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What can we learn from business models in the European forest sector: Exploring the key elements of new business model designs

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ABSTRACT

This study represents the first attempt to operationalize a novel methodological approach that couples the expanded business model canvas (BMC) with an analytical evaluation of business model items and incorporates *context-intervention-mechanism-outcome logic (CIMO*-logic). We applied the designed methodology to analyse ten forest-related business models in eight European countries. This study aims to enhance the understanding of the challenges and opportunities generated by changing forest ownership due to the use of new business models. The adopted procedures both enhance the understanding of existing business models and the associated mechanisms and suggest improvements for existing business models. In other words, these procedures facilitated the understanding of business model dynamics. The changing operational environment forces the traditional forestry industry to adapt, and the analysed European cases indicate that business system innovations should always be considered to meet consumers' needs. The analysed business models are mostly grounded on traditional forestry and mainly include either new services or organizational improvements. The analysed business models introduce new organizational channels for reaching customers, satisfying new customer needs, targeting unique customers, reducing transaction costs, and improving customer relationships.

1. Introduction

The myriad impacts of past changes and increasing market competition are important drivers for forest-related companies to seek new forms of competitive advantage or business opportunities. Innovation is a relevant mechanism for companies seeking to develop new business opportunities, increase their competitive advantage, positively impact economic performance (Nybakk et al., 2009) and improve organization performance (Hansen, 2010; Välimäki et al., 2004; Weiss et al., 2011). Innovation in a sector can be separated into three categories: product, process, and business systems (Hansen et al., 2014). We adopted the following definitions of product and process innovation: "*the implementation/commercialisation of a product with improved performance characteristics*" (e.g., the ability to deliver new or improved services to consumers) and "*the implementation/adoption of new or significantly improved production or delivery methods*" (e.g., changes in equipment, human resources, working methods or a combination of these) (OECD, 1995, p. 9). Kajanus et al. (2014) found that considerable research has been conducted in recent years on product and process innovation and innovation strategy, but much less has focused on business systems innovation (see also Hansen et al., 2014). Business systems innovations are essentially new ways of managing a business, including the creation of new business models (Kajanus et al., 2014). There are consistent signs of shifts in business practices in the forest sector even though companies are often characterized as having a commodity and production orientation rather than a customer or market orientation

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(Hansen et al., 2014). There is also a move towards using open innovation practices (Ukrainski and Kajanus, 2011); in response to the ongoing multidimensional change occurring in the external environment, companies are actively adapting or creating new business models in a dynamic way. Companies are continuously seeking new opportunities and exploring comparative advantages as well as evaluating those opportunities against the business context to find an optimal fit with the turbulent external environment.

Major events, e.g., democratization, changes in political regimes, and market liberalization, and particularly those that occurred after the fall of the iron curtain, triggered a series of restitution and privatization processes in post-socialist countries, such as Estonia, Slovenia and the Czech Republic. Other Western European countries, such as Sweden and Finland, have been challenged by policy liberalizations and the need to emphasize ecological values, although these issues are considered to be minor shifts (Brukas and Sallnäs, 2012). The scientific literature provides evidence of several initiatives and approaches that can be used to tackle managerial and organizational issues originating from these (structural) changes. For example, Bogataj and Krč (2014) highlighted the forest commons revival in Slovenia as a potential solution for improving the management of natural resources. A study on forest owner organizations (FOOs) in Eastern European countries (Weiss et al., 2012) showed that these organizations are established to support the restitution process, represent owners' interests in policy making processes and engage in forest management and marketing. Brukas and Sallnäs (2012) argued that the forest policy instruments used in some Eastern European countries, such as Lithuania, were designed by a rigid authority that did not have any experience with private owners and strict regulations. Likewise, Kissling-Näf and Bisang (2001) concluded that changes in Central and Eastern European countries might be caused not only by historical events but also by inactive institutional frameworks or the failure to introduce new ideas into policy agenda. Therefore, the adaptation strategies used to mitigate the potential negative impacts and boost economic prosperity and human well-being vary among countries and are mainly shaped by their historical, cultural and socio-economic characteristics.

Nevertheless, the changing operational environment considerably affects the forest sector. Earlier forestry practices were rather resource oriented and "*the impact of top-down forest management has not always been harmonious or balanced*" (Kopnina, 2017). Currently, new dimensions, such as ecological forestry, which integrates the concepts of ethics, conservation, sustainability, and health, have become rather important (Batavia and Nelson, 2016). When making forest management decisions, practicing foresters should aim at balancing nature-guided interests, such as integrity, stability and the beauty of the forests, with human-centered objectives, such as financial expectations. The ethics of many forestry practitioners dictate that good forestry succeeds when both of these outcomes are met (Evans and Clark, 2017). New research findings and advanced managerial practices based on this philosophy open the way for companies and individuals to start exploring ecosystem services and designing businesses and business models that both embrace the specific local characteristics that are beneficial and align with the global idea of sustainability.

The discussion above indicates that beyond the mask of a strategic organizational institution, there is always an opportunity that can be exploited. This opportunity is always contextual in the sense that it is locally specific and shaped by both past and current political, economic, social and cultural aspects of the entity's operational environment. By adopting a new business model, organizations can create a sustainable continuity for new concepts that are not only economic but also related to other dimensions. In this article, we focus on business models for the European forest sector; we acknowledge the diversity and innovativeness of this sector because of its potential to boost economic growth and increased competitiveness. Furthermore, there is a lack of literature on this topic. The aim of this article is to develop an understanding of forest-related business models in the context of changing forest ownership in Europe by using a novel methodological approach. The specific objectives of the study can be condensed into three research questions:

a) Does changing forest ownership provide opportunities for new business models in Europe?
b) What are the main elements and driving factors of the analysed business models?
c) What can we learn about innovative business models in light of changing forest ownership in Europe that can enhance this sector?

This article is structured as follows: a conceptual framework is outlined in Section 2; Section 3 describes the methodology and data used; and the results of the analysis are presented in Section 4 and discussed in Section 5. Section 4 develops the CIMO-logic structure for all the case studies analysed, and the lessons learned are summarized and the conclusions are drawn in Section 5.

2. Conceptual framework

The business model concept is not universally understood and can be defined from different perspectives, namely, the content, process or context (Ahokangas and Myllykoski, 2014). For the purpose of this study, we use the definition of Osterwalder et al. (2005, p. 17) who defined a business model from a content perspective as "*a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams.*" Basically, each business fulfils several functions such as articulating the value proposition, identifying the market segment, specifying the revenue generation mechanism, defining the structure of the value chain and formulating the competitive strategy. The importance of the context where a business model is established is crucial for understanding the overall logic of the company, the design and creation processes, and the company interconnectedness with other entities.

