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Digitalisation and development policies to enhance cultural heritage in inland and marginal areas: a pilot study on the Gargano agritourism sector

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Abstract: Starting from the state of the art, it is possible to establish that currently the agritourism represents a peculiarity, as well as one of the driving forces, of the Italian tourism sector. The main purpose of this study is to investigate what is the status of digitalisation processes in the development policies of the agritourism sector, with particular reference to agritourism operators present in the inland and marginal areas of the Apulia region; therefore, preservation and enhancement of local cultural heritage are key priorities. The research question can be summarised as follows: how does digitalisation play a role in the development of the agritourism sector, particularly in inland and marginal territories? To this end, the study is based on pilot research and will refer to the territory of the Gargano National Park. The methodology provides for an empirical investigation conducted starting from a structured interview to investigate the sentiment of local agritourism operators towards Information and Communication Technology (ICT). The selection of operators and municipalities was randomised in order to obtain a more representative data. In the later stages of the research, interviews will be conducted with an equal number of operators per location. The data collection and interpretation process in the pilot study, while not allowing for broad statistical inferences, enable logical-formal inferences and preliminary reflections on the current dimension of the topic under investigation, as well as discussions on the state of the art based on the newly acquired data. This pilot study highlights an increasing interest and greater awareness of the importance of ICTs, such as Blockchain technology, in the tourism and agritourism sector of Gargano; however, there is also a significant lack of digital culture and limited knowledge of both the limitations and potential of digital technologies in the tourism industry. The practical implications of the present work are the following:

enhancement of customer experience; operational efficiency; marketing and visibility; environmental sustainability. In this regard, emerging technologies and ICT, combined with the unique characteristics of the territory and the already strong tourist appeal of the Gargano and surrounding areas, will provide operators in the sector with an advantage in the national and international market and enter the mechanisms of Tourism 4.0, as indicated in the National Recovery and Resilience Plan (PNRR), hence paying particular attention to the UNWTO strategies and guidelines established during the G20 meeting of September 2022**.**

Keywords: *digitalisation processes; sustainable agritourism; cultural heritage; marginal areas; development policies.*

JEL Codes: P18; P28; Q56; R11; Z32

1. Introduction

Starting from the state of the art, it is possible to establish that currently the agritourism represents a peculiarity, as well as one of the driving forces, of the Italian tourism sector. Undoubtedly, at the heart of agritourism activity lies the concept of multifunctionality (Mangialardi, 2011). Multifunctionality in agritourism signifies the array of additional roles and services that agricultural businesses offer beyond conventional agriculture (Galasso et al., 2016). The enhancement of local cultural heritage is often intrinsic to agritourism. This encompasses a variety of activities including accommodation services, educational initiatives, leisure activities, and the direct sale of agricultural products; therefore, the enhancement of local cultural heritage plays a primary role (LaPan & Barbieri, 2013; Noviello, 2020). Agritourism establishments often promote and preserve traditional agricultural practices, offer local products, and allow visitors to immerse themselves in the environment and lifestyle of rural communities (Paniccia & Baiocco, 2020; Ferreira & Sánchez-Martín, 2022). Additionally, many agritourism locations are situated in areas rich in historical, artistic, or archaeological heritage, making them ideal starting points for exploring the surrounding area and its cultural attractions (Mitchell & Shannon, 2018; Forlani et al., 2023).

In more details, agritourism establishments offer distinctive experiences such as staying on a farm, participating in guided agricultural tours, attending farming-related workshops, and sampling local produce (Mastronardi et al., 2015; Ferreira & Sánchez-Martín, 2022). These offerings not only increase the attractiveness of a region for tourism but also support the economic viability and endurance of the farms (Che, 2007; Galluzzo, 2022); in fact, multifunctionality represents the amalgamation of agriculture, eco-tourism, and education, fostering innovation, cultural interactions, preserving rural traditions, and facilitating a connection to the natural environment, thereby broadening the economic foundation of rural communities (Montanari, 2009; Komppula, 2014). Therefore, sustainable agritourism can play a significant role in enhancing and promoting local cultural heritage.

On the other hand, the multifunctionality of agritourism refers to the diversification of activities conducted within an agritourism facility beyond agricultural production, such as offering tourist, recreational, or cultural services through digital innovation (Ammirato, 2010; Kumar & Asthana, 2020). In principle, digitalisation in marginal areas is relevant for revitalising local economies and bridging urban-rural divides; it enables wider reach through online marketing and e-commerce, attracting tourists and enhancing economic prospects (Ammirato, 2010). Digital tools facilitate accessibility, inclusivity, and sustainable tourism practices by offering online bookings, virtual experiences, and efficient resource

management (Healy, 2002; Ozdemir et al., 2023). This technological integration aids in preserving and promoting rural heritage and traditional practices through digital storytelling and educational content (Esquivel-Marìn et al., 2023); additionally, it supports data-driven decision making for service improvement and sustainable development (Tanina et al., 2020). Indeed, eco-friendly digital technology can promote sustainable agritourism by streamlining operations, minimising waste, and optimising resource use (Kumar & Asthana, 2020). It enhances customer communication, marketing, and booking, fostering economic growth for agritourism businesses; moreover, digital tools enable sustainable agricultural practices through crop monitoring and efficient resource management, attracting visitors interested in green and sustainable rural tourism (Chin & Pehin Dato Musa, 2021).

Despite the numerous examples provided in the literature, the actual outcome of digitalisation processes in the agritourism sector remains ambiguous, particularly concerning marginal and internal territories where digital infrastructures exhibit shortcomings (Tanina et al., 2020; Santarius et al., 2023); furthermore, the environmental performances of the agritourism and diversified farms raise concerns (Lupi et al., 2017; Giaccio et al., 2018; Mastronardi et al., 2021).

Indeed, the state of the art highlights a gap with regard to the description of digitalisation processes in the agritourism sector, especially on sub-regional scale (Belliggiano et al., 2020; Ivona et al., 2021; Ferrero & Pinto, 2023). Furthermore, as observed by several studies (Camagni, 2009; Lopolito & Sisto, 2017; Galluzzo, 2022), specific gaps in planning and implementation of local development strategies represent a starting point for improving future socio-economic policies. For these reasons, the main purpose of this study is to investigate what is the status of digitalisation processes in the development policies of the agritourism sector, with particular reference to agritourism operators present in the inland and marginal areas of the Apulia region; therefore, preservation and enhancement of local cultural heritage are key priorities. Given these premises, the research question of this study can be posed as follows: how does digitalisation play a role in the development of the agritourism sector and the enhancement of cultural heritage in inland and marginal territories? For this purpose, this pilot study is based on a survey to investigate the sentiment of agritourism operators and refers to the territorial scope of the Gargano National Park, an area that not only has a significant impact on the economy of the Puglia region but also represents one of the major tourist destinations nationwide (Buongiorno & Intini, 2021); the area hosts one of the largest natural parks in Italy (i.e., The Gargano National Park, ranked 5th at national level) and is high demanded in terms of touristic attraction at regional level. The Gargano National Park area, between tangible and intangible assets, has also an immense cultural and environmental heritage (Volpe, 2014; 2020), suffice it to say that in its territory there are two UNESCO sites out of the five located in Puglia (three in the province of Foggia). Nonetheless, the network infrastructures are not adequate for the tourist vocation of the territory – as often occurs in marginal areas and internal areas (Giannelli, 2015). What has just been outlined makes it difficult to implement development models in line with the principles of Tourism 4.0 at a local level (Stankov & Gretzel, 2020), in the perspective of a moderate boosterism, capable of not losing sight of the need for responsible and fair tourism (Forlani et al., 2023).

This pilot study is relevant for several reasons. Firstly, there are no case studies in the considered area. Secondly, despite many studies emphasising the importance of digitalisation processes in the tourism sector, the literature reveals gaps regarding the actual ability of agritourism operators to leverage digital infrastructure implementations due to low levels of digital literacy. Thirdly, the literature review emphasises that there is a lack of clarity regarding the role of digitalisation processes concerning the agritourism sector in internal and marginal areas (Chiodo et al., 2019). Finally, this would underscore the need to strengthen development policies aimed at overcoming the outlined gaps. For these reasons, it was appropriate to

consider the opinion of internal stakeholders (e.g., agritourism operators) of the Gargano area to assess the role of digitalisation processes in territorial development.

The methodology employed in this study involves an empirical investigation, preliminary to a future market survey, through the administration of an ad hoc questionnaire, aiming to explore the sentiment of local agritourism operators towards Information and Communication Technology (ICT), e.g., Blockchain technology. Since this pilot study involves the implementation of the emerging technologies within a park area such as that of the Gargano, it is necessary for it to be eco-sustainable and with an environmental impact as close to zero as possible, in line with the principles of ecotourism (Montanari, 2009), which, together with cultural and religious tourism, characterises the possibility of seasonally increasing tourism in the Gargano National Park area (Giannelli, 2015). For these reasons, it is appropriate to evaluate what the margins of application are at a theoretical level through the review of the literature, which will act as a pivot for the interpretation of the data acquired through the administration of the survey. The expected results relate to the need to reflect on the development opportunities for the agritourism sector represented by optimising digitalisation processes in marginal territories as a necessary condition for further development trajectories through emerging and established technologies (Tyan et al., 2020; Lyping, 2021; Del Vacchio & Bifulco, 2022). In light of these preliminary observations, the next sections of this article will be divided as follows: Section 1 introduces the context of the research. Section 2 will focus on literature review. Sub-section 2.1. will describe the evolution of agritourism in reference to the theoretical framework of the concepts of multifunctionality, innovation and digitalisation of agritourism; Sub-section 2.2 will provide examples of implementation of digitalisation processes, with particular reference to the enhancement of agritourism through Blockchain technology; Sub-section 2.3. will provide the descriptive statistics relating to the agritourism sector**.** Section 3 will present the methodology used for the research. Section 4 will discuss the obtained results from the survey. Lastly, Section 5 will conclude the work.

2. Theoretical background and literature review

2.1. Multifunctionality and enhancement of cultural heritage

The theoretical background of agritourism in Italy is shaped by the country's rich agricultural history, cultural traditions, and a focus on sustainable rural development. Key elements include the preservation of traditional farming practices, economic diversification for rural communities, and the promotion of regional culinary traditions (Mangialardi, 2011). Agritourism also emphasises sustainable and responsible tourism, supported by government policies and regulations. It provides opportunities for cultural exchange, education, and a connection between visitors and the authentic rural lifestyle (Montanari, 2009; Esquivel-Marìn et al., 2023). Overall, agritourism in Italy integrates historical, cultural, economic, and environmental aspects to create a unique and sustainable tourism experience (Lemmi, 2009).

The beginnings of agritourism in Italy can be traced back to the 1960s and 1970s (Mangialardi, 2011). The evolution of agritourism in Italy over the past decades exemplifies the integration of agriculture and tourism to boost economic and cultural development. Initially facing hurdles, the sector, evolved through pioneering efforts in lobbying for supportive policies and navigating legislative challenges; this foundational period was crucial for what would become a flourishing sector (Santucci, 2013). Agritourism's significance in multifunctional agriculture is highlighted by Cardillo et al. (2023), illustrating its role beyond a mere business model to a vital component in diversifying farm income and addressing societal needs. The sector's legal and economic impacts, detailed by Santucci (2013), have been substantial since its formal recognition. In fact, the real breakthrough occurred in the 1980s when the concept of "multifunctionality" emerged (Law of February 20, 1985, No. 41), a milestone for the development of agritourism in Italy. It introduced the concept of "multifunctionality" in the agricultural context, allowing

farmers to engage in activities beyond those strictly related to agricultural production. In fact, multifunctionality in agritourism refers to the ability to integrate various activities within a farm, going beyond traditional agricultural production (Mastronardi et al., 2015; Borrelli, 2016). This concept was introduced to address the economic challenges of agriculture and provide sustainable alternatives for rural businesses. In the 1980s and 1990s, Italian authorities introduced specific regulations to govern agritourism, providing guidelines for permitted activities and encouraging the diversification of agricultural activities (Law of December 6, 1991, No. 394). These laws helped promote agritourism as a profitable option for farmers. With the evolution of the multifunctionality concept, farm businesses began diversifying their activities; In addition to hospitality, many expanded their offerings to include restaurants, activities related to food and wine tourism, cooking classes, direct sales of agricultural products, and other activities linked to the local area (Galasso et al., 2016; Cardillo et al., 2023).

In recent decades, there has been a growing awareness of the importance of sustainability. Agritourism businesses in Italy have increasingly embraced sustainable practices, promoting environmentally and community-friendly tourism. Agritourism in Italy has experienced substantial growth and diversification in recent decades (Ohe & Ciani, 2011). The "Consolidated Text on Agritourism," enacted by Legislative Decree No. 228 on May 18, 2001, serves as the fundamental regulatory framework for this sector. This legislative document consolidates various regulations pertaining to agritourism and addresses key aspects of its operation, management, and development. Galluzzo (2022) further describes how agritourism offerings have adapted over time to align with the varying preferences of tourists, reflecting a dynamic evolution from 2003 to 2013. As suggested by Ciervo (2013) examines the local impacts in the Itria Valley, underscoring the variability of agritourism's impact based on different models.

The EU has regulated agritourism and deployed resources and provided funding to facilitate entrepreneurship in the agritourism sector for rural development projects (Regulation (EC) No. 1698/2005 of the Council of the European Union). Consequently, the law of February 20, 2006, No. 96 introduced additional changes to the Italian agritourism sector. The concept of multifunctionality takes on greater centrality in the theoretical and practical framework (Chiodo et al., 2009). It streamlined bureaucratic procedures for the opening and management of agritourism facilities and provided tax incentives to promote the development of multifunctional activities. Successively, the Law of January 9, 2007, No. 4 was introduced to promote the sustainable development of rural areas and incentivise multifunctionality in agricultural enterprises, to improve the quality of life in rural areas. The latest regulations at national level have essentially confirmed what is determined by current legislation introduced additional support measures for agritourism, including tax incentives and funding to enhance the efficiency and competitiveness of agritourism facilities (Law of October 23, 2017, No. 167 and Law of December 30, 2023, No. 213).

These laws and regulations have contributed to creating a legal and political framework that has fostered the development of agritourism in Italy, promoting multifunctionality and enabling farmers to diversify their activities successfully by integrating hospitality, catering, and other related initiatives (Zanetti et al., 2022; Cardillo et al., 2023).

Currently, the concept of multifunctionality is central to Italian agritourism. Businesses aim to offer a diverse range of experiences, integrating agriculture, hospitality, gastronomy, environmental education, and other related activities; this approach contributes to making agritourism businesses resilient and competitive (Borrelli, 2016; Ferrero & Pinto, 2023).

Digital platforms' growing role has been pivotal in promoting and enhancing agritourism’s reach (Ammirato, 2010). The COVID-19 pandemic’s impact, analyzed by Zanetti et al. (2022), highlights the

sector's resilience and its role in crisis management, suggesting policy implications for future competitiveness and innovation. As suggested by Paniccia & Baiocco (2020), sustainability remains a key focus. In this regard, Belliggiano et al. (2020) developed a sustainability index to assess agritourism's impact. Economic challenges, especially in less favored areas, are noted by Arru et al. (2021), while Giaccio et al. (2018) emphasise the influence of policies like the Common Agricultural Policy (CAP) in supporting sustainable agritourism. In this highly competitive and information-intensive economic environment, understanding the importance of using ICT has become a fundamental prerequisite for the success of a tourism activity (Barbieri, 2019; Gretzel & Stankov, 2021). Digitalisation gives the opportunity to expand and implement the agritourism offer, opening up new paths in the cultural tourism sector (Del Vacchio & Bifulco, 2022; Santarius et al., 2023).

Nowadays, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) has acknowledged the profound significance of agritourism as an integral part of cultural heritage (Benhamou, 2000; Noviello, 2020). This recognition stems from the multifaceted role that agritourism plays in preserving and showcasing the rich tapestry of rural traditions, agricultural practices and local cultural heritage. Indeed, agricultural landscapes serve as a testament to the enduring relationship between humanity and the land, showcasing diverse cultural and landscape dynamics, sustainable land-use practices, and resilience in the face of challenging environmental conditions (*n°69 - World Heritage agricultural landscapes* | UNESCO, s.d.). Digitalisation processes contribute to the conservation of rural landscapes, historic architectures, and promote sustainable agricultural practices; they support local economies and help in maintaining cultural festivals, crafts, and arts. This recognition by UNESCO highlights agritourism's importance in preserving cultural diversity and ensuring the sustainability of rural communities globally (Benhamou, 2000; Ammirato et al., 2020; Barbieri, 2019). As observed by several studies, there is a significant connection between sustainable agritourism and cultural heritage, both tangible and intangible (Guglielmetti, 2020; Noviello, 2020). The next table shows how these two concepts are intertwined.

Table 1. Enhancement of cultural heritage: UNESCO main objectives and definitions.

Main targets	***Description***
Promotion of cultural tourism	Agritourism can become hubs for cultural tourism, offering visitors an authentic immersion in the local culture by exploring both tangible and intangible heritage, the promotion and enhancement of the cultural assets of a territory such as the Gargano National Park (where there are not only many material assets, but also many intangible assets[1]).
Enhancement of Tangible Heritage	Many agritourism establishments are situated in historic buildings or rural areas with remarkable tangible heritage. These places are often restored and preserved, contributing to the conservation of material and landscape heritage.
Engagement in Local Culture	Agritourism guests often have the opportunity to participate in activities related to the local culture, such as olive harvesting, grape harvesting, cheese making, or involvement in local cultural events and festivals. This encourages active

[1] In line with the 1972 and 2003 UNESCO Convention (*Text of the Convention for the Safeguarding of the Intangible Cultural Heritage*, s.d.).

	participation and appreciation of intangible cultural heritage.
Enhancement of Intangible heritage	A direct consequence of the previous objective. Agritourism can contribute to the preservation of intangible heritage, including traditions, stories, songs, and cultural practices passed down through generations. Guests may be exposed to these traditions during their stay.
Promotion of cultural tourism	Agritourism can become hubs for cultural tourism, offering visitors an authentic immersion in the local culture by exploring both tangible and intangible heritage.
Enhancing the social and economic well-being of the reference community	The enhancement process does not only favor the protection and socio-economic enhancement of the asset considered and the income of the tourism operators, but aims to globally enhance the level of welfare such as to satisfy the community of reference.

Source: Authors' elaboration

What is outlined in Table 1 involves a reflection on which technologies can achieve the required implementations; for these reasons, it would be appropriate to deal with all the methodologies suitable for the purpose and identify the means and sustainable resources to achieve the identified target; in this way, for example, it would be possible to give value to those intangible assets that risk being lost or to enhance those assets that are already materially compromised (Montella, 2009; Bizzarri & Micera, 2022). The use of eco-sustainable smart technologies, in particular VR applications and simulators of various kinds, can also affect the aesthetic dimension of the heritage experience, allowing high levels of immersion of visitors in highly realistic virtual worlds (Guttentag, 2010; Buonincontri & Marasco, 2017).

In summary, sustainable agritourism plays a significant role in conserving, promoting, and enhancing both tangible and intangible cultural heritage (Ohe & Ciani, 2011). The diversification of activities and a greater focus on sustainability promote ethical investments, attentive to the development of local communities (Lingnau et al., 2022; De Cicco et al., 2023); indeed, it contributes to the preservation of the cultural roots of local communities and provides visitors with an authentic cultural experience (Mangialardi, 2011; Aquino et al., 2018). In this regard, digitalisation processes, as long as they are eco-sustainable, offer additional methods and perspectives (Healy, 2002; Zhao et al., 2023). They will provide a new impetus and a competitive advantage in the tourism services market, giving rise to a connected generation of "Smart Tourists", for a human-centered design perspective (Gretzel & Stankov, 2021). The range of services offered by agritourism establishments has expanded in recent years. Numerous activities such as horseback riding, hiking, trekking, and mountain biking have complemented the more traditional accommodation and catering services. Diversification is therefore confirmed as the main and necessary tool for achieving multifunctionality and seeking a competitive advantage in the market (Galasso et al., 2016; Pitrova et al., 2020; Snowball, 2010; 2022).

2.2. Blockchain technology application in the agritourism sector

Today, as evidenced by numerous studies, ICTs have a significant impact on the implementation of the tourism offer. Among them, Blockchain technology has not yet revealed its potential and the literature offers few examples of practical application in the agritourism sector, despite being one of the most participatory and human-centred ICTs (Stankov & Gretzel, 2020). In fact, one of the peculiarities of this

technology lies in being able to establish network agreements, and partnerships between public and private bodies, aimed at creating Smart Tourism (Srakar, A., & Čopič, 2012; Ming & Wei, 2021). Another distinctive feature is to create a synaptic link between the consumer and the agritourism operator, that is, to focus the tourist experience and the services offered on the needs of the consumer, in a peer-to-peer relationship (*What is Blockchain Technology*? | CB insights, s.d.). The Blockchain, which can be translated as a chain of blocks, is a relatively new technology that underlies, among other applications, the famous and first cryptocurrency and payment system called Bitcoin, created in 2009 by an anonymous inventor (or group of inventors) known by the pseudonym Satoshi Nakamoto (Nakamoto, 2008).

In the evolving landscape of agritourism, Blockchain technology emerges as a pivotal digital tool, promising to revolutionise the sector; its application in agritourism aligns with the increasing need for transparent, secure, and efficient operational processes in rural tourism settings (Tyan et al., 2021). Blockchain's decentralised nature allows for the creation of tamper-proof, traceable records of agricultural produce, enhancing the authenticity and trustworthiness of agritourism experiences). Hacking or tampering attempts would become unlikely since all the blocks would need to be violated, which is extremely complex to achieve (Del Vacchio & Bifulco, 2022). This technology can also streamline supply chain management, ensuring the traceability of local products from farm to table, a critical aspect in authenticating the agritourism experience (Hughes et al., 2019). Moreover, Blockchain facilitates secure peer-to-peer transactions, simplifying the booking and payment processes for agritourism services, thus fostering a more direct and personalised interaction between service providers and tourists (Rejeb & Rejeb, 2020). This is also due to the increasing need for qualitative and quantitative information about travel destinations (Kitsios et al., 2022). Potential buyers of travel packages or proposals are no longer passive recipients of services but, with access to vast amounts of information, they are more knowledgeable, informed, attentive, and independent, becoming information providers themselves regarding travel experiences, accommodations, and more (Hughes et al., 2019). In essence, Blockchain technology holds the potential to significantly contribute to the sustainable and responsible development of agritourism, aligning with the strategic objectives outlined in the National Recovery and Resilience Plan and the UNWTO guidelines (Rana et al., 2022). Blockchain technology, known for its decentralised, transparent, and unchangeable nature, is especially transformative in rural areas like Gargano National Park (Arbatskaya & Khoreva, 2021). Here, the transparency provided by Blockchain technology could play a crucial role in ensuring a fair distribution of revenue, aiding in sustainable development while preserving the area's rural charm (Lyping, 2021). The security features of Blockchain, including its immutability and cryptographic techniques, make it exceptionally secure, beneficial in ensuring secure international payments, simplifying check-in processes, and supporting decentralised reward systems in the tourism sector (Rejeb & Rejeb, 2020; Zhang & Danko, 2021; Prados-Castillo et al., 2023). The myriad advantages of Blockchain in rural tourism address challenges such as inadequate infrastructure and the impact of seasonal tourism with its transparent, traceable, and decentralised nature. Blockchain technology ensures secure transactions for bookings and payments, decentralises services to enhance economic benefits for local communities, and authenticates reviews and ratings vital for genuine tourist experiences (Erceg et al., 2020; Lyping, 2021; Viano et al., 2022). Furthermore, Blockchain technology aids in eco-friendly resource management, promoting sustainable agritourism and local products by connecting tourists directly with local producers and farmers, and plays a crucial role in preserving cultural heritage by managing funds transparently (Del Vacchio & Bifulco, 2022). It also supports loyalty and rewards programs, enhances travel experiences through efficient data management, enables crowdfunding for infrastructure development, and validates and promotes sustainable tourism practices, making rural areas more accessible and attractive to global tourists (Thees.

et al., 2020; Balasubramanian et al., 2022; Ni, 2022). While Blockchain's role in revolutionising rural tourism is undeniable, its implementation in marginal areas faces challenges, including technological and environmental barriers and the need for educating stakeholders (Lepore et al., 2020; Ni, 2022). A balanced approach is essential, considering both the excitement for new technology and the practical aspects of its application (Melkic & Čavlek, 2020; Bolici et al., 2020). Below (Table 2), are highlighted potential applications of Blockchain technology in the agritourism sector.

Table 2. Potential applications of Blockchain technology in the agritourism sector

	Decentralisation processes in line with Tourism 4.0 indications		
Key components for development in the agritourism sector	Customer loyalty programs	Peer to Peer Processes	Smart Contracts
	Shared reward systems	Supply chain Tracking	Interoperability

Source: Authors' elaboration

As shown in Table 2, Smart Contracts, which are based on and functioning through Blockchain technology, could be described as contracts that exclude intermediaries (such as notaries, service providers, banks, insurance companies, etc.), significantly reducing costs and processing times. These Smart Contracts are pre-programmed applications that follow contractual actions organised according to computer logic and aim to provide greater security compared to traditional contracts. One applicable example in the tourism sector, specifically for agritourism, could be the establishment of a decentralised travel or accommodation insurance contract operating on the Ethereum platform, a peer-to-peer Smart Contracts platform, as suggested by Hughes et al. (2019). Loyalty programs, such as frequent flyer programs offered by most airlines to reward customer loyalty, could be easily replicated using Blockchain technology, providing each entity in the tourism sector, including agritourism, the opportunity to create their own secure, transparent, and original loyalty service, shared, for example, with retail chains or online service and/or product sales platforms (Kowalewski et al., 2017; Arif et al., 2020). In a context where a member of a tourism hospitality chain, such as agritourism, has affiliations with airlines, car rental companies, and/or road or rail transport, all interconnected through shared, certain, and accessible information contained in a shared Blockchain, the hotel chain, agritourism facility, or airline can offer customers a range of options to redeem loyalty points with any partner within the same network; furthermore, fast and secure payment processing thanks to the peer-to-peer technology innovation introduced by Blockchain (Del Vacchio & Bifulco, 2022). The two parties involved in an economic transaction would have the possibility to transfer money securely without the need for a third-party intermediary. With Blockchain, sharing unique data with all involved companies would become fast, simple, and accessible. The technology is applicable and already applied in all sectors requiring tracking along a supply chain. An emblematic and leading case is the "Food" sector (Rejeb & Rejeb, 2020). Ultimately, this technology would guarantee development and benefits for local communities. Interoperability allows for the creation of broader and more inclusive ecosystems, enabling different networks to work together and leverage the resources and functionalities of each Blockchain. Thanks to the interoperability of the Blockchain mentioned above, industry agents, including agritourism facilities, can have direct access to data and information, allowing them to reach tourists and stakeholders directly, offering tailored services and packages while eliminating national and international intermediaries, ensuring reliability, traceability, and secure and efficient payments (Rana et al., 2022).

In conclusion, agritourism in Italy has evolved from a traditional rural hospitality offering to a more multifunctional model, incorporating a variety of activities to address economic challenges and promote sustainable development in rural areas. Digital technologies have the potential to drive social and economic development (Bukht & Heeks, 2017; Stankov & Gretzel, 2020) by employing ICT to foster innovation (Arbatskaya & Khoreva, 2021). In this context, a disruptive element like Blockchain can serve as a foundation for other technologies or applications, which can generate a competitive advantage for the Gargano tourism sector. The next sub-section shows how the tourism sector has become a fundamental component of the Gross Domestic Product (GDP) of global economies, including the Italian economy among others. Subsequently, the agritourism sector has been analysed in detail at regional and sub-regional levels, with a particular focus on the province of Foggia and the Gargano area.

