UNIVERSITA' DEGLI STUDI DI PADOVA

DIPARTIMENTO DI SCIENZE ECONOMICHE ED AZIENDALI "M.FANNO"

CORSO DI LAUREA MAGISTRALE IN ENTREPRENEURSHIP AND INNOVATION

TESI DI LAUREA

"INNOVATION IN TRADITIONAL SECTORS: A CASE STUDY OF EKOFUNGI'S IMPACT ON SMES IN SERBIAN AGRICULTURE"

RELATORE:

CH.MO PROF. ANDREA GANZAROLI

LAUREANDO/A: CASLAV SAVIC

MATRICOLA N. 2005533

ANNO ACCADEMICO 2023 – 2024

Il candidato dichiara che il presente lavoro è originale e non è già stato sottoposto, in tutto o in parte, per il conseguimento di un titolo accademico in altre Università italiane o straniere. Il candidato dichiara altresì che tutti i materiali utilizzati durante la preparazione dell'elaborato sono stati indicati nel testo e nella sezione "Riferimenti bibliografici" e che le eventuali citazioni testuali sono individuabili attraverso l'esplicito richiamo alla pubblicazione originale.

The candidate declares that the present work is original and has not already been submitted, totally or in part, for the purposes of attaining an academic degree in other Italian or foreign universities. The candidate also declares that all the materials used during the preparation of the thesis have been explicitly indicated in the text and in the section "Bibliographical references" and that any textual citations can be identified through an explicit reference to the original publication.

Firma dello studente

L. Savic

This thesis marks not just the culmination of my academic journey but also the beginning of the new chapter in my professional life. It is a testament to perseverance, dedication, and the invaluable support of those around me.

As I embark on this new phase, I extend my deepest gratitude:

To my parents,
for their unwavering love, guidance, and support, they have provided me.

To my brother,
for his constant encouragement and the unique bond we share.

To my friends,
for their companionship and support at all times, always pushing and helping me along my path.

To my girlfriend,
for her understanding, patience, love, and being my biggest support.

To all my professors and mentors,
for shaping my intellectual journey and instilling in me the thirst for knowledge and excellence.

To my supervisor,
for the availability, help, guidance, and overall support that have greatly enriched this work.

Table of Contents

List of Figures

List of Tables

1. INTRODUCTION

Innovations play a pivotal role in propelling any industry or human activity to higher stages of development and are crucial for small and medium-sized enterprises (SMEs) in traditional sectors, especially in emerging markets such as Serbia. Within it, given the significance of agriculture and food processing in the Serbian economy and exports, albeit also globally, innovations in this domain are of vital importance.

Despite facing challenges like regulatory gaps, limited funding, and access to modern technologies, some enterprises, like Ekofungi, have successfully implemented innovative practices to sustain growth and competitiveness. This thesis examines Ekofungi's journey to understand how other SMEs can learn from its experiences to overcome similar barriers and achieve innovation with limited resources.

Context: Serbia's SME sector, significant for its economic contribution, often struggles with innovation due to financial limitations and outdated business models. This research focuses on unlocking the potential for innovation within these constraints. Other parts of the context are agriculture, and the circular economy.

Theoretical Framework: The study is guided by the theory of dynamic capabilities, suggesting that SMEs' ability to adapt and innovate is key to their success in rapidly changing environments. It explores how Ekofungi, and similar enterprises develop such capabilities to foster innovation.

Methodology: A qualitative case study methodology is used, incorporating interviews, observations, and secondary data to gain in-depth insights into Ekofungi's innovative practices and their applicability to other SMEs in traditional sectors.

Purpose and Implications: The findings aim to provide actionable strategies for SMEs in Serbia and similar contexts to navigate innovation challenges. Furthermore, it seeks to inform policies that support SME innovation and contribute to academic discussions on SMEs' dynamic capabilities in emerging markets.

Research Question

How can SMEs in traditional sectors, particularly in Serbia and similar markets, learn from Ekofungi's innovative practices to overcome barriers and foster development and growth, while achieving global relevance in innovation?

Sub-Questions

1) What are Ekofungi's key innovative practices that drive its sustainability and growth?
2) How does Ekofungi overcome innovation barriers with limited financial resources?
3) How can Ekofungi's strategies inspire other SMEs in traditional sectors to innovate?

Structure: This master's thesis is structured into an introduction, four main chapters, and a conclusion, detailed as follows:

The introduction outlines the study's objectives, research questions, and the overall structure of the thesis.

Chapter 2, 'Theoretical Background,' establishes the global context for the case study and introduces key concepts related to innovation in traditional sectors, innovation in agriculture, and innovation in SMEs, with a particular focus on those operating in emerging economies. It further discusses the core concepts and frameworks for sustainable innovation, including circular, blue, and green economies, and concludes with a discussion on barriers and enablers to innovation.

Chapter 3, 'Methodology,' describes the research tools and processes employed in the study, including interviews, field visits, questionnaires, and the analysis of a survey conducted by Ekofungi on its know-how transfer clients.

Chapter 4 presents a case study on Ekofungi, beginning with an overview of the Serbian agricultural context, characteristics of organic production, and the emerging circular economy scene, focusing on actors, institutions, regulations, and incentives for innovation. The latter part of the chapter provides an in-depth empirical exploration of Ekofungi, covering its leadership, evolution, key achievements, innovation strategy, vision and mission, product portfolio, market position, competitive environment, SWOT analysis, and final insights. This section is complemented by the results of a questionnaire and an analysis of Ekofungi's know-how transfer client survey.

Chapter 5 engages in a discussion of the main findings, underlining both theoretical and managerial contributions. This chapter synthesizes insights from Ekofungi's case within the broader framework of innovation in SMEs, circular economy practices, and the specific challenges and opportunities for sustainable agriculture in Serbia and similar contexts.

The conclusion offers a comprehensive summary of the research, emphasizing the significance of Ekofungi’s innovative approaches for SMEs in traditional sectors and

emerging markets. It reflects on the study's objectives, research questions, and the implications of the findings for theory and practice, highlighting future research directions and the potential for scaling Ekofungi's model to other contexts.

This structure aims to provide a coherent and detailed exploration of innovation in traditional sectors, with a particular focus on the agricultural industry and the role of SMEs in fostering sustainable economic development.

2. THEORETICAL BACKGROUND

2.1 Innovation in Traditional Sectors

Even though there doesn't seem to be a universally recognized definition of innovation, according to Baregheh et al. and Goswami and Mathew (as cited in Alonso and Bressan, 2016), this thesis relies on the OECD and Statistical Office of the European Communities (2005, p. 46) definition of innovation as "the implementation of a new or significantly improved product (good or service), or process (including technological innovations), new marketing method, or a new organizational method in business practices, workplace organization or external relations."

Transitioning from the broader concept of innovation, it is essential to narrow our focus to its application within traditional sectors. This historical context underscores the significance of innovation as a mechanism for revitalization and competitive advantage in these established sectors. Radicic et al. (2015) define traditional industries as industries that have been established for a long period of time, suggesting that they have existed since at least the years between the two World Wars (1918–1939), have been one of the main sources of employment on a sub-regional level, and usually are labor-intensive, involving manual labor that is low-skilled, repetitive, and frequently outsourced to foreign countries.

Further elaborating on the nature of traditional sectors, Zheng et al. (2020) describe traditional industries as sectors primarily engaged in manufacturing and processing, characterized by high production volume but low added value. These industries exhibit limited demand elasticity and a reduced capacity to adapt to market changes and technological advancements.

In exploring the dynamics of innovation within traditional sectors, it's crucial to address the concept of absorptive capacity, particularly in relation to inbound open innovation. Despite the commonly low levels of formal R&D and absorptive capacity among SMEs in these sectors, research indicates a trend toward engaging in open innovation activities (Spithoven et al., 2011). This engagement is often contrasted with the practices of larger or high-tech counterparts, highlighting a unique adaptation process in traditional industries. The paper by Spithoven et al. (2011) investigates how firms in traditional sectors manage with limited absorptive capacity to organize efficient inbound open innovation activities and sheds light on the resilience and adaptability of these enterprises. This resilience is pivotal for understanding innovation's role in sectors often perceived as less dynamic and more resistant to change.

Building on this foundation, it is evident that the contrast between traditional sectors' inherent characteristics and their emerging innovation practices provides fertile ground for examining how SMEs navigate the complexities of innovation. In traditional sectors, SMEs often engage in inbound open innovation despite facing challenges related to limited absorptive capacity, a crucial component for effectively organizing such activities. SMEs from traditional sectors, lacking the substantial R&D infrastructure of their larger or high-tech counterparts, navigate these limitations through absorptive capacities and adaptation, allowing for more efficient management of external knowledge flows and fostering innovation. This is critical for SMEs in traditional industries to overcome inherent R&D constraints and achieve competitive advantage (Spithoven et al., 2011).

The following figure describes some relationships between traditional and other sectors related to innovation, more precisely how creative industries can contribute to innovation in traditional sectors by collaboration and partnerships.

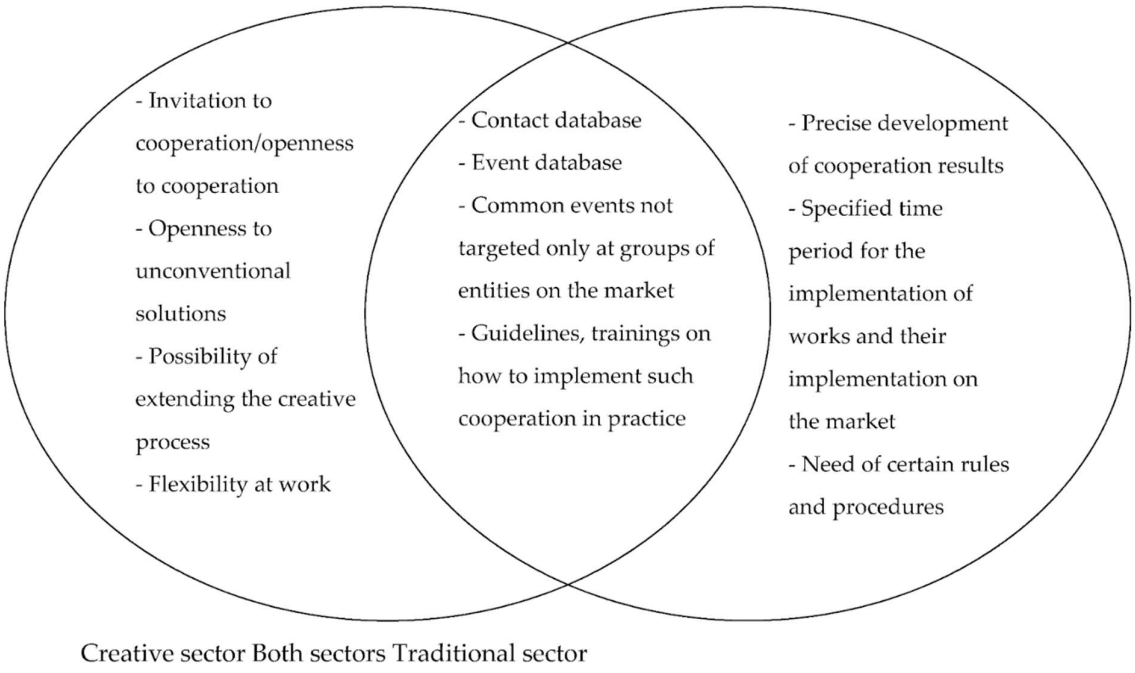

Figure 1, Factors important for the creative sector, factors important for the traditional sector, and factors important for both, source: Klein and Spychalska-Wojtkiewicz (2020)

2.2 Introduction to Innovation in Agriculture

Agriculture faces pressing challenges, including climate change and the need for sustainable food production. Section 2.2 focuses on innovation as a critical response to these issues. It starts by outlining the global challenges and the evolution of agricultural innovation, providing context for understanding the sector's current innovations and future directions.

This section then examines the role of digital transformation and innovation management in agriculture, highlighting the benefits and obstacles of automated production. It also considers the enablers and barriers to adopting new technologies and practices in the field. The discussion aims to offer insights into how innovation can support sustainable and efficient agricultural practices, reflecting on the importance of both technological advancements and strategic approaches to overcoming challenges in the agricultural sector.

2.2.1 Global Challenges and the Evolution of Agricultural Innovation

As Blakeney (2022) pointed out, global agriculture faces significant and, in some cases, existential challenges, prominently including climate change. This phenomenon poses risks such as desertification, increased salinity, pest outbreaks, and extreme weather events like floods and droughts, potentially reducing arable land precisely when the global population is expected to rise to 9.7 billion by 2050. In developing and less-developed countries, agriculture is crucial for employment, livelihood, foreign exchange, and as a raw material source for industries, playing a vital role in economic development. Despite its importance, the sector remains underperforming, failing to ensure stable income for small-scale farmers, national and household food security, or to effectively support broader socio-economic growth. Contributing factors include the continued use of outdated agricultural methods, logistical challenges in storage and transport, and structural issues in product marketing.

After highlighting the pressing challenges facing global agriculture as identified by Blakeney (2022), it's essential to consider the historical context and incremental nature of agricultural innovations, according to Van der Veen (2010), understanding agricultural evolution means acknowledging that most advancements are small and incremental, adapting to new or specific local conditions, rather than large and radical, incorporating external technologies. While transformative changes and the contributions of inventors and entrepreneurs are acknowledged, the innovation process frequently involves everyday farmers and craftspeople.

This innovation manifests through knowledge transfer, usually to a child or apprentice. Despite their modest appearance, these micro-innovations often have significant impacts.

The figure below depicts the phases of the innovation process in agriculture.

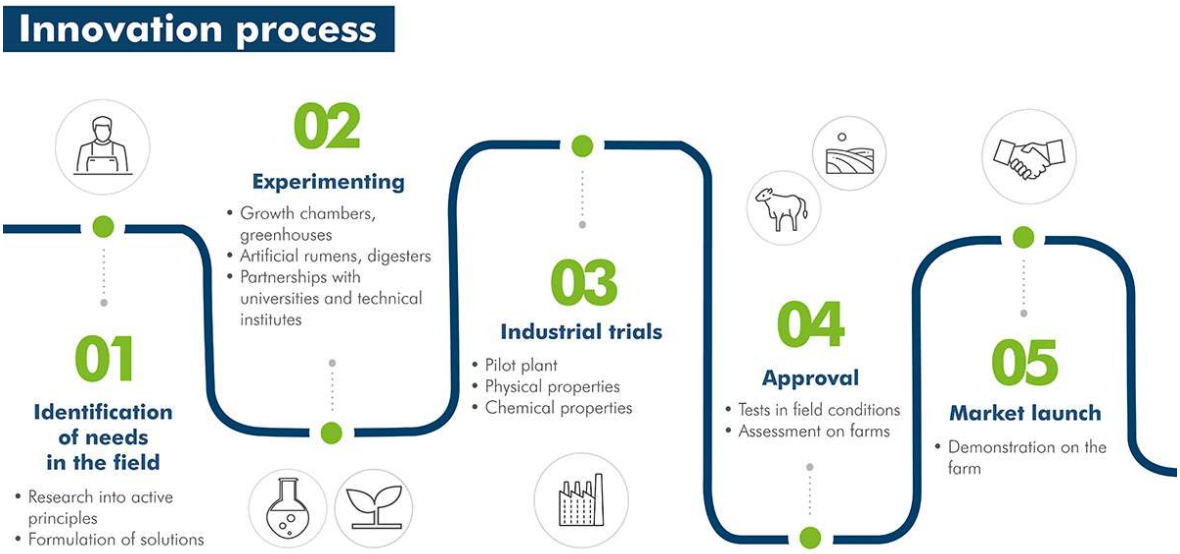

Figure 2, Phases of the innovation process in agriculture, source: Groupe Roullier (n.d.)

Innovations in agriculture, whether incremental or radical, have caused broader societal and other transformations, including attaching individuals to land, land ownership, and population increase. These innovations have further, directly or indirectly, led to specialization, the establishment of social hierarchies, the accumulation of wealth, and the expansion into lands less suited for agriculture. Additionally, these advancements have resulted in increased production, enhanced trade and exchange, urbanization, and eventually, the development of state systems and the contemporary world as we know it. The ability to produce ample food has been a foundational element of these shifts and continues to play a critical role in global dynamics today (Van der Veen, 2010).

Agricultural innovation is critical to humanity's transition from hunter-gatherer societies to industrial economies, impacting global food consumption and livelihoods. The field's economics, characterized by market and government failures, requires nuanced policies and research investments. Despite the high returns of agricultural R&D, investment has declined, with research increasingly focused on politically driven issues rather than farm productivity. This shift occurs amidst a global slowdown in agricultural productivity, underscoring the need for enhanced investment in agricultural innovation (Alston and Pardey, 2021)

According to Pardey, Alston, and Ruttan (2010), agricultural innovation has been pivotal to human advancement and, at times, vital for economic development. However, its impacts are multifaceted, and not all consequences have been positively received by those impacted.

It is of vital interest to create and sustain networks of expertise and related diffusion of innovation in agriculture, one such model is illustrated by the next graphic.

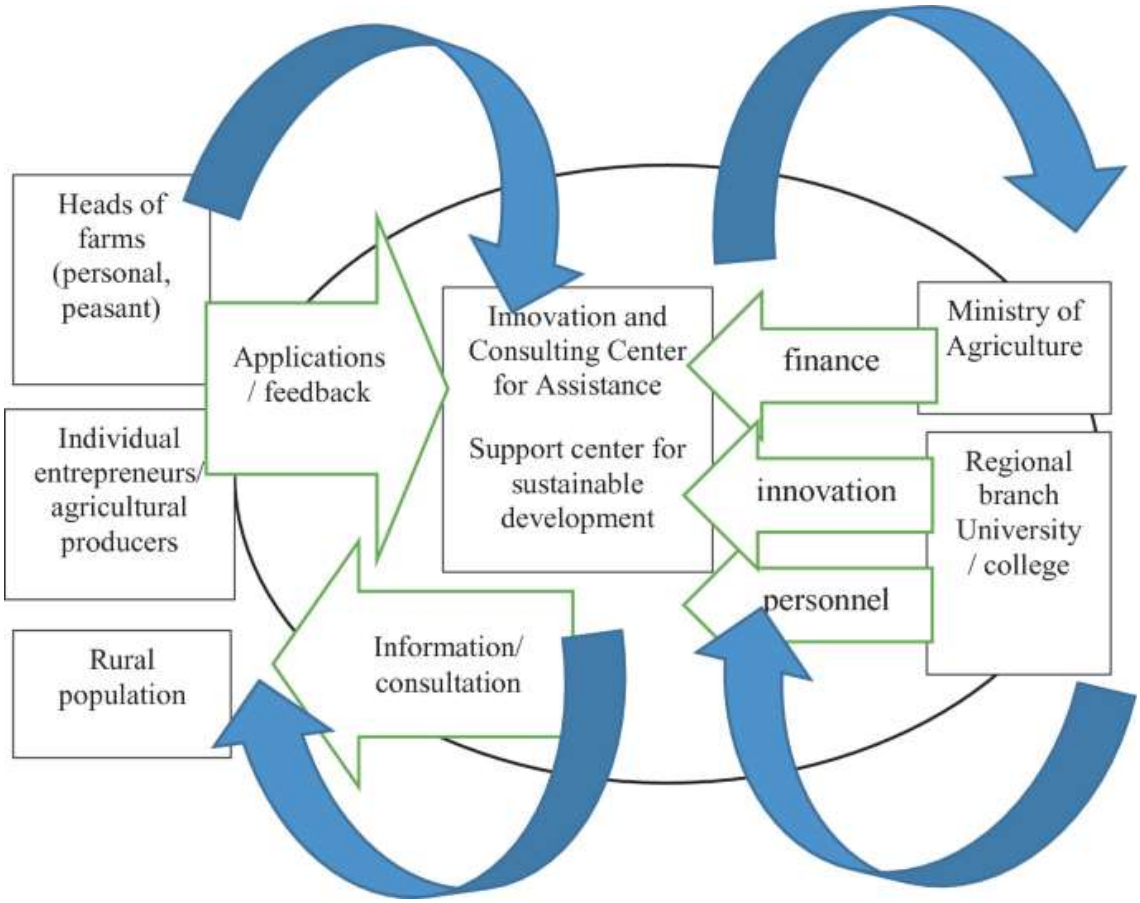

Figure 3, Model of the System of Innovative and Consulting Services for Agricultural Entities, source: Shamin et al. (2021)

Acknowledging the necessity for sustainable innovation to overcome contemporary challenges, Blakeney (2022) introduces the crucial role of intellectual property rights in promoting agricultural research and development. IPRs encourage R&D in agriculture by fostering investment in new technologies and creating tradeable assets. Essential IPRs for agricultural innovation encompass patents for inventions, plant variety rights for breeding new plants, and trademarks and geographical indications that secure product identity linked to manufacture or origin. Additionally, layout designs for smart agriculture, confidential information laws, and copyright, though less central, contribute to protecting and incentivizing innovation.

In conclusion, Pardey, Alston, and Ruttan (2010) remind us that agricultural innovation has been pivotal throughout history, facilitating the evolution from hunter-gatherer societies to modern industrial economies, a transformation still underway. Currently, 40% of the global population relies directly on agriculture for their livelihoods, and agricultural advancements impact everyone by influencing food consumption.

2.2.2 Types of Innovation in Agriculture

Innovation in agriculture encompasses various types, including institutional, technological, and social innovations, each aiming to enhance performance, competitiveness, and quality of life through changes in policies, practices, goods, services, and organizational structures. These innovations can be entrepreneurial, driven by individuals or companies, or organizational, initiated by institutions or associations, targeting economic, social, or environmental improvements across product, process, marketing, and organizational domains. (French, Montiel, and Palmieri, 2014)

One typology of agricultural innovation is presented here:

Table 1, One typology of agricultural innovation, adapted from Abrosimova et al. (2020)

Type of innovation	Essence
Selection and genetic	New varieties and hybrids of agricultural plants, new breeds, types of animals and crosses of birds, selection of plants and animals resistant to diseases and pests, adverse environmental factors.
Technical and technological and industrial	Use of new equipment; resource-saving new technologies in agriculture and animal husbandry; new waste-free technologies of production and storage of food products aimed at improving their nutritional qualities.
Organizational, managerial and	Development of cooperation and the formation of integrated structures in agriculture; progressive forms of maintenance and resourcing of

economic	agriculture; new forms of organization and management in agriculture; the creation of innovation and advisory systems in the field of scientific, technical and innovation activities; modern forms and mechanisms of innovative development.
Socio-ecological	Updating the personnel training system, improvement of labor protection, solution of problems of medicine, culture, and education, workers of settlements, villages. Improvement and greening of the environment. Ensuring favorable environmental conditions

Expanding on the categorization of innovation, the following discussion focuses on two critical technological advancements reshaping the agricultural sector: digital transformation and automated agricultural production. These types exemplify the dynamic integration of cutting-edge technology within traditional farming practices, highlighting the sector's evolution towards increased efficiency and sustainability.

Digital Transformation and Smart Agriculture

The challenges of modern agriculture relate to reduction of agricultural resources and the increase in population, ensuring adequate product quality and yield growth while optimizing inputs to reduce the impact of agriculture on the environment, i.e., the environment and the production of the necessary amount of food in the world. One of the solutions for overcoming such challenges is the digital transformation of traditional agriculture, meaning the improvement of traditional methods and work models of agricultural production and sales with the help of digital technologies. Digital agriculture smartly utilizes data and communications to optimize systems. The tools enabling this are numerous: sensors, robots, digital communication tools, etc. For example, this allows for the collection of necessary data without physical presence through the use of auto-guided drones, which are automatically processed and used for decision-making regarding further actions. Yields are monitored, precise soil sampling is performed, and livestock is identified through radio-frequency identification chips, with milking and feeding done using automated or robotic systems among many other activities. A large volume of collected information can be made available to numerous users, but for this to be effective, it is necessary for farmers or local consultants to have certain knowledge and be willing to invest in new technologies.

In developed countries, the impact of digital technology on the agricultural industry is increasingly present, and it is also gaining influence in less developed countries. Governments must pay special attention when defining policies and methods for introducing digitization into agriculture. This is necessary because the characteristics of agriculture are specific—significant influence of local conditions, instability and variability of resources, weak connectivity of participants in agricultural production due to dispersion and poor connectivity of rural areas themselves, insufficient education, and poor knowledge of new research in digitization, quality of support to companies in this field, and competition from global players. However, the importance of introducing digitization into agriculture, which is the only and most crucial path to its development and sustainability, makes the effort to develop this system worthwhile. (Van Es and Woodard, 2017)

Figure 4, The digitization of agricultural industry, source: Abbasi, Martinez, and Ahmada (2022)

Industry 4.0, known as the fourth industrial revolution, significantly impacts changes across every industry. "It is a strategic initiative characterized by a fusion of emerging disruptive digital technologies such as Internet of Things (IoT), big data and analytics (BDA), system integration (SI), cloud computing (CC), simulation, autonomous robotic systems (ARS), augmented reality (AR), artificial intelligence (AI), wireless sensor networks (WSN), cyber-physical system (CPS), digital twin (DT), and additive manufacturing (AM) to enable the digitization of the industry" (Abbasi et al., 2022, p.2). The introduction of these technologies into agriculture represents the next higher generation of industrial agriculture, which can be defined as Agriculture 4.0, also referred to as smart agriculture, smart farming, or digital farming.

