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"Innovation Labs for Digital Transformation Strategies and Business Model Innovation in the Digital Age: a Focus on Tourism and Cultural Sector"

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I have had the opportunity to grow personally and professionally during these three years. Writing a doctoral thesis is a professional experience comparable to managing a project. It is necessary to plan, meet deadlines, test, collect feedback and review initial strategies in progress. I, therefore, had the opportunity to test myself from various points of view, learning to cope with stress, anxieties and pressures of various kinds.
Along the way, I also had the opportunity to participate in events and conferences in renowned contexts at local, national and international level. I learned a lot by listening to expert speeches, and sometimes by talking to them. I understood the importance of comparing and networking, to generate opportunities and to collect feedback to continuously improve.
I have read a lot, thus improving my vocabulary, my academic language and my writing style.

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Francesco Santarsiero

Abstract

The research proposes the Innovation Labs as a valuable management initiative to support tourism and cultural organisations in developing Digital Innovation Capacity, fostering Digital Transformation (DT) and Business Model Innovation (BMI).
Innovation Labs are innovation management models aimed at fostering creative and critical thinking, driving the organisation in finding the best ways to generate knowledge and digital culture, introduce technologies, digitise operations, and implement digital strategies for continuous and sustainable innovation paths (Santarsiero et al., 2019; 2020).

The need for investigating and identifying possible solutions, and governance models, in terms of management initiatives that follow emergent innovation trends, and support tourism and cultural organisations in embracing digital innovation journeys, is having a growing interest, both in scholars and practitioners, especially after the pandemic Covid-19.

Tourism and cultural organisations, pursuant their attitude to be a labour-intensive production sector, in which the competitive advantage depends on the differentiation of the tourism product and the humanisation of the offered experiences, resulted as one of the sectors that most repudiate DT, conceiving it as a process that would lead to standardisation and loss of appeal to the end customer.
However, nowadays, due to the emerging challenges in the Digital Age that are also affecting the tourism and cultural sector, the need for embracing digital journeys favouring DT and BMI should be considered mandatory to guarantee competitiveness and the gain of a sustainable competitive advantage.

The rapid development of digital technologies and solutions, and their democratisation, induced changes in consumers' and users' habits and behaviours, resulting in the need for developing new products, services and methods of use based on emerging market needs. In the same way, organisations are asked to become resilient, proactive and able to evolve in the same way the competitive landscape does. After Covid-19, besides, the needs for digital innovation journeys and digital revolutions are even more accentuated, confirming that the pandemic has acted as an accelerator of DT dynamics. The

competitiveness and attractiveness of organisations and destinations will therefore depend on the digital innovative capacity and ability of operators and destination managers to rethink the tourist offer according to the new emerging trends and context dynamics.

Although the need for embracing digital innovation journeys is crucial, it is not an easy process to manage and exploit. Organisations, indeed, experience several difficulties and innovation barriers. In SMEs, in particular, which represent a typical configuration of tourism and cultural organisations, resistance to innovation, and insufficient skills, finance, culture, attitudes, and often also the time to devote to innovation due to overburden of bureaucratic aspects and various routines, are particularly accentuated. It follows these organisations require forms of support to face these needs and develop an innovative capacity, fostering DT and BMI to improve offers, competitiveness, efficiency, as well as customisation and customer relationships.

Despite the relevance of these topics, however, the search for solutions and ways to support tourism and cultural organisations in embracing digital innovation journeys has not structurally explored yet.
On this vein, the research aims to explore and investigate, in the field of innovation management, models and approaches to face DT and BMI challenges and opportunities, and thus to investigate the emerging phenomenon of Innovation Labs to understand their management model and assess their suitability for tourism and cultural organisations.
In the theoretical section, the study presents a systematic literature review of Innovation Labs to provide a comprehensive understanding of the phenomenon and identify critical patterns according to two main dimensions of analysis: space & infrastructure, and strategy & management.
Furthermore, the study utilises a multiple-case study approach to better enrich the insights gathered from the literature, and to propose an Innovation Lab's working definition and a management framework. The working definition takes into account all the emerging aspects, the new principles and paradigms that are governing the field of innovation management and that become essential for the organisations competing in this scenario. The framework describes key phases and relevant issues for effective management of Innovation Labs as catalysts of DT and BMI.
Then, the research applies the proposed framework through an Action Research (AR) project involving an organisation operating in the tourism sector, to assess its efficacy in fostering tourism and cultural organisations' digital innovation journeys.

The research contributes to enrich knowledge and build theory in the field of Innovation Labs and tourism innovation management. In particular, the study led to developing theories on the contributions of Innovation Labs in fostering DT and BMI in tourism organisations. A further framework explaining

the business model's dimensions on which DT processes impact thanks to these initiatives has been proposed.
Lastly, the analysis of the AR project compared Innovation Labs' management framework with change management frameworks to detect alignments and to highlight insights to support researchers in considering the model as a tool to support innovation dynamics in times of crisis.

This research also has relevant practical implications since it provides managers and practitioners with an overview of the dimensions to be considered while designing and managing an Innovation Lab to develop digital innovation capacity and foster DT and BMI. Expressly, managers and practitioners are provided with a framework supporting them designing and exploiting management initiatives aimed at embracing digital innovation journeys to generate marketable digital solutions, improve performance and develop a mindset continuous learning and innovation.

The study also reveals some limitations that may address future research.
Further empirical, also quantitative, investigations could be developed to extend the sample and to allow a comprehensive validation of the Innovation Lab's management framework, focusing the research also on the evaluation of Innovation Labs' activities.

Abstract (in italiano)

La ricerca propone gli Innovation Labs come una valida iniziativa gestionale a supporto delle organizzazioni turistico-culturali nello sviluppo di una Digital Innovation Capacity che promuove Digital Transformation e Business Model Innovation.
Gli Innovation Labs sono modelli gestionali finalizzati a favorire la stimolazione del pensiero critico e innovativo, guidando l'organizzazione alla ricerca delle strategie e dei percorsi migliori per generare nuova conoscenza e cultura digitale, attraverso l'introduzione e implementazione di tecnologie, digitalizzando i processi, e implementando strategie digitali per abilitare percorsi di innovazione continua e sostenibile.

Il bisogno di investigare e identificare possibili soluzioni, e modelli di governance, nei termini di iniziative gestionali che seguono i trend emergenti nel campo dell'innovazione, e che supportano le organizzazioni turistico-culturali nell'intraprendere percorsi di innovazione digitale, sta riscontrando un crescente interesse sia tra gli accademici che tra i professionisti, specialmente a seguito della pandemia Covid-19.

Le organizzazioni turistico-culturali, in virtù della loro attitudine ad essere considerate settore *labour-intensive*, nell'ambito del quale il vantaggio competitivo dipende dalla differenziazione dell'offerta turistica e dall'umanizzazione delle esperienze offerte, sono sempre risultate come uno dei settori maggiormente restii alla Digital Transformation, concependola come un processo che avrebbe portato alla standardizzazione ed alla conseguente perdita di appeal verso il cliente finale.
Oggi, però, a causa delle sfide emergenti che caratterizzano l'Era Digitale, che stanno caratterizzando fortemente anche il settore turistico-culturale, il bisogno per intraprendere percorsi di innovazione digitale che favoriscono la Digital Transformation e la Business Model Innovation dovrebbe essere considerato imprescindibile per garantire competitività e guadagnare un vantaggio competitivo sostenibile.

Il rapido sviluppo di tecnologie e soluzioni digitali, nonché la relativa democratizzazione ha provocato cambiamenti nelle abitudini e nei comportamenti dei consumatori, che sfociano nell'esigenza di sviluppare nuovi prodotti, servizi e modalità di fruizione degli stessi, sulla base dei bisogni emergenti nel mercato di riferimento. Allo stesso modo, le organizzazioni sono chiamate a diventare resilienti, proattive ed abili nell'evolversi di pari passo con lo scenario competitivo. A seguito del Covid-19, inoltre, l'esigenza di intraprendere percorsi di innovazione digitale è ancora più accentuata, confermando che la pandemia ha agito da acceleratore di processi già in atto e delle dinamiche di Digital Transformation. La competitività e l'attrattività delle organizzazioni e delle destinazioni, dipenderà quindi dalla capacità innovativa e dall'abilità degli operatori turistici e dei destination managers di ripensare l'offerta turistica sulla base dei nuovi trends emergenti e delle nuove dinamiche di mercato.

Sebbene il bisogno di intraprendere percorsi di innovazione digitale sia quindi ritenuto fondamentale, è pur vero

che questo non è affatto un percorso semplice. Le organizzazioni, infatti, riscontrano notevoli difficoltà e barriere all'innovazione. In particolare, nelle PMI, che rappresentano una configurazione aziendale tipica delle organizzazioni turistico-culturali, le barriere all'innovazione, espresse in termini di carenza di competenze, risorse economiche, cultura, attitudini all'innovazione, e spesso anche in termini di mancanza di tempo da dedicare all'innovazione, sono particolarmente accentuate. Ne consegue che queste organizzazioni necessitano di forme di supporto per soddisfare queste esigenze e sviluppare una capacità innovativa che promuove Digital Transformation e Business Model Innovation al fine di migliorare l'offerta, la competitività, l'efficienza, nonché le relazioni con i clienti.

