

Agricultural entrepreneurship research: challenges and sustainable development issues

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Abstract

This paper seeks to conduct a comprehensive review of recent studies on the characteristics of agricultural entrepreneurship in Greece, aiming to explore factors that notably impact entrepreneurship in the agricultural sector as a means of promoting sustainable development. The study, conducted among agripreneurs in western Greece, formulates ideas and practical strategies for future researchers. The central question addressed is the role of agricultural entrepreneurship in sustainable development. The paper outlines challenges, identifies research gaps, and provides recommendations to steer future research efforts toward promoting sustainable agricultural entrepreneurship in the study region.

Keywords: sustainable agriculture; agricultural development; entrepreneurship education; Greece

JEL Classification: Q13

1. Introduction

Considering that there is less than ten years remaining until the completion of the United Nations 2030 Agenda for Sustainable Development, challenges in agricultural entrepreneurship research introduce a new set of debates in the field of knowledge about agricultural sustainable development. This paper delves into issues pertaining to entrepreneurship within the agricultural sector and presents a conceptual framework, elucidation, and critical evaluation of the concept. Examining entrepreneurship entails the challenging endeavor of identifying essential characteristics within this complex and dynamic process. It is noteworthy that, despite the predominant role of agriculture in nearly all traditional economies, both developed and developing nations have frequently overlooked it as a pivotal sector for sustainable development (Pingali et al., 2019). Existing research literature strongly affirms the positive correlation between financial resilience, sustainable development, and entrepreneurial activity (Kan et al., 2018). Furthermore, it validates that elevated levels of general education and entrepreneurship education contribute to the enhancement of entrepreneurship and the establishment of sustainable ventures (European Commission, 2006a). The Covid-19 pandemic has tested business resilience, making sustainability action imperative. According to Kasseah (2016), entrepreneurship is increasingly recognized as a tool that promotes sustainable development, and countries fostering entrepreneurship tend to experience higher economic development. More attention is needed in research related to managerial development (Maurer et al., 2021; Zaccaro et al., 2000). However, entrepreneurship is not solely about the aforementioned factors. It is a catalyst for personal development and can enhance social cohesion, providing entrepreneurial opportunities for everyone

regardless of their social background or geographic location (Onalan & Magda, 2020).

The latest report from the Global Entrepreneurship Monitor for the year 2019/2020 provides an overview of findings derived from more than 150,000 individual interviews conducted in 50 economies. The report investigates attitudes towards entrepreneurship, the reasons behind initiating businesses, and the extent of entrepreneurial engagement in each economy (Bosma et al., 2020). While the Global Entrepreneurship Monitor report examines entrepreneurship as a global concept, this paper mainly focuses on agricultural sustainable development and entrepreneurship in Greece as a member of the European Union.

While the components of entrepreneurship appear to be relatively consistent across various contexts, a recurring inquiry in international literature revolves around the distinctiveness of agricultural entrepreneurship compared to entrepreneurship in other sectors of an economy (Lans, et al., 2013). Entrepreneurship has consistently played a pivotal role in sustaining the agricultural sector, often obscured by intricate market regulatory mechanisms and the perception that agriculture necessitates a distinct analysis, separate from other economic activities (Alsos et al., 2011). The study of agricultural entrepreneurship should consider specific characteristics: a) the agricultural sector, where historically agricultural work is not viewed as entrepreneurial behavior; b) the immediate environment of the farm, integrated into the countryside; c) the escalation of risk intensity and state intervention; and d) the family character of agricultural enterprises.

According to Deakins et al. (2016), there are different types of agricultural entrepreneurship involved in various ways in their agricultural environment. Agriculture in Europe, including Greece, is generally a family activity where management and control are inseparable (Pindado & Sanchez, 2017). Over the past two decades, however, the environment in which agricultural enterprises operate has become more complex due to challenges such as growing market globalization, changes in consumer habits, and rapid advancements in technology, biotechnology, and industry. In this globally and locally competitive context, this study aims to provide more information on policies strengthening entrepreneurship and highlight the contribution of developing entrepreneurial spirit to the general economic development of the countryside. The value lies in how agripreneurs can help overcome recent changes in employment structures to achieve sustainable and smart inclusive development goals.

This matter is notably current and significant, especially in light of the United Nations' 2030 Agenda for Sustainable Development. The agenda advocates for the incorporation of the three dimensions of sustainable development—social, environmental, and economic—in all sectoral policies. It emphasizes the promotion of interconnectedness and coherence in policy and legislative frameworks pertaining to the Sustainable Development Goals. This involves addressing the following challenges: 1) finding sustainable and inclusive development solutions; 2) securing human rights for all; and 3) ensuring that no one is left behind. The challenge of the 21st century is to transition to sustainable development in both developed and low-income countries (United Nations, 2017a). Consequently, it is crucial for countries to mobilize efforts to set priorities and effectively implement the Sustainable Development Goals in alignment with the needs of the agricultural sector. In this light, entrepreneurship becomes even more important, gaining emphasis at the academic and policy planning levels by national governments and supranational

organizations like the European Union. The assumption is that the ultimate goal of sustainable development in agriculture should link economic growth, sustainable practices, and perceived entrepreneurial success. The central assumption of this research is that entrepreneurship is influenced by and influences the personality of the entrepreneur. In other words, entrepreneurship is in a reciprocal relationship with the individual. Therefore, this study's main purpose is to emphasize the importance of promoting entrepreneurship for achieving Sustainable Development Goals. The impact of entrepreneurial intentions, entrepreneurship education, and farmers' perception of entrepreneurial success are vital constructs in understanding why some agripreneurs are more entrepreneurial than others.

