The 22nd Economic International Conference
Challenges and Opportunities for a Sustainable Development
Stefan cel Mare University of Suceava, 2026

INNOVATION DYNAMICS IN LITHUANIAN FORESTRY SMES: PATHWAYS TOWARD SUSTAINABLE FOREST MANAGEMENT

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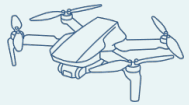
INTRODUCTION

Topic relevance

- Innovation plays a crucial role in enhancing the competitiveness and sustainability of forestry enterprises
- Growing environmental and economic challenges increase the need for innovative solutions in the forestry sector.
- Analysing innovation trends helps to understand the sector's development and future opportunities.

Research Aim

- To identify the dominant forms of innovation in Lithuanian forestry enterprises, examine the key drivers and barriers influencing innovation adoption, and analyse long-term innovation trends related to sustainable forest management



Topic Relevance

- To identify the main forms of innovation adopted by Lithuanian forestry enterprises.
- To analyse the key drivers and barriers influencing innovation implementation.
- To assess the relationship between innovation and sustainable forest management.

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Methodology

The study employed a qualitative expert survey to investigate innovation trends in Lithuanian forestry enterprises. Data collected in 2024 were compared with survey results from 2005 to evaluate changes in innovation practices over time.

Qualitative Expert Survey

- Structured questionnaire
- Survey conducted in 2005 and 2024
- Focus on innovation forms, drivers and barriers

Research Sample

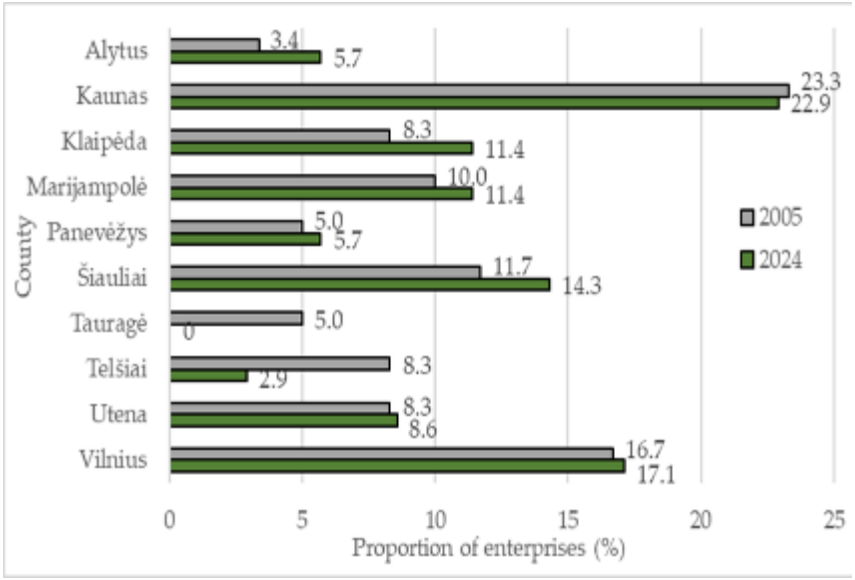
- Small and medium-sized forestry enterprises
- More than 30 experts participated
- Owners, managers and innovation specialists

Data Analysis

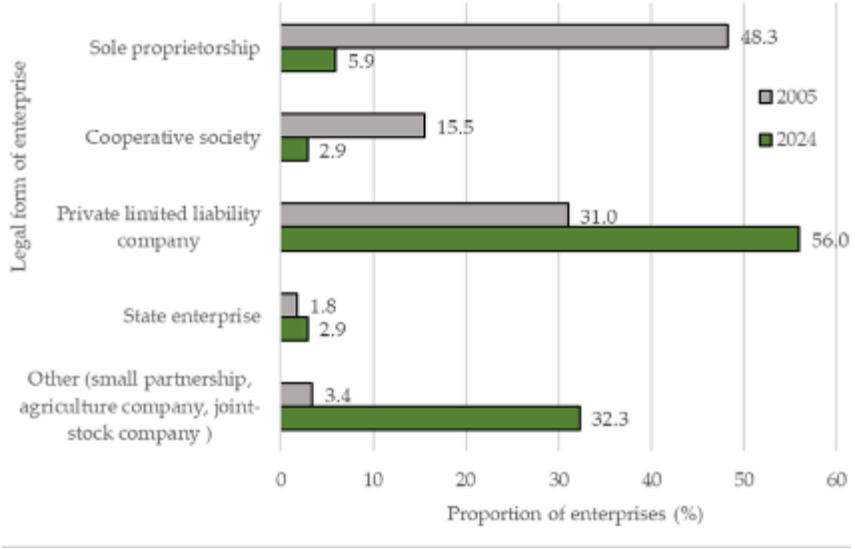
- Descriptive statistics
- Cronbach's Alpha reliability test
- Exploratory Factor Analysis (EFA)