Nonostante la rilevanza di questi temi, però, la ricerca di soluzioni e metodi per supportare le organizzazioni turistico-culturali nell'intraprendere percorsi di innovazione digitale non è ancora stata esplorata in maniera strutturata.
In virtù di ciò, la presente ricerca si propone di esplorare e investigare, nel campo dell'Innovation Management, modelli e approcci per fronteggiare le sfide e le opportunità nel campo della Digital Transformation e Business Model Innovation, e quindi di investigare l'emergente fenomeno degli Innovation Labs per comprenderne il relativo modello di gestione e verificarne l'idoneità ad essere applicato e diffuso tra le organizzazioni turistico-culturali.
Nella sezione teorica, lo studio presenta una revisione sistematica della letteratura sugli Innovation Labs per fornire un quadro chiaro del fenomeno ed identificare le componenti distintive secondo due dimensioni di analisi: aspetti strutturali ed infrastrutturali, ed aspetti manageriali e strategici.
Inoltre, lo studio adotta la metodologia di analisi di casi di studio multipli per arricchire e rendere più rigorose le evidenze emerse dalla letteratura, e per proporre una definizione di lavoro di Innovation Lab e un framework rappresentante il modello di gestione. La definizione di lavoro tiene conto di tutti gli aspetti emergenti, dei nuovi principi e paradigmi che stanno caratterizzando il filone dell'Innovation Management e che diventano essenziali per le organizzazioni che competono all'interno di questo scenario. Il framework, invece, descrive le fasi principali e gli aspetti distintivi da tenere in considerazione per gestire efficacemente un Innovation Lab, come strumento catalizzatore di processi di Digital Transformation e Business Model Innovation.
In seguito, la ricerca applica, nell'ambito di un progetto di Action Research che ha visto coinvolta un'organizzazione turistica, il modello gestionale proposto al fine di verificarne l'idoneità a promuovere lo sviluppo di percorsi di innovazione digitale nelle organizzazioni turistico-culturali.

La ricerca contribuisce a generare nuova conoscenza e sviluppare teorie intorno il filone degli Innovation Labs e nel campo del Tourism Innovation Management. In particolare, lo studio ha consentito di sviluppare elementi teorici inerenti al contributo degli Innovation Labs nel facilitare processi di Trasformazione Digitale e Business Model Innovation nelle organizzazioni turistico-culturali. A tal riguardo, è stato infatti sviluppato e proposto un ulteriore framework che individua le dimensioni dei modelli di business su cui impattano i processi di trasformazione digitale attivati per mezzo di queste iniziative.
Infine, l'analisi del progetto di Action Research consente di comparare l'Innovation Lab's management

framework con alcuni framework tipici del *change management*, al fine di individuare affinità ed evidenziare aspetti rilevanti per consentire ai ricercatori di considerare gli Innovation Labs come uno strumento per favorire dinamiche di innovazione in periodi di crisi.

La ricerca ha inoltre anche implicazioni pratiche, in quanto fornisce a managers e professionisti un quadro complessivo raffigurante le dimensioni chiave da considerare per progettare e gestire un Innovation Lab finalizzato a stimolare lo sviluppo della capacità innovativa e promuovere processi di Digital Transformation e Business Model Innovation. Nello specifico, a managers e professionisti è fornito un framework a supporto della progettazione e gestione di iniziative gestionali finalizzate a promuovere percorsi di innovazione digitale per generare soluzioni digitali orientate al mercato, per migliorare le performance interne e per sviluppare un mindset volto all'apprendimento ed all'innovazione continui.

Lo studio presenta inoltre delle limitazioni che potrebbero indirizzare ricerche future.
Ulteriori analisi empiriche, anche quantitative, potrebbero essere condotte per estendere il campione della ricerca e per validare in maniera più rigorosa l'Innovation Lab's management framework, focalizzando la ricerca anche su aspetti legati alla valutazione delle attività espletate attraverso l'Innovation Lab.

Publications related to the monography

The present monographic dissertation is linked to papers published, presented, submitted, or under development as inserted in the working pipeline. The following table presents such contributions of the author related to this monography: per each paper, it details the reference (or proposed title, for working papers), the status and the connection to the monography.

Reference / Proposed Title	Status	Connection with the monography
Schiuma, G., Lerro, A., Carlucci, D., Santarsiero, F. (2018). ***Investigating Management and Innovation Practices of Business Models of Arts and Cultural Organizations: Designing a Survey-Based Research***. In IFKAD 2018 proceedings.	Published	Gathering first insights about how arts and cultural organizations are managing and innovating their business models
Santarsiero, F., Carlucci, D. & Schiuma, G. (2018). ***Big Data in the Arts & Humanities: theory and practice.*** *In* "Towards a Data-Driven World: Challenges and Opportunities in Arts and Humanities", Taylor and Francis, CRC Press	Published	Understanding the potential of big data and technology, detecting challenges and opportunities for organisations in the Digital Age
Carlucci, D., Schiuma, G., Santarsiero, F. (2019) ***"Beyond Lessons Learned: Opportunities and Challenges for Interplay Between Knowledge Management, Arts and Humanities in the digital age"***, Knowledge Management, Arts, and Humanities, Springer	Published	Shed more light on big data and technology opportunities and challenges for organisations in the Digital Age connecting them to knowledge management aspects.
Santarsiero, F., Carlucci, D., Schiuma, G. (2019). ***Framework for Digital Innovation Capacity Development***. In IFKAD 2019 proceedings.	Published	Explores the field of innovation capacity, to detect patterns, challenges and organisations approaches
Santarsiero, F., Carlucci, D., & Schiuma, G. (2019). ***Understanding the Phenomenon of Innovation Labs***. In *ANNUAL GSOM EMERGING MARKETS CONFERENCE 2019* (pp. 177-180).	Published	Review of Innovation Labs' definition to provide a first taxonomy and a first working definition of Innovation Labs
Santarsiero, F., Schiuma, G., & Carlucci, D. (2020). ***"Entrepreneurability: Innovation Labs as Engines of Innovation Capacity Development".*** In *Innovative Entrepreneurship in Action* (pp. 115-127). Springer, Cham.	Published	Insights from a first narrative literature review of Innovation Labs. Proposal of a conceptual framework to understand, from a descriptive and a prescriptive viewpoint, the setup of organizational units and initiatives for innovation capacity development.
Report – Santarsiero et al. (2020). ***"Le sfide del turismo lucano per disegnare un nuovo futuro di successo".*** www.transformalab.com	Published	The report resumes the results of activities carried out during the first AR cycle aimed at identifying the critical challenges for regional tourism organisations

REPORT - Santarsiero et al. (2020). ***"Le opportunità per il turismo lucano: disegnare un nuovo futuro di successo"***. www.transformalab.com	Published	The report resumes the results of activities carried out during the first AR cycle aimed at identifying the potential opportunities for regional tourism organisations
REPORT - Santarsiero et al. (2020). ***"Possibili soluzioni innovative per il turismo lucano: disegnare un nuovo futuro di successo".*** www.transformalab.com	Published	The report resumes the results of the online hackathon carried out during the first AR cycle aimed at generating potential innovative solutions for tourism organisations operating in the regional tourism ecosystem
Santarsiero F., Lerro A., Carlucci D., Schiuma G. (2021). **Modelling and Managing Innovation Lab as catalyst of Digital Transformation: theoretical and empirical evidence**	Accepted for publication in the journal *Measuring Business Excellence*	Application of the Innovation Labs' management framework to a tourism organisation to propose Innovation Labs as a tool fostering digital innovation in organisations. (focus on the AR section)
Schettini, E., Schiuma G., Santarsiero, F., Carlucci, D., (2021). **The transformative leadership compass: six competencies for digital transformational entrepreneurship**	Accepted for publication in the *Journal of Entrepreneurial Behaviour and Research.*	The paper identifies six critical competencies distinguishing the transformative leadership profile supporting enterprises' digital transformation development
Proposed title: Schiuma, G., Schettini, E., Santarsiero, F. **How wise companies drive digital transformation**	Submitted to the *Journal of Open Innovation: technology, market and complexity*	The paper investigates the distinguishing attitudes and practices of companies driving digital transformation processes
Proposed title: Santarsiero, F., Carlucci, D., Schiuma, G., **Understanding Innovation Labs as a management initiative to create Innovative Spaces for developing Digital Innovation Capacity**	Submitted to the Journal *Technological Forecasting and Social Change*	The paper proposes a Systematic literature review to shed light on how Innovation Labs work to support organisation in transforming themselves developing an organisational innovation capacity promoting digital transformation and business model innovation

Table 1 . Publication pipeline

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Abbreviations

RQ: Research Question

AR: Action Research

DT: Digital Transformation

BMI: Business Model Innovation

1. INTRODUCTION

1.1 Context

Tourism, cultural heritage and creative industry are today, one of the most important ecosystems on which to leverage to create new opportunities for economic growth for our country at a local and national level.

The tourism industry is responsible for the 5,5 of wealth produced in Italy, quantifying an average cost of the amount of 112 billion €. (WTTC, 2019). Therefore, tourism has always considered one of the leading industries of the national economy.

Moreover, as noted in the latest report "Io sono Cultura" (Symbola, 2019), the Cultural and Creative Production System was responsible for the 6,1% of the wealth produced in Italy: 95,8 billion euro. Besides, culture has on the rest of the economy a multiplier effect equal to 1.8: in other words, for every euro produced by the culture, it activated 1.8 in other areas. Thus, 95,8 billion will "stimulate" a further 169,6, to reach 265,4 billion produced by the entire cultural sector, equal to the 16,9% of domestic value-added, with tourism as the primary beneficiary of this flywheel effect. Thus, more than a third of the national tourism expenditure is on culture.