In agriculture, IoT enables the collection of the most crucial data on soil and crops such as temperature, humidity, pH value, water level, leaf color and freshness, among others, with data transmitted to users through various techniques. Wireless sensor networks (WSN) are used in IoT and represent a group of sensors deployed to monitor physical conditions in the environment, store collected data, and transmit it. Cloud computing (CC) is increasingly transforming agriculture by providing cheaper data storage services, easier conversion of data into actionable information for decision-making, and a secure platform for application development. The rapid development of IoT has led to an increase in the volume of collected data to immeasurable extents—big data (BD), which are used for examining market trends, customer demands, establishing correlations, etc. (BDA). The benefit of such a large amount of data is significant, yet their selection and cross-referencing pose a challenge. In conclusion, it is stated that digitization fosters an increase in agricultural productivity and agility, and product quality, helps make the agricultural process more ecological, encourages more efficient use of all resources, including time, raises asset management security through direct supervision, reduces the chances of product counterfeiting, making them safer for health (Abbasi et al., 2022).

Modern business in the 21st century has contributed to companies developing by world trends, which has influenced that a large number of services can be provided in a fast and efficient manner to satisfy the ultimate needs of users (Easterby-Smith, Thorpe, and Jackson, 2015). The implementation of artificial intelligence (AI) and the Internet of Things (IoT) are some of the most prominent inventions in the field of digital technologies. The introduction of IoT was aimed at transforming human and business entities into the Internet of Things, that would improve the operations of modern companies (Bouhaï and Imad, 2017) The Internet of Things, figuratively speaking, gives machines the ability to connect with other machines and communicate with each other, as well as collect data from the environment without direct human manipulation (Ackerman, 2011). That is why many researchers in recent years have been interested in defining the Internet of Things that are applied within new business models and assessing their future impact (Atzori, Iera, and Morabito, 2010).

The management of innovations that have been stimulated by digital transformation in the agricultural sector represents the application of acquired knowledge to realize a new or improve an existing innovation. In order for the management of an innovation to take place as well as possible, organizations often establish supervision over the innovation. According to Hussain (2017) digital technologies have significantly influenced the creation of a virtual organization based on teamwork. This organization is gaining more and more importance due

to the globalization of business activities that take place around the world under the supervision of the parent company.

Automated Agricultural Production

The automated process of agricultural production contributes to solving very important issues such as the growing global population, labor shortages, and changing consumer preferences. The benefits of automating traditional farming processes are enormous, and they are reflected in the following (Ku and Serma, 2023):

a) A greater degree of benefit for consumers, considering that their consumer preferences are increasingly directed towards fresh and high-quality organic products. Increasing agricultural productivity through automation processes increases yield and production rate, reducing costs for end users.

b) Labor costs account for more than 50% of costs in the structure of agricultural production costs, which is why 31% of farmers focus their production on crops that require less labor. This problem can be solved with automated robotic technology, reducing labor costs in agriculture. For example, one strawberry-picking robot has the potential to replace up to 30 workers in 3 days on a 25-hectare plot of land.

Automated agriculture can make this sector more profitable and, at the same time, a sustainable economy, given that it has a significant impact on environmental protection. By applying automated farming techniques, agricultural producers can selectively reduce their impact on the environment by applying pesticides and fertilizers, reducing the use of chemicals in soil and water.

Although the current level of automated agricultural production is at a relatively early stage, the automation of the agricultural process will play a very significant role in the future. The automated process of agricultural production will contribute to increasing yields, reducing production costs, and, at the same time, will make it a safer and more sustainable industry. (Ku and Serma, 2023)

New technological achievements that experienced expansion during the 21st century included the application of scientific and technological innovations related to the implementation of software, robots, and drones. in the field of agriculture. Modern agricultural production has been completely transformed thanks to the application of innovations and the use of robotics in agriculture in the form of autonomous tractors, harvesters, and robots for automatic

watering and sowing. Agricultural producers, through the application of innovation, have access to the tools of automated agriculture that use various technological devices to improve and automate agricultural operations and production cycles (Benjamin and Wigand, 2015).

The concept of automated farming uses various technological devices to improve and automate farming operations, making them more efficient. Many agricultural technology companies are now working on robotics innovations to perfect the efficiency of using drones, autonomous tractors, and harvesters, as well as automatic watering and seeding robots. Although these technologies are relatively recent, an increasing number of farmers are switching to automation in their agricultural production. Drones that are widely used in agriculture can remotely monitor the conditions of use of fertilizers, pesticides, and other biological treatments (Ku and Serma, 2023).

One of the most popular technologies applied on farms is the harvesting of fruits and vegetables, where robots must carefully handle the products to avoid damage. By using autonomous tractors, agricultural producers can remotely control their tractors or pre-program them to be completely autonomous. Rabbit Tractor Company has developed an autonomous tractor that reduces labor costs for producers, increases the efficiency of all operations, and contributes to increased yields by using state-of-the-art technology while implementing control (Ku and Serma, 2023).

Sowing and weeding with the help of robotics-designed for sowing and weeding aims to reduce the participation of manual labor in the performance of daily agricultural work in certain crop areas. Using robotics in weeding can reduce pesticide use by 90% using computer vision. In addition to the above, robotics is used to spray herbicides on a precisely determined surface at a precisely determined time, allowing farmers a new way to prevent the growth of weeds that are resistant to herbicides (Ackerman, 2011). Drones used in agriculture can remotely monitor sowing conditions, as well as apply fertilizers, pesticides, and other treatments via drones. American Robotics has built autonomous drone robots, base stations, and platforms, giving organic growers the ability to monitor their crops using the latest resolutions and frequencies. Using infrared analysis, they can quickly identify problem areas, allowing agricultural producers to diagnose problems at an early stage (Ku and Serma, 2023).

The figure below provides more information on technical types of innovations.

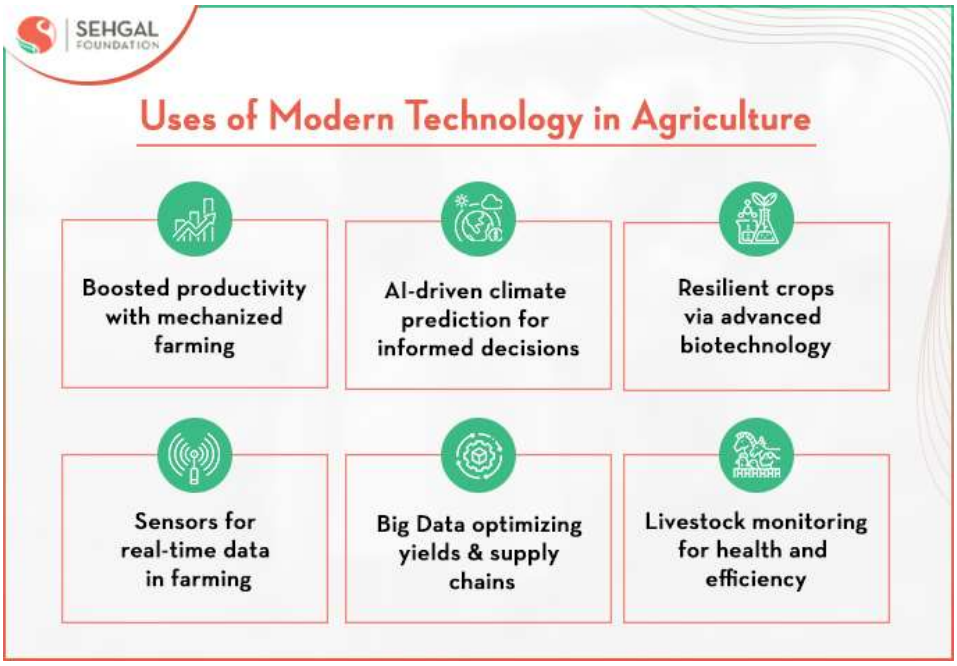

Figure 5, Types of applied innovation in agriculture - uses of modern technology, source: Sehgal Foundation (2023)

2.2.3 Organic Agriculture and Innovation

This section examines organic agriculture's role in sustainable development and its integration with innovation. It starts with "Foundations and Challenges of Organic Agriculture Innovation," outlining the principles and hurdles of organic farming. The focus then shifts to the impact of organic practices in "Organic Agriculture and Innovation in Emerging Economies," discussing opportunities and challenges in these contexts. "Marketing Instruments for the Promotion of the Export of Organic Products" and "Quality Marks for Organic Products in the EU" explore strategies and regulations enhancing organic trade.

Foundations and Challenges of Organic Agriculture Innovation

Organic agriculture, with its minimal use of external inputs and emphasis on sustainability knowledge, is pivotal in addressing future food production challenges. It offers a means to increase food availability for a growing population while mitigating environmental contamination. (Rahmann et al. 2017). According to Niggli (2015), organic farming effectively integrates agro-ecological methods with productivity, relying on preventive and system-oriented practices due to restrictions on pesticides, herbicides, synthetic fertilizers, and veterinary medicines.

Understanding the foundational principles behind organic agriculture sets the stage for a deeper exploration of its practices and potential benefits. Organic agriculture is often

discussed as a consumer trend rather than a comprehensive approach to sustainable farming. Despite currently accounting for about 1% of global agricultural production, it has the potential to become more mainstream, as evidenced by various examples in Europe (Niggli, 2015).

Combining organic agriculture with reduced soil tillage is a highly effective strategy for enhancing carbon sequestration in arable crops. However, its adoption among organic farmers remains limited due to increased challenges with weed management (Niggli, 2015).

Organic agri-food systems require enhancement to bolster resilience to extreme weather and climate change. Enhancing biodiversity integration within these systems is essential. Moreover, improving nutrient use efficiency and developing effective pest and pathogen management methods are critical. Innovative approaches must assess their capability to meet these goals while promoting clean water, air, and soil health, alongside system resilience. (Rahmann et al. 2017)

Rahmann et al. (2017) concluded that ensuring the fair distribution of high-quality, reasonably priced organic food is crucial. Making organic products universally affordable without compromising production standards is essential. Identifying drivers of sustainable consumption and fostering sustainable lifestyles are key goals. Organic initiatives must extend beyond agricultural practices to embody sustainable and healthy food systems on a local and global scale. Developing pathways for these models is urgent, and through innovative research, the organic sector can lead in pioneering sustainable practices.

Organic Agriculture and Innovation in Emerging Economies

The constant growth of demand for organic products in the world indicates that the application of innovation can contribute to a very profitable business if natural resources, knowledge, and production experience are used in the right way. Producers and consumers around the world are realizing the economic and ecological advantages of this type of agriculture, considering that the production of organic products is currently the fastest-growing food sector (Radovic, Zejak, and Pejanovic, 2023). In addition to the advantages that organic production has for human health and the ecosystem, its advantages can also have an impact on the economic aspect. For a large number of developing countries, the development of organic production represents potential export opportunities in the production and export of organic products.

In this way, the existential problem of a significant part of the rural population would be solved, given that they could sell their organic products at higher prices, and thus their production would become economically profitable (Simanovic, 2017)

Marketing Instruments for Organic Agriculture

Marketing instruments in the promotion of organic export products include the use of means to promote products to customers in other countries by providing information about those products, their tasting, and demonstrations (Bjelic, 2011). Foreign trade promotion instruments contribute to the creation of a positive image of the country's economy, and of its agricultural products, which it tries to present using marketing instruments within the framework of foreign trade exchange. The marketing tools of promotion include all the techniques by which the economies of certain countries try to improve the perception of foreign consumers about products originating from a specific country. According to Jantyik (2013) there are a large number of marketing instruments for the promotion of foreign trade, among which the most important are geographical origin, quality marks, and national quality schemes.

The designation of geographical origin (PGI - Protected Indication of Origin) is a designation that serves to identify products originating from the territory of a certain country, region, or locality. The geographical origin mark can be used to determine the quality or other characteristics of goods that are consistent with their geographical origin. The designation of geographical origin proves that a product originating from the territory of a certain country contains all the characteristics of a product whose production takes place in a certain limited area (Klasen, 2021).

Designation of Origin (PDO - Protected Designation of Origin) is the geographical name of a country, region, or locality that designates a product that originates from there and whose quality and special properties are exclusively or significantly conditioned by the geographical environment, including natural and human factors, and whose production, processing, and preparation as a whole take place in a certain limited area (Serbia Organica, 2020).

PGI products have specific characteristics or product reputations that link them to a given region, and at least one stage of production takes place in a given region, while the raw materials used for production may also come from other regions. The geographical association of products and places is stronger for PDO products than for PGI products. Each product with a geographical indication has its own standard (Kobel et al., 2017)

Quality Labels for Organic Products in the EU

The increased efficiency of production of organic products affects the increase in the value of raw materials for further processing, and packaging, meeting high standards, and enabling effective participation in trade (Giovannucci, 2004).

The national quality scheme in Slovenia is integrated production, which implies a balanced application of agrotechnical measures while respecting economic, ecological, and toxicological factors. By applying these agrotechnical measures, with equal economic performance, preference is given to ecologically, and toxicologically acceptable measures. Examples of the national quality schemes of EU members are shown in the following table.

Table 2, Quality schemes of EU Member States, complied by the author

Environmental Protection	Leaf Marque (UK); Milieukeur (NL); agri-confiance (FR)
Good-natured animal	Neuland (DE); Anbefalet af dyrenes beskyttelse (Recommended by the Animals' Protection Society in Denmark) (DK); FreedomFood (UK)
Integrated agriculture production	FruitNet (BE); Producció Integrada (ES); Agriqualita (IT)
Organic agriculture	Demeter (Int); Bioland (DE); Agrobio (PT); AMA Bio (AT); Bio-Hellas (EL); etc.
Superior product quality Including organoleptic properties	Label Rouge (FR); Klasa (CZ)
Production in the geographical area	Unser Land (DE); mentions valorisantes "montagne", "produit pays" (FR)

Ethical concern	Fair Trade label (Int); Max Havelaar (Int)
Food safety	QS (DE); Assured beef/pigs/ chicken/ combinable crops (UK);

According to Uzelac et al., (2022) Successful food producers in the member countries of the EU strive to improve the entire system in the food chain through quality schemes, thereby providing consumers with trust, safety, reliability, recognition of quality, and, most importantly, a sense of security when consuming the food they use every day.

One of the quality marks in the EU is the organic farming logo, which indicates organic production. This label indicates products that are produced and processed in a way that is suitable for humans, using approved organic methods that respect the environment and high standards of livestock breeding. Farmers especially avoid the use of synthetic pesticides and chemical fertilizers, making the food safe and healthy.

Figure 6, Organic seals, adapted from Ekowarehouse (n.d.)

In addition to the quality scheme developed by the EU, each member country has its own national quality labels and seals (some presented in Figure 6) which are harmonized with the legislation of the EU and with other member countries. In this way, the aim is to increase the market value of the product, thereby creating opportunities for the development of certain areas as well as the identity and recognition of a particular region and product.

According to their requirements, the national quality schemes are equal to the quality schemes of the EU, and all products bearing the mark of the national quality schemes must meet the high standards of quality and safety in the complete production chain prescribed by the EU.

2.2.4 Barriers and Enablers for Innovation in Agriculture

Innovation in agriculture and rural development requires a mix of favorable conditions. According to French, Montiel, and Palmieri (2014), these conditions include strong domestic growth, established institutions and laws, a wealth of knowledge and skilled people, solid economic and financial backgrounds, a society eager for innovation, and support from regional and global communities. How these factors interact also plays a crucial role in the innovation process.

The OECD (2013), as mentioned by French, Montiel, and Palmieri (2014), highlights the importance of government policies in promoting innovation. These policies should aim to improve long-term conditions, human resource quality through education, health, and infrastructure.

Governments, sectors, and institutions are key in creating a supportive environment for innovation. This involves agricultural policies that correct market imbalances and support for science, technology, and innovation. Policies on intellectual property rights, regulation simplification, and providing financial and technical support are vital. A stable, predictable legal and regulatory framework and clear government objectives also encourage innovation. Building effective innovation systems is essential in this context.

Valdés et al. (2021, p. 3344) list obstacles to innovation by grouping them into five separate types: “cost-based, knowledge-related, market problems, lack of necessity for innovations and regulatory”.

Legacy paradigms in the agriculture sector, when extended to international markets, reveal how disparities in innovation capacity lead to the export of these paradigms to developing countries, obstructing the advancement and distribution of technologies crucial for addressing global social, environmental, and security issues. In agriculture, such barriers to desired innovation are further intensified by tariff regimes and market imperfections, which reduce investment in the sector, deprive tropical countries of their natural comparative advantage, and thus hinder their economic and social development. (Weiss and Bonvillian, 2013)

2.3 Innovation in SMEs

This section explores innovation within SMEs, detailing types of innovations, their unique characteristics, and the advantages and disadvantages they present. It examines Open Innovation in SMEs, various innovation models suited to SMEs, and the barriers and enablers affecting their innovative efforts. Further, it discusses management innovation and its spread, with a focus on SMEs in emerging economies, highlighting the role of innovation in overcoming market challenges and driving economic and sectoral growth.

2.3.1 Exploring Innovation in SMEs: Types, Features, and Open Innovation

In the context of small and medium-sized enterprises (SMEs), innovation emerged as a critical catalyst for growth, adaptation, and competitive advantage. Running a modern business and maintaining a competitive advantage in the national and global markets requires the constant implementation of innovations, which are considered one of the most important factors for the survival and further development of SMEs.

SMEs in the EU are pivotal to economic growth, representing 99% of businesses in the EU. Over the last five years, they have been responsible for 85% of new job creation and constitute two-thirds of the private sector employment. In 2015, approximately 23 million SMEs in the EU provided 90 million jobs and generated €3.9 billion in added value. Unlike large corporations, SMEs possess greater flexibility and adaptability to technological changes, market fluctuations, and evolving customer demands, helped by their streamlined organizational structures that make rapid decision-making possible (Gherghina et al., 2020).

Specific Features of Innovation in SMEs

Exploring the specific features of innovation in SMEs offers a unique perspective on how these enterprises navigate the innovation landscape differently from larger corporations. Drawing on insights from Chen (2017), the following comparison highlights these distinctive characteristics and their impact on the innovation process.

Table 3, Characteristics of innovation in SMEs vs large enterprises, adapted from Chen (2017)

	SME'S	Large enterprises
Marketing	Able to respond promptly to rapidly changing market demands; closely	Powerful channel and service ability; existing products have market power.

	related to customers; an effective market manipulator.	
Management	The owner and the manager are usually the same one; less bureaucracy and management level, rapid decision making; entrepreneurial managers can respond quickly to the favorable opportunity and is willing to undertake the risk.	Owners and managers are usually separated; professional managers control complex organizations and develop corporate strategies; formal management skills.
Internal communication	Efficient informal internal information communication network can quickly solve the internal problems and has the ability to reorganize the organization's external environment changes.	Internal communication is often not smooth and leads to a slow response to external opportunities and threats.
Technical personnel	Often the lack of appropriate technical specialists; often without the ability to follow-up formal research and development.	An expert who can attract high technology; a large research and development laboratory.
External communication	Often lack of time or resources to identify and use important external resources (expertise in science and Technology); the ability to absorb knowledge is weaker.	Able to maintain close contact with external scientific, technological, and specialized knowledge; provide books and information services; specialized research and development specialists; able to purchase critical technical information and techniques.
Financial resources	It is difficult to attract capital (venture capital), there is a great deal of financial risk in innovation; risk cannot be dispersed through multiple projects or portfolios.	Able to obtain capital from the capital market; capable of dispersing risks through projects or product combinations; able to finance new products and new markets.
Scale economy	In some economies of scale, there is a huge barrier to entry for SMEs, and there is no ability to provide a	Able to build barriers to entry, economies of scale for research, production, and marketing; capable of providing a range

	complete product line and the entire system.	of related products; capable of bidding for “turnkey projects”.
Growth	The difficulty of obtaining external funds to meet rapidly growing needs; entrepreneurial managers are often unable to cope with and manage increasingly complex organizations.	Ability to fund expansion of production scale; financial support for diversification and mergers; the ability to control complex organizations.
Patent	Failing to deal with the patent application department, there is not enough time and cost involved in the patent dispute.	Able to employ specialists in applying for patents; able to protect patents by law and prevent infringement.
R&D	Informal and temporary	Formal and planned
Government regulation	Generally, it is impossible to deal with complex regulatory provisions; compliance regulation is usually costly for SMEs.	It can provide legal support for solving complex regulatory regulations, and can disperse the costs of regulation, and can provide funding for R&D activities to deal with regulatory actions.

Chen (2017) highlights that the advantages of innovation in SMEs mainly revolve around "behavioral advantages," such as:

- Agile and less bureaucratic organization, enabling swift adaptation to technology and market changes.
- Rapid and efficient internal communication.
- Direct involvement of business owners in management with entrepreneurial spirit and flat leadership style.

On the other side, according to Chen (2017) disadvantages include:

- Lack of resources, such as management skills and financial support.
- Reliance on individual entrepreneurs.
- High fixed costs in technology investments.
- Sensitivity to failure with significant financial repercussions.
- Challenges in attracting skilled staff and enhancing technical knowledge.

Types of Innovation

Exploring the landscape of innovation within SMEs reveals a spectrum of types, illustrated through subsequent figures that present varied perspectives on how small and medium-sized enterprises innovate.

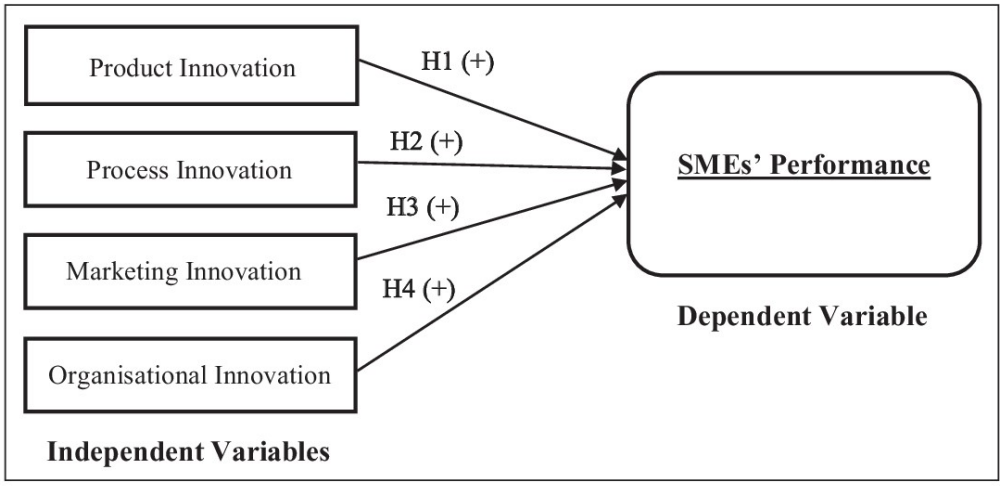

Figure 7, Conceptual Framework of the Nexus Between Innovation Types and SMEs' Performance, source: Oduro (2019)

Yet another source (Dossou-Yovo and Keen, 2021), further contributes to understanding of the complex nature of such typology and authors that introduced these concepts as seen in the following figure.

Authors	Types of innovation
Schumpeter & Backhaus (2003) Cantner & Vannuccini (2018) Malerba & McKelvey (2020)	• New products • New production methods • New supply sources • Exploiting new markets • New ways of organizing business
Edquist (2001) Azar & Ciabuschi (2017) Markard (2020)	• Technological innovation • Organizational innovation
Freeman & Soete (1997) Christensen et al. (2015)	• Incremental innovation • Disruptive innovation

Figure 8, Types of innovations, source: (Dossou-Yovo and Keen, 2021)

The same authors (Dossou-Yovo and Keen, 2021) show how SME innovation processes depend on external resources and present the key factors such as in the illustration below:

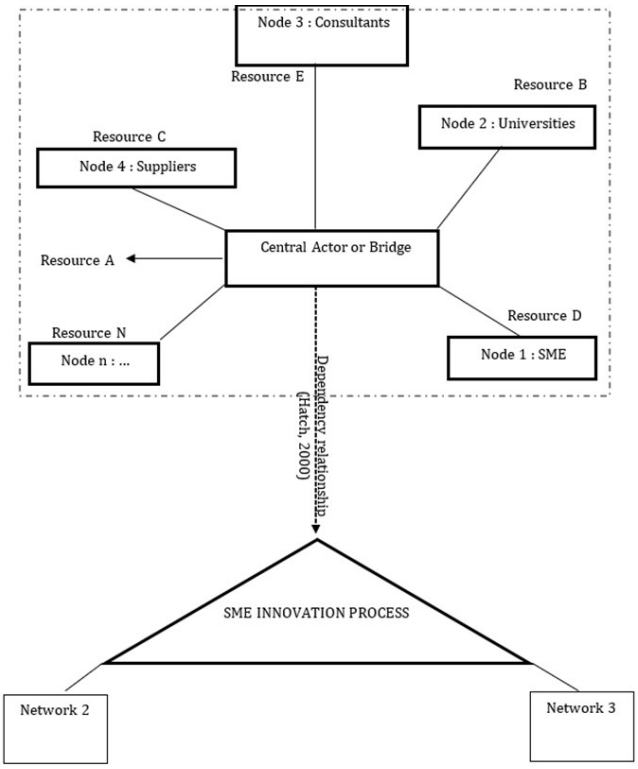

Figure 9, Innovation process and network of actors for innovation resource, source: (Dossou-Yovo and Keen, 2021)

This leads towards the concept of Open innovation, according to Chesbrough (2003), open innovation has been defined as the inflow and outflow of technological knowledge to advance innovation in production and market positioning. (as cited in Annamalah et al., 2022).

Some authors claim that the prevailing model of closed innovation is deemed unsuitable for product and service development in today's significantly altered innovation landscape. Small and Medium-sized Enterprises (SMEs) are urged to adopt a blend of internal and external innovation strategies, aiming to incorporate external knowledge purposefully. This approach, known as technology breakthrough, seeks to enhance SMEs' technological capabilities by acquiring external knowledge, thereby enabling them to maximize operational efficiency and enhance technological competencies for competitiveness both locally and globally. The adoption of open innovation is essential for SMEs to attract foreign investment and foster economic growth. However, a lack of creativity, motivation, learning, knowledge desire, and cooperation hampers SMEs' commitment to open innovation, making it the sole viable pathway for technological advancement. (Annamalah et al., 2022).

O'Regan and Ghobadian (2005) highlight a distinction within SMEs between "prospectors," firms that actively engage in innovation and new product development to address market demands, and "defenders," who prefer to refine existing products to maintain their market

position. Prospectors in the SME sector demonstrate a strong commitment to using process technologies and management practices innovatively to explore new opportunities and adapt to environmental changes. In contrast, defenders tend to innovate reactively, mainly under external pressures, showing a less proactive approach to leveraging technological advancements for innovation. The findings underscore the importance of strategic orientation in influencing an SME's innovation activities, with prospectors better positioned to navigate both stable and turbulent environments effectively, thereby ensuring sustained competitiveness.

Holt's (2000) model of SME innovation, as discussed by Dossou-Yovo and Keen (2021), outlines a four-stage linear process:

a) Generating new ideas by identifying needs and technological solutions.

b) Utilizing ideas through technology acquisition or in-house development.

c) Preparing through production planning and marketing strategies for new products.

d) Implementing by introducing the product to the market.

Similarly, Cooper & Kleinschmidt (1996), as cited in Dossou-Yovo and Keen (2021), detail a seven-stage process:

a) Defining product ideas via internal and external idea generation.

b) Conducting preliminary feasibility assessments.

c) Defining the market, product benefits, attributes, and specifications.

d) Developing or producing a prototype.

e) Testing to identify improvements.

f) Pre-commercialization.

g) Launching for commercialization and scaling production.

Furthermore, Dossou-Yovo and Keen (2021) themselves suggest a multi-level model comprising:

a) Idea generation and selection.

b) Transformation.

c) Learning.

d) Resource mobilization.

e) Commercialization.

f) Coordination, highlighting the importance of stakeholder interaction.

Management innovation and its diffusion

In recent years, there has been a significant increase in the emergence of standardized and rational management schemes, models, and techniques that formalize the management process, making it much more efficient compared to the management process of the past decades. This situation leads to the fact that in the process of creative innovation management in manufacturing SMEs, managers often have precisely defined, practically tested, and formalized tools for automated management in the form of approaches, methods, methodologies, standards, etc. (Benjamin and Wigand, 2015).

This trend has had a rather positive impact on the development of the innovation market while at the same time setting limits on saturation with effective technologies, and the process of creative innovation management. Although not yet fully considered, the development of management theory, methodology, and practice at the same time radically accelerates the process of knowledge exchange and the effective application of tools for cost-effectively managing formulated procedures and solutions. In this sense, it is important to note that for routine innovation management activities in SMEs, this situation is relatively favorable, and the availability of such tools for most managers (free or for a fee) leads to an equalization of the aspect of competition in management and production business organization. The approach to performance measurement in the process of innovation management represents, for many, the possibility of creating competitive products that were created as a result of an efficient investment process. This approach also contributes to reducing the potential for creating competitive advantages for individual market participants.

2.3.2 Innovation in SMEs Operating in Emerging Economies

Some authors conclude that SMEs play a crucial role in stabilizing and developing economies. Countries lacking a significant SME sector, often experiencing a "missing middle" in their firm size structure, face income and capital concentration in larger firms. This leads to unequal income distribution, with a large microenterprise sector characterized by low

wages and capital incomes due to the scarcity of capital. A robust SME sector can mitigate such disparities, contributing significantly to employment, income generation, and export revenues in developing countries (Keskin, H. et al., 2010)

Enhancing innovation in SMEs in emerging economies is crucial for regional growth and involves bolstering their competitiveness and productivity across global, national, and local markets. Success relies on advancing knowledge, management practices, and human resource competencies, underlining the importance of these enterprises' capacity to strategically adapt and thrive in competitive environments (Surya et al., 2021).

According to Vujicic (2016), innovations are a challenge for all SMEs, especially for entrepreneurs operating in developing countries. The adoption and process of implementing innovations within SMEs operating in developing countries is a very challenging process, considering the limited financial resources available to these entrepreneurs and other barriers.

The innovation planning process in SMEs in developing countries must be aligned with the mission and the main goal of the company's business to motivate all employees for the sake of more profitable business based on the application of innovation (Ravic and Radic, 2015).

According to Ravic and Radic (2015), the importance of innovation for gaining competitive advantage in SMEs requires the necessity of detailed and analytical planning of this process with consideration of all necessary resources (human, financial, and material). A part of that should be, when relevant, the engagement of experts, i.e., intellectual capital for the implementation of the project.

Eco-innovation practices enhance the environmental management and competitiveness of SMEs in developing countries, enabling simultaneous economic and ecological benefits. These practices underscore that addressing environmental challenges can lead to improved efficiency and competitive advantages for innovative SMEs (Gherghina et al., 2020).

2.3.3 Barriers and Enablers for Innovation in SMEs

Rahman and Ramos (2013) discuss that high wage levels and the resulting scarcity of skilled manpower present significant barriers to innovation for SMEs. These challenges are compounded by the economic crisis, which further restricts purchasing power and skilled resource availability. Moreover, the high cost of innovation and a lack of familiarity with open innovation strategies further hinder SMEs' ability to innovate effectively.

To overcome barriers to innovation, SMEs are actively pursuing product differentiation, seeking partnerships, and exploring opportunities in foreign markets (Rahman and Ramos, 2013).

A study by Fanelli (2021) found that the majority of SMEs highlight the scarcity of financial resources and the challenge of accessing both public and private funding as a significant barrier to adopting innovation.

According to some authors, SMEs encounter significant economic challenges, including heightened global competition, limited access to financing, constraints in establishing networks with foreign partners, inadequate access to research and technology transfer, rapid changes in technology, and uncertainties regarding sustainability (Cordeiro and Vieira, 2012)

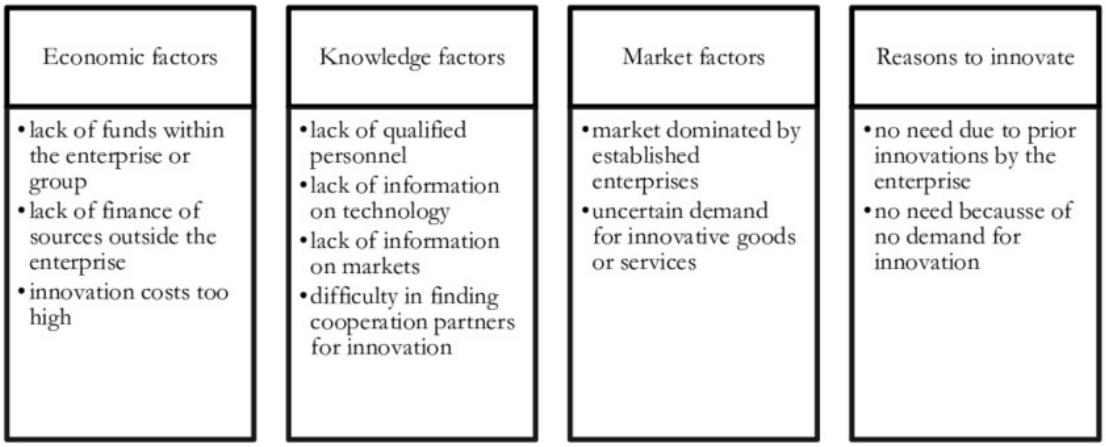

Figure 10, Four main types of barriers to innovation in SMEs, source: Hvolkova et al. (2019)

Five key factors hinder the introduction of technological innovations. The first factor is government support, which consists of three components: minimal financial support from the state, the absence of government-organized training specifically for technological innovations, and the lack of any state support for innovative equipment. The second factor is the quality of human resources, namely the lack of a highly qualified and competent workforce, the workforce's and owners' inflexibility to changes in technology and innovations, and the absence of sufficient knowledge among business owners about technological innovations. The third limiting factor is the method of financing innovations, relating to the difficulty of obtaining loans from banks and financial institutions, high interest rates, and high costs of technological innovations. The fourth factor cited is economic conditions, which complicate the acquisition of innovative equipment, unstable economic

conditions, and low purchasing power. The fifth factor involves business partners, referring to the difficulty of finding the right suppliers and marketing agencies. (Indrawati, Caska, and Suarman, 2020)

2.4 Frameworks for Sustainable Innovation: Circular, Blue, and Green Economies

Green economy definition

Jim Hart et al (2019) define the green economy as an economic framework aimed at achieving sustainable development without degrading the environment. It focuses on reducing carbon emissions, increasing energy and resource efficiency, and preventing the loss of biodiversity and ecosystem services. This approach emphasizes the importance of economic growth that is both environmentally sustainable and socially inclusive, suggesting a balanced integration of economic, social, and environmental goals to ensure long-term sustainability and equitable development. This definition of the green economy emphasizes it as economics that pays particular regard to natural resources, with the circular economy acting as an instrument for their protection and reuse.

“UNEP proposed a definition of ‘green economy’ as an economy that ‘results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.” (Eaton, 2013, p.62). Eaton comments that while many technologies that already exist can be used in a transition to the green economy, it is obvious that in the long term, such a transition will require new technologies in almost all sectors, therefore innovation is necessary.

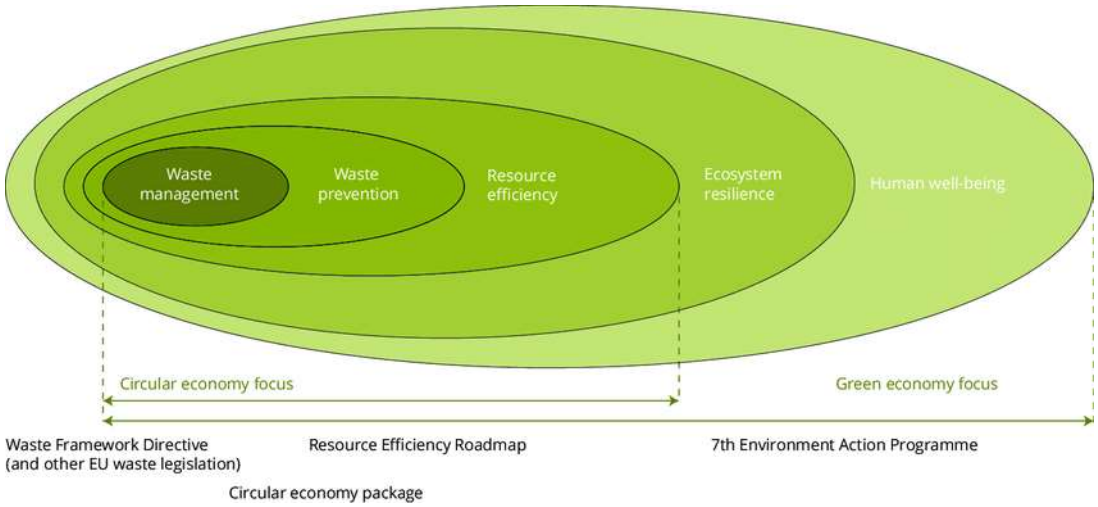

Figure 11, Circular and Green Economy, source: Reichel et al. (2016)

The previous figure (Figure 2) shows the process by which waste originating from the consumption of resources and finished products by consumers is recycled. By recycling waste, it is reused in a modified form for the further production of new products, which closes the circular economy process.

Circular economy definition:

Suchek, et al. (2021), define it as "The circular economy emerged as an alternative model to the linear system, which now appears to be reaching its physical limitations. To transition to a circular economy, companies must not only be aware of but also engage in more sustainable practices. For such a transition, companies must rethink and innovate their business models and the ways they propose value to their clients while simultaneously considering environmental and social facets."

The circular economy is described by Jim Hart et al. (2019), as a model that maintains the value of products, materials, and resources in the economy for as long as possible, aiming to minimize waste and keep resources in use through repeated recycling.

According to the Ellen MacArthur Foundation (EMF), the leading international foundation for research and policymaking in the field of the circular economy, the fundamental principles of the circular economy are: the elimination of waste and pollution through product design improvement, keeping products and materials in use for as long as possible, and the restoration of natural systems.

In the EMF circular economy concept waste does not exist, rather, it is a resource that can be reused for the same or other production processes. In addition to this, renewable energy

sources are prioritized in this concept, energy is used as efficiently as possible without waste, the introduction of innovative technologies is encouraged, there is an emphasis on green public procurement, as well as on replacing hazardous chemicals with less dangerous ones, and changes in consumer habits are inevitable in achieving these goals.

Sehnem et al. (2014), quote EMF considering "To make the CE feasible, propose the technical cycle and the biological cycle. These are mechanisms that allow the separation of compostable materials from those that may be dematerialized and reintroduced into new production cycles. To make this possible, the following principles are followed:

a) Preservation and increase of natural capital: This seeks to manage the finite stocks of resources combined with the use of renewable ones.
b) Optimization of resources by introducing assumptions of circularity into the management of products, components, and materials: In this way, it emphasises the high level of utility in both the technical and biological cycles. This principle is operationalized based on remanufacturing, reform, and recycling practices.
c) Zeal for the effectiveness of the system: This is intended to eliminate negative externalities, especially when it comes to reducing damage to products and services essential for people's survival."

(Hart et al, 2019) discuss the imperative shifts needed to transition towards a circular economy (CE), emphasizing the need to move away from the entrenched make-use-dispose model. This entails a shift in business models, stakeholder behaviors, and attitudes towards resource stewardship, highlighting the necessity for a more sustainable approach that balances technological and regulatory developments with changes in societal norms and business practices.

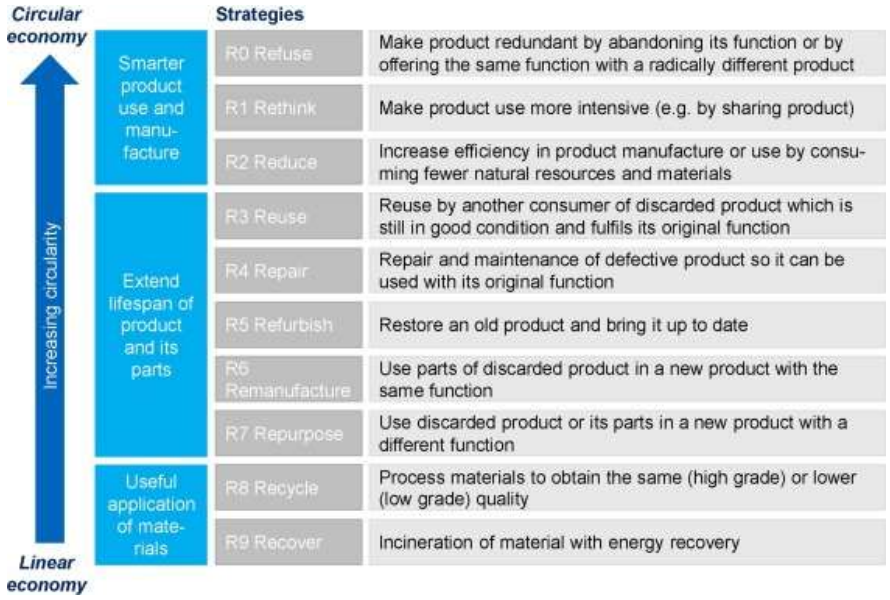

Figure 12, 9R in Circular Economy source: Kirchherr et al. (2017)

The above figure depicts the current 9 R view about key processes in the circular economy.

Barriers and incentives in CE:

Rizos et al. (2015) outlines several barriers to adopting circular economy practices by SMEs, including financial constraints, a lack of technical skills, insufficient government support, and ineffective legislation. Additionally, challenges like the administrative burden and lack of information hinder the transition.

Barriers and incentives in CE are categorized by (Hart et al, 2019) into cultural, regulatory, financial, and sectoral dimensions. Each category addresses specific challenges and opportunities within the built environment to facilitate a transition towards CE. Cultural barriers include resistance to change and a lack of awareness, while regulatory barriers focus on inconsistent frameworks and obstructive laws. Financial barriers highlight the economic challenges, such as high upfront costs and limited funding, and sectoral barriers deal with industry-specific obstacles like complexity and lack of standardization.

The complexities of implementing CE principles are discussed by (Hart et al, 2019) and the myriad of barriers that exist are acknowledged, as are the potential enablers that can drive change. The groups of enablers and main subcomponents within are these:

(1) Cultural Enablers (Leadership ; Sustainability/environmental drivers; Value chain engagement activities; Systems thinking;) (2) Regulatory Enablers (Policy support; Regulatory reform; Incentives for CE;) (3) Financial Enablers (Whole Life Costing;

Collaboration and design tools and strategies; R&D and innovation; Development of standards / assurance schemes; Development of a reverse logistics infrastructure:)

The emphasis is on the need for systemic transformation across cultural, regulatory, financial, and sectoral domains to effectively transition towards a more circular and sustainable economy (Hart et al, 2019).

Table 1. Barriers and enablers, showing some of the most links between them. Each barrier is given a code, and suggested links to those barriers are indicated from enablers in the RH column. Although important, connections within the cultural section are not suggested, as they are numerous and diffuse.

	Code	Barrier	Enabler	Link
Cultural	C1	Lack of interest, knowledge/skills and engagement throughout the value chain	Leadership	S1, S7
	C2	Operating in linear economy	Sustainability/environmental drivers	S1
	C3	Lack of vertical and horizontal collaboration	Stimulate demand	F4
	C4	Lack of collaboration between business functions – silo mentality	Value chain engagement	F1
			Longer term relationships and partnerships	F1
			Systems thinking	S2
Regulat.	R1	Lack of consistent regulatory framework	Policy support & public procurement	R1
	R2	Obstructing laws and regulations	Regulatory reform	R2
	R3	Lack of incentives for CE	Fiscal support	R3
			Producer responsibility	R3
Financial	F1	Short-term blinkers – CAPEX prioritised over OPEX	Whole life costing	F1, S3
	F2	High upfront investment costs.	Easy wins	F4, F2
	F3	Low virgin material prices	CBMs	F5
	F4	Poor business case / unconvincing case studies	Scale	F4
	F5	Limited funding		
Sectoral	S1	Lack of bandwidth compounded by no coherent vision	Clearer vision for CE in the built environment	S1
	S2	Complexity / confused incentives	Better evidence base	R1, F5
	S3	Long product lifecycles (buildings and materials)	Collaboration and design tools and strategies	S6, C3
	S4	Technical challenges re material recovery	R&D, innovation	S4, C1
	S5	Lacking standardization	Develop standards and assurance schemes	S5
	S6	Insufficient use or development of CE-focused design and collaboration tools, information and metrics	Develop reverse logistics infrastructure	F2, S4
	S7	The industry itself – conservative, uncollaborative, risk-averse		

Figure 13, Barriers and enablers for Circular Economy, source: Hart et al. (2019)

The conclusion drawn from Rizos et al. (2015) highlights the necessity for a supportive policy framework, enhanced awareness, and financial and technical support to overcome the barriers to circular economy adoption. This implies the need for policies that encourage sustainable practices, investments in technology and skills development, and initiatives that bridge the gap between traditional agricultural practices and modern, sustainable approaches.

Benefits of CE for SMEs:

On the benefits side, Rizos et al. (2015) lists that the circular economy offers SMEs the opportunity for innovation, resource efficiency, and the development of new markets.

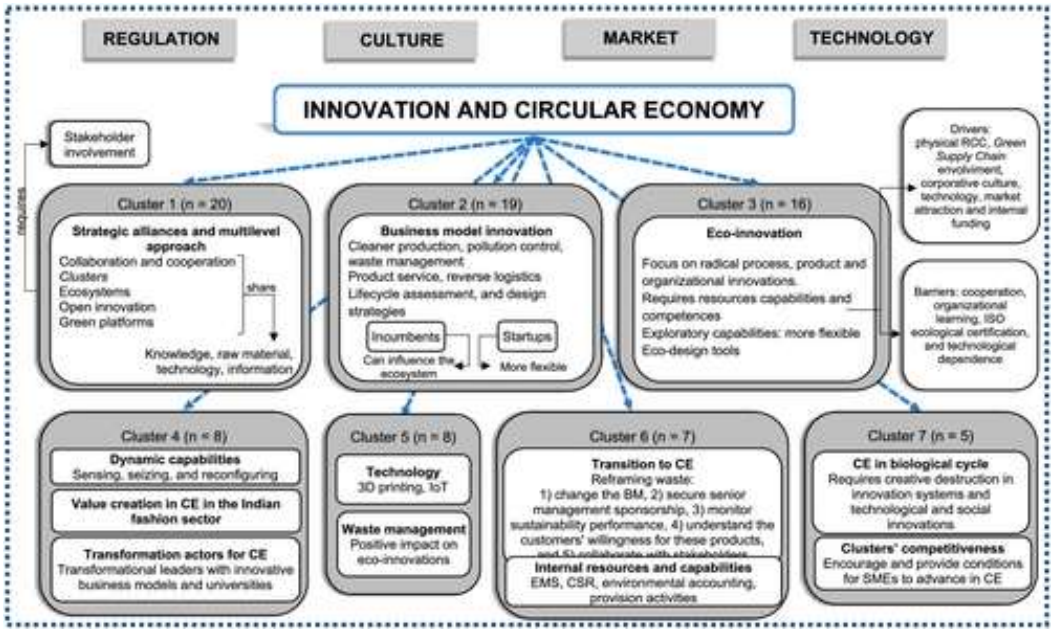

Figure 14, Framework for examining innovation in the circular economy, source: Suchek et al. (2021)

Another related concept is sustainability. The concept organization of sustainability is discussed with focus simultaneously on four categories: economic, social and environmental performance, with goal that organizations create value considering preservation of four categories of capital: financial, environmental, social, and human (Scipioni et al., 2021)

The overlapping and much-used idea is also the triple bottom line:

"The triple bottom line is a business concept that states firms should commit to measuring their social and environmental impact—in addition to their financial performance—rather than solely focusing on generating profit, or the standard "bottom line." The triple bottom line can be broken down into "three P's": profit, people, and the planet. Firms can use these categories to conceptualize their environmental responsibility and determine any negative social impacts to which they might be contributing.

From there, companies can integrate sustainable practices into every facet of their business operations—including supply chains, business partners, and renewable energy usage—to positively impact society and the environment in addition to turning a profit" (Miller, 2020)

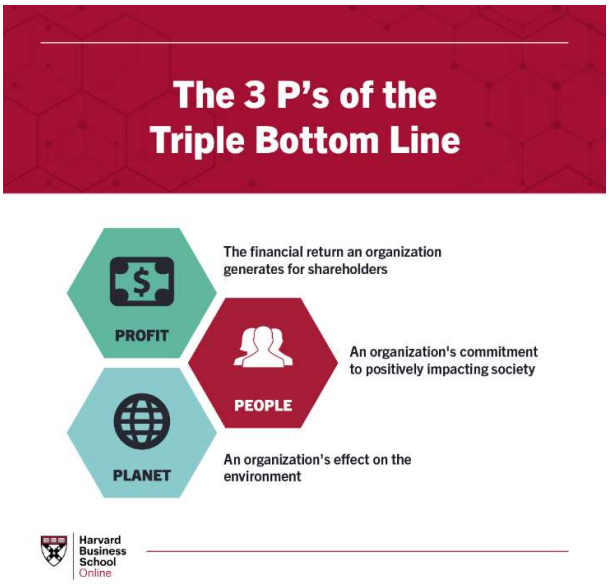

Figure 15, Triple bottom line, source: Miller (2020)

Finally, it is necessary to mention the concept of blue economy as created and promoted by Gunter Pauli.

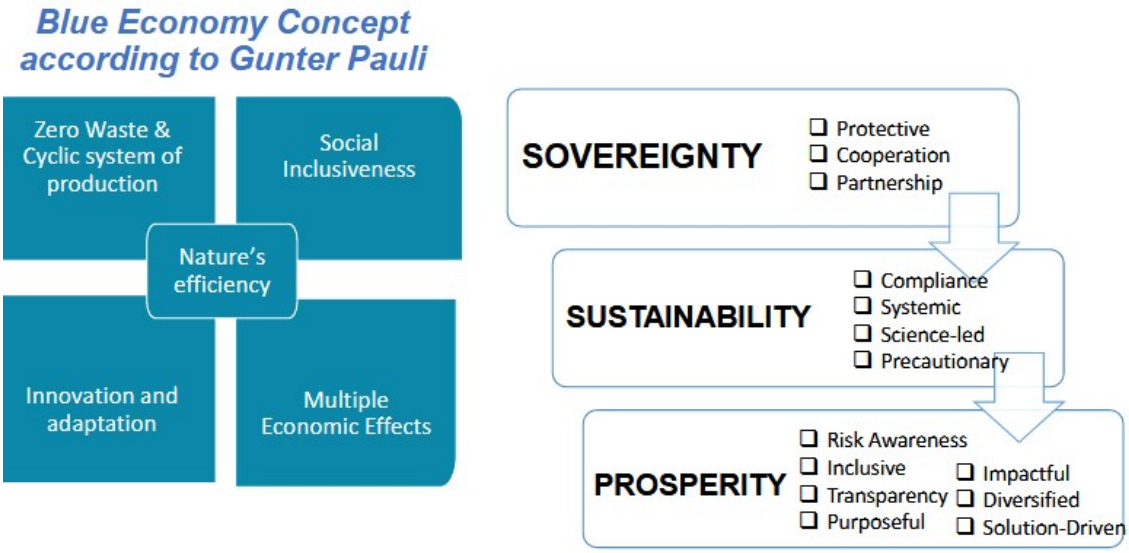

Figure 16, Concept of Blue Economy as defined by Gunter Pauli. Source: Chomariyah and Chomariyah (2020).

In his book Blue Economy (versions 1.0 as of 2010, 2.0, in 2014, and finally 3.0 in 2017) Pauli emphasizes the importance of societal and environmental convenience, understanding and feasibility of initiatives, and sharing successes in an economy inspired by biomimicry. The book chronicles the evolution of Pauli's ideas over a decade, starting in 2004, aiming to

move beyond environmental conservation towards regeneration. By 2010, he highlighted the first results in his book "The Blue Economy," translated into multiple languages. Pauli proposes solutions for creating new jobs, improving environmental quality, and cultivating a concrete business culture amid a crisis by focusing on environmental and territorial redevelopment.

The book integrates theoretical perspectives with practical experiences, emphasizing what is realistically achievable. Case studies, from India and worldwide, showcase the application of blue economy principles, addressing urban design, zero-emission building materials, water and food provision, recycled paper production, Tetra Pak recycling, and water quality control. (Radogna, 2018, p. 15).

The blue economy philosophy is based on three guiding principles:

- Be continually inspired by nature
- Change the rules of the game
- Focus on what is locally available.

In his interview with Arlette Diederiks, of Plastic Oceans Europe, Pauli comments on the differences between the blue economy and (EMF) concept of CE. As stated in the interview "The Circular Economy is based on the current linear business models, meaning that within the framework, it is an excellent solution. But it still focuses on businesses that center on one core business. The Blue Economy shows that having a portfolio of businesses can create more value, not only in economic terms, but for society and nature as a whole." (Diederiks, 2021).

However, the concept of blue economy later received another meaning that is now prevailing, related to the oceans. The blue economy is now, defined, inter alia, by The World Bank (2017) as "the sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health."

Therefore, the blue economy of Pauli currently relates only to Pauli's book. Due to their collaboration and the very strong influence of Pauli on Ivanka Milenkovic, CEO and founder of Ekofungi Ltd (subject of our case study), it was necessary to make reference to the wider concept.

Pauli established an NGO named ZERI (Zero Emissions Research and Initiatives) in 1994. ZERI, by his own words, is: "a global network of creative minds taking on various challenges.

These members try to find sustainable solutions for society, using science as a starting point for new ideas. Currently, there are 200 projects being executed worldwide, based on the principles of the blue economy. All these projects together have generated approximately 3 million jobs. We have proven that our model works in creating value for the people, the businesses, and the environment." (Diederiks, 2021)

3. METHODOLOGY

This chapter outlines the methodology used to explore innovation in traditional sectors, focusing on Serbia's agricultural sector and the case study of Ekofungi. Ekofungi is a Small and Medium-sized Enterprise (SME) that has effectively used limited resources and a commitment to sustainability to achieve global innovation. This research aims to understand Ekofungi's innovation processes, its potential for replication, and its impact on different markets.

3.1 Research Design

This study uses a qualitative case study approach to deeply analyze Ekofungi's innovation ecosystem within Serbia's agricultural sector. Ekofungi was chosen for its standout innovation, overcoming financial constraints, and commitment to circular and sustainable production. The company's unique position as a recognized circular enterprise in the Western Balkans, known for its innovation internationally, suggests that SMEs in traditional sectors in developing countries like Serbia can not only innovate but also leverage this innovation as a source of revenue. The research aims to uncover how SMEs can replicate Ekofungi's success and the impact of using local knowledge to promote economic and sustainable development.

3.2 Data Collection

Literature Review: This section aims to understand innovation in traditional sectors, especially within agriculture, focusing on SMEs, and emerging economies. It investigates the barriers and enablers to innovation in these contexts and further examines the concepts of blue, green, and circular economies to establish a comprehensive theoretical framework for analyzing Ekofungi's innovative practices.

Market and Context Research: This study focuses on Serbia's agricultural sector, using government statistics, EU reports, and information on grants and subsidies to provide a detailed view of the environment Ekofungi operates in. This research helps to understand the economic and environmental factors influencing innovation in Serbia.

Informal Interview and Site Visit: Conversations with Ekofungi's founder provide a direct insight into the company's history, its approach to innovation, and the challenges and

successes it has faced. This method offers a deeper understanding of Ekofungi's innovative culture and operations.

Questionnaire for the Founder of Ekofungi: A detailed questionnaire was used to formalize insights from informal discussions, aiming to validate and expand the findings about Ekofungi's innovative practices and their impact on its success and market position gathered during the informal interview and site visit.

Company-Provided Documents and Anonymized Surveys: Analysis of financial reports, operational metrics, and anonymized client feedback surveys provides empirical evidence of Ekofungi's innovation impact, demonstrating its reach beyond geographical and economic limits.

3.3 Data Analysis

The study employs thematic analysis for qualitative data collected through the formal questionnaire, while it uses statistical, and comparative analysis for anonymized surveys, creating a comprehensive narrative on the impact of innovation across different client countries. For the analysis of Ekofungi-provided documents and materials, a detailed content analysis was conducted to identify themes and insights relevant to the company's innovation strategies and their impact on sustainability and market growth. This process involved evaluating the content for patterns and extracting meaningful data that contributed to understanding Ekofungi's innovative practices within the broader context of agricultural innovation in emerging markets. This approach provides a detailed understanding of Ekofungi's innovation's effectiveness and global relevance.

3.4 Expanding on Serbia and Agriculture

Serbia's agricultural sector is crucial to its economy, offering a mix of traditional and innovative practices. It contributes significantly to the GDP and employment, with a growing recognition for its export potential. Serbia is chosen for this study due to its status as an emerging market facing both challenges and opportunities. Government initiatives supporting agricultural innovation indicate a fertile environment for SMEs like Ekofungi to innovate.

Serbia's diverse climate and geography enable a wide range of agricultural activities, from crop production to organic farming. This diversity underpins opportunities for sustainable and innovative practices. Ekofungi, thriving in this setting, demonstrates how SMEs can blend

traditional methods with sustainable innovations to make an impact beyond national borders. Their success underlines the potential for circular and blue economy principles to transform agriculture in Serbia and other developing countries, emphasizing the sector's move towards sustainability and innovation-led growth.

Serbia's commitment to agricultural development is further underscored by its strategic investments in agricultural technology and infrastructure. This includes efforts to modernize irrigation systems, introduce precision farming techniques, and adopt environmentally friendly practices that reduce the carbon footprint of farming activities. Such advancements are crucial for enhancing crop yields, improving product quality, and ensuring the sustainability of agricultural practices.

Additionally, the impact of Serbia's agricultural policies on smallholder farmers and rural communities provides a critical lens through which to examine the sector's challenges and opportunities. Policies aimed at supporting small-scale farmers, promoting organic certification, and facilitating access to international markets are essential for the inclusive growth of the agricultural sector. These measures not only contribute to rural development but also help in preserving the cultural heritage and biodiversity of Serbia's countryside.

Finally, exploring the potential for Serbia's agriculture to contribute to regional food security and sustainable development goals offers a broader perspective on the significance of the sector. As the world faces increasing challenges related to food production and environmental sustainability, Serbia's agricultural innovations, particularly in organic farming and sustainable practices, can offer valuable insights and models for other countries to emulate.

By situating the case study within Serbia's agricultural landscape, this research not only highlights Ekofungi's innovative prowess but also sheds light on the broader implications for the sector's transformation towards sustainability and innovation-driven growth.

3.5 Ethical Considerations

This thesis strictly follows ethical guidelines by keeping sensitive data anonymized to protect the identities of Ekofungi's clients, in compliance with GDPR requirements. This approach maintains the research's integrity and confidentiality.

3.6 Limitations

This study recognizes its limitations, including the difficulty of generalizing from a single

case study, the complexities of data anonymization, and restricted access to complete datasets. These issues highlight the challenges of detailed case study research within the context of SMEs in developing economies.

3.7 Summary

This section summarizes the methodology, detailing the approach used to explore innovation in traditional sectors through the case of Ekofungi. Combining a comprehensive literature review, varied data collection methods, and advanced analysis, this study aims to offer deep insights into how innovation can transform traditional sectors, especially in emerging economies like Serbia.

4 CASE STUDY ON EKOFUNGI

This chapter presents a case study on Ekofungi, a leading example of innovation within Serbia's agricultural sector. This section begins with an introduction to the case study, followed by an exploration of the broader context of agriculture, organic production, and circular economy practices in Serbia. It culminates in an in-depth analysis of Ekofungi, detailing the company's journey, innovative practices, and the qualitative research findings that illustrate its impact on the industry and beyond. This chapter aims to offer insights into how Ekofungi navigates and contributes to the evolving landscape of sustainable agriculture in Serbia.

4.1 Introduction to the Case Study

The hypothesis this thesis attempts to prove is that by using an innovative approach in operations, constantly introducing new innovations into the work process, and following all contemporary trends and requirements of both science and the market, it is possible not only to survive in the competitive market but also to be first or even the best in many respects. That is, innovations are such a crucial segment for advancement in all human activities, especially in production.

To prove this hypothesis, the example of a small company from a relatively poor and, in many respects, underdeveloped country, which is not an EU member and where there are no benefits that would make this company competitive compared to similar small firms from countries that have a whole set of measures supporting small businesses and offering them various tools for development and progress, was chosen.

Ekofungi is a small company founded by Ms. Ivanka Milenkovic, who holds a master's degree in biology, and is engaged in mushroom cultivation near Belgrade. The fact that the industry this company operates in is not particularly dynamic, nor is it an area where significant research is conducted for the innovation of work processes, that Serbia is a country with economic development problems, lacking sufficient financial resources or well-developed instruments to support small and medium-sized enterprises, that it is still not in the EU, as well as that Ekofungi has a relatively small number of employees, speaks volumes about the challenging circumstances under which this company operates.

However, thanks primarily to the knowledge and practical experience of the founder, this small enterprise has succeeded in many areas where much larger and economically stronger companies have, not only in Serbia but in many countries, especially in Southeast Europe.

Namely, Ekofungi has introduced several innovations into its work process, which have not only enabled it to improve its production but also to generate additional income by selling know-how.

The mission of this company is to strictly follow all the postulates of the circular and blue economies and to make no compromises, even at the cost of remaining relatively small. In 2018, it was recognized by the OECD as the sole representative of the true circular economy in the entire Southeast Europe and the only certified producer of organic mushrooms in Serbia, as well as the only exporter of organic mushroom products from Serbia to America via the Amazon platform.

This case study of Ekofungi, a leading example of innovation within Serbia's agricultural sector, was conducted using a qualitative research approach to capture the depth and breadth of the company's innovative practices. Chosen for its significant contributions to sustainable agriculture in an emerging market, Ekofungi provided a unique opportunity to explore the potential for scalability and impact of similar innovations.

The study's methodological foundation included a comprehensive literature review, which established the theoretical context for innovation in agriculture. This was complemented by a detailed examination of the agricultural environment in Serbia, providing essential background for understanding Ekofungi's operations.

Primary data were collected through direct engagement with the company and its founder, including:

- a field visit and an informal interview with the founder (conducted on 26.06.2023.)
- a structured questionnaire for Ekofungi’s founder, with an idea to formalize the insights gathered from the informal discussions and acquire additional details on aspects not fully explored in the initial interview (sent on 12.02.2024., answers received on 14.02.2024.)

The secondary data collection relied, mostly, on items provided by Ekofungi:

- Company history timeline

- Internal documents presenting a statistical overview of their sales for different products and services.
- Know-how services client feedback survey
- A list of awards, grants, and other achievements
- Other internal documents

These methods allowed for a rich, multi-dimensional understanding of Ekofungi's innovation ecosystem and its implications for the broader agricultural sector.

4.2 Context: Agriculture, Organic Production and Circular Economy in Serbia

This section delves into the agricultural landscape of Serbia, focusing on organic agriculture and the circular economy's role within the sector. It provides a theoretical base to understand the challenges and opportunities in Serbia's agriculture, highlighting the importance of innovation, sustainable practices, and the circular economy framework. This context is crucial for comprehensively understanding the case study of Ekofungi and its operational environment.

4.2.1 Overview of Serbia's Agricultural Sector and the Role of Innovation

Overview of the Sector

Some key features of the agricultural sector in the Republic of Serbia include its significant contribution to GDP, employment, and export volume, underscoring agriculture as a still crucial and priority sector of the domestic economy.

Crop production dominates over livestock production (according to the Statistical Office of the Republic of Serbia, it accounts for 68.5% of total agricultural production), and within crop production, cereals and fruits have the highest share, while in livestock production, pigs and cattle have the largest share.

The agricultural sector occupies a significant place in Serbia's exports (achieving a surplus) immediately after the manufacturing industry, which dominates over all other export sectors. The EU is the most important foreign trade partner of the Republic of Serbia, with the highest exports being cereals and fruits.

Of the total active population in the Republic of Serbia (2,971,220), according to the last census in 2021 (Statistical Office of Republic of Serbia), 340,186 economically active residents relate to the active agricultural population, which is about 11.5%.

Although the values of total agricultural production have a rising trend, its share in the total GDP is declining (in recent years at the level of 5-6%), mainly due to outdated technology that is slowly being replaced by more modern ones, insufficient investment volume, and slower and more difficult adaptation to contemporary market requirements than other more profitable economic areas whose GDP share is increasing. The Republic of Serbia has a smaller share than Albania, North Macedonia, and Montenegro, but is larger than Croatia and BiH (Dimitrijevic, 2021).

As the Republic of Serbia is a candidate for EU membership, it has been enabled to compete for the use of EU pre-accession assistance funds, which also relate to rural development within the IPARD program. The future development of agricultural production and rural areas will certainly have a positive impact on agriculture in Serbia through greater use of these funds.

Among all agricultural enterprises, the majority are micro, then small, medium, and the least number are large enterprises, while the largest number of workers are employed in large agricultural enterprises, then medium, small, and finally micro agricultural enterprises. The highest turnover is achieved by small agricultural enterprises, then medium and micro, and finally large agricultural enterprises. In terms of GVA, i.e., contribution to economic development, small and medium-sized agricultural enterprises have the most significant impact (Dimitrijevic, 2021).

SMEs and entrepreneurship could turn some of the current weaknesses into development opportunities in the development of rural areas and agriculture, especially due to the growing demand for organic products, rural tourism, etc.

In recent years, there has been an increase in agricultural subsidies, although their level and scope are still modest.

Types of incentives in the agriculture of the Republic of Serbia, according to the Law on Incentives in Agriculture and Rural Development ("Official Gazette of RS", Nos. 10/13, 142/14, 103/15, and 101/16) are: 1) "direct payments; 2) incentives for rural development measures; 3) special incentives; 4) credit support.

According to the findings of a large number of authors from Serbia (as seen in Dimitrijevic, 2021) it is possible to select the key strengths and weaknesses of agriculture in Serbia, as follows:

The advantages and potentials of Serbian agriculture are:

- Favorable natural conditions: a relative abundance of natural resources, not only in terms of quality land resources but also favorable climate,
- The continuous maintenance of the tradition of engaging in agriculture,
- The existence of processing factories for certain primary products (predominantly fruits and vegetables), some of which are restored old processing complexes from the socialist period, while others are modern new facilities for freezing and processing, also forms a vital base for agricultural production.
- The support provided to agriculture by numerous educational, scientific, and research institutions (and advisory services), which try to keep up with contemporary trends in this field and constantly adapt to them. Proximity to the EU market, as well as cooperation agreements with other countries, are certainly beneficial.

Although many strategic documents state that Serbia has very favorable natural conditions for the development of agriculture, the results achieved in practice are significantly below expectations and the EU average.

List of weaknesses/problems:

- Farms are relatively small.
- The machinery used is, in most cases, quite outdated.
- Production is extensive.
- Livestock production is underdeveloped and declining.
- A lack of knowledge for better utilization of agricultural land
- A large area is not under irrigation systems.
- The organization of many farms is inadequate.
- The state does not provide enough support for the development of agriculture.
- The rural (agricultural) population is quite old and of a lower education level.

Besides national resources, by obtaining the status of a candidate for EU accession, the Republic of Serbia acquired the right to use funds from the IPARD funds for financial support for the development of agriculture.

Innovation in Serbian agriculture

Like any other sector of the economy, agriculture is compelled, if it wishes to remain competitive, to constantly improve through the implementation of innovative solutions and increased investments in research and development.

The declarative commitment of the Government of the Republic of Serbia is in the same direction, that is, the intention is for the development of agriculture and rural areas to be based on the principles of sustainability and greater application of innovations. This intention is confirmed by several strategies regulating this area adopted in the last few years, the most important of which are "Agriculture and Rural Development Strategy of the Republic of Serbia for the period 2014-2024" *(2014) and "Science and Technological Development Strategy of the Republic of Serbia for the period 2021-2025 – The Power of Knowledge" (2021).

Today, innovations in agriculture are predominantly associated with the application of information and communication technologies (ICT) in the digitalization of agricultural production management and precision agriculture, as well as the use of bio and nanotechnologies in agricultural sciences and food production. (Parausic and Roljevic Nikolic, 2021).

According to research from the Institute of Agricultural Economics, Serbia significantly lags behind European countries in the application of innovations in agriculture and food production. Total investments in research and development, as a percentage of Gross Domestic Product (GDP), in Serbia are below 1% and although these investments show a slight upward trend, they are still significantly below the EU average (Parausic and Roljevic Nikolic, 2021).

Although Serbia lags behind Europe in terms of applying innovations in the agricultural sector, the trends are changing for the better. One of the good examples is the BioSens Institute, a pioneer in the digital transformation of agriculture in Serbia. The Institute is known beyond the borders of Serbia, especially to the international scientific community, through its 30 national and 50 international projects, as well as numerous national and international awards received by its researchers. Most projects involving BioSens are from the European Union's research and innovation program – Horizon 2020. The ANTARES project (H2020), supported by the European Commission and the Republic of Serbia, has made BioSens the leading Center of Excellence for sustainable agriculture.

Innovations in agriculture are not treated differently by the state support in Serbia from other innovations, meaning they compete equally with other participants in contests for state subsidies. The Innovation Fund supports several innovative solutions every year by awarding grants for their implementation.

4.2.2 Challenges and Opportunities in Organic Agriculture

The research conducted by the Serbia Organics Association of Organic Producers through a project supported by the German Organization for International Cooperation (GIZ), titled "Organic Production in Serbia 2020" (author Ivana Simic), provides a comprehensive overview of the field of organic production and presents abundant data.

Organic agricultural production in Serbia has been in existence for several decades, during which conditions for its development have improved. It has been 30 years since the first export of organic fruit from Serbia, 30 years since the development of the non-governmental sector in Serbia, 20 years since the adoption and implementation of the first Law on Organic Agriculture, 10 years since the enactment of the first Law on Organic Production, which was prepared in accordance with EU legislation, and 11 years since the establishment of the National Association Serbia Organica.

The development of organic production in Serbia has been supported by many foreign donors, such as USAID, FAO, ADA, REC, SIDA, UNDP, SIPO, and the EU, through the IPA program, Erasmus Plus, and others, among which the German Organization for International Cooperation (GIZ) is particularly notable.

For statistical data, the analysis by Serbia Organica (Simic, 2021) was used. According to this analysis, organic plant production in Serbia in 2019 was carried out on an area of 21,264 ha (with ⅓ of the land being in conversion to organic), which is not a large area (about 0.5% of the total arable land of 4.2 million ha), but is about 10% larger compared to the area in 2018 (and 100% compared to 2010), noting that this includes areas used for collecting wild organic berries, mushrooms, and medicinal herbs, as Serbia still lacks an official methodology for recording this data.

In 2019, the most cultivated organic products were fruits, followed by cereals, while the share of other products was significantly smaller. Since Ekofungi is the only producer of organic mushrooms (in small quantities, certainly), this product was not included in the analysis.

All data from the organic production registry show that fewer producers are involved in organic livestock production compared to the number of producers involved in organic plant production. This is primarily because organic livestock production requires meeting many additional requirements, such as strict requirements for animal housing, their feed, and treatment, as well as compliance with prescribed technological conditions for processing, storage, and transport, in accordance with regulations for organic production, for livestock products to be marketed as organic. However, livestock production in Serbia is experiencing a growth trend, and in 2019, there was a particular increase in poultry, bee colonies, sheep, and pigs, while a decrease in the number of goats was observed compared to 2018. A positive novelty in organic livestock production in Serbia is the development of group production, which was almost exclusively characteristic of plant organic production until recently.

Since organic products have a higher added value compared to conventional products, this gives small producers a competitive advantage in the local market through higher prices, growing demand, and much less competition, allowing them to run their farms as small family businesses in which all family members can be engaged in various ways, thus ensuring economic sustainability. Large farms and companies are not directly competing with small organic producers as they mainly deal with the production of cereals and industrial crops, which require larger investments in machinery.

The processing of organic products in Serbia is carried out by over 120 operators (mostly cold storage facilities), not all of whom are purely organic producers, but combine the processing of both organic and conventional products in their facilities. Large processors, who export their products, often own large cold storage facilities and plants with lines for the production of fruit concentrates, dryers for fruits and vegetables, or other processing. The processing of animal products from organic farming systems in Serbia occurs at a fairly low level with a small number of registered processors.

A more intensive development of the domestic market for organic products in Serbia has been observed only in the last 5-7 years through the opening of specialized markets, organic product stalls at certain markets, the formation of "organic corners" in retail outlets of all major retail chains, the establishment of specialized retail outlets, sales via the internet, and the contribution of fairs, festivals, and other events to market development.

Serbia has been continuously present for more than a decade at the leading international organic products fair BioFach in Nuremberg, Germany. Since 2019, along with the Chamber

of Commerce and Serbia Organica, the Development Agency of Serbia (RAS) has joined the organization and provided financial support for participation in this important fair.

The analysis in this document concludes that the key challenges for organic production in Serbia are primarily expensive raw materials, which, along with the abolition of tariffs for EU-origin processed products, make domestic products non-competitive; the fact that most producers produce small quantities, which reduces profitability; and the uncertain market for organic raw materials, which decreases the efficiency of producers, making them less acceptable for the international market.

The case of Ekofungi shows that all these challenges can be overcome, but only by using all available resources and knowledge.

As key advantages, Serbia Organica mentions the fact that producers who engage in organic production have relatively recently entered this type of processing and that their equipment is more modern, meeting all required standards. Due to the security of suppliers and the certainty of raw material quality, processors group their suppliers, providing them with support in training, procurement of some necessary resources, or paying for certificates.

The greatest advantages of Serbia for the development of organic production are listed as: unpolluted land due to little or no use of chemical agents (5 to 10% of the land is unpolluted and ready for organic production), climatic advantages, numerous agricultural producers, and a growing foreign market demand for organic products. As domestic threats in the SWOT analysis conducted in this study, the danger of environmental pollution and deterioration of environmental quality due to inadequately regulated environmental protection, as well as insufficient state and bank support for this sector are listed. At the same time, threats from foreign markets include rapid changes in consumer demands and pronounced competition. Weaknesses of domestic producers include insufficient knowledge and lack of information, lesser acceptance of innovations in production by domestic producers, lack of entrepreneurial spirit, absence of marketing orientation, and insufficient financial strength (Parausic and Roljevic Nikolic, 2021)

The institutional framework consists of the Group for Organic Production at the Ministry of Agriculture, Forestry, and Water Management, which is the competent authority that performs tasks related to organic production and oversees it, while the Expert Council for Organic Production was formed in 2011 by the same Ministry to consider professional issues, provide

expert opinions, and participate in the implementation of all project tasks related to organic production.

Financial support: The Ministry of Agriculture provides grant funds for organic production, which are modest and insufficient (plant production for organic product plantations; livestock - calves, lambs, kids, pigs, cows, bee hives, consumption fish and breeding livestock and fish mothers, milk production).

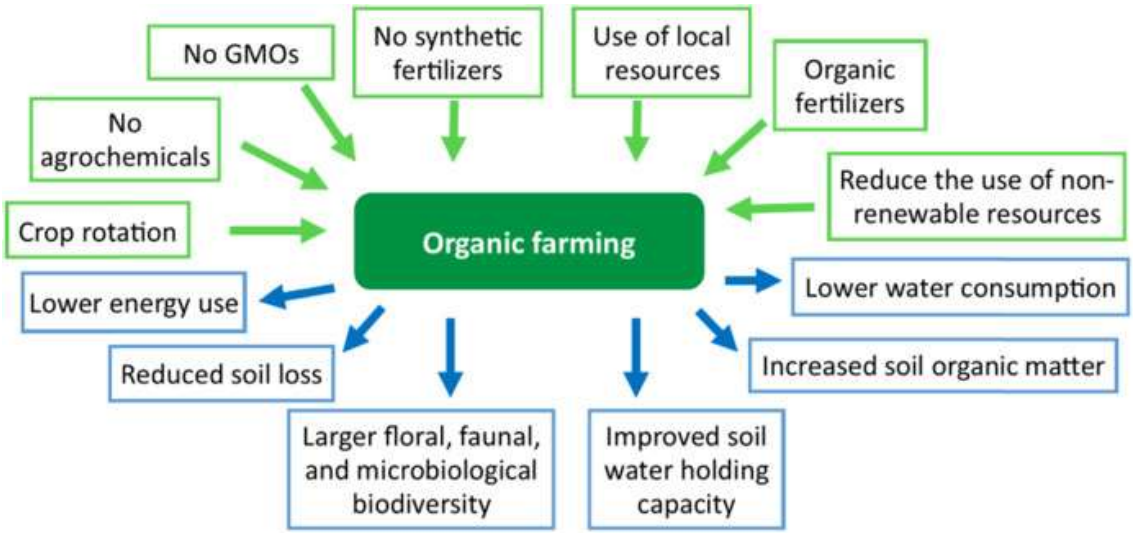

Figure 17, Organic Agriculture, source: Gamage et al. (2023)

Regulatory Environment and Certification Processes:

The most important act is the Law on Organic Production and the regulations adopted based on it (Official Gazette of the Republic of Serbia, 85/2014).

The law regulates all significant elements important for organic production:

a) production of agricultural and other products using organic production methods,

b) their processing, storage, transport, marking, declaration, and sale of organic products.

c) issuance of certificates, etc.

Organic production is based on natural processes, organic and mineral substances are used in that production, and reproductive material, such as seeds, planting material, eggs, offspring, and sperm for animal fertilization (except for precisely mentioned exceptions), is also produced by organic production methods. The use of synthetic-chemical origin is prohibited in this production, and genetically modified organisms and their derivatives are also included

(Radovic and Milicevic, 2020). The exclusion of artificial fertilizers and protective chemical agents in this production significantly protects the environment, especially agricultural land.

The above implies the existence of a precise register of producers of organic products for which the Ministry of Agriculture, Forestry, and Water Management of the Republic of Serbia is responsible. The basic conditions for the development of organic production are (Official Gazette of the Republic of Serbia, 85/2014):

a) spatial isolation of plot land, and cattle farms and processing facilities from sources of pollution.

b) unpolluted land in which the content of harmful substances must be below the maximum allowed.

c) valid quality water for irrigation.

d) minimal air pollution in the area in which organic production is based.

In organic production, the law stipulates that habitats should not be treated with illegal preparations at least 3 years before collection and that the stability of the natural environment and vegetative/animal survival in the collection zone should not be disturbed.

The methods of organic production (vegetative and livestock) are prescribed by the minister authorized for agriculture. Organic products are specially packed in packaging made of natural materials and stored in special rooms (Rajnovic, Mihailovic, and Cico, 2023).

Producers involved in organic production in Serbia are individuals or legal entities, and their number has shown a positive trend over the last ten years, noting that a significantly smaller number of them have direct contracts with authorized control organizations for issuing certificates (534) compared to a large number of producers included in group certification (5.727).

Based on the report on the performed controls and the manufacturer's request, the authorized control organization makes a certification decision and issues a certificate for the product or production process.

The majority of participants in organic production are individuals, and small farms, most of whom are included as cooperatives in the group production system, a model that has been successfully represented in Serbia for decades and that gathers over 90% of organic producers and is regulated by the Regulation on Control and Certification in Organic Production and

Organic Production Methods (Official Gazette of RS 48/11 and 40/12). This form of organization of organic production was allowed by the EU only for third countries, but from 2022, group production will also be permitted in EU countries.

When exporting organic products to a foreign market, the producer should have a certificate that is recognized in the country to which he plans to export his organic product. For the export of organic products, control, and certification are usually carried out by the regulations of the EU. In the case of a producer who is a legal entity that carries out organic production and concludes a contract regarding the cooperation with other producers, who form a group of subcontractor producers, the authorized control organization issues a certificate in which all subcontractor producers are listed (group certificate), and the sale of such certified organic products is performed only by that manufacturer.

The authorized control organization publishes data on issued certificates on its website.

For export, the control of organic production is carried out by the office in Belgrade, while the certificate for organic products by EU regulations is issued by the headquarters of this organization in France (Organica Serbia, 2020). Organic production develops under specific and permanently controlled conditions, and its basis requires the special involvement of agricultural producers, and significant financial resources, but also means a reduction in production.

The current situation in the field of organic production related to certification could be described as somewhat chaotic, given that there is no adequate evidence of authorized organizations for the certification of organic production. Apart from the Ministry of Agriculture and the Chamber of Commerce of the Republic of Serbia, certain foreign organizations are involved in the activities of issuing certificates to certain producers of organic products (Tomas Simin et al., 2019). There is also no precise data on the number of producers by specific categories, their associations, the areas on which organic production is based, the volume of organic production, or the share of organic products in the volume of foreign trade (Stankovic Andjelkovic, and Milovanovic, 2023).

The organic product must be accompanied by a confirmation in the form of a certificate, re-certificate-issued by an authorized organization for 1 year), labeled organic products, and declared appropriately.

For imported organic products, there is also a procedure for the declaration of an authorized organization to obtain a new certificate for such a product together with the necessary

documentation. According to Stankovic, Andjelkovic, and Milovanovic (2023), ‘’for the labeling and declaration of imported organic products, there are the same rules as for domestic organic products. It is necessary to note that the existence of a participatory certification process can cause several problems and limitations.’’ One of the most prominent challenges to implementing participatory certification is that it is currently done voluntarily, which places significant limits on the amount of time people can commit to the process. In addition, many producers come and leave the organic market, creating a lack of consistency and continuity within organic certification.

In addition to the above, the lack of training and education is an obstacle to an adequate level of expertise for conducting inspections and quality control of organic products (Sevarlic, 2015). These challenges have made it difficult to seek certification for new producers who want to place their organic products on the market, as well as to consistently control existing participants in this market.

Although there are good conditions for the start of this production, there are significant limitations stemming from insufficient institutional organization, insufficient information of producers of organic products about the possibilities and importance of this production, the need to invest certain financial resources, etc. It is necessary to invest significant efforts and many efforts to approach the establishment, improvement, and expansion of this type of production in an organized manner, which is important for domestic agricultural production, producers, and consumers, but also for the improvement of the environment, considering that organic production is the basis of sustainable agricultural production (Draškovic, 2017).

Additional weaknesses: The tax system of the Republic of Serbia does not recognize the difference between conventional and organic agricultural production, that is, it does not differentiate between a healthy environment and fiscal goals. Organic production in the Republic of Serbia is significantly influenced by the difficulties and expenses related to quality seeds, quality control, certification, employment of labor, land preparation costs, and more. Faced with the impossibility of optimizing production costs and revenue, domestic producers often abandon organic production in favor of non-organic production. Thus, they contribute to increasing the competition between traditional production methods and organic production (Filipovic et al., 2014).

According to Avramovic and Stankovic (2020) the tax system should significantly include measures and instruments to reduce the costs of organic production. Reducing the costs of

organic products through a system of tax incentives and exceptions would necessarily lead to an increase in production efficiency and competitiveness.

4.2.3 Circular Economy and Sustainable Practices in Serbia

Current Status, Vision, and Obstacles

In 2020, the Ministry of Environmental Protection of Serbia adopted the Roadmap for the Circular Economy in Serbia. This document primarily aims to encourage systemic changes in society's thinking, culture, and attitude towards resources, as well as to convince decision-makers of the necessity to change public policies in the context of the circular economy. This initial document will define future transition steps and timelines through dialogue between decision-makers, industry representatives, the academic sector, and civil society, utilizing digital tools.

The Roadmap mentions that out of the 17 Sustainable Development Goals (SDGs) from the UN General Assembly's Agenda for Sustainable Development by 2030, seven are directly related to the implementation of the circular economy: the goal of affordable and renewable energy, decent work and economic growth, sustainable cities and communities, responsible consumption and production, climate action, life below water, and life on land.

It is also stated that the transition to a circular economy requires quite radical changes, innovations, and measures both in the production and consumption systems. It is expected that this process will not be smooth and without challenges and obstacles. The document identifies the biggest challenges as: insufficient information and the need for additional knowledge and skills about circular economy business models; understanding the importance of the transition in the context of market competitiveness; availability of adequate financial resources and financial justification for using new technological processes; creation and application of public policies and circular economy standards; availability of grants and subsidies for investments in the circular economy; and insufficiently developed circular consumer culture.

The roadmap for the circular economy in Serbia claims that it becomes evident that Serbia's agricultural sector possesses significant potential for the adoption of circular economy practices. The document's analysis and recommendations provide a strategic roadmap for leveraging this potential, emphasizing the role of policy, innovation, and collaboration in overcoming barriers to sustainability. This integration not only aligns with global

environmental goals but also offers a pathway for enhancing the sector's economic resilience and competitive advantage on the international stage.

The exploration of the circular economy within Serbia, underscores the nation's emergent commitment to sustainable practices. This segment emphasizes Serbia's pivotal shift towards resource efficiency and sustainability, spotlighting initiatives aimed at reducing waste, enhancing recycling efforts, and promoting renewable energy sources. Such endeavors are instrumental in transitioning Serbia's agricultural sector towards a more sustainable and resilient future, aligning with global environmental goals, and fostering economic growth that is both inclusive and sustainable (Mitrovic et al.,2017).

There are two distinct pathways for Serbia's progression towards a circular economy: a reactive approach, which adheres to the status quo with minimal advancements in sustainability, risking further environmental degradation and missed economic opportunities; and a proactive approach, advocating for a comprehensive embrace of circular economy principles. This proactive path suggests a transformative shift in policy, culture, and business practices, positioning Serbia as a leader in sustainable development within the region. It emphasizes the importance of investing in green technologies, fostering innovation, and enhancing public-private partnerships to achieve sustainability targets.

A further claim is that the agricultural sector stands at a crossroads. The sector's ability to adopt circular economy principles will not only contribute to environmental sustainability but also offer avenues for economic diversification and resilience. The proactive path, although challenging, offers a strategic direction for leveraging Serbia's rich agricultural heritage towards sustainable development, enhancing food security, and contributing to the global sustainability agenda.

The analysis reveals the imperative for Serbia's agricultural sector to transition towards a circular economy, underscoring the need for strategic investments, policy reform, and stakeholder engagement to overcome existing barriers and harness the potential for sustainable growth (Mitrovic et al., 2017).

Institutional Framework and Policy Support

Serbia's key strategies include the adoption of the Roadmap for the Circular Economy and the Circular Economy Development Program by 2024.

The roadmap lists comprehensive recommendations for facilitating this transition. These include the development of supportive policy measures, investment in research and development, and the promotion of public-private partnerships. Such recommendations are aimed at addressing the identified challenges and barriers and laying the foundation for systemic change within the sector.

The roadmap elaborates on these recommendations, proposing targeted strategies for implementation. These strategies encompass enhancing the regulatory framework, fostering innovation ecosystems, and building capacities among farmers and other stakeholders. The recommendations highlight the importance of a coordinated approach that leverages both national and international resources for the development of a circular economy in Serbia's agricultural sector.

Key Actors, Innovative Projects, and Grants

The Chamber of Commerce of Serbia recently established a Center for Circular Economy, which is another attempt by Serbia to engage institutionally in this area, recognized as a developmental opportunity.

The Center for Circular Economy PKS has the role of informing, educating, and preparing the economic environment for the transformation of the linear economy to a circular one. It is a kind of chamber start-up for professional - advisory assistance to business entities, and members of the Chamber, in the following areas: Introducing the principles of circular economy into the business of companies through monitoring and analyzing economic trends in the waste recycling industry, ending the status of waste and introducing the "zero waste" model of production, establishing a waste exchange, using waste for energy purposes, encouraging and attracting green investments in waste processing according to the model "from waste to product", external communication with companies (databases, best solutions, available technologies, investment advice), availability of money for green investments (domestic and foreign funds), green public procurement, connecting with companies in the region, green jobs and reducing the gray waste market (PKS, n.d.)

Another actor is the Academy of Circular Economy. It is a comprehensive model for educating businessmen in the field of transitioning to a circular economy. In partnership with the Serbian Chamber of Commerce and with the support of EIT Climate KIC, in two years, this program has gathered over 60 businessmen from over 15 business areas, collaborating with over 20 domestic and international experts from various business subfields of the

circular economy. In Serbia, ACE defines the community of responsible companies. The average grade of ACE in the last two years was 4.62 (out of 5), and the participants are ready to propose and systematically approach new circular solutions that will soon differentiate them on the market (Cirebon, n.d.)

The case of Ekofungi analyzed in this study was chosen, among other reasons, because, as of 2018, it was the only agricultural production company in Serbia that adheres to all principles of the circular economy (2018, OSCE conference on the circular economy).

Examples of good practices include the "Tetra Pak Production" company, which produces recyclable cardboard packaging, and "Feplo" which manufactures eco-friendly waterproof boards from recycled Tetra Pak and plastic, demonstrating innovative approaches to circular production and resource conservation (Cadjenovic, 2023)

The United Nations Development Programme (UNDP) in Serbia has initiated actions like the "Circular Economy Platform for Sustainable Development in Serbia" focusing on single-use plastics, textiles, furniture, and food surplus.

The authors of the 19 best innovative solutions for a faster transition to a circular economy received cash prizes in the total amount of $190,000, awarded by the Ministry of Environmental Protection and the United Nations Development Program (UNDP), with the support of the Global Environment Facility (GEF) as announced by UNDP (UNDP Serbia, 2023)

Prizes were awarded to private, public and social enterprises, scientific institutions and citizens' associations.

Their innovations will contribute to more efficient use of resources and energy, better waste management, and thus to the reduction of greenhouse gas emissions (GHG) and environmental preservation, according to the announcement.

Thirteen innovations that are the result of cooperation between science and business were awarded with a "circular voucher" worth $10,000 each.

Winning projects of circular vouchers for cooperation between science and business were:

1. Along the new, clean green path from biowaste to bioactive treasure

The Faculty of Technology and Metallurgy of the University of Belgrade and Beoflos DOO will treat bio-waste from frankincense resin, pureed tomato remains, and wild rose seeds in a

new way, supercritical extraction, to obtain new bioactive components that are used for natural medicine and as supplements in the diet.

2. Hydrocarbon production from fruit processing waste

The Faculty of Technology of the University of Niš and Fruvita DOO will develop a simulation model of the processing of organic fruit waste to obtain hydrocarbon black and process water by hydrothermal carbonization. As a result, a feasibility study of this industrial process will be done. Hydrocarbons can be used as a bioenergetic, an absorbent, or a solid fertilizer.

3. Valorization of colors for food products from fruit and vegetable waste isolated using green extractions

The Faculty of Chemistry of the University of Belgrade and "MANDARINA CAKE SHOP" DOO will, in an innovative way, extract pigments from fruit and vegetable waste that are of high quality and safe for health and are used for coloring ice cream. This will contribute to the transition to the use of natural colors in food production, as well as to the reduction of food waste, which today accounts for 40% of waste in Serbia.

4. Application of geographic information systems for identifying locations suitable for the use of biofertilizers

The Faculty of Geography of the University of Belgrade and "BioCombact" LLC will use geographic information systems to analyze three districts in Serbia in order to identify the area most suitable for the application of innovative microbial-organic biofertilizers, where it will be optimal to place composters, and to test the commercial application of this fertilizer and the development of new variations of fertilizers.

5. Application of waste from fruit processing to obtain high-value pectin-based products

The Faculty of Technology of the University of Novi Sad and ESSALK DOO will treat fruit waste in an innovative way in order to obtain pectin-based ingredients used for the production of edible coatings. In this way, it will contribute to the reduction of waste and negative effects on the environment caused by conventional ingredients of this type, which are predominantly in use today.

6. Tradition and innovation in the service of circular agriculture

Mihajlo Pupin Institute LLC, Belgrade, and "Biofrost Bioplastics" LLC have designed a new system for planting plant crops. Planting and watering plants will be automated using artificial intelligence. Biodegradable pots will be used for planting, which can be planted directly in the soil, and which, during decomposition, will additionally feed it with their properties. This will speed up production, so instead of several tens of minutes for one plant, it will now take one minute - for three plants. With this solution, the carbon footprint will be reduced by 5.8 tons of CO2 per year.

8. The potential of mushrooms produced in Serbia for obtaining high-quality chitin and chitosan

The Institute for Multidisciplinary Research (IMSI) of the University of Belgrade and EKOFUNGI DOO will examine the potential of using the substrate from the cultivation of mushrooms in Serbia, champignons and oyster mushrooms, to obtain chitin, which is used as an alternative material for the production of nanopaper, in medicine, environmental protection, agriculture and food industry, as packaging.

4.3 Ekofungi's Story: Innovation and Impact

The research question was: How can SMEs in traditional sectors, particularly in Serbia and similar markets, learn from Ekofungi's innovative practices to overcome barriers and foster development and growth, while achieving global relevance in innovation?

To investigate this research question, the following section delves into the operations, strategies, and innovation journey of Ekofungi. This case study offers an in-depth look at how one SME in Serbia has navigated the complexities of integrating innovation into traditional agriculture, providing a blueprint for others in similar contexts.

Summarized content of this chapter and main findings as follows:

- First the story of Ekofungi’s founder is presented, as her personal specific knowledge and innovations based on research are key to the company's success.
- Next is the history and evolution of the company: key milestones, values, mission, and innovations.
- Then, section 4.3.3 covers other aspects of Ekofungi business: products, markets, competitors, collaborators.
- Next section covers a SWOT analysis of the company.

- The main case study findings and insights are presented in the following section.
- The last section are two annexed data sources, namely the Questionnaire for the Founder of Ekofungi (primary data source) and Know-How Services Client Feedback Survey (secondary data source)

The questionnaire with Ekofungi's founder, Ivanka Milenkovic, revealed key strategies for innovation and sustainability that contributed to the company's success. Her answers highlighted how Ekofungi overcame industry challenges, emphasizing the importance of sustainable innovation for global impact.

The anonymized surveys from Ekofungi's know-how services clients reveal a universally positive reception, highlighting the system's effectiveness across different economic backgrounds. This feedback underscores Ekofungi's role in transforming the oyster mushroom manufacturing niche of the agricultural sector through sustainable and innovative practices. The findings from this comparative analysis serve as a testament to the potential of innovation in driving significant advancements in traditional industries, supporting the thesis's objective of showcasing how focused, sustainable innovations contribute to sector-wide development and both economic and environmental sustainability.

4.3.1 Ekofungi's founder: Ivanka Milenkovic

Ivanka Milenkovic, with a MSC degree in biology, started working on mushroom production in 1988, at the same location where Ekofungi is incorporated in 2012. From 1990 to 1993 she was in the Netherlands and worked for various research institutes. After returning to Serbia, Ivanka Milenkovic went to work in a facility for production of mushrooms at another location from 1993 to 1996. There, she witnessed huge amounts of compost being wasted as part of the production process. Ivanka Milenkovic quickly came to realize that this ‘waste’ by-product could be repurposed and used in the animal (ruminant) feeding technology. From 1996 she has worked almost continuously at the same physical place in Padinska Skela through different business entities, but in the same and only field: mushroom production.

Together with sustainability visionary Gunter Pauli, she completed a variety of integrated mushroom-from-waste projects across four continents. Mushroom farming businesses were established to recycle brewing residues, apple branches, water hyacinth biomass, salt cedar biomass, pineapple residues, banana leaves, and weed biomass. In the early 2000s she was

also involved in managing the Association AgroMreza (AgroNetwork), aiming to contribute to the transformation of Serbian agriculture.

Her in-depth understanding of biological processes had a real-life application, materialized in several innovations that finally presented themselves as a business opportunity that could become profitable in a sustainable, environmentally friendly way, finally with establishment of Ekofungi Ltd. and its further development.

She is involved within the international community of mushroom scientist in different ways, including participation in EU and other projects (with two ongoing Horizon projects), at conferences, writing articles, also publishing (for example Mushroom Cultivation Manual for the Small Mushroom Entrepreneur, with sections written by the most globally prominent authors from this field), but also acts within Blue Economy movement, supplied (in NESTLE funded project) the training of African girls and women in mushroom production through the Future of Hope Foundation and shares her knowledge with other potential mushroom growers in variety of forms, as a firm believer in open source innovation (directly or indirectly, Ekofungi has trained more than 500 mushroom growers all over the world).

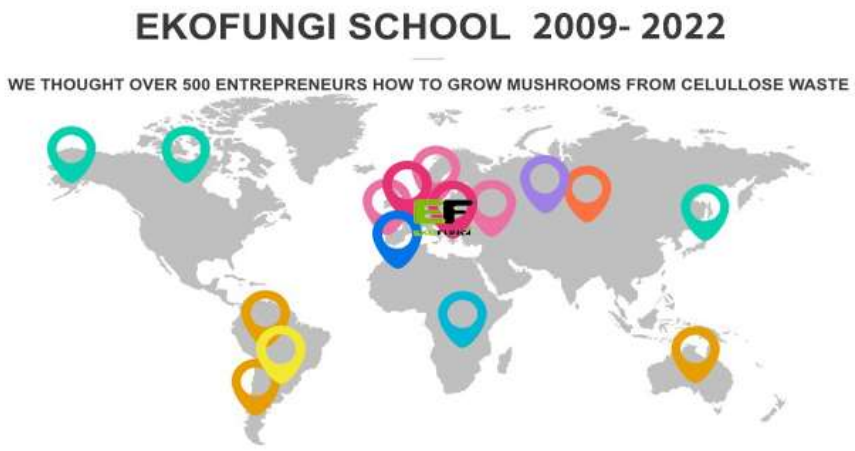

Figure 18, Trainees of Ivanka Milenkovic, source: Ekofungi (2023)

4.3.2 Evolution of the Company: Key Milestones, Values, Mission, and Innovation

The following table presents the timeline of Ekofungi Ltd. since its establishment in 2012. Prior to this, the founder has a rich history of engagement in the same field, including roles as

an employee and founding other ventures not officially branded as Ekofungi, which laid the groundwork for the current company's inception and growth.