The integration of these complementary constructs poses the first challenge in agricultural entrepreneurship research, leading to various sub-challenges such as adopting the cooperative and digital model of entrepreneurship. The chapter goes beyond empirical research, offering a personal viewpoint on the state of entrepreneurship in the agricultural sector and discussing implications for future research. Writing this chapter serves three primary purposes. Firstly, it aims to share findings from one of the few extensive studies on personality traits in agricultural entrepreneurship, emphasizing their role as a tool for sustainable development and offering insights into their practical application in business. Secondly, drawing on the experiences accumulated during three years of research on agricultural entrepreneurship, the chapter highlights implications and raises questions about the present and future trajectory of both research and practical applications in this field. Lastly, it endeavors to spark future discussions and debates among practitioners, researchers, and policymakers.

The study is structured as follows: It begins with a brief introduction of the paper's context, followed by an exploration of the research on entrepreneurship and agricultural sustainable development. Finally, it concludes by formulating directions for future research and explaining practical strategies and reflections.

2. Methods and Context

This paper draws on the findings of five previous works by the authors, originating from extensive empirical research in the field of agricultural entrepreneurship. These works encompass both theoretical and empirical research, addressing challenges in various aspects of agricultural entrepreneurship research through the use of quantitative and qualitative data. Primary data were collected through a structured questionnaire and the random sampling method, involving an extensive survey of over 400 agripreneurs in the Western Greece region. The subsequent section lays the groundwork for the remainder of the paper.

2.1 Research Approach to Entrepreneurship and Agricultural Sustainable Development

The heightened focus and strategies for sustainable development, structural transformation, and entrepreneurship have been underscored by efforts to implement the 2030 Agenda. Entrepreneurship plays a crucial role in sustainable development, particularly in the agri-food sector (Tzanopoulos et al., 2011). To comprehend the significance of this strategic orientation and why it necessitates structural transformation and entrepreneurship, this section revisits the concept of sustainable development and its connection to structural transformation. As per Timmer & Akkus (2008), structural transformation extends beyond the economic realm, encompassing

broader social-individual aspects and emphasizing the bold and transformative steps urgently required to steer the world toward a sustainable and resilient path. In acknowledging this dimension, the present paper discusses the ongoing structural transformation with a focus on the agripreneur and the dimensions influencing their entrepreneurial activity, quality of life, and sustainability. The following provides a brief overview of the content of each study included in this paper. Five central constructs have emerged from respective investigative approaches: First, "Entrepreneurial intentions"; second, "Entrepreneurial success"; third, "Entrepreneurship Education"; fourth, "Cooperative model of entrepreneurship"; and fifth, "Digital model of entrepreneurship."

Entrepreneurial Intentions: Recognizing and acting on viable entrepreneurial opportunities are closely tied to an individual's aspiration for success. Therefore, EI is increasingly explored from the perspective of sustainable development. By integrating the theory of human values into the theory of planned behavior, the intention study aimed to investigate how personal characteristics (locus of control) and motivation interact with sustainable entrepreneurial intentions (Marshall & Gigliotti, 2018). In particular, entrepreneurship education represents the decision commitment of an individual to start a business, emphasizing the centrality of professionals in the entire entrepreneurial process. Scholars argue that intentions are the best predictor variable for an individual's future behavior (Onalan & Magda, 2020). Research on entrepreneurial intentions gains significance, especially when focusing on specific population groups like agripreneurs. On one hand, insufficient and critical research has been conducted on entrepreneurial intention models, and on the other hand, these individuals should be evaluated based on their entrepreneurial activity stemming from their intentions. Most studies aim to differentiate entrepreneurs from non-entrepreneurs, exploring entrepreneurial intentions and how they can be developed and strengthened.

This paper extends the guidelines to elucidate the entrepreneurial intentions of existing farmers. The primary objective of the first study was to examine the relationship between personal characteristics (such as Locus of Control) and motivations) and entrepreneurial intentions among agripreneurs. While many researchers have concentrated on the predictors of entrepreneurial intentions (Autio et al., 2001; Krueger, 1993; Reitan, 1996), the conceptual model of entrepreneurial intentions presented in this study employs a sample of existing agripreneurs, providing insights from those who made entrepreneurial decisions outside university settings and within existing enterprises. This research tests the idea that entrepreneurial intentions can predict certain outcomes, thus establishing a two-way relationship with personality traits. The main findings indicate a two-way relationship between entrepreneurial intention, total entrepreneurial motivations, and the locus of control of the survey participants, the primary variables tested in the model. Regression modeling (Table 1) demonstrates the statistical significance and strength of individual relationships of entrepreneurial intentions, with the most robust two-way relationship found with internal locus of control and pull motivation. Individuals in higher professional hierarchies tend to display internal locus of control (Hattie et al., 1997). In agriculture, Kaine et al. (2004) discovered a correlation between locus of control and agripreneurs' adoption of innovations, participation in extension activities, and financial performance. Van Kooten et al. (1986) also found locus of control correlated with farmers' objectives.

