance* [43,74] is a challenge and an opportunity for institutional advances. Opportunities arise if policy reforms are taken up to cover multiple and *multi-level institutions*, simultaneously. Concerning challenges, the post-soviet legacy shapes transition patterns and requires radical reforms throughout the levels of governance. However, this will not be easy because of the lack of consensus amongst relevant actors on the need for, and a direction of, changes. The respondents, who belonged to the statistically strongest attitudinal group in our Q-method study (capturing 29% out of 75% of the total variance), stressed the necessity of

radical societal transformation. However, other interviewees have different visions. The *heterogeneity of attitudes* to forestry reforms poses a great challenge for large-scale changes to develop and spread.

Scaling up of the reconfiguration of social practices depends on power relations [17,75]. However, some powerful actors could be resistant to losing their privileges and/or incomes and would rather support the existing system. The scaling of social innovation is likely to be challenged by the whole institutional landscape which provides opportunities for the most powerful actors to drive self-interests. Therefore, social innovations should focus on establishing new institutions, and on the improvement of existing ones.

In *conceptual terms*, the co-evolution of environment and institutions should show what types of new social practices could be scaled up/out, and what corrective measures would be most beneficial to take. It may be more cost-efficient to rectify existing practices than to invent new ones. The *Forest Watch* and *FORZA* initiatives are examples of how people seek to accomplish this. However, at the national level, constructive institutional reforms rather than corrective measures are likely to be justified. This is derived from responses of the experts who were interviewed and by the respondents belonging to attitudinal group 1 of our Q-method study. This is particularly so because the transformations in forestry are linked to the overall political situation. If social innovations succeed with being upscaled, collective actions for sustainable forestry could produce common benefits at the national scale. Estimates [76] suggest that if timber harvesting in Ukraine were to become sustainable, the forest sector could more than double its contribution to the economy, with a simultaneous enhancement of the provision of forest other ecosystem services.

4.3. Impact and Prospects

Co-evolution of institutions and forest environment via social innovation can have several types of impacts. Social innovations can change the institutions through collective action, collaboration, and novel policy solutions. Participatory decision-making and collaborative networks can assist in the development of a better understanding of the drivers and pathways of change and demonstrate how these drivers can affect the sector and local communities residing in forested areas. Social innovations can introduce (temporarily or in the long-term) changes affecting communities and the territory and can have spill-out effects. Our study reports on primarily *environmental and governance impacts* of social initiatives associated with Ukrainian forestry. Elsewhere, impacts can be observed through improved living conditions [19], provision of services for communities [21]; sustainable forest management and natural resource use; improved quality of *social, economic, and environmental* assets [11].

The impacts [77] in all three of the social initiatives analysed can potentially be instrumental, e.g., changes in behaviours, practices, and decisions; conceptual, regarding the advance of knowledge and raising of awareness; and capacity-building, e.g., through changes to skills and expertise. There could also be impacts on the connectivity and changes in the number and quality of relationships and the building of trust, as well as cultural and attitudinal impacts, e.g., through knowledge exchange. These changes can influence, and be influenced by, a variety of stakeholder groups (policy and decision-makers, such as communities, NGOs, and scientists) or their joint actions, with a particularly important role in social innovations to be played by local people and civic society actors.

Potentially, social innovation can re-invent rules and governance arrangements by connecting actors around shared values and visions [4,22], shared narratives [78], questioning power relations [17], and offering new world views [79]. However, in Ukraine, the window of opportunities seems to be constrained, and for social innovation to break through there is a need for an alignment of actors at different scales, i.e., actors whose vision for change coincide or whose interests are aligned, at least partially. A social innovation that leads to sustainability is a transformative social innovation, i.e., an innovation that challenges, alters and/or replaces established institutions [18,19]. If social innovation is given an opportunity to emerge due to a set of enabling conditions at different scales, a transformative perspective could be feasible.