Culture and tourism are, therefore, one of the more relevant "productive pairs" in social and economic development processes in the country, and in particular at a local and regional level. Therefore, it suffices to note that the Basilicata region, especially under the nomination of Matera as European Capital of Culture 2019, has experienced an increase in tourist flows of 6,35 with peaks of +16,4% for the city of Matera. Also, cultural tourism data are significant. They record +7% of arrivals and +5% of attendance. In the city of Matera, there are 119 thousand arrivals (+143%) and 631 thousand attendance (+80%) with an increased expenditure of 33% (APT Basilicata, 2019). It is also not negligible that cultural tourism is the wealthiest tourist segment, with a tourist daily average expenditure equal to €131, compared with the seaside tourist who, instead, spends €89 per day (Federcultura, 2019).

To maximise the contribution of the tourism and cultural sector to sustainable growth and employment, however, an integrated and synergistic approach is needed. It must be based not only on the attractiveness and availability of natural resources and services but also on a comprehensive set of integrated networks and services, based on new emerging digital technologies that are still not primarily employed in the tourism sector, with particular regard to the local territory. The low employment of digital solutions provokes a relevant gap compared with other productive sectors, and with destinations that have understood the potential of implementing digital innovations in the business. Today, consumers attitudes and behaviours are changed. New customers, new tourists are

more informed, and they look for experiences rather than merely buying products, services, or booking accommodations and travels. According to the new emerging attitudes, people are more inclined to be engaged in the production and/or design processes to enable co-creation dynamics, guaranteeing a leading role and iterative processes involving at the same way tourists, customers, local communities, stakeholders, employees, and entrepreneurs (Gimpel and Westerman, 2012; Schor, 2019).
This aspect, in particular, seems emphasised by the evolution of ICT solutions that also influence the change in tourist demand and in the tourist itself. It becomes an experienced and well-prepared traveller who prefers and requires customised services tailored to his needs. Its habits and attitudes are even more digital, mobile and social based. 91% of tourists have booked online at least one product or service in the last 12 months, and they use online browsers as their primary source for searching or planning trips. Moreover, the 42% of them use mobile devices to plan, book and get information, and the 68% do online researches before deciding where and how to travel, finding all kinds of information including places, curiosities, weather, leisure activities, etc. (Officina Turistica, 2019).

In the age of digital tourism, the capacity of a tourism organisation to produce a smart, sustainable, responsible and accessible offer requires innovative digital solutions that ensure integration with the territory and the safeguarding and enhancing of cultural heritage and landscape, as well as the comprehension and adaptation to customers' needs and attitudes. New products, services and tourism offers based on the new emerging demand, and a strategic and holistic vision of cultural and tourism development, allowing an increase of attractive capacity of the territory are required.
Consequently, the tourist offer requires an adjustment and realignment with the changes in demand mentioned above. Ease of travel, access to detailed and up-to-date information, the ability to personalise the way of using them, the simplicity and speed of purchasing services strongly affect the choice of destination. Therefore, DT and BMI processes become essential to improve the reputation and to increase the degree of customisation of bids, customer satisfaction, and therefore the attractiveness of the site, products and services offered.
This aspect is reinforced by the National Tourism Plan 2017-2022, which aims to govern intelligently and sustainably the growth of Italian tourism by increasing its attractiveness and enabling sustainable and quality tourism to become a policy tool for the economic and social welfare of all. The same is also in synergy with the National Industry Plan 4.0, which aims to improve performance and to increase the competitiveness of the cultural tourism sector, with a view to sustainable, responsible and accessible development.
Finally, taking into account the challenges of the fourth industrial revolution in progress, the task of tourist and cultural companies, from Basilicata in particular, should be to bridge the digital divide that distances them from the rest of Europe. The digital divide may be filled through the development of

digital and leadership skills, as well as the usage of models, tools, and business approaches to lead the DT and BMI. These processes are needed to enhance and increase the attractiveness and resilience of the cultural tourism sector to allow it to become an economic development driver.

Besides, after the covid-19 pandemic, DT in the tourism industry has been heavily accelerated. Health and economic crisis, indeed, acted as an accelerator of pre-existent dynamics. Therefore, the innovation that was a hot topic, with the crisis upgraded to a mandatory priority. Tourism organisations due to the health protocols and new safety requirements have found to be forced to invest on innovation, to implement digital technologies, to embrace DT, to rethink services, products, processes, and business models.

1.2 Towards a Digital Innovation Journey

The relevance of innovation to guarantee companies' competitiveness is acknowledged among scholars and practitioners (Chesbrough, 2010; Neely and Hill, 2014; Santarsiero et al., 2020; Schiuma, 2012). Public administrations, companies, suppliers, and professionals are driven to innovate and digitize their offer to face fierce competition and to provide citizens and users with increasingly efficient products and services.

Nowadays, however, in the Digital Era innovation dynamics are changing. The digital ecosystem is even more dynamic and unpredictable. The global and virtual competition, as well as the rapid development of digital technologies and solutions, raise the efficiency standards, increase the speed of market dynamics, and decrease the product lifecycle (Schiuma, 2012). Moreover, consumers are evolving in prosumers aiming at getting engaged in co-creation processes of products, services, and experiences. Their needs and habits are changing, as well as the ways and speed of exploiting goods. Therefore, innovation rapidly and easily becomes conventional and replaced by new emergent innovative solutions. It follows that organisations operating in the digital ecosystem have to become resilient, proactive and able to evolve in the same way the competitive landscape does. Innovation, then, must be recurrent, cyclical. Continuous innovation is required and must be pursued through a holistic engagement of the whole organisation, stakeholders, and customers, rather than solely of top management and dedicated facilities. Each actor engaged in innovation must be aware of the organisation's vision, goals, and strategies to effectively contribute and generate value (Lianto et al., 2018; Nonaka and Takeuchi, 2019).

Furthermore, innovation is increasingly digital and data-driven, and frequently, organizations have to embark on a digital innovation journey and not without problems.

The fast development of digital technologies contributes to the generation of a high amount of data, information, and knowledge that increase even more the innovation barriers and accelerate the pace of

change.

After Covid-19, besides, the needs for digital innovation journeys and digital revolutions are even more accentuated, confirming that the pandemic has acted as an accelerator of DT dynamics. In this regard, if whilst a marked GDP decline in 2020 in Italy is estimated (Svimez, 2020), the survey conducted by The Innovation Group (2020) on a relevant sample of Italian companies, highlights how the organizations that are already equipped and open to digital innovations will suffer the crisis provoked by the pandemic in a much more limited way without putting their survival at risk.

It follows that, in the digital age, innovation is the essential condition to face and address challenges and opportunities of the competitive scenario (Nambisan et al., 2017). In particular, today, in response to the Covid-19 pandemic and the new competitive dynamics that will emerge as a consequence, the need for innovation has become tremendously pervasive across all the industries. Organizations must, therefore, develop an organizational capacity for innovation. This ability, also helpful in times of crisis, proves to be one of the few critical success factors to survive, drive the change and gain a competitive advantage. It is an essential element to encourage the resumption, as well as to recover the entrepreneurial fortunes in sectors affected by disruptive revolutions.

Companies aiming to survive and play a leading role during and after the crisis have thus to be ready to innovate and to change their business model in response to the evolution of the socio-economic context quickly.

BMI may not be pursued without showing consideration for innovative digital solutions. Therefore, DT becomes an enabler of BMI, and together, these processes, act as critical factors for the organisations' competitiveness (Rogers, 2012; Nonaka and Takeuchi, 2019). Managers and industry leaders recognize that digital technologies are not more conceived merely as drivers of marginal efficiency. Digital technologies become the key to innovation and the enabler of disruptive evolutions that radically change competitive dynamics (WEF, 2016).

1.3 Towards a Digital Innovation Journey in Tourism

Despite the acknowledged importance of innovation perceived across almost every productive sector, it is not an easy process. On the contrary, it presents many risks and barriers, sometimes insurmountable for companies. These barriers, in the tourism sector, in particular, appear highly accentuated. Tourism is always considered a labour-intensive production sector, in which the competitive advantage depends on the differentiation of the tourism product and the humanization of the offered experiences. It follows that tourism results as one of the sectors that most repudiate DT, conceiving it as a process that would lead to standardization and loss of appeal to the end customer.

Therefore, the barriers to innovation, here, appear much more accentuated. Furthermore, this is also and above all due to the hardship expressed in terms of strategic and cultural vision resulting in the difficulty rethinking the traditional business models and products/services based on emerging digital solutions or digital customer relationships.

It follows that digital innovation breaking into the current tourism ecosystem in a disruptive way can only be effectively managed through the definition of a control room driving tourism organizations, destinations and the entire sector towards a process of DT. The process should involve people, tour operators, entrepreneurs, tourists first, and to induce them to accept digital, understand its potential, generate awareness, new knowledge. Then, the DT process should contribute to allowing imagining new possible scenarios, models of business, and innovative solutions in response to current trends and allowing organizations to transform challenges into opportunities for development.

Furthermore, in this particular historical period, the imminent restart of the tourism sector following the crisis caused by Covid-19 presents complex challenges for tourism players. The competitiveness and attractiveness of places will depend on the innovative capacity and ability of operators and destination managers to rethink the tourist offer according to the new emerging demand and the new rules to be respected.

