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Examining the role of innovation in enhancing the performance of agritourism enterprises and agricultural farms in Albania

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Abstract: Innovation is considered a key driver for agricultural transformation and rural development, especially in the context of developing countries. The purpose of this study is to examine the role of innovation in the performance of agritourism enterprises and agricultural farms in Albania. The methodology used for this paper focused on the collection and analysis of data from questionnaires in 12 regions of the country, through face-to-face interviews with 672 respondents. The data were analyzed and processed with the SPSS program, in accordance with the purpose and research objectives of the study. The results from the respondents' responses show that innovation plays a critical role in increasing the performance and competitiveness of agricultural farms and agritourism enterprises, improving efficiency and productivity, diversification of activities, cost reduction, and increased income. The data show that the barriers and drivers that affect the adoption of innovation in the agricultural sector in Albania are costs of implementing technologies, access to financing, risk and uncertainty in investment returns, lack of necessary digital infrastructure, lack of knowledge and professional skills of farmers, and support from public institutions. The study findings highlight the importance of collaboration among stakeholders (policymakers, public agencies, academic institutions, etc.) in drafting policies and strategies to foster the implementation of innovation in the rural sector.

Keywords: *Agriculture innovation systems, Digital technologies, Farm performance, Innovation, Productivity, Sustainable rural development.*

1. Introduction

The rural sector is one of the most important sectors in Albania, contributing to economic growth, gross domestic product, and employment levels. This sector accounts for about 20% of the GDP, with 35% of the labor force employed in agriculture. Despite its economic significance, the sector faces persistent challenges, including rural depopulation caused by youth migration, limited access to finance, low productivity of agricultural farms, inefficient resource use, and low levels of technology adoption. These factors threaten the competitiveness and sustainability of development in this sector. Innovation is widely recognized as a key driver of productivity, resource efficiency, and competitiveness in agriculture, with positive implications for economic, social, and environmental sustainability [1]. Innovation in agriculture includes a wide range of processes and practices, such as the adoption of new technologies, the implementation of new management systems, the use of digital tools, and value-added products and services that lead to improved farm performance [2-4]. The literature indicates that the future of small and medium-sized farms depends on technological and institutional innovations. Furthermore, innovation allows farmers to adapt to changing market conditions, environmental constraints, and consumer preferences [5, 6]. Small farms face many challenges, which have caused many farmers to end their operations or become innovative in finding ways for longevity and success in their agricultural enterprises. Agritourism and farm diversification can financially enhance farm operations by adding new revenue streams outside standard farming practices. Agrotourism, as a complementary activity, can be a smart and sustainable option, focusing on specific resources and

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providing economic and social benefits. It emphasizes local tourism entrepreneurs, local agencies, appropriate management strategies, and modern technologies [7]. Digital technologies can increase efficiency, foster innovation by reducing transaction costs, facilitate information collection and sharing, improve extension services for farmers, support economies of scale by enabling innovative business models, and improve agricultural supply chain management [8]. Digitalization is an increasingly important dimension of agricultural innovation, encompassing technologies ranging from basic communication tools to advanced systems such as big data analytics, blockchain, the Internet of Things (IoT), cloud computing, and artificial intelligence. Digital technologies and innovation have the potential to improve decision-making, enhance the efficiency of services to farmers, reduce transaction costs, facilitate integration into value chains, and improve the sustainability of agricultural systems [9, 10]. Studies show that digital agriculture can contribute to sustainable resource management, increase market access, and foster resilience to challenges such as climate change, rural depopulation, and demographic shifts.

The European Union's Rural Development Policy emphasizes that innovation and knowledge transfer are vital tools for addressing structural weaknesses in rural areas and supporting the transition towards sustainable systems. Initiatives such as the European Innovation Partnership for Agricultural Productivity and Sustainability promote cooperation between farmers, extension agencies, universities, research institutions, entrepreneurs, and other actors to foster and spread innovative ideas and practices adapted to the context of rural development [11]. Despite the importance of innovation in the development of the rural sector, in Albania, the adoption and implementation of innovative practices vary by region and farm level. Structural barriers, such as limited access to finance, lack of professional knowledge and skills, and insufficient institutional support, continue to hinder the diffusion of innovation, especially for smallholder farmers. Innovation is considered an important instrument to address challenges such as productivity growth, resource efficiency, competitiveness, food quality and safety, climate change, quality of life, depopulation, and youth migration, which are closely linked to the sustainable development of the rural sector. In developing countries like Albania, agriculture constitutes one of the main sectors of the economy. Therefore, there is a need for extension agencies, universities, research institutions, and other actors to train, advise, and collaborate with farmers and entrepreneurs on implementing innovative practices and digital technologies in their activities. According to the Global Innovation Index, Albania ranks 84th and has an innovation index level of 24.5 [12]. Considering the role and importance of innovation and digitalization, the Albanian government has drafted several strategic documents to include them in its agricultural and rural development strategies. Through these documents and strategies, it is intended to promote the use of information technologies, innovation, and the development of digital infrastructure. The findings of this study aim to inform policymakers, researchers, and stakeholders to contribute to the design of strategies that promote and support the implementation of innovation in the agricultural sector in Albania.

1.1. Research Problem and Objectives

The purpose of this study is to examine the role of innovation in the operational and economic performance of agritourism enterprises and agricultural farms in Albania. This study contributes by providing empirical data that focuses on the role of innovation in increasing the performance and competitiveness of agricultural farms, identifying obstacles and factors that promote the implementation of innovation in the agricultural sector. Adapting to innovation would not only improve productivity and resource efficiency but also increase competitiveness and farmers' incomes, contributing to poverty reduction and rural well-being. The structure of the paper is presented in the figure below.

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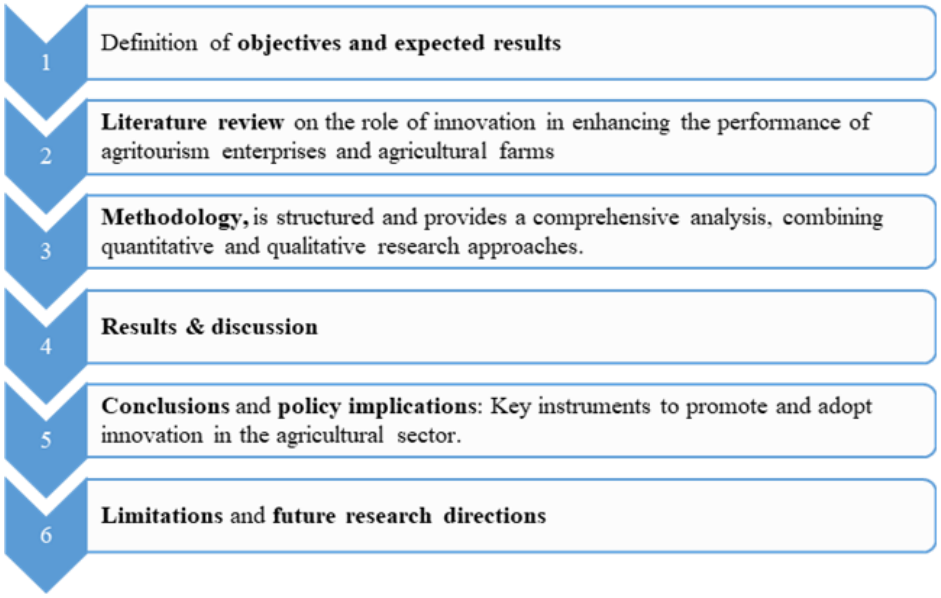

Figure 1.
Research structure.

The specific research objectives and expected results are presented in the following table.

Table 1.
Research objectives and expected results.

No.	Objective	Expected results
1	Identify typologies and innovation practices implemented at the farm level in selected regions of Albania.	Providing data on innovation practices implemented by agritourism enterprises and agricultural farms in Albania.
2	Examine the relationship between innovation adoption and the performance and productivity of agritourism enterprises and agricultural farms.	Evaluation of the role of innovation in improving productivity, efficiency and overall farm performance.
3	Evaluate the impact of innovation on competitiveness and sustainable development in the agricultural sector.	Evaluate how innovation contributes to competitiveness, environmental sustainability, and long-term growth of the agricultural sector.
4	Identify the main driving factors and barriers influencing the adoption of innovations by agritourism and agricultural farms.	Recommendations for the design of institutional policies and support programs to promote the adoption of innovation in the agricultural sector.