CHARACTERISTICS OF FOREST ENTERPRISES PARTICIPATING IN THE SURVEY

DISTRIBUTION OF ENTERPRISES BY COUNTY, %.



DISTRIBUTION OF Enterprises participating in the survey by legal form, %.



Note: Data are presented as percentage shares (%), including SMEs, for 2005 and 2024.

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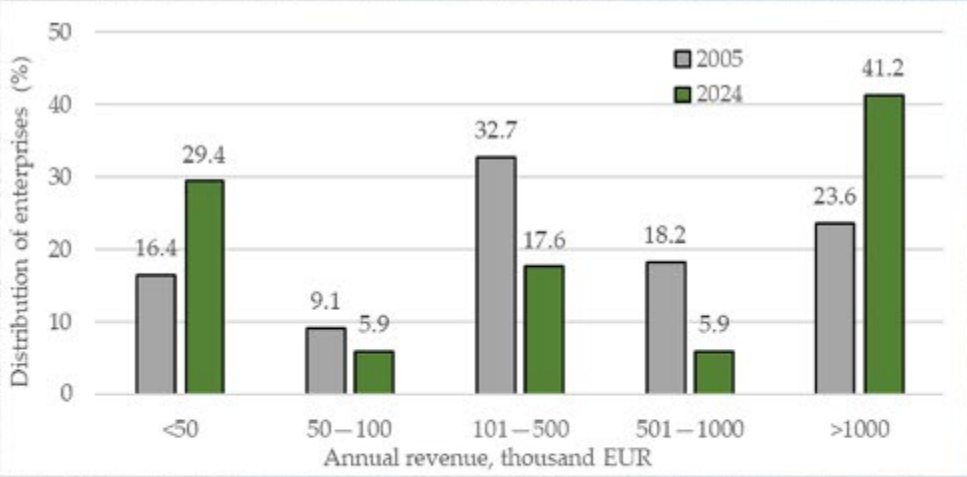
CHARACTERISTICS OF FOREST ENTERPRISES PARTICIPATING IN THE SURVEY



DISTRIBUTION OF ENTERPRISES BY ANNUAL REVENUE (%)

The **smallest** enterprises have become more **prevalent.**

Forest enterprises are predominantly small-scale (fewer than 10 employees)

Large enterprises have grown **slightly** in number.

A slight increase is observed among firms with over 100 employees.

Decline in **other** categories by number of employees.

Other enterprise size categories by number of employees show a declining trend.