To ensure an intelligent, sustainable and inclusive tourism development and respectful of the health provisions in force, it is therefore essential to leverage innovation and DT and to integrate these elements with the differentiating factors of the individual territorial realities. This action should be achieved not only through the satisfaction of the needs of citizens, stakeholders and tourists, but intelligently capturing their attention, adopting strategies that consider them as main actors in the innovation process.

An approach designed to stimulate innovation, which places the user, the citizen, or the tourist at the centre of the destination processes and strategies is co-creation (Tussyadiah and Zach 2013). This approach, which acts with tourists, not for new tourists, looks at the destination in light and develops tools, techniques and skills to involve not only tourists but also other stakeholders in the sector, like public bodies, businesses and professionals (Lapointe D. et al., 2015).

Technology advancements, as well as the current pandemic who act as an accelerator of processes already in progress, today, facilitate human-centred and user-driven approaches. Digital advancements have provoked a paradigm change in the way of understanding technology. Today, technology is no longer regarded as a tool for the achievement of standardization and economies of scale. The introduction of digital innovation like Artificial Intelligence, Internet of Things, Cloud, etc., fostered the democratization of technology and its employment as a tool for humanization and customization (Holly, 2012). It becomes, therefore, a tool that allows meeting tourists and customers' needs and to

face detected scenarios challenges.

In short, tourism and cultural organizations, like those operating in the other productive sectors aiming at staying competitive and keep the pace of change, are called to open to innovation dynamics, through paths of DT and BMI.

1.4 Motivation of the Research

Starting from the above-discussed context scenario, with particular attention paid to tourism, it is possible to declare that nowadays, innovation dynamics are changing. The innovation ecosystems, already characterised by complexity, turbulence, interdependence and unpredictability, have been currently further stressed by the Covid-19 outbreak. The pandemic, therefore, acted as an accelerator of already ongoing processes, shifting the focus on the need for DT and innovation, especially in the tourism and cultural sector. It becomes thus essential to develop, acquire and implement digital solutions to increase performance and face market needs.
Digital innovation, indeed, is not only about technology innovation. It is more about the innovation of knowledge and cultural attitudes (Nonaka and Takeuchi, 2019).
Thus, competitive organisations are those able to readapt their business models to context evolutions, and emerging consumers' attitudes (Santarsiero et al., 2020; Schiuma, 2012).
It follows that a further challenge in the digital ecosystem is the promotion and definition of conditions, roadmaps and management models for the implementation of digital innovation strategies to manage digital knowledge and foster continuous innovation (Bharadwaj et al., 2013; Nonaka and Takeuchi, 2019). To effectively understand and manage technology, and codify and exploit generated knowledge, specialised skills and new governance models are therefore required (Joshi et al., 2010). However, these processes are not immediate, in particular for SMEs, distinguishing the tourism and cultural sector, where resistance to innovation and insufficient skills, finance, culture and attitudes are particularly accentuated. It follows that these organisations require forms of support to face these needs and develop an innovative capacity, fostering DT and BMI to improve offers, competitiveness, efficiency, as well as customisation and customer relationships.

Despite the relevance of this topic, further increased recently due to the Covid-19, the search for solutions and ways to support tourism and cultural organisations in embracing digital innovation journeys has not structurally explored yet.

On this vein, and to extend the research stream, ***this study aims to investigate the possible solutions,***

and governance models, in terms of management initiatives that follow emergent innovation trends and support tourism and cultural organisations in their required digital innovation journeys.

1.5 Research Design

This paragraph presents the methodological approach of the study. Following an overview of study design, the section discusses the Research Questions (RQs) and research instruments used to collect empirical data for answering them, as well as the research approach undertaken for designing, developing, and evaluating the carried-out empirical investigations.

1.5.1 Research Questions and Research Strategy

The research paradigm and research approach are described following the model proposed by Saunders et al. (2009). The structure of the model provides different levels for each part of the research strategy. The research philosophy is at the extreme level, and practical techniques and procedures lead even more to the innermost. The Figure 1 describes in detail the logic behind the model and each layer.

The starting point for this research was practical and guided by the need to support tourism organizations in solving their challenges. Therefore, the research philosophy is pragmatic. Saunders et al. (2009, p. 144) declared that "*Pragmatism strives to reconcile both objectivism and subjectivism, facts and values, accurate and rigorous knowledge and different contextualized experiences*". In this research, the pragmatism is strictly connected with the philosophy of realism. In this regard, the aim is to be as much objective as possible. Although the pragmatism research philosophy, according to Saunders et al. (2009) provides for various options to collect data, this study follows the Kelemen and Rumens (2008) approach, by which methods are selected based on their ability to gather the most reliable data to produce research advancements.

The approaches layer in the Saunders et al. (2009) model considers the possibility for deduction, induction and abduction. This study includes multiple research phases with different kinds of approaches, which makes it difficult to define what is the prevailing. All research phases consider existing theories or are informed by insights gathered during previous research activities. Therefore, the approach is mostly deductive.

Regarding the research methods, this study follows a mixed-method approach aimed at increasing the validity of gathered data through triangulation (Molina-Azorin, 2012).

The methods used in this thesis include mainly qualitative methods resulting in the core strategies adopted to provide answers to the RQs: systematic literature review, multiple-case study, Action

Research (AR). These strategies, as well as time horizon, and techniques and procedures adopted are explained below.

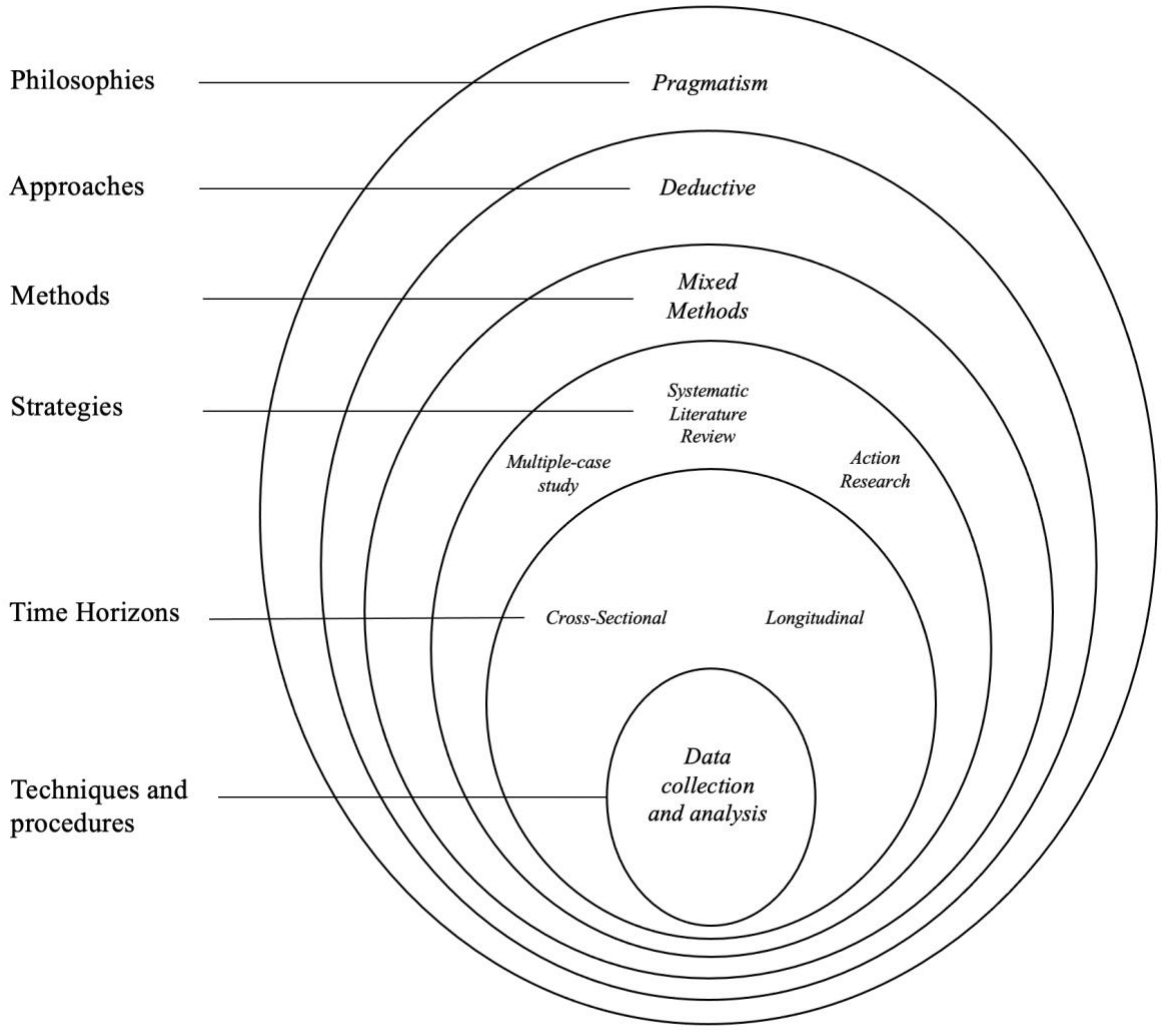

Figure 1 . Research Philosophy (modified from Saunders et al., 2009

According to the research problem stated in the previous paragraph, at the basis of this study is the purpose to investigate models and approaches supporting tourism and cultural organisations in exploiting DT and BMI, that emerged as fundamental development drivers in the Digital Age.