Motivations for entrepreneurial activity are diverse, with a stronger emphasis on socio-economic achievement and the recognition of entrepreneurial opportunities in agricultural areas. In other words, motivations such as independence, the pursuit of increased income, and social prestige define entrepreneurial behavior and attract business establishment in agricultural settings. Hence, this study delves into understanding why farmers decide to initiate their enterprises. The findings contribute both theoretically and practically. This research adds to the existing literature on sustainable entrepreneurial intentions by utilizing a different sample set, extending the antecedents of intention using a sample of existing agripreneurs. The study offers a theoretical assessment of how and when locus of control, as well as motivations, impacts the entrepreneurial intentions of existing agripreneurs. On a practical note, insights into entrepreneurial intentions and locus of control have implications for motivating agripreneurs, guiding agricultural development initiatives to target individuals based on internal locus of control and motivations for maximum production impact.

However, caution is necessary when assessing the potential distributive impact on agripreneurs labeled as "non-entrepreneurial." The key managerial implication is that entrepreneurial intentions and locus of control can assist policymakers, educators, and both existing and start-up agripreneurs in understanding that these specific entrepreneurial traits play a significant role in the formulation of sustainable EI. Additionally, an individual's locus of control can provide valuable insights into their approach to agriculture, making it a valuable focal variable for discussion and reflection. In future research and practice, this can serve as an initial step in understanding how agripreneurs reflect, proposing a sustainable development framework that centers on the agripreneur personality.

Table 1.Regression model for entrepreneurial intention

Model	Unstandardized		Standardized	t	Sig.	Collinearity	
	Coefficients		Coefficients			Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.398	.576		2.428	.016		
Internal Locus of Control	.281	.111	.136	2.540	.000	.807	1.238
External Locus of Control	.111	.078	.071	1.412	.159	.928	1.077
Pull Motivation	.213	.106	.102	2.002	.006	.901	1.110
Push Motivation	-.166	.062	-.141	-2.667	.008	.832	1.202
Neutral Motivation	.040	.061	.035	.657	.512	.816	1.225

Source: Authors' calculation

Entrepreneurial Success: The term entrepreneurial success embodies diverse constructs in its significance, comprehensible through various indicators, such as a successful entrepreneur, the success of an entrepreneur, and the success of an enterprise (e.g., Crane and Crane, 2007). A scrutiny of entrepreneurship literature reveals that ES is construed based on indicators that may encompass typical business, economic, psychological, and social factors. Antecedents of entrepreneurial success are readily discernible in the literature, spanning economic, psychological, sociological, and management factors (Fisher et al., 2014). Sustainable entrepreneurial

activity and entrepreneurial success are influenced and determined by both the "external environment," encompassing economic, social, technological, and political conditions, and the "internal environment," comprising the personality, specialization, trust, and psychology of the individual towards their ideas and strengths, and their ability to adapt to the "external environment" and changing conditions (Katekhaye et al., 2019).

In the second part of the study, an effort was made to formulate an entrepreneurial model of success for agricultural enterprises, drawing on theoretical perspectives from previous studies to comprehend entrepreneurial success through the lens of the farmer entrepreneur. Despite an absence of a consistent and universally accepted definition or benchmark for entrepreneurial success, as indicated by Fisher et al. (2014), it is typically understood contextually, varying across academic, policymaker, commentator, and entrepreneur perspectives. Previous research highlights the significance of numerous variables influencing entrepreneurial success (Lin, 1998; Rose et al., 2006; Rodriguez-Gutierrez et al., 2015). To address the question of "How do farmers perceive entrepreneurial success?" this empirical research delved into personality traits (e.g., locus of control, motivation), socio-demographic features (e.g., gender, educational background, initial financial capital), and external non-organizational predictors (e.g., financial crisis, competition, taxes, labor problems, etc.). The goal was to uncover relationships between selected organizational and non-organizational predictors, contributing to the understanding of perceived entrepreneurial success. The inclusion of internal and external indicators aligns with literature recognizing a crucial relationship between them and success (Staniewski, 2016). The research unveiled that entrepreneurial success is acknowledged through internal/organizational factors rather than the external environment. The noteworthy finding of the diminished direct impact of external/non-organizational factors on perceived entrepreneurial success underscores the human factor's significance. This emphasizes the importance of attributes such as independence, effective business organization, personal effort, collaboration abilities, communication skills, and innovative perspectives. Existing literature (Vallerand, 2008; Mageau et al., 2007) addresses the interconnectedness between satisfaction, achievement, and entrepreneurial activities, reflecting on "things that make our lives worth living." Considering various approaches to entrepreneurial success studies, this research contributes to entrepreneurial practice by offering guidance on predictors positively associated with perceived entrepreneurial success, those negatively associated, and those unrelated. Internal Locus of Control, pull motivation, innovativeness, and entrepreneurial capacity positively impact perceived entrepreneurial success, while push motivations, educational background, and internal funding were negatively rated (Table 2). Contrary to expectations, external/non-organizational predictors did not seem to play a significant role in agripreneurs' perception of success. This result suggests that external/non-organizational predictors have limited relevance in the perceptual scripts of success.