The business model canvas (BMC) proposed by Osterwalder and Pigneur (2010) has become quite a popular tool and even a de facto standard for designing or analysing business models. The BMC consists of nine interrelated building blocks that represent the "earning logic" for creating, delivering and capturing value: customer segments, customer relationships, value propositions, channels, key activities, key resources, key partners, cost structure and revenue streams. To facilitate the business model design process, Kajanus et al. (2014) introduced an expanded BMC that adds three building blocks to the original canvas, namely, customer needs, the solution provided and the competition. Moreover, in the same article, the authors presented a procedure to analytically evaluate the business model *items* that represent each building block. The expanded BMC and the procedure the authors describe are particularly convenient for individuals with non-business backgrounds because it helps them consider all the relevant aspects when designing a business model. The expanded BMC includes twelve building blocks in four main areas: customers and competition, the offering, the infrastructure and the profit formula. The *customers and competition* area includes the people and organizations that a company targets, as well as the channels through which the customers are reached and the value is derived, and the type of relation the organization aims to establish with the customers. An organization's *offering* encompasses the assortment of products and services that create value for the corresponding customers. In essence, the value proposition satisfies the customer's needs and represents the core building block of a business model. *Infrastructure* is represented by the key activities, resources and partner networks the organization requires to make the business model work. The infrastructure results in costs and is prerequisite for enabling the value to generate revenue. The *profit formula* embodies the cost structures and revenue streams, while the profit

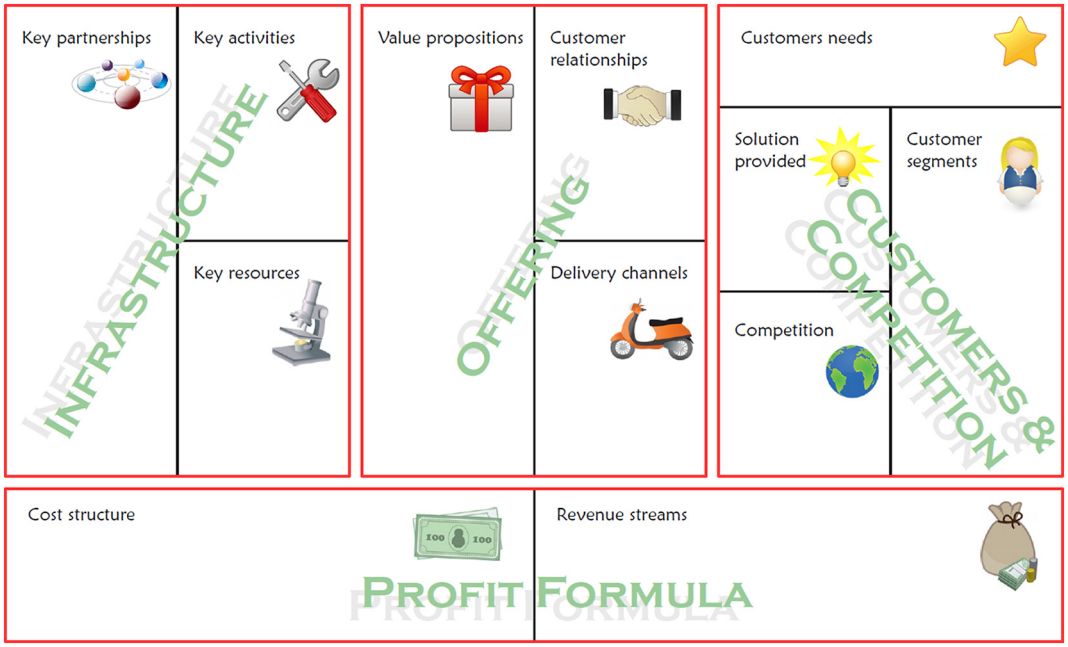

Fig. 1. The expanded BMC, including its four main areas and building blocks (adapted from Kajanus et al., 2014; Osterwalder and Pigneur, 2010).

demonstrates the organization's ability to sustainably deliver value. A schematic representation of the expanded BMC is depicted in Fig. 1.

To understand and present the business model dynamics, i.e., how a business model creates and implements new innovative solutions, we opted to apply the *context-intervention-mechanism-outcome logic* (CIMO-logic) (Denyer et al., 2008). The CIMO-logic is an upgraded version of the "classical" logic of prescription and provides answers to questions regarding causality rather than merely highlighting the relationships among variables. The "classical" logic of prescription states that in a specific context *C,* one should use intervention *I* to produce the desired outcome *O*. Following this logic, one cannot clearly distinguish between the causes and effects that resulted in a specific outcome. Thus, Denyer et al. (2008) embedded in the "classical" logic of prescription the concept of *generative mechanism*, which fills the gap between intervention *I* and outcome *O* and explains the intervention effects that result in an outcome. The CIMO-logic is thus constructed as follows: in the class of problematic contexts *C*, use intervention(s) *I* to invoke generative mechanism(s) *M* to deliver outcome *O* (Denyer et al., 2008). Notably, the generative mechanism concept is the key element used to establish a "*full causal chain connecting the intervention and outcome*" ("Committed to field problems...", 2009, p. 7). In other words, this concept enables one to explore and understand the underlying phenomena that caused the outcome and was triggered by the intervention (Mulinski, 2012).

It is crucial to understand that Denyer et al. (2008) constructed the CIMO-logic reasoning based on the tradition of the *design science paradigm,* which aims to improve the human condition by developing knowledge that is useful for shaping and planning artificial human-made systems and solving field problems (Denyer et al., 2008; Niiniluoto, 2014). The added value of the design science paradigm is its ability to accentuate the importance of answering the questions "how" or "why" in addition to answering the question "what" in a transparent and useful way. The overall purpose of thinking according to CIMO-logic is to produce a design proposition to enable the understanding of the phenomena under consideration. Design propositions are produced through research synthesis and represent mid-range theories, i.e., contextual knowledge about a certain problem at a specific time and involving specific actors and interventions ("Committed to field problems...", 2009). Consequently, a design proposition developed in a certain context can only possesses the feature of transportability of design proposition but not its generalizability. In other words, "*you develop knowledge in a context, you decontextualize by asking yourself what did I learn, then you have a next case, you reconceptualise what have you learned and then you again ask what did I learn*" ("Committed to field problems...", 2009, pp. 13–14).