On this vein, and to address the research problem, a first RQ is introduced:

RQ1) How to foster Digital Transformation and Business Model Innovation in tourism and cultural organisations? What are the most relevant challenges and barriers? What

are the recurrent models and approaches?

This RQ, therefore, aims at investigating and understanding the approaches that lead to foster DT and BMI in organisations, paying particular emphasis to those operating in the tourism and cultural sector.
A review of the literature in the field of innovation management, DT, and BMI has been carried out to answer this RQ. It aimed to detect emerging trends on these topics, understand how the organisations are facing them, what are the key challenges and barriers deterring digital transition or innovation. These aspects have been analysed first at a macro-level, looking longitudinally across all productive sectors. Then, a particular emphasis on tourism, that is the sector on which the research will focus on, has been paid. This approach, to identify the organisations' needs and consequently possible models, approaches and solutions valuable to support organisations, tourism and cultural in particular, to face these challenges and embrace a digital innovation journey to stay competitive in the Digital Age.

Among detected challenges, the need for developing a digital innovation capacity fostering DT and BMI, and benefit from governance models to exploit this need, emerged.
On this vein, Innovation Labs emerged as valuable solutions to answer the needs mentioned above. The topic is raising considerable interest among scholars and practitioners. It seems defined as an umbrella concept, under which innovation centres, co-working and R&D labs reside.
The notion of Innovation Lab has been introduced in the management literature to distinguish the creation of organisations' creative spaces equipped with the latest technologies and dedicated to supporting, in different ways, the enhancement of innovation capabilities, and for developing and testing innovative ideas and solutions (Lewis and Moultrie, 2005, Memon et al., 2018; Osorio et al., 2019; Schmidt et al., 2015).
However, even if equipped with high tech infrastructure, and skilled staff, current innovation laboratories, in the traditional form of R&D labs and innovation centres, are not always able to sustain and enhance the innovation capacity of companies (Capgemini, 2017). These innovation spaces are still conceived as separate organisational units, often not able to guarantee a stakeholders' commitment and a prolific dialogue with the entire organisation and with the surrounding ecosystem. Sometimes organisations benefit from these labs only to put on *"tech company clothes and trying to look more like a startup"* (Tucker, 2017) resulting in mere technology demonstrators isolated from the rest of the organisation. At the same time, also employees, due to a mismatch in terms of digital skills and awareness, face difficulties understanding reasons and potentials of the implementation of new technologies.

Moreover, the technological progress, the pace of change, and the reduction of digital solutions'

lifespan contribute to making obsolete the traditional configuration of Innovation Labs, namely innovation centres, R&D labs that are built inside the organisations and where projects are autonomously designed and realised (Chesbrough, 2001; Turrin, 2020).
In the current competitive landscape, as already mentioned, this approach does not seem to make sense anymore. It would be unthinkable to set up closed laboratories capable of keeping up with technological evolution. Barriers to innovation would arouse in terms of resources and skills. It would take considerable investments always to replace technologies and adapt internal processes to new trends and new digital solutions that are introduced on the market from time to time. In the same way, it would take staff always up-to-date, they should be trained continuously, or it would always be necessary to hire employees with the skills required from time to time. These dynamics lead to the emergence of the open innovation trend (Chesbrough, 2007), which induces organisations to seek opportunities for dialogue with the external ecosystem to build collaborations that mutually fill internal gaps. For example, mature and traditional companies, which find themselves operating in an evolving sector in which digital is breaking into a disruptive way, will first seek collaboration with an emerging innovative startup, rather than investing to independently create innovative digital solutions that allow them to adapt to the scenario. Similarly, the startup will also benefit from collaboration to exploit visibility and accelerate the growth process.

Furthermore, moving forward with technology also leads to changing market dynamics, consumer habits and behaviour. It is now possible to carry out services that previously could not even have been imagined. Communication, promotion and sales channels evolve, as well as how relationships with customers are generated and maintained. Consequently, consumers become more aware, have more opportunities to inform themselves and want to live experiences by becoming part of the design and creation process of the product/service they will purchase.
Therefore, the dynamics of innovation and the way of developing new solutions must necessarily adapt, and this is how user-driven, human-centred approaches to innovation aimed at the co-creation of innovative products and services take hold (Holly, 2012; Santarsiero et al., 2020).

By opening the doors of innovation to the external ecosystem, and controlling the risks of innovation, the needs of consumers can be better understood and satisfied. Therefore, an innovation that becomes user-driven and human-centred gives way, also thanks to technology, to interface with consumers to influence and consequently motivate the company's internal innovations. The production and placing on the market of products and services that respond to demand will, therefore, be encouraged.

Based on this, and to avoid failures mentioned above, the concept of Innovation Lab seems to be

changing. New configurations emerge that are based on open innovation, human-centred and user-driven logics. However, contrary to the traditional configuration of Innovation Lab, these new configurations are hardly addressed from a theoretical point of view.
It is, therefore, necessary to understand what the State of the Art is, even from a theoretical point of view and to develop further theory in the field.

Besides, and strongly aligned to the focus of this research, traditional R&D models, in SMEs, and therefore also in the tourism and cultural sector, have always developed and spread with difficulty (Griffith et al., 2014; Hjalager 2010). In addition to the obstacles mentioned so far, SMEs do not have the strength to support internal R&D processes independently. They do not have enough economic resources, internal skills and not even often the time to devote to innovation because bureaucratic aspects and various routines overburden them.
It follows that the emerging new configuration of Innovation Labs that opens to the ecosystem the doors of R&D and rides the emerging trends in innovation management, and that acts as innovation intermediaries to promote collaboration and innovation opportunities, should become a valid solution to foster innovation, dynamics of DT and BMI also for SMEs and thus for the tourism and cultural sector.

In this perspective, the second RQ is introduced to investigate why these Innovation Labs, which emerge after the first research phase, can be considered a valuable solution to face the challenges, overcoming the barriers that emerged from the analysis of the RQ1.
The aim is, therefore, investigating Innovation Labs' State of the Art, understanding the causes that led to the various failures, and what are the potential new emerging configurations of these labs, how they are therefore defined, what are the characteristics, what the inspiring principles and paradigms, what the services offered and what the objectives for which they are built.

> **RQ2) Why, Innovation Labs could become a valuable solution to foster DT and BMI in tourism and cultural organisations? What is the State of the Art? What are the emergent Innovation Labs' configurations? What are their features and provided services? How do they work?**

The RQ2 has then answered through a systematic literature review allowing a better understanding of the phenomenon.
An analytical review approach has been adopted to carry out a systematic analysis of the literature's contributions (Ginsberg and Venkatraman, 1985). In particular, the approach proposed by Tranfield et

al. (2003) has been adopted. The authors suggested the systematic literature review as an effective method to perform an analytical examination of the most significant contributions defining and characterising a contingent understanding of a conceptual theme. The systematic literature review is acknowledged as an analytical approach to contribute to theory building. Adopting an explicit algorithm, it provides clear, transparent and reproducible processes that allow finding, synthesising and evaluating insights and evidence from the literature (Cillo et al., 2019).

The most relevant articles in the field have then been analysed according to two main perspectives: space & infrastructure, and strategy & management.

The first dimension led to studying the phenomenon from the point of view of physical space, furniture design, equipment and instrumentation, as well as intangible components, and how all these affect innovative thinking stimulation. The second dimension focused, instead, on strategic and managerial aspects. The main objectives pursued by the Innovation Labs, the services offered and the operating logic was identified to strive to classify the Innovation Labs according to a series of typologies.

In the review, an attempt was then made to investigate the question linked to management aspects, but a critical gap emerged in the literature. Managerial models that describe the critical phases for the proper management of Innovation Labs remains underexplored. Most of the studies on the subject focus indeed on structural components and on the impact that physical spaces used in a creative way and full of cutting-edge technologies can have on the innovation dynamics of an organisation. However, following the paradigm changes characterising the current competitive scenario, it emerges that this space becomes conceived more metaphorically. It can also take on hybrid or even virtual forms. Therefore, it becomes essential to understand better how to manage these 'places' to make the phenomenon replicable and to promote its diffusion in those organisations, including and above all tourism, that are interested in innovating their business models, in digitally transforming themselves to remain competitive and gain a sustainable and lasting competitive advantage.

A third RQ was, therefore, necessary:

RQ3) What is the management model of an Innovation Lab?

A multiple-case study approach is carried out to answer this question. It was developed during my research period spent abroad (at the Tampere University - Finland), observing nine different Innovation Labs and interviewing their respective managers.

This methodological approach has been chosen to fill a further gap found in the literature review. The previous research activity, indeed, showed that most of the studies are based on single-case studies or case studies concerning Innovation Labs in the traditional configuration. It was therefore considered

appropriate to further empirically investigate.

The purpose of the multiple-case study analysis is twofold. On the one hand, the aim is to enrich insights emerging from literature, through the verification, from an empirical point of view, of patterns resulting from the systematic literature review. Understand, therefore, if these new emerging Innovation Labs also meet the same categories and possess the same characteristics that emerged from the previous analysis. On the other hand, aiming to study and analyse them from a management point of view to propose an Innovation Labs management framework.