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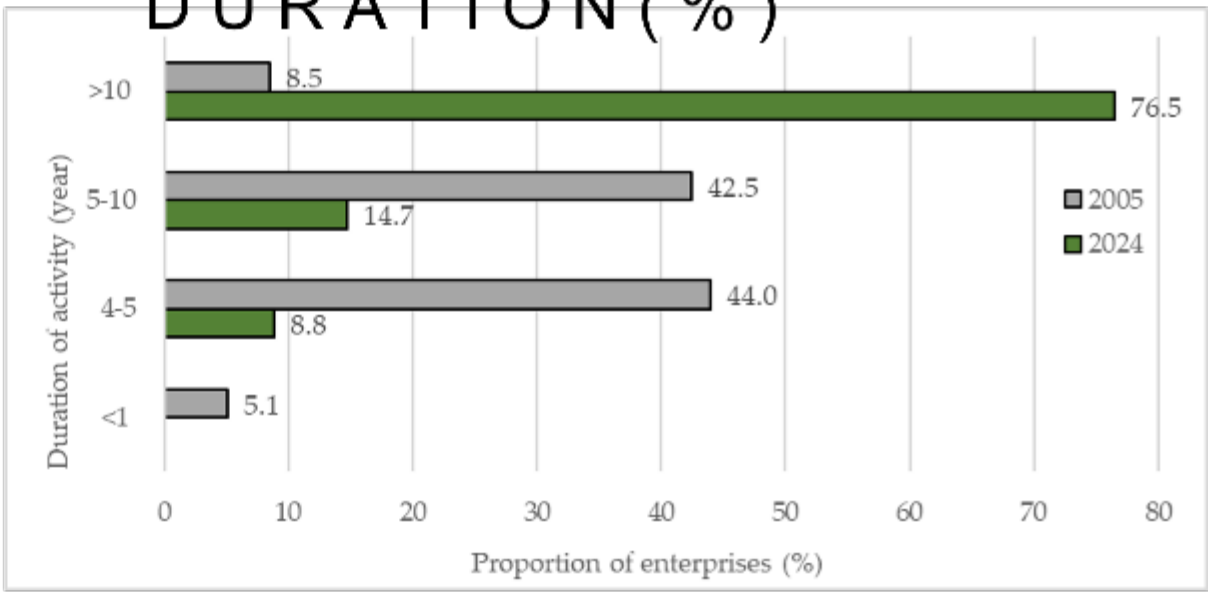
DISTRIBUTION OF ENTERPRISES BY ACTIVITY DURATION(%)

This demonstrates that in 2005 most enterprises had either been recently established or were still in the early stages of development.

In contrast, survey data from 2024 revealed that the majority of enterprises had been operating for more than 10 years (76.5%)



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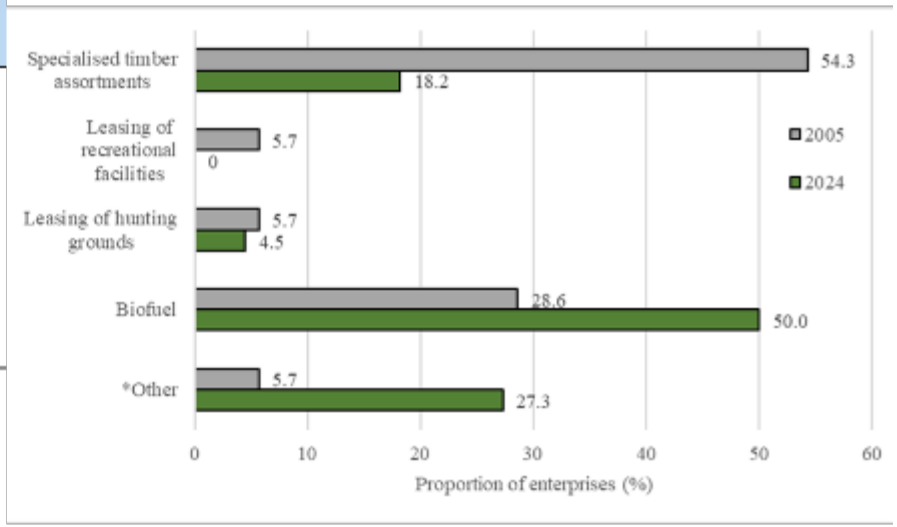
DEVELOPMENT OF NEW PRODUCTS AND SERVICES IN THE FOREST SECTOR

CHANGES IN FOREST SECTOR ACTIVITIES (2005–2024)	CHANGE
Enterprises have begun offering new services and products (27.3%), including biochar production, nature tourism, CO_2 trading, educational programmes, medicinal plant processing, and software development.	GROWTH
The most significant structural change is the decline in specialised wood assortments, from about 54% of enterprises in 2005 to 18% in 2024, due to changes in business models and reduced market demand.	DECLINE



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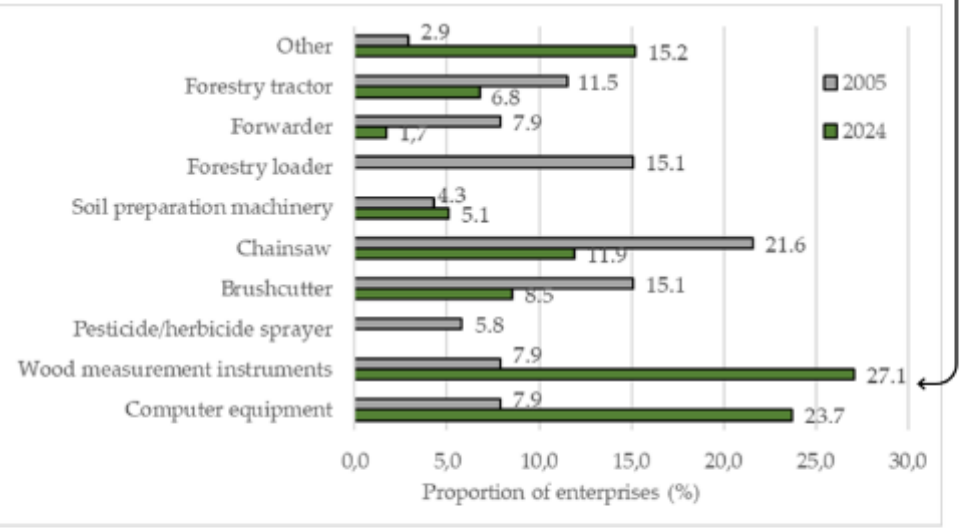
USE OF TECHNOLOGY AND EQUIPMENT IN FORESTRY ENTERPRISES (%)



NEW FORESTRY MACHINERY AND SPECIALISED INSTRUMENTS ARE EMPLOYED IN ENTERPRISES.

According to the 2024 survey data, enterprises have adopted modern timber measurement devices (27.1%) and computer equipment (23.7%) more intensively than in 2005.

In 2005, only 7.9% of enterprises reported such use. At the same time, acquisitions of chainsaws, timber extraction machinery (forest tractors, forwarders, forestry loaders), sprayers, and brush cutters have declined. Several factors may explain this trend: (1) changes in the nature of services provided by enterprises; (2) modifications in the support schemes for acquiring new forestry machinery; and (3) existing sufficiency of such equipment within enterprises. The increased application of modern devices and computer technologies in work processes requires a higher level of employee qualifications. The technological breakthrough has stimulated and facilitated the use of new advanced instruments that accelerate and simplify forestry operations. Employees in forestry enterprises have begun to use GPS systems, digitised databases, precise electronic measuring devices, and similar technologies.

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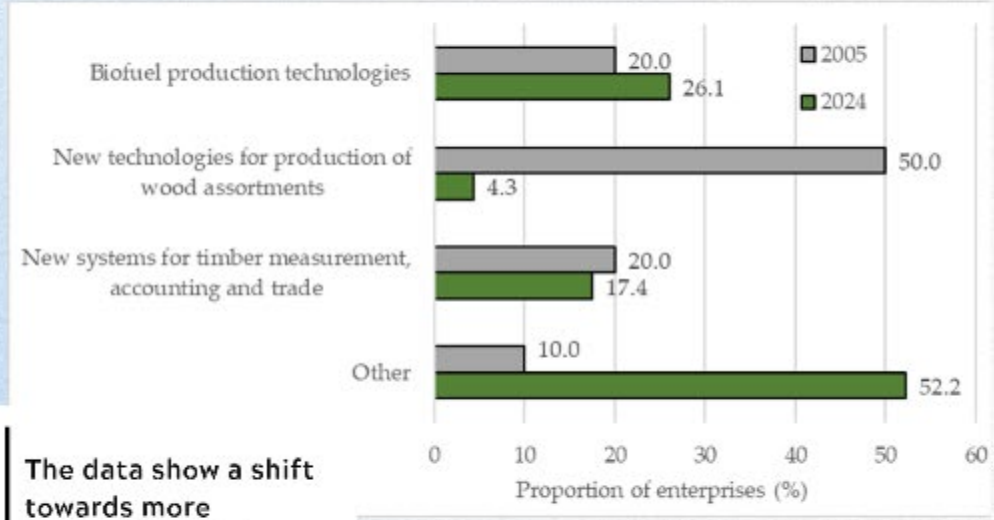
ADOPTION OF NEW TECHNOLOGIES IN FORESTRY ENTERPRISES 2005-2024

In recent years, enterprises have increased their use of modern measuring devices and computer equipment, while investment in traditional forestry machinery has declined. A significant increase (42.2%) in the adoption of modern technologies has also been observed. These changes are driven by shifts in services, support schemes, and sufficient existing equipment



Growing demand for highly skilled employees capable of working with advanced technologies.

Digital tools such as GPS, databases, and electronic measuring devices are becoming standard.

The data show a shift towards more innovative and diverse technological applications in forestry enterprises.

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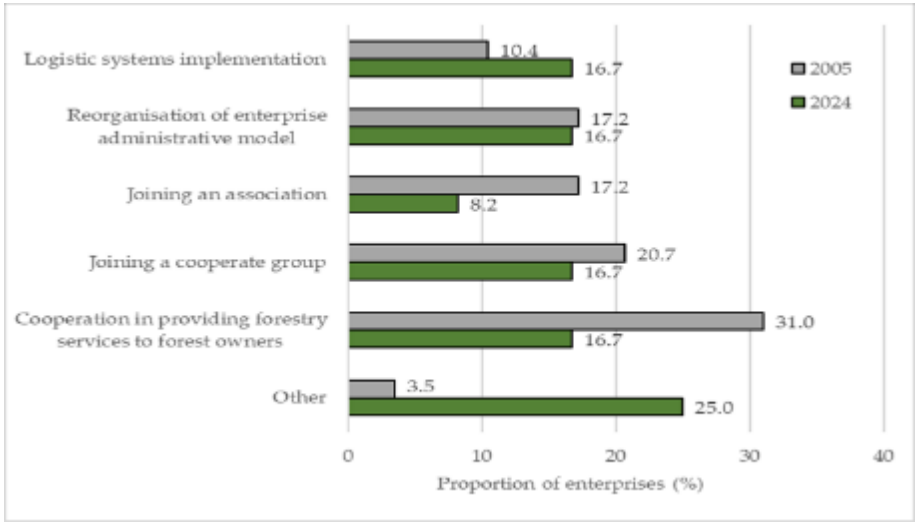
NEW ORGANISATIONAL MODELS AND FORMS IN ENTERPRISES

DURING THE PERIOD 2005–2024, The forestry sector underwent significant organisational changes. The development of logistics systems became one of the most important organisational innovations, as GPS navigation and digital supply chain management systems enable the optimisation of timber transportation, the reduction of costs, and the efficient monitoring of raw material flows from harvesting to the end user.