Our findings from the forest sector in Ukraine offer several scenarios [27] that could be usefully considered in other post-transition countries. These relate to how social innovation could develop and spread, and represent an alternative to current configurations of social practices. They are of: (i) social innovation emerging as an innovation niche in the context of the wider socio-ecological landscape and totally reconfiguring social practices, leading to disruptive innovation and novel governance arrangements; (ii) social innovation emerging to blend with the existing regime to offer mixed governance arrangements between the established institutional settings and new social practices (i.e., arrangements between the public private sectors); (iii) the restoration of old social practices that have fallen in recent times, by the inclusion of new dimensions.

5. Conclusions

Social innovations are often motivated by failures of existing governance systems and market imperfections. They could be triggered by challenges caused by mismatches and misfits for existing institutions to coevolve and put forestry on a sustainable pathway. However, due to “*path dependencies*”, *inertia*, and institutional *rigidity*, social innovations encounter difficulties in scaling up/ out and its impacts in Ukrainian forestry are limited, but are showing potential. Social innovation can lead to social, economic, environmental, and governance (and wider societal) impacts. However, success will depend on supportive institutional conditions and other factors, including: (i) political and public support; (ii) human and social capital, together with strong civic engagement of motivated actors, with sufficient capabilities; (iii) the presence of a social innovator, with characteristics of competent leadership; (iv) adequate financial resources and/or public and private incentives, including economic.

The reconfiguration of social practices is required in Ukrainian forestry, as well as the development of capabilities and awareness raising for relevant stakeholders to realise the nature and extent of the challenges to be faced, and to become actively engaged in decision-making processes. For social innovation to be transformative, it must challenge existing institutions, shift existing power relations, and create new norms, rules, and decision-making arrangements. Important preconditions for success would be an increasing role of partnerships; collaboration across agents and organisations to advance and share knowledge and resources; development of institutional capabilities; promotion of social learning; and a new type of leadership. It will also require people to move away from old sets of norms, rules, and mental models and become capable to reshape places, envision alternative futures, and make sustainability changes happen. We trust that, along with adding value to social science, our findings will be helpful to policy actors and the communities of practice, in Ukraine and beyond, involved in decision-making processes in the forestry sector as well as to innovators and facilitators of social innovations on the ground.

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Appendix A

Questionnaire for Interviewing Ukrainian Forestry Experts

Institutions are considered in a wider sense, as policies, regulations, and arrangements, both formal and informal. For the definition of social innovation, see <http://www.simra-h2020.eu/>.

Interviewee					
Affiliation & role:					
Data & place:					
Focus 1. CAUSALITY.					
1: What are the challenges associated with Ukrainian forestry institutions? <i>Please name/explain the Q1-13</i>					
Challenge X (please add boxes for Q1-13, as necessary)					
2: What are the institutions that meant to confront the challenges identified in Q1? What are their roles? Are their actions adequate for the delivery of sustainable outcomes?					
Institution X					
3: Which policies or initiatives are most useful for putting forestry on a sustainable path? How do they help?					
Policy X					
Are there problems (e.g., lack of clarity, inconsistencies) in policies & regulations that enlarge or ease the challenges?					
Problem/Gap X					
To what degree you agree/disagree:					
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Forest policy documents often cause confusion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest governance experiences 'path dependency'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Civic actors' participation is excluded from forest governance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest governance does not promote cooperation and partnerships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Most key forestry decisions are made top-down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Property rights remain unclear or poorly enforced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is a lack of cross-sectoral coordination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The general situation badly affects the forestry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Focus 2. DESIGN.
4: Are there prospects for changing forestry institutions to confront the challenges? How could the policy-institutional framework be improved?
Idea X
5: What are the barriers towards implementing changes? What can be done for advancing sustainability?
Barrier X
6: Do you know examples of social innovation in Ukrainian forestry?
Example X
7: Is there a role for social innovation ? Can it ease the challenges?
Role X
Focus 3. PERFORMANCE.
8: What are the motivations, triggers and driving forces of social innovation?
Trigger/motivation/driving force X
9: What are the supporting factors , both internal and external? Why are some social innovations more successful than others?
Factor X
10: Do you know a social innovation that was taken over in a different location, or spread? Any success stories or lessons learned?
Example X
Focus 4. IMPACT.
11: What impacts from social innovations in Ukrainian forestry have been observed?
Impact X
12: Can social innovation offer transformative opportunities ?
13: Any other considerations?

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