From this research phase, and therefore empirically observing new configurations of innovation labs, and triangulating the data with the literature already analysed, a new working definition of Innovation Labs has been proposed. It takes into account all the emerging aspects, the new principles and paradigms that are governing the field of innovation management and that become essential for the organisations competing in this scenario and that, especially in the case of SMEs and therefore of tourism companies, require support from intermediaries, like the Innovation Lab.

Once this framework has been elaborated, there is a need to validate it through further empirical investigation. The research continued with a final research phase, also aimed at understanding the applicability of the model to SMEs and tourist-cultural organisations.

Hence, the fourth RQ is:

> **RQ4) How can an Innovation Lab contributes to the Digital Innovation Capacity development, Digital Transformation and Business Model Innovation in tourism and cultural organisations? How managing an Innovation Lab for this purpose?**

An AR project has been designed and carried out to answer this RQ. A tourism organisation operating in the Basilicata region has been involved in the research. The aims of the project were increasing knowledge and attracting interest around the topic of Innovation Labs; validating the management framework, assessing the potential and weaknesses of the application of this model to increase the innovation potential of the organisation involved in the study.

Moreover, the project has been carried out during the Covid19 pandemic. This aspect was a criticality at first because the tourism organisation involved was undergoing a time of crisis due to the production shutdown. Therefore, other priorities distracted the company and research and innovation activities were considered of secondary importance. However, after an alignment of vision and objectives, the AR project evolved in a shared opportunity for both researcher and organisation. The project was

furthermore conceived as the opportunity for testing the Innovation Labs as a management model to surf times of crisis, as well as the chance for the organisation to drive the uncertainty and to generate innovative solutions to innovate its business model in times of crisis and to adapt business and processes to the new habits and rules imposed by the pandemic.

The thesis is organised as follows (Fig. 2). Section two provides a narrative literature review on DT, BMI, and the other key emerging trends in the innovation management to detect challenges and opportunities for organisations with a particular emphasis on tourism. In the third section, a systematic literature review of Innovation Labs has been carried out to understand the phenomenon that results from the previous analysis as one of the emerging trends to face context challenges and opportunities. The fourth section then reports a multiple-case study approach, through which nine Innovation Labs have been analysed to enrich the understanding of the concept of Innovation Lab and to propose a management framework then applied and validated, through an AR project, in a tourism organisation. AR project is discussed in the fifth section. Lastly, the thesis concludes with final discussions, conclusions, limitations and future research directions.

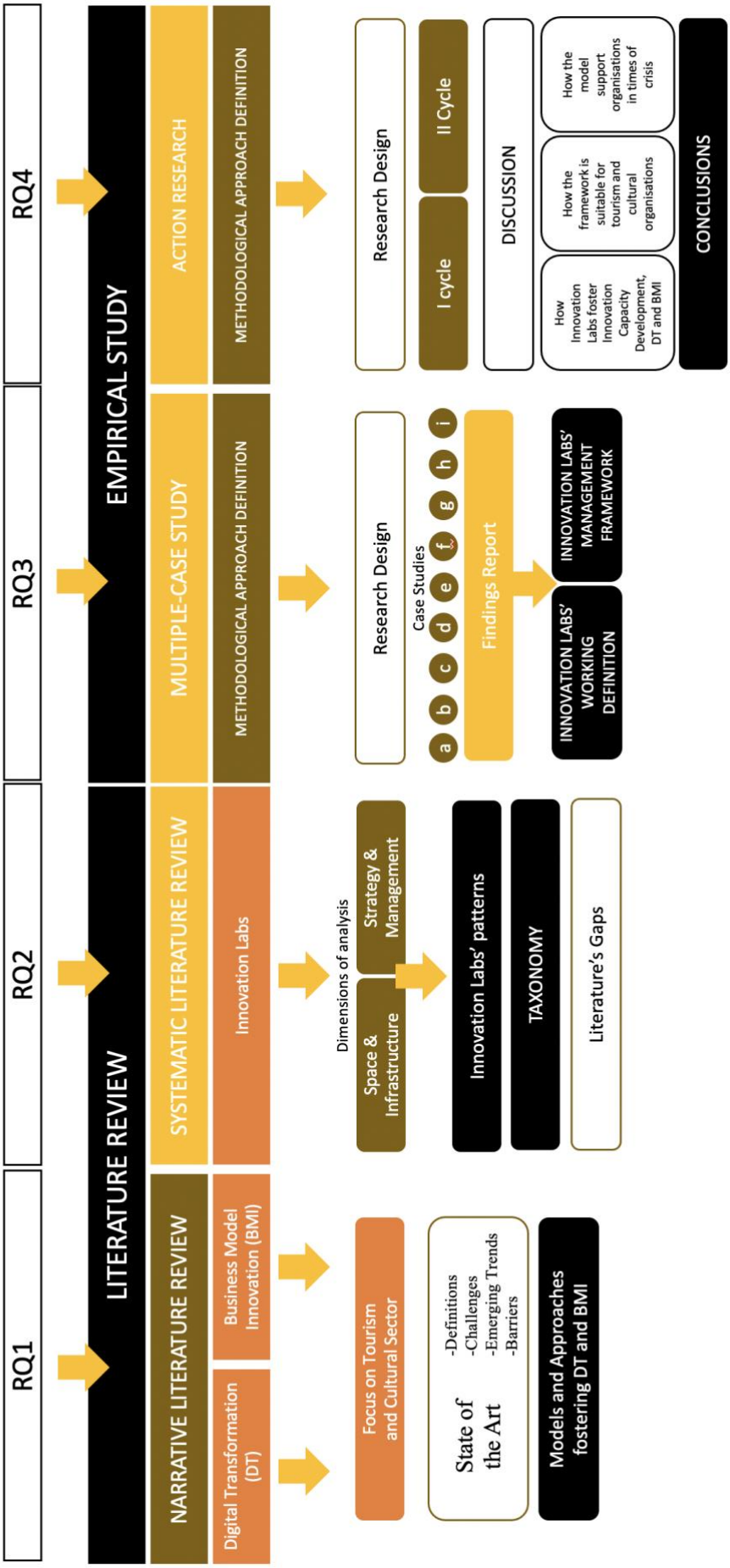

Figure 2 . Structure of the work

2. Digital Transformation, Business Model Innovation and emerging trends in the Innovation Management: challenges, opportunities and future directions

2.1 Introduction

The process of DT is crucial to track, because the most relevant socio-economic and labour-market arising impacts are innovating the business models, through the transformation of work, processes, services, products, as well as the paradigm of the whole economy (Muro et al., 2017). At the centre of this impact, there is digital technology (e.g. Big Data, Analytics, Artificial Intelligence, etc.) that contribute to the improvement of workers' abilities and companies' effectiveness. The integration of emergent technology in the company's routines alongside the employees instead of in their place should contribute to the increase of knowledge creation and management dynamics. This, allowing workers to dedicate more time to added value processes rather than consuming and alienating ones. It follows that technology is, even more, resulting as a driving force of today's competitive landscape. Therefore, DT, BMI, and the processes to implement technology in the right way to produce innovation are current almost mandatory topics for organizations' competitiveness and survival.

In this regard, in this chapter, desk research in the fields of DT, and BMI has been carried out to identify challenges, opportunities and organizations' risks and needs, with a particular emphasis on tourism organizations.

The chapter is structured as follows. The 2.2 paragraph analyzes the DT concept, paying attention to the state of the art, definition, critical process' stages, challenges, and the situation in tourism. Then, paragraph 2.3 focuses on BMI.

2.2 Digital Transformation

2.2.1 State of the Art

DT defined by Capgemini (2011, p. 5) as "the use of technology to radically improve performance or reach of enterprises" is becoming even more a discriminating factor for organisations across the world. New digital tools and innovations, such as smart devices, mobile apps, analytics, social media, etc. are tested and employed by a growing number of enterprises interested in improving efficiency in the customer relationship, internal processes, and growth strategy (Westerman et al., 2014).

DT impacts on almost every sector of society, affecting economies, improving processes, and fostering networking opportunities between different actors (Schallmo et al., 2017). This, with the broader aim

of developing an offer that will match even more the customers' needs and global demand.
However, the potential of digital products and processes began to be understood since the introduction of mass media advertising campaigns in the 1990s. These were the first attempts to reach customers in innovative and human-centred ways. Then, from the 2000s, the fast development of smartphones, digital devices, and social media platforms, radically changed the ways of interaction between customers and companies. Customers used to spend more time online, and they are connected on a multi-channel base, producing and sending data through the interaction with the web. Their needs and habits are changing, as well as the ways and speed of exploiting goods. Companies have been encouraged to develop and test new approaches and methods to communicate with consumers on an individual basis and often in real-time, as well as to gather data to understand their desires and behaviours. Digital innovations like chatbots, Artificial Intelligence, analytics, digital payments, etc. have been introduced to contribute to the abovementioned purposes. E-commerce, digital customer relationships, and digital businesses, in general, are therefore becoming the standard. As a consequence, the digital presence of companies actionable through internal DT journeys and digitisation of products and processes is getting mandatory for organisations aiming at staying relevant and keeping the pace of change in the current business scenario.
In the same way, also, the customers' expectations have radically changed. The fast development of digital technologies and solutions, raise the efficiency standards, increase the speed of market dynamics, and decrease the product lifecycle (Schiuma, 2012). Moreover, consumers are evolving in prosumers not more interested only in the buying process. They look for experiences and want to get a central position in the process. So, they aim at getting engaged in co-creation processes of products, services, and experiences.