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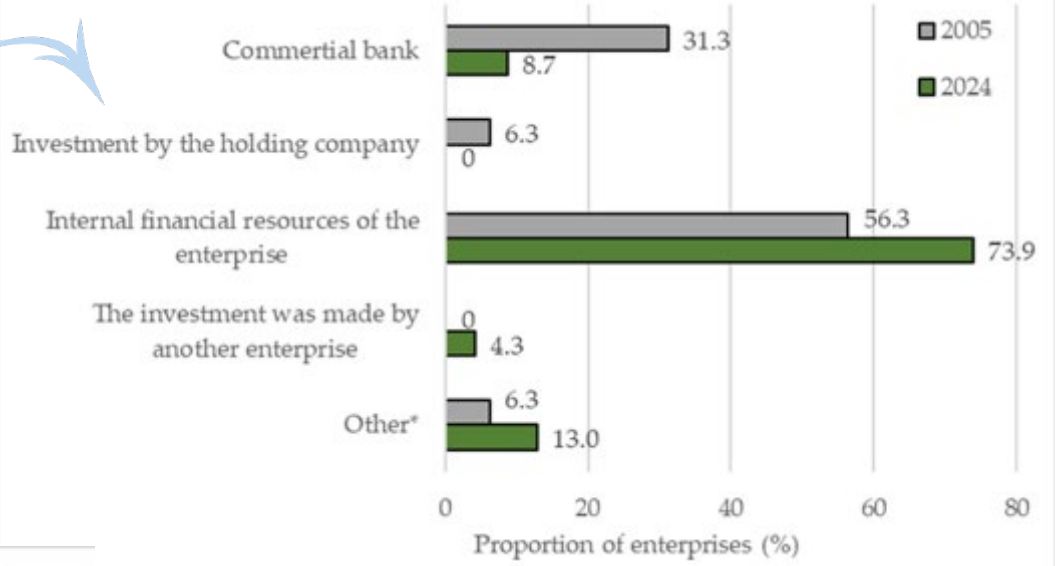
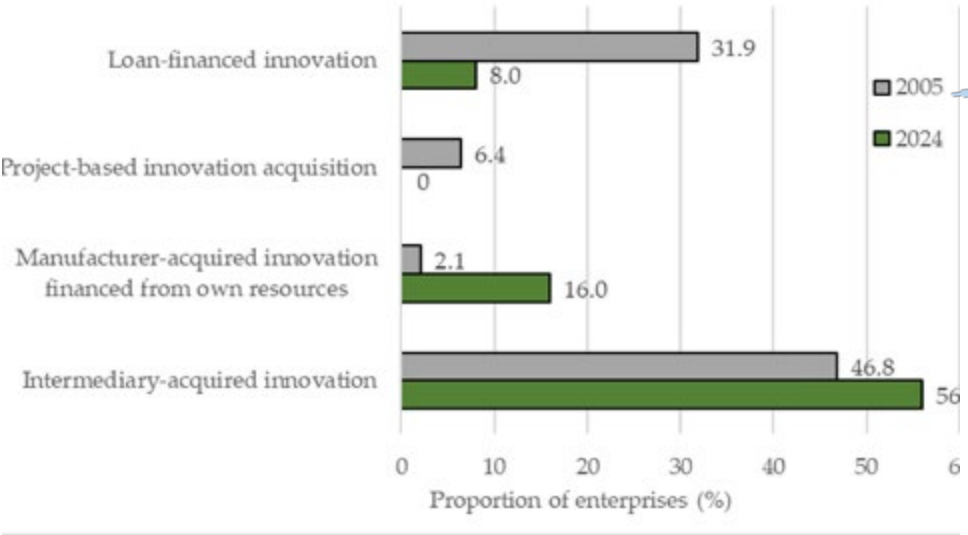
Innovation implementation financing sources

Enterprises use various sources to finance innovation, often combining them, while financial independence is increasing. Own funds have become the main source of financing, rising from 56.3% to 73.9%, whereas the use of bank loans has significantly declined from 31.3% to 8.7%. At the same time, the importance of EU and national funding is growing.





Innovation acquisition methods (ways)

Survey data from 2024 indicated that innovations in enterprises are most frequently acquired through intermediaries from other companies (56.0%). This trend was also observed in the 2005 survey; however, the number of enterprises purchasing innovations directly from the manufacturer has increased (16.0%). In 2005, only 2.1% of enterprises acquired innovations directly from the manufacturer..

DRIVERS TO INNOVATION

Most Important Drivers (2005):

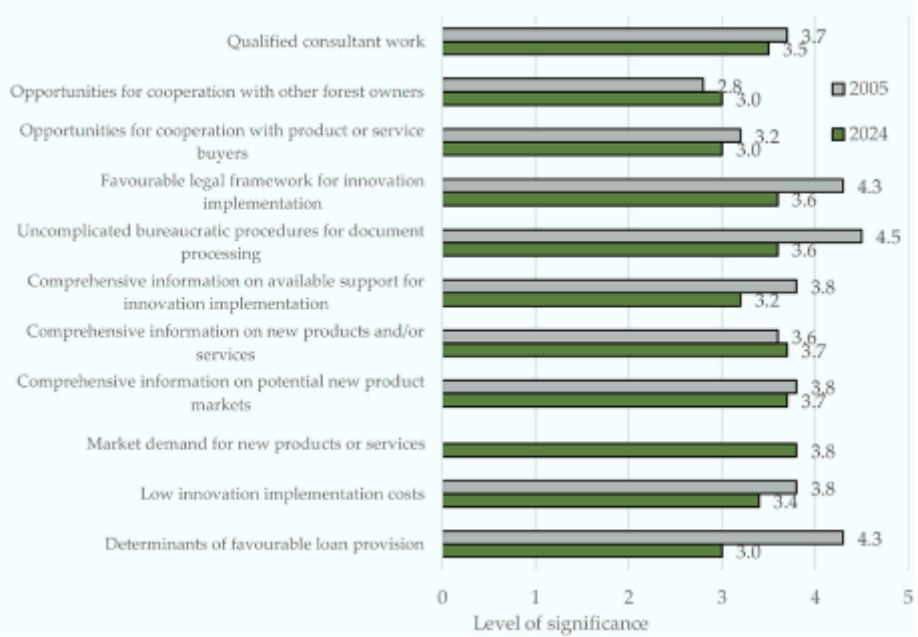
- Uncomplicated Bureaucratic Procedures 4.5;
- Favourable Loan Provision 4.3;
- Favourable Legal Framework 4.3;