Table 2. Perceived entrepreneurial success/ Pooled Within-Groups Matrices

	Internal locus of control	Pull Motivation	Push Motivation	Internal funding	Innovativeness	Entrepreneurial capacity	Educational background
Internal locus of control	1.000						
Pull Motivation	.087	1.000					

Push Motivation	-.106	.101	1.000				
Internal funding	.072	.034	.047	1.000			
Innovativeness	.017	.020	.001	-.009	1.000		
Entrepreneurial capacity	.153	.054	-.134	.067	.020	1.000	
Educational background	.094	.084	-.056	.056	.030	.038	1.000

Source: Authors' calculation

Entrepreneurship Education: This study offers insights into entrepreneurship education, specifically emphasizing entrepreneurial challenge-based learning for the purpose of fostering a sustainable future. Challenge-based entrepreneurship education is integrated throughout the entire educational continuum and extends into post-educational years within the framework of lifelong learning. Various educational programs with alternative subjects are implemented at each level of education—primary, secondary, and higher education. In primary education, the main goal of entrepreneurship education is to realize entrepreneurial choices as a profession and understand the role of entrepreneurship in the financial cycle. In secondary education, the goal of entrepreneurial education is to instill specific entrepreneurial skills and corresponding mobilization. Finally, in higher education, the goal is to provide appropriate and specialized scientific knowledge while developing the professional skills acquired during the previous period. In the case of lifelong learning in rural education, trainee farmers should be aware that they are learning, the objectives should be specific (not generalizations of the “mind expansion” type), and these objectives should be the reason the learning takes place (Bello-Bravo et al., 2018). Another issue that needs discussion is whether entrepreneurship can be approached as something that can or cannot be taught. There are skills that can be taught and some that cannot be taught (Katz, 1991). Baumol (1983) poses this question: “How can we analyze and teach actions whose nature is not yet known and whose effectiveness is particularly dependent on the difficulties that others have predicted?” (Baumol, 1983). It is commonplace to emphasize the complexity of the entrepreneurial process and skepticism about the idea of teaching it (Swedberg, 2000). Stevenson and Jarillo (1991) criticize social science research, which has become highly theoretical and, according to their approach, requires more knowledge of the “how” in terms of entrepreneurial behavior.

In the study's third section, the authors emphasize the significance and requirement of entrepreneurship education for the improvement of entrepreneurship. Concurrently, the research aims to pinpoint effective practices and educational approaches, specifically within the realm of agriculture. Examining how entrepreneurship education contributes to its advancement and acceptance can deepen our comprehension of entrepreneurship education research and its impact on entrepreneurial success. Entrepreneurship education is crucial for subsequent entrepreneurial behavior and attitude because it can be a powerful indicator not only for entrepreneurial intentions but also for entrepreneurial success and management development.

Current research on entrepreneurship education serves as a valuable resource in defining the knowledge base concerning what, when, and how agripreneurs require such education. This offers policymakers and researchers a chance to assess and expand upon the insights gleaned from research findings (refer to Table

3). Additionally, the research results demonstrate the complexity of agricultural education and confirm the need for careful approaches to target populations before planning and implementing the educational process. In particular, farmers believe that entrepreneurship can be taught. Given the existence of different subgroups and profiles within the wider group of farmers, as well as different local conditions and needs, entrepreneurship education should consider individual training needs.

Teaching personal skills should not be limited to traditional methodologies and specific courses; they also require a different pedagogical style. The transfer of knowledge in the context of structured educational programs can incorporate combinations of different methods adapted to the content of the programs. The research findings highlight the need to introduce new, more participatory models of knowledge dissemination, such as field activities or contact with other agripreneurs. This study supports "learning experience," "learning by act," and "social learning" (the process by which knowledge is created through the transformation of experience). Participating in an entrepreneurship program has an impact on both locus of control and entrepreneurial intentions. The research concludes that the implementation of any educational effort should be based on the "targeting before implementation" approach.