2.3. The agritourism sector: statistical data.

The statistical description is one of the most useful tools to collect data and understand trends at the sub-regional level, that is, to understand how professionals in the sector currently perceive and value technology (Kotler, 2003; Gummeson, 2008). What has just been outlined is generally corroborated by statistical data. In an increasingly globalised society, the tourism sector is considered a critical element of the economies of numerous nations. The tourism industry accounts for nearly 10% of global GDP and employs over 300 million people (10.6% of the total) (*Travel & Tourism Economic Impact* | World Travel & Tourism Council, s.d. (WTTC)). Among the EU countries, Italy in 2022 ranks third after France and Spain, in terms of nights spent at tourist accommodation facilities by degree of urbanisation and coastal/non-coastal area (*Tourism Industry* | EUROSTAT, s.d.). In general, the data show an exponential growth in the post-pandemic period, from 289,178,142 in 2021 (in which Italy ranked second) to 412,008,532 presences in 2022. However, Spain recorded a larger percentage increase and a total of 451,624,940 accommodation places it in first place in the EU). According to the last *Briefing on Rural Tourism* promoted by the EU in 2023 (European Parliament, s.d.), during the last year tourism saw a strong recovery, with a persistent interest in sustainable travel to rural and nearby destinations. However, this interest might be affected by the rising cost of living, and a general high inflation in EU countries in the context of global conflicts that do not seem to be diminishing in scope.

On a national scale the most recent statistical survey highlights that, despite the health crisis caused by the Covid-19 pandemic, the number of agritourism businesses has been increasing, with an increase of 484 units compared to 2019, confirming the growth that has characterised this sector since 2007 (*Le Aziende Agrituristiche in Italia* | ISTAT, s.d.). Over the past 13 years, we have witnessed an average national growth of agritourism establishments of +41.4%, distributed geographically as follows: +61.3% in the Northwest, +45.6% in the Center, +41.9% in the Islands, +36.2% in the South, and +30.2% in the Northeast, with a total increase of 7,340 establishments. However, accompanying this positive growth trend is a decline in the economic value of this sector, primarily due to the limitation of transfers and tourist flows caused by the health crisis. In 2020, agritourism production experienced a drastic decline of -48.9% compared to 2019 and -27% compared to 2007. The health crisis has significantly diminished the economic value of this sector, whose value-added accounts for 2.3% of the entire industry (ISTAT, s.d.). This trend is confirmed by regional and sub-regional data, which show an increase in the tourist presence beyond just agritourisms.

In 2021, according to the Regional Report, the Puglia region in Italy recorded a total of 13,875,537 tourist arrivals (ranked 9th in Italy); Apulian Institute of Economic and Social Research (IPRES) estimates

based on ISTAT data have predicted that the impact of the tourism industry on the real GDP of the Puglia Region in 2022 would have been between 8.3 and 8.8%, that is, for a figure ranging from 75 to 80 million euros. In Puglia, the recovery was driven by the good performance of international tourism: +8.5% arrivals in 2019 and +11% attendance. The increase in international tourism offset the decline in domestic tourism (-4% and -1%). The internationalisation rate reached 30% for arrivals and 27% for presences, a positive trend both compared to 2019 and 2015 (*I principali indicatori del turismo in Puglia nel 2022* | Agenzia Regionale del Turismo, s.d.). Briefly, the attendance in agritourism establishments was less than one million, about half of the attendance in private houses/apartments, therefore approximately 1/9 of the attendance in hotels and campsites from 3 to 4 stars, highlighting a negative difference in terms of the impact of agritourisms on regional tourism in Puglia, a greater gap than that found in most of the central-northern regions.

As for the travel intentions planned last year in Puglia, 43% of travelers will use virtual reality for inspiration, and 46% will be more inclined to visit a destination because they had the chance to experience it virtually beforehand. Nearly three-quarters (73%) wish to step out of their comfort zone during travel, and 30% intend to explore lesser-known locations to discover hidden gems. 68% claim to prioritise their travel budget. However, despite the ongoing energy and economic crisis, half (50%) believe that investing in a vacation is still a priority. Almost two-thirds (63%) will keep an eye on deals and other ways to save, and over half (53%) are willing to travel off-peak or take longer routes (Agenzia Regionale del Turismo, s.d.). The data processed by the Foggia Chamber of Commerce show that Gargano is mostly a summer tourist destination, indicating the need to develop development policies suitable for the development of a community-based strategy. On a sub-regional scale, the province of Foggia alone accounted for 4,058,927 arrivals, with 3,865,608 of them being tourists visiting the Gargano area (a 30% increase in 2022). Vieste, with 1,969,531 arrivals, emerged as the top tourist destination in Puglia. Other notable locations include Peschici (628,788), Rodi Garganico (334,021), San Giovanni Rotondo (222,281), Mattinata (172,708), and Vico del Gargano (140,106). The islands of Tremiti (59,596), Lesina (57,319), Cagnano (55,149), Monte Sant'Angelo (53,659) and the other municipalities recorded comparatively lower numbers (Agenzia Regionale del Turismo, s.d.). It's important to note that these figures only account for tourists staying in official tourist accommodations. In the latest report of the Chamber of Commerce of Foggia (*Osservatori economici* | *CCIAA* di Foggia, s.d*.)*, it is noted that in 2017 in the province of Foggia there are 1,225 agritourisms out of 12,115 in the whole of Puglia (equal to 10.11%). As an example, most of the tourist facilities in the province of Foggia are campsites/tourist villages, equal to 56,811 out of 97,742 total facilities (equal to 58.12%). This figure is also reflected in the Gargano area, where no more than 10% of the agritourisms in the entire province of Foggia are located; a tourist vocation that sheds light on the lack of market surveys on agritourisms, as they contribute less to the increase in the regional tourism sector than in the Centre-North of Italy. These data briefly highlight the importance of implementing digitalisation processes to activate marketing strategies aimed at matching demand with tourism supply and developing *ad hoc* policies. Consequently, the socio-economic implications of ICTs in the development of rural tourism are central to this work. In this regard, the observation of the Gargano area can serve as a parameter to broaden the theoretical perspective.

3. Materials and methods

3.1. Structure of the questionnaire

From a theoretical perspective, this pilot survey is a useful tool to gather early qualitative and quantitative information to highlight the sentiment of the operators, the role and status of digitalisation processes in the agritourism sector of the Gargano area – starting from the analysis of the available data (*Osservatori economici* | CCIAA di Foggia, s.d.). The most appropriate tool for this purpose was a structured interview. Our analysis is based on a survey structured into three clusters. The choice of these clusters is supported by current literature. The first section is designed to assess farmers' profile and some economic aspects of their farm (Nouman et al., 2013). The second section aims at detecting farmers' awareness on marketing strategies not necessarily related to ICT (Kotler, 2003; Gummeson, 2008; Montella, 2010). The third section retrieves information on the current state of digitalisation processes and on the sentiment of operators regarding the implementation of necessary infrastructures for marketing promotional strategies in the context of Tourism 4.0 and network economy (Tarutė & Gatautis, 2014; Kotler, 2022).