Key Drivers in 2024:

- Market demand for new products and services 3.8;
- Information on potential new product markets 3.7;
- Information on new products and services
- 3.7

Factor analysis *identified* three main factors:

- Financial and Practical Support;
- Information Availability;
- Institutional Environment;
- Three significant factors explained 86% of the total variance.
- Factor 3 (legal framework and bureaucratic procedures) was the only factor that differed significantly between 2005 and 2024.



- Innovation drivers were evaluated using a 5-point Likert scale (1 - not important; 5 - very important).

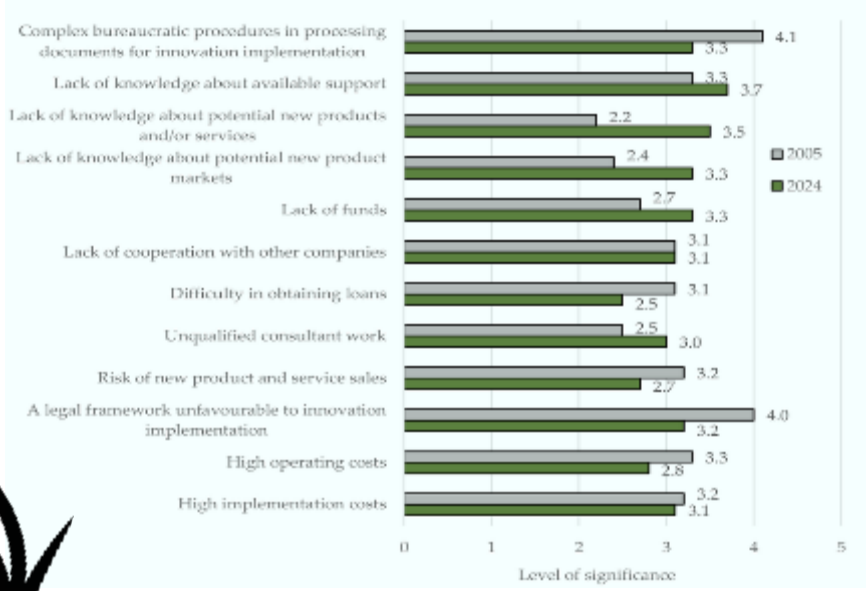
BARRIERS TO INNOVATION

In 2005, the main barriers were:

- Complex bureaucratic procedures (4.1)
- Unfavourable legal framework (4.0)

In 2024, the main barriers became:

- Lack of knowledge about available support (3.7)
- Lack of knowledge about new products and services (3.5)



Factor analysis identified four factors:

- Knowledge and Competence Barriers
- Cost and Risk Barriers
- Financial Resource Constraints
- Institutional and Bureaucratic Barriers

87%

Experts assessed the importance of innovation barriers using a Likert scale (1 - not important; 5 - very important).

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Conclusions:

- The sector shows both consolidation and fragmentation, with more small enterprises alongside stronger, financially stable companies.
- Digital technologies are widely adopted, and new services reflect a shift towards more innovative and multifunctional activities.
- Enterprises are strengthening internal capacities, implementing advanced logistics systems, and relying less on collaborative structures.
- Financial independence is increasing, with innovations more often financed by own funds, alongside growing EU and national support.
- Forest policy and market dynamics jointly shape the innovation environment and drive sectoral transformation.

Thank you