Therefore, innovation rapidly and easily becomes quite common and replaced by new emergent innovative digital solutions based on technological advancements and that meet even better the customers' needs. It follows that organisations operating in such mutable and unpredictable digital ecosystem have to become resilient, proactive and able to evolve in the same way the competitive landscape does.
It is relevant, to do so, consider that the broader goal of DT is not to digitise the company. It is more related to the generation of growth (Suh et al., 2018). In this regard, the next paragraph provides for a detailed definition of DT and the distinction between DT, digitisation, and digitalisation.

2.2.2 Defining Digital Transformation

In the Digital Era, the concept of DT is a hot topic both for scholars and practitioners. Despite this, today, the concept still not have an acknowledged definition. Moreover, the terms digitization,

digitalization, and DT are often used interchangeably causing confusions to readers (Schallmo et al., 2017; Vial, 2019). In the following, a distinction between the terms is discussed. Moreover, a review of existent definitions of DT is proposed (Table 2).

According to Gartner's IT Glossary (2020), "Digitization is the process of changing from analogue to digital form". Typical examples are the digitization of paper-based documents. Public or private organizations should digitize their archives, invoices, medical records, etc.
The concept is referred to as the digitization of the information, not to the process. This is the most crucial difference with the concept of 'digitalization' (Bloomberg, 2018).
Gartner's IT Glossary (2020) in fact, defines the digitalization as "the use of digital technologies to change a business model and provide new revenue and value-producing opportunities. - … – It is the process of moving to a digital business". The term digitalization, therefore, is more related to the impact on business and processes on which the business is based. Digitalization is not the introduction of new technology, but the new process generated as a result of the technology introduction.
Moreover, the concept has also a significant impact on people and their way of work. According to Muro et al., (2017, p. 38) "Digitalization is transforming the world of work". It follows that the digitalization refers to the processes an organization want to innovate and the related digital skills required to concretize and manage this evolution. Introducing new software, digital devices, and evolving processes in digital forms also entail the evolution of the people's work.
Examples of digitalization projects are the automation of processes, the retraining of employees to use digital devices, etc.

DT, on the contrary, is a broader concept that cannot be conceived as a project (Bloomberg, 2018). It is more like a strategic transformation, a planned roadmap customer-driven and human-centred, and that requires a more in-depth and cross-cutting change in the whole organization. This, also through the implementation of new digital technologies. Therefore, a DT process might include several digitalization projects, but it is not only a sum of these. DT is more like a journey that drives the organization to become customer-driven and agile, then able to manage the changes effectively. It is related to the acquisition of a mindset that helps the organization to lead the change and the transition to digital. It is not only related to the development of digital skills required for managing new technologies. In definitive, DT contributes to the acquisition of changes as a core competence for driving internal digitalization initiatives.

Moreover, to further discuss the DT concept, In Table 2, a list of definition of DT emerged from the academic literature is reported.

Finally, to conclude the distinction between these terms, a quote by Bloomberg (2018, p. 5) is given: "we digitize information, we digitalize processes and roles that make up the operations of a business, and we digitally transform the business and its strategy. Each one is necessary but not sufficient for the next, and most importantly, digitization and digitalization are essentially about technology, but digital transformation is not. Digital transformation is about the customer".

Definition	*Source*
The use of technology to radically improve performance or reach of enterprises — is becoming a hot topic for companies across the globe. Executives in all industries are using digital advances such as analytics, mobility, social media, and smart embedded devices — and improving their use of traditional technologies such as ERP — to change customer relationships, internal processes, and value propositions."	Westerman et al. (2011); Westerman et al. (2014); Karagiannaki et al. (2017)
Digital Transformation describes the fundamental transformation of the entire business world through the establishment of new technologies based on the internet with a fundamental impact on society as a whole.	PwC (2013)
Digital Transformation is the deliberate and ongoing digital evolution of a company, business model, idea process, or methodology, both strategically and tactically.	Mazzone (2014)
Digital transformation encompasses both process digitization with a focus on efficiency, and digital innovation with a focus on enhancing existing physical products with digital capabilities.	Berghaus and Back (2016)
Digital transformation encompasses the digitization of sales and communication channels, which provide novel ways to interact and engage with customers, and the digitization of a firm's offerings (products and services), which replace or augment physical offerings. Digital transformation also describes the triggering of tactical or strategic business moves by data-driven insights and the launch of digital business models that allow new ways to capture value.	Haffke et al. (2016)
Digital transformation is concerned with the changes digital technologies can bring about in a company's business model, which result in changed products or organizational structures or in the automation of processes. These changes can be observed in the rising demand for Internet-based media, which has led to changes of entire business models (for example in the music industry).	Hess et al. (2016)

Digital Transformation is the evolving pursuit of innovative and agile business and operational models — fueled by evolving technologies, processes, analytics, and talent capabilities — to create new value and experiences for customers, employees, and stakeholders.	Solis (2016)
Digital transformation is not a software upgrade or a supply chain improvement project. It's a planned digital shock to what may be a reasonably functioning system.	Andriole (2017)
Digital transformation as encompassing the digitization of sales and communication channels and the digitization of a firm's offerings (products and services), which replace or augment physical offerings. Furthermore, digital transformation entails tactical and strategic business moves that are triggered by data-driven insights and the launch of digital business models that allow new ways of capturing value.	Horlach et al. (2017)
An evolutionary process that leverages digital capabilities and technologies to enable business models, operational processes and customer experiences to create value.	Morakanyane et al. (2017)

Table 2 . Extent Definitions of Digital Transformation

2.2.3 When to start a Digital Transformation Journey

To successfully implement a DT process within an organization, the mere investment in technology is not enough (Solis, 2016). Technology and digital innovations had a strong impact not only on companies, but also in markets, consumers and employees' attitudes and expectations, and therefore on the products' lifecycle. Consequently, the process of change is not only related to the evaluation of the right technology, service to develop or buy. In this case, the change would have been prosecutable by any organization. On the contrary, for an effective DT organization might consider both the internal and the external context, looking at the market, customers, and stakeholders in general. The transformation plan needs an alignment "with market changes using new technology that serves as an enabler to compete at scale in the new (and evolving) world" (Solis, 2016, p. 4). Moreover, the broader DT aim is that of guarantee an improvement of business to match the employees' needs at work, the customers' desires during shopping, the efficiency required by managers in the company, the innovation sought-after.

All that said, every organization does not equally perceive the need for DT. Although we live in the Digital Darwinism Era, namely the Age during which the market makes a natural selection that

excludes those organizations that do not implement DT adapting themselves to the current context, companies declare that the need for DT is only perceived if it springs from a pressure (Westerman et al., 2011; Goodwin, 2018). Pressures commonly should be internal or external to the organization. Individual intuition or problem identification during routine processes; the need for scale and open to the global market; the necessity to improve to keep the pace of change and the pace of competitors are the typical pressures that push to start the change. These are therefore internal or external pressures from which gather the information that fosters a change of organization's perspective and orient the DT strategy to adopt and follow. Sometimes organizations are vulnerable to change and innovations. For example, the lasts years are characterized by a considerable number of cases of technological shifts that broken-down barriers through the opening of doors for new disruptive competitors. Is this the case of Uber, Netflix, Airbnb, etc. (Reis et al., 2018). Therefore, the DT requires a vigilant attitude on the context, trying to understand, adapt and possibly anticipate the change.

2.2.4 Stages and Blocks of Digital Transformation

In the era of Digital Darwinism where organizations must adapt or die, ignoring change is not an option. Therefore, embracing DT is the only strategy to guarantee competitiveness in the Digital Age. Buying and implementing the latest technologies is, however, not enough to complete a DT journey. As discussed in the previous pages, DT is a process that involves the entire organization, and in addition to technologies, it requires skills, competence, vision, and a shared and planned roadmap. Therefore, the DT is a structured path which consists of different stages organizations might encounter before they can be declared ready and mature to manage DT.

On the basis on the ability and attitude of an organization to understand, anticipate and adapt themself to the context change, its maturity regarding DT should be determined. Solis (2016) in his research identifies six stages to explain and understand the position of an organization regarding DT: business as usual; test and learn; systemize and strategize; adapt or die; transformed and transforming; innovate or die (Figure 3).