Table 3. Description of the questionnaire structure

Questions number	***Cluster***	***Objective***
From Q.1 to Q. 12	*Socio-economic aspects*	Retrieve information and data on the socio-economic and financial status of the agritourism operators for subsequent analysis of the socio-economic impact in the Gargano area.
From Q.13 to Q.17	*Adopted Marketing strategies (ICT-related)*	Determine the effectiveness and relevance of actions and implemented by the operators to promote their products or services in the market.
From Q.18 to Q.24	*Potential Marketing strategies (ICT-related)*	Detect the willingness to invest of agritourism operators in promoting products and services related to ICT in the Gargano area. Some of the primary objectives include: 1) Market Positioning/Brand Building 2) Demand Generation 3) Market Education/Digital literacy 4) Digital Customer Loyalty 5) Resource optimisation and sustainability

Source: Authors' elaboration

As shown in Table 3, the final pilot survey has 24 questions, of which 12 are related to the socio-economic and demographic aspects and the remaining 12 are related to marketing promotion strategies and ICT. The selectable responses for each question may have different levels of intensity in some cases, while in others they are alternatives. The questionnaire was administered using the Computer Assisted Personal Interview (CAPI) methodology; in some cases, it was necessary to administer the questionnaire electronically, using the Computer Assisted Web Interviewing (CAWI) methodology (Cocco & Tuzzi, 2012; Ellguth et al., 2013). As shown later, several questions have been formulated to determine the level of consistency in the respondent's answers. Similarly, several control items have been included to assess the overall degree of attention given by the respondent in providing the answers. In order to ensure and protect the privacy of the interviewees, in this phase of the research, each agritourism operator has been assigned an identifying code (e.g., AO1)[2]. In the preliminary phase of the research, it was possible to interview 33 AOs, whose tourist facilities are located in different municipalities in the Gargano area – out of a total population of around 95-105 units (*Osservatori economici* | CCIAA di Foggia, s.d.). Their distribution in the territory is not homogeneous but

[2] Henceforth in this study, by convention, the term "agritourism operator" will be referred to as “AO”.

adequately diversified. Among them, a number of 30 units provided all the required answers, while a number of 3 units only answered the questions strictly related to ICT, without providing responses to the socio-demographic questions. In order to obtain representative data, the interview was conducted with an equal number of operators per municipality, with the selection of operators and municipalities being randomised; hence, in this pilot phase of the research, the survey concerned 15 municipalities in the park area out of a total of 22 municipalities covering both the municipalities with a greater tourist presence and higher income levels, as well as the marginal and internal ones.

3.2. Determination and reliability indexes of the sample

For the aforementioned reasons, the initial sample of the pilot research is conventionally determined to be 30 units out of a total observable population of around 95-105 units. The initial sample increases to 33 units when considering those who only answered the questions about ICT and digitalisation processes. The updated list of local AOs would have been published in the register of the Puglia Region in the early months of 2024, which is why the total population is currently based on previous lists; not all are currently available or active, because the list of the operators has not yet been published. Therefore, the total population will be conventionally set at 85 units. Initially, we ruled out the possibility of determining the sample from the Cochran equation and the Yamane equation since the number of the actual total population is unknown and small, making them inadequate and inaccurate (Israel, 2003; Weiss & Weiss, 2012). For similar reasons, we discarded the possibility of using the Slovin equation to determine the sample size. Based on the above, it was possible to determine the minimum sample size using the standard equation (1):

$$(z\text{^}2 * p\ (1-p))/(e\text{^}2/(1+[(z\text{^}2 * p\ (1-p))/(e\text{^}2\ \ N)]) \qquad (1)$$

As previously outlined, the number of the total reference population (N), conventionally adopted, is 85 units; the level of significance (p) has been set at 50%, while the margin of error (e), given the small number of initial observations, has been set at 20%. Since several questions show a response shared by all or most of the respondents, it was possible to establish a confidence level of 99%, which is generally associated with a standard score (z) of 2.58. The sample size determined based on the previous values is equal to 29.37 units (rounded up to 30 AO). By virtue of the exploratory purpose of this survey, the statistical description will be limited to the arithmetic mean as a position index to evaluate the trend of the answers provided by the AOs. For these reasons, at the moment, the statistical description will be limited to the arithmetic average as a position index to evaluate the trend of the answers provided by the AOs, using the standard formula:

$$M(x) = \frac{1}{N}\sum_{i=1}^{n} x_i \qquad (2)$$

As will be shown in the next section, the fact that most of the observations are channeled in the same direction, offers a discrete degree of reliability, as it reduces the specific weight of any outliers and, at the same time, highlights a distributed, uniform trend of the selected sample (Israel, 2003). In the subsequent phases of the research, the questionnaire will be reformulated and restructured in such a way that a more detailed qualitative description can be made. As mentioned, the questions are also structured in such a way as to present a level of consistency between the selected answers – e.g., Questions no. 16-17-18 and 21-22. A further reliability index is given by the last control item (Question

no. 24). In the epistemological perspective of propositional calculus, the question is posed in such a way that there is only one selectable false answer, as it responds to the principle of non-contradiction. Since it is a multiple-choice item, the answers are not completely true, but at the same time the principle of non-contradiction is respected by the necessarily false item. Referring to fuzzy logic (Zadeh & Aliev, 2018), it answers the following equation:

$$\mu(\neg X) \wedge \mu(X) = \min(\mu(X), 1 - \mu(X)) \qquad (3)$$

According to the equation of the principle of non-contradiction, the value of each answer X will necessarily be less than the value 1, or, better, never be greater than 1/2; at the same time, each completely false answer can only have a value of 0, respecting the principle of non-contradiction, which continues to apply in polyvalent logic (Łukasiewicz et al., 2020). Therefore, the higher the number of AOs who responded correctly to the control items, the higher the reliability of their responses and consequently of the results of the survey. The data collection and interpretation process in the pilot study, while not allowing for broad statistical inferences, enable logical inferences and preliminary reflections on the current dimension of the topic under investigation, as well as discussions on the state of the art based on the newly acquired data. Furthermore, from an eminently theoretical perspective, it will be possible to expand the scope of the research, determining its limits and overcoming the conceptual and empirical barriers that will be identified from time to time. Hence, the results of this survey represent a benchmark to develop insights on the current state of understanding and importance of technologies among AOs.

4. Findings and discussion

It is appropriate to emphasise that this pilot study primarily focuses on the state of the art regarding the use of ICT by AOs, consequently on the possibility of implementing digitalisation in the Gargano area to promote sustainable agritourism and enhancement of local cultural heritage. Therefore, the reflection on the initial data emerging from the questionnaire will reflect this need, highlighting the responses provided by AOs to the questions related to this area of discussion. It should be noted that the publication of the survey information and data, would be available upon the written consent of AOs. In contrast, the same operators, have agreed for the present pilot project, about the publication of the data relating to marketing promotion strategies and the aggregate opinion on the implementation of the digitalisation processes in the considered area. Table 4 shows a synoptic illustration of the ICT-related responses to the actual 30 operators who fully answered to the questionnaire. Furthermore, questions that allow for multiple responses will be marked with the letter "M". Given the pilot nature of this work, only the arithmetic mean will be considered as a preliminary statistical criterion to observe the frequency of responses from AOs.

Table 4. Questions and ICT-related responses from AOs who completed the survey.

ICT-related questions	Responses provided by AOs (from AO1 to AO30)	Average percentage
N.13: On average, through which channels are your	On the spot	(80%)

services sold? (M)	Booking portals	(83.33%)
	Website	(60%)
	Agencies	(20%)
	Other	(10%)
N.14: Through which media channels do you advertise and promote your tourist facility? (M)	Word of mouth	(80%)
	Booking portals	(83.33%)
	Website	(80%)
	Agencies	(20%)
N.15: Are promotion/loyalty activities carried out through digital channels?	Yes	(10%)
	No	(90%)
N.16: Do you know what ICT is? Have you ever applied this technology in your business?	Yes	(73,33%)
	No	(0%)
	No, I've only heard of it	(26.67%)
N.17: One of the emerging ICTs is certainly Blockchain technology. Have you ever applied this technology in your business?	Yes	(0%)
	No	(3.33%)
	No, I've only heard of it	(96,67%)
N.18: Do you think that the network services and digital infrastructure in the area are satisfactory and adequate for the needs of your business?	Yes	(10%)
	No	(90%)
N.19: Are you aware of the European Agricultural Fund for Rural Development (EAFRD-Next Generation EU) to implement rural tourism in synergy with the Smart Tourism Destinations project (Tourism 4.0)?	Yes	(3.33%)
	No	(96.67%)

N.20: How useful do you think a digitalisation plan for the Gargano area would be for your facility?	Necessary	(80%)
	Very	(20%)
	Sufficient	(0%)
	Little	(0%)
	Unnecessary, not needed	(0%)
N.21: Would you be interested in using a sustainable, shared and accessible digital platform for Gargano operators?	Yes	(90%)
	No	(10%)
N.22: Would you be interested in applying an emerging ICT such as Blockchain technology, and the implementation of digitalisation processes it entails?	Yes	(90%)
	No	(10%)
N.23: Could you indicate which aspects of your business you believe are most important to improve and for which you would appreciate support? (M)	Language and technology courses	(83,33%)
	Tourism marketing	(83,33%)
	Training for web promotion	(60%)
	Administrative/accounting training	(33.33%)
	Energy-saving opportunities	(83,33%)
	Other	(10%)
N.24: Overall, in your opinion, what benefits does tourism and the use of ICT, e.g., Blockchain technology, bring to territorial development? (M)	Increased employment	(66.67%)
	Transportation enhancement	(80%)
	Increased consumption	(60%)
	Environmental pollution	(0%)
	Enhancement of cultural heritage	(100%)
	Improved infrastructure maintenance	(80%)

Source: Authors' elaboration

As shown in Table 4, these data reveal a significant tendency towards certain responses. Therefore, despite the margin of error (e) being set at 20%, the data demonstrates a certain degree of significance

given the high percentages of certain responses from the interviewees. Despite clear trends emerging from single-response questions in interviews, the sample size remains insufficient to develop a significant quantitative or qualitative hypothesis; that said, the discussion of research limitations is referred to the concluding chapter of this work.

Although Question no. 13 highlights an average use of ICTs equal to 100% among respondents to sell services on the market – to the detriment of agencies (20%) and other obsolete methods (10%) – 80% try to propose the offer on the spot. Question no. 14 shows that with regard to the promotion of their business, the level of word of mouth (80%) remains very high, more or less equal to the use of booking portals (83.33%) and websites (80%); also, in this case the data on agencies is consolidated (20%). Additionally, 90,00% of the interviewees stated that they did not envision digital strategies/activities useful for retaining customers (Question no. 15). This result requires further attention in the subsequent stages of this research as it highlights a general lack of knowledge of EU strategies and low customer loyalty. Hence, the use of digital channels is consolidated, but based on these initial findings it is not an exclusive channel for AOs.

Most of them were already aware of the possibilities offered by ICTs and applied these technologies (Question no.16); in terms of percentage, respectively, 73,33% applied ICTs, while 26,67% did not. At the same time, Question no. 17 highlights that many AOs already knew about Blockchain technology or had heard about it (96, 67%) but no one has ever used it; however, 90% of respondents expressed interest in Blockchain technology and the implementation of digitalisation processes based on their knowledge (Question no. 22). Question no. 18 shows a degree of discrete coherence with respect to the previous items, as 90% of the AOs considered that the level of digital infrastructures and services is not adequate to the needs of their business. Question no. 19 allows for an additional consideration: 96.67% of the interviewees stated that they were not aware of the CAP, nor the EU's strategic plans (*European Agricultural Fund for Rural Development (EAFRD)*, s.d.); the fund aims to implement rural tourism in synergy with the “Smart Tourism Destinations” project (Tourism 4.0), direct consequence of the "Tourism & ICT" plan proposed by the European Commission (Memo/10/289) to implement tourism development – included, *de facto*, in the National Recovery and Resilience Plan (NRRP).

Question no. 20 provides further insights: 80% of AOs consider necessary the implementation of a plan for the digitalisation of the Gargano area, while 20% deem it very important but not entirely necessary. It is noteworthy that none of the respondents defined this plan as unnecessary, slightly necessary, or at most sufficient (0%). This data is consistent with previous findings (Question no.18) but gains importance as it emphasises the lack of digital infrastructure, which is fundamental to any digitalisation process in the Gargano area. This result is also highlighted by Question no. 21, which sees 90% of respondents interested in installing digital platforms for sharing data and information related to their business.

On the same wavelength, the survey data reveals a strong interest in implementing Blockchain technology and digitalisation processes among 90% of the respondents (Question no. 22); therefore, it would be appropriate to develop a pathway that includes suitable development models and policies tailored to the needs expressed by AOs. In fact, while they show interest in digital implementations, they express a need for training and resources to carry out these initiatives. It is noteworthy that 83,33% of respondents agree that they need institutional support to improve the following aspects of their business: tourism marketing, language and technology skills, as well as energy-saving opportunities (Question No. 23). Based on the outlined circumstances, it is currently possible to make some

considerations as they represent the most noteworthy preliminary data. As implied earlier, several questions (e.g., no.18, no. 20, and no. 21) were formulated to evaluate the level of coherence of the interviewees, and the results were satisfactory (87.50% of the interviewees did not provide logically contradictory inferences).

A control item (Question no. 24) was also included, which, although selectable, was necessarily false and served as an indicator of the interviewee's attention in answering the questions. 100% of the respondents did not select the control item, increasing the reliability of the answers. Furthermore, Question no. 24 also highlights a fundamentally important finding: respondents heterogeneously believe that ICT implementation can increase consumption (60%) and employment (66.67%), improve infrastructure maintenance (80%), and enhance transportation (80%); at the same time, all agree regarding the possibility that ICT implementation can enhance cultural heritage (100%) by bringing benefit to territorial development.

Such a clear result highlights AOs' awareness of the essential link between agritourism, digitalisation processes and local cultural heritage enhancement – emphasised in section 1. and 2. of this pilot study. Furthermore, by overlaying this control item (Question no. 24) with Question no. 19, it is possible to state that AOs are aware of the importance of enhancing the local cultural heritage, even though most AOs are not aware of the scope of the EAFRD-Next Generation EU to implement rural tourism in synergy with the Smart Tourism Destinations project (Tourism 4.0), and consequently, they are not aware of the UNESCO guidelines implied by the CAP and national agricultural policies.

In summary, the results of the survey support the thesis that the application and understanding of ICT and new technologies such as Blockchain has a significant impact at the local level, especially in relation to the possibility of internationalising the company; but, implicitly, the moderate rate of digital illiteracy leads us to conclude that these technologies are not necessary for the operation of agritourism structures. The AOs have shown interest in an implementation of digitalisation processes with a particular focus on their eco-sustainability. The process of data collection and interpretation allow for preliminary reflections on the current dimension of the topic under investigation, as well as discussions on the state of the art based on the newly acquired data. From a practical perspective, Blockchain technology can serve as a foundation for other potentially emerging technologies or applications in the tourism sector, as suggested by the review of the literature (sub-section 2.4.).

5. Conclusions

The main purpose of this study was to investigate the sentiment of AOs of the Gargano area to better understand, starting from the analysed sample, the role and status of digitalisation processes in marginal and internal areas of the Puglia region, as well as suggesting the implementation of development policies aimed at strengthening the agritourism sector in the reference area – with a focus on enhancing local cultural heritage. In principle, the data obtained through the administration of the pilot survey allow us to answer the initial research question: to support the activities of the agritourism sector in inland and marginal areas, we consider the role and understanding of ICT and new technologies such as Blockchain to be fundamental, tracing a path towards energy transition and energy democracy processes as advocated by the United Nations (UN).

5.1. Policy implications

Despite skepticism and limitations, the UN strategy converges on the need for implementing effective energy policies in the short and long term as highlighted in the 2030 Agenda for Sustainable Development and the latest COP 27. A similar view is also advocated by the European Union with regard to the adoption of the Green Deal strategy. These guidelines intersect with the concepts of multifunctionality and diversification in sustainable agritourism, and they gain greater significance in light of UNESCO's recommendations. UNESCO's designation aims to preserve and enhance these unique areas while promoting sustainable development and community livelihoods. As described in section 2. of this pilot study, UNESCO World Heritage agricultural landscapes are culturally and historically significant regions where traditional farming methods foster biodiversity. Managed by local communities, these landscapes reflect deep-rooted traditions and attract agritourism for education on sustainable agriculture and local culture.

The policy implications arising from this analysis are manifold. Firstly, targeted awareness campaigns are essential. These campaigns should promote the benefits and potential of digital technologies in the tourism sector. The aim is to educate tourism businesses, local communities, and tourists themselves about the opportunities offered by adopting digital solutions, including Blockchain, to enhance efficiency, transparency, and the customer experience. Additionally, policies must focus on education and awareness-raising, ensuring that stakeholders understand the importance of preserving and enhancing cultural heritage through digital tools. In fact, the enhancement of local cultural heritage is essential for sustainable agritourism.

Secondly, it is crucial to promote digital education and training programs to enhance local cultural heritage through sustainable agritourism. Bridging the digital knowledge gap and enhancing digital skills among stakeholders in the tourism and agritourism sector is essential. Targeted training programs need to be developed to provide comprehensive preparation on various digital technologies, including Blockchain, and their specific applications for the industry. Hence, it is crucial to invest in the development of a robust digital infrastructure. This includes implementing high-speed internet connectivity and reliable and secure data management systems. Governments and industry stakeholders need to collaborate to ensure the availability of efficient and sustainable digital infrastructure throughout the Gargano region. In other words, digitalisation processes in the agritourism sector must be eco-sustainable, especially when referring to a Park area. Therefore, in the Gargano area, the protection and enhancement of environmental and cultural heritage through sustainable agritourism takes on particular importance. Hence, the enhancement of cultural heritage requires the development of targeted digital policies that actively promote and support the implementation of sustainable digital projects related to cultural heritage.

Thirdly, fostering collaboration and knowledge sharing is important. Encouraging collaboration among industry operators, universities, and technology experts can facilitate the adoption and integration of digital technologies. Establishing partnerships and information exchange platforms to share best practices and stay updated on the latest digital trends and innovations in the tourism sector is necessary. Moreover, to incentivise the adoption of digital technologies, institutions and relevant authorities can provide financial incentives such as grants, tax incentives, or subsidies. These incentives can help cover the costs associated with technology adoption and encourage tourism businesses to explore the potential of Blockchain and other digital solutions. *Extrema ratio*, sustainable digitalisation can boost agritourism by improving operational efficiency, reducing waste, and optimising resources. It enhances communication, marketing, and booking processes, contributing to the economic growth of agritourism businesses. Additionally, digital tools help implement sustainable

farming practices through crop monitoring and resource management, attracting visitors interested in environmentally conscious rural tourism.

.By addressing these policy implications, the tourism and agritourism sector of Gargano can fully leverage the potential of digital technologies such as Blockchain, enhancing their competitiveness and promoting sustainable growth in the digital era. In conclusion, the implications of a possible structural upgrading are many, such as to allow AOs to position themselves effectively on the international market and enter into the mechanisms of Tourism 4.0, as indicated in the NRRP; at the same time, paying particular attention to the UNWTO strategies and guidelines established during the G20 meeting of September 2022.

5.2. Limitations of the study and further research

The survey administered to the AOs made it possible to achieve the objective of this work, albeit to a limited extent. In fact, this research is not without limitations: first, the preliminary nature of this work; similarly, the lack of time to complete the survey (on the current research, for example, hypothetical stage) and obtain permit releases from all AOs to publish sociodemographic data. Secondly, the need to provide more scientific evidence of what is evidenced by the statistical data and preliminary observations and to provide further evidence to support policy makers. For this reason, the description, at the moment, is qualitative (the sample size does not allow a quantitative description). In addition, the qualitative statistical description was minimal by virtue of the exploratory nature of this work, which will be followed by a restructuring of the questionnaire so that it can be more informative, detailed, and allow a more in-depth analysis. Hence, although questions that do not allow for multiple responses show a marked trend regarding the position of the interviewees, the sample size would still be too small to formulate a noteworthy quantitative and qualitative hypothesis. Furthermore, as mentioned, this work is still in progress as data collection is not yet complete; in the subsequent stages of the research, interviews will be conducted with an equal number of operators per location.

However, there is also a significant lack of digital infrastructure, digital culture, and limited knowledge of the potential of technologies in the tourism industry; despite this, as the preliminary results of this study point out, stakeholders are aware of the importance of enhancing local cultural heritage from the perspective of sustainable agritourism that is attentive to Tourism 4.0 processes.

In this regard, it would be appropriate to establish a synergy between the outcomes of this work and the planned digitalisation project in the Gargano area. Furthermore, the possibility of implementing such solutions would allow sector operators to focus their investments more precisely on promotional activities and provide users with more useful tools and services for locating and selecting the considered facilities, thus increasing loyalty, security, and ensuring lower costs by eliminating intermediaries. In fact, the conclusion of this research shows a growing interest and awareness of the importance of cultural heritage enhancement, as well as the potential role of digital technologies in the development of the tourism and agritourism sector in the Gargano National Park area.

Contribution

Giuseppe Basile conceived the research and designed the methodology, data collection and description of the literature, conclusion and policy implications. Angelo Porcaro contributed to data collection and

description of the literature. Caterina De Lucia provided revision and supervision to the manuscript. Pasquale Pazienza provided conceptualisation and supervision to the manuscript.

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Conflict of interest

All authors declare no conflicts of interest in this paper.

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