2. Literature Review and Theoretical Framework

The agricultural sector continues to face significant challenges, including low productivity, fragmented land ownership, limited market integration, and high vulnerability to climatic and economic fluctuations. Innovation is increasingly becoming a key driver for agricultural transformation and rural development, especially in developing countries such as Albania. The literature highlights the importance of innovation as a catalyst for improving productivity, resource efficiency, enhancing competitiveness, and promoting sustainability in the agricultural sector [1, 13]. In this context, these innovative practices contribute not only to the operational and economic performance of agricultural farms but also to the sustainable development of rural areas.

2.1. Conceptual Framework for Agricultural Innovation

Agricultural science, technology, and innovation are vital to promoting rural development and poverty reduction. Innovation and digitalization in agriculture are essential for stimulating growth and

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enhancing competitiveness, particularly in developing economies. However, agricultural innovation is increasingly viewed as a complex, multi-actor process, making it challenging to identify the most effective investments and policy interventions [14]. According to the Oslo Manual, innovation is a new or improved product, process, or combination thereof that is significantly different from previous products or processes for potential users and consumers [13]. Innovation in agriculture includes a wide range of processes and practices, such as the adoption of new technologies, the implementation of new management systems, the use of digital tools, and value-added products and services that lead to improved farm performance [1].

The OECD-Eurostat defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization, or external relations." These may include technological innovations (e.g., precision farming, digital platforms), organizational innovations (e.g., new business models, collaborative networks), and institutional innovations (e.g., extension services, market linkages). This encompasses activities such as research, technological development, financial investment, capacity building, and the use of ICTs (e-agriculture) to support knowledge exchange, marketing, and farm management [13]. Innovations are the result of developmental, scientific, technological, organizational, financial, and commercial activities, as well as investments in knowledge, aimed at implementing innovative practices.

The Oslo Manual, 2018, classifies innovations into four categories: 1) Product innovations – new or significantly improved products or services; 2) Process innovations – improved production or delivery methods; 3) Organizational innovations – new workplace structures, supply chain systems, or collaborative arrangements; and 4) Marketing innovations – novel approaches to product design, promotion, pricing, or distribution. Digitization is another term used in relation to the implementation of digital innovations. Digital technologies include big data, artificial intelligence, the Internet of Things (IoT), robotics, sensors, and drones [15]. In agritourism enterprises, for instance, institutional innovations such as destination branding partnerships can significantly boost the visibility and profitability of farm-based tourism. Agritourism is important for the quality of life for economic and cultural reasons, preserving traditional land use and contributing to the rural development of the country [16]. Innovation is a major driver of competitiveness, even for agritourism farms operating in the rural sector. In agritourism offerings, the resources of farms are combined with the values provided by the immediate surroundings and the owners' competencies and collaboration skills. Regarding agritourism, innovations may extend to product, process, management, marketing, and institutional innovations [17]. To analyze and evaluate the role of innovation in the agricultural sector, a conceptual framework has been designed as follows.

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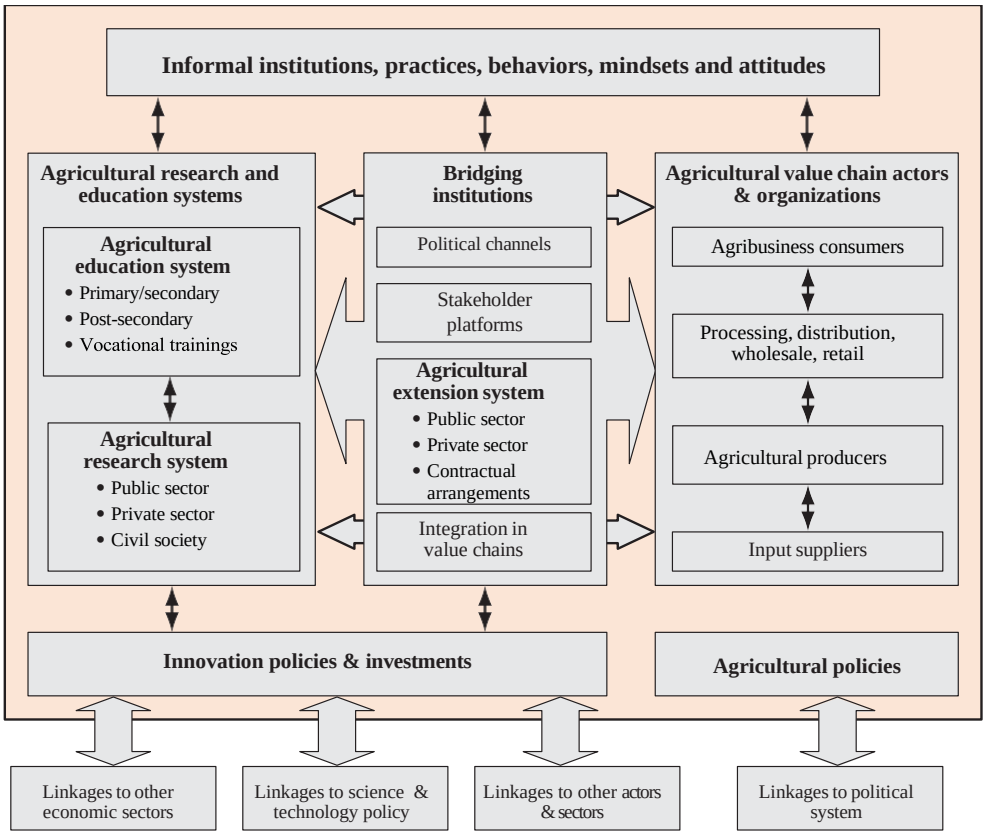

Figure 2.
Conceptual Framework of Agricultural Innovation System (AIS).
Source: Spielman and Birner [14].

The conceptual framework in Figure 2 illustrates the complexity and systemic nature of innovation, highlighting the main components, roles, and interactions among actors. It emphasizes the dimensional nature of processes and factors that influence the adoption of innovation in the agricultural sector. Within this framework, farmers serve as a bridge within these processes, while public policies, informal institutions, practices, attitudes, science, technology, knowledge resources, markets, and other actors also play crucial roles in implementing innovation. Cooperation among farmers, public agencies, research institutions, advisory services, the private sector, and financial institutions is essential for knowledge sharing, resource efficiency, and profitable activities in rural areas. In developing countries like Albania, this process is particularly vital for sustainable development and the competitiveness of the rural sector. Despite the increasing body of research on agricultural innovation, few studies focus specifically on the Albanian context or provide detailed analyses at the farm level. This study aims to fill this gap by contributing empirical data on the role of innovation in enhancing farm performance and competitiveness, as well as identifying barriers and factors that influence innovation implementation in the agricultural sector.

2.2. Innovation and Agricultural Farms Performance

Empirical studies have demonstrated a strong correlation between innovation adoption and improved farm performance. Farms that integrate innovative practices often achieve higher yields, enhanced environmental outcomes, and better market access. Innovation enables diversification of income sources, reduces vulnerability to market and climate shocks, and allows adaptation to shifting consumer preferences. Economic growth is driven by the advancement of ICTs, which are also a key

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driver of innovation and change [18, 19]. Digital technologies support better decision-making on farms, helping to boost innovation and improve agricultural productivity and sustainability [20, 21]. Precision farming techniques, digital technologies, and agricultural innovation have transformative potential, leading to improved resource utilization, increased productivity, and income [22]. Digital technologies increase production efficiency, complement other production factors, stimulate innovation, significantly reduce costs, overcome information barriers that impede market access for many small farmers, expand knowledge through new ways of providing extension services, and offer new methods to improve management of supply chains in agriculture [23, 24]. Digital technologies (e.g., artificial intelligence, robotics, innovation, Internet of Things, drones, etc.) are being applied along the agricultural value chain to address challenges related to agricultural production systems [25]. Innovation and digitalization in agriculture are expected to provide technical optimization of agricultural production systems, value chains, and food systems [26].

The implementation of digital technologies by entrepreneurship is the main driving force for achieving sustainable development goals [27]. Innovation also supports social inclusion by facilitating access to training, fostering youth and women's participation, and empowering rural communities. Technical support, training through appropriate incentives, and extension services are various means to promote adoption [28]. Linking knowledge to innovation is critical for resolving the agricultural sector's information and knowledge gaps. The impact of digitization concerns the production side of the agri-food sector, where new technologies enable customers to have complete traceability and visibility of the production process and consumer behavior of agricultural products [29, 30]. The transition towards digitized agriculture and rural areas can have significant socio-economic and environmental impacts [31, 32]. In the agricultural sector, dominated by small and medium-sized farms, which often face seasonal fluctuations in cash flow, weather-dependent production risks, and limited access to financing, there has traditionally been a poor tendency to implement innovation and digital technologies [33]. In recent years, the digital transformation of agricultural economies has become a crucial driver for rural development and agricultural modernization [34, 35].

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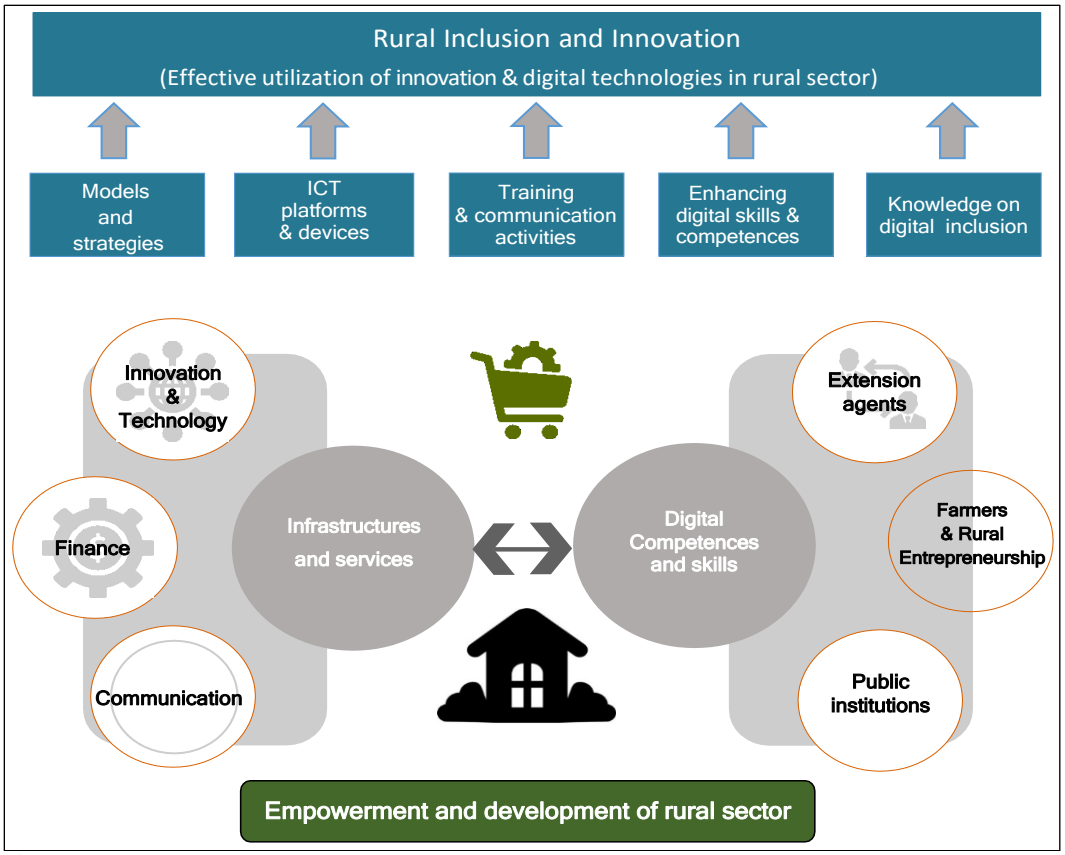

Figure 3.
Conceptual framework of innovation and digitization in rural areas.

Figure 3 presents a conceptual framework illustrating how innovation and digitalization drive rural transformation through three interrelated mechanisms:

1. Productivity and efficiency improvements—through advanced technologies, optimized production systems, and value chain enhancements.
2. Knowledge and Capacity Development – by improving access to information, education, and training, enabling farmers to adopt and adapt to innovative practices and digital technologies.
3. Social and economic empowerment – through improved market access, inclusive participation of rural communities, and the creation of new economic opportunities.

The model highlights how innovation and digital technologies increase farm productivity, market access, and value chain efficiency. Digitalization and innovation in rural areas facilitate access to education and training, enabling farmers and rural entrepreneurs to acquire new technical knowledge and skills. This ensures greater participation of women and youth and fosters social empowerment within marginalized communities. Innovation and digitalization help farmers and rural enterprises to manage natural resources more efficiently, mitigate risks related to climate variability and land degradation [36, 37]. These results highlight that innovation should be considered a comprehensive and integrated process, requiring coordination across sectors and stakeholders. It aligns with national and EU priorities for rural development, particularly in the context of the Common Agricultural Policy (CAP), digital transformation agendas, and the sustainable development strategy for the rural sector. The sustainable development of rural areas means an increase in the productivity of agricultural farms, competitiveness, and improvement of the standard of living of the population in these areas. Innovation and digitalization contribute to increasing farm productivity and sustainable rural development [38].

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The process of digitalization has the potential to bring about significant changes in the way agriculture operates, in terms of innovative tools, technologies, or practices. The digital transformation of agriculture can promote an increase in farmers' income by improving production efficiency, broadening sales channels, and promoting the upgrading of agricultural systems [39-42]. Innovation and digitalization can contribute to improving the quality of work processes in traditional rural activities and make them more attractive to young people.

The rural sector has already undergone many changes that have led to a significant transformation of production processes and activities on agricultural farms. In this context, policymakers should design strategies and define actions aimed at developing collaborations between actors involved in the agri-food chain and the use of digital technologies to support rural development [43, 44]. Agritourism in developing countries is essential for rural development and economic diversification of activities, increasing employment and farmers' incomes as well as poverty alleviation in rural areas. In their study, they emphasize that agritourism is a sustainable diversification strategy that requires collaborative efforts from both the government and farmers to build capacity for agritourism growth and sustainable development [45]. Agritourism in Albania is a developing sector with great potential. Its geographical location, extraordinary landscapes, and a long tradition of hospitality with many traditional products make Albania the perfect place for an agritourism experience [46]. In recent years, agritourism has attracted the attention of donors and the Albanian government as a potential sector for job creation and rural diversification. Governments should help strengthen private funding for research and development (R&D) and foster public-private partnerships to increase the impact of public funding, targeting support to innovation in areas where there is underinvestment [47]. In developing countries, there is a growing awareness of the many challenges facing agricultural extension systems and how innovation can be useful in addressing these problems [48].

2.3. Driving Factors and Barriers to Agricultural Innovation Adoption

The adoption of innovation in the agricultural sector is influenced by a complex set of economic, social, technical, and institutional factors. While numerous benefits are associated with innovation, including improved productivity, competitiveness, and sustainability, various barriers continue to limit its diffusion, particularly in small and medium-sized rural farms. Empirical research identifies several barriers to innovation adoption in rural areas, such as limited access to finance, lack of farmers' skills and knowledge, small farm size, insufficient extension services, land and market fragmentation, weak digital infrastructure, risk and uncertainty in investment returns, and insufficient institutional support [47, 49, 50].

Despite these barriers, several factors can drive the adoption of innovation in agriculture, such as support and policy incentives from public institutions, investment in human resources (transfer of knowledge and digital skills to farmers), collaborative networks between different actors, development of digital infrastructure, promotion, and investment in agritourism entrepreneurship [25, 51]. Several key enablers of innovation have been identified in the literature, including skills and training, access to information, participation in networks, and the availability of financial support. Conversely, barriers include risk aversion, limited institutional capacity, and a lack of coordination among stakeholders. As highlighted, a systemic approach to innovation is necessary, one that considers the interdependence of technological, social, and institutional factors. Recent technological changes driven by innovation processes remain a key driver of socioeconomic transformation. The factors influencing the innovation process appear to differ and vary in nature for companies operating in the agri-food sector [52].

The literature highlights that innovation networks, which include innovation intermediaries, non-governmental organizations, cooperative associations, public agencies, research institutions, and digital platforms, play a major role in the adoption of innovations. Strengthening the skills and capabilities of agricultural producers, especially smallholder farmers, to successfully manage their agricultural enterprises requires sustained investment. Innovation and digital agricultural technologies are helping to address barriers related to productivity growth, access to finance, markets, and supply chain

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management [53]. Human capital and farmers' skills (efficient use of agricultural resources, managerial skills, as well as the ability to use technological tools and data sources) are important for the adoption of innovations [13, 54].

Knowledge, research, and development are also factors in the creation and adoption of innovations because, in modern agriculture, innovation occurs through formal research and development (R&D) activities. It is important to foster cooperation and interaction between institutional structures to facilitate the spread of new technologies, as well as to enhance the contribution of institutions to innovation processes through the implementation of policies, programs, and digital infrastructure for knowledge transfer [3, 55, 56]. The knowledge network is fundamental to the innovation process and innovative practices. A transition to sustainable agriculture requires an agricultural agency that supports farmers in providing and sharing knowledge [13, 57, 58]. Public support for modernizing farm technology should therefore be considered and should focus on the most cost-effective strategies. Furthermore, the right incentives must be created for farmers to foster the adoption of technologies with promising environmental benefits [59]. The role of innovation and structural change in increasing productivity involves three components: 1) technological progress, 2) changes in technical efficiency, and 3) economies of scale resulting from a change in firm size. The comparative analysis of barriers and drivers shows that while structural constraints are important, there are also strong opportunities for policy intervention. By prioritizing drivers that directly address the above barriers, such as access to finance and training, policymakers can create a reinforcing cycle of innovation adoption in both agriculture and agritourism. Addorisio et al. [60] in their study, they point out that collaboration between stakeholders through technical support and training activities is a key strategy for technology adoption. A key component is public and private investments in agricultural research, education, and extension services. Innovation is closely linked to the generation and dissemination of knowledge. Support and funding from government institutions for research and development institutions facilitate technology transfer to agricultural farms through advisory systems and enable the appropriate infrastructure for long-term adoption of innovation [61, 62]. It is important to implement specific policies and programmes for agriculture that provide direct incentives for innovation, structural change, and the use of natural resources in agriculture. This is particularly important for Albania's alignment with EU rural development policy. The adaptation of innovation in the agricultural sector in Albania is limited by structural barriers such as limited access to finance, small farm sizes, weak digital infrastructure, lack of farmers' skills and knowledge, and insufficient institutional support [49, 50]. Strategies and policies should orient innovation not only towards increasing productivity but also towards social inclusion (support for small farmers, women, and youth), environmental protection, and conservation (e.g., conservation of biodiversity, soil health, water efficiency) in accordance with FAO's global frameworks. The rural sector in Albania needs to be transformed into a competitive sector that can guarantee sustainable development, attract investment, and provide employment, especially for young people. Government strategies focused on infrastructure, financial support, and regulatory frameworks enable farmers to adopt sustainable, innovative practices. Regarding innovation drivers, they include access to financing, support with grants/subsidies from government institutions, improvement of digital infrastructure, training programs for farmers from public agencies and academic institutions, as well as cooperation with other actors.

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Table 2.
Defining features of NASR, AKIS in relation to Agricultural Innovation Systems (AIS)

Defining features	National agricultural research systems (NARS)	Agricultural knowledge and information systems (AKIS)	Agricultural innovation systems (AIS)
Purpose	Planning capacity for agricultural research, technology development, and technology transfer	Strengthening communication and knowledge delivery services to farmers in the rural sector.	Strengthening the capacity to innovate throughout the agricultural production and marketing system.
Actors	National agricultural research organizations, agricultural universities, extension services, and farmers.	National agricultural research organizations, agricultural universities, extension services, farmers, and entrepreneurs in rural areas.	All actors involved in the creation, dissemination, adaptation, and use of all kinds of knowledge related to agricultural production.
Outcome	Technology invention and technology transfer	Technology adoption and innovation in agricultural production	Combinations of technical and institutional innovations across production, marketing, policy research, and enterprise domains.
Organizing principle	Use of science to create inventions	Accessing agricultural knowledge	New uses of knowledge for social and economic change
Mechanism for innovation	Transfer of technology	Interactive learning, training programs	Interactive learning, training programs
Role of policy	Resource allocation, priority setting	Enabling framework	Integrated component and enabling framework
Nature of capacity strengthening	Infrastructure and human resource development	Strengthening communication between actors in rural areas	Increasing cooperation between stakeholders, drafting policies and programs to create a favorable environment for innovation.

Source: World Bank [63].

Table 2 provides a comparative overview of three major frameworks central to agricultural research, knowledge dissemination, and innovation: 1) National Agricultural Research Systems (NARS), 2) Agricultural Knowledge and Information Systems (AKIS), and 3) Agricultural Innovation Systems (AIS). This framework evaluates their defining features to understand their evolving roles in agricultural development and innovation. The comparative analysis reveals a clear evolution from linear, research-driven models (NARS) to networked and systemic approaches (AIS) to the complexity of modern agricultural challenges. While NARS and AKIS are important, especially in supporting basic research and knowledge provision, AIS offers a more integrated and flexible framework for fostering innovation in the agricultural sector. For developing countries, this analysis suggests the need to move from fragmented models to comprehensive, innovation-driven systems. This requires investments not only in scientific capacities but also in institutional collaborations, policies and support mechanisms, and stakeholder engagement. Boru et al. [64] in their study, they emphasize that strengthening institutional frameworks, promoting greater stakeholder collaboration, and integrating technological innovations are key strategies for enhancing agricultural innovation.

The findings highlight the crucial role of institutional support and networking in fostering innovation, with government policies significantly influencing technological advancements. In the rural sector, environmental, land, water, and agricultural policies are particularly important for AIS, as they affect structural adjustment, the quality and availability of natural resources, investment capacity for production systems, including extension services and related programmes [65]. Agricultural Research and Development (ARD) enables new knowledge and technologies, education, training, and agricultural advice to respond to market demands, encouraging and promoting cooperation among different actors in the rural sector [63]. A key component is the institutional context, which includes agricultural policies, extension services, research organizations, and financial systems. These institutions provide the infrastructure for innovation through education, training, expertise, and technical knowledge, as well as innovation financing instruments. This analysis emphasizes the importance of interaction between

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institutional actors to strengthen policies and support mechanisms as facilitators and drivers of innovation. Agricultural policies are strongly influenced by the common ambition of many countries in the region to cooperate closely and become members of the European Union. The European Commission's Digital Agenda proposes making better use of the potential of ICT to foster innovation, economic growth, and progress. Governments should ensure that farm advisory and extension systems include a variety of public and private actor providers to address constraints to technology adoption, from farm and natural resource management to climate change adaptation [11, 47].

In Albania, innovation in the agricultural sector is still at an emergent stage, but this component is particularly critical for the sector's development. Despite clear benefits, the Albanian agricultural sector continues to face significant barriers to adopting innovation. Limited access to financing, weak extension networks, low digital literacy, and fragmented knowledge systems have hindered innovation adoption at the farm level. The sector, dominated by smallholders, fragmented landholdings, and limited formal support, provides a comprehensive view to analyze barriers and drivers of innovation. Addressing these challenges requires targeted measures, improving extension services, facilitating public–private partnerships, investing in rural digital infrastructure, and creating financial instruments tailored to small farmers. The implementation of innovative practices and systems will not only improve farm performance but also contribute to the sustainable development of rural areas.

Considering the role and importance of innovation and digitalization, the Albanian government has drafted several strategic documents to include them in its agricultural and rural development strategies. Through these documents and strategies, it aims to encourage the use of information technologies, innovation, and the development of digital infrastructure.

The government has supported cooperation between the scientific research community and business, including innovation, with financial funds. The Cross-Sectoral Strategy for Rural and Agricultural Development (2014-2020), aims to promote and include innovation in agricultural and rural development. In the Strategy for Agricultural and Rural Development (2021-2027), the development of institutional and administrative capacities, cooperation between actors, transfer of knowledge, and innovation in agriculture and rural areas are emphasized. It is important to strengthen the Agricultural Knowledge and Innovation Systems (AKIS) to increase the acquisition of advanced knowledge, information, access to technology, collaboration, and digitalization of agriculture [11, 66, 67]. In the National Strategy for Scientific Research, Technology, and Innovation 2023-2030, the aim is that by 2030, Albania will provide quality scientific research for sustainable socio-economic development that is comprehensive and in accordance with international and European standards, based on new scientific knowledge and technological innovations. The Agriculture and Rural Development Agency (ARDA), Centres for Transferring Agricultural Technologies (CTAT), Regional Agencies for Agricultural Extension (RAAE), and other stakeholders play an important role in advising and training farmers, as well as facilitating the transfer of knowledge regarding digital technologies and innovative practices in agricultural farms. Universities and research institutions also play a significant role in exchanging new knowledge and efficiently adapting inventions and innovations within the framework of AKIS in Albania [68].

3. Materials and Methods

The methodology employed in this study involves the collection, processing, analysis, and interpretation of data and statistical indicators. It focuses on examining the role of innovation in the performance of agritourism enterprises and agricultural farms in Albania. Primary data were gathered through questionnaires, while secondary data were obtained from publications by national and international institutions. The methodology is designed to provide a comprehensive analysis by integrating both quantitative and qualitative research approaches. The conceptual framework of the methodology is outlined as follows:

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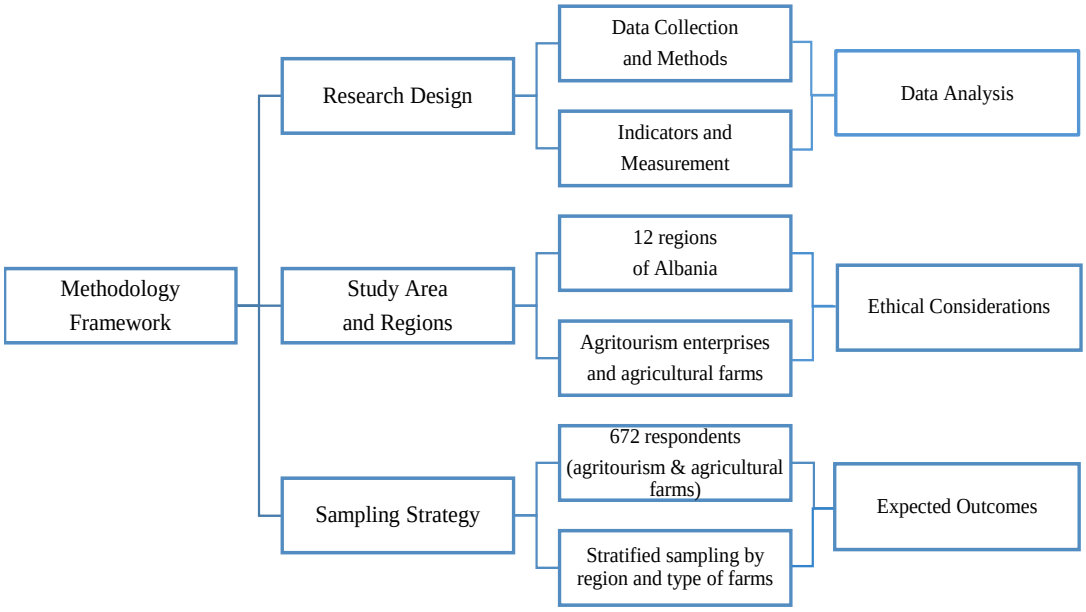

Figure 4.
Methodology conceptual framework.

3.1. Research Design

The study used a mixed methods approach, combining quantitative and qualitative techniques to examine and analyze the role of innovation in farm performance in Albania. This questionnaire enabled the collection of measurable data on performance indicators, as well as farmers' perceptions of the importance and impact of innovation in their activities. The research was conducted as a case study, covering all regions of the country with a focus on agritourism enterprises and agricultural farms.

3.2. Study Area and Sample Selection

The research was conducted across all regions of the country, considering geographic distribution, concentration, and typology of farm and agritourism enterprises oriented toward innovation. Based on Institute of Statistics (INSTAT) & Ministry of Agriculture and Rural Development (MARD) [69] on farm activities and typology, questionnaires were completed face-to-face with farmers, owners/managers of agritourism enterprises, and agricultural farms for the regions included in the study [70].

3.3. Data Collection

To achieve the objectives of the study, a structured questionnaire was designed to collect information from farmers (interviewees) regarding the implementation of innovation in agrotourism enterprises and agricultural farm activities, its role and impact on farm performance and productivity, as well as the factors and drivers that influence the adoption of innovation in the agricultural sector in Albania. The questionnaire is composed of five main sections to provide information on:

- Socio-economic characteristics of respondents (gender, age, residence, education, employment, etc.).
- Data on the agricultural farm/agritourism enterprise (location, duration of business, number of employees, activities, investments, income, performance indicators, etc.).
- Data on activities and services offered by agritourism and agricultural farms,

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- Data on innovation (attitude and perception of innovation, types of innovations implemented, role and impact of innovation on the performance of agrotourism enterprises and agricultural farms).
- Data on the drivers and barriers to implementing innovation in the agricultural sector, as well as challenges for the future.

The questionnaire was structured to provide comprehensive data. The collection and completion of data were carried out over a three-month period in 2025. After completing the questionnaires, the data were analyzed and processed with the SPSS program.

3.4. Data Analysis

Survey data were analyzed using descriptive and exploratory statistical methods, in accordance with the purpose and research objectives of the study. Quantitative analysis focused on the role of innovation in the performance of agricultural farms and agritourism enterprises. Performance was measured through a combination of indicators such as productivity, input use efficiency, and income level, based on data and results from all regions. Qualitative analysis focused on farmers' perceptions and attitudes towards innovation, the role and impact of innovation on the efficiency and performance of agricultural farms and agritourism enterprises, as well as drivers, barriers, and challenges for the adoption of innovation in the agricultural sector.

4. Results and Discussion

Empirical studies have confirmed a strong correlation between innovation and agricultural farm productivity. Innovation is increasingly becoming a key driver for agricultural transformation and rural development, especially in developing countries such as Albania. It is considered a vital component in improving the performance and competitiveness of agricultural farms and agritourism enterprises. The role of innovation is multifaceted: it facilitates data collection and processing on inputs and products, improves traceability, enhances access to information and communication among stakeholders in the value chain, boosts competitiveness, reduces costs, increases revenues, and contributes to higher employment opportunities in rural areas. The rural sector is a priority for the national economy, with the government focusing on its development and consolidation. Over the past decade, Albania has experienced significant positive developments in this sector, supported by government strategies, grants, and subsidies aimed at fostering innovative ideas and practices among farmers. According to the study's purpose and objectives, the collected data from questionnaires and results are as follows:

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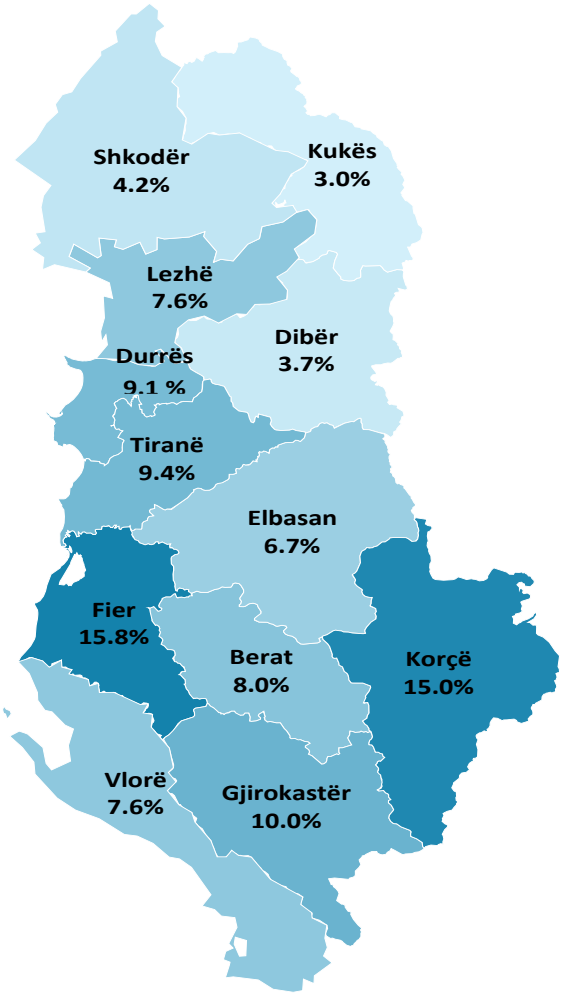

Figure 5.
Distribution of completed questionnaires by region.

Referring to the data in the above figure, a total of 672 questionnaires were completed, distributed across 12 regions of Albania, providing a broad and representative sample of agricultural farms and agritourism enterprises, which are important for the analysis and interpretation of the study findings.

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Table 3.
Data and characteristics of respondents.

No	Characteristics	Frequency	Percentage
I	Gender		
a	Female	84	12.5%
b	Male	588	87.5%
*	Total	672	100.0%
II	Age		
a	18-30	42	6.3%
b	31-40	117	17.4%
c	41-50	129	19.2%
d	51-60	176	26.2%
e	Over 60	208	31.0%
*	Total	672	100%
III	Education		
a	Basic Education	131	19.5%
b	Secondary Education	231	34.4%
c	Vocational Education	103	15.3%
d	Higher Education (Master, PhD)	207	30.8%
*	Total	672	100%
IV	Role/Position		
a	Owner	177	26.3%
b	Manager	49	7.3%
c	Owner and manager	419	62.4%
d	Other	27	4.0%
*	Total	672	100%

The data show that 87.5% of the interviewees are male and 12.5% are female. Regarding age, most interviewees (31%) are over 60 years old, 26.2% are aged 51-60, 19.2% are aged 41-50, 17.4% are aged 31-40, and 6.3% are aged 18-30.

Regarding the education level, it turns out that 19.5% of the farm managers interviewed have basic education, 34.4% have secondary education, 15.3% have vocational education, and 30.8% have higher education. In terms of their role/position on the farm, most respondents, 62.4%, are owners and managers, 26.3% are owners, 7.3% are managers, and 4% are others.

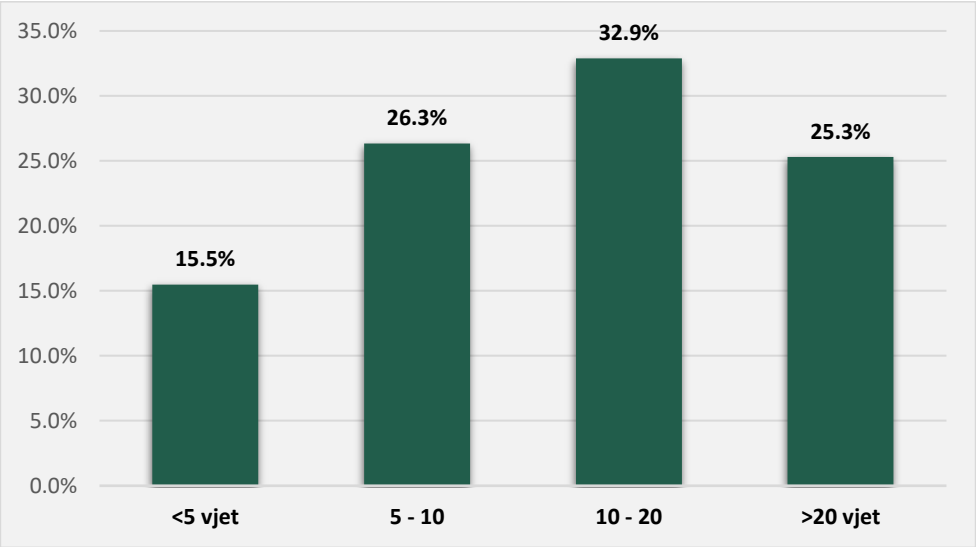

Figure 6.
Duration/lifespan of agrotourism/agricultural farm.

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The results presented in the above figure show that 15.5% of agricultural farms and agritourism enterprises have been active for up to 5 years, 26.3% for 5-10 years, 32.9% for 10-20 years, and 25.3% for more than 20 years.

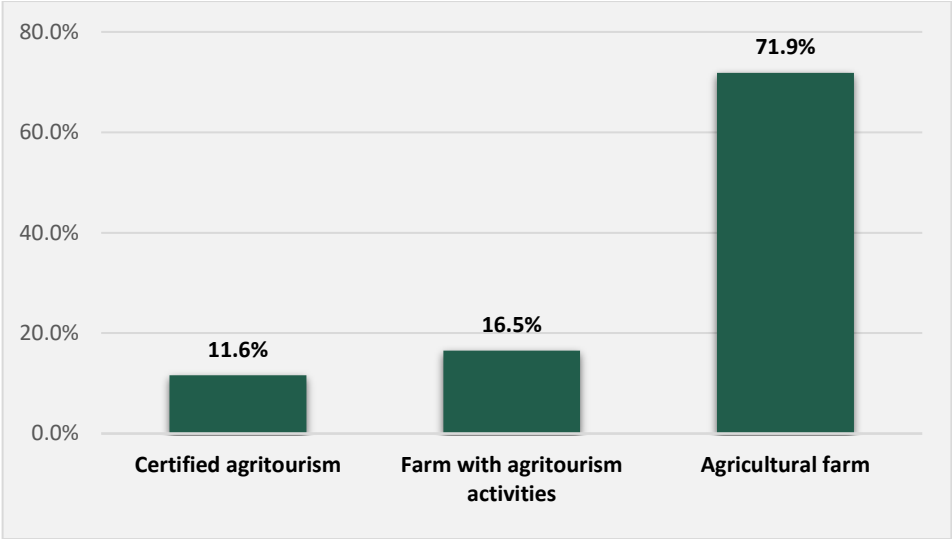

Figure 7.
Profile of farm/business.

Regarding the data, for the farm/business profile, it turns out that 78 or 11.6% are certified agritourism enterprises, 111 or 16.5% are farms with agrotourism activities, and 483 or 71.9% are agricultural farms.

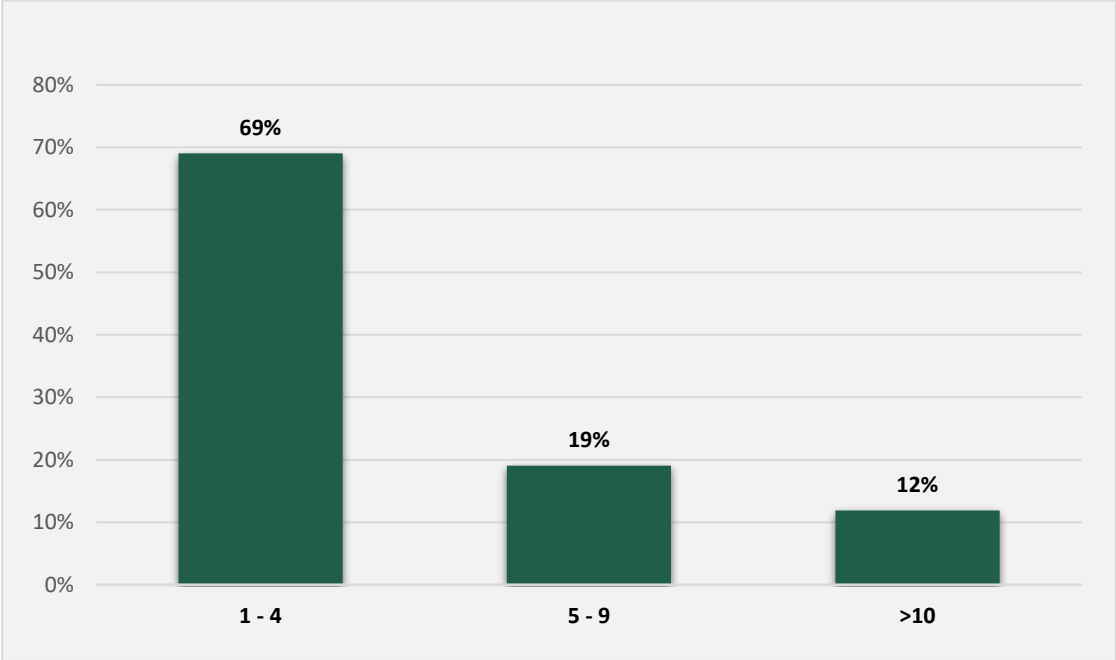

Figure 8.
Number of employees on agritourism/agricultural farm.

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The results presented in the above figure show that 69% of agricultural farms and agritourism enterprises have 1-4 employees, 19% have 5-9 employees, and 12% have over 10 employees.

Regarding the role and impact of innovation on the efficiency and performance of agricultural farms and agritourism enterprises, as well as the barriers and drivers for adopting innovation in the agricultural sector, relevant indicators were evaluated using a Likert scale: [1-5].

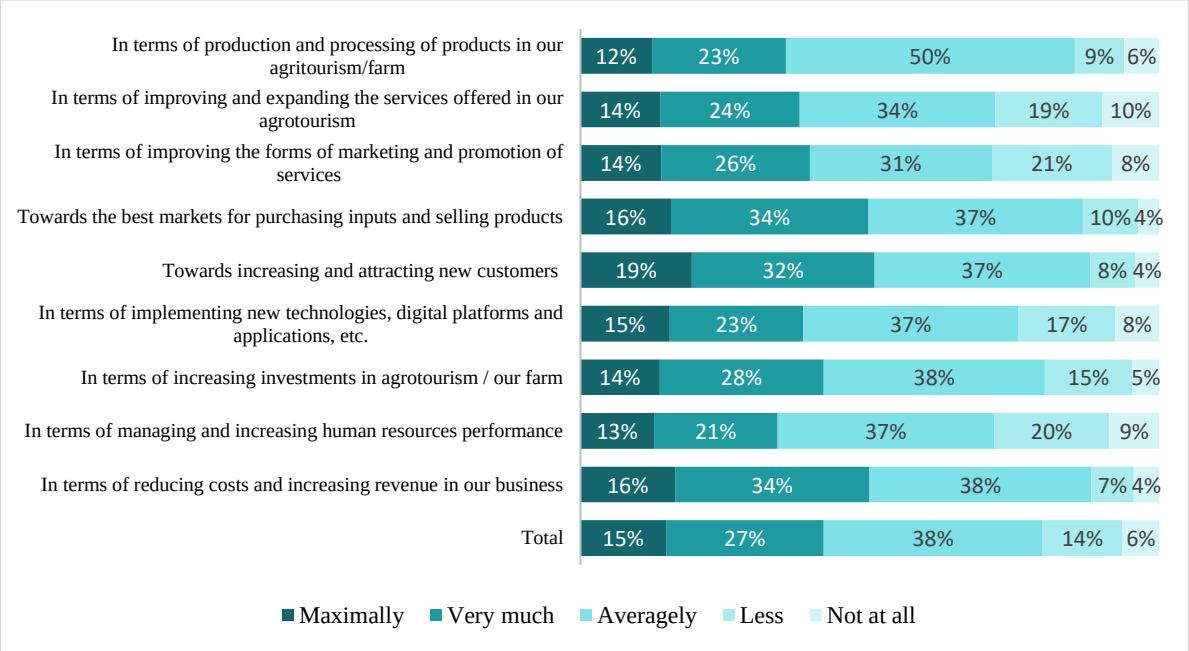

Figure 9.
The impact of innovation on the efficiency of activities and services in agritourism/agricultural farms.

The results highlight a largely positive perception of farmers regarding the impact of innovation on improving activities and services on their farms. Most respondents evaluate it as "Maximally" and "Very much," respectively (15%) and (27%). This indicates that farmers adopting new technologies and practices perceive clear benefits in terms of reduced costs, time savings, and improved services. Such findings are consistent with growing evidence that innovation increases farm productivity and operational management in the rural sector. A portion of respondents evaluated it as "Averagely," with 38%. This reflects either partial adoption of innovative practices or the presence of constraints, such as limited financial resources, insufficient technical knowledge, or inadequate infrastructure, which may prevent farms from fully realizing the benefits of innovation. A smaller percentage of farmers evaluate it as "Less" and "Not at all," respectively (14%) and (6%), regarding the impact of innovation on the efficiency of their activities.

The predominance of positive assessments by respondents indicates a strong potential for increasing the use of innovation in the rural sector. However, the presence of moderate and low assessments highlights the need for supporting interventions, including training, advisory services, and financial incentives, to ensure that the benefits of innovation reach farms and agritourism enterprises. Overall, the data show that innovation is widely perceived as a driver of efficiency in agricultural and agritourism activities. Strengthening institutional support, addressing knowledge gaps, and improving access to innovation-related resources are critical for the sustainable development of the rural sector.

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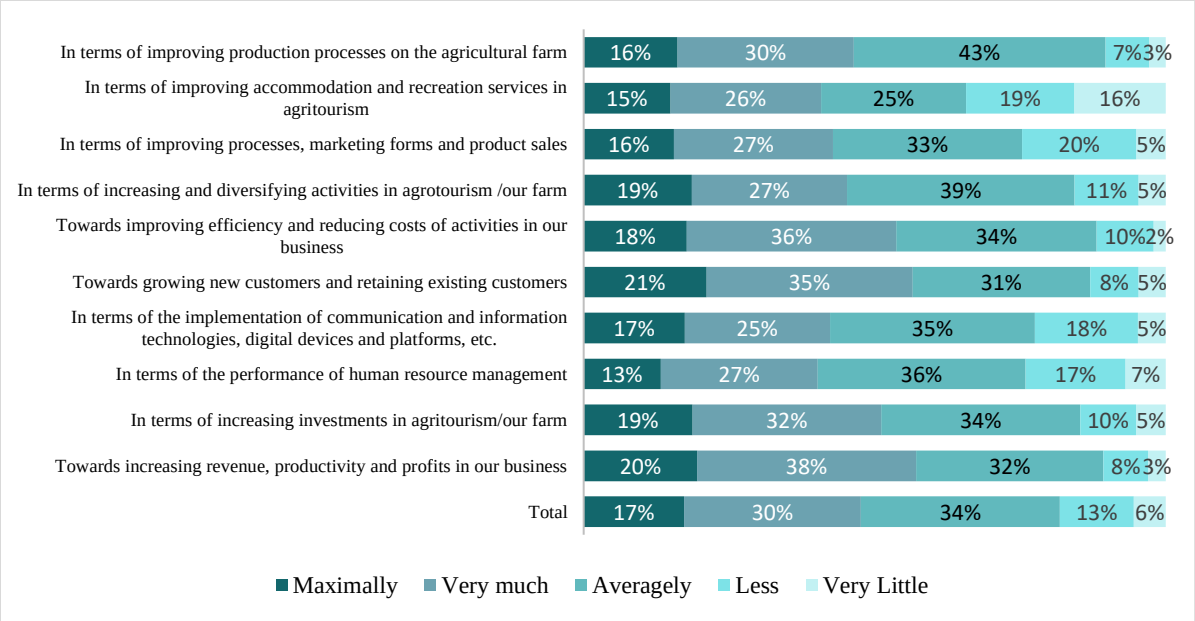

Figure 10.
The role of innovation in the performance of agritourism enterprises and agricultural farms.

The results in the figure above show a positive assessment by the respondents of the role of innovation in increasing the competitiveness, efficiency, and performance of farms and agritourism enterprises. Most respondents evaluate it as "Maximal" and "Very much," respectively (17%) and (30%). This indicates that innovation plays a decisive role in improving productivity, efficiency, and competitiveness in the rural sector. Some participants evaluated it as "Average" (34%). Only a minority of respondents rated the role of innovation as "Less" and "Very little," respectively (13%) and (6%).

Positive evaluations from most respondents indicate that innovation is widely perceived as a main driver of the performance of agritourism enterprises and agricultural farms. The presence of moderate and low assessments highlights the need for supportive policies that increase access to financial resources, investments, and support from rural advisory agencies, as well as knowledge transfer and training programs for farmers, to ensure a wider and more effective uptake of innovation.

The findings confirm that innovation is perceived as a critical factor for enhancing farm performance and the sustainable development of the rural sector in Albania.

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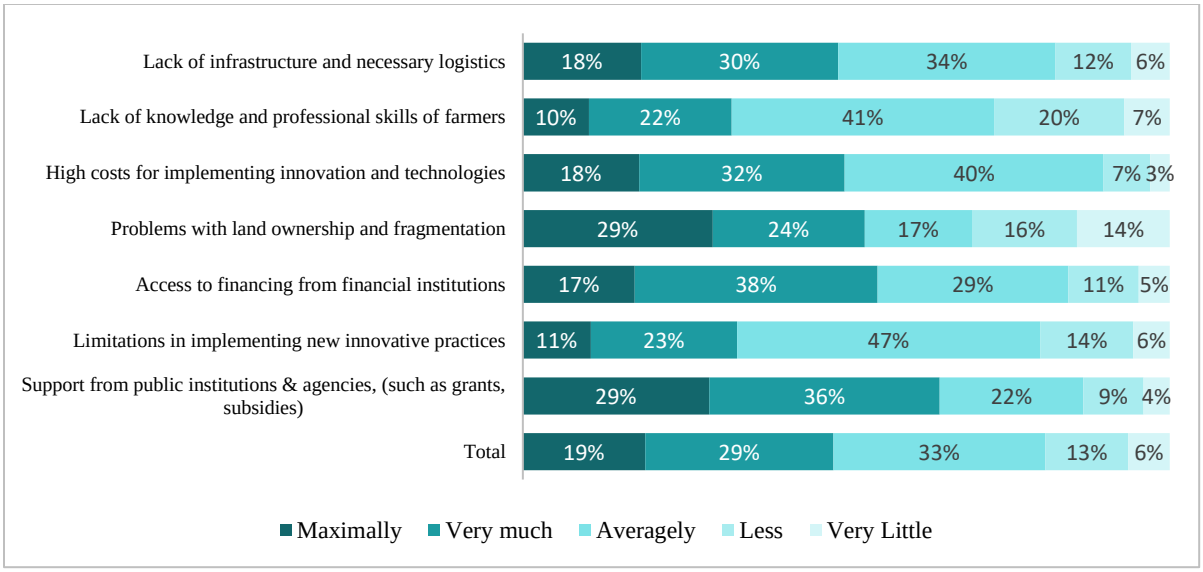

Figure 11.
Barriers and drivers influencing the adoption of innovation in agritourism/agricultural farm.

From the analysis of data related to barriers and drivers influencing the adoption of innovation by agrotourism enterprises and agricultural farms, it results that the majority of respondents evaluate (maximally, very much, and averagely) high costs for implementing innovation and technologies, respectively, with (18%, 32%, and 40%). Support from public institutions and agencies (such as grants and subsidies) is evaluated as significant by (29%, 36%, and 22%). Access to financing is considered important by (17%, 38%, and 29%). Lack of necessary infrastructure is reported by (18%, 30%, and 34%). Additionally, lack of professional knowledge and skills among farmers is noted by (10%, 22%, and 41%).

