



Short communication

New frontiers of forest economics, IV: Entrepreneurship in forestry: Innovation, uncertainty and profit

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1. Entrepreneurship in forestry

Forestry, generally, is not in a state of economic equilibrium but in a state of flux. Oftentimes, forestry practitioners assume that these many changes are induced by exogenous phenomena such as climate change, extreme weather events and population growth or stagnation. This is obviously true. However, forestry also changes because of entrepreneurial action. Humans always and continuously discover new means and new ends and realize these discoveries. Entrepreneurs see new opportunities which others may not recognize or fail to grasp.

During the last few decades, the world's forestry sector was full of new attempts and accomplishments.

For example, at the beginning of the 1990s harvesters and forwarders became ripe and were introduced numerous. Another result of entrepreneurial action was the move of timber production forestry in the United States from the Pacific Northwest to the Southern U.S. during the second part of the twentieth century.

A third example of entrepreneurial action is the formation of timberland investment management organizations and of timberland real estate investment trusts in the U.S. which was the introduction of new types of organization in forestry. In 2010 nearly 10 % of timberland and about 26 % of planted forest in the 11 southern states of the U.S. were owned by these two types of organizations (cp. Zhang, 2021). Fourth, there are many examples of entrepreneurship in markets for ecosystem services, such as biodiversity, carbon, ecotourism, nature conservation, and watershed management. Finally, in the last decade there has been a rapid rise of socially and environmentally responsible enterprises driven by the values and preferences of Generation-Y (Millennials) and Generation-Z. In summary, forestry is full of entrepreneurial actions and the scope of these actions is changing rapidly.

The success of the entrepreneurial action cannot be taken for granted automatically. It is dependent on the correctness of the anticipation of the future events. These anticipations are uncertain. Therefore, while some entrepreneurs will succeed, earn a profit and make an impact on our wellbeing, others will fail, suffer losses and close.

As we can see, entrepreneurship is essential in the course of forestry.

However, academics and practitioners understand very little about the fallacies and fortunes of forestry entrepreneurship. It was the task of the fourth international conference “New Frontiers of Forest Economics” (neFFE) to bring the entrepreneur back into forest economic theory. After three previous gatherings respectively held in 2012 Zurich (Switzerland), 2015 Beijing (China), and 2018 Vancouver (Canada), the fourth international neFFE conference was held at the Dresden University of Fine Arts (Germany) from September 25 to 27, 2023.

Not only the representative, traditional building of the Dresden University of Fine Arts in the downtown of Dresden was the reason for choosing this venue, rather, the meaning of the word “universitas”, according to Wilhelm von Humboldt the “totality of the sciences”, was decisive. For discovering “New frontiers” it is important to abandon the old paths and to consider all methods and methodologies that the “totality of the sciences” provides.

The Dresden University of Fine Arts represents this totality. For instance, the famous painter Gerhard Richter, whose paintings fetch the highest prices in the world for works by a living painter, studied here from 1952 to 1956, and this century-old institution of higher education embodies art, science and entrepreneurship.

It was a great pleasure to have three excellent scholars as keynote speakers, given their deep scientific knowledge and understanding of the subject of the conference. Specifically, Beniamino Callegari is an Associate Professor at Kristiania University College (Oslo, Norway) and teaches ecological economics and innovation management. He has published a book about Schumpeterian economics and many articles in reputable scientific journals. Daowei Zhang is Alumni and George Peak Jr. Professor of Forest Economics and Policy at Auburn University College of Forestry, Wildlife and Environment (Auburn, Alabama, USA). As an internationally recognized scholar in forest economics, he ventured deep into the institutional and organizational changes in the US forestry industry over the past decades with his 2021 book on the rise of institutional investment in timberland. Erlend Nybakk is a professor at the School of Economics, Innovation and Technology of the Kristiania University College (Oslo, Norway). With his extensive knowledge of innovation management, entrepreneurship, and organizational theory, he

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made a significant contribution to the success of our conference.

The first keynote address by Erlend Nybakk and Beniamino Callegari was on the Schumpeterian theory of entrepreneurship in forestry in which they extend their profusely downloaded paper (Callegari and Nybakk, 2022) through further empirical examples and theoretical insights. The second keynote address by Daowei Zhang drilled into Schumpeter's and Kirzner's entrepreneurship theories, presented a few examples of successful forestry entrepreneurs in the United States, and speculated on the future of entrepreneurship in forestry in terms of sustainable production and environmental stewardship.

Unlike many other conferences, the neFFE conference is a place for intensive discussions and debates. Similar to the first three conferences, the number of participants was restricted. In total, 14 participants from 10 countries (i.e., Canada, China, Iran, Iraq, Italy, Japan, Norway, Switzerland, USA and Germany) presented 7 papers in addition to 2 keynote lectures. All chosen papers in full length were submitted before the conference, and each of the papers had two discussants, with the discussion of every paper being allocated about 75 minutes.

The field trip at the end of the conference was organized and conducted by Dr. Karl Preussner of the Lusatian Energy Company (LEAG). Under the theme "Landscape change through acting humans", the participants had the opportunity to visit a huge unique open-cast mining landscape. Since the mine has been in operation for about 100 years, the excursions sites enable four snapshots of intensive landscape changes: the traditional pine woods, the mine in operation and the old and new post-mining restored forest landscape. The participants quickly recognized the significance of the words that resembled the remarks by Hugh Raup (1966: 11): "Humans have always had trouble with time because the human mind produces changes in the uses of landscape several times faster than ecological and geological processes can do."

2. Overview of the papers included in this special issue

In this special issue, the collection of articles begins with Zhang (2024a) paper titled "On entrepreneurship in forestry". By way of reviewing the theories of economic entrepreneurship, D. Zhang takes a broad view in defining entrepreneurship as encompassing a whole spectrum from efforts to create new opportunities to endeavours to improve a business. On the basis of the Schumpeterian Innovation Entrepreneurship theory and the Kirznerian Alertness Entrepreneurship theory, the author goes one step further by deeming entrepreneurship in forestry as a mindset and practice of creating new, or improving existing, forest-related enterprises. This broad perspective provides the basis for the author to develop an analytical framework suitable for examining a wide range of entrepreneurialships, from startups to family businesses, large corporations, franchises, and other types of firms. The article presents several cases of successful forestry entrepreneurialships in the United States to highlight the rise and success of institutional forestry ownership. According to the author, the future of entrepreneurship in forestry is rather promising and, given proper designs and executions, it is possible for current programs such as forest carbon and biodiversity conservation to achieve the goals of sustainable production as well as environmental stewardship.

In his paper titled "The role of internal culture for coping with uncertainty in forest management", Peter Deegen (2024) examines the theory about uncertainty from the standpoint of how uncertainty arises from the innovative and creative capabilities of the human mind for the purpose of welfare improvement. With an overview of three centuries of entrepreneurship in Europe including the classical forestry in Germany, Deegen dives into historical processes of valuating and re-valuating dynamic situations in pursuit of positive outcomes from uncertainties. The paper presents a framework for extending the theory of uncertainty, especially from the point of view on how uncertainty may lead to human welfare improvement. The author argues that, instead of simply focusing on the reduction of uncertainty, forest professionals need to acquire a new competency or a new state of mind. In other words, when foresters

become comfortable with getting entangled in contradictions as a new norm, they will understand that life is about both reducing and creating uncertainty simultaneously. The author suggests that new ideas and, especially, the desire to innovate and improve are the hallmark of innovations in the forestry sector.

