

FSC Motivações, benefícios e desafios: revisão sistemática da literatura

FSC Motivation, benefits and challenges: A systematic review

CAMILA FAGUNDES
UNIVERSIDADE FEEVALE

DUSAN SCHREIBER
UNIVERSIDADE FEEVALE

MOEMA PEREIRA NUNES

MARIA EDUARDA FERNANDES

Nota de esclarecimento:

O X SINGEP e a 10ª Conferência Internacional do CIK (CYRUS Institute of Knowledge) foram realizados de forma remota, nos dias 26, 27 e 28 de outubro de 2022.

Agradecimento à órgão de fomento:

A Capes por fornecer uma bolsa de doutorado.

ANOS
SINGEP

FSC Motivações, benefícios e desafios: revisão sistemática da literatura

Objetivo do estudo

Identificar a principal motivação, bem como os benefícios e desafios sociais, econômicos da certificação FSC ao redor do mundo.

Relevância/originalidade

Estudos individuais focam em casos diferentes, utilizam metodologias diferentes e podem até apresentar resultados diferentes. A leitura isolada torna-se demorada e cansativa para gestores e profissionais que correm o risco de serem influenciados por um ou mais estudos.

Metodologia/abordagem

Revisão sistemática da literatura com abordagem qualitativa e quantitativa.

Principais resultados

Diversas motivação para adotar o FSC foram encontrados. Com relação aos benefícios citam-se: novos mercados, lucratividade, melhorias de imagem, preço premium, segurança e saúde de colaboradores e também aumento da conscientização ambiental dos funcionários.

Contribuições teóricas/metodológicas

Como principais contribuições teóricas tem-se a união de vários estudos sobre o FSC em apenas um, contribuindo para o avanço das pesquisas a partir daqui.

Contribuições sociais/para a gestão

Este estudo demonstra os resultados encontrados em diversos casos, proporcionando a partir daqui, o avanço do conhecimento sobre certificação, seja através da definição de políticas para superar os desafios ou mesmo estratégias para potencializar os benefícios.

Palavras-chave: Forest Stewardship Council (FSC); , Revisão Sistemática da Literatura, Motivação, Benefícios, Desafios

FSC Motivation, benefits and challenges: A systematic review

Study purpose

Identify the main motivation as well as social, economic benefits and challenges of the FSC certification around the world.

Relevance / originality

Individual studies focus on different cases, use different methodologies and may even present different results or conclusions. Isolated reading becomes painful and tiring for most managers and professionals who are at risk of being influenced by one or more studies.

Methodology / approach

Systematic review of the literature with qualitative and quantitative approach.

Main results

Signaling, market, legal, moral and learning are the motivations to adopt the FSC. A variety of social and economic benefits are felt, for example: new markets, profitability, image improvements, price premium, safety and healthcare, also environmental awareness increase of employees.

Theoretical / methodological contributions

As main theoretical contributions, it is the union of several studies on the FSC into just one, contributing to the advancement of research from here.

Social / management contributions

As main contributions, this study demonstrates the results found in several cases around the globe, providing from here, the advancement of knowledge about certification, either through the definition of policies to overcome the challenges or even strategies to enhance the benefits.

Keywords: Forest Stewardship Council (FSC); , Systematic Literature Review; , Motivation, Benefits, Challenges

1 Introduction

Forests are vital for human survival, whether through the provision of ecosystem services, recreational areas, carbon stocks, provision of clean air and water or through its impact on local, regional and even global economic development, namely due to economic benefits gained from wood and non-wood products (Blumroeder et al., 2019; Hermudananto et al., 2018; Rana & Sills, 2018).

Commercial timber extraction has profound impacts on forest ecosystems by causing a deterioration in forests structure and function. Which inevitably affects the provision of ecosystem services and raises the question about the proper balance between this economic activity essential for many countries and the continuous loss of forest areas (Blumröder et al., 2020). The forestry sector has therefore been under pressure to demonstrate that it does not use illegal and predatory practices (e.g. deforestation, degradation and disrespect for the rights of indigenous people); certifying their commitment to society and the environment to continue competing in the market (Alves et al., 2019; Basso et al., 2018; Chen et al., 2020; Espinoza et al., 2012).

Forest certification is defined as an independent assessment method with the objective of evaluating social, economic and environmental performance of an organization (Espinoza et al., 2012; Palus & Kaputa, 2009). It is an important communication system between firm and consumers to address the sustainability of forests products especially when considering the growing number of consumers who are concerned about purchasing products that do not harm the environment.

Among the most varied existing types of certifications Programme for the Endorsement of Forest Certification (PEFC) and Forest Stewardship Council (FSC) dominate the world (Xu & Lu, 2021). The FSC is the most accepted by organizations, civil society and the most widely used to certify forest management (Cerutti et al., 2017; Garzon et al., 2020; Hermudananto et al., 2018; Piketty & Garcia Drigo, 2018; Sánchez-Almendro et al., 2018). Furthermore, it is considered the most rigorous approach to sustainable forest management since its creation in 1993 with the aim of promoting environmentally appropriate, socially beneficial and economically viable management practices (Hoang et al., 2019). In addition to certifying forest management, the FSC can also certify chain of custody, wood controlled and ecosystem services being the most recent incorporation of the FSC (FSC, 2021).

Since its creation in 1993 many studies have been published to better understand how it works, the main motivations behind its adoption, as well as the benefits and challenges of this certification (de Paiva et al., 2015; Fagundes et al., 2021; Malovrh et al., 2019; Rana & Sills, 2018; Sugiura & Oki, 2018). However, those individual studies focus on different cases, use different methodologies and may even present different results or conclusions. Isolated reading becomes painful and tiring for most managers and professionals who are at risk of being influenced by one or more studies that are not represented in the subject under discussion.

Through a systematic review of the literature, this article aims to identify the main motivation as well as social, economic benefits and challenges of the FSC certification around the world. To achieve the proposed objective, the current paper is organized as follows: After the present introduction, the main characteristics of the FSC and its benefits and challenges are briefly described in the next section. After that, the methodology used to pursue the systematic literature review is demonstrated, as well as the main characteristics of the publications selected to be part of this study. The next (fourth) section presents and discusses the results achieved and finally, the paper closes presenting its final considerations and conclusions.

2 Methodology

2.1 Research design

Systematic literature reviews result from the application of a detailed, replicable and transparent scientific method of data collection, which allows the audit of the collected data, thus providing a reliable database (Donato & Donato, 2019; Page et al., 2021; Tranfield et al., 2003). As shown on Table 01, there are some essential stages for conducting a systematic review (Tranfield et al. 2003; Donato and Donato, 2019). Firstly, it is essential that researchers plan the study demonstrating the need for the research and structure a protocol (plan the review).

Table 01: Steps of a systematic review research

Stage	Step
Plan the review	Identify the need for revision
	Prepare the proposal
	Develop a protocol
Conduct the review	Identify the research
	Select the studies
	Evaluate the quality of the studies
	Extracting the data and monitoring the progress
	Synthesize the data
Report and disseminate	Report and recommend
	Putting the evidence into practice

Source: Tranfield et al. (2003) and Donato and Donato (2019).