Table 4, Ekofungi timeline 2012-2023, Source: created by the author, data provided by Ivanka Milenkovic, founder of Ekofungi

Year	EVENTS / ACTIVITIES/ RESULTS
2012	• Ekofungi Ltd. established in August 2012, as a startup company, in order to apply to call for mini grants of the Innovation Fund of Serbia • First consultations on cultivation of mushrooms were provided to clients, as a result companies Grow Holland and Decicle Paris were founded
2013	The first Innovation Fund of Serbia mini grant won and implemented (80.000 EUR). As a result, additional know-how created - processing of cellulose material for the production of mushrooms without the use of energy
2014	• Second Innovation Fund of Serbia mini grant received. • Mushroom Learning Network conference held as a presentation of the Ekofungi model to the world of small and alternative producers
2015	Ekofungi school formal curriculum was created, and initial strategy determined
2016	A training and other transfer of knowledge provided to NGO in India, based on which their mushroom producing social company created, based on our circular economy production model
2017	A range of products was designed and implemented with the involvement of other innovative solutions in the field of processing
2018	International symposium of mushroom products, Ekofungi approach and the experiences in production presented
2019	Transfer of knowledge to Mauritius, to create a brand-new facility created for mushroom production, fully consistent with the Ekofungi model
2020	• Creation of the machine for substrate processing, hardware prototype produced, also software, as our new product line for micro growers. • The NESTLE INDIGO Africa project, know-how transfer provided within it, on the spot. This project is the first in the line of sustainability in the NESTLE company globally. • Involvement in 2 EU HORIZON projects 2020 (ongoing to 2022) IPANEMA and

	BIOSCHAMP • Our products, as the first brand from Serbia. registered on AMAZON platform and sales to USA started
2022	Sales of our equipment and knowledge transfer to various locations
2023	Sales of our equipment (machine for substrate processing, according to the innovative model for cultivation) and knowledge transfer to clients in Europe and Africa
Up to - 2023	EKOFUNGI SCHOOL • A total of about 180 participants trained (150 on site and 30 online). • About 30 SMEs were established as the result of his training and consultations. These were in different continents and countries, such as France, Germany, Algeria, Morocco, Denmark, Netherlands, Paraguay, Peru

Prior to the establishment of Ekofungi, significant milestones contributed to its foundation, detailed in the previous section. A notable event was Ms. Milenkovic's participation in the FINE FOOD SALON exhibition in Turin, Italy, in 2008. There, in collaboration with the University of Turin's Department of Systemic Design, she showcased the process of mushroom cultivation on coffee grounds. This presentation garnered significant interest and attracted prospective clients for know-how transfer and training.

Vision and Mission:

The vision and mission of the business model of Ekofungi are based on the principles of the Blue Economy, where, in addition to circularity and sustainability, collaboration (even with competing companies) is also of great importance. This form of cooperation has been achieved with business partners from Rotterdam in the Netherlands. Ekofungi's mission is to capacitate, collaborate with, support, and mentor marginal and vulnerable members of society through entrepreneurial and self-development initiatives. Ekofungi facilitates research and training in innovative initiatives that provide for and promote sustainable food, nutrition, and income security to improve the conditions necessary for every member of society to reach their full potential. The future of organic mushroom production as perceived by Ekofungi, is based on local production and small local producers.

As stated, in addition to a focus on environmental sustainability, a core value of Ekofungi's business is an emphasis on social sustainability. This can be seen in the company's approach

to dealing with its employees who receive benefits not commonly provided by businesses in Serbia, such as private social security and complementary health insurance. Ekofungi also participated in various projects offering assistance to vulnerable groups and youth.

Innovations Applied in the Process of Mushroom Production

Figure 19, Some of the circular processes related to Ekofungi, source: Ekofungi (2023)

Mushrooms are natural 'waste managers' and have the ability to grow nearly anywhere and on anything. What is deemed a waste by-product in one industry can, therefore, be used in the production of mushrooms (Youth in Business Case Study, 2021).

Ekofungi grows mushrooms on organic waste products that contain cellulose, including straw (for oyster mushrooms) and compost with horse manure (champignons). Once the mushrooms are cultivated, the leftover compost is used to grow vegetables and grain and is sold as fully organic fertilizer to hobby gardeners. Growing grain (wheat, rye, millet) produces cellulose as a by-product, which Ekofungi uses as substrate for its oyster mushroom production. The champignons and oyster mushrooms are sold as fresh produce in Serbia at organic markets and are dehydrated for sale abroad. Re-purposing materials that would otherwise be disposed of – in the case of Ekofungi, coffee grounds, grain straw, different sorts of branches and horse manure – allows for the value of the by-product to be retained in the production process and within the economy. This makes Ekofungi's business model a fully sustainable one.

The inputs required for mushroom production are far cheaper as waste by-products than purchasing compost commercially. Without a circular model, Ekofungi, as a small-scale mushroom producer, would not be able to compete with large, industrial producers growing

mushrooms at scale. The spent compost is used as soil for flowers, thus closing the production cycle.

The oyster mushroom is produced according to an innovative substrate preparation process, primarily an energy-saving model, introduced first as a response to the sudden increase in gas and electricity prices. This production model is recognized in the world of mushroom cultivation as a separate direction of development that is in line with the principles of circular economy.

The essence of the innovation in Ekofungi's production process is that, unlike modern technology based on technical solutions, it is based on satisfying sustainable biological conditions. In Ekofungi's production process, the material is first chopped to break down the structure of straw or lignocellulosic molecules, followed by a washing process that makes up 90% of the entire oyster mushroom production process.

In addition to the mentioned innovation, Ekofungi in its previous legal form, under a different name, started using innovative greenhouses during 2002 and 2003, and later continued to introduce many other technical improvements and innovations throughout its work. For example, during the summer of 2013, Ekofungi implemented an innovation focused on reducing CO2 emissions and enhancing the further development of its sustainable business. This project was realized with funds from the Innovation Fund and their grants.

The range of technical innovations is much more voluminous, and having in mind the limitations of this thesis, we will only provide a basic overview. It includes an array of improvements, from the production tunnels to ventilation and heating systems, and integrates many other components. Most of these components aren’t manufactured in-house, but they were created based on Ekofungi’s design or customized for Ekofungi’s needs.

Even if some of these external inputs were already made products (e.g. equipment for dehydration), spotting the opportunity to use such and create a whole new range of products, required Ekofungi creativity and an innovative approach, with adjustments made at company’s premises.

Figure 20, Equipment in Ekofungi facilities, source: made by the author during the field visit

Ekofungi is the only Serbian and SEE organic mushroom producer using innovative technology and specialized know-how to fully leverage the opportunities sustainable, circular business models offer.

4.3.3 Other Aspects of Ekofungi Business: Products, Markets, Competitors, Collaborators, and Revenue Sources

Product and service portfolio:

The portfolio consists of the following parts:

- Physical products
- Mushrooms
- Fresh
- Dehydrated (only mushrooms or mixtures with vegetables)
- Machine for substrate preparation
- Ekofungi School
- Transfer of know-how

Mushroom Production:

Today, using a fully circular business model, Ekofungi produces about 100 tons of champignons and 30 tons of oyster mushrooms per year, sustainably and ecologically.

Significant parts of these are used to create dehydrated products, which are predominantly exported.

By certifying its organically produced mushrooms, Ekofungi has classified its products in the highest quality class demanded by modern consumers. Basically, there are 2 product groups.

Fresh mushrooms: (champignon and oyster mushrooms): these are sold in some supermarkets and occasionally also as B2C (direct to consumer through online sales) including delivery to customers in the Belgrade urban area.

Dehydrated products: These consist of several types of pure dehydrated mushrooms and mixtures of dehydrated (organic grown) vegetables and mushrooms. Ekofungi dehydrated products have a shelf life of up to 24 months. The mixtures are predominantly sold on Amazon for the USA market, but they are available on other markets as well.

Figure 21, One of the dehydrated mix packages, source: Ekofungi (2023)

Machines:

Ekofungi has designed a range of machinery that can be seen on their website and consists of:

- Ekofungi machines for substrate production (2 types, one automatic, see below)
- Ekofungi ventilation system for substrate production

Figure 22, One of the Ekofungi machines, source: Ekofungi (2023)

Ekofungi School:

In addition to producing mushrooms, the business operates the Ekofungi School, where 25 years of mushroom-on-waste business were packaged into a comprehensive course. Founded in 2013, the school aims to transfer knowledge by educating young individuals in the entrepreneurial skills and technical expertise needed to start a circular mushroom growing business. Ekofungi training in sustainable mushroom growing, rooted in both science and practice, provides participants with a firm knowledge base on how to grow a sustainable and profitable mushroom business.

Ekofungi's technology is largely open source, and the founder aims to further develop the global network of small-scale, ecological, and energy efficient mushroom producers that has been established. Founded on the conviction that it is necessary to spread the word about sustainable business practices, the school has become an important revenue stream for Ekofungi. Trainees have come to Serbia from all over the world, including Japan, Canada, Italy, Zimbabwe, Denmark, and the Netherlands. In Rotterdam, two former trainees went on to start their own circular mushroom-growing business, which is now one of the largest urban farms in the Netherlands.

The curriculum of Ekofungi School is officially accredited by the Agency for Additional Education of Serbia (part of VET). The number of trainees was 150 on site and 30 online over the whole period (data provided by the founder, though it differs from the data on their website). Some of these (about 30) have established their own companies and tend to use additional consulting services of Ekofungi. Some of them also purchased Ekofungi's machinery.

Figure 23, Ekofungi School, attendees and trainer, the classroom and Ekofungi facilities, source: Ekofungi (2023)

Transfer of know-how

The know-how provided by Ekofungi is supplied in different formats and modalities, and in specific cases:

- Together (prior and after purchase) with the sales of machine to its byers, or without such hardware component
- Online consultations, at the location of client, at Ekofungi premises, or a combination of these
- Duration varies from 1-2 days, to several months (repeated missions over a longer period, affordable only for larger clients)

In all these cases, clients are supposed to launch a business and create a facility in mushroom production. Some of them are beginners in entrepreneurship altogether, while others (individuals and companies) have prior experience, but in different fields. They come from various parts of the world and from countries at different levels of development. You can see the feedback from some of these clients presented via survey results found in section 4.3.6, while you can find both questions and aggregate answers in the Annex section at the end of this thesis.

Occasionally, advice (know-how) is also provided to companies with an already existing production of mushrooms. This includes a recent arrangement with EBRD to act on their own behalf as their consultant in the mushroom production industry. Recently (in 2024) the first Ekofungi expert mission within EBRD was made to Kazakhstan.

A special case is also the Amazon Market Research tool. Until recently, Ekofungi did not use systematized market research at all, which presents one of their weaknesses identified during this case study. They implemented this approach only since the Amazon platform gave them access to its own tool created for that purpose, because Ekofungi got identified as one of Amazon's preferred clients. Not only has it been useful directly for Ekofungi (helping them

increase sales of their products), but also, they have utilized this tool to assist other SMEs who wanted to enter the USA market, charging them a fee, and creating another income stream for the company.

Revenue Sources and Financial Performance of Ekofungi

Regarding the financial results of Ekofungi, they are publicly available on the website of the Agency for Business Registers of Serbia, only for the years 2020, 2021, and 2022 (data for 2023 have not yet been published), and from them, it is possible to see only the total revenue achieved, while their structure by sources of origin is not available.

A more detailed structure of Ekofungi's revenue was obtained directly from the founder, with the note that the amounts achieved from the placement of innovations, nor the names of customers, could not be published due to data protection. From the data provided, it is clear that less than one-third of the revenue is generated by direct sales of fresh mushrooms and mushroom products (predominantly via Amazon), while the revenue from Ekofungi school, know-how transfer services, and selling machinery, together constituted a larger part of Ekofungi's revenue each year, and their relative proportions varied by year. A part of the revenue in recent years has also been generated from participation in Horizon EU projects related to mushroom cultivation, in which Ekofungi has participated.

It should be noted that the total revenue achieved are not significantly high in nominal terms, but it is important to mention that they have recorded growth every year, which in some years (e.g., in 2022) was particularly high (revenue were doubled compared to the previous year).

As a final note on the diverse set of products and services Ekofungi offers, while comparing the mushroom production side of the business and the other parts and revenue streams (machinery, know-how, and the Ekofungi school), the impression (gained through the informal interview with the founder) is that these supplementary parts of the business were the ones growing significantly faster than the primary mushroom production and have become at least equally important to Ekofungi, if not more.

Markets: Local and Global Reach

Local Market

Ekofungi targets environmentally conscious, high-income consumers with its organic mushrooms, which are sporadically available in Serbian supermarkets. The primary challenge in partnering with retail chains is the high profit margin demanded by intermediaries, ranging

from 20% to 40%. Such margins complicate Ekofungi's ability to achieve profitability, occasionally breaking even when selling through these channels. Despite higher production costs, the local market price ceiling for organic mushrooms aligns with that of conventional (industrial or home-grown) mushrooms, limiting revenue potential.

Ekofungi's efforts to sell organic mushrooms through retail supermarkets faced challenges, including profitability issues with multiple retailers, leading to discontinuation. Despite these challenges, a partnership with Super Vero in Serbia since February 2024 offers a new opportunity. However, the lack of a marketing budget remains a significant hurdle, impacting sales even for the products sold in supermarkets.

International Market

Ekofungi primarily exports 95% of its dehydrated products to the USA through Amazon, targeting consumers willing to pay more for organic and sustainably grown products. Beyond the USA, Ekofungi's global sales span various countries, and there are plans to further diversify market reach in the future, reflecting a strategic approach to tapping into international demand for premium organic products.

Competitive Landscape and Strategic Alliances: Competitors and Collaborators

In Serbia and Southeastern Europe, Ekofungi stands out as the only recognized producer of organically grown mushrooms, contrasting with numerous small-scale home-based producers.

Fresh mushrooms in retail chains are placed by traders, significantly reducing the producer's share of the final sale price.

Competitors: In regard to competition on local markets, imported Chinese marinated mushrooms and medicinal dried mushrooms from Asia represent a different market segment and do not directly compete with Ekofungi's offerings.

Local producers do not export fresh mushrooms, facing challenges due to Serbia's non-EU status, complex export procedures, and the perishability of fresh mushrooms. Conversely, Serbia is a notable exporter of wild mushrooms, primarily to Italy. In the competitive US market, particularly on Amazon, Ekofungi contends with imports from China and US-based products, benefiting from higher quality (100% mushroom content) but is compelled to set prices lower than desired due to intense competition.

Collaborators: Ekofungi collaborates with local organic vegetable growers for its mixed dehydrated products. It views networks of worldwide companies, some trained by Ekofungi, as potential competitors yet considers their success as an extension of its own philosophy.

Market Analysis: The study did not extend to a market analysis beyond mushrooms, though it's noted that similar training and know-how offerings exist in the market. For machinery, Ekofungi appears unique.

Legal Dispute: A notable case involves a European startup that bought machinery from Ekofungi for product replication. Legal actions are underway due to contract violations regarding know-how use. Interestingly, this startup initially offered Ekofungi ownership shares as know-how compensation.

Figure 24, Part of Ekofungi facilities (production tunnels), source: courtesy of the founder

4.3.4 SWOT Analysis

The SWOT analysis, a tool not previously used by Ekofungi, was conducted by the author to identify the company's key characteristics. One major strength is Ekofungi's focus on innovation, which is vital for its growth and ability to stand out in the market. This includes coming up with new ideas in-house, adopting ideas from other companies tailored to their needs, or working together with partners. This innovative approach has led to new ways for the company to make money, build its brand, and gain international recognition.

For example, Ekofungi is currently working on a project with the Institute for Multidisciplinary Studies, supported by the UNDP and the Serbian government. They are trying to create a new type of paper from mushroom waste that can be used for packaging.

This project shows how Ekofungi is always looking for new ideas to improve mushroom farming, understanding that constant innovation and keeping up with the latest trends are crucial. These innovations are not just about technology; they also involve new ways of organizing the business and strategic planning.

During the interview, these main challenges faced by Ekofungi were discussed, focusing on the overall situation in the country and its mushroom production sector:

- The innovative activities of enterprises like Ekofungi often remain unregulated and misunderstood, leading to undervaluation by clients, institutions, banks, and the state. Consequently, Ekofungi's brand and knowledge-based activities are predominantly recognized and utilized by international clients.
- Mushroom production, including organic varieties, receives no subsidies or financial incentives from the Serbian budget or the IPARD (EU) program due to its exclusion in negotiation discussions. Previously available co-financing for organic certification fees has also been discontinued.
- Selling organic products at a higher value is challenging due to their pricing significantly exceeding that of regular products. The purchasing power of the local population, and in many cases even in some EU countries, is insufficient to support these higher prices, especially when considering additional costs from import and retail chain margins.

The author has identified potential additional weaknesses within the constraints of the field visit duration, interview, and information access, including:

- Excessive reliance on the entrepreneur's personal talents and qualities poses a risk to the company's sustainability post-retirement, a challenge common in SMEs, especially those that are family-owned. This issue is exacerbated by the specialized nature of the knowledge and skills involved, which are difficult to transfer.
- Inconsistencies in English usage in some communications and discrepancies in information provided to the author versus the public, such as the establishment year of the Ekofungi School and the number of people trained. While some discrepancies may be minor and unintentional, they could potentially be addressed to enhance professionalism.
- Potential underutilization of business opportunities, characterized by a lack of systematic efforts to pursue grants related to the circular economy or similar fields, and a passive rather than proactive approach to seeking consultancy opportunities.

This may stem from the company's small size and the staff being stretched thin by primary business activities.

The key opportunities and enablers, as identified by Ekofungi and the author, include:

- International Community of Practice (CoP) within the Blue Economy, as well as collaboration and networking in Circular Economy sector, including both global contacts and local Serbian experts.
- Financial and advisory support from grants, such as those awarded by the Innovation Fund, Belgrade ("Waste to taste" in 2013, and "21st Century Food" in 2014), which provided not only funding but also business advice in marketing, intellectual property, negotiations, and strategy.
- Participation in international projects like EU Horizon's IPANEMA, BIOSCHAMP, and Nestle funded INDIGO in Africa, which expanded Ekofungi's research and development horizon.
- Success in the US market led to significant revenue, branding benefits, and the development of a new service related to Amazon's embedded marketing tool for other SMEs.
- Public recognition as a leading circular economy company in Southeast Europe by OECD in 2018, highlighted in the EC report on circularity in Southeast Europe and featured in the Ministry for Environment's Circular Economy Roadmap, 2021.

The threats are presented solely within the SWOT table.

Table 5, SWOT analysis of Ekofungi business, source: developed for this thesis by the author

Strengths	Weaknesses
• Brand recognition, international reputation, partnerships and linkages • Applied innovations, including processes and machinery. • Flexibility and creative approach to overall business • Revenue from additional product lines: training, know-how,	• Micro company: insufficient financial capacity, difficult future transfer to another CEO (after retirement), • Difficulties to expand expensive organic production in the local circumstances of Serbia. • No success in entering the EU market with products (so far) • Almost no options for capital infusion

machinery • Success in USA market via Amazon (dehydrated product)	(attracting investors)
Opportunities • Systematic exploitation of international contacts & networking for marketing purposes • Further grants & projects incomes primarily abroad • Increasing interest for circular economy and energy savings leading to better profiling of organic production • Identifying new clients and further expansion of know-how transfer. • Utilizing our knowledge and innovations in new fields in collaboration with other researchers and entrepreneurs	Threats • Local competition: Grey economy producers of non-organic products • Other competitors on Amazon (already prices lower than expected) • Limited buying power of local buyers for organic products • Buyers of machines could start their own production (happened in 1 case), or some other companies may do the same. • Lack of any subsidies for mushrooms (unlike other organic food products)

4.3.5 Synthesized Overview of Findings from the Informal Interview, Questionnaire, Client Surveys, and Additional Documents

The following insights, provided by Ekofungi's founder during the field visit and informal interview, serve as preliminary guidance for SMEs in traditional industries aiming to integrate innovative practices into their business models:

- To have a wider view on innovation means that they should start from their own existing knowledge and try to adjust and adapt and this into their own circumstances.
- Small, incremental innovation is also important. Include your staff in this on an everyday basis.
- Open innovation approach, outside to SME: use the best you can the knowledge that you can get from the others such as consultants, scientists and company's suppliers

and anyone else that can provide you with useful advice, concept, hardware or software tools.

- Lack of registered patents is not necessarily an obstacle to getting income from IP. Know-how seems to be an equally or even more valid type of intellectual property. (without huge investments in international protection). Within contracts for sales of machinery or sales of know-how Ekofungi has a stipulation that buyers cannot resell such knowledge or reverse engineer and sell to others our machinery without our consent and economic participation
- Open innovation, inside out: On the other side, look for opportunities to share your knowledge with others (even if you can't always charge immediately for it). In the long run it can indirectly ensures additional sources of income and recognition in the academic and business community
- Creative approach adjusted to various local circumstances. The same technology must be adjusted locally.
- Flexibility, readiness to change elements of business (defined by Ekofungi a lot like the pivoting in the Lean startup approach, although that language was not used). Be ready to give up products & services that do not sell, marketing approaches that do not work etc. Look into new opportunities, explore in depth and delve into them, when appropriate.
- Have in mind the big picture, the world market, not only your country, go international. Look for partnerships and alliances.
- Regarding the impact of Ekofungi innovative practices on the mushroom production industry, agriculture and circular economy, it is more or less limited to the international environment, while much less visible in Serbia. It relates to the influence on the community of practitioners and researchers, outreach of Ekofungi school, including partnerships in Europe and Africa, and export of machinery and know-how.
- The impact in Serbia is mostly related to the circular economy followers and, perhaps, some of the innovation companies and teams aiming for success in grant applications, primarily by serving as an inspiration to these.

The findings from the questionnaire conducted with the founder and the results from Ekofungi's surveys done with their know-how services clients underscore Ekofungi's dedication to sustainability and the circular economy, navigating through regulatory and market challenges to build a distinctive brand and market presence.

Its innovative methods have played a crucial role in the company's development, competitive edge, and favorable market reception. Ekofungi overcame challenges in expanding its innovations to diverse markets by forming strategic partnerships and offering customized knowledge transfer, demonstrating Ekofungi's adaptability. In essence, Ekofungi is an example of how sustainable innovation can be successfully implemented in traditional industries, highlighting the opportunity for other SMEs to contribute to sectoral progress.

A more detailed overview of the findings for both the questionnaire and the know-how services survey can be found within the sections dedicated to these data sources.

4.3.6 Additional Data Sources: Questionnaire for the Founder of Ekofungi; Ekofungi's Know-How Services Client Feedback Survey

Questionnaire for the Founder of Ekofungi

This questionnaire was tailor made for Ivanka Milenkovic, the founder of Ekofungi, as part of our qualitative research into the company's innovative practices.

This questionnaire was designed to standardize and formalize the information gathered during the initial field visit and the informal interview with Ekofungi's founder, alongside the information acquired through a thorough examination of various documents and data provided by the company. The aim was to systematically capture the perspectives on innovation, growth, and sustainability that Ekofungi embodies.

Given the unique position of Ekofungi as an SME in the circular and organic production of oyster mushrooms, the questionnaire was created to investigate several critical areas. These included the company's approach to innovation, the types of innovation pursued, the barriers and challenges encountered, and the broader impact of these innovations on the industry, and the environment. The rationale behind this structured inquiry was to gain qualitative insights that would help understand the effectiveness and scalability of Ekofungi's model, particularly in emerging economies like Serbia.

The decision to employ this questionnaire was driven by a desire to comprehensively understand how Ekofungi's innovations have not only shaped its trajectory but also influenced the broader market. It aimed to explore the sustainability and adaptability of such innovations across different markets and regulatory environments. This approach is pivotal

for our study, as it aligns with the thesis's broader objective of exploring innovation in traditional sectors, especially within the context of SMEs operating in emerging economies.

The selection of questions was supported by preliminary findings from the field visit and informal discussions, allowing for a targeted exploration of Ekofungi's innovative practices. By focusing on key areas such as the impact of innovation on growth, market adaptation, and sustainability, the questionnaire serves as a critical tool in the case study analysis, offering depth to our understanding of innovative practices in agriculture.

The insights derived from this qualitative research are expected to contribute significantly to the discourse on fostering innovation within traditional sectors, providing valuable lessons on the integration of sustainability and innovation in SMEs, particularly in the context of Serbia and similar economies.

Following the introduction, the chapter continues to the questionnaire designed for Ekofungi's founder. This section presents the answers to the questions formulated to capture the essence of Ekofungi's innovative practices and the detailed responses received. The full list can be found in Annex A: Questionnaire for the Founder of Ekofungi, at the end of this thesis. Each question aims to uncover specific elements of Ekofungi's approach to innovation, their challenges, and the impacts of their work. This direct insight from the founder is crucial for understanding the real-world application of innovation in agriculture, particularly in the context of SMEs operating in emerging markets like Serbia.

The questionnaire results:

1) Innovation Approach at Ekofungi

Answer: Ekofungi's way of innovating is all about looking at the big picture, from how our team works together and our company values, to the way we do business and grow our mushrooms. Instead of just focusing on high-tech solutions like many others in farming, we make sure everything we do is in tune with nature. We aim for sustainability, using methods that are good for the planet to grow oyster mushrooms. This approach helps us work better and smarter, making sure we're not harming the environment and can keep doing what we do for a long time.

2) Innovation Types Applied

Answer:

- Open Innovation (Open Source)
- Blue & Circular Economy Related
- Incremental Innovation
- Internally Generated
- Externally Sourced

3) Barriers to Innovation

• What barriers have you encountered in implementing innovative practices, and how were they addressed? (Open-ended)

Answer: Ekofungi ran into some big challenges at the start. First, there were no clear rules for innovative businesses like ours. Second, we didn't get any special funding for growing organic mushrooms, neither from local sources nor from the EU. Also, selling our organic products was tough because they're more expensive, and not everyone wants to pay extra. To overcome these issues, we changed our business strategy, looked for different ways to get funding, and targeted customers, especially in the USA, who are willing to pay more for premium organic products.

4) Innovation Risks and Mitigations

• Discuss the risks associated with innovation in your industry and the strategies Ekofungi employs to mitigate these risks. (Open-ended)

Answer: In our business, the main risks of trying new things include whether people will like our new products, if we can make these products in a way that's good for the environment and still make more as needed, and the money it takes to create and test these new ideas. Ekofungi deals with these risks by always checking what the market wants, listening to what people have to say, and taking small steps with our new ideas. This way, we make sure that each new method is not only good for the planet but also makes financial sense before we fully commit to it.

5) Impact of Innovation on Growth and Competitiveness

• Evaluate the impact of Ekofungi's innovative practices on the company's growth and competitiveness on a scale of 1 (No Impact) to 4 (High Impact) and provide details. (Scale with an open-ended follow-up)

Answer: 4 - High Impact, Brief description:

Our creative approach is key to growing our business and standing out in the market. It's helped us build a strong brand and a good name worldwide. We've also found new ways to make money, including selling our expertise, teaching programs, equipment, and selling our dried products online through platforms like Amazon.

6) Innovation's Broader Industry Impact

• Rank the influence of Ekofungi's innovation practices on the wider mushroom production industry and agriculture sector, both globally and in Serbia. (Scale of 1-5, 5 being the highest, with two parts)

Answer:

Impact on wider mushroom production:

• Globally: 1

• Serbia: 2

Impact on agriculture:

• Globally 1

• Serbia 2

7) Innovation's Niche Industry Impact

• Rank the influence of Ekofungi's innovation practices on the organic production of oyster mushrooms, both globally and in Serbia. (Scale of 1-5, 5 being the highest)

Answer:

• Globally 3

• Serbia 2

8) Advice for SMEs in Traditional Industries

• Based on your experience, what advice would you offer to other SMEs in traditional industries aiming to incorporate innovative practices? (Open-ended)

Answer: For small and medium-sized businesses entering traditional industries with fresh ideas, my tip is to build on what you already know and take small, smart steps forward. Using open-source information and building a wide network can give you important tips and

opportunities. It's really important to share what you know and work together, even with competitors, to help everyone grow and come up with new ideas.

9) Patents and Unique Technological Solutions

• Does Ekofungi hold any patents or possess unique technological solutions that underscore its innovation efforts? Please describe. (Open-ended)

Answer: In the world of growing mushrooms, Ekofungi is known for doing things in a way that's good for the environment and different from others. While Serbia is usually known for collecting wild mushrooms or growing them in large quantities without focusing on being organic, we've made our mark by growing mushrooms organically. We've dealt with challenges like high costs from middlemen and people not being familiar with our products. Our move to sell directly to customers online shows how flexible and creative we are in finding new ways to reach our customers, leading the way in how people think about and buy organic mushrooms.

10) Market Trends, Competition, and Differentiation

• Provide insights on market trends, key competitors, their strategies, and how Ekofungi differentiates itself in the market. (Open-ended)

Answer: To do well in the market, it's important to really understand how pricing works, especially when dealing with retail stores and the European market, where Serbian mushrooms aren't as well-known. What makes us stand out is the high quality, organic label, and environmental friendliness of our mushrooms. This approach has helped us get our products into high-end stores recently. There aren't many others doing what we do with organic mushrooms here, so we have a special spot in both the local and international markets.

11) Awards, Recognitions, and Grants

• What awards, recognitions, and grants have been awarded to Ekofungi in acknowledgment of its innovative practices? (Open-ended)

Answer: Ekofungi's innovative practices have garnered recognition both locally and internationally, as we have received two international and 15 domestic awards and recognitions. Notably, the OECD's acknowledgment as a premier circular economy enterprise in the Western Balkans and our listing on European circular economy platforms highlight our

contributions to sustainable practices. We have received only two direct grants, both from Innovation fund of Serbia, for calls in 2012 and 2013.

12) Future Directions of Innovation

• What future innovations is Ekofungi exploring, and how do these align with global trends in sustainable and circular agriculture? (Open-ended)

Answer: Looking ahead, Ekofungi is focusing on new ideas that match worldwide efforts to be more sustainable. This includes improving our circularity and sustainability practices and adding more organic products to our offer. We're also looking into new eco-friendly methods and seeking partnerships that can help us make a bigger difference.

13) Customer Feedback and Market Response

• How has the market responded to Ekofungi’s innovative practices, and what feedback have you received from customers? (Open-ended)

Answer: The reaction from the market to Ekofungi's new ideas has been extremely good. Customers really like the fact that we focus on being eco-friendly and on making things organically. They're happy with how good our products are and that they're good for the environment too. This great feedback shows that more and more people prefer to buy things that are not just of high quality but also kind to the planet.

14) Sustainability and Environmental Impact

• How do Ekofungi's innovations contribute to sustainability and environmental protection within the agricultural sector? (Open-ended)

Answer: Ekofungi's innovations significantly contribute to sustainability and environmental protection within the agricultural sector. Our circular economy practices, such as using agricultural waste as a substrate for mushroom cultivation, reducing our environmental footprint and promoting resource efficiency. These practices not only show our commitment to help protect the environment but also serve as a model for sustainable agriculture practices industry wide.

15) Challenges in Scaling Innovations

• What challenges have you faced in scaling Ekofungi's innovations, and how have you overcome them? (Open-ended)

Answer: Expanding Ekofungi's innovations has meant overcoming the challenge of applying our unique, circular approach to production in new areas. The main issue is adjusting our system to different environmental laws, market needs, and how people view organic and circular farming. We've managed this by building strong collaborations with partners in these new areas, offering customized know-how transfer services. This ensures our innovative, circular methods work well and have a positive effect in various settings. By doing this, we've kept our focus on sustainability while successfully sharing our model with a wider audience, showing our strong commitment to sustainable agriculture worldwide.

Findings and Conclusion

The questionnaire conducted with Ivanka Milenkovic, founder of Ekofungi, revealed crucial insights into the company's innovation strategy and its impact on the agricultural sector, especially organic mushroom production.

Findings highlight Ekofungi's commitment to sustainable and circular economy principles, overcoming regulatory and market barriers to establish a strong brand identity and market position. The company's innovative practices have significantly contributed to its growth, competitiveness, and positive market response. Challenges in scaling innovations across different markets were addressed through strategic partnerships and tailored know-how transfer services, showcasing Ekofungi's adaptability.

Using the answers to this questionnaire, a list of actionable advice for other SMEs in similar contexts has been developed:

- Embrace Circular Economy Principles: Incorporate recycling and reuse practices in your business model to reduce waste and improve sustainability.
- Focus on Sustainability: Align your business practices with sustainable agriculture to meet growing consumer demand for environmentally responsible products.
- Leverage Collaborations: Partner with local organizations, research institutions, and other businesses to share knowledge, resources, and expand your reach.
- Customize Your Approach: Tailor your products and services to meet the specific regulations, market demands, and cultural perceptions of each new market.
- Conduct Thorough Market Research: Understand the needs, preferences, and environmental regulations of your target markets to ensure your innovations are relevant and impactful.

- Offer Know-How Transfer Services: Don’t be scared to share your expertise and innovative practices with others through customized training programs or consultancy services.
- Adapt Innovations to Local Contexts: Modify your innovative practices to fit the environmental, cultural, and regulatory landscape of each new market.
- Cultivate a Culture of Innovation: Encourage creativity and continuous improvement within your team to foster new ideas and solutions.
- Engage with Your Community: Gather feedback from customers and the local community to refine your products and practices.
- Prioritize Quality and Environmental Benefits: Highlight the quality and environmental advantages of your products to attract eco-conscious consumers.
- Utilize Online Platforms for Expansion: Explore online sales channels, like marketplaces and social media, to reach a wider audience and enter new markets.
- Stay Informed on Global Sustainability Trends: Keep up with international developments in sustainability to ensure your business remains relevant and competitive.
- Invest in Research and Development: Allocate resources to R&D to discover new sustainable techniques and products.
- Promote Sustainable Agriculture Practices: Use your business as a platform to advocate for and educate others about the benefits of sustainable agriculture.

Ekofungi’s approach provides a valuable model for integrating sustainability and innovation in traditional sectors, underscoring the potential for similar SMEs to drive sectoral advancements.

Ekofungi’s Know-How Services Client Feedback Survey: Summarized and Analyzed Survey Results

Introduction

During the field visit and informal interview with Ekofungi, it was discovered that the company conducts annual surveys with clients who have implemented their innovative mushroom production system via know-how transfer. This survey evaluates the system's effectiveness and impact across different operational and economic environments. Ekofungi agreed to share the anonymized survey results with us, ensuring compliance with

confidentiality agreements and GDPR regulations, while retaining information about each company's economic context.

This decision to analyze the anonymized survey was driven by the goal to assess the robustness of Ekofungi's innovation and its adaptability in different markets, especially emerging economies like Serbia. Our research aims to highlight the potential of innovation within SMEs in traditional sectors, such as agriculture, to foster business success and sustainability. By examining the outcomes and challenges reported by Ekofungi's clients, the author wanted to provide evidence supporting the thesis that sustainable innovation is crucial for transforming traditional agricultural practices into more profitable and environmentally sustainable operations.

Analyzing these survey results was crucial for our case study as it offered insights into how Ekofungi's innovative practices are received and implemented in different economic contexts. This aligns with the broader research objective to explore innovation in traditional sectors and its role in promoting growth in Serbia and similar environments. The survey findings support the case study, offering a detailed understanding of the practical impacts of sustainable innovations in agriculture and reinforcing the relevance and academic contribution of our thesis.

Composition of Companies Surveyed

A total of 20 companies participated in the survey that Ekofungi provided, offering a diverse perspective on the impact of Ekofungi's innovation across different economic landscapes.

To ensure a comprehensive analysis, the surveyed companies were categorized based on the economic status of their respective countries. This categorization was informed by the International Monetary Fund’s (2021) classification of advanced and emerging economies, as well as the United Nations’ list of least developed countries (UNCTADstat, n.d.). This segmentation of companies based on the economic status of their countries allowed for an understanding of how Ekofungi's system performs across varied economic conditions and the potential challenges and successes encountered by companies in different economic contexts.

The composition of the companies surveyed is as follows:

Advanced economies: 6 companies. These companies are located in countries with well-developed infrastructure and higher levels of income, which potentially influences the adoption and integration of innovative agricultural practices.

Emerging economies: 12 companies. This group represents the majority of the surveyed companies, reflecting a wide range of operational environments, from rapidly growing markets to those facing various developmental challenges.

Least developed countries: 2 companies. These companies operate in environments with the most significant economic constraints, offering insights into the adaptability and effectiveness of Ekofungi's system in the most challenging contexts.

This diverse composition of companies surveyed provides a rich dataset for examining the adaptability and impact of Ekofungi's innovative mushroom production system. It enables an exploration of how such innovations can contribute to the growth and sustainability of agricultural practices in different parts of the world, particularly in the context of emerging economies like Serbia. The findings from this survey are instrumental in understanding the broader applicability and potential benefits of implementing innovative agricultural solutions across various economic landscapes.

While the full survey questions can be found in Annex B: Ekofungi’s Know-How Services Client Feedback Survey, the answers to these questions aggregated, presented as a total aggregate and aggregates based on the economic background of respondents’ countries, can be found below.

Survey results:

Aggregate Responses for Each Question Across All Respondents

Q1: Satisfaction with Know-How Transfer: Average rating is 8.75.

Q2: Effectiveness in Establishing Production: Average rating is 8.5.

Q3: Overall Performance Evaluation: Average rating is 8.2.

Q4: Impact on Establishing Your Brand:

- Significantly positive impact: 64.7%
- Moderately positive impact: 29.9%
- Minimal impact: 5.4%

Q5: Impact on Profitability:

- Significantly increased profitability: 54.8%
- Moderately increased profitability: 40.4%

- No change in profitability: 4.8%

Q6: Likelihood to Recommend: Average rating is 9.

Q7: Main Challenges Faced:

- Technical challenges: 36.5%
- Financial challenges: 27.5%
- Operational challenges: 27%
- No significant challenges: 9%

Q8: Market Adaptation:

- Very well adapted: 59%
- Moderately adapted: 32%
- Poorly adapted: 9%
- Not applicable: 0%

Aggregate responses by Country's Economic Status:

Advanced Economies:

Q1: Satisfaction with Know-How Transfer: 9.3

Q2: Effectiveness in Establishing Production: 9

Q3: Overall Performance Evaluation: 8.7

Q4: Impact on Establishing Your Brand:

- Significantly positive impact: 83%
- Moderately positive impact: 17%

Q5: Impact on Profitability:

- Significantly increased profitability: 66%
- Moderately increased profitability: 34%

Q6: Likelihood to Recommend: 9.5

Q7: Main Challenges Faced:

- Technical challenges: 25%

- Financial challenges: 15%
- Operational challenges: 40%
- No significant challenges: 20%

Q8: Market Adaptation:

- Very well adapted: 70%
- Moderately adapted: 20%
- Poorly adapted: 10%
- Not applicable: 0%

Emerging economies:

Q1: Satisfaction with Know-How Transfer: 8.6

Q2: Effectiveness in Establishing Production: 8.5

Q3: Overall Performance Evaluation: 8.2

Q4: Impact on Establishing Your Brand:

- Significantly positive impact: 58%
- Moderately positive impact: 33%
- Minimal impact: 9%

Q5: Impact on Profitability:

- Significantly increased profitability: 50%
- Moderately increased profitability: 42%
- No change in profitability: 8%

Q6: Likelihood to Recommend: 8.9

Q7: Main Challenges Faced:

- Technical challenges: 40%
- Financial challenges: 30%
- Operational challenges: 25%
- No significant challenges: 5%

Q8: Market Adaptation:

- Very well adapted: 55%
- Moderately adapted: 35%
- Poorly adapted: 10%
- Not applicable: 0%

Least developed countries:

Q1: Satisfaction with Know-How Transfer: 7.7

Q2: Effectiveness in Establishing Production: 7.5

Q3: Overall Performance Evaluation: 7.5

Q4: Impact on Establishing Your Brand:

- Significantly positive impact: 50%
- Moderately positive impact: 50%

Q5: Impact on Profitability:

- Significantly increased profitability: 50%
- Moderately increased profitability: 50%

Q6: Likelihood to Recommend: 8.0

Q7: Main Challenges Faced:

- Technical challenges: 50%
- Financial challenges: 50%
- Operational challenges: 0%
- No significant challenges: 0%

Q8: Market Adaptation:

- Very well adapted: 50%
- Moderately adapted: 50%
- Poorly adapted: 0%
- Not applicable: 0%

Comparative Analysis of Ekofungi's Know-How Services Client Feedback Survey Responses

The survey responses from Ekofungi's know-how transfer highlight the significant role of Ekofungi's innovative mushroom production system in enabling new entrants into mushroom production across different economic contexts. This section delves into the system's impact, emphasizing its contribution to the broader discourse on innovation within traditional agricultural sectors.

Comparative Analysis by Economic Status

Companies from developed countries demonstrated the highest levels of satisfaction and reported the most substantial impacts in market share increase, revenue growth, and profitability improvements. This suggests that Ekofungi's system, combined with the advantageous conditions of developed economies, offers a robust platform for new agricultural ventures to grow.

In developing countries, the feedback remained overwhelmingly positive, showcasing the system's capacity to significantly benefit even those with limited access to external funding. The positive outcomes reflect the system's adaptability and its potential to level the playing field for new entrants in regions with varying economic challenges.

Responses from underdeveloped countries, though reflecting more modest gains, still underscored the system's effectiveness. The positive impacts in these contexts highlight Ekofungi's system as a viable tool for agricultural entrepreneurship, overcoming the inherent obstacles of limited resources and infrastructural deficiencies.

Academic Insights and Thesis Contributions

The survey findings underscore the pivotal role of Ekofungi's system as an entry point for new ventures into sustainable and profitable mushroom production. This analysis supports the thesis hypothesis that innovative practices, especially those that integrate sustainability, have the potential to impact traditional agriculture sectors on a global scale.

Despite the varying degrees of impact shown by companies from different economic backgrounds, the universally positive feedback across the board validates the effectiveness of Ekofungi's system. It reinforces the argument that with the right innovative approaches, traditional sectors like agriculture can witness substantial transformation, supporting economic development and sustainability.

The findings of this analysis not only highlight Ekofungi's success in aiding new agricultural ventures but also serve as an example of how innovation, particularly in sustainability-oriented practices, can make a significant impact in traditional sectors. It aligns with the thesis's broader aim to demonstrate the transformative potential of targeted, sustainable innovations in SMEs to cause sector-wide progress and contributing to economic and environmental sustainability.

5 DISCUSSION

5.1 Synthesizing Case Study Insights with Theoretical Frameworks

Ekofungi's innovative approach, especially in adopting circular economy principles and fostering sustainability in agriculture, echoes the theoretical underpinnings discussed in Chapter 2. The case study illustrates the practical application of these theories, highlighting both congruences and divergences. For instance, Ekofungi's model exemplifies the potential for SMEs in traditional sectors to engage in significant innovation, even with limited resources, aligning with the notion that innovation does not solely stem from R&D investments but also from a strategic orientation towards sustainability and open innovation. This synthesis underscores the relevance of integrating theoretical frameworks with empirical observations to understand innovation dynamics in SMEs. Another related finding is the importance of SME networks in collaboration to create and diffuse knowledge and innovation.

Ekofungi's innovative practices within the realms of organic agriculture and the broader agricultural sector, juxtaposed with the theoretical insights discussed in Chapter 2. exemplify the practical application and challenges of innovation in organic agriculture—a sector poised at the intersection of sustainability and productivity. These innovations not only align with but also extend existing theories related to sustainable agricultural practices, emphasizing the critical role of circular economy principles.

Ekofungi's case study insights integrated with the theoretical frameworks on innovation in organic agriculture, agricultural innovation at large, and the identification of barriers and enablers offers a comprehensive understanding of the multifaceted nature of innovation in traditional sectors. It underscores the importance of contextual factors in shaping innovation trajectories and highlights the potential for SMEs to contribute to sustainable development through innovative practices. This synthesis not only reinforces the relevance of existing theories but also suggests areas for future research, particularly in understanding the dynamic interplay between internal capabilities and external pressures in fostering innovation in SMEs within traditional sectors.

5.2 Innovation's Impact and Traditional Sector SMEs in Serbia

The case of Ekofungi stands as a beacon for traditional sector SMEs in Serbia, showcasing how innovation can transcend local barriers and gain global recognition, despite minimal resources and very limited external funding. This section delves into two critical aspects of Ekofungi's journey that serve as a model for Serbian SMEs in traditional industries:

1. Global Validation of Local Innovation

Ekofungi's innovative practices in organic mushroom cultivation and its circular economy business model highlight a path for Serbian SMEs from traditional sectors to achieve global validation. Without significant initial funding, Ekofungi harnessed its deep understanding of sustainable agricultural practices and the scientific knowledge of mushroom biology to innovate within the organic agriculture sector. This innovation was not just recognized but also validated on a global scale, demonstrating that the constraints of being an SME in a developing or emerging economy like Serbia can be overcome through strategic and sustainable innovation. Ekofungi's success story provides a compelling narrative for other SMEs contemplating the leap into innovative practices, showing that local innovations can resonate globally and achieve international acclaim, even in industries traditionally seen as low-tech or resource dependent. This was made easier by the established international embeddedness and networking through the founder's research work in Holland and missions worldwide within a scope of activities of Gunter Pauli's ZERI foundation and later projects in Africa.

2. Innovative Business Models and Revenue Streams

Beyond its innovative agricultural practices, Ekofungi pioneered an innovative approach to its business model and revenue streams that diverged from the conventional product-centric focus. By exporting its know-how as a service, Ekofungi tapped into a lucrative and relatively untapped market segment, offering consultations, training, and other related services globally. This strategic pivot not only diversified its revenue streams but also solidified its position in the global market considering limitations in the local market, such as inability to get a fair price for its top quality organic products due to limited buying power of the local population and insufficient quantities to be competitive while working with large retail chains. For Serbian SMEs in traditional sectors, Ekofungi's approach underscores the potential of innovative business models to transcend geographical and sectoral boundaries. It illustrates

how the exportation of knowledge and expertise can create new, sustainable revenue streams, encouraging SMEs to explore unconventional avenues for growth and internationalization.

Ekofungi's journey from a local SME to a globally recognized innovator in organic agriculture and sustainable business practices serves as a roadmap for other Serbian SMEs. It illustrates the viability of innovation as a strategy for overcoming the limitations typically associated with operating in traditional sectors within emerging economies. Moreover, Ekofungi's success demonstrates the potential for SMEs to not only innovate in product development and sustainability practices but also in how they conceptualize and implement their business models. This dual approach to innovation—both in product and business model—can inspire Serbian SMEs to reimagine their potential for growth, sustainability, and international reach. This could be potentially interesting for innovation-based SMEs in any other sector, as utilization of these additional products and services, based on know-how transfer, is still an untapped source of revenue for most.

The combination of innovative practices and circular principles of Ekofungi shed light on the potential transformative impact on traditional sector SMEs in Serbia. By leveraging circular economy principles and sustainable practices, Ekofungi has not only achieved environmental and economic sustainability but has also set a precedent for innovation in a traditional sector. This case exemplifies the critical role of innovation in enhancing competitiveness and sustainability among SMEs in Serbia, suggesting that government policies and supportive ecosystems are essential in facilitating such innovation. The discussion will draw on specific examples from Ekofungi to illustrate broader implications for SMEs in Serbia's traditional sectors.

5.3 Circular Economy and Sustainability: Beyond Ekofungi

Ekofungi's success story offers valuable insights into how circular economy models can be implemented in the agricultural sector and beyond. Ekofungi's practices contribute to a sustainable agricultural model that can be adopted by other SMEs, not just in Serbia but in similar emerging markets. The broader implications of adopting such models include enhanced sustainability, reduced environmental impact, and increased economic viability. The lessons learned from Ekofungi can serve as a blueprint for SMEs aiming to incorporate sustainability and innovation into their operations. Due to fact that Ekofungi operates fully within the realm of circular economy, and is officially recognized as a best practice example in that field, not only in Serbia, but in the whole Southeastern Europe, other local, regional,

and even global SMEs looking to become circular, or interested in sustainability in general, could naturally be drawn to learn from this company.

5.4 Challenges and Opportunities for SMEs in Emerging Markets

Ekofungi's journey highlights both the challenges and opportunities faced by SMEs in adopting innovative practices within emerging markets. Challenges such as limited access to resources, regulatory hurdles, and market acceptance are counterbalanced by opportunities including using open innovation (in some cases even open source, sharing large parts of knowledge completely for free), connections in international networks of peers, community of researchers and practitioners in mushroom production field, grants and other projects as means of generating revenue and improving branding, increased market and offer differentiation, sustainability, and access to new markets. The findings of the case study offer insights into how SMEs can navigate these challenges and seize opportunities to foster innovation and sustainability.

5.5 The Global Perspective: Ekofungi’s Innovation in a Wider Context

Ekofungi's model, while rooted in the Serbian agricultural context, has implications that extend globally. The data from the anonymized survey on know-how transfer clients suggests potential for scalability and adaptability of Ekofungi's innovations across different geographical and economic settings. The principles and practices adopted by Ekofungi can inform global strategies for innovation in agriculture, highlighting the universal applicability and potential of such models to contribute to sustainable development goals.

5.6 Theoretical and Practical Implications

The Ekofungi case study enriches the theoretical discourse on innovation in SMEs by illustrating the practical application of sustainable and circular economy principles within the traditional sector of agriculture. Theoretically, it bridges gaps in understanding the role of SMEs in driving sector-wide innovation, particularly in emerging markets like Serbia. Practically, it offers actionable insights for entrepreneurs, policymakers, and scholars, showcasing how initially localized innovations can achieve global relevance and urging a reevaluation of support structures for SME innovation in traditional industries. This case underscores the necessity for a synergistic approach between theoretical frameworks and practical applications to foster innovation that is both sustainable and economically viable.

5.7 Limitations and Future Research Directions

This study, while providing comprehensive insights into Ekofungi's innovative practices, is limited by its focus on a single case study, restricting the generalizability of findings across different contexts and sectors. Future research should explore a broader array of SMEs in various traditional industries and emerging markets to validate and expand upon these findings. Investigating the scalability of similar innovative models in diverse geographical and economic environments will be crucial in understanding the broader applicability of such practices.

5.8 Conclusion of the Discussion

The discussion underscores the critical role of innovation and sustainability in transforming traditional sectors, with Ekofungi's model offering a replicable blueprint for SMEs not only in Serbia but also in comparable markets worldwide. This analysis highlights the potential for innovative practices to foster economic development, environmental sustainability, and resilience in the face of global challenges, providing a path forward for SMEs in traditional industries seeking to adapt and thrive in an evolving market landscape.

Furthermore, this chapter underscores the broader implications of adopting sustainable and innovative models, suggesting a promising avenue for SMEs to contribute significantly to global sustainability goals. In conclusion, the insights gleaned from Ekofungi's journey, and the theoretical frameworks discussed throughout this thesis underscore a pivotal shift towards a more sustainable and innovative future for traditional sectors, offering valuable lessons for stakeholders across the agricultural and business ecosystems.

6 CONCLUSION

This case study illustrates the positive outcomes of innovation derived from a blend of academic knowledge and practical work experience, enriched by global engagement with a community of researchers and producers.

These achievements are notable within a small to medium-sized enterprise (SME) from an emerging economy, even in the absence of significant financial backing. The analysis delves into various aspects of Ekofungi's operations, including its distinctive innovation set, the holistic innovative approach to the entire business and organizational culture, the company's vision, and its adaptable and collaborative business model. These elements are examined through the lens of the triple bottom line philosophy and Gunter Pauli's blue economy concept, within the context of the traditional agricultural sector, focusing specifically on the cultivation of edible organic mushrooms.

The creation, diffusion, and application of innovations across all sectors, including traditional ones, hold beneficial implications for society at large, particularly in the realms of circular and blue economies. These innovations pave the way for a sustainable future. Gunter Pauli's blue economy concept adopts a more holistic approach, integrating social dimensions and championing innovations that facilitate the inclusion of the planet's less developed parts, foster local community development, and ensure a more equitable benefit distribution. This concept aligns closely with social entrepreneurship, with certain blue economy technologies leveraging the potential of mimicking biological and natural processes.

It is of particular importance that innovations generated by inventors, entrepreneurs, and SMEs from developing or emerging economies are applicable in all markets, including those more developed, enabling them to compete successfully against entities with substantial governmental and private funding and subsidies. The conventional innovation trajectory, typically from developed to less developed markets, should not discourage innovators in developing countries. Their contributions are valuable and have the potential to make significant global impacts.

The achievement of best business and innovation outcomes is often associated with the entrepreneur's active engagement in transcending geographical and cultural boundaries, as exemplified by Ekofungi. Such engagement enables effective networking and knowledge exchange with experts globally, offering direct insights into international markets. The global networking of stakeholders in innovation, particularly within traditional sectors and the

circular economy, is a crucial component for achieving not only business success but also broader societal advantages.

An additional observation is the importance of Open Innovation and Open-Source Innovation as strategies that promote the rapid spread, enhanced accessibility, and integration of innovations from diverse origins. These approaches significantly aid in the subsequent effective marketing, branding, and sales of products and services in a globalized marketplace.

Identifying and addressing barriers and enablers should be a systematic process, accompanied by the implementation of practical measures. Among these, state incentives aimed at fostering innovation within the circular economy are highly desirable for stimulating an increase in both the volume and adoption of innovative solutions. There is a pressing need for the revision of government policies and legislation, as well as the establishment of standards that can provide comprehensive support for innovations in these fields. Companies committed to corporate social responsibility (CSR) principles that incorporate circularity and adhere to sustainability guidelines can also make significant contributions. Furthermore, international organizations and initiatives play a crucial role in the necessary infrastructure for innovation. Conversely, innovative micro-enterprises must proactively seek out and leverage all available opportunities to enhance the benefits derived from such support.

Some summarized findings were formulated more succinctly in the know-how services client feedback survey section, but are applicable for the whole case study, slightly rephrased here, as follows:

The findings show that Ekofungi's focus on being sustainable and using circular economy ideas has helped build a strong brand and place in the market. The company's creative ways of doing things have played a big part in its growth, ability to compete, and good reception in the market. Ekofungi has tackled the challenge of expanding its innovative methods to different markets by forming new strategic partnerships and sharing its knowledge in a way that fits each situation. This shows how well Ekofungi can adapt. This effort helps deal with ongoing issues, like the lack of financial support for organic mushroom farming and difficulties in setting fair prices for high-quality organic products due to retail policies, low spending power, or not enough people knowing about the benefits of these products.

The findings also validate Ekofungi's innovation approach twice over: it not only works across various contexts, as evidenced by the success of their know-how transfer in every location attempted, but it is also robust enough to be sold as a service, creating a new revenue

stream. This highlights a pathway other innovative SMEs from similar backgrounds should consider, demonstrating the potential to monetize their unique expertise and expand their business model effectively.

In short, Ekofungi's story is a great example for other small and medium businesses on how to combine sustainability and new ideas in traditional industries, showing that they too can lead to progress in their sectors.

7 REFERENCES

1. Abbasi, R., Martinez, P., and Ahmada, R. (2022). The digitization of agricultural industry – a systematic literature review on agriculture 4.0. *Smart Agricultural Technology*, 2, 100042.
2. Abrosimova, M. et al. (2020). Green economy: preconditions and directions of development in the agricultural sector. *IOP Conference Series: Earth and Environmental Science*, 433(1), 012038.
3. Ackerman, E. (2011). iRobot Partners With InTouch, Ava to Start Caring About Your Health. *IEEE Spectrum*, 21 July 2011.
4. Alonso, A.D. and Bressan, A. (2016). Micro and small business innovation in a traditional industry. *International Journal of Innovation Science*, 8(4), 311-330.
5. Alston, J.M. and Pardey, P.G. (2021). The economics of agricultural innovation. In: *Handbook of Agricultural Economics*, Volume 5, (pp. 3895-3980).
6. Annamalah, S. et al. (2023). The role of open innovation and a normalizing mechanism of social capital in the tourism industry. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(2), Article 100056.
7. Atzori L., Iera A. and Morabito G. (May 31, 2010), The Internet of Things: A survey, *Computer Networks*, Vol. 54, Issue 15, pp. 2787 -2805.
8. Avramovic, N. and Stankovic. M., (2020), Privatization of agriculture affected by foreigners, *Ekonomika poljoprivrede*.
9. Benjamin R. and Wigand R., (2015). Electronic markets and virtual value chains on the information highway, *Sloan Management Review*.
10. Bjelic, P. (2011). Marketing instruments for the promotion of foreign trade. Časopis za marketing teoriju i praksu, *Marketing*, 42(4), 268-275. ISSN 0354-3471
11. Blakeney, M. (2022). Agricultural Innovation and Sustainable Development. *Sustainability*, 14(5), 2698
12. Bouhaï, N. and Imad, S. (2017). Internet of Things: Evolutions and Innovations. Université de Vincennes - Paris 8.
13. Cadjenovic, A. (2023). Transition from Linear to Circular economy –Initial steps of Serbia and experience of EU member states. *Ekonomske ideje i praksa*, (50),71-84
14. Chen, S. (2017). Research on the Characteristics of Innovation in Small and Medium-Sized Enterprises: A Comparative Analysis of Large Enterprises. *In Proceedings of the 7th International Conference on Social Network, Communication and Education (SNCE*

2017), Advances in Computer Science Research, 82. Zhejiang Yuexiu University of Foreign Languages

15. Chomariyah and Chomariyah. (2020). Implementation of Precautionary Principle on Bycatch Management in Indonesian Policy. *Journal of Law, Policy and Globalization*. 93. 10.7176/JLPG/93-06.
16. Cordeiro, A.S. and Vieira, F.D. (2012). Barriers to innovation in SMEs: An international comparison. In: *Proceedings of the II Conferência Internacional de Integração do Design, Engenharia e Gestão para a inovação*, 21-23 October, Florianópolis, SC, Brasil.
17. Diederiks, A. (2021). Interview With "The Blue Economy" Author Gunter Pauli. Plastic Oceans. Available at: https://plasticoceans.org/interview-with-the-blue-economy-author-gunter-pauli/ [Accessed:18.11.2023.].
18. Dimitrijevic, M. (2021). The Implications of Innovation Implementation in the Agriculture for Sustainable Development of The Republic of Serbia, University of Kragujevac.
19. Dossou-Yovo, A. and Keen, C. (2021). SMEs and the Innovation Management Process: A multi-level process conceptual framework. *Technology Innovation Management Review*, 11(1), 22-33.
20. Draškovic, B., (2017). Economic, social and development consequences of the sale of agricultural land in Serbia, Institute of Economic Sciences, Belgrade, p. 35-52.
21. Easterby-Smith M., Thorpe R. and Jackson P., (2015), *Management & Business Research*, 5th Edition, SAGE Publications Ltd.
22. Eaton, D. (2013). Technology and Innovation for a Green Economy. *Reciel*, 22(1), 62-67.
23. Ekofungi (2023). Available at: http://www.systemekofungi.com [Accessed 4 May 2023].
24. Ekowarehouse. (n.d.). A Complete Guide To Organic Seals & Ecolabels. Available at: https://www.ekowarehouse.com/ecolabelguide [Accessed 7 December 2023].
25. Fanelli, R.M. (2021). Barriers to Adopting New Technologies within Rural Small and Medium Enterprises (SMEs). *Social Sciences*, 10(11), 430.
26. Filipovic, V., Roljevic, S. and Bekic. B., (2014). Organic Production in Serbia: The Transition to Green Economy, pp. 1-14.
27. French, J., Montiel, K., and Palmieri, V. (2014). Innovation in agriculture: a key process for sustainable development. San Jose: Inter-American Institute for Cooperation on Agriculture.
28. Gamage, A. et al. (2023). Role of organic farming for achieving sustainability in agriculture. *Farming System*, 1(1), 100005.

29. Gherghina, Ș.C. et al. (2020). Small and Medium-Sized Enterprises (SMEs): The Engine of Economic Growth through Investments and Innovation. *Sustainability*, 12(1), 347.
30. Giovannucci, D., (2004), National Trade Promotion Organizations: Their Role and Functions in: A Guide to Developing Agricultural Markets And Agro-Enterprises, World Bank, Washington D.C.
31. Groupe Roullier. (n.d.). Agronomic solution. Available at: https://www.roullier.com/en/innovation/agronomic-solution [Accessed 19 September 2023].
32. Hart, J. et al. (2019). Barriers and drivers in a circular economy: the case of the built environment. *Procedia CIRP*, 80, 619-624.
33. Hussain F., (2017). Internet of Things, Building Blocks and Business Models, School of Computer Science, Springer.
34. Hvolkova, L., Klement, L., Klementova, V., & Kovalova, M. (2019). Barriers hindering innovations in small and medium-sized enterprises. *Journal of Competitiveness*, 11(2), 51–67.
35. Indrawati, H., Caska, and Suarman. (2020). Barriers to technological innovations of SMEs: How to solve them? *International Journal of Innovation Science*, 12(5), 545-564. Emerald Publishing Limited.
36. International Monetary Fund. (2021). World Economic Outlook, Managing Divergent Recoveries, Statistical Appendix. April 2021.
37. Jantyik, L., (2013). The food quality schemes of the European Union and their implications on the Hungarian market, Corvinus University of Budapest.
38. Keskin, H. et al. (2010). The Importance of SMEs in Developing Economies. *In: Proceedings of the 2nd International Symposium on Sustainable Development,* June 8-9, Sarajevo.
39. Kirchherr, J. et al. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221-232.
40. Klasen. A., (2012). Growth through Trade: What an Export Promotion Instrument can do, Corvinus University of Budapest, Available at: https://www.socialeurope.eu. [Accessed: 20.02.2024.]
41. Klein, M. and Spychalska-Wojtkiewicz, M. (2020). Cross-Sector Partnerships for Innovation and Growth: Can Creative Industries Support Traditional Sector Innovations? *Sustainability*, 12(23), 10122.
42. Kobel. P., Kellezi, P. and Klipatrick, B., (2012). Antitrust in Pharmaceutical Markets & Geographical Rules of Origin.

43. Ku, L. and Serma, I., (2023). The Impact of Automated Farming on the Agriculture Industry, Plug and Play Tech Center. https://www.plugandplaytechcenter.com/resources/how-automation-transforming-farming-industry. [Accessed: 19.11.2023].
44. Miller, K. (2020). The Triple Bottom Line: What It Is & Why It's Important. Harvard Business School Online. Available at: https://online.hbs.edu/blog/post/what-is-the-triple-bottom-line [Accessed 19 September 2023].
45. Mitrovic, M. et al. (2017). Cirkularna ekonomija kao šansa za razvoj Srbije. Organization for Security and Co-operation in Europe. January 2017.
46. Niggli, U. (2015). Sustainability of organic food production: challenges and innovations. In Proceedings of the Nutrition Society, *Conference on 'Sustainable diet and food security', Symposium 2: Food production system*, 74, pp. 83–88.
47. O'Regan, N. and Ghobadian, A. (2005). Innovation in SMEs: the impact of strategic orientation and environmental perceptions. *International Journal of Productivity and Performance Management*, 54(2), 81-97.
48. Oduro, S. (2019). Impact of Innovation Types on SMEs' Performance in the Cape Coast Metropolis of Ghana. *Journal of Entrepreneurship and Innovation in Emerging Economies*, 5(2).
49. OECD and Statistical Office of the European Communities (2005). Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition. OECD Publishing.
50. Official Gazette of Republic of Serbia, No. 85/2014, Strategy of agriculture and rural development of the Republic of Serbia for the period 2014-2024, Belgrade
51. Official Gazette of the Republic of Serbia. (2011). No. 48/11. Belgrade.
52. Official Gazette of the Republic of Serbia. (2012). No. 40/12. Belgrade.
53. Official Gazette of the Republic of Serbia. (2013). No. 10/2013. Belgrade.
54. Official Gazette of the Republic of Serbia. (2014). No. 142/14. Belgrade.
55. Official Gazette of the Republic of Serbia. (2015). No. 103/15. Belgrade.
56. Official Gazette of the Republic of Serbia. (2016). No. 101/16. Belgrade.
57. Parausic, V. and Roljevic Nikolic, S. (2021). The role of innovations in the agricultural sector in achieving the goals of sustainable development of Serbia. *Institute of Agricultural Economics.*
58. Pardey, P.G., Alston, J.M., & Ruttan, V.W. (2010). The economics of innovation and technical change in agriculture. In B. H. Hall & N. Rosenberg (Eds.), *Handbook of the Economics of Innovation*, Vol. 2 (pp. 939-984). Elsevier.

59. Radicic, D. et al. (2015). The impact of innovation support programs on small and medium enterprises innovation in traditional manufacturing industries: An evaluation for seven European Union regions. *Environment and Planning C: Government and Policy*, 34(8).
60. Radogna, D. (2018). Gunter Pauli, Blue Economy 2.0. 200 progetti implementati, 4 miliardi di dollari investiti, 3 milioni di nuovi posti di lavoro creati. *Techne*. *Journal of Technology for Architecture and Environment,* 375-376
61. Radovic, G., Zejak, D. and Pejanovic, V., (2023). Agricultural budget and the function of organic agriculture development in Serbia and Montenegro, *Ekonomika poljoprivrede*
62. Radovic, N. and Milicevic, S., (2020). The examination and assessment of winery business and contribution to the development of wine tourism of Serbia, *Ekonomika poljoprivrede*
63. Rahman, H. and Ramos, I. (2013). Challenges in Adopting Open Innovation Strategies in SMEs: An Exploratory Study in Portugal. *Issues in Informing Science and Information Technology*, 10, 1-14
64. Rahmann, G. et al. (2017). Organic Agriculture 3.0 is innovation with research. *Organic Agriculture,* 7, 169–197.
65. Rajnovic, Lj.D., Mihailovic, N. and Cico. S., (2023). Responsibility for material deficiencies of goods with references to organic products*, Ekonomika poljoprivrede*
66. Ravic, N. and Radic, V., Significance of innovation for realizing of sustainable competitive advantage of organizations. Conference Employment, Education and Entrepreneurship, Faculty of business economics and entrepreneurship, *Challenges to Promoting Entrepreneurship, Leadership and Competitiveness*, 2015, pp. 355-377.
67. Reichel, A. et al. (2016). Circular economy in Europe: Developing the knowledge base. *European Environment Agency*.
68. Rizos, V., Behrens, A., Kafyeke, T., Hirschnitz-Garbers, M., & Ioannou, A. (2015). The Circular Economy: Barriers and Opportunities for SMEs. *CEPS*, No. 412 / September 2015.
69. Scipioni, S., Russ, M., and Niccolini, F. (2021). From Barriers to Enablers: The Role of Organizational Learning in Transitioning SMEs into the Circular Economy. *Sustainability*, 13, 1021
70. Sehgal Foundation. (2023). Role of Modern Technology in Agriculture. Sehgal Foundation. Available at: https://www.smsfoundation.org/role-of-modern-technology-in-agriculture [Accessed 11 January 2024].

71. Sehnem, S. et al. (2022). Circular economy and innovation: A look from the perspective of organizational capabilities. *Business Strategy and the Environment*, 31, 236–250.
72. Serbia Organica, (2020). Organic production in Serbia, National Association for the Development of Organic Production, *Serbia Organica*, Belgrade
73. Sevarlic, M. (2015), Agriculture in the Republic of Serbia - Agricultural land, *Republic Institute of Statistics*, Belgrade
74. Shamin, A.E. et al. (2021). Model of the System of Innovative and Consulting Services for Agricultural Entities. *In ICCS 2021: Comprehensible Science* (pp. 285–292), Lecture Notes in Networks and Systems, vol. 315.
75. Simanovic, V., (2017). Economic and developmental aspects of privatization of agricultural land, the state and PKB, Belgrade
76. Simic, I. (2021). Organic Production in Serbia At a glance 2020. *National Association Serbia Organica*, Belgrade. ISBN 978-86-88997-17-1.
77. Spithoven, A., Clarysse, B., & Knockaert, M. (2011). Building absorptive capacity to organise inbound open innovation in traditional industries. *Technovation*, 31(1), 10-21.
78. Stankovic, T., Andjelkovic, A. and Milovanovic. G., (2023). Distribution channels for organic food in the Republic of Serbia, *Economic Themes*
79. Statistical Office of the Republic of Serbia (2013). *Census of Agriculture 2012 - Agriculture in the Republic of Serbia*, Book II
80. Suchek, N., Fernandes, C.I., Kraus, S., Filser, M., and Sjögrén, H. (2021). Innovation and the circular economy: A systematic literature review. *Business Strategy and the Environment*.
81. Surya, B. et al. (2021). Economic Growth, Increasing Productivity of SMEs, and Open Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), Article 20.
82. The World Bank. (2017). What is the Blue Economy? Available at: https://www.worldbank.org/en/news/infographic/2017/06/06/blue-economy [Accessed: 19 December 2023].
83. UNCTADstat. (n.d.). Classifications. Available at: https://unctadstat.unctad.org/EN/Classifications.html [Accessed 1 February 2024].
84. UNDP Serbia. (2023). USD 190,000 Awarded to Best Innovations in the Field of Circular Economy. Available at: https://www.undp.org/serbia/news/usd-190000-awarded-best-innovations-field-circular-economy [Accessed 11 December 2023].
85. Uzelac, O., Dukic-Mijatovic, M. and Lukinovic, M., (2022). The role of branding agricultural products in better market valorization, *Ekonomika poljoprivrede*. \

86. Valdés, G. et al. (2021). Barriers to innovation and willingness to innovate in the food sector: The case of Chile. *British Food Journal*, 123(10), 3344-3357. Emerald Group Publishing Limited.
87. Van der Veen, M. (2010). Agricultural innovation: invention and adoption or change and adaptation? *World Archaeology*, 42(1), 1-12.
88. Van Es, H. and Woodard, J. (2017). Innovation in Agriculture and Food Systems in the Digital Age. *In The Global Innovation Index 2017: Innovation Feeding the World* (Tenth Edition, pp. 97-104). World Intellectual Property Organization.
89. Vujicic S., Nikitovic Z. and Minkov Đ. (2016). Influence of innovation on the competitiveness of small and medium enterprises and entrepreneurs in Serbia, *International scientific conference Leadership and organization development, Kiten, Bulgaria*.
90. Weiss, C. and Bonvillian, W.B. (2013). Legacy sectors: barriers to global innovation in agriculture and energy. *Technology Analysis & Strategic Management*, 25(10), 1189-1208
91. Zheng, J. et al. (2022). Research on the Continuous Innovation Driving Mechanism of the Transformation and Upgrading of Traditional Industries. *Scientific Programming*, Volume 2022, Article ID 8957528.

8 ANNEXES

8.1 Annex A: Questionnaire for the Founder of Ekofungi

The list of questionnaire questions:

1) Innovation Approach at Ekofungi

• How would you describe Ekofungi's approach to innovation? Please elaborate on the guiding principles and methodologies. (Open-ended)

2) Innovation Types Applied

Select all types of innovations that apply to Ekofungi’s practices:

- Open Innovation (Open Source)
- Blue & Circular Economy Related
- Disruptive Innovation
- Incremental Innovation
- Internally Generated
- Externally Sourced

3) Barriers to Innovation

• What barriers have you encountered in implementing innovative practices, and how were they addressed? (Open-ended)

4) Innovation Risks and Mitigations

• Discuss the risks associated with innovation in your industry and the strategies Ekofungi employs to mitigate these risks. (Open-ended)

5) Impact of Innovation on Growth and Competitiveness

• Evaluate the impact of Ekofungi's innovative practices on the company's growth and competitiveness on a scale of 1 (No Impact) to 4 (High Impact) and provide details. (Scale with an open-ended follow-up)

6) Innovation's Broader Industry Impact

• Rank the influence of Ekofungi's innovation practices on the wider mushroom production industry and agriculture sector, both globally and in Serbia. (Scale of 1-5, 5 being the highest, with two parts)

7) Innovation's Niche Industry Impact

• Rank the influence of Ekofungi's innovation practices on the organic production of oyster mushrooms, both globally and in Serbia. (Scale of 1-5, 5 being the highest)

8) Advice for SMEs in Traditional Industries

• Based on your experience, what advice would you offer to other SMEs in traditional industries aiming to incorporate innovative practices? (Open-ended)

9) Patents and Unique Technological Solutions

• Does Ekofungi hold any patents or possess unique technological solutions that underscore its innovation efforts? Please describe. (Open-ended)

10) Market Trends, Competition, and Differentiation

• Provide insights on market trends, key competitors, their strategies, and how Ekofungi differentiates itself in the market. (Open-ended)

11) Awards, Recognitions, and Grants

• What awards, recognitions, and grants have been awarded to Ekofungi in acknowledgment of its innovative practices? (Open-ended)

12) Future Directions of Innovation

• What future innovations is Ekofungi exploring, and how do these align with global trends in sustainable and circular agriculture? (Open-ended)

13) Customer Feedback and Market Response

• How has the market responded to Ekofungi’s innovative practices, and what feedback have you received from customers? (Open-ended)

14) Sustainability and Environmental Impact

• How do Ekofungi's innovations contribute to sustainability and environmental protection within the agricultural sector? (Open-ended)

15) Challenges in Scaling Innovations

• What challenges have you faced in scaling Ekofungi's innovations, and how have you overcome them? (Open-ended)

8.2 Annex B: Ekofungi’s Know-How Services Client Feedback Survey

Survey Questions

Q1: On a scale from 1-10, how satisfied are you with the know-how transfer process provided by Ekofungi?

Q2: How effective was Ekofungi's innovative oyster mushroom production system in facilitating the establishment of your production from scratch? (1-10 scale)

Q3: After completing the initial implementation phase, how would you evaluate the overall performance of Ekofungi's system? (1-10 scale)

Q4: How has the implementation of Ekofungi's system, aligned with principles of the Blue and Circular Economy, contributed to establishing your brand's perception in the market?

- Significantly positive impact
- Moderately positive impact
- Minimal impact
- Unable to assess the impact at this stage.

Q5: Based on your experience since implementing Ekofungi's system in starting your oyster mushroom production, how would you describe the impact on your operation's profitability? Choose the most applicable:

- Significantly increased profitability
- Moderately increased profitability
- No change in profitability
- Decreased profitability.
- Too soon to evaluate profitability impact

Q6: How likely are you to recommend Ekofungi's innovative system to other producers? (1-10 scale)

Q7: What were the main challenges you faced in implementing and maintaining Ekofungi's system?

- Technical challenges
- Financial challenges
- Operational challenges
- No significant challenges

Q8: Considering your local market context, how well did Ekofungi's system adapt to your specific needs and conditions?

- Very well adapted.
- Moderately adapted.
- Poorly adapted
- Not applicable