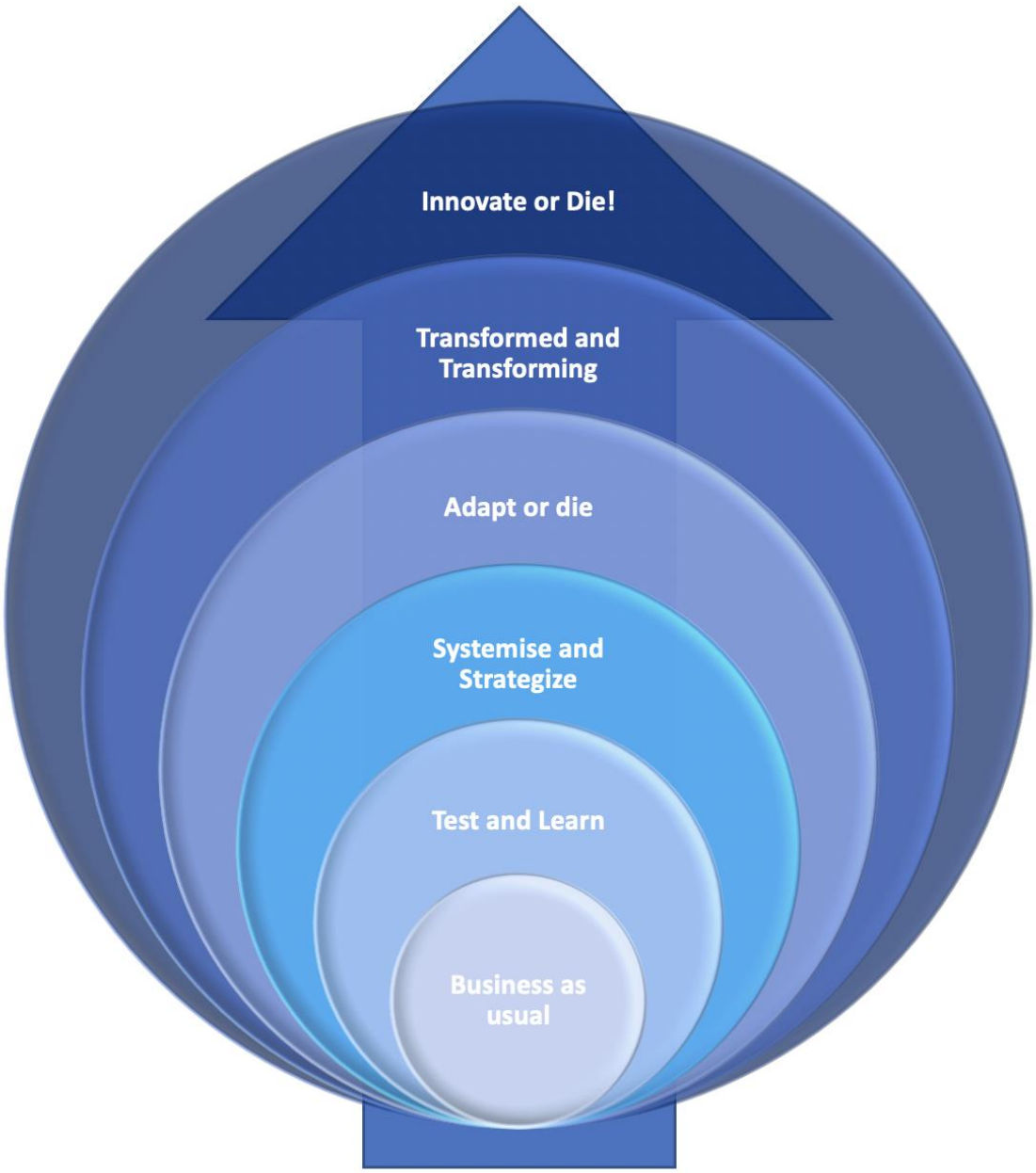

Figure 3 . Levels of Digital Transformation Maturity (Adapted from Solis, 2016).

In the lowest level towards the DT Maturity are placed those organisations that do not perceive the importance of translating into digital their own business. Usually, these kinds of organisations are those affected by the 'We have always done in this way' syndrome (Zimmerman, 2019). They are, thus, those organisations who perceive the digital just like an approach to optimise and scale internal practices. Therefore, they plan some isolated digitalisation project without any plan or holistic vision. In the second stage are placed the organisations that start experiencing with digital due to the recognition of troubles in processes or organisational units. Consequently, they start testing and learning from the slow introduction of new digital methods in the routines. Experiments are conducted in isolation, without interdepartmental synergies. These tests provoke chaos, and the lack of a shared vision and strategy is dominant. Despite this, successful experiments should act as a starting point to

stimulate interest and inform companies on how and on what invest in developing innovation projects/programs. In definitive, there is an emerging interest in digital innovation, but it is isolated to a single unit. Coordination is required, but the organisation is still not ready. However, this approach, especially when the conducted tests register a positive result, should be the first step for a formalisation and diffusions of innovative practices. Starting from tests conducted in isolation, they could get attention and then be extended to the rest of the company. This is a nonlinear process that might lead to change, but under long times and non-optimised efforts.

The third step, 'Systemise and strategise' is the first stage where DT appears as more concrete. The organisation is interested in gathering data to orient significant investments, to train executives in order to formalise programs and create the conditions for successful DT. Moreover, the organisation critically look at the business landscape to detect opportunities, focusing on digital customer experience (DCX). So, innovation becomes a strategic goal.

The next stage, 'Adapt or die' is referred to those organisation that are becoming resilient and recognise and appreciate the need for change. Here, the DT starts to be a structured project based on investments on technologies, training, and infrastructures. Goals are defined, DCX is conceived as a primary target and as a focal point for the upcoming strategy. Therefore, performance and areas of opportunity are monitored through analytics and tools for managing data to decode information and "create a single view of the customer across every interaction point" (Solis, 2016, p. 13).

The stage 'Transformed and Transforming' states the adequate comprehension of the DT. It is continuously applied and implemented within an organisation having an impact on processes, people and business models. The DT results as coordinated and operates longitudinally across all the organisational units. Digital literacy is spreading among employees, and learning is continuous, as well as the decision-making is based on learning from an internal and external context.

The final stage 'Innovate or die' refers to organisations where DT is accomplished, and new efforts are made to find innovation solutions unconventionally guaranteeing growth. In this regard, intra-sectorial and extra-sectorial benchmarking activities are conducted to foster cross-fertilisation; get inspiration from advanced innovative ecosystems, startups and companies; find new talents, technologies; invest in startups and/or stimulate product or service innovation.

The model proposed by Solis (2016) results in inspiring evidence of how DT should be implemented in organisations. However, it is not a linear process. Some companies may skip stages or can start their digital journey not necessarily from the first one. Indeed the author makes an exact frame of the current broader situation related to this process.

According to the previously provided definitions, and considering the Solis' model (2016), it emerges that DT is a complex process that through the introduction of digital technologies, impact on various areas of business.

Westerman et al., (2014) as a result of interviews conducted on 157 executives in 50 companies, individuate three key business areas where DT impact most: customer experience, operational process and business models. Moreover, each of these areas presents three different sub-elements identified in nine resulting building blocks.

It resulted that DT impacts on customer experience through customer understanding, top-line growth and customer touchpoints. Digital innovations allow improvement in customer understanding, offering new methods, approaches and solutions to discover and identify needs, habits, attitudes and behaviours. Organizations, looking at data produced online by customers and analyzing social media interactions, can better segment the market, understand what consumers want. This to customize the promotions and the offer and produce something customers desire. However, the DT of customer understanding does not help only in the product/service selling. It also contributes to the loyalty and retention of clients through active engagement, the improvement of the online experience.

Moreover, the DT contributes to the acceleration of the top-line growth through analytics for the predictive marketing; or digital tools for a digitally-enhanced selling; or through a digital plug-in, process automatization for the simplification of customers' buying process.

Also, customer service should be affected by DT. Digital-based solutions in the form of multi-channel-based relationships, chatbot, live assistance, etc. can contribute to the fast and transparent resolution of everyday problems that favour loyalty and retention.

Organizations implement DT to improve the efficiency of operational processes. The digitization of processes through innovative software that automates the procedures (i.e. ERP) to allow employees to focus on added-value activities; or the use of digital printing or rapid prototyping to reduce production times and costs; help the organization to make processes more scalable and efficient.

The introduction of technology in ordinary processes also impact on people. At the same way, organizations should pay attention to the productivity and quality of work of employees. Digital innovation can contribute heavily in this regard. The reorganization of workspaces, the introduction of collaborative tools, videoconferencing, etc. allow people to work everywhere and to enhance their productivity, as well as to capitalize and codify knowledge and becoming a powerful tool for knowledge sharing. Moreover, gathered data and information might inform the decision-making system, contributing to making the organization management even more data-driven.

The last business area where DT impacts is that of business model. DT, as previously stated, is not only about technology. Moreover, new technologies rarely have a radical impact on business. The impact depends more on how technology is exploited. The exploitation of technology may transform the company's business model in various forms: through an incremental modification of the existent

business model; through the development/generation of a new business model that reshapes the organizational boundaries; or finally benefitting of digital globalization to scale and to optimize services.

Finally, dedicated attention must be paid to the digital capabilities, namely those skills required for the effective management of DT, and that impact longitudinally across the three above-described pillars. The most required digital capabilities are related to the ability to manage analytics to transform data into insights that will influence decision-making and will provide real-time KPIs to monitor performance and customers' interactions. In this regard, it becomes relevant to unify data and processes to guarantee a shared view and a perfect matching between customers and provide products and/or services. About this, integrated digital platforms are proposed as a valuable solution to get advantages from analytics and unified data and processes. Once data and processes have been merged, companies need professional quality to develop new methods and approaches to deliver newly generated solutions. Often, organizations have rooted and codified practices that sometimes should results as obsolete and not in line with new technologies. Therefore, digital capabilities allowing breaking rules and out-of-the-box thinking are sometimes recommended.

2.3 Digital Transformation in Tourism

In tourism, like other sectors, DT offers opportunities to scale, grow, improve efficiency and productivity, gain a competitive advantage and foster innovation. In the specific, in tourism, DT might contribute to innovate the offer, the destination management; to customize offers and develop new typologies of products, services, tourism packages; as well as to offer policy guidelines and insights for the development and improvement of local tourism ecosystems.

In this regard, it is essential to recognize that DT "provides the tools, frameworks, and technologