



# Services for What and for Whom? A Literature Review of Private Forest Owners' Decision-Making in Relation to Forest-Based Services

Anne Matilainen<sup>1</sup> · Elias Andersson<sup>2</sup> · Merja Lähdesmäki<sup>1</sup> · Gun Lidestav<sup>2</sup> · Sami Kurki<sup>1</sup>

Accepted: 3 February 2023 / Published online: 18 February 2023  
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## Abstract

The more distanced forest owners become from their forests, the more room there is for different kinds of advice and service provision to help them in their forest management decisions. Therefore, the quality and adaptation of these services impact the use of forest resources significantly, including at a broader scale. Even though the forest owners' decision-making at the general level, as well as the role of advisory services and their efficiency has been the subject of various studies, literature on how forest owners make decisions in relation to the various types of service provisions appears to be limited, and no systematic review has been found. To offer a better understanding of the present state of knowledge on, and the relations between, decision-making, forest related services, and forest ownership, this literature review provides an overview of the scientific research between 2008 and 2020 on private forest owners' decision-making related to services. The results show that the forest owners' decision-making related to services has been gaining increasing interest as a research topic, especially during the last 5–6 years. However, it is still dominated by a few countries and contexts. In addition, in the current research decision-making concept is mostly understood as a decision outcome i.e., the forest owners' choice between typically two alternatives. The importance of process-based understanding on decision-making, on the other hand, seemed to be largely missing from the forest owner studies. As conclusions, five proposals for future research avenues are presented.

**Keywords** Private forest owners · Woodland owners · Decision-making · Service · Extension · Literature review

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✉ Anne Matilainen  
anne.matilainen@helsinki.fi

<sup>1</sup> University of Helsinki, Ruralia Institute, Seinäjoki, Finland

<sup>2</sup> Department of Forest Resource Management, Swedish University of Agricultural Sciences, Umeå, Sweden

## Introduction

Although private forest ownership in Europe and North America is still to a large extent a “family business,” the concept of the family estate as a joint unit of production and consumption has lost significance. Fewer and fewer forest owners support themselves and their families from their forest property, and an increasing proportion do not reside on the land but in urban areas (Westin et al. 2017; Weiss et al. 2019). These lifestyle changes have had a major impact on the relationship between the forest owner and the land. While the sense of ownership and emotional ties towards the forest holdings seems to remain strong (Lähdesmäki and Matilainen 2014; Matilainen et al. 2019), the lack of time, skills, and equipment needed for management generates a physical and intellectual distance, in addition to the spatial separation (Lidestav et al. 2020). This physical and material disconnect has become a challenge for the management of an increasing number of small-scale forest holdings, not only from the owners’ perspectives, but also from the perspective of wood mobilization. More recently, issues of the provision of other societal and public demands on ecosystem services, environmental considerations and forest social values, have also gained emphasis (Fischer et al. 2010, Ficko et al. 2019). Thus, forest owners are increasingly expected to adjust their forest management to the demands and expectations of markets, policies, NGOs and the general public (Lawrence et al. 2020). External advice and support is often needed to do so (*ibid.*).

These governance conditions are also reflected in research, with an expanding literature on how to influence private owners’ decisions and behaviours by various coercive, rewarding, and normative strategies, and the corresponding use of particular tools or combinations of them (e.g., Appelstrand 2012; Fischer et al. 2010; Löfmarck et al. 2017; Nichiforel et al. 2018). Regardless of the direction and extent of adaptation to external expectations, the various decisions made by the forest owners typically relate to forest management alternatives and associated services. It can be assumed that the more distanced the owners are from their forests, the more room there is for multifarious advice and service provision to help and support their management decisions. Therefore, the quality and adaptation of these services by forest owners significantly impacts forest management and related decisions.

In addition to forest owners’ decision-making at the general level, the role of advisory services and their efficiency have been the subject of various studies (see, e.g., Erlandsson et al. 2017; Ficko and Boncina 2013; Hujala et al. 2019 or Wilkes-Allemann et al. 2021). However, literature on how forest owners make the decisions in relation to the variety of service provision appears to be limited, and no comprehensive or systematic review has been found. There is, nevertheless, an on-going discussion in the sector on the declining trend of the forest owners’ engagement in various forest management schemes, as well as in buying external management services (Weiss et al. 2017). This suggests that the current service provision does not fully meet the needs of the forest owners and thus further service development is warranted, especially if multifold forest policy goals are to

be met in the future. A wider meta-level understanding of what is known on this issue would help to summarise the current research, as well as point out the gaps in it. This information also serves the development of new generation service provision to enable the owners to meet both their own objectives and the external expectations of the use of forest resources.

Thus, to offer a better understanding of the present state of knowledge, this study will provide an overview of the recent research on private forest owners' decision-making related to services. First, we elaborate the central concepts of the literature review: decision-making and service, and present some thoughts on how these concepts have been understood in research in general. Next, we present an overview of the scientific literature on the topic between 2008 and 2020 in the forest ownership context. Finally, some insights on the current research trends, as well as proposals for future research avenues, are presented.

## The Key Concepts

As this review article aims to summarise the knowledge of private forest owners' decision-making in terms of the forest-related service types, it is worthwhile elaborating these two concepts and how they are constructed.

A **decision** is normally described as the process of making a choice between at least two alternative actions to achieve a desired result (Brunsson 1982; Eisenfuhr 2011). According to Ebbers et al. (2016), there are two streams of thought on decision-making. The first is that of the rational actor and rational choice (e.g., Hahn and Hollis 1979). The actor will carefully weigh all choices available and then choose the best possible alternative. However, a vast amount of research has challenged rational actor and rational choice theory. When people make choices and decisions that go against the assumption of rational utility-maximizing behaviour, either the decision-making or the behaviour has been called irrational (Barcovic 2019), which represents the other approach to decision-making studies.

According to Brunsson (1982), there are three common ways of explaining the irrationality found in the decisions in practice. According to the first explanation, the people studied are not clever enough to behave rationally (Huysmans 1970). If they only had the brains and knowledge of the experts in the topic, they would end up with "the right" decision. The second explanation derives from psychological research, which indicates that certain types of irrationality are inherent human characteristics, and these characteristics are difficult to change by training (Goldberg 1968; Kahneman and Tversky 1973). Consequently, not even experts can be fully rational, and full rationality can only be achieved by mathematical formulae or computer programs assuming there is the needed data available. The third way of explaining apparently irrational behaviour, according to Brunsson, is to point out practical restrictions. In realistic decision situations, values, alternatives and predictions interact so that the decision-makers have either incomplete or biased information or more information than human beings can grasp. Rutar (2020) further listed four explanations, partly parallel to Brunsson's, especially in terms of meeting the rational expectations in human decision-making. The first one, rational

ignorance, arises when “*ignorance prevails for rational reasons*” (Rutar 2020, p. 554, see also Downs 1957) meaning that the effort to gain proper information to make rational decision is too big compared to the expected outcome of the decision. Secondly, in some social situations a person can make epistemically irrational decisions to serve one’s other interests like confirming one’s identity or signal allegiance (Caplan 2001). This relates also to the third explanation, arational behavior resulting from norm-following. The fourth explanation, miscalculation, states that some apparent irrational behavior is simply due to miscalculation and human error (Rutar 2020).

One widely applied, even though sometimes criticized (Cohen et al. 1975; Marcuse 1965), approach to understanding the rational and irrational elements of the decision-making process and combining them was proposed by Max Weber (1922).<sup>1</sup> According to Weber, the key thing is to understand that different types of rationality exist, each one having different drivers. He divides rational social action into purposive rationality (*Zweckrationalität*) and value rationality (*Wertrationalität*). Purposive rational actions are seen as actions aiming to attain some end by the conscious and calculated use of certain means. By contrast, he sees value-rational oriented actions as driven by a conscious belief in the value of some ethical, aesthetic, or other form of behaviour, for its own sake irrespective of its prospects of success. Nevertheless, both of these include elements of conscious evaluation of the alternatives. Similarly, he divides irrational social action into affectional action (*Affektuelles Handeln*) and traditional action (*Traditionales Handeln*). Affectional actions are determined by someone’s specific affects and feelings, whereas traditional actions are based on settled habits.