Table 3. Estimated time/practices/methods for entrepreneurship training

At what level of education do you think it would be good to include entrepreneurship education?	Statement	Completely disagree	Disagree	Neither Agree Nor disagree	Agree	Completely Agree	Mean	Std. Deviation
	Inelementary school	17.7%	26.0%	30.8%	18.4%	7.0%	2.71	1.164
In the Middle/High school	5.3%	12.1%	14.8%	48.3%	19.4%	3.64	1.088	
Post high school education	3.4%	5.1%	16.5%	45.6%	29.4%	3.92	.982	
When agripreneurs enter their work (new entrants to the Register of Farmers and Agricultural Holdings)	4.6%	15.3%	11.7%	38.3%	30.1%	3.74	1.175	
Someone cannot be trained if has not been born with this ability	48.1%	15.5%	19.2%	9.7%	7.5%	2.13	1.313	
Practices								
How important the following actions / practices are considered	Providing consulting services by active agripreneurs	0.7%	6.8%	31.8%	24.3%	36.4%	3.89	1.005
	Interviews with agripreneurs	2.4%	15.0%	37.6%	26.2%	18.7%	3.44	1.034
	Training business trips	1.7%	14.1%	32.8%	32.8%	32.8%	3.58	1.052
	Participation in agripreneurs' exchange programs between the Member-States of the European Union	4.4%	15.0%	33.3%	25.0%	22.3%	3.46	1.123
	Opportunity to experience specific activities related to a job that interests you (exploring career choices).	3.4%	16.7%	33.7%	31.6%	14.6%	3.37	1.033
	Training for agricultural entrepreneurship to be specialized based on real local needs and dynamics	0.5%	1.3%	20.9%	32.4%	44.9%	4.12	0.950

Source: Processed Primary Data

Cooperative Model of Entrepreneurship: The cooperative is a model that has survived for many centuries, and the cooperative movement has over 100 million participants worldwide. The model represents a unique form of entrepreneurial entity, with a fundamental distinction from other companies being the emphasis on participation. As an entrepreneurial model, the cooperative serves a different strategic purpose than

other models. The cooperative model of entrepreneurship has long been regarded as a mechanism for community and regional development. Many developing countries employ this model as a tool for economic self-progress (Chom and Ferreira, 2017). In Greece, there are over 6,000 agricultural cooperatives boasting more than 700,000 members. Virtually all farmers in Greece are affiliated with at least one cooperative organization. Agricultural cooperatives play a substantial role in market shares within the olive oil, table olives, wine, and dairy sectors. However, their contribution to the overall food sector is relatively modest, comprising nearly 8% of the total businesses in this sector. The food industry in Greece accounts for approximately 17% of the total number of companies, contributes to 22% of overall employment, and represents 21% of the annual turnover in the manufacturing industry. In agriculture, the cooperative model, based on "cooperative capitalism," combines business freedom, economic solidarity, and a strong bond with a local area, placing farmers at the heart of governance and business development strategy (Kontogeorgos et al., 2016). According to Sjauw-Koem-Fa (2012), a real challenge is how small agripreneurs can be connected in a market and integrated into farm-to-fork value chains. Sergaki & Nastis (2011) state that various forms of collective entrepreneurship can transform agricultural value chains into competing entities that could, under certain conditions, promote sustainable agricultural development.

Engagement of young agripreneurs in strong agricultural cooperatives can contribute to their business success and address the challenge of limited market representation. The substantial advantages derived from the presence of robust agricultural cooperatives in the market include countervailing power, economies of scale, risk mitigation, reduction of asymmetric information, and the cultivation of social capital (Kontogeorgos et al., 2017). Behind these definitions of an agricultural cooperative is a robust structure that guarantees the long-term future of sustainable agriculture, provided cooperatives overcome the barriers limiting them and preventing them from taking center stage to stimulate changes in the food system for the benefit of both producers and consumers.

This study presents a theoretical framework exploring obstacles hindering the acceptance of the agricultural cooperative entrepreneurial model. Uniquely, it proposes a conceptual framework for effective management development, anticipating increased commitment among cooperative members. The innovative methodology employs a systematic literature review to formulate a novel concept. Given the global pursuit of sustainable livelihoods in agriculture, exploring cooperative entrepreneurship is essential. Cooperatives, as emphasized by Hidalgo-Fernandez et al. (2020), are people-centered organizations. Ribeiro-Soriano and Urbano (2010) highlight collective entrepreneurship, emphasizing the creation of a new occupational identity. Establishing the cooperative model in the agri-food sector is an economic necessity due to the sector's limited competitiveness. This analysis aims to identify challenges in organizing and managing agricultural cooperatives, categorizing them for strategic addressing and evolution into a dynamic entrepreneurial model. The key challenge is connecting small-scale farmers to markets and integrating them into farm-to-fork value chains, with the involvement of young farmers offering a solution to their limited market presence. The substantial advantages arising from the presence of resilient agricultural cooperatives in the market include countervailing power, economies of scale, risk mitigation, reduction of asymmetric information, and the cultivation of social capital (Kontogeorgos et al., 2018; Giones & Brem, 2017). In agriculture, this entrepreneurial model, labeled as

"cooperative capitalism," harmonizes business autonomy, economic solidarity, and a strong connection to the local community, placing farmers at the forefront of governance and business development. Furthermore, the cooperative model fosters self-determination and a sense of responsibility—critical attributes empowering cooperative members, in this instance, farmers, to assume their roles as agripreneurs. It stands as a model created and sustained by the people for the people, capable of actively participating in regional development initiatives. The systematic literature review identified several obstacles, largely due to the lack of education and awareness about the cooperative movement. In particular, the most important obstacles for the existence of strong agricultural cooperatives in the market are identified in the existence of management problems (decision-making, participation and cooperation, transparency, as well as the problem of organizational fragmentation), financial problems (finance and accounting, economies of scale, product diversification), as well as a lack of cooperative training (technical training and work, cultivation of a spirit of cooperation). If education focuses on the significant barriers identified in this study, targeted actions and learning practices can be suggested not only to reduce but also to eliminate these barriers, thus contributing to the success of this entrepreneurial model. This comprehensive examination of literature holds value not just for academics and researchers but also for executives and policymakers. By outlining significant barriers and uncovering related themes in a systematic manner, this review provides a foundation for academics and researchers to design studies of considerable importance, further delving into the intricacies of this agricultural entrepreneurial model.

Digital Model of Entrepreneurship: The technological revolution, reshaping industrial production, is now extending to agriculture, altering entrepreneurial concepts globally (Sulimin et al., 2019). The widespread integration of digital technologies has become a key trend in the global economy, requiring the agricultural sector to modernize for global competitiveness. Technological advancements are vital for rural development and enhancing agricultural productivity (Salampasis & Theodoridis, 2013). In Greece, the adoption of Information and Communication Technology and digital technology in agriculture lags behind other European Union countries (Beliaeva et al., 2020). Bridging this gap requires collaborative efforts from stakeholders to embrace and utilize digital technology. In this vein, Greece, along with 23 other European Union member states, signed a declaration of cooperation for "A smart and sustainable digital future for European agriculture and rural areas" during the "Digital Day 3" event in Brussels on April 9, 2019. The signatory countries committed to taking various measures to support the successful digitization of agriculture in European rural areas, recognizing the potential of new technologies in addressing significant economic, social, climatic, and environmental challenges in the agri-food sector.

Last but not least, the study tested the usability evaluation of a 'Farm management' application, provided free of charge on Google Play, to help resolve issues related to the acceptance and use by agripreneurs of mobile applications for improving entrepreneurship. The study analyzes how mobile applications can be powerful tools in the hands of agripreneurs. In recent times, increased focus has been directed towards the digital entrepreneurial model, emerging as a burgeoning area of study. Digital entrepreneurship encompasses the creation of new ventures and the revitalization of existing businesses through the innovative development and application of digital technologies (Selart, 2005). Bearing this dynamic in mind, the owners of 10 agricultural enterprises were asked to manage their farms with the help

of a mobile "farm management" application for a period of 4-6 months. The study then presents, from an empirical point of view, how this process evolves, considering the experience of users through an evaluation of the application under study to research the field of digital technology and highlight its adoption factors. The evaluation identifies the features that an application should have to be user-friendly and easily applicable by users (agripreneurs) so that they can manage the farm efficiently from anywhere, gather all information in one place, have real-time data, and make better decisions on inputs, crop planning, leases, etc., to enhance productivity and competitiveness, and achieve their business goals. The rural population must compete in a complex and highly competitive environment, necessitating changes to its strategic process. This study proposes that the foundation of this entrepreneurial model relies on service offerings that integrate innovative demonstrations, growth strategies tied to an expanding user base, and adept management of development. It is imperative to identify opportunities for advancing the Greek economy by modernizing technical, technological, and managerial processes, leveraging the latest technologies that digitize the economy as a novel developmental paradigm. In this context, the research suggests that designing user-friendly applications would facilitate their widespread adoption by agricultural enterprises. The findings indicate that key factors influencing the acceptance and intent to use the new technology include the user experience of mobile applications, expectations of enhanced performance, ease of use, utility, anticipated personal benefits (e.g., reduced effort), and the technology's suitability for its intended purpose. Despite the majority of users being familiar with the Android system, concerns were raised about the ease of use and learning curve of the application. Given the extensive application of digital technology in agriculture, the technological skills of agripreneurs play a crucial role in identifying and exploring opportunities in various domains. The acquisition of "analytical" skills, a broadened knowledge base, and the creation of user-friendly functional environments for individuals without programming expertise are deemed highly significant.

Utilizing digital farm management provides agripreneurs with the means to optimize their time and resources, allowing for the expansion and diversification of current business practices. The integration of digital technology presents farmers with the chance to establish new business ventures that align with and complement the knowledge economy. The document encourages the adoption of a hybrid strategy (combining cost control and diversification) to improve the competitive position of these agricultural enterprises by identifying which crops, fields, machines, or workers have the best productivity. Finally, this research enhances the advancement of farm entrepreneurship, with a particular emphasis on the utilization of mobile technology.

2.2 Locus of Control and Sustainable Development

The necessity to augment the understanding and management of Locus of Control as a link between experience and development persists. When control is directed towards changeable or improvable factors, such as behaviors, skills, knowledge, etc., locus of control, as a purposeful tool of managerial abilities, facilitates development. Selart (2005) suggests that Locus of Control may serve as a bias in organizational decision-making. Abay (2017) contends that locus of control significantly predicts farmers' decisions on technology adoption, encompassing the use of chemical fertilizers, improved seeds, and irrigation. Locus of control can serve as a distinguishing factor between successful and unsuccessful businessmen. While

Nuthall's (2010) research does not indicate that locus of control is a major basic component of agripreneurs' managerial ability, it may be related to other crucial aspects of a farmer's operation, proving useful as an aid to training and extension activities. An agripreneur's locus of control likely expresses something about their approach to farming, making it a valuable construct in agricultural sustainable development.

2.3 Cooperatives and Sustainable Development

Cooperatives are strategically positioned to advance sustainable development by addressing economic, social, and environmental goals, along with governance concerns. Functioning as enterprises committed to both economic advancement and socio-cultural interests, cooperatives have long been recognized for fostering community development, especially in developing countries (Kumar et al., 2015; Fernandez et al., 2018).

Cooperative social responsibility is vital for aligning internal and external interests, linking cooperatives to Sustainable Development Goals. With inherent principles geared towards sustainability and integration, cooperatives contribute significantly to job security, local investments, and the overall objectives of sustainable development (Dhakal, 2018).

2.4 How Do Digital Technologies Contribute to Sustainable Development?

Even in contemporary times, digital skills and competencies are imperative for employment. Hence, there is a need to emphasize the development of digital skills to achieve sustainable economic and social development in countries and regions. Digital models play a significant role in entrepreneurship and sustainable development, as noted by Panda (2019). Digital entrepreneurship, a category of entrepreneurship, involves the utilization of information technology in entrepreneurial endeavors. The complexity of decisions faced by managers and producers is increasing, demanding their support through specialized tools. The evolution of digital technology, particularly Information and Communication Technology, poses numerous challenges for smart, sustainable, and inclusive growth. Therefore, it becomes a crucial initiative to strengthen entrepreneurship and management development in the agricultural sector (Habanik et al., 2019). Additionally, digital technology can play a vital role in achieving Sustainable Development Goals by enabling innovative solutions that address economic, social, and environmental challenges. The advancements in digital technology have the potential to support and accelerate the achievement of each of the Sustainable Development Goals (Pliakoura et al., 2021; Ingram et al., 2022).

2.5 Entrepreneurship Education and Sustainable Development

Sustainable development is not a stable or fixed state but a lifelong process of evolution in which people take actions that lead to development that meets current needs without threatening the ability of future generations to meet their own needs (Edokpolor, 2020). Entrepreneurship education and training have a direct correlation with positive entrepreneurial outcomes, thus contributing to sustainable development—an assertion supported by the literature (Edokpolor, 2020). Research has also confirmed that there is a positive and significant relationship between entrepreneurship education and entrepreneurial intentions (Pliakoura et al., 2021). Therefore, entrepreneurship education plays a significant role in promoting sustainable development. The idea that education can be a transformational process, and that the outcome of this process depends on the individual and is not guaranteed,

is a key feature of sustainable entrepreneurial education. Sustainable entrepreneurship education is situated in the wider landscape of transformative learning (Strachan, 2020). Additionally, entrepreneurship education emphasizes the practical application of skills. Through the adoption of a framework facilitating assessments of the sustainability of an endeavor, entrepreneurship education has the potential to empower entrepreneurs in making informed decisions regarding the impact of their activities on sustainable development. Education in sustainable entrepreneurship can furnish entrepreneurs with the knowledge to make decisions that promote more sustainable business practices, as emphasized by Strachan in 2020.

3. Discussion

As explored in the preceding sections, the agricultural sector lacks sufficient studies focusing on individuals despite the extensive entrepreneurship literature. The empirical research in this paper has spotlighted numerous challenges and solutions within the sustainability of the agricultural entrepreneurship model. While promising research is underway, this paper maintains its focus on the self-aware, educated, and growth-oriented agripreneur. The article addresses these challenges by shedding light on specific aspects of the agripreneur's personality linked to the creation and discovery of entrepreneurial opportunities. The study of the entrepreneurial process among existing agripreneurs lays the groundwork for explaining, anticipating, and defining entrepreneurial intentions and success as factors contributing to opportunities and agricultural economic development. The research underscores the importance of individual characteristics in entrepreneurial practices and sustainable development efforts, emphasizing the need for entrepreneurship education and training among agripreneurs. The challenges discussed have implications for various stakeholders:

1. **Researchers:** They are encouraged to adopt a different approach to entrepreneurship, delving beyond economic data and exploring new complex scientific fields and issues. The study and analysis of factors enhancing entrepreneurship highlight that entrepreneurship and its theory are multidimensional phenomena requiring coordinated efforts for positive economic outcomes.

2. **Policymakers:** Emphasis should be placed on embedding sustainability in entrepreneurial models and designing special programs that create favorable conditions for agripreneurs in their specific operating environments. Recognizing how agribusiness interacts with individual features can lead to more effective design, implementation, and enforcement of business policies in underdeveloped areas. Integrating sustainable development principles into business strategy fosters innovation and sustainable development in enterprises.

3. **Agents involved with entrepreneurship:** Their role is to transfer and communicate to agripreneurs the responsibilities they undertake in local sustainable development. Additionally, facilitating the acceptance and use of mobile applications by farmers is vital, minimizing cross-border barriers to trade and investment and strengthening regional integration in the value chain.

To fortify new entrepreneurship models (cooperative, digital) in line with contemporary demands, there should be a focus on educational and training programs. Developing skills, with the aim of promoting collaborative forms and establishing communication channels between farmers to find "common ground," offers a solution to many challenges faced by farmer agripreneurs. The simultaneous consideration of these diverse acceptances and challenges establishes the framework for research approaches to entrepreneurship research at all levels. Undoubtedly, more challenges may emerge, some becoming apparent only after reaching their intended recipients.

4. Implications/limitations and future research

This study builds on previous research concerning personality variables impacting agricultural entrepreneurship (e.g., Chlosta et al., 2010; Denisi, 2015; Fisher et al., 2014; Katekhaye et al., 2019). On one hand, it provides a theoretical evaluation of how internal and external locus of control, in conjunction with entrepreneurial motivations, shapes the entrepreneurial intentions of existing agripreneurs. On the other hand, it contributes to the literature by crafting a measurement model of perceived entrepreneurial success, introducing innovative concepts that shape the entrepreneurial culture in how farmers perceive success. Additionally, existing research on entrepreneurship education proves valuable in delineating what, when, and how farmers need it, offering policymakers and researchers opportunities to evaluate and build upon research findings.

Regarding practical implications, this research underlines the importance for agricultural enterprises to adopt Sustainable Development Goals as a means to augment entrepreneurial success and associated benefits. The integrative perspectives from respondents reveal critical insights for comprehending the factors influencing the entrepreneurship and sustainable development of Greek agripreneurs. Simultaneously, the study recognizes entrepreneurship as a multifaceted issue, with success contingent on effectively addressing elements such as highlighting entrepreneurial opportunities, fostering entrepreneurial thinking, developing a cooperative spirit, adopting necessary technology, and maintaining a lifelong commitment to entrepreneurship education.

However, the research is subject to limitations stemming from specific choices in approach, design, and methodology. Notably, the study is confined to Western Greece, offering insights into its distinctive developmental opportunities but lacking comparisons with areas of different geomorphology, culture, and growth rates. Additionally, being cross-sectional, the study focuses on investigating phenomena at a specific "statistical" time, necessitating future exploration of long-term interdependencies to provide valuable insights into the nature of studied relationships and effects. Given these limitations and the urgent need to enhance agricultural entrepreneurship, future research should prioritize the following areas:

Development of Integrated Tools: Formulate more integrated and multilevel tools and methodological approaches for evaluating entrepreneurship factors at a developmental level. The integration of economic data (e.g., performance) into the conceptual model stands as a crucial research avenue for future empirical studies in the field.

Effectiveness of Entrepreneurial Education Programs: Examine the effectiveness of entrepreneurial education programs, specifically assessing the achievement of learning and behavioral goals in all directions outlined by respective development frameworks. An intervention study concentrating on regional policy could yield valuable insights. Analyzing the effects of specifically designed local policies in different spatial contexts can contribute to understanding what strategies are effective for fostering entrepreneurship and sustainable development.

Conclusions

This study identifies opportunities and challenges in Greek agribusiness linked to Sustainable Development Goals, emphasizing the multifaceted nature of entrepreneurship. Success involves recognizing opportunities, fostering collaboration, adopting technology, and committing to entrepreneurship education. The findings highlight the significant impact of personal capabilities on sustainable

entrepreneurship goals, shaping agripreneurs' behaviors and mindsets. For policymakers, translating these findings into concrete actions is crucial for accelerating economic growth. Programs focusing on improving farmers' personal qualities, tailored to Sustainable Development Goals challenges, are essential. The study fills a void in Greek agripreneurs' education, emphasizing the importance of recognizing productive capacities within sustainable development frameworks, aligning with the 2030 Agenda.

Urgently needed is a comprehensive national strategy challenging the prevailing mindset undervaluing training in the sustainable management of agricultural enterprises. Shifting this perception can create an environment conducive to holistic agripreneur development, contributing to broader sustainable development goals on national and international scales. In agricultural policy, dedicated support for existing enterprises is crucial, aiming beyond sustainability to promote innovation, enhance production capabilities, attract entrepreneurial talent, and elevate Greece's primary sector value. The multifaceted approach empowers enterprises to thrive, adapt to market dynamics, and contribute significantly to the broader economic landscape, positioning the agricultural sector as a dynamic component of Greece's economic growth and sustainable development.

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