After having developed the research question and the protocol, the literature search begins (second stage, “Conduct the review”). A key part of a systematic review is an exhaustive search of the literature to find all relevant studies on the subject (Tranfield et al. 2003 Donato and Donato, 2019; Page et al., 2021). It is important to mention that the systematic review usually generates many potentially eligible references, whose inclusion needs to be assessed according to predefined criteria. For this task, the use of some software to manage these references is recommended (Donato & Donato, 2019; Tranfield et al., 2003). For this evaluation title, abstract and keywords are read to determine the relevance of these papers to the topic under analysis and thus eliminate those which are not clearly related to the theme.

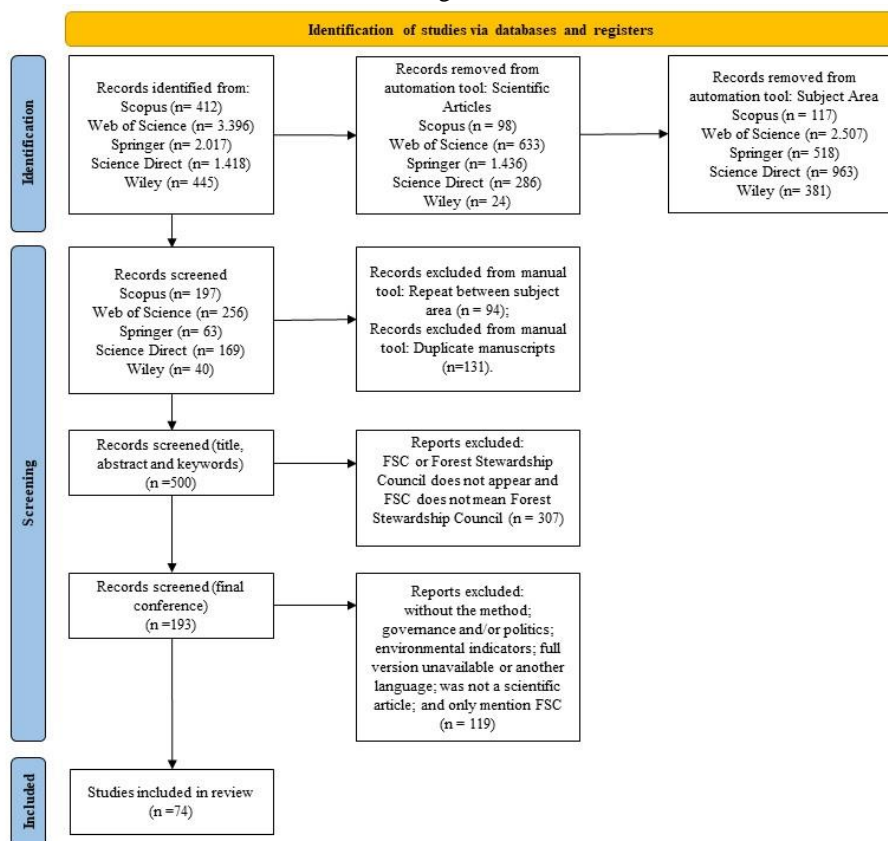
Once the most relevant articles have been selected, they are read and critically analyzed to extract the relevant information to answer the previously established research question. Extracted data must be summarized to lead to valid and logical conclusions and only after that, the systematic review article can be written and published so that other people interested in the subject can understand the results achieved (“Report and disseminate” stage).

2.2 Data collection

The initial part of identifying studies took place with the insertion of keywords (“*sustainable forestry*” OR “*forest certification*” AND “Forest Stewardship Council” OR “FSC”) in the 5 databases in January of 2022. The review was based on peer-reviewed literature published in international scientific journals. This process generated a total of 7.683 results (Wiley= 445; Science Direct= 1,418; Scopus=412; Springer Link= 2,017; Web of Science= 3,396;). After analyzing the general panorama of publications, the articles selection process

began according to the inclusion and exclusion criteria defined for this review. The step-by-step process can be seen in Figure 01.

Figure 01: Flow chart



Source: Prisma Diagram (2021).

In all individual databases we first used refinement options (filters) such as relevant document types (i.e., research articles) and limiting the sample to specific areas to reach the studies that most interested us. Institutional reports, conference paper and graduate theses were not considered for this paper and the refinement limited to social and economic science. Thus, several areas were excluded such as: Material, Medical, Engineering, Education, Political, Computing and others. In these two processes publications 2.477 and 4.486 were excluded respectively. The areas and the number of studies that remained in each one can be viewed in Table 02.

Table 02: Areas of interest

Areas/Databases	Scopus	Science	Springer	Wiley	Web
Social Sciences	126	169	40	7	17
Economics, Econometrics and Finance	47				
Business, Management and Accounting	23				
(Other) Multidisciplinary	1				55
Economics			13	12	87
Business and Management			9	8	65
Finance			1		
Business and Finance					7
Development Studies				13	19
Business Economics					
Behavioral Science					6

Total	197	169	63	40	256
Duplicated	49	None	None	21	24
Total	148	169	63	19	232

Source: Databases (2022).

After the studies identification in the screening stage (n= 725), we proceeded with the exclusion of articles. Manuscripts which were double listed were filtered and removed. This process resulted in the exclusion of 225 articles. We proceeded with the eligibility stage (n=500), along the criteria defined in the planning phase. By analyzing the content of the title, abstracts and keywords we excluded 307 more articles as they did not mention the Forest Stewardship Council (FSC) and the acronym had a different meaning. The other meanings identified for the acronym FSC were: Food Supply Chain; Financial Services Company; Family Social Capital; Fiber Supercapacitors; Full-Service Carriers; Fractional Snow Cover; Finite-State Controllers and others.

Before starting with the qualitative phase of the studies, a final conference was held in front of the 193 remaining articles. At this stage, another 119 articles were excluded for reasons such as: without detailing the method makes it impossible to reproduce the study (44); main theme was governance and/or politics (21); the article does not talk about motivations, benefits and/or challenges (14); research with environmental indicators (17); pay wall (authors were contacted, but no response) (10); only mentions the FSC, but does not study the certification itself (7); full version of the article in another language (6). Ultimately, we conducted a qualitative screening of 74 articles.

2.3 Research data analysis

The results achieved went through a process of content analysis using the qualitative data analysis software MAXQDA 2020. For the synthesis of our research, we decided to do both quantitative and qualitative analyses of the 74 articles. Digital papers were full reading which permitted more rigorous interpretation. The collected data was based on a coding framework developed through an inductive approach. Coded texts in MAXQDA were converted into an Excel database, whereas insights from a non-digital literature were entered directly into the Excel database. With Excel it was possible to create graphs and tables to facilitate the presentation of results. Quantitative analysis was performed using the IBM SPSS Statistics Software using descriptive statistics tools linear regression and multivariate statistics (Mann-Whitney test). Also following the Tranfield et al. (2003), Donato and Donato (2019) and Page et al., (2021) recommendations, Mendeley was used for reference management.

3 Results

The objectives outlined in the studies were to identify the main reasons why organizations choose the FSC and what benefits and challenges it can achieve in the economic and social dimension of sustainability. In Table 03 we summarized the main motivation to adopt the FSC certification found in the systematic review. The results were organized based on Araújo et al., (2009), Faggi et al., (2014) and Galati et al., (2017) studies, where the authors systematize the reasons into 5 categories which are: Signaling (Reducing pressure in social conflicts demonstrating corporate social responsibility); Market (Access market and financial gain); Legal (Compliance with mandatory regulation); Moral (Ethical beliefs and personal values); and Learning (Generation of science and technical knowledge).

Table 03: Motivation to adopt the FSC certification

Motivation to adopt the FSC	Authors
Signaling	
Image improvements	(A. Galati et al., 2017; Tupputa et al., 2016)
Competing certification programs	(van der Loos et al., 2018)
Timber traceability	(A. Galati et al., 2017)
Market	Authors
Market requirements	(Basso et al., 2018, 2020; Carlsen et al., 2012; A. Galati et al., 2017; Johansson, 2014; A. Tolunay & Türkoglu, 2014; Tupputa et al., 2016)
Market access	(Araujo et al., 2009; Carlsen et al., 2012; A. Galati et al., 2017; Johansson, 2012; Pinto & McDermott, 2013; A. Tolunay & Türkoglu, 2014; Tricallotis et al., 2019; van der Loos et al., 2018; van Kooten et al., 2005)
Price premium	(van der Loos et al., 2018)
Profitability	(Tupputa et al., 2016)
Legal	Authors
Government requirements	(Basso et al., 2018; A. Galati et al., 2017; Tupputa et al., 2016; van der Loos et al., 2018)
Moral	Authors
Ensure sustainable forest management	(Basso et al., 2018; Berock & Ongolo, 2019; A. Galati et al., 2017; Shvarts et al., 2015)
Environmental benefits	(Basso et al., 2020; Cashore et al., 2005; A. Galati et al., 2017)
Employee satisfaction	(A. Galati et al., 2017)
Risk management	(Tupputa et al., 2016)
Learning	Authors
Product quality	(A. Galati et al., 2017)
Productivity	(Carlsen et al., 2012)
Improve management system	(A. Galati et al., 2017)
Increase internal control	(Tupputa et al., 2016)

Source: adapted from (Araujo et al., 2009; Faggi et al., 2014; Antonino Galati et al., 2017)

According to Table 03, we found in the literature several motivations to implement the FSC certification. Most of them are related to the benefits it can generate such as market category. In addition to this motivation, moral issues were also highlighted. Although these two categories present a greater number of results, it was also possible to perceive motivations in the categories “signaling, legal and learning” demonstrating the variety of reasons that companies have for adopting the FSC.

As said before, the motivations for adopting a certification are directly linked to the possible benefits. In Table 04, we demonstrate the concrete FSC-benefits found in the systematic review. They were organized into 4 subcategories: employees, local communities (including indigenous people), consumers and producers’/companies’ benefits.

Table 04: Social and economic FSC benefits

Benefits	Authors
Employees	
Environmental awareness	(Bieri & Nygren, 2011; Hain & Ahas, 2011; Paluš et al., 2017, 2018; Sansalvador & Brotons, 2020)
Safety and health care	(Bieri & Nygren, 2011; Cerutti et al., 2017; Hain & Ahas, 2011; Tricallotis et al., 2018)
Local communities	Authors

Stakeholders communication and participation	(Araujo et al., 2009; Bieri & Nygren, 2011; Guillaume, 2017; Hain & Ahas, 2007; Johansson, 2012; Kulyasova, 2013; Lescuyer et al., 2021; Quaedvlieg et al., 2014; Teitelbaum & Wyatt, 2013; Tricallotis et al., 2018; Tulaeva, 2013b)
Infrastructure and social services improvement	(Cerutti et al., 2017; Degnet et al., 2020; Kalonga & Kulindwa, 2017; Miteva et al., 2015; Tricallotis et al., 2018)
Job generation	(Bieri & Nygren, 2011; Degnet et al., 2020; Miteva et al., 2015)
Customary resource rights	(Bieri & Nygren, 2011; Teitelbaum & Wyatt, 2013; Tricallotis et al., 2018)
Consumers	Authors
Responsible purchasing products	(Michal et al., 2019; Panico et al., 2022)
Producers/companies	Authors
Public confidence and image improvements	(Berock & Ongolo, 2019; Castka & Corbett, 2016; Cubbage et al., 2009; Hain & Ahas, 2007; Kulyasova, 2013; Narasimhan et al., 2015; Paluš et al., 2018; Sansalvador & Brotons, 2020; Ahmet Tolunay & Türkoglu, 2014; Tricallotis et al., 2019; Wibowo et al., 2019)
Law compliance	(Bieri & Nygren, 2011; Cerutti et al., 2017; Kalonga & Kulindwa, 2017; Tricallotis et al., 2018; Tsanga et al., 2014)
New markets and sales increase	(Araujo et al., 2009; Berock & Ongolo, 2019; Carlson & Palmer, 2016; A. Galati et al., 2017; Narasimhan et al., 2015; Paluš et al., 2018; A. Tolunay & Türkoglu, 2014; Tricallotis et al., 2018)
Price premium	(Araujo et al., 2009; Duchelle et al., 2014; S. Eriksson & Hammer, 2006; Kalonga & Kulindwa, 2017; Nebel et al., 2005; Paluš et al., 2018; Tham et al., 2021)
Profitability	(Araujo et al., 2009)
Timber traceability	(Lescuyer et al., 2021; Paluš et al., 2017)
Forest management and practices improvement	(Berock & Ongolo, 2019; Cubbage et al., 2009, 2010; Duchelle et al., 2014; Paluš et al., 2018; Quaedvlieg et al., 2014; Tricallotis et al., 2019)

Some of the social and economic benefits are related to the motivation to adopt the certification, especially the economic ones like new markets, profitability, image improvements and price premium. Furthermore, other economic benefits were also identified, such as: sales increase, household income and job creation. Thus, not only does the organization/producer that has the certification are impacted, but also the local community.

Social benefits are also perceived for employees and local communities, including indigenous people. For employees specifically, safety and healthcare and environmental awareness increase are highlighted. With respect to local communities the benefits linked to the opening of a dialogue between the parties, as well as the participation of all in the decision-making process, stand out. Moreover, customary resources rights are also highlighted.

Although the FSC has many benefits, some social and economic challenges were also identified. Table 05 lists those found throughout the systematic review which are separated into 4 subcategories: employees, local communities, consumers and producers'/companies' challenges.

Table 05: Social and economic FSC challenges

Challenges	Authors
Employees	
Standard knowledge and complex procedures	(Carlsen et al., 2012; Duchelle et al., 2014; Hermudananto et al., 2018; Kongmanee et al., 2020; Paluš et al., 2018; Piketty & Garcia Drigo, 2018; Rafael et al., 2018; Tsanga et al., 2014; Wibowo et al., 2019; Xu & Lu, 2021)
Safety and health care	(Hermudananto et al., 2018; Rafael et al., 2018)
Local Communities	Authors

Conflicts	(Cerutti et al., 2017; Doremus, 2019; Hermudananto et al., 2018; Miteva et al., 2015; Niedziałkowski & Shkaruba, 2018; Tricallotis et al., 2018; Xu & Lu, 2021)
Gender equality employed	(Cerutti et al., 2017; Guillaume, 2017; Hain & Ahas, 2007)
Consumers	Authors
Public awareness and seal acceptance	(McDermott, 2012; Michal et al., 2019; Xu & Lu, 2021)
Gaps between willingness-to-buy and actual purchases	(Panico et al., 2022; Xu & Lu, 2021)
Producers/companies	Authors
High costs	(Berock & Ongolo, 2019; Bieri & Nygren, 2011; Carlsen et al., 2012; Carlson & Palmer, 2016; Gregory E. Frey et al., 2021; A. Galati et al., 2017; Kongmanee et al., 2020; Michal et al., 2019; Quaedvlieg et al., 2014; Tricallotis et al., 2018; Tysiachniouk & McDermott, 2016; Xu & Lu, 2021)
External support and lack of equity	(Bieri & Nygren, 2011; Carlson & Palmer, 2016; Duchelle et al., 2014; G. E. Frey et al., 2018; Niedziałkowski & Shkaruba, 2018; Pinto & McDermott, 2013; Scudder et al., 2018; Tysiachniouk & McDermott, 2016; Xu & Lu, 2021)
Investment return	(Bouslah et al., 2010; Espinoza et al., 2012; Foster et al., 2008)
Price premium	(Paluš et al., 2017; Tricallotis et al., 2018; Xu & Lu, 2021)
Auditor's professionalism	(Cook et al., 2021)
Annual allowable cut and low income	(Bieri & Nygren, 2011; Cerutti et al., 2011; L. O. Eriksson et al., 2007; Xu & Lu, 2021)
Low net present value	(Foster et al., 2008)
Low margin	(Paluš et al., 2017)
Material input insufficient and overpriced	(Paluš et al., 2017)
Demand in domestic market	(Basso et al., 2018; G. E. Frey et al., 2018; Xu & Lu, 2021)

A variety of FSC challenges were found in the literature. High cost is the most cited followed by financial dependency. Furthermore, complex procedures, lack of investment return and price premiums are also other major concerns. According to the selected studies the certification also presented several societal challenges. Regarding the employees, there is a lack of knowledge about the FSC standards. Public awareness and seal acceptance are challenges of the FSC in relation to consumers. And finally, local communities, specifically indigenous, they suffer with food insecurity and malnutrition.

4 Discussion

4.1 Economic benefits

Although its standards are considered to have the best quality, it is not an easy task to implement the certification in view of the principles and criteria extension and complexity (Alves et al., 2019; Garzon et al., 2020; Wibowo et al., 2019). A series of organizational investments are essential to achieve certification and companies are not always willing invest in it (Basso et al., 2018; Espinoza et al., 2012).

This study's results indicate that the company's motivation to adopt forest certification are more often external rather than internal reasons, and more market driven than regulation driven. Organizations seem to be more interested in the possible economic and financial gain that certification can generate. They look for concrete results to introduce the FSC, especially due to the possibility of operating in new markets or remaining in existing ones, but now require certification (Araujo et al., 2009; Basso et al., 2018, 2020; Carlsen et al., 2012; A. Galati et al., 2017; A. Tolunay & Türkoglu, 2014; Tuppura et al., 2016; van Kooten et al., 2005). In this

sense, companies envision the possibility of increasing their profit and gaining a competitive advantage over their competitors that do not have the certification.

The expectations generated by the implementation of the FSC are not always met. Nevertheless, in this specific study, the results show that some companies are accessing new markets and increasing their sales as expected (Berock & Ongolo, 2019; Carlson & Palmer, 2016; A. Galati et al., 2017; Johansson, 2012; Paluš et al., 2018). In view of the growing presence of consumers concerned about their consumption habits, the FSC seal is an important communication system between companies and consumers to address the sustainability of forest products (Espinoza et al., 2012). However, not all consumers are aware of the cause and recognize the FSC seal. To overcome this challenge, Michal et al., (2019) suggests building reliable communication between the company and consumers which is something that does not happen quickly. Attitudes of consumers are highly dependent on the knowledge of basic information about products. As knowledge increases, positive attitude can also increase.

In addition to access new markets and increase sales, other economic benefits are also perceived, such as: price premium, company reputation and value increase (Nebel et al., 2005; Eriksson et al., 2007; Hain and Ahas, 2007; Kulyasova, 2013; Berock and Ongolo, 2019; Sansalvador and Brotons, 2020; Tham et al., 2021). Demonstrating a companies' commitment to society and the environment has gained a lot attention over the years.

The FSC economic benefits are not always manifested in the same way around the 80 countries that it is present in (FSC, 2021). There are some possible explanations for these facts, such as: weak forest governance; high rates of illegal logging; unsupportive socioeconomic structures; corruption; diverse of forests ecosystems; multifaceted interests toward forest resources; lack of recognition and interest of certified products (Bieri & Nygren, 2011; Carlsen et al., 2012; Michal et al., 2019; Tricallotis et al., 2019).

The difference in economic benefits can also depend on the time of certification. Companies that have been certified the longest tend to feel the benefits first (Nebel et al., 2005). This could be related to the establishment of the companies on the market with certified products followed by an increase in the economic indicators. Economic effects of the certification depend on a long-term monitoring of the selected indicators (Michal et al., 2019; Nebel et al., 2005).

In addition, other FSC-challenges were also encountered. The most cited was the high costs to meet the certification requirements (Berock & Ongolo, 2019; Bieri & Nygren, 2011; Carlsen et al., 2012; Carlson & Palmer, 2016; Gregory E. Frey et al., 2021; A. Galati et al., 2017; Michal et al., 2019; Tricallotis et al., 2018; Tysiachniouk & McDermott, 2016). The closer the organizational processes are to the sustainability concept; less investment is needed to achieve FSC certification. Otherwise, a greater allocation of resources is necessary (Newsom et al., 2006). High costs are directly linked to the discouragement of joining the FSC. Small-scale land managers end up not joining the FSC due to lack of external support for the implementation and maintenance of the certification due to the unavailable resources to invest on it. Among the main limitations, there is: lack of time, skills, capabilities, flexibility, strategic thinking, external networking among others (Bieri & Nygren, 2011; Carlsen et al., 2012; Duchelle et al., 2014; Gregory E. Frey et al., 2021; Nebel et al., 2005; Scudder et al., 2018; Xu & Lu, 2021). Such issues demonstrate the lack of equity that the system presents unlike large companies that have more available resources to overcome the FSC challenges.

4.2 Social benefits

Companies also seek certification to demonstrate the social corporate responsibility, implement sustainable forest management practices and generate environmental benefits. Ethical beliefs and individual values seem to be also present in these kinds of companies.

As well as economic issues, social aspects are also present in the FSC principles and criteria, but more expressively because require companies to comply with national laws and international conventions related to the social well-being of workers and communities surrounding forest including indigenous people (FSC, 2021).

Better working and living conditions of logging companies' employees and their families include: individual home showers; provision of safety gear; health- and life-insurance; local medical facilities; written procedures for waste collection and treatment; active associative bodies; wages and proper holidays; stability and among others benefits (Bieri & Nygren, 2011; Cerutti et al., 2017; Hain & Ahas, 2007; Tricallotis et al., 2019).

However, such improvements do not always happen everywhere. Such difficulties are found in companies located in developing countries where the problem lies in the weak implementation of existing laws (Alves et al., 2019; Bieri & Nygren, 2011; Cerutti et al., 2017). Communities in these countries are concerned that certification omits the local analysis. In this sense, as in other countries, the FSC is limited in relation to social benefits (Carlsen et al., 2012). On the other hand, this kind of improvement becomes more evident when compared to business as usual on developing and tropical countries (Pinto & McDermott, 2013).

As already mentioned, one of the main costs of implementing the certification is the employee training to follow the FSC standard due to the high complexity (A. Galati et al., 2017; Paluš et al., 2018). Training and the obligation to follow the standards may justify the increase of employee's environmental awareness (Bieri & Nygren, 2011; Hain & Ahas, 2007; Palus et al., 2017).

The FSC has also demonstrated a strong commitment to local communities. There have been some important benefits to forest dwellers and forest communities from forest certification. FSC-certified companies make local investments in infrastructure and social services to guarantee the community well-being. Among the main local investments, infrastructure and social services stand out, such as: health center, roads and bridges constructions; more access to basic education; water-supply catchments; impact mitigation of forest operations; firewood donation; authorization to collect non-timber forest products among others (Cerutti et al., 2017; Degnet et al., 2020; Miteva et al., 2015; Tricallotis et al., 2019).

Many of the company investments arise from the integration of the wider community into the decision-making process. Gaining a voice may therefore help build a trust relationship between the parties which gradually makes everyone adopt new rules and values (Kulyasova, 2013; Tulaeva, 2013a).

In addition, other ramifications well beyond the certification process happens. In some cases, stronger community claims to land and resources, also fostering new market relationships are an important role in the mitigation of rural poverty (Bieri & Nygren, 2011) and less conflict relations (Tsanga et al., 2014). However, this mechanism also can be questioned. In some cases, the certification can generate food insecurity, malnutrition and disease incidence which can create conflict and decrease the local community's well-being (Doremus, 2019; Miteva et al., 2015; Tricallotis et al., 2019).

Despite some limitations, the market has been perceiving and highlighting companies that are committed to sustainability (Alves et al., 2019; Basso et al., 2018; Chen et al., 2020; Espinoza et al., 2012). This is still not enough to increase their knowledge and acceptance of the FSC seal and raise awareness of them in order to make a more responsible purchase.

5 Conclusion

This article aimed to identify the main motivation, benefits and challenges of the FSC certification in the social and economic sustainability sphere. Through a systematic review of the literature, it is believed to have achieved the proposed objective.

Companies or communities opt for FSC certification for several reasons. Despite moral, signaling, legal and learning motivation, market reasons still prevail. Forests are vital for humanity's survival, despite presenting their implementation of certification through a market requirement, companies automatically assume their commitment to the environment which can be an extremely positive point as many illegal practices are left behind.

As main contributions, this study demonstrates the results found in several cases around the globe, providing from here, the advancement of knowledge about certification, either through the definition of policies to overcome the challenges or even strategies to enhance the benefits.

References

- Alves, R. R., Fraj-Andrés, E., Rojo-Alboreca, A., & Gracioli, C. R. (2019). Implementation of Forest Certification in Brazil, Spain and Portugal: An Analytic Hierarchy Process (AHP) Application. *International Forestry Review*, 21(1), 11–22.
<https://doi.org/10.1505/146554819825863726>
- Araujo, M., Kant, S., & Couto, L. (2009). Why Brazilian companies are certifying their forests? *Forest Policy and Economics*, 11(8), 579–585.
<https://doi.org/10.1016/j.forpol.2009.07.008>
- Basso, V. M., Andrade, B. G., Jacovine, L. A. G., Silva, E. V., Alves, R. R., & Nardelli, A. M. B. (2020). Forest Management Certification in the Americas: Difficulties in Complying with the Requirements of the FSC System | Certification de la gestion forestière dans les Amériques: difficultés à se conformer aux exigences du système FSC. *International Forestry Review*, 22(2), 169–188.
<https://doi.org/10.1505/146554820829403478>
- Basso, V. M., Jacovine, L. A. G., Nardelli, A. M. B., Alves, R. R., Silva, E. V., Silva, M. L., & Andrade, B. G. (2018). FSC Forest Management Certification in the Americas. *International Forestry Review*, 20(1), 31–42.
<https://doi.org/10.1505/146554818822824219>
- Berock, I. N., & Ongolo, S. (2019). Why Do Logging Companies Adopt or Reject Forest Certification in the Congo Basin? Insights from Cameroon. *International Forestry Review*, 21(3), 341–351. <https://doi.org/10.1505/146554819827293213>
- Bieri, M., & Nygren, A. (2011). The challenges of certifying tropical community forests: A case study from honduras. *Journal of Environment and Development*, 20(2), 145–166.
<https://doi.org/10.1177/1070496511405154>
- Blumröder, J. S., Hoffmann, M. T., Ilina, O., Winter, S., Hobson, P. R., & Ibisch, P. L. (2020). Clearcuts and related secondary dieback undermine the ecological effectiveness of FSC certification in a boreal forest. *Ecological Processes*, 9(1).
<https://doi.org/10.1186/s13717-020-0214-4>
- Blumroeder, J. S., Burova, N., Winter, S., Goroncy, A., Hobson, P. R., Shegolev, A., Dobrynin, D., Amosova, I., Ilina, O., Parinova, T., Graebener, U. F., & Ibisch, P. L. (2019). Ecological effects of clearcutting practices in a boreal forest (Arkhangelsk Region, Russian Federation) both with and without FSC certification. *Ecological Indicators*, 106. <https://doi.org/10.1016/j.ecolind.2019.105461>
- Bouslah, K., M'Zali, B., Turcotte, M.-F., & Kooli, M. (2010). The Impact of Forest

- Certification on Firm Financial Performance in Canada and the U.S. *JOURNAL OF BUSINESS ETHICS*, 96(4), 551–572. <https://doi.org/10.1007/s10551-010-0482-5>
- Carlsen, K., Hansen, C. P., & Lund, J. F. (2012). Factors affecting certification uptake - Perspectives from the timber industry in Ghana. *Forest Policy and Economics*, 25, 83–92. <https://doi.org/10.1016/j.forpol.2012.08.011>
- Carlson, A., & Palmer, C. (2016). A qualitative meta-synthesis of the benefits of eco-labeling in developing countries. *ECOLOGICAL ECONOMICS*, 127, 129–145. <https://doi.org/10.1016/j.ecolecon.2016.03.020>
- Cashore, B., Van Kooten, G. C., Vertinsky, I., Auld, G., & Affolderbach, J. (2005). Private or self-regulation? A comparative study of forest certification choices in Canada, the United States and Germany. *Forest Policy and Economics*, 7(1), 53–69. [https://doi.org/10.1016/S1389-9341\(03\)00011-X](https://doi.org/10.1016/S1389-9341(03)00011-X)
- Castka, P., & Corbett, C. J. (2016). Erratum to: Governance of Eco-Labels: Expert Opinion and Media Coverage (Journal of Business Ethics, DOI: 10.1007/s10551-014-2474-3). *Journal of Business Ethics*, 135(2), 401. <https://doi.org/10.1007/s10551-015-2542-3>
- Cerutti, P. O., Lescuyer, G., Tacconi, L., Eba'a Atyi, R., Essiane, E., Nasi, R., Ekebil, P. P. T., & Tsanga, R. (2017). Social impacts of the forest stewardship council certification in the Congo Basin. *International Forestry Review*, 19, 50–63. <https://doi.org/10.17528/cifor/004487>
- Cerutti, P. O., Tacconi, L., Nasi, R., & Lescuyer, G. (2011). Legal vs. certified timber: Preliminary impacts of forest certification in Cameroon. *Forest Policy and Economics*, 13(3), 184–190. <https://doi.org/10.1016/j.forpol.2010.11.005>
- Chen, J., Wang, L., Li, L., Magalhaes, J., Song, W., Lu, W., Xiong, L., Chang, W.-Y., & Sun, Y. (2020). Effect of Forest Certification on International Trade in Forest Products. *FORESTS*, 11(12). <https://doi.org/10.3390/f11121270>
- Cook, W., Turnhout, E., & van Bommel, S. (2021). Performing an FSC audit. *Journal of Organizational Ethnography*. <https://doi.org/10.1108/JOE-10-2020-0039>
- Cubbage, F., Diaz, D., Yapura, P., & Dube, F. (2010). Impacts of forest management certification in Argentina and Chile. *Forest Policy and Economics*, 12(7), 497–504. <https://doi.org/10.1016/j.forpol.2010.06.004>
- Cubbage, F., Moore, S., Henderson, T., & Araujo, M. M. F. C. (2009). Costs and benefits of forest certification in the Americas. In *Natural Resources: Management, Economic Development and Protection*.
- de Paiva, S. N., da Silva, D. A., Rochadelli, R., Hosokawa, R. T., & Oshiro, C. R. (2015). The forest certification by FSC: Case study. *Floresta*, 45(2), 213–222. <https://doi.org/10.5380/rf.v45i2.30055>
- Degnet, M. B., van der Werf, E., Ingram, V., & Wesseler, J. H. H. (2020). Do locals have a say? Community experiences of participation in governing forest plantations in Tanzania. *Forests*, 11(7). <https://doi.org/10.3390/F11070782>
- Donato, H., & Donato, M. (2019). Stages for undertaking a systematic review. *Acta Medica Portuguesa*, 32(3), 227–235. <https://doi.org/10.20344/amp.11923>
- Doremus, J. (2019). Unintended impacts from forest certification: Evidence from indigenous Aka households in Congo. *Ecological Economics*, 166. <https://doi.org/10.1016/j.ecolecon.2019.106378>
- Duchelle, A. E., Kainer, K. A., & Wadt, L. H. O. (2014). Is Certification Associated with Better Forest Management and Socioeconomic Benefits? A Comparative Analysis of Three Certification Schemes Applied to Brazil Nuts in Western Amazonia. *Society and Natural Resources*, 27(2), 121–139. <https://doi.org/10.1080/08941920.2013.840022>
- Eriksson, L. O., Sallnäs, O., & Ståhl, G. (2007). Forest certification and Swedish wood

- supply. *Forest Policy and Economics*, 9(5), 452–463.
<https://doi.org/10.1016/j.forpol.2005.11.001>
- Eriksson, S., & Hammer, M. (2006). The challenge of combining timber production and biodiversity conservation for long-term ecosystem functioning-A case study of Swedish boreal forestry. *Forest Ecology and Management*, 237(1–3), 208–217.
<https://doi.org/10.1016/j.foreco.2006.09.046>
- Espinoza, O., Buehlmann, U., & Smith, B. (2012). Forest certification and green building standards: Overview and use in the U.S. hardwood industry. *Journal of Cleaner Production*, 33, 30–41. <https://doi.org/10.1016/j.jclepro.2012.05.004>
- Faggi, A. M., Zuleta, G. A., & Homberg, M. (2014). Motivations for implementing voluntary environmental actions in Argentine forest companies. *Land Use Policy*, 41, 541–549.
<https://doi.org/10.1016/j.landusepol.2014.04.011>
- Fagundes, C., Schreiber, D., Nunes, M. P., & Fernandes, M. E. (2021). Perception of Brazilian companies on the potential and concrete benefits resulting from the FSC certification. *Forests*, 12(12), 1–14. <https://doi.org/10.3390/f12121622>
- Foster, B. C., Wang, D., & Keeton, W. S. (2008). An exploratory, post-harvest comparison of ecological and economic characteristics of forest stewardship council certified and uncertified Northern hardwood stands. *Journal of Sustainable Forestry*, 26(3), 171–191.
<https://doi.org/10.1080/10549810701879701>
- Frey, G. E., Cubbage, F. W., Ha, T. T. T., Davis, R. R., Carle, J. B., Thon, V. X., & Dzung, N. V. (2018). Financial analysis and comparison of smallholder forest and state forest enterprise plantations in Central Vietnam. *International Forestry Review*, 20(2), 181–198. <https://doi.org/10.1505/146554818823767582>
- Frey, Gregory E., Charnley, S., & Makala, J. (2021). Economic viability of community-based forest management for certified timber production in southeastern Tanzania. *World Development*, 144, 105491. <https://doi.org/10.1016/j.worlddev.2021.105491>
- FSC. (2021). *FSC - Facts and Figures*. <https://fsc.org/en/facts-figures>
- Galati, A., Gianguzzi, G., Tinervia, S., Crescimanno, M., & La Mela Veca, D. S. (2017). Motivations, adoption and impact of voluntary environmental certification in the Italian Forest based industry: The case of the FSC standard. *Forest Policy and Economics*, 83, 169–176. <https://doi.org/10.1016/j.forpol.2017.08.002>
- Galati, Antonino, Gianguzzi, G., Tinervia, S., Crescimanno, M., & La Mela Veca, D. S. (2017). Motivations, adoption and impact of voluntary environmental certification in the Italian Forest based industry: The case of the FSC standard. *Forest Policy and Economics*, 83, 169–176. <https://doi.org/10.1016/j.forpol.2017.08.002>
- Garzon, A. R. G., Bettinger, P., Siry, J., Abrams, J., Cieszewski, C., Boston, K., Mei, B., Zengin, H., & Yeşil, A. (2020). A comparative analysis of five forest certification programs. *Forests*, 11(8). <https://doi.org/10.3390/f11080863>
- Guillaume, E. (2017). A case study on inclusiveness in forest management decision-making mechanisms: a comparison of certified and non-certified forests in the Republic of the Congo. *INTERNATIONAL FORESTRY REVIEW*, 19(2), 145–157.
- Hain, H., & Ahas, R. (2007). Can forest certification improve forest management? Case study of the FSC certified Estonian State Forest Management Centre. *International Forestry Review*, 9(3), 759–770. <https://doi.org/10.1505/ifor.9.3.759>
- Hain, H., & Ahas, R. (2011). Impacts of sustainable forestry certification in European forest management operations. *WIT Transactions on Ecology and the Environment*, 148, 207–218. <https://doi.org/10.2495/RAV110201>
- Hermudananto, Romero, C., Ruslandi, & Putz, F. E. (2018). Analysis of corrective action requests from Forest Stewardship Council audits of natural forest management in

- Indonesia. *Forest Policy and Economics*, 96, 28–37.
<https://doi.org/10.1016/j.forpol.2018.07.012>
- Hoang, H. T. N., Hoshino, S., Onitsuka, K., & Maraseni, T. (2019). Cost analysis of FSC forest certification and opportunities to cover the costs a case study of Quang Tri FSC group in Central Vietnam. *Journal of Forest Research*, 24(3), 137–142.
<https://doi.org/10.1080/13416979.2019.1610993>
- Johansson, J. (2012). Challenges to the Legitimacy of Private Forest Governance - the Development of Forest Certification in Sweden. *Environmental Policy and Governance*, 22(6), 424–436. <https://doi.org/10.1002/eet.1591>
- Johansson, J. (2014). Towards democratic and effective forest governance? The discursive legitimization of forest certification in northern Sweden. *Local Environment*, 19(7), 803–819. <https://doi.org/10.1080/13549839.2013.792050>
- Kalonga, S. K., & Kulindwa, K. A. (2017). Does forest certification enhance livelihood conditions? Empirical evidence from forest management in Kilwa District, Tanzania. *Forest Policy and Economics*, 74, 49–61. <https://doi.org/10.1016/j.forpol.2016.11.001>
- Kongmanee, C., Ahmed, F., & Longpichai, O. (2020). Cost-Benefit Analysis and Challenges of Implementing FSC Standards in Rubber Plantations in Southern Thailand. *Journal of Asian Finance, Economics and Business*, 7(12), 423–431.
<https://doi.org/10.13106/JAFEB.2020.VOL7.NO12.423>
- Kulyasova, A. (2013). Trust as a strategy of interaction: Three logging companies in one district. *Forest Policy and Economics*, 31, 28–36.
<https://doi.org/10.1016/j.forpol.2013.01.008>
- Lescuyer, G., Tsanga, R., Nziengui, S., Forni, E., & Romero, C. (2021). Influence of FSC certification on the governance of the logging sector in the Congo basin. *Natural Resources Forum*, 45(3), 289–304. <https://doi.org/10.1111/1477-8947.12231>
- Malovrh, Š. P., Bećirović, D., Marić, B., Nedeljković, J., Posavec, S., Petrović, N., & Avdibegović, M. (2019). Contribution of forest stewardship council certification to sustainable forest management of state forests in selected Southeast European countries. *Forests*, 10(8). <https://doi.org/10.3390/f10080648>
- McDermott, C. L. (2012). Trust, legitimacy and power in forest certification: A case study of the FSC in British Columbia. *Geoforum*, 43(3), 634–644.
<https://doi.org/10.1016/j.geoforum.2011.11.002>
- Michal, J., Březina, D., Šafařík, D., Kupčák, V., Sujová, A., & Fialová, J. (2019). Analysis of socioeconomic impacts of the FSC and PEFC certification systems on business entities and consumers. *Sustainability (Switzerland)*, 11(15). <https://doi.org/10.3390/su11154122>
- Miteva, D. A., Loucks, C. J., & Pattanayak, S. K. (2015). Social and environmental impacts of forest management certification in Indonesia. *PLoS ONE*, 10(7).
<https://doi.org/10.1371/journal.pone.0129675>
- Narasimhan, R., Schoenherr, T., Jacobs, B. W., & Kim, M. K. (2015). The Financial Impact of FSC Certification in the United States: A Contingency Perspective. *Decision Sciences*, 46(3), 527–563. <https://doi.org/10.1111/dec.12141>
- Nebel, G., Quevedo, L., Bredahl Jacobsen, J., & Helles, F. (2005). Development and economic significance of forest certification: The case of FSC in Bolivia. *Forest Policy and Economics*, 7(2), 175–186. [https://doi.org/10.1016/S1389-9341\(03\)00030-3](https://doi.org/10.1016/S1389-9341(03)00030-3)
- Newsom, D., Bahn, V., & Cashore, B. (2006). Does forest certification matter? An analysis of operation-level changes required during the SmartWood certification process in the United States. *Forest Policy and Economics*, 9(3), 197–208.
<https://doi.org/10.1016/j.forpol.2005.06.007>
- Niedziałkowski, K., & Shkaruba, A. (2018). Governance and legitimacy of the Forest

- Stewardship Council certification in the national contexts – A comparative study of Belarus and Poland. *Forest Policy and Economics*, 97(December 2017), 180–188.
<https://doi.org/10.1016/j.forpol.2018.10.005>
- Page, M. J., McKenzie, J. E., Bossuyt, P., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The prisma 2020 statement: An updated guideline for reporting systematic reviews. In *Medicina Fluminensis* (Vol. 57, Issue 4, pp. 444–465).
https://doi.org/10.21860/medflum2021_264903
- Palus, H., & Kaputa, V. (2009). SURVEY OF ATTITUDES TOWARDS FOREST AND CHAIN OF CUSTODY CERTIFICATION IN THE SLOVAK REPUBLIC. *DREWNO-WOOD*, 52(182), 65–81.
- Palus, H., Parobek, J., Dudík, R., & Šupín, M. (2017). Assessment of Chain-of-Custody Certification in the Czech and Slovak Republic. *SUSTAINABILITY*, 9(10).
<https://doi.org/10.3390/su9101898>
- Paluš, H., Parobek, J., Dudík, R., & Šupín, M. (2017). Assessment of chain-of-custody certification in the Czech and Slovak Republic. *Sustainability (Switzerland)*, 9(10).
<https://doi.org/10.3390/su9101898>
- Paluš, H., Parobek, J., Šulek, R., Lichý, J., & Šálka, J. (2018). Understanding sustainable forest management certification in Slovakia: Forest Owners' perception of expectations, benefits and problems. *Sustainability (Switzerland)*, 10(7).
<https://doi.org/10.3390/su10072470>
- Panico, T., Caracciolo, F., & Furno, M. (2022). Analysing the consumer purchasing behaviour for certified wood products in Italy. *Forest Policy and Economics*, 136, 102670. <https://doi.org/10.1016/j.forpol.2021.102670>
- Piketty, M.-G., & Garcia Drigo, I. (2018). Shaping the implementation of the FSC standard: the case of auditors in Brazil. *Forest Policy and Economics*, 90, 160–166.
<https://doi.org/10.1016/j.forpol.2018.02.009>
- Pinto, L. F. G., & McDermott, C. (2013). Equity and forest certification - A case study in Brazil. *Forest Policy and Economics*, 30, 23–29.
<https://doi.org/10.1016/j.forpol.2013.03.002>
- Quaedvlieg, J., García Roca, I. M., & Ros-Tonen, M. A. F. (2014). Is Amazon nut certification a solution for increased smallholder empowerment in peruvian amazonia? *Journal of Rural Studies*, 33, 41–55. <https://doi.org/10.1016/j.jrurstud.2013.10.004>
- Rafael, G. C., Fonseca, A., & Jacovine, L. A. G. (2018). Non-conformities to the Forest Stewardship Council (FSC) standards: Empirical evidence and implications for policy-making in Brazil. *Forest Policy and Economics*, 88, 59–69.
<https://doi.org/10.1016/j.forpol.2017.12.013>
- Rana, P., & Sills, E. O. (2018). Does certification change the trajectory of tree cover in working forests in the tropics? An application of the synthetic control method of impact evaluation. *Forests*, 9(3). <https://doi.org/10.3390/f9030098>
- Sánchez-Almendo, A. J., Hidalgo, P. J., Galán, R., Carrasco, J. M., & López-Tirado, J. (2018). Assessment and monitoring protocols to guarantee the maintenance of biodiversity in certified forests: A Case Study for FSC (Forest Stewardship Council) forests in southwestern Spain. *Forests*, 9(11). <https://doi.org/10.3390/f9110705>
- Sansalvador, M. E., & Brotons, J. M. (2020). How Environmental Certification Can Affect the Value of Organizations? The Case of Forest Stewardship Council Certification. *International Forestry Review*, 22(4), 531–543.
<https://doi.org/10.1505/146554820831255506>

- Scudder, M. G., Herbohn, J. L., & Baynes, J. (2018). The failure of eco-forestry as a small-scale native forest management model in Papua New Guinea. *Land Use Policy*, 77, 696–704. <https://doi.org/10.1016/j.landusepol.2018.06.023>
- Shvarts, E., Bunina, J., & Knizhnikov, A. (2015). Voluntary environmental standards in Key Russian industries: A comparative analysis. *International Journal of Sustainable Development and Planning*, 10(3), 331–346. <https://doi.org/10.2495/SDP-V10-N3-331-346>
- Sugiura, K., & Oki, Y. (2018). Reasons for choosing forest stewardship council (FSC) and sustainable green ecosystem council (SGEC) schemes and the effects of certification acquisition by forestry enterprises in Japan. *Forests*, 9(4). <https://doi.org/10.3390/f9040173>
- Teitelbaum, S., & Wyatt, S. (2013). Is forest certification delivering on First Nation issues? The effectiveness of the FSC standard in advancing First Nations' rights in the boreal forests of Ontario and Quebec, Canada. *Forest Policy and Economics*, 27, 23–33. <https://doi.org/10.1016/j.forpol.2012.09.014>
- Tham, L. T., Darr, D., & Pretzsch, J. (2021). Analysis of Acacia hybrid timber value chains: A case study of woodchip and furniture production in central Vietnam. *Forest Policy and Economics*, 125. <https://doi.org/10.1016/j.forpol.2021.102401>
- Tolunay, A., & Türkoglu, T. (2014). Perspectives and attitudes of forest products industry companies on the chain of custody certification: A case study from Turkey. *Sustainability (Switzerland)*, 6(2), 857–871. <https://doi.org/10.3390/su6020857>
- Tolunay, Ahmet, & Türkoglu, T. (2014). Perspectives and attitudes of forest products industry companies on the chain of custody certification: A case study from Turkey. *Sustainability (Switzerland)*, 6(2), 857–871. <https://doi.org/10.3390/su6020857>
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review* Introduction: the need for an evidence- informed approach. *British Journal of Management*, 14, 207–222.
- Tricallotis, M., Gunningham, N., & Kanowski, P. (2018). The impacts of forest certification for Chilean forestry businesses. *Forest Policy and Economics*, 92, 82–91. <https://doi.org/10.1016/j.forpol.2018.03.007>
- Tricallotis, M., Kanowski, P., & Gunningham, N. (2019). The Drivers and Evolution of Competing Forest Certification Schemes in the Chilean Forestry Industry. *International Forestry Review*, 21(4), 516–527. <https://doi.org/10.1505/146554819827906870>
- Tsanga, R., Lescuyer, G., & Cerutti, P. O. (2014). What is the role for forest certification in improving relationships between logging companies and communities Lessons from FSC in Cameroon. *International Forestry Review*, 16(1), 14–22. <https://doi.org/10.1505/146554814811031305>
- Tulaeva, S. (2013a). Institutional trust: The process of trust formation in Russian forest villages in accordance with the international system of forest certification. *Forest Policy and Economics*, 31, 20–27. <https://doi.org/10.1016/j.forpol.2012.03.006>
- Tulaeva, S. (2013b). The adventures of global standards in Russia: The implementation of FSC certification in the Russian forestry sector through the concept of global legal pluralism. *Journal of Legal Pluralism and Unofficial Law*, 45(3), 340–356. <https://doi.org/10.1080/07329113.2013.865931>
- Tuppura, A., Toppinen, A., & Puumalainen, K. (2016). Forest Certification and ISO 14001: Current State and Motivation in Forest Companies. *Business Strategy and the Environment*, 25(5), 355–368. <https://doi.org/10.1002/bse.1878>
- Tysiachniouk, M., & McDermott, C. L. (2016). Certification with Russian characteristics:

- Implications for social and environmental equity. *Forest Policy and Economics*, 62, 43–53. <https://doi.org/10.1016/j.forpol.2015.07.002>
- van der Loos, H. Z. A., Kalfagianni, A., & Biermann, F. (2018). Global aspirations, regional variation? Explaining the global uptake and growth of forestry certification. *Journal of Forest Economics*, 33, 41–50. <https://doi.org/10.1016/j.jfe.2018.10.002>
- van Kooten, G. C., Nelson, H. W., & Vertinsky, I. (2005). Certification of sustainable forest management practices: a global perspective on why countries certify. *FOREST POLICY AND ECONOMICS*, 7(6), 857–867. <https://doi.org/10.1016/j.forpol.2004.04.003>
- Wibowo, A., Pratiwi, S., & Giessen, L. (2019). Comparing management schemes for forest certification and timber-legality verification: Complementary or competitive in indonesia? *Journal of Sustainable Forestry*, 38(1), 68–84. <https://doi.org/10.1080/10549811.2018.1498359>
- Xu, L., & Lu, A. J. (2021). Forest Certification in Developing Countries: Current Status and Hindrances to Its Adoption within a Macro-Framework | Certification forestière dans les pays en voie de développement: statut actuel et obstructions à son adoption au sein d'un macro-cadre. *International Forestry Review*, 23(1), 105–126. <https://doi.org/10.1505/146554821832140376>