According to various theorists, both rational and irrational decision-making can exist at the same time (see e.g. Essen and Kronenberg 2015; Fazio 1990; Payne et al. 1993). One such theory, the adaptive decision-maker hypothesis, assumes that “*the use of various decision strategies is an adaptive response of a limited-capacity information processor to the demands of complex task environments*” (Payne et al. 1993 p.9). In other words, depending on the situation, such as a lack of time or urgency, people will change the level of rationality in their process. According to Payne et al. (1993), this also depends on the desired accuracy of the decision-making process and the desire to minimize the (cognitive) effort required to make the decision. The apparent irrationalities are not limited to insignificant decisions, indeed it has been argued that the apparent irrationalities are largest in major decisions (Brunsson 1982). Several scholars (e.g. Esser and Kronenberg; 2015; Etzioni 1999; Opp 2020) further claim that normative-affective factors shape decision-making significantly, the extent to which it takes place, the information gathered, how it is processed, the inferences that are drawn, the options being considered, and those that are finally chosen. The existence of norms do not always require conscious evaluation of the

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<sup>1</sup> For example, Marcuse (1965) criticized Weber’s conception of formal rationality as missing the linkages between intellectual and material culture and therefore being correspondent to the rationality of dominant groups and capital in late industrialization.

decision (Esser and Kronenberg, 2015). Instead, they can be impacted via mental modes (habitualized behavior) and thus be an unconscious process (Garfinkel 1967).

Forest owners constantly make decisions regarding their forest resource at different levels. Some decisions are strategic in nature and may relate to selling or buying the forest property and thus determine whether the forest owner actually retains ownership. Some decisions can, however, be tactical; for example, dealing with forest management choices, and some operational ones, which deal with issues such as to whom to sell the timber (after the decision to sell has already been made) or from which contractor to buy the forest management service (see, e.g., Bare and Weintraub 2015). These decision-making processes do not differ from any other type of decision-making, with the rationalities and irrationalities, as well as influences, the literature above mentions. Human decision-making can, indeed, be approached from the viewpoint of several research fields and a number of aspects seem to impact it, which makes it challenging to grasp the overall picture in the forest-owning context. Lunenburg (2010) offers one way to categorize this heterogeneity by dividing understanding of the decision-making concept into three key elements. First, decision-making involves making a choice among a number of options. This can be understood to create a desired outcome. Secondly, decision-making is a process that involves more than simply a final choice between alternatives. In other words, it is not a single moment, but a succession of activities which the decision-making context and all the issues related to it also impact. Finally, the "desired result" mentioned in the definition of decision-making involves a mental activity that the decision-maker engages in to reach a final decision. Naturally, the capacities, knowledge and other qualities of the decision-maker significantly impact this. In this study, the categorization inspired by Lunenburg has been used to understand the perception of decision-making in the existing forest ownership literature.

The other important concept used in this literature review is that of **a service**. In general terms, services can be defined as "*formal economic activities of producers which do not themselves directly result in the production or modification of physical objects*" (Gershuny and Miles 1983, p. 11) or, more briefly put, an economic unit that performs some activity for the benefit of another (Hill 1977). Common features among many services are that they are simultaneously produced and consumed, often increasingly personalised, with an output that is often hard to measure and requiring professional and skilled labour (Gershuny and Miles 1983). However, the definition of services is also highly dependent on their consumption and marketing (e.g., Dean 1999; Baudrillard 1981). One example of this, although imprecise, is the separation between producer services and consumer services, where the former mainly constitute a part of the production process or a means to final activity/product, while the latter is more directly associated with the final product. The diversity of services makes it hard to distinguish between the immediate and final product of a service, and the service and sale interaction (consumption and marketing) (e.g., Jobber and Lancaster 2012). This contributes to "*the consumer find[ing] it difficult to isolate service quality from the quality of the service provider*" (Enderwick 1992 p. 139). The value of services is determined in the exchange and production of value-in-use, where the value proposition is realized in consumption. Within economic literature, abstract conceptions of needs and desires highlight services as "valuable"

by improving the “quality of life” (Ballantyne and Varey 2006), “well-being” (Vargo and Lusch 2016) and “everyday practices” (Grönroos 2008) of consumers. This produces a tendency to overstate consumer demand as a driver for service offering (Fine 2013).

Given the importance of consumption in the value-creation of services, all service offerings should be understood as socially and culturally embedded and therefore requiring an ideological and discursive interpretation to be more comprehensively understood (see Arnould 2007). Thus, the service, being based on cultural values and needs and interwoven with the social context in which the service is offered, is always a “cultural product” (Wittel et al. 2002). Accordingly, the understanding of forest owners, their needs and desires impacts service development and offering. However, it equally contributes to the conceptualisation and subjectification of relations and identities within the service provision context, such as a decision-maker and an expert (see Andersson and Keskitalo 2019; 2021; Lidskog and Sjödin 2015). This further means that the current forest-related services provided by companies and associations also constitute an element of the socialisation and practice of forest owners within forestry (Keskitalo 2017), in which the drivers and motives, such as timber sales, become highlighted (Andersson and Keskitalo 2019; Mattila and Roos 2014).

In forestry, the tangible and intangible dimensions of forest-based products and services have become increasingly inseparable, especially with the increased emphasis on environmental responsibility, climate change mitigation, and adaptation within the bioeconomy (Pelli et al. 2017; Pülzl et al. 2014). The abstract value-in-use of service offering and conceptualisation contribute to a broad and more general articulation of the value of forests, for example, in the form of ecosystem services. In many cases, the forest owners are not, at least yet, seen as producers of these services: many ecosystem services are seen provided to society by the forest resources, not by the owners of these resources. This approach seems to be slowly changing, however. In relation to forest ownership, most current services can primarily be defined as producer services, such as pre-commercial cleaning and thinning (e.g., Favada et al. 2009; Häyrynen et al. 2015; Erlandsson et al. 2017). In a way, these services aim to support the forest owner to produce some particular product or ecosystem service from their forests. Lately, also examples of consumer services which are primarily intended to provide value to the forest owners as an end consumer, rather than providing them with a part of the production process when they are providing services to others, has also been highlighted. These may, for example, be various forms of advisory services or more value-oriented products (Hansen et al. 2006; Toppinen et al. 2014; Andersson and Keskitalo 2019; Mattila and Roos 2014).

## Material and Methods

A literature review can be broadly described as a systematic way of collecting and synthesizing previous research (Snyder 2019). As our aim was to map out the state-of-the-art of research on private forest owners’ decision-making related to various services, a semi-systematic literature review methodology was chosen (Wong

et al. 2013). This means that even though the methodology includes the systematic approach to and analysis of the literature search with scientific rigour, it leaves some freedom for the researchers to analyse the relevance of the literature included/excluded. A semi-systematic literature review has been designed for topics conceptualized and studied differently within diverse disciplines which does not allow a full systematic review process (Wong et al. 2013; Snyder 2019). This type of literature review has been found to be useful in detecting themes, theoretical perspectives and common issues within a particular research discipline or methodology (Ward et al. 2009) and facilitates mapping of a field of research, synthesizing the state of knowledge, identifying knowledge gaps within the literature and creating an agenda for further research (Snyder 2019). The analysis process followed a widely recognized PRISMA (Preferred reporting items for systematic reviews and meta-analyses)-methodology (Moher et al. 2009).

At the beginning, a systematic literature search was made of the Web of Science and SCOPUS research databases. The following combinations of search words were used.

"forest owner \* " + decision \* + service \*: 82 (SCOPUS) + and 134 + (Web of Science) articles

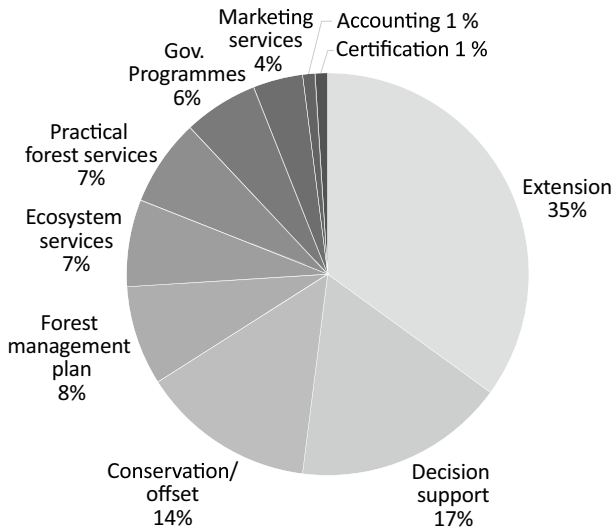
"woodland owner \* " + decision \* + service \*: 5 (SCOPUS) and 16 (Web of Science) articles

"forest owner \* " + decision \* + extension \*: 16 (SCOPUS) and 27 (Web of Science) articles

"woodland owner \* " + decision \* + extension \*: 5 (SCOPUS) and 5 (Web of Science) articles

The time period of the last 13 years (2008–2020) was surveyed as the aim was to determine the state of the art in recent research rather than show historic changes in the research traditions (Snyder 2019). After the duplicated articles were excluded from the literature searches, 189 articles remained. Of these, only those in English and published in peer-reviewed scientific journals were included in the first phase of analysis ( $n=182$ ). This phase included the authors reviewing all identified articles. The review excluded articles that were not on the topic of the literature review. These included articles analyzing forest cover, pest mitigation and ecosystem services in general without any decision-making or private forest owner aspects. As a result, 140 research articles remained for the final analyses. The remaining articles were further analysed by using a joint framework which incorporated the research topics, justification for the importance of the research, theoretical background used, type of service being studied, methodological approach, main results and the findings related to forest owners' decision-making.

Both quantitative and qualitative analytic approaches were used. The aim of the quantitative descriptive analysis was to provide an overview of the recent research on private forest owners' decision-making related to services. The qualitative analysis was used to determine how the services and the decision-making were perceived in the articles in order to find potential gaps in the existing research. A qualitative thematic analysis was also used. This can be broadly defined as a method for identifying, analysing, and reporting patterns in the form of themes within a text (Braun and Clarke 2006). In order to increase the validity of the qualitative analysis, all analysis and interpretation phases were a collaborative and iterative effort by the authors. In the event of any disagreements, the data were jointly reanalysed until



**Fig. 1** Type of services found in the research literature ( $n=72$ ). The articles categorised as “no service” are not included in this figure

a shared interpretation was achieved. This way of utilizing analyst triangulation, though rather laborious, is often regarded as bolstering the credibility of the research (Patton 2002), and builds confidence in the findings (Eisenhardt 1989).

## Results and Analyses

### Descriptive Results

To get an overview of the existing research and state of knowledge in this area, the literature was analysed based on what kind of services were in question, in what national contexts (countries) the research was situated, how these services and decision-making were being studied (methods), when (year) and where (journal) the research was published.

### Service Provision Studied in The Existing Research

In our analyses, a service was understood as something that is offered to the private forest owners, whether a government subsidy programme or an actual operational service, such as a forest plan. Thus, both producer and consumer service approaches were included. These services were further divided inductively into various themes and further into the categories which appear in Fig. 1. In addition, some papers discussed service provision and decision-making more generally, rather than dealing



with any specific services targeted at private forest owners. These articles were categorised as “no specific service”.

As to the existing literature, extension services were the most widely studied (Fig. 1). In general, “extension” is defined here as an advisory service, often provided by governmental institutions or private actors, focused on outreach and providing general knowledge to support forest owners and the efficacy of forest management and operations (Lawrence et al. 2020). Thus, the extension services category was considered to include studies which covered a larger range of services, not simply an individual service. More than a third of the papers that mentioned forest owner-related services dealt with extension services. These were studied in terms of the information they provided, but there was also a group of extension services that focused on facilitating networking and knowledge-sharing among forest owners (e.g., André et al. 2017; Stoettner and Dhubhain 2019). In general, it can also be said that the vast majority of papers were on developing and optimising extension services mainly from the perspective and goals of the service provider.

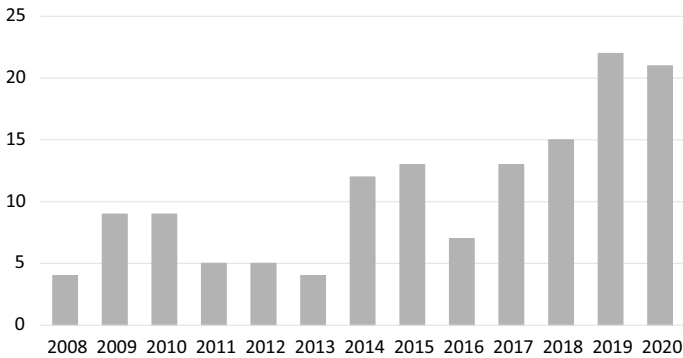
Approximately a sixth (17%) of papers explicitly mentioned services to private forest owners focused on decision support-services providing optimal outcome scenarios, such as decision-support models and services related to family succession (e.g., Gruver et al. 2017), management (e.g., Nordström et al. 2013; Simon and Etienne 2010), multiple-use/values (e.g., Pynnönen et al. 2018; Kurttila et al. 2018), specific challenges/risks such as drought (Caurla and Lobianco 2020) or wind throws (Petucco et al. 2020). Fourteen percent of papers focused on conservation and conservation offsets schemes for forest owners (e.g., Kumela et al. 2012; Kittredge 2016). These mainly dealt with top-down compensation programmes targeted at private forest owners and analysing their potential drivers.

The public and governmental institutions and actors provided most of the services in the articles reviewed. The second largest group of service providers were forestry organisations, such as associations and private companies. A high percentage of the papers also discussed services as a secondary aspect of the research in relation to a primary research focus like economic modelling, tools, assessment, and governance. Only relatively few articles considered the service offering more extensively, i.e. covering the relationships, needs, values and price (Ambrusova, and Rastislav, 2014; Rickenbach 2009). Instead, most articles simply focused on the service description, per se.

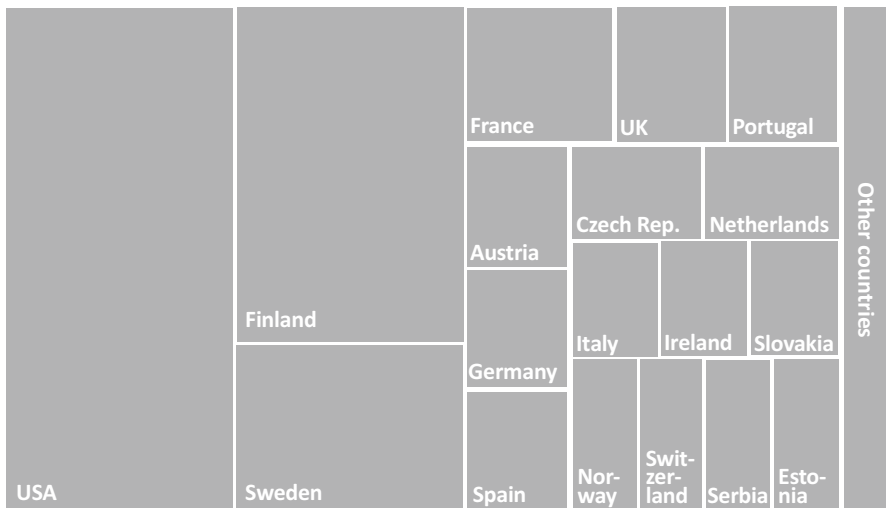
Almost half (49%,  $n=69$ ) of the articles did not focus on any specific services targeted at private forest owners, even though they were included in the corpus, focusing instead on forest owners’ decision-making at a more general level. The majority of these papers were focused on forest owners’ attitudes towards different types of ecosystem services. Thus, they did not focus on services targeted at the forest owners, but instead to services the forest owners provide for the environment and society in general.

## Temporal Distribution of The Studies and The Research Context

The number of published articles in scientific journals per year indicates that there is a growing interest in forest owners’ services-related decision-making.



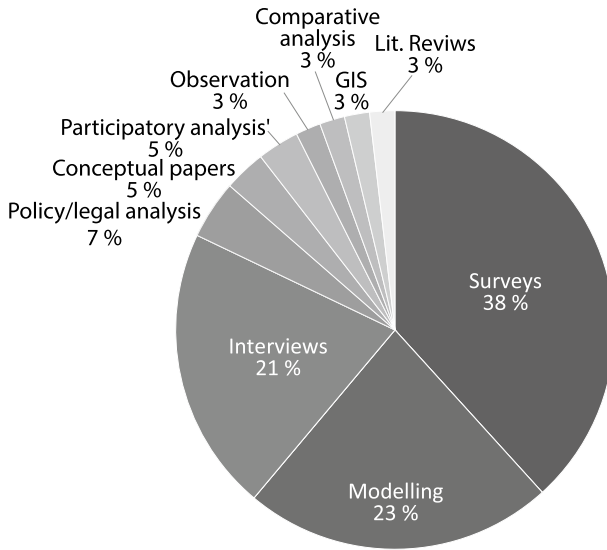
**Fig. 2** The number of articles per publishing year



**Fig. 3** The origin of the existing research ( $n = 163$ , some articles focused on more than one country)

However, it is worthwhile noting that the number of articles varies from a very low level of four during 2008 to over twenty per year over the last two years. (Fig. 2).

The US was the most reoccurring research context in the studies, 45 of the papers (32%) being within this setting. The second largest contributor to the research was Finland with 30 studies, with Sweden in third place with 15 studies. (Fig. 3). In general, the European context dominated. Only a few studies focused on more than one country (e.g., Blanco et al. 2015; Petrovic and Cabaravdi, 2010; Kajanus et al. 2019) and only 5 articles in total focused on other than USA or European contexts (e.g. Baker et al. 2019; Guo et al. 2014).



**Fig. 4** The research methods used in the literature analysed ( $n=162$ , some articles used more than one method)

### Research Methods Used

To get an understanding of the existing knowledge, the research methods were also analysed (Fig. 4). Surveys constitute the method that clearly dominates this research field, included in more than a third (38%) of the studies. Various forms of modelling were also a major source of knowledge, mainly focusing on types of decision-support models (e.g. models utilising economic modelling, scenario modelling or optimization modelling such as risk-averse expected utility maximizing approach), and almost a quarter of the studies (23%) included this method within their methodology. The third broadly used method was interviews, which were included in about a fifth of the studies (21%). Although most studies used only one method of collecting information, mixed-methods were used in 17%. Generally, the combination was a survey and interviews (often a focus group), a survey and modelling or combining a forest owner survey with the forest property analysis.

A majority of the studies used no particular theoretical background other than describing the previous research on the topic (54%). The papers taking modelling approaches, implicitly used the theories behind the used models as a background and briefly referred to them. In addition, in several articles the theoretical background described the concepts used rather than adopting a wider theoretical approach. The explicitly described theoretical approaches used in the articles focused on knowledge and learning, networks, stakeholders and communication, behavioural theories, economics and institutions and some specific theories related to land valuation and scenarios (Table 1). The most commonly used were economic and institutional theories, as well as behavioural theories.

**Table 1** Examples of the theoretical approaches, concepts and tools used in the existing literature

Knowledge, learning	Community of practice Inter-organizational learning Initiation–response–evaluation pedagogical sequence model Communication and educational theories Theories of knowledge management and knowledge lifecycle
Networks and stakeholders	Ladder of partnership activity Cultural-historical activity theory Social network analysis Interest group theories Ego-centric social networks Collaborative governance Collective action theory (CAT) Social exchange theory (SET)
Behaviour	Goal-frame theory Action-based theory Theory of planned behaviour (TPB) Adaptive decision analysis (ADA) Activity theory Behavioral economics Psychometric segmentation Linguistic nudging and dissonance theory Lancaster's consumer choice theory Social-cognitive theory
Economics and institutions	Ostrom's institutional analysis Maximisation framework Random utility theory Anti-commons theory Institutional analysis Service dominant logic framework Economic theory Profit model (economic activity) and utility model (moral norm) Governance/stakeholder interactions Innovation (soft) system -theories
Other	Forest landscape development scenarios (FoLDS) framework Ricardian land rent theory & discrete choice model of forestland conversion Theory of forest investment Land expectation value

## Journals

Most of the studies were published in the forest or environmental science journals. *Forest Policy and Economics* published the most papers (25), the next being *Forests* (9), *Land Use Policy* (8) and *Small-scale Forestry* (6). The remaining journals, which comprise many of the major forest science and environmental management journals, had 4–5 papers each. The papers from other journals beyond forest and environmental science were very few, having had only a single paper each.

## Thematic Analysis – Understanding Decision-Making

In addition to the descriptives, the articles were analysed by using qualitative theme analysis to estimate how the decision-making concept was understood. This was done to identify the gaps in the existing research, as well as to better understand existing knowledge on the topic. The analysis of the decision-making concept and perceptions of it used Lunenburg's (2010) categorization as an inspiration. Thus, the articles were analysed based on whether and how they treated the decision-making outcome (i.e., the choice made), the decision-making context issues impacting it in one way or another, and whether they focused on decision-makers, i.e., the private forest owners' characteristics and/or abilities as decision-makers in relation to forest services. The articles exhibited all these approaches.

### Focus on the Decision-Making Outcome

**Binary Outcome of the Decision-Making** A majority of the papers understood decision-making simply as the forest owners' answer of "yes" or "no" on whether to participate in some programme or buy the offered service (e.g., Ma et al. 2012; Creamer et al 2012). In the other words, decision-making was perceived as an outcome of the decision rather than the process itself or considered the time and/or space in which the decision took place. This approach is well suited to a survey study, which may partly explain its popularity in the existing research. The studies also further analysed the socio-economic characteristics of the respondents, aiming to show the connection between them and the decision outcome. In that sense, these approaches did partly, if not with very much depth, involve the forest owner as a decision-maker and partly the decision-making context. Typically, there were no optional choices considered for the decision. Rather it was binary in nature; whether the forest owner participated in or bought the service or not. The aim of the research was also often very top down, trying to understand what types of forest owner were the most prominent in deciding "yes".

The binary decision outcome was studied in two ways, since the great majority of the studies focused on measuring participation or purchase intentions rather than the actual outcome (e.g., Clarke et al. 2019; Karppinen and Berghäll 2015). Some studies also analysed various statistics, in which case they focused on decisions already made and their outcomes and attempted to identify their antecedents using either the socio-economic characteristics of the forest owners or statistics related to the forest resource.

**Optimal Outcome** In addition to binary decision outcomes, another widely used approach to decision-making was to determine how to achieve the optimal alternative for the forest use based on the forest owners' values and preferences. This perception of the decision-making involves a strong evaluative element and thus keeps alternative options open for different types of decision outcomes. Often these studies included decision support model approaches (e.g., Nordsröm et al.

2013). In some studies, this kind of approach was also used in reverse, analysing what types of forest owners (objectives) were the most likely to come up with a specified pre-set decision outcome using a range of models (e.g., Härtl and Knoke 2019).

### Focus on The Decision-Making Context

The second approach focused on influences on the decision-making like social networks, peer support, trust in the forest advisor, and the role of formal and informal information for the decision-making context, rather than the decision outcome as such (e.g., Maier et al. 2014; Hujala et al. 2009). Some articles did not include the decision outcome at all in their analysis. This approach also partly considered the decision-making process, typically from the point of view of a specific element. The following topics under the decision-making context were identified:

**Operational Environment and Political Context** Some articles described the operational environment in which the forest owners make their decisions (such as management and withdrawal rights). These articles typically took a quantitative approach and were implemented by using the survey method or utilised existing statistics (e.g., Nichiforel et al. 2020).

**Social Context** Especially in recent years, there has been increasing interest in the literature on research aiming to understand the social context of the forest owners' decision-making, even though this is still relatively small in forest owner research. The role of trust in the relationship between the advisor and the forest owners and the role of peer support have been studied (e.g., Hujala and Tikkanen 2008; Virkkula et al. 2009; Stoettner and Ní Dhúbháin 2019). Even though the use of theories was not very common, the studies in this category often utilised some kind of theoretical approach.

**Knowledge Context** A partly parallel context related topic with the existing research focusing on the social context can be called the knowledge context. In these studies, the aim has been to see how the knowledge available influences the decision-making. In the existing research, the knowledge has been, for example, in a form of extension services, decision support of information campaigns (e.g., Carlton et al. 2014; Pynnönen et al. 2018; Sjølie et al. 2019).

### Focus on the Decision-Maker

The third approach found had an individual approach and in the core of the analyse were the private forest owners, their characteristics and capacity as decision-makers. These articles focused on, among other things, the decision-making styles and the knowledge levels of the forest owners and the impacts of these on the decision-making (e.g., Hujala et al. 2013). The research on the decision-maker can be

divided further into two groups: studies analysing the socio-economic characteristics of forest owners and those analysing the capabilities of forest owners. The first group focused mostly on determining what type of forest owner was most likely to end up with some particular decision outcome by using the quantitative approach (e.g., Ficko and Boncina 2013; Butler et al. 2016). This approach can also be seen as including articles using background statistics to describe who the forest owners are. The second group of studies focused on the forest owners' decision-making styles and their impact on them, the forest owners' skills and knowledge of forest related issues and their impact on certain decision outcomes (e.g., Hamunen et al. 2015). The capability approach typically also utilised some kind of theoretical background such as the theory of planned behaviour (Ajzen 1991), communities of knowledge (Wenger 2009) or random-utility theories (McFadden 1986).

In summary, decision-making was constructed in the existing research to include mainly one or two dimensions of Lunenburg's (2010) categorization. However, as the decision-making dimensions are somewhat interlinked, many articles brought out the other dimensions in the discussion as well, even though they did not provide new results or data on them.

## Discussion

The results show that the forest owners' decision-making related to services has been gaining increasing interest as a research topic, especially during the last 5–6 years. This is not a surprising finding as such. Approximately 50% of the forests in Europe and USA are privately owned (Weiss et al. 2019) and society's interest in forest resources has increased continuously in recent years because of the bioeconomy discussion as well as climate change mitigation and declining biodiversity (Routa et al. 2012; EU Commission 2012). Simultaneously, forests still have an important economic role, not only for their owners, but also regionally and nationally. Thus, the decisions private forest owners make impact the potential for full utilization of forest resources.

The lack of theories in the existing research is evident, even though there are indications that the use of more theory-driven research is increasing. A more human sciences approach to the decision-making studies typically entails the use of theoretical approaches, especially from fields like psychology and social-psychology. Even though the existing studies already provide valuable knowledge of forest owners' decision-making on forest services, as well as decision-making in general, having more multidisciplinary approaches would deepen the existing understanding. Similarly, more variety in the research methods could be introduced to this topic. At the moment, survey methodological approaches dominate. Interventions based on ongoing service provision and experimental approaches could bring a new research area to forest owner studies. In addition, these studies could benefit more from the mixed-method approaches, as they often delineate a broader picture of the research questions, even though this is more laborious for the researchers (Driscoll et al 2007).

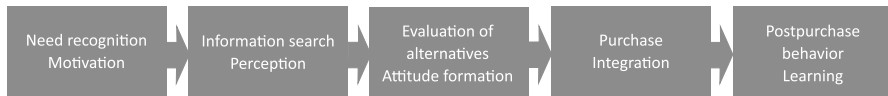
As it seems that a few countries dominate in research related to forest owners' decision-making about services, whether the general understanding of the topic is shaped by the national contexts and their specific conditions of forest ownership can also be speculated. The role of forests in society, the legal context, and the traditions in different countries influence the decision-making and its opportunities significantly. Thus, it is reasonable to assume that this has an impact on both the general understanding of the conceptualization of decision-making and its agency; i.e., how the forest owner is seen as an actor in the process (Lawrence et al 2020). For example, in the top three countries measured by the amount of research (the US, Finland and Sweden), there is a very normative approach to what an active forest owner is and what the correct ways to manage forests are, which is also institutionalized in the sector. This may also partly explain why there are so many top-down approaches in the current research and the service provision under scrutiny is often provided by national public actors rather than market-based companies.

### **From Expert-Based Approaches to Co-Creation of Knowledge in Service Provision?**

Similar to agriculture (Ozcatalbas and Brumfield 2010; Vanclay 2004), forestry has a long tradition of extension and educational outreach (e.g., Virkkula and Hujala 2014; Lawrence et al. 2020), which also often stipulates the forest owners' service conception within the forestry sector. As highlighted in previous studies, traditional forestry extension activities tend to focus on the transfer-of-knowledge (Steyaert et al. 2007) and "teaching" forest owners (Ma et al. 2012). Shaped by a history of detailed regulations and enforcement systems (Ma et al. 2012; Steyaert et al. 2007; Appelstrand 2012), this contributes to structuring the relations between professionals and forest owners, where the nature of extension practice, and the expert and lay-person dichotomy are reproduced (Virkkula and Hujala 2014). This also adds to services having been primarily focused on the needs of service providers and not those of forest owners (Leeuwis 2013; Vanclay 2004; Andersson and Keskitalo 2019) and the production of "the forest expert" being an integrated part of the service offering (Lidskog and Sjödin 2015; Mattila and Roos 2014). Even though extension has in recent years more actively incorporated more networking and knowledge co-creation (e.g., André et al. 2017; Stoettner and Ní Dhubháin 2019), it's goals have still often remained conventional ones.

It can be concluded that results of this review highlight the importance of integrating forest owner decision-making and the service offering within their socio-cultural settings, not only to understand the service itself, its potentiality and value, but also how it's being produced, sold and consumed and how that shapes the negotiation and production of forest-related knowledge, decision-making and subject positions in relation to power at multiple levels. These issues and their roles are rarely discussed in more depth in the current research, despite recognising them as limitations of the studies. Therefore, this review also highlights the contextual understating of the research on these issues and the implications the context has for various social, material, and institutional conditions, relations, and forest ownership settings





**Fig. 5** The main stages of the consumers' decision-making process (Stankevich 2017)

in order to improve the general understanding of service provision and decision-making (cf. Nichiforel et al. 2018).

The concept of service in the existing forest research seemed to have several interpretations. The abstract value-in-use of service offerings and conceptualization related to ecosystem services are included in a large number of articles dealing with “forest-related services”, but without being directly related to forest owners' decision-making or services offered to forest owners. These perspectives often consider the normalization of “value” as a general positive outcome, where it risks neglecting social, institutional and psychological aspects of decision-making and forest-based services. Another more “non-traditional” approach to the forest-based services is service-dominated logic (SDL) (Berghäll 2018; Matthies et al. 2016; Häyriinen et al. 2015; Mattila and Roos 2014; Mattila et al. 2013; Hujala et al. 2019). The emphasis here is on understanding a service as a co-creation of value and reciprocal approaches to using resources for the benefit of others (Vargo and Lusch 2004). All this adds to the complexity of understanding the concept of service in the forest-owning context. However, through the concept of co-creation, specific use-values, social relations, subject positions and the power of service and knowledge production (cf. Vainio and Paloniemi 2012; Winkel 2012) are absorbed in understanding the service provision. This, in turn, enables an increased integration of forest owners and their values into the service provision processes. However, the concept of co-creation does not provide theoretical tools to integrate the forest owners beyond the exchange process. Thus, such conceptions of services are not yet used in depth in literature on theorizing services as market offerings or understood as forest owners decision-making support, but instead as expand the constructs of service provision and consumption (cf. Hietanen et al. 2017). Service dominant logic does, nevertheless, provide an interesting approach compared to more traditional understandings of service provision in forest research, which could better integrate the understanding of context into the current knowledge.

### **Processual Approach to Decision-Making Provides a Novel Research Avenue to Forest Owner Research?**

The results suggest that decision-making was mostly understood as a decision outcome i.e., the forest owners' choice typically between two alternatives. In addition, there is research focused on the decision-making context and the forest owners' capabilities as decision-makers. The research from other sectors, on the other hand, has demonstrated the importance of the process in decision-making (e.g., Engel et al. 1968; D'Astous et al. 1989; Erasmus et al. 2001; Punj and Srinivasan 1992). However, this approach seemed to be largely missing from the forest owner studies.

If we look, for example, at Stankevich's (2017) widely used approach to decision-making based on consumer research (Fig. 5), it can be seen that the decision-making, in fact, has several stages. The starting-point for the process is a recognition of a need which can be motivated either internally or externally through marketing. After identifying the need, the decision-maker gathers information on alternatives—often by utilizing memories and experiences, asking for information and experiences from friends and experts as well as seeking information from public sources. During the third stage, alternatives are evaluated and compared based on information gathered. This stage aims at choosing the most important attribute based on which the decision-maker will make the final decision (e.g., price, quality). The emotional connections and experiences can have a significant role in the evaluation phase. The fourth stage signifies the actual choice or purchase. The time between the decision to purchase and the actual purchase depends on the nature of the object—in case of complex purchases—like for example forest management services—the time delay is longer than for those objects including low involvement, like everyday goods. The decision-making processes end with the evaluation phase where the satisfaction in the purchased product is assessed. This evaluation influences future consumption behaviour.

According to the research analysed here, most of it focuses on the “purchase integration”-phase of decision-making and some also on the information search phase. Evaluation has not really been studied either, other than the optimal choice point of view, in which selecting the optimal choice is delegated to the decision support models. All the other phases in the Stankevich (2017) model are largely forgotten. The process approach to decision-making, even though no doubt complex to study, could bring new insights to the forest owners' “consumer behaviour” as customers for different types of forest services as well as to the forest owners' decision-making. The consumer research tradition (e.g., Holbrook 1987) already provides tools and approaches that could be used more widely within forest owner research.

Most papers in our literature review derived from the rational actor and rational choice approach. However, in consumer research it has been widely known that consumers often settle for a satisfactory decision rather than aspire to the rational optimal choice (Schiffman et al. 2008). It would probably add knowledge of the forest owners' decision-making to have a wider focus, e.g., via the adaptive decision-maker hypothesis (Payne et al. 1993) or take a stronger approach to normative-affective considerations (Etzioni 1999). The apparent irrationality in the decision-making seems to be understood in the existing forest owner research mainly as a lack of information or decision-making capacity of the forest owners. Having a more generous approach to and understanding of the “irrational” decision-making and utilizing theories and methods of psychological research (e.g., Goldberg 1968; Kahneman and Tversky 1973) could bring further insights into the forest owners' decision-making process and outcomes related to it.