The article contributed by Hyde and Olmos (2024) is titled "General policy uncertainty: A crucial, yet overlooked, factor for the forest sector". As the title indicates, the topical issue of the paper is uncertainty. Unlike natural disturbances which have occupied the attention of many researchers, the authors call attention to two types of uncertainty, one related to macroeconomic policy environment and the other pertaining to administrative actions. While both types of uncertainty are external to the activities of the forestry sector, they affect the performances of the forestry sector from production to growth, and development. To explain the general effect of the uncertainty at the macro level, the authors employ a comparative analysis approach by using data from Argentina in comparison with Argentina's more stable neighbors such as Brazil, Chile and Uruguay. The effects of the uncertainty associated with administrative actions are illustrated with examples from several South, Southeast and East Asian countries. Through these examples, the authors appeal to policymakers as well as economists for broadening their horizons beyond conventional thinking about the realm of uncertainty. It is imperative to give due attention to the factors that are exogenous to the forestry sector, and the authors conclude that any forest policy designed without full comprehension of the impact of macroeconomic and administrative uncertainty is bound to fail.

The staples theory advanced by Harold Innis in the 1930s used to be referenced extensively for understanding countries endowed with natural resources. In his article, Sen Wang (2024) begins by providing an overview of the staples theory and how it has faded in its applicability for describing the forestry sector in Canada. Over the past three decades, the Canadian forestry sector has experienced profound changes in terms of timber harvest reduction, forestry employment decrease, and a declining share of the forestry sector in the country's overall economy. The author argues that the transition from 'timberism' to 'post-timberism' has given rise to the emergence of a new paradigm in favour of meeting a multitude of values as well as ecosystem health from forests. The paper suggests that, drifting away from the traditional staples of timber and wood products, the new forest management paradigm in Canada, especially in British Columbia, appears to resemble a "smorgasbord". Nevertheless, according to the author, the new paradigm is overloaded with excessive expectations and high costs. Promising to become the Zeitgeist of forest management in the 21st century, the multi-objective paradigm needs to be augmented to account for contemporaneous transformations in the forestry sector worldwide.

In recent years, among various reform measures that have been adopted in some parts of the world, community forestry enterprises (CFE) have gained popularity. With a focus on governance structures, resource mobilization, and organization performance, Zhang (2024b) analyzes three distinct CFE models in southern China, namely, shareholding forest farms, community-corporation partnerships, and cooperative reforestation. The author has identified three villages from Fujian Province for a comparative analysis of how CFEs differ in governance structures, modes of decision-making, and benefit distribution, especially how governance structures and resource mobilization interplay and exert an influence on organizational performances. Empirical evidence suggests that the models of CFEs tend to evolve on account of local community governance types in existence, the possibility to leverage external financial resources, and the ability of villagers' self-organization. While all three CFE models have revealed their advantages and limitations, one commonality is that the levels of social capital and human capital are critical for success. The study suggests that, as organizational structures differ in their effects on CFEs' socio-economic and environmental goals, resource managers need to take into account broad policies as well as locally unique circumstances so as to achieve desirable organizational performance outcomes.

Forest ecosystem services and their valorization do not fall from the sky. They are the result of innovation and the capacity for overcoming implementation difficulties by the acting humans. [Takahashi et al. \(2024\)](#) step into this research field. They start with the statement that ideas and practices on innovation massively expanded in the second half of the 20th century. Following this statement, they provide a systemization of this expansion through three types of the process of innovation: innovation for growth, national systems of innovation and transformative change. To get specific, they conducted two questionnaire survey series in Japan with forest owners and municipalities to investigate their innovativeness concerning the valorization of ecosystem services. The authors focused on the first and second types of innovation processes mentioned above. The result is an engaging, instructive study on the influence of various factors, such as ownership type, age and holding size, pertaining to the owners' innovativeness.

Last but not least, the paper by [Tu et al. \(2025\)](#) deals with innovation from a sectoral perspective. He opens the paper with the observation that the forestry industry in China lags behind other industries in terms of innovation. As in the paper by [Takahashi et al. \(2024\)](#), Dang also inquires about factors which influence the innovativeness, in this case, to the forestry industry. In concrete terms, he seeks to understand the impact of foreign direct investment in innovation in China's forest product industry. To investigate this impact, Dang gathered data from 146,526 forest product enterprises between the years 1998 to 2013 and combined these data with patent application records from the China National Patent Database. Although the impact of foreign direct investment differs across the sub-sectors of the forest product industry, there is a clearly positive relationship between foreign direct investment and the innovativeness of China's forest product industry. Thus, the paper by Dang presents a valuable study on how global and national industries are interwoven from the point of view of innovation. Furthermore, it gives a lot of detailed insights into the spatial distribution of foreign direct investment within the forest product industry in China, the temporal trends of foreign direct investment and patents and various other aspects. This paper is highly recommended for anyone interested in the global forestry industry and its change through innovation.

3. The return of the entrepreneur into the economic theories of forestry

Humans have always discovered and will continuously seek new means and new ends in their endeavor to improve and innovate. Entrepreneurs see new opportunities which others may not recognize or fail to grasp. It is the entrepreneurship, ingenuity and aspiration for positive change that propel the advancement in forestry and other sectors.

However, if we study current reference books of forest economics, we will realize that the entrepreneur leads a miserable existence. Most of the theories within forestry economics are based on *homo oeconomicus*: the human maximizes her or his utility subject to constraints. The objective(s) of the individual is given, just as all involved products and production factors and their prices.

However, the data required for maximization are usually not given. They are the result of the actions of humans. During her/ his lives humans discover their objectives. During her/ his lives humans discover which things of nature are goods and services. During her/ his lives humans invent new goods and services for the betterment of their lives. Also prices do not fly in the air. They are also not given but the result of bargaining, negotiation and many other forms of inter-actions among the humans. This part of human action is described as entrepreneur action ([Kirzner, 1979](#)).

Humans do not only maximize. They also discover and invent. Thus, human action contains elements of maximization and elements of entrepreneurial action (cp. [Deegen and Hostettler, 2014](#)). Therefore, it is time to complete our economic theories of forestry with the

entrepreneur.

It is not necessary to start from zero. Numerous studies on entrepreneurship have been carried out outside (e.g. [Acs and Audretsch, 2010](#)) and also inside the forestry sector (e.g. [Rametsteiner et al., 2005](#)) over the past two decades. However, the research and the development of entrepreneurial theories in forestry economics look more as a patchwork than a systematic structure. It seems important to configure the numerous contributions on entrepreneurial research into an overall theoretical picture. This development could be seen as a new frontier of forest economics.

Furthermore, in his paper [Zhang \(2024a\)](#) documents once again that the three concepts "entrepreneur", "uncertainty" and "innovation" are inextricably linked. We cannot imagine an entrepreneur without simultaneously thinking about the concepts of uncertainty and innovation.

And yet, from an analytical point of view, it is useful to examine the three concepts separately. This is because one concept cannot be used as a substitute for the other two concepts. Each of the three concepts merely represents certain aspects of the much broader human reality. In this perspective we can arrange the papers of this special issue into a classification scheme of the three main concepts above, cp. [Fig. 1](#). In addition, we found that the papers by [Wang \(2024\)](#) and [Zhang \(2024b\)](#) describe the institutional environment of the above mentioned concepts. Therefore, we completed [Fig. 1](#) by a large circle "institutions".

Clearly, the paper by [Zhang \(2024a\)](#) is basically on entrepreneurship. It is located at the centre of the graph in which the three main concepts "uncertainty", "innovation" and "entrepreneur" overlap. It is interesting to note that no other paper of the special issue at hand deals with entrepreneurship, although the conference theme was titled "Entrepreneurship in forestry ...". All other papers focus on one of the other main concepts

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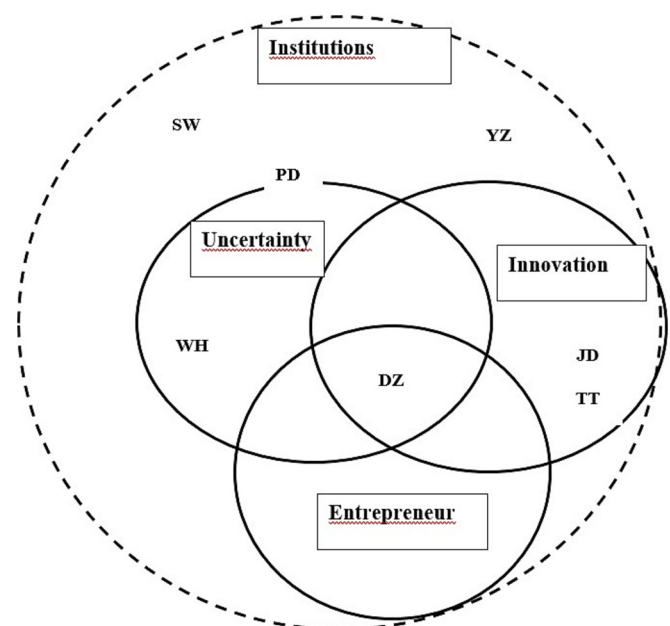


Fig. 1. The arrangement of the papers of this special issue into a diagram of the main concepts "uncertainty", "innovation" and "entrepreneur".

Abbreviations of [Fig. 1](#)

DZ: [Zhang \(2024a\)](#), JD: [Tu et al. \(2025\)](#), PD: [Deegen \(2024\)](#), SW: [Wang \(2024\)](#), TT: [Takahashi et al. \(2024\)](#), WH: [Hyde and Olmos \(2024\)](#), YZ: [Zhang \(2024b\)](#)

population changes, areas of private plantation, forest ownership, etc. effect the innovativeness of forest owners and municipalities. Although innovation needs the innovator, the two papers are examples for showing that innovation is also dependent on certain social conditions.

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When forestry practitioners talk about uncertainty, they usually refer to the uncertainty resulting from natural phenomena. By contrast, when forest economists talk about uncertainty, they usually refer to uncertainty resulting from market processes. It is the merit of the paper by Hyde and Olmos (2024) to focus on uncertainty resulting from political processes, because this type of uncertainty is often completely overlooked. Using examples from several regions of the world, they document the immense influence of this type of uncertainty on people's economic actions.

Although in the centre of the fourth neFFE conference were placed the three concepts of “uncertainty”, “innovation” and “entrepreneur” it has become clear that these concepts are embedded into an institutional environment. We located the papers by Wang (2024) and Zhang (2024b) within this institutional embeddedness.

In his paper Zhang (2024b) demonstrates how different governance structures induce very different incentives to the humans involved. When Zhang, (2024b: 11) writes that the people of community forest enterprises prefer direct rather than indirect democracy system in their community forests, it becomes clear once again that many of those involved are more *homo agents* rather than *homo oeconomicus*.

According to the famous paper on the new institutional economics by Williamson (2000), the embeddedness is characterized by informal institutions, customs, traditions, norms and religion. These institutions, as Williamson (2000: 596) wrote, change very slowly, maybe within centuries or millennia. Wang (2024) adds the term “Zeitgeist”. In contrast to the slowly changing customs traditions, etc., which remain fairly constant over longer periods of time, the term “zeitgeist” refers to the typical characteristics of an era (cf. Klotz, 1760).

With help of the “zeitgeist” Wang (2024) showed that the staples “zeitgeist” described by Innis (1930a, 1930b, 1940) changed into a new “zeitgeist” where the preservation of a healthy, resilient forest ecosystem that supports local communities, Indigenous peoples, urban dwellers and others, as well as the forest products industry play an important role. And this new “zeitgeist” is linked back to the actions of people in forestry. Exactly this interplay between the informal long-term institutions and the “zeitgeist” is applied in Deegen's (2024) paper in which coping with uncertainty is described as consequence of the internal culture in forest management.

Overall, at the beginning, we assumed that the concepts of “entrepreneur”, “innovation” and “uncertainty” were closely intertwined. In

the end, however, we realized that each of the concepts mentioned represents its own theoretical perspective, which is probably different from the others. Finding a research approach that allows both the pure analysis of the single concepts and at the same time to realize the synthetic unity of the three concepts within *homo agents* is seeing another frontier of forest economics which could change the economic theory of forestry dramatically.

Declaration of competing interest

None.

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