4.1. Data analysis and Findings

Through the data, we analyzed the distribution of questionnaires by region (see Figure 5), the characteristics of respondents (see Table 3), grouped by gender (male or female), age, education level (higher, secondary, vocational, and basic), and their position (owner, manager, owner and manager, other). Based on this data, we analyzed the duration/lifespan of agrotourism/agricultural farms (see Figure 6), the profile of businesses (see Figure 7), and the number of employees in agritourism enterprises or agricultural farms (see Figure 8).

Referring to the data on the impact that innovation has on the efficiency of activities and services of agricultural farms and agrotourism enterprises (see Figure 9), it results that the majority of respondents evaluate it as "Maximal" and "Very much," respectively with 15% and 27%. A part of the respondents evaluated it as "Average," respectively with 38%, and a smaller percentage evaluated it as "Less" and "Not at all," respectively with 14% and 6%.

Regarding the role of innovation in the performance of agricultural farms and agrotourism enterprises (see Figure 10), it focuses on improving production processes, marketing and sales of products, diversification of activities, efficiency and cost reduction, implementation of digital technologies and platforms, human resource management, increased investments, income, and productivity. The majority of respondents evaluate it as "Maximally" and "Very much," respectively with 17% and 30%. Some respondents evaluate it as "Averagely," with 34%, while a minority assess it as "Less" and "Not at all," with 13% and 6%, respectively.

From the analysis of data related to the barriers and drivers that influence the adoption of innovation by agritourism enterprises and agricultural farms (see Figure 11), it turns out that the

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majority of respondents evaluate (maximally, very much, and averagely) high costs of implementing innovation and technologies, access to financing from financial institutions, lack of necessary infrastructure and logistics, support from public institutions and agencies, as well as lack of knowledge and professional skills of farmers.

The findings and results show that innovation plays a critical role in increasing the performance and competitiveness of agricultural farms and agritourism enterprises, improving efficiency and productivity, and diversifying activities and income, especially for agritourism enterprises that integrate agricultural production with agritourism services.

5. Conclusions

This study examined the role of innovation in the performance of agricultural farms and agritourism enterprises in Albania. In total, 672 questionnaires were completed, distributed across 12 regions of Albania, providing a broad and representative sample of agricultural farms and agritourism enterprises. Through the collected data, we analyzed the characteristics of respondents, grouped by gender, age, education, and their position. Additionally, we examined the duration and profile of the businesses, as well as the number of employees in agritourism enterprises and agricultural farms.

Referring to data on the role and impact of innovation on the efficiency of activities and performance of agricultural farms and agrotourism enterprises, it focuses on improving production processes, marketing and sales of products, diversification of activities, efficiency and cost reduction, implementation of digital technologies and platforms, human resource management, increased investments, income, and productivity. The majority of respondents evaluate it positively, from average to maximum.

From the analysis of the data regarding the barriers and drivers affecting the adoption of innovation by agrotourism enterprises and agricultural farms in the agricultural sector, it results that the majority of respondents evaluate high costs of implementing innovation and technologies, access to financing, lack of necessary infrastructure and logistics, support from public institutions and agencies, as well as lack of knowledge and professional skills of farmers.

The findings show that innovation plays a critical role in increasing the performance and competitiveness of agricultural farms and agritourism enterprises, improving efficiency and productivity, and diversifying activities and income, especially for agritourism enterprises that integrate agricultural production with agritourism services. Innovation is increasingly becoming a key driver for agricultural transformation and rural development, particularly in developing countries such as Albania.

The results show a strong correlation between the adoption of innovation, performance, and competitiveness of agricultural farms and agritourism enterprises. Agricultural farms that implement innovative practices have higher efficiency and productivity in their activities, as well as better market access.

In recent years, the digital transformation of agricultural economies has become a crucial driver for rural development and agricultural modernization. Innovation and digitalization have the potential to bring about significant changes in how agriculture operates, contributing to improved work processes through new technologies and innovative ideas, which can be more attractive to young people.

The adoption of innovation in the agricultural sector is influenced by a complex set of economic, social, technical, and institutional factors, such as limited access to finance, high costs for implementing innovations and technologies, lack of digital infrastructure, necessary skills and knowledge among farmers, uncertainty of investment returns, weak advisory services, and insufficient institutional support.

The development of the rural sector in Albania is accompanied by challenges related to increasing the productivity of agricultural farms, efficiency of resource use, access to financing, cooperation between farmers and other actors, food quality and safety, implementation of innovative practices and digital technologies, as well as building administrative capacities to support these processes. Innovation

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is considered an important instrument to address these challenges, which contribute to and are closely linked to the sustainable development of the rural sector.

In our country, where agriculture constitutes one of the main sectors of the economy, it is necessary for research institutions and extension agents to advise, train, and collaborate with farmers on the implementation of innovative practices and digital technologies in their businesses. The implementation of innovative practices and systems will not only improve farm performance but also contribute to the sustainable development of rural areas.

Human resources (farmers' skills and knowledge) are important for the adoption of innovations on their farms. Increasing skills and capacities, especially for smallholder farmers, to successfully manage their agricultural activities requires sustainable investments. Research and development, skills, knowledge transfer, and professional training of farmers are essential for adopting new innovative technologies and practices. A crucial role in the exchange of new knowledge, digitalization, and efficient adaptation of innovation in Albania can be played by public agencies, universities, and research institutions by increasing efforts, capacities, and cooperation among themselves and with farmers or farmers' organizations.

Agricultural Knowledge and Innovation Systems (AKIS) enable knowledge transfer, access to new technology, education, training, and agricultural advice to respond to market demands, encouraging and promoting cooperation among different actors in the rural sector. The findings of the study highlight the importance of policies and supporting mechanisms to promote innovation as a key component for increasing the performance of agricultural farms and the sustainable development of the rural sector.

Government institutions should help strengthen private funding for research and development and foster public-private partnerships to increase the impact of public funding, targeting support to innovation in the rural sector. It is important to implement specific policies and programmes for agriculture that provide direct incentives for innovation, structural change, and the use of natural resources in agriculture.

This is particularly important for Albania's alignment with EU rural development policy. Strategies and policies should focus on innovation not only to increase productivity but also to promote social inclusion, support for small farmers, women, and youth, as well as environmental protection and conservation of biodiversity, soil health, and water efficiency, in accordance with FAO's global frameworks.

Considering the depopulation of rural areas in Albania, it is necessary to encourage and support young people in their entrepreneurial initiatives regarding the implementation of new technologies and innovation in farms and agricultural activities. All stakeholders, such as agricultural extension agencies, universities, research institutions, and other actors, should collaborate to design policies and strategies, share knowledge, and find ways and models that aim to foster innovation in the agricultural sector.

6. Recommendations

Based on the empirical findings of this study, to increase the potential for innovation in the agricultural sector, some of the main recommendations are:

- Enhance access to finance. Apply tailored financial instruments, such as innovation grants, credit schemes, and risk-sharing mechanisms, to facilitate investments in digital technologies and innovative practices by small and medium-sized farms.
- Improving agricultural advisory and extension services. Establish and strengthen effective extension service systems in collaboration with universities and research institutions to provide farmers with technical support, training, and knowledge transfer.
- Promoting and building administrative capacities. Implementing continuous education and capacity-building programs focused on digital skills, sustainable farming practices, and entrepreneurship, with special attention to youth and women in rural areas.

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- Increased investment in agricultural research and development. It is important to enhance investment in agricultural research and strengthen the Agricultural Knowledge and Innovation Systems (AKIS) to promote digitalization and innovation in the rural sector.
- Encouraging and supporting cooperation among farmers. Fostering and supporting cooperation among farmers and producers that facilitates collective action, knowledge sharing, and better integration into agricultural value chains.
- Promoting and strengthening public-private partnerships. Strengthen collaborative initiatives between public agencies, research institutions, and other private actors to promote the implementation of innovation and digitalization in the agricultural sector.
- Drafting a national innovation strategy for agriculture. The formulation of a comprehensive and long-term strategy for adapting innovation in the rural sector, in accordance with the policies and processes of integration into the European Union.

In conclusion, the study highlights that innovation is not merely a technological process but an essential instrument for transformation and sustainable development in the rural sector. It is an economic imperative and a social necessity, requiring coordinated efforts among policymakers, public agencies, research institutions, and other stakeholders to harness its full potential.

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Transparency:
The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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