These approaches could also bring new viewpoints to service design. It has been shown that, even though the functional value of the product or service is usually considered as the primary driver of consumption choice, social approval (social values), emotional responses (emotional values), knowledge satisfaction (epistemic values) and situational (conditional) values may significantly affect the behavioral

consumption intention (Sheth et al. 1991). Similarly, decision-making processes seldom proceed in a sequential or purely rational fashion, but some stages of the process occur simultaneously and consumers are also engaged in non-conscious behaviour (Erasmus et al. 2001).

## Conclusions

To conclude this review, we propose that future research should pay more attention to the following five main points.

Firstly, in addition to the top-down approach to forest owners' decision-making, the research should focus more on a bottom-up approaches. At the moment, most of the research concentrate on such questions as how forest owners could be persuaded to use certain services or to take part in certain governmental programmes. More focus could be put on customer orientation and customer demand as well as co-creation of knowledge: what the forest owners actually want or need in relation to services. This topic is often discussed in the current research, especially when justifying the need for forest owner research, but in the end, it is empirically analysed surprisingly little.

Secondly, the decision-making process and context should be considered more closely. In many cases, the existing research takes very simplistic views on both human decision-making and its processes. In addition, even though the service offering being investigated is very context bound, the context is seldom analysed in depth. Instead, of seeing it as a limitation of a study, it could be taken as a crucial element in formulating the research questions. Without analyzing the context's role in both decision-making and service offering, the results may not reveal all of the insights related to forest owners' decision-making that they could potentially do. One can also ask how much the dominant context of the current studies impacts our understanding of the forest owners' decision-making. In addition, in studying service provision for forest owners, one should pay more attention to the existing service markets. In many countries, these can be divided into public, semi-public (i.e., subsidized) and privately produced market-based services. The current studies mainly focus on public or semi-public services, while the market-based services are less studied. Thus, the context also impacts what kind of services are being researched and how it shapes our understanding of the forest owners' decision-making in this respect.

Thirdly, forest owners' capacity building for decision-making could also be more researched in terms of bottom-up approaches. Even though the knowledge level and information take-up of forest owners have been studied, there is less research on how the forest owners could be empowered in relation to their forests and decisions on it. How to build the forest owners' own capacity to make decisions instead of studying how they make the decisions society wants them to make?

The fourth main point is that forest owners are often considered objects, rather than agents, in both service creation and related studies. The forest owners also provide a wide range of products and services for society through their forests, but they are rarely studied from this point of view. There are several studies

focusing on forest owners' attitudes towards climate change, water management, and so on, but their actual position as a producer of forest-based benefits in the supply chain of these benefits have rarely been the objective of the research.

In addition, more cross-sectoral and multidisciplinary research and theoretical thinking are needed. Forest owner studies are, in the end, studying human behaviour and issues affecting it. In this sense, even though the trend of applying socio-psychological theoretical ideas to the forest owner studies, for instance, has increased, there is still a need to expand this research avenue further. Also, to a larger extent, including other academic fields like consumer and marketing research and educational/pedagogical studies would benefit the forest sector. In line with this, research methodologies more frequently used in other academic fields could be more widely used in forest owner studies. Experimental approaches and interventions, as well as more participatory methodologies, could greatly advance the forest owner studies and provide new insights into the social conditions and practices of decision-making, such as "irrational" decision-making.

In the end, some limitations of this literature review should be mentioned. As typical of a literature review, one should always consider the relevancy of the search words and databases used. It is always possible that the search has not garnered all the relevant literature on the topic (Snyder 2019). In the case of this review, the focus of the analysis was not the forest owners' decision-making in general, but more so decision-making in relation to the services targeted at the owners. The search words were selected accordingly, but also deliberately at a general level, which allowed the search to reach a wider scope of research. The aim was also to use terms used both in the European and Northern American contexts. The databases are recognized scientific literature databases and two different ones were used in order to increase validity. Thus, we feel fairly confident that the search has managed to capture the relevant research on the topic of this paper and the findings represent at least the "big picture" and general trends in the state of knowledge. However, one must also remember that in focusing on the state of scientific knowledge of the field we only included research published in English and in international scientific journals, which might have had an impact on our results. Part of the analysis of the literature found was done by using a qualitative approach, which also imposes some limitations on interpreting the results (Patton 2002). However, this approach was seen as important in understanding more details on how the decision-making was analysed in the existing research and revealing the gaps in the current research.

**Funding** Open Access funding provided by University of Helsinki including Helsinki University Central Hospital.

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## References

- Ajzen I (1991) The theory of planned behavior. *Organ Behav Hum Decis Process* 50(2):179–211
- Ambrusová L, Sulek R (2014) Factors influencing forest owners and manager's decision making about forestry services in logging-transport process. *Lesnický Casopis* 60(3):177
- Andersson E, Keskkitalo ECH (2019) Service logics and strategies of Swedish forestry in the structural shifts of forest ownership: challenging the “old” and shaping the “new.” *Scand J for Res* 34(6):508–520
- Andersson E, Keskkitalo ECH (2021) Constructing forest owner identities and governing decisions and relationships: the owner as distant consumer in Swedish forestry. *J Environ Planning Manage* 64(11):1963–1984
- André K, Baird J, Swartling ÅG, Vulturius G, Plummer R (2017) Analysis of Swedish forest owners' information and knowledge-sharing networks for decision-making: insights for climate change communication and adaptation. *Environ Manage* 59(6):885–897
- Appelstrand M (2012) Developments in Swedish forest policy and administration – from a “policy of restriction” toward a “policy of cooperation.” *Scand J for Res* 27(2):186–199
- Arnould EJ (2007) Service-dominant logic and consumer culture theory: natural allies in an emerging paradigm. *consumer culture theory*. Emerald Group Publ Ltd 11:57–76
- Baker K, Baylis K, Bull GQ, Barichello R (2019) Are non-market values important to smallholders' afforestation decisions? a psychometric segmentation and its implications for afforestation programs. *Forest Policy Econ* 100:1–13
- Ballantyne D, Varey RJ (2006) Creating value-in-use through marketing interaction: the exchange logic of relating, communicating and knowing. *Mark Theory* 6(3):335–348
- Bare BB, Weintraub A (2015) Brief history of systems analysis in forest resources. *Ann Oper Res* 232(1):1–10
- Barković D, Tuševski B (2019) Rational decision versus irrational decision. *Interdiscip Manag Res* 15(1847–0408):402–418
- Baudrillard J (1981) *For a critique of the political economy of the sign*. Telos Press, St. Louis, Mo.
- Berghäll S (2018) Service marketing phenomena in the context of private forest owners—a service dominant logic perspective on scholarly literature. *Current Forestry Reports* 4(3):125–137
- Blanco V, Brown C, Rounsevell M (2015) Characterising forest owners through their objectives, attributes and management strategies. *Eur J Forest Res* 134(6):1027–1041
- Braun V, Clarke V (2006) Using thematic analysis in psychology. *Qual Res Psychol* 3(2):77–101
- Brunsson N (1982) The irrationality of action and action rationality: decisions, ideologies and organizational actions. *J Manage Stud* 19(1):29–44
- Butler BJ, Hewes JH, Dickinson BJ, Andrejczyk K, Butler SM, Markowski-Lindsay M (2016) Family forest ownerships of the United States, 2013: Findings from the USDA Forest Service's national woodland owner survey. *J Forest* 114(6):638–647
- Caplan B (2001) Rational ignorance versus rational irrationality. *Kyklos* 54(1):3–26
- Carlton JS, Angel JR, Fei S, Huber M, Koontz TM, MacGowan BJ, Prokopy LS (2014) State service foresters' attitudes toward using climate and weather information when advising forest landowners. *J Forestry* 112(1):9–14
- Caurla S, Lobianco A (2020) Estimating climate service value in forestry: the case of climate information on drought for maritime pine in Southwestern France. *Clim Serv* 17:100–106
- Clarke M, Ma Z, Snyder S, Floress K (2019) What are family forest owners thinking and doing about invasive plants? *Landsc Urban Plan* 188:80–92
- Cohen J, Hazelrigg LE, Pope W (1975) De-Parsonizing Weber: a critique of Parsons' interpretation of Weber's sociology. *American sociological review* pp 229–241
- Creamer SF, Blatner KA, Butler BJ (2012) Certification of family forests: what influences owners' awareness and participation? *J for Econ* 18(2):131–144

- d'Astous I, Bensouda I, Guindon J (1989) A re-examination of consumer decision making for a repeat purchase product: Variations in product importance and purchase frequency. In: Srull, T Provo, (1989) *Advances in Consumer Research*, UT: Association for Consumer Research 16, pp 433–438.
- Dean, M. (1999) *Governmentality : power and rule in modern society*. Thousand Oaks, Calif.: SAGE.
- Downs A (1957) *An economic theory of democracy*. Harper and Row, New York
- Driscoll DL, Appiah-Yeboah A, Salib P, Rupert DJ (2007) Merging qualitative and quantitative data in mixed methods research: How to and why not. *Ecol Environ Anthropol* 3(1):19–28
- Ebberts WE, Jansen MG, Pieterse WJ, van de Wijngaert LA (2016) Facts and feelings: the role of rational and irrational factors in citizens' channel choices. *Gov Inf Q* 33(3):506–515
- Eisenfuhr F (2011) *Decision making*. Springer, New York, NY
- Eisenhardt KM (1989) Building theories from case study research. *Acad Manag Rev* 14(4):532–550
- Enderwick P (1992) The scale and scope of service sector multinationals. In: Buckley P, Casson M (eds) *Multinational Enterprises in the World Economy*. Edward Elgar, Aldershot, pp 134–152
- Engel JF, Kollat DT, Blackwell RD (1968) *Consumer behaviour*. Holt, Rinehart, Winston, New York
- Erasmus AC, Boshoff E, Rousseau GG (2001) Consumer decision-making models within the discipline of consumer science: a critical approach. *J Consum Sci* 29:82–90
- Erlandsson E, Fjeld D, Lidestav G (2017) Measuring quality perception and satisfaction for wood harvesting services with a triad perspective. *Int J for Eng* 28(1):18–33
- Esser H, Kroneberg C (2015) An integrative theory of action. In: *Order of the Edge of Chaos*. Eds. Lawler EJ, Thye, SR and Yoon, J pp 63–85
- Etzioni A (1999) Normative-affective factors: Toward a new decision-making model. In: *Essays in socio-economics* Springer, Berlin, Heidelberg pp 91–119
- Favada IM, Karppinen H, Kuuluvainen J (2009) Effects of timber prices, ownership objectives, and owner characteristics on timber supply. *Forest Sci* 55(6):512–523
- Fazio RH (1990) Multiple processes by which attitudes guide behavior: the MODE model as an integrative framework. *Advances in experimental social psychology* 23: 75–109).
- Ficko A, Boncina A (2013) Probabilistic typology of management decision making in private forest properties. *Forest Policy Econ* 27:34–43
- Ficko A, Lidestav G, Ní Dhúbháin Á, Karppinen H, Zivojinovic I, Westin K European private forest owner typologies: a review of methods and use. *Forest Policy and Economics* 99: 21–31.
- Fine B (2013) *Consumption Matters*. *Ephemera* 13(2):217–248
- Fischer AP, Bliss J, Ingemarson F (2010) From the small woodland problem to eco-social systems: the evolution of social research on small-scale forestry in Sweden and the USA. *Scand J for Res* 25(4):390–398
- Garfinkel H (1967) *Studies in ethnomethodology*. Prentice-Hall, Englewood Cliffs, NJ
- Gershuny J, Miles I (1983) *The new service economy: the transformation of employment in industrial societies*. Frances Pinter, London
- Goldberg LR (1968) Simple models or simple processes? Some research on clinical judgments. *Am Psychol* 23(7):483
- Grönroos C (2008) Service logic revisited: who creates value? And who co-creates? *Eur Bus Rev* 20(4):298–314
- Gruver JB, Metcalf AL, Muth AB, Finley JC, Luloff AE (2017) Making decisions about forestland succession: perspectives from Pennsylvania's private forest landowners. *Soc Nat Resour* 30(1):47–62
- Guo H, Li B, Hou Y, Lu S, Nan B (2014) Rural households' willingness to participate in the grain for green program again: a case study of Zhungeer, China. *Forest Policy Econ* 44:42–49
- Hahn F, Hollis M (1979) *Philosophy and economic theory*. Oxford University Press 1979:177p
- Hamunen K, Virkkula O, Hujala T, Hiedanpää J, Kurttila M (2015) Enhancing informal interaction and knowledge co-construction among forest owners. *Silva Fennica* 49(1):15
- Hansen E, Dibrell C, Down J (2006) Market orientation, strategy, and performance in the primary forest industry. *Forest Sci* 52(3):209–220
- Härtl F, Knoke T (2019) Coarse woody debris management with ambiguous chance constrained robust optimization. *Forests* 10(6):504
- Häyriäinen L, Mattila O, Berghäll S (2015) Forest owners' socio-demographic characteristics as predictors of customer value: evidence from Finland. *Small-Scale Forestry* 14(1):19–37
- Hietanen J, Andéhn M, Bradshaw A (2017) Against the implicit politics of service-dominant logic. *Mark Theory* 18(1):101–119
- Hill TP (1977) On goods and services. *Rev Income Wealth* 23(4):315–338
- Holbrook MB (1987) What is consumer research? *J Consum Res* 14(June):128–132

- Hujala T, Tikkanen J (2008) Boosters of and barriers to smooth communication in family forest owners' decision making. *Scand J for Res* 23(5):466–477
- Hujala T, Tikkanen J, Hänninen H, Virkkula O (2009) Family forest owners' perception of decision support. *Scand J for Res* 24(5):448–460
- Hujala T, Kurttila M, Karppinen H (2013) Customer segments among family forest owners: combining ownership objectives and decision-making styles. *Small-Scale Forestry* 12(3):335–351
- Hujala T, Toppinen A, Butler BJ (2019) Services in family forestry. Springer International Publishing
- Huysmans JH (1970) The effectiveness of the cognitive-style constraint in implementing operations research proposals. *Manage Sci* 17(1):92–104
- Jobber D, Lancaster G (2012) Selling and sales management David Jobber and Geoff Lancaster. Pearson, Harlow
- Kahneman D, Tversky A (1973) On the psychology of prediction. *Psychol Rev* 80(4):237
- Kajanus M, Leban V, Glavonjić P, Krč J, Nedeljković J, Nonić D, Eskelinen T (2019) What can we learn from business models in the European forest sector: Exploring the key elements of new business model designs. *Forest Policy Econ* 99:145–156
- Karppinen H, Berghäll S (2015) Forest owners' stand improvement decisions: applying the theory of planned behavior. *Forest Policy Econ* 50:275–284
- Keskitalo ECH (2017) Globalisation and change in forest ownership and forest use: natural resource management in transition. Palgrave Macmillan, London
- Kittredge DB (2016) Private landowner awareness of their conservation alternatives: an important factor affecting the management of small-scale and community forests. Small-scale and community forestry and the changing nature of forest landscapes, 11–15 October 2015, Sunshine Coast, Australia, pp 133–140
- Kumela H, Hujala T, Rantala M, Pykäläinen J (2012) Forest owners' decision support for voluntary conservation—the present state and tensions among purposeful action models in Finland. *Scand Forest Econ* 2012:60–68
- Kurttila M, Pukkala T, Miina J (2018) Synergies and trade-offs in the production of NWFPs predicted in boreal forests. *Forests* 9(7):417
- Lähdesmäki M, Matilainen A (2014) Born to be a forest owner? an empirical study of the aspects of psychological ownership in the context of inherited forests in Finland. *Scand J for Res* 29(2):101–110
- Lawrence A, Deuffic P, Hujala T (2020) Extension, advice and knowledge systems for private forestry: understanding diversity and change across Europe. *Land Use Policy* 94:104522
- Leeuwis C (2013) Communication for rural innovation: rethinking agricultural extension. John Wiley & Sons
- Lidestav G, Weiss G, Živojinović, (2020) Changes in forest ownership. In: United Nations Economic Commission for Europe. Who owns our forests? Forest ownership in the ECE region, United Nations publications
- Lidskog R, Sjödin D (2015) Risk governance through professional expertise: forestry consultants' handling of uncertainties after a storm disaster. *J Risk Res* 19(10):1–16
- Löfmarck E, Ugglä Y, Lidskog R (2017) Freedom with what? interpretations of “responsibility” in Swedish forestry practice. *Forest Policy Econ* 75:34–40
- Lunenburg FC (2010) The decision-making process. *Nat Forum Educ Adm Superv J* 27(4):1–13
- Ma Z, Butler BJ, Kittredge DB, Catanzaro P (2012) Factors associated with landowner involvement in forest conservation programs in the US: implications for policy design and outreach. *Land Use Policy* 29(1):53–61
- Maier C, Lindner T, Winkel G (2014) Stakeholders' perceptions of participation in forest policy: a case study from Baden-Württemberg. *Land Use Policy* 39:166–176
- Marcuse H (1965) Industrialization and capitalism. *New Left Review* (March/April): 1–30
- Matilainen A, Koch M, Živojinovic I, Lähdesmäki M, Lidestav G, Karppinen H, Scriban RE (2019) Perceptions of ownership among new forest owners—a qualitative study in European context. *Forest Policy Econ* 99:43–51
- Matthies BD, D'Amato D, Berghäll S (2016) An ecosystem service-dominant logic? – integrating the ecosystem service approach and the service-dominant logic. *J Clean Prod* 124:51–64
- Mattila O, Roos A (2014) Service logics of providers in the forestry services sector: evidence from Finland and Sweden. *Forest Policy Econ* 43(6):10–17
- Mattila O, Toppinen A, Tervo M (2013) Non-industrial private forestry service markets in a flux: results from a qualitative analysis on Finland. *Small-Scale Forestry* 12(4):559–578
- McFadden D (1986) The choice theory approach to market research. *Mark Sci* 5(4):275–297

- Moher D, Liberati A, Tetzlaff J, Altman DG, Prisma Group (2009) Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS medicine* 6(7)
- Nichiforel L, Keary K, Deuffic P (2018) How private are Europe's private forests? a comparative property rights analysis. *Land Use Policy* 76:535–552
- Nichiforel L, Deuffic P, Thorsen BJ, Weiss G, Hujala T, Keary K, Bouriaud L (2020) Two decades of forest-related legislation changes in European countries analysed from a property rights perspective. *Forest Policy Econ* 115:102–146
- Nordström EM, Holmström H, Öhman K (2013) Evaluating continuous cover forestry based on the forest owner's objectives by combining scenario analysis and multiple criteria decision analysis. *Silva Fennica* 47(4):1–22
- Opp K-D (2020) Rational choice theory and methodological individualism. In: *The Cambridge Handbook of Social Theory*, Ed. Peter Kivistö, pp 1–23. Cambridge University Press
- Ozcatalbas O, Brumfield R (2010) Allelopathy as an agricultural innovation and improving allelopathy extension. *J Food Agric Environ* 8(2):908–913
- Patton MQ (2002) Two decades of developments in qualitative inquiry: a personal, experiential perspective. *Qual Soc Work* 1(3):261–283
- Payne JW, Bettman JR, Johnson EJ (1993) *The adaptive decision maker*. Cambridge University Press
- Pelli P, Haapala A, Pykäläinen J (2017) Services in the forest-based bioeconomy – analysis of European strategies. *Scand J for Res* 32(7):559–567
- Petrović N, Čabaravdić A (2010) Outlook for the Formation of Private Forest Owners' Associations in the Western Balkan Region. In: Tuomasjukka T (ed) *Forest Policy and Economics in Support of Good Governance*, EFI Proceedings 58: 63–75
- Petucco C, Andrés-Domenech P, Duband L (2020) Cut or keep: what should a forest owner do after a windthrow? *Forest Ecol Manag* 461:117866
- Pülzl H, Kleinschmit D, Arts B (2014) Bioeconomy – an emerging meta-discourse affecting forest discourses? *Scand J for Res* 29(4):386–393
- Punj G, Srinivasan N (1992) Influence of problem recognition on search and other decision process variables: a framework for analysis. In: Sherry JF, Sternthal B, Provo UT (eds) *NA - Advances in Consumer Research* 19: 491–497
- Pynnönen S, Paloniemi R, Hujala T (2018) Recognizing the interest of forest owners to combine nature-oriented and economic uses of forests. *Small-Scale Forestry* 17(4):443–470
- Rickenbach M (2009) Serving members and reaching others: the performance and social networks of a landowner cooperative. *Forest Policy Econ* 11(8):593–599
- Routa J, Kellomäki S, Strandman H (2012) Effects of forest management on total biomass production and CO<sub>2</sub> emissions from use of energy biomass of Norway spruce and Scots pine. *BioEnergy Res* 5(3):733–747
- Rutar T (2020) Varieties of 'rationality' and the question of their continued theoretical relevance. *Soc Sci Inf* 59(4):542–562
- Schiffman LG, Hansen H, Kanuk LL (2008) *Consumer Behavior*. Pearson Education
- Sheth JN, Newman BI, Gross BL (1991) Why we buy what we buy: a theory of consumption values. *J Bus Res* 22:159–170
- Simon C, Etienne M (2010) A companion modelling approach applied to forest management planning. *Environ Model Softw* 25(11):1371–1384
- Sjölöe HK, Wangen KR, Lindstad BH, Solberg B (2019) The importance of timber prices and other factors for harvest increase among non-industrial private forest owners. *Can J for Res* 49(5):543–552
- Snyder H (2019) Literature review as a research methodology: an overview and guidelines. *J Bus Res* 104:333–339
- Stankevich A (2017) Explaining the consumer decision-making process: critical literature review. *J Int Bus Res Market* 2(6):7–14
- Steyaert P, Barzman M, Billaud J-P (2007) The role of knowledge and research in facilitating social learning among stakeholders in natural resources management in the French Atlantic coastal wetlands. *Environ Sci Policy* 10(6):537–550
- Stoettner EM, Ní Dhubbáin Á (2019) The social networks of Irish private forest owners: an exploratory study. *Forest Policy Econ* 99:68–76
- Toppinen A, Wan M, Lähtinen K (2014) Strategic Orientations in the Global Forest Sector. In: Hansen E, Panwar R, Vlosky RP (eds) *The global forest sector: changes, practices, and prospects*. CRC Press, Boca Raton, pp 405–428



- Vainio A, Paloniemi R (2012) Forest owners and power: a Foucauldian study on Finnish forest policy. *Forest Policy Econ* 21:118–125
- Vanclay F (2004) Social principles for agricultural extension to assist in the promotion of natural resource management. *Aust J Exp Agric* 44(3):213–222
- Vargo SL, Lusch RF (2004) The four service marketing myths: remnants of a goods-based, manufacturing model. *J Serv Res* 6(4):324–335
- Vargo SL, Lusch RF (2016) Institutions and axioms: an extension and update of service-dominant logic. *J Acad Mark Sci* 44(1):5–23
- Virkkula O, Hujala T, Hokajärvi R, Tikkanen J (2009) Are forestry consultation meetings owner-driven?—Analyzing the interplay between the owner and the planner. In: Piatek K, Spong, B, Harrison S, McGill D (eds) *Seeing the Forest Beyond the Trees: New possibilities and expectations for products and services from small-scale forestry*. IUFRO 3.08 Small Scale Forestry Symposium Proceedings, June 7–11, pp 318–327
- Virkkula O, Hujala T (2014) Potentials of forestry extension encounters: a conversation analysis approach. *Small-Scale Forestry* 13(4):407–423
- Ward V, House A, Hamer S (2009) Developing a framework for transferring knowledge into action: a thematic analysis of the literature. *J Health Serv Res Policy* 14(3):156–164
- Weiss G, Lawrence A, Hujala T, Lidestav G, Nichiforel L, Nybakk E, Živojinović I (2019) Forest ownership changes in Europe: state of knowledge and conceptual foundations. *Forest Policy Econ* 99:9–20
- Weiss G, Lawrence A, Lidestav G, Feliciano D, Hujala T (2017) Changing forest ownership in Europe – main results and policy implications. COST Action FP1201 FACESMAP POLICY PAPER. EFICEEC-EFISEE Research Report. University of Natural Resources and Life Sciences, Vienna (BOKU), Vienna, Austria p 25
- Wenger E (2009) Communities of practice. *Communities* 22(5):57–80
- Westin K, Eriksson L, Lidestav G, Karppinen H, Haugen K, Nordlund A (2017) Individual forest owners in context. In: Keskitalo C (ed) *Globalisation and change in forest ownership and forest use*. Palgrave Macmillan, London, pp 57–95
- Wilkes-Allemann J, Deuffic P, Jandl R, Westin K, Lieberherr E, Foldal C, Jarský V (2021) Communication campaigns to engage (non-traditional) forest owners: a European perspective. *Forest Policy Econ* 133:102621
- Winkel G (2012) Foucault in the forests—a review of the use of ‘Foucauldian’ concepts in forest policy analysis. *Forest Policy Econ* 16(March):81–92
- Wittel A, Lury C, Lash S (2002) Real and virtual connectivity: new media in London. *Virtual Soc* 189–208
- Wong G, Greenhalgh T, Westhorp G, Buckingham J, Pawson R (2013) RAMESES publication standards: meta-narrative reviews. *J Adv Nurs* 69(5):987–1004

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