Knowledge, which has been developed in a certain context, can therefore be applied to other contexts only when it is decontextualized. From an analytical perspective, the CIMO-logic allows one to build on knowledge based on different contexts and synthesize the results to produce either several design propositions or a classification of the decontextualized knowledge on a specific issue ("Committed to field problems...", 2009; Denyer et al., 2008; Mulinski, 2012). Notwithstanding, the presented CIMO-logic only constitutes the logic rather than its form or content; therefore, the business model concept was framed within it, as shown in Fig. 2. In this study, the general context is related to recent and ongoing changes in forest ownership across Europe, while the specific context applies for each case study analysed through CIMO-logic reasoning. The "framed" CIMO-logic is as follows: in context *C*, business model *XY,* with its main activities (i.e., intervention[s] *I*) and "earning logic" (i.e., mechanism[s] *M*), has to be implemented to produce outcome *O* and resolve the identified problem. From the content perspective, the interventions answer the "what" part of the question, while the generative mechanisms help us to understand the "how" part of the question, or in other words, the manner in which the business activities produce outcome O. In this conceptualization, a business model does not represent the outcome per se but rather a composite of (a) interrelated items in each of the building blocks and the relationships among them (the "what" part) and (b) the established causalities between the interventions and outputs (the "how" part). The items represent the elements of the content of each building block that defines its "earning logic". This can be tangible or intangible objects, processes, company's qualities and people's virtues or other subject-specific concepts that beneficially affect the business model functioning. A business model represents the set of relevant items belonging to all relevant building blocks (Kajanus et al., 2014).

3. Methodology

3.1. Overall design

The presented conceptual framework has been operationalized for

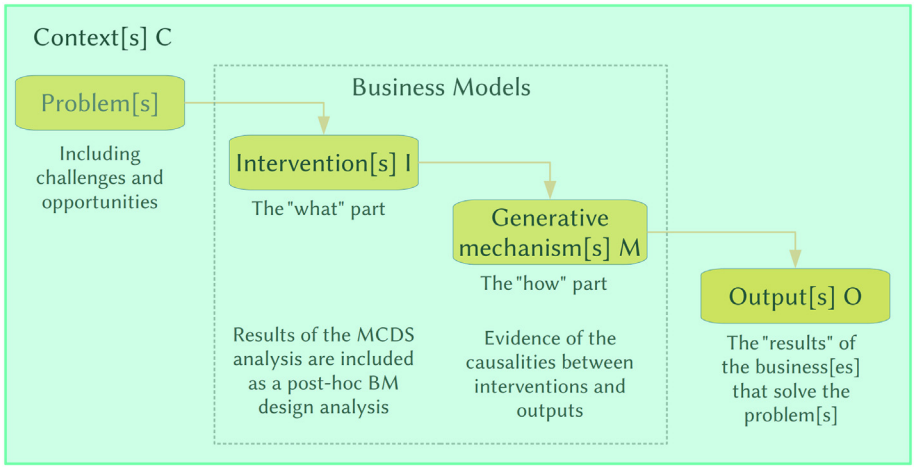

Fig. 2. Business model concept framed within the CIMO-logic (adapted from Denyer et al., 2008).

case studies on forest-related business models that are part of an international research project. The designed methodology was employed not only to describe new business models but also to assess and understand how they function to facilitate the research synthesis and enable the development of the design proposition. The methodology encompasses the following phases, which are described in detail in the remainder of this section:

1. Context definition and preparation of the process;
   - Collection of basic information and discussions with key persons
   - Agreement on case study procedure among the participants involved
2. Identification of relevant business model items for each case;
   - Participants identified business model items, which they consider important for business success of the case study
   - Different procedures were applied, e.g., brainstorming workshops, interviews, and email questionnaires
3. Evaluation of relevant items for each case;
   - Selected evaluators separately assessed the importance of relevant items using a seven-point scale based on selected criteria. Scale anchors: 1 = "not so good idea", 7 = "good idea".
   - Different procedures were employed for data collection, e.g., a web-based tool and email inquiries
4. Core-value calculations for each case with the INTO tool, which is web-based application producing information on the core values (see Section 3.3 for full description);
   - The core-value calculations include a process and a calculation procedure that combine participants' perceptions and systematically analyses them in complex decision making situations
   - From an analysis of the core-value results, we identified *the TOP4 items,* meaning the four items with the highest core-value scores, and *the TOP10 items,* meaning the ten items with the highest core-value scores, for use in the case business model
5. In-depth analysis of the obtained results with case participants;
   - Researchers discussed the results with case participants to obtain a common understanding about the business model functioning
   - The results are valuable for understanding the existing business model and proposing its further improvements
6. Research synthesis and design proposition;
   - Researchers explored each business model from the CIMO-logic perspective by studying the *context* and *outcomes*
   - The developed proposition is constructed by synthesizing the *intervention* and *mechanism* analysed in conjunction with the INTO tool results

The case studies were conducted by thirteen national researchers partly using the principles of participatory action research (PAR). The PAR approach is based on collaboration between scientists and non-scientists who share their local knowledge and expertise in a learning and education process that involves observation, negotiation, reflection, data collection and analysis (Ballard and Belsky, 2010). An important aspect of studies employing PAR principles is the added value of data and results that can be used for practical business model development and other purposes. Every case study followed a strict research design described above. The differences in the research and participation processes are presented in the right-most column of Table 1.

3.2. Case study selection and data collection

The procedure for defining the business models was different among cases due to different contexts and developmental phases. Nevertheless, several recommendations were considered during the selection phase, including the need to explicate primary motivations for selecting cases that involved a consortium, the proper contextualization of case studies, and the application of a dynamic and iterative selection procedure instead of a linear procedure (see e.g., James, 2006; Markusen, 2003). Furthermore, during the selection process, we followed the concepts of Lacroix et al. (2016), who identified two intertwined phases for case study selection in environmental management studies, namely, *identification* and *building a common ground*. The identification and building a common ground phases for the case selection were done during the COST Action FP1201 FACESMAP (*Forest LAnd Ownership Change in Europe: Significance for Management And Policy*). To identify and build a common ground for case selection, the task researchers organized eight face-to-face meetings and conducted two short-term scientific mission visits.

The communication between the researchers occurred via emails and other virtual conversations (e.g., Skype). An iterative case selection procedure was applied, starting with the identification of potentially interesting cases on a country level. A potential case could have already implemented a business model or could be in its developmental phase (i.e., not yet fully implemented). The selection of cases using innovative approaches for business models was emphasized. However, since we aimed to implement a novel methodology and were faced with the risk of not being successful, we chose convenience sampling (Ritchie and Lewis, 2003). The case studies were selected according to the ease of access by the national experts involved in the study, who also worked on those cases. Ten cases were selected from eight countries that are also members of the COST action for further exploration. At last, the business models established some time ago and proven successful on the market (e.g., the Slovenian and Latvian cases) were analysed by describing and understanding their earning logic. On the other hand,

Table 1
Basic information and description of the analysed business model case studies.

Name and business model characteristics	Country	Implementation year	Research and participation processes
Forest berry map – Mobile application to find forest berries	Finland	Development phase	The idea to develop a forest berry map service was identified in a separate, earlier research project. Researchers were asked to help design the business model. The INTO process was organized, and the model was designed; interested persons from several organizations participated but not the implementers. The business model was provided to several potential implementers, and as a result, a small IT company developed the service named *Mustikka-Go* to test it. Now the service is available, but not yet widely used.
FOA e-Shop – A new way to reach forest owners and provide services	Finland	2013	The business activities were already started by the FOA on a small scale when the researchers were asked to help in developing the business. The business model design was selected to define what needed to be done. The INTO process was organized, and the model was designed, FOA personnel participated in the process. An action plan was defined and implemented according the business model. The business has been strongly growing and is doing well at the moment.
High-quality wood auctions – Creating more value from wood through auctions	Slovenia	2007	Initially, one researcher conducted an interview with a district forester about the main characteristics of auctions (e.g., wood supply and roles). Based on this information, the researchers developed a questionnaire that was sent to the district forester for validation and final corrections. The final version of the questionnaire was sent by email to five representatives of the auction organizers. The results were transmitted into the web application INTO tool and evaluated. The interpretation was done by both researchers and based on the reviewed literature (in this phase, no key business model persons were involved).
Joint forest ownership – Organizing and managing joint ownership in an original way	Estonia	2013	The business model activities were already started, and the researcher contacted the leading person and asked if he/she was interested and willing to describe the business model as a case study example. A scientific interview with the leading person of the commercial association was conducted, and the business model evaluation based on the INTO tool was carried out by the researcher and the leading person. The responses were analysed later. The short introduction of results was sent to the case enterprise (commercial association). Later, the researcher contacted the leading person and asked for updates. By the end of 2017, they owned 4 properties. The total forest area is more than 20 ha, and the number of members is 31.
Joint stock company – State-owned forests managed by joint stock company	Latvia	2000	The researcher contacted the management of the company, and they agreed to participate so the company business model could be evaluated by a wider group of experts representing different backgrounds: the Latvian Forest Industry Federation, forest owners using the forest for personal purposes such as firewood or personal house building and having an interest in making a business using the forest, the Chamber of Commerce and Industry, forest owners selling a small amount of wood and the Forest Research Institute. In the first phase, the participants answered the questionnaire and identified business model items. In the second phase, they evaluated the items' importance by using INTO tool. The results of the core-value calculations were presented to the expert group and analysed by them.
Permaculture – Providing unique experiences and educational courses	Sweden	2014	The business activities were already started, and the researcher heard about it during a meeting regarding another research project with a reference group of the Vilhelmina Model Forest. The researcher contacted the manager and asked if she and her husband were interested and willing to describe their idea and business model and be used as an example for our study. The manager responded to the questionnaire. The INTO tool was used to evaluate the items and to calculate the core values. The answers were analysed and evaluated by an experienced business manager.
Private forest company – Managing forests in a sustainable way	Croatia	2011	The business activities started during the COST FACESMAP meetings and discussions. The researcher contacted the company director who was willing to describe the Croatian case study and participate in the research. A scientific interview with the responsible leading person was conducted, and afterwards, the business model items were evaluated by using the INTO tool. The company continues to manage private forests and developed other services such as consulting and preparing business plans for private forest owners and applications for EU funds.
New type of FOA – Providing services by business-oriented FOA with employed professionals	Serbia	Development phase	The idea of the business model was developed by one of the FACESMAP participants as a part of another research project. The researcher completed the questionnaire. The idea was evaluated by national experts and the data were entered into the INTO tool. Data were analysed by the Savonia University team. Researchers and national experts analysed the business model following the CIMO-logic.

(*continued on next page*)

Table 1 (*continued*)

Name and business model characteristics	Country	Implementation year	Research and participation processes
SERBIO – Providing biomass for market needs through regional logistic and trade centers	Serbia	Development phase	The business activities had already started, and the researchers contacted the business manager and asked if he would be interested in participating in this case study. The business manager agreed and completed the questionnaire via email. The idea was evaluated by national experts, and the data were entered into the INTO tool. Data were analysed by the Savonia University team. The researchers and business manager analysed the business model following the CIMO-logic.
Small and municipal forest owner service – Providing business model design service to more detailed private forest owner segments	Czech Republic	Development phase	The activities started during the FACESMAP meetings and discussions in 2015. To identify the factors of an enhanced business model, the researcher used controlled brainstorming with 50 foresters and conducted qualitative telephone interviews with 20 forest owners and four experts in the field. In total, 68 items were identified. Using the INTO tool, the four experts evaluated the identified items for each model. The core-value analysis identified the best portfolios of ideas by calculating all the alternatives, and two new business models were analysed. These models were presented at the seminar organized by the SVOL and could serve as the basis for a business strategy and its implementation.

when analysing relatively new business models (e.g., the Finnish e-shop and the Estonian case) we focused on producing recommendations for improving models and guaranteeing their success. The analysis of business models in developmental phase aimed to obtain proof of concept (e.g., SERBIO in Serbia) and oriented to help actors design the intended model. Finally, the purpose of the studies on the Czech Republic and forest owner association (FOA) in the Serbian cases were designed to demonstrate the applicability of the business model in forestry by creating a platform for systematic thinking about business in a complex environment and crossing traditional archetypes. Table 1 summarizes the selected business models, their characteristics, and the research and participation processes.

For each study case, the researchers collected qualitative and quantitative data that were relevant for describing the *context* of the business activities. The information obtained for the cases varies due to local specificities and includes statistical data on economic growth, employment in forestry, the share of private forest ownership extracted from official databases and other statistical databases; the development of the policy framework; the evolution of the cultural factors identified by legislative documents; wood resource usage; forest management approaches and the characteristics of private forest owners obtained from reports on finished projects and articles on related topics.

For analysing the *interventions*, *mechanisms* and *outcomes* of each business model, the researchers remained in contact with the business model key person(s) and agreed on the data collection procedures. Basically, researchers aimed to create a list of relevant items that fall within each business model building block and rank their importance based on the selected criteria. The items represent elements or segments within a building block that depict its characteristics or represent some process that is crucial for the analysed business model. A business model, in this study, represents a portfolio of relevant items that are included in all the building blocks of the BMC framework. The two criteria represent the two main dimensions of a business model definition (see also Ahokangas and Myllykoski, 2014; Kajanus et al., 2014) that often contradict, and it is challenging to design a business model that includes both of these dimensions at the same time. As noted by Kajanus et al. (2014), the identification and evaluation of the items can be accomplished using several approaches; however, the most common is using a group setting that allows for a collective consideration and creation process. However, due to objective limitations (e.g., financial resources), the identification and evaluation approaches used in the present study varied across cases. The approaches are briefly described in Table 1.

Once the list of relevant items was finalized, each evaluator (e.g., selected FOA members and business key persons) evaluated the items based on two criteria, namely, business potential and competitive advantage. The evaluation in this context means the items were prioritised on a seven-point scale; in other words, each item was assigned a value from one (i.e., the least important item "not so good idea", to seven (i.e., the most important item "good idea") that represents the significance of the item in a specific building block relative to (i.e., in comparison to) the other items in the block. Again, for objective reasons, each case study was given the liberty to conveniently choose the approach to be used to evaluate the items. However, everyone followed the six step research design described in Chapter 3.1.

3.3. Data analysis procedures

The collected data were processed and analysed in *two steps*. First, the *core values* were calculated using the web-based application *INTO tool*. The INTO tool produces information on the core indices of the items and prepares a recommendation for a business model, including those items fulfilling both criteria (business potential and competitive advantage) at the same time (see Eskelinen et al., 2017). The INTO tool has been used in many different applications from regional waste-to-energy production to investment decisions and university collaboration strategy design (Kangas et al., 2016; Lõõnik et al., 2012). Recently, one of the most popular applications was for business model design; the detailed information on the methodology used and its application can be found in Kajanus et al. (2014). The core-value calculation method used by the INTO tool is based on robust portfolio modeling (RPM) (see Liesiö et al., 2007), which is a decision aid methodology used for analysing large-scale project portfolio problems. RPM principles are used for *core index* calculations and the multi-attribute value theory (MAVT) provides a theoretical framework for the prioritization of relevant portfolio items in a setting characterized by multiple criteria, uncertainty and risks (Liesiö et al., 2007). A specific feature of the RPM that differs from other multi-criteria decision analysis methods is its ability to efficiently examine the multi-criteria dominances among all the possible portfolios covering all the possible combinations of criteria weights.

Fig. 3 illustrates the idea behind the identification of business model items fulfilling both criteria at the same time. For each case study, a set of identified items for each building block (left side of Fig. 3) is evaluated based on selected criteria (i.e., different colours of rounded squares on the right side of Fig. 3), and the items at the intersection of both criteria are assigned the core index value of 1. In other words, an item obtaining a core index value of 1 is included in all non-dominated solutions (i.e., this particular item dominates all the other items in all calculated scenarios) and an item obtaining a core index value of 0 is not included in any non-dominated solution (i.e., this particular item does not dominate any other item). The criteria weight combinations

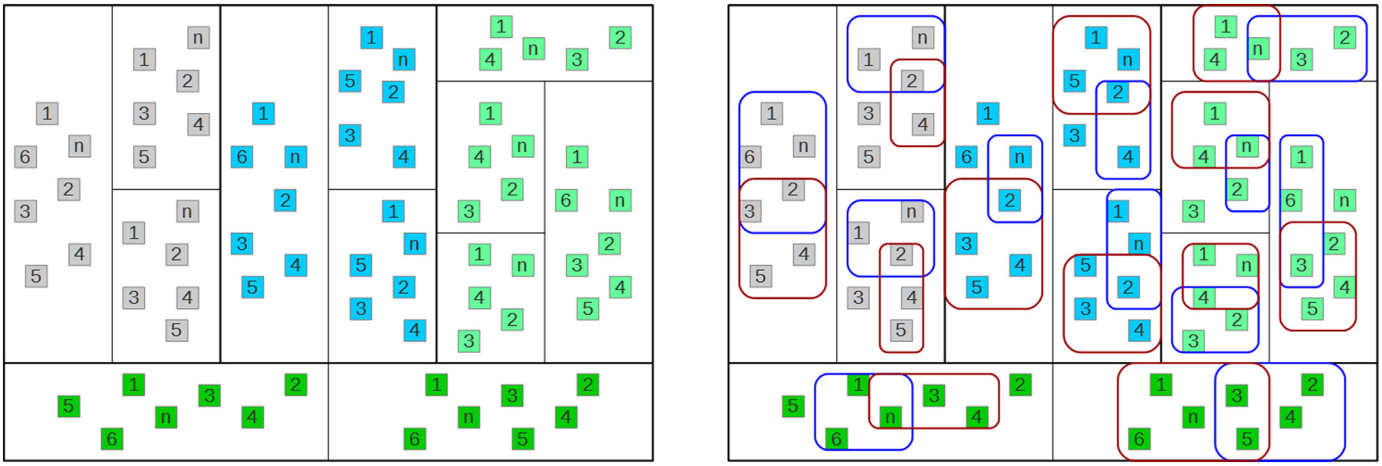

Fig. 3. Representation of items (squares with numbers) in each BMC building block. The coloured rounded squares on the right side represent the different criteria used (adapted from Kajanus et al., 2014).

are calculated following the method proposed by Kajanus et al. (2014). Typically, items that obtain high core index values are regarded as a potential final choice. For each case, we arbitrarily calculated between four and ten business model items, which the evaluators assigned higher importance. Afterwards, we first defined the core of the business model with the four business model items that were assigned the highest values. Then, we defined the overall picture of the business model according to the ten business model items that were assigned the highest values.

The *second step* includes a comparative analysis and research synthesis. By means of comparative analysis, we identified the common elements, the key mechanisms, the main differences and the similarities of the business models. The comparison was framed within the CIMO-logic, which was used to identify and describe the interventions and mechanisms of business models. In addition, the context and outcomes were considered not only to design propositions containing information on what to do in which situation to produce what type of effect, but also to increase our understanding of why this occurs (Denyer et al., 2008, p. 396). In comparison to Denyer et al. (2008), our study was mainly based on the items that were most highly evaluated by the participants and analysed with the INTO tool. The experts working on the case studies with the participants considered the items using the CIMO-logic for each business model analysed. The method of synthesis involved the following steps: (a) developing an initial theory on the impact of forest ownership on business model innovation; (b) revising and refining the initial theory, including the results of INTO tool evaluation; and (c) incrementally modifying the initial theory by applying the results from the analysis of the CIMO-logic elements.

4. Results

4.1. Understanding the contexts

Private forest owners around Europe are faced with various issues that demand the implementation of different solutions. These issues are driven by the socio-cultural, economic and political settings, in addition to all the institutions that govern the forest. An emblematic dichotomy that emerged after the Second World War classifies European countries into either "Western" or "Eastern" countries. In the present study, "Eastern" countries are understood as former socialist countries that are either members of the EU or candidates for membership. One of the key processes that have characterized Eastern European countries in the last two decades is their almost concluded processes of restitution, decentralization and privatization. These processes have caused major changes in the lives of people who were not as experienced as those in the Western European countries since the agrarian reforms. The effects of the abovementioned processes had – due to the relatively high relevance of these sectors for economic prosperity in the past – an enormous impact, especially on primary sectors, i.e., forestry, agriculture, mining and fishery.

Several "new" phenomena have emerged in the forest sector of the Eastern European countries under analysis, including the privatization of the forest industry, the formation of a free timber market, increased timber exports, and the appearance of new forest ownership types and enterprises (Teder et al., 2015). Consequently, the operational environment for designing and implementing (novel) business models in some cases is still rather immature. In general, several primary characteristics of the context in these countries were identified by the participants and can be grouped as follows: obscure socio-economic situations, unsettled political and institutional frameworks, and unlimited access to natural resources. The first group reflects the consequences of under-developed and suppressed economies originating in past political systems: the under-developed and inflexible markets in Slovenia and Serbia; the low purchasing power of individuals in Estonia, Slovenia and the Czech Republic; and the lack of knowledge and motivation to be involved in forestry in Serbia, Slovenia and Czech Republic (Nonić et al., 2015; Teder et al., 2015). The Estonian market and some of the Croatian markets have been considered relatively active with various customers and have identified many needs. The second group encompasses the unfinished restitution and privatization processes in Estonia and Slovenia, the continuing "top-down" approach to problem-solving and the considerable role of the government and its corresponding policies in Slovenia, Serbia, Croatia and Latvia. The third group includes the perceived unexploited potential of forests in Slovenia and Serbia. These perceptions, among other things, have had an enormous impact on policy making and designing forest policy instruments (see also Brukas and Sallnäs, 2012).

On the other hand, Western European countries were faced with different kinds of changes that mainly include structural changes within institutions (e.g., membership decline, member inactivity, and legislative changes, such as the FOAs in Finland), lifestyles, motivation, attitudes (e.g., permaculture in Sweden; Lidestav et al., 2015) and changes in "production and protection" techniques (e.g., the berry map in Finland; Karppinen et al., 2015). Distant forest owners have been recognized in Finland as well as in the Czech Republic and are considered as a specific type of forest owner that needs to be approached in a new and attractive way. The progress and development of novel or improved information and communication technologies have led to the increased use of alternative channels (e.g., the Internet) in places where they were traditionally not used, which has facilitated the access to certain

Table 2
Key elements of the analysed business models: the **core four items are bolded**, the ten items appear in normal font, and the *additional items appear in italics*.

Case	Infrastructure	Customers and competition	Offering	Profit formula
Forest berry map, Finland	**Identification of the benefits for customers;** Knowledge of experienced berry pickers; Berry map mobile service provider	**Website;** Individuals; Apps	**Helping inexperienced pickers;** Developing easy to use applications; Providing the best berry picking locations	Value customers are willing to pay for
FOA e-Shop, Finland	Marketing strategy and budget; Collaboration with other FOAs	Popular products; Distant forest owners; Availability of special products	**Marketing channel (Google); Benefits for FOA members; Visibility in Internet searches;** Marketing by the FOA Network; Marketing forest newspaper	*Product based margin approximately 20%*
High-quality wood auctions, Slovenia	**Intellectual sources (e.g., information and knowledge); Clearly, identified target market and customers;** Establishment of logistical system	**Assurance of supply and demand;** Supply of high-quality wood; Undisturbed supply of high-quality wood	Professionalism and sincerity; Stimulation for investments in research and development; Personal contacts and personal support	Wood transportation and manipulation
Joint forest ownership, Estonia	**Leader with a clear vision;** Good idea	**Democratic decision making; Possibility of regular payments;** Capitalizing on the emotions of forest owners	Feeling of being a forest owner; Legal issues; It is impossible to sell the organization; Personal contacts at the beginning	Increase in biological assets; Revenues growing stepwise
Joint stock company, Latvia	**Forests and lands; Adequate road network;** Other forest owners; Woodworking enterprises in Latvia; Current assets	Stability and predictability; Collaboration with researchers; Ability to manage a whole process and the opportunity to manage; Stable and predictable wood supply	No threats to wood flow	**Incomes are much higher than costs**
Permaculture, Sweden	**Collaboration with neighbors and advisors;** Desire, humility, trust, and flexibility of the managers; Personal commitment and openness	Study to provide the best conditions for the organisms; No competitors	**Offering unique field trips**; Answering the "Why?" question	**Customers recognize the value;** Own accommodation costs; Food costs
Private forest company, Croatia	Forests and lands; Knowledge and continuous education	Local and foreign hunters; Operators in forest road; Wood chip buyers; Croatian wood processing companies; Good quality tree seeds and other forest goods with good prices; Hunting and other wildlife recreational services; New possibilities for forest road builders; Raw materials for green energy production; Providing quality wood and other forest goods and services	Promotes market development; Sustainable growth of high-quality wood; Circular economy from nursery to forest and sawmill; Company's web-page; Free Recreation; Stand damage is forbidden	*Environmental benefits such as biodiversity*
New type of FOA, Serbia	Professional workers; Public enterprises for forest management	**Consumers of firewood;** Briquettes and pellets industry; Public companies for forest management	Stable and trustworthy enterprise	**Costs of new equipment; Costs of road construction;** Income from roundwood and firewood; Registration costs
SERBIO, Serbia	People with practical knowledge; Financing opportunities from project development funds; Small and medium enterprises	*Consulting services*	**Quality of services;** Consulting services; Quality of information; Reliability; Participation in events	**Bank costs; Annual assembly costs;** Website
Small (S) and Municipal (M) forest owner service, Czech Republic (*)	Basic knowledge and the willingness to learn (S); the Forest Management Institute (S); Cooperation with local forest owners (S); Means of transport, tools and machinery (M); Effective planning and organization of forest production (M); Maintenance and increase in the expertise of forestry staff (M);	Residents live near local forest property (S); **Cheaper raw material obtained directly from sources (S + M);** Self-production of firewood (S); Saw mills and other woodworking enterprises (M); General public (M);	Reliable and honest community members (S + M); Wood at the place of delivery (S); Cheap firewood (S); Healthy and beautiful forests (M); Recreation and tourism (M)	Fixed and variable costs (S); Income from wood sales (M); Social and environmental benefits (M)

products and services (e.g., the Finnish e-shop; Karppinen et al., 2015). In contrast, Sweden's permaculture model highlights an increased interest in environmental values and alternative paradigms of sustainable natural resource management that gives greater importance to ecological functions or adjusts to an changing operational (and living) environment (see also Brukas and Sallnäs, 2012).

4.2. Interventions and mechanisms: Business models

In this section, each business model is described and the key items of the four areas are identified by considering both the business potential and competitive advantage of the corresponding business model. The results are presented in Table 2. The core items of the model, i.e., the *four items*, are **bolded**, while the overall picture of the business model is described by the *ten items*. If a business model area did not have any items, then more items were considered in the analysis (see also Section 3.3) to ensure that each column includes at least one item. Those additional relevant items are shown in *italics*. The business model areas of *infrastructure* and *customers and competition* are mainly related to interventions, and *offering* and *profit formula* are mainly related to mechanisms.

The *FOA e-shop* creates new offerings that align with what customers want to buy, meaning they quickly adapt to their customers' demands. This organization is managed by an FOA that tries to reach new forest owner groups and provide new types of service to existing forest owners. The core of the model emphasizes offering new marketing channels based on social media (e.g., using Google as a marketing channel), offering benefits for the FOA members and acquiring visibility in Internet searches. The key elements include using the Internet as a delivery channel and providing easy access to products and services, which were accomplished by establishing a new type of nationwide partnership with other FOAs. Other key elements include the infrastructure (marketing strategy and budget and collaborations with other FOAs), the offering (marketing by using an FOA network and forest newspapers) and the customers (distant forest owners, the availability of special products and popular products).

In Sweden, forest owners want to develop their forests and holdings in accordance with the idea of *permaculture*[1] and spread this idea by holding courses on this topic. The aim is to help people (forest owners as well as others) to learn becoming responsible producers even if there is an uncertain future with less available energy. The core of the model includes the infrastructure (the forest owners in addition to neighbors and advisors), the offering (offering unique field trips) and the customers (customers recognize the value). The other key items include desire, humility, trust, and flexibility, personal commitment and openness, which answer the "why?" question. In addition, the forest owners study to ensure they provide the best conditions for organisms, to have no competitors, and are able to cover their own accommodation costs and food costs.

The key person of one Estonian FOA came up with the idea of making investments and becoming a joint owner of forest properties in a new way. This idea grew into a business model "*joint forest ownership*" with the aim of finding a way to earn profits from increased biological assets and at the same time compete with other players in forest land markets. The core of the model comprises infrastructure (having a leader with a clear vision), customers and competition areas (democratic decision making and the possibility of receiving regular payments). Other key items include the following: this group has a good idea, they can capitalize on the emotions of new forest owners, there are few legal issues, it is impossible to sell the organization, they made personal contacts at the beginning of the project, new forest owners have certain positive emotions, there has been an increase in biological assets and revenues are growing stepwise.

The business model of Slovenian *high-quality wood auctions* offers private forest owners the opportunity to sell high-quality wood from their forests for a price that is higher than ordinary prices. This increases the motivation of forest owners to become active in forest management and education. The core of the model comprises the infrastructure (intellectual sources and a clearly identified target market and customers) and the customer (the assurance of supply and demand). Other key items include the following: they have established a logistical system, there is an undisturbed supply of high-quality/rare wood, the individuals are professional and sincere, there is stimulation for investments in research and development, the individuals enjoy personal contact and support, and the wood transportation and manipulation result in costs.

The Croatian *private forestry company* aims to provide quality wood and other forest goods by developing and implementing innovative stand productivity treatments that are based on scientific methods. The company markets the produced wood assortments and provides marketing services (e.g., finding the buyers, negotiating the prices, and arranging the contract). Moreover, this company is registered for providing forest and game management, engages in production, is able to trade with wood assortments, provides touristic activities and services, and prepares and provides consulting services for rural fund applications. The items considered to be the key elements are found in the infrastructure, offering and customer areas.

The *forest berry map* business model is grounded on an emerging wild food phenomenon among urbanizing citizens and established based on individual rights in Finland. This organization has access to publicly provided forest resource data, scientific wild berry crop models and weather data that can help them plan for the future; therefore, the mobile berry map service has emerged as a new business opportunity. The core of the berry map business model encompasses the infrastructure (providing benefits to customers), the offering (helping inexperienced pickers) and the customers (via the website). The other key items include the following: the knowledge of experienced berry pickers, having a berry map mobile service provider, the development of easy to use applications, the provision of information on the best berry picking locations, the individuals involved in the project, the apps that have been developed and value for which the customers are willing to pay.

The Czech *small and municipal forest owner service* case segments forest owners according to the amount of property they own, the distance from the property they own to their residence and the type of ownership (municipal and private). The core-value analysis concentrated on the differences in the forest owner segments. The following elements are necessary for the small forest owners: carefully studying the size and cost structure, building good relationships and positioning as a reliable and honest member of the community. For municipal forests, two customer segments are stressed (see also Pek et al., 2017): wood processing companies and the public, which needs to acquire a better understanding of municipal forest management and innovative approaches. Recommended activities include the following: the development of recreational services and educational projects. Outside market benefits are highlighted in the profit formula.

The Latvian *joint stock company* has applied a sustainable business model. The core of the model emphasized the infrastructure (the forests, land and an adequate road network) and the profit formula (incomes are much higher than their costs). The other key items include the following: other forest owners and woodworking enterprises in Latvia, current assets, no threats to wood flow, stability and predictability, collaboration with researchers, the ability to manage a whole process, the opportunity to manage and a stable and predictable wood supply. The private forest owners sell to three main customer groups, produce high-quality roundwood for local markets and for export, can provide energy through wood for fuel chips, and they also own recreational areas (Zālīte and Auzina, 2015).

The Serbian *SERBIO* mission is to contribute to the sustainable

[1] More on permaculture principles at https://permacultureprinciples.com

development of the bioenergy sector in Serbia. The core of the model encompasses the offering (the quality of the services) and the profit formula (bank costs and annual assembly costs). Other key items include the following: consulting services, quality information, reliability, participation in events, bank costs, a website, people with practical knowledge, financing opportunities due to project development funds and collaborations with small and medium enterprises. In addition, one item that represents customers was identified, namely consulting services.

The main goal of establishing *new type of FOAs in Serbia* is to increase the current level of wood mobilization from private forests. The idea is to form an organization of forest owners that includes a professional organization and the employment of a qualified person with the primary objective of wood mobilization and joint market performance. The core of the model encompasses customers (consumers of firewood) and the profit formula (costs for new equipment and costs for road construction). Other key items include the following: income from roundwood and firewood, costs for registration, a market for briquettes and pellets, public companies engage in forest management, professional workers, public enterprises for forest management, and the organization is a stable and trustworthy enterprise.

4.3. Outcomes: Innovation potential

Five case studies have been implemented, meaning that the markets have proved that they are successful in the European private forest ownership context. The Latvian case has been implemented, and the market has proved it is successful, but this case represents public forests. However, this case was included in the analysis because it is an example of one of the first successful sustainable business models in Latvian forestry and provides some implications for private forestry. The Finnish berry map case is a proven concept, and the service has already launched and is available, although it has not yet become a successful business case. Both, the Serbian and Czech Republic case studies are still in their developmental phase, and the business model has not been operationalized yet. Three of the cases demonstrated the applicability of their business model ideas, but they have not yet been tested or implemented as a concept at the market level.

New business models seem to be emerging in several traditional forestry business areas, such as organizing wood production, investing in forests, providing new services, providing bioenergy, conducting wood auctions, and connecting forest owners. Other examples of core elements of new business models include the following: new forms of partnerships, the clear vision and commitment of key individuals, logistics, intellectual sources, and new delivery channels. The case studies, and in particular those that have not yet been implemented, show how challenging it is to break through the market. New business models tend to be either very new and marginal or slightly improved and traditional models.

Because the business models are in the developmental phase, we were only able to determine the *expected* impacts: for the Serbian FOA, the expected outcomes include the increased participation of forest owners in market activities and increased benefits. Members of the FOA are expected to have a better position in the market and better sales of timber assortments, and the forest management is provided by a professional worker that is employed by the association, which will decrease the management costs of forest owners. Likewise, the expected outcomes of the SERBIO case include an increased share of wood bioenergy in the domestic market, a sustainable supply, reduced transaction costs for the biomass logistics and trade center development, improved local policies and commercial frameworks, an increase in the number of workplaces and the supported development of small and medium enterprises (*BioRES Milestone Report about priority locations for new Biomass Logistic and Trade Centres in Bulgaria, Croatia and Serbia, 2015*).

Differences were also found in actors' roles: all the cases that have been implemented and proved to be successful were recognized by the individual that implemented the project. Generally, key persons are involved in the implementation, as in the Swedish, Estonian and Croatian cases. FOAs can be used, as in the Finnish and Slovenian cases, or a stock company can be used, as in the Latvian case. Clearly, the berry map case did not include a key person that was involved in the implementation stage. In the Serbian and Czech cases, the key individual involved in the implementation was not recognized or mentioned. Differences were also found in the roles of the national experts. For the e-shop, forest berry, PFOA Serbia and SFO Czech cases, the experts were an active part of the business model design process and actively involved in the business model, which would be considered PAR because both the researchers and implementers had active roles (Hujala et al., 2014). In Latvia, the national expert had an active role in transferring experiences from a state-owned forest into a privately owned forest. For the permaculture, wood auction, SERBIO and Croatian cases, the national experts' role was more focused on understanding the business model that had already been implemented.

5. Design proposition and potential implications

The general challenge of business model design is combining two separate objectives, namely, business potential and competitive advantage (Ahokangas and Myllykoski, 2014). Thus, we used core-value calculations in the business model analysis to identify key items that correspond to both aspects. The business models analysed in this study introduce new channels for reaching customers (i.e., the Finnish e-shop), satisfying new customer needs (i.e., the Swedish permaculture), targeting new customers (i.e., the Slovenian auctions), reducing [transaction] costs (i.e., the Czech service), and improving customer relationships (i.e., the Estonian case, the Latvian company and the Croatian company). The key areas of the analysed businesses include infrastructure and the offering. The core business model elements of the infrastructure and the offering include the following building blocks: key resources (e.g., human resources), customer relationships (e.g., uniqueness) and key activities (e.g., reinforced cooperation). Moreover, a difference was observed between Western and Eastern European countries in that the latter were mainly concentrated on organizational innovations, while the former focused on service innovation. However, the Estonian case can be classified as a forerunner of historical changes in Eastern European countries. The Swedish permaculture case was the only analysed case that focused on sustainability, the ecologic and ethic dimensions of forestry and forest ownership. Notably, our analysis did not include a case related to carbon emissions or the sink phenomenon, despite the importance of this topic in the forestry field. It seems that there is a lack of new business models that can be used as an intervention tool for the forestry industry to adapt to global changes.

The design proposition resulting from the above analysis and synthesis basically includes a combination of interventions that use specific generative mechanisms to produce specific outcomes in a specific context (Denyer et al., 2008). As such, the tentative design proposition allows us to understand the relationships between the interventions and the outcomes, namely, the mechanisms. For instance, the legally-based joint ownership of forests might represent a tool to ensure democratic decision making that can be used to eliminate or reduce the distrust that originates from the era when Estonia was a part of the Soviet Union. Another example is the use of a legal entity (e.g., a company, FOA) to offer forest owners the ability (at hand) to sell their wood in an organized way, which will increase their motivation to manage their forests to increase their profits; the lack of motivation might originate from the ungrounded wood market that is a heritage of the incomplete economic transition that Slovenia has experienced.

The analysed business models are mainly grounded on traditional forestry and incorporate either new services or organizational improvements. Business model thinking can lead to the use of tools and approaches that can generate new models for exploring innovation

potential. The new business models analysed in this study seem to be either very new models or either marginally or slightly improved traditional models. However, although the main mechanisms that have been identified may vary according to the context, in general, we consider the following design proposition: in the context of changing forest ownership, emerging new forest owner types, changing FOA structures, membership declines, unstable legislative and business environments, and an ungrounded wood market (i.e., contexts), the following recommendations are made to improve forest management, increase the turnover of FOAs or forest owner's profits, reach new forest owners, overcome distrust, increase cooperation and improve the organizational environment (i.e., outcomes):

- Enhance *reliability* and increase the *honest* membership in communities (i.e., mechanism) by increasing the professionality of FOAs and promoting consultancy (i.e., intervention);
- Increase the *motivation* of forest owners by offering them the ability to sell (high-quality and rare) wood through auctions;
- Ensure *democratic decision making* by ensuring the creation of a legal structure for joint ownership;
- Enhance *efficient communication* channels by building partnership with traditional FOAs;
- Stimulate personal *commitment* and *openness* to new ideas by offering field trips to interesting forest areas;
- Increase the *awareness* and *education* of forest owners by providing workshops on selected topics;
- Ensure there is an *involved implementer* of the business model, which can be either a person or an organization;
- Apply active *participative and co-creation* methods to create a joint understanding among relevant actors and to find creative initiatives for new business models.

This study represents the first attempt to shed light on emerging forest business models field by operationalizing a novel methodological approach. This study conducted an expanded BMC with an analytical evaluation of business model items based on CIMO-logic. The procedures increased our understanding of existing business models and the associated mechanisms. In some cases, the participative co-creation process resulted in suggestions for improving existing business models. Based on this experience, it is recommended that the business model design process combine qualitative and quantitative elements and include all the relevant actors in the co-creation process. The analysed cases show that business models can be used as intervention tools to help local forests and the forestry industry adapt to global changes. However, it remains unclear whether these models could be combined with greater ambition to induce even more significant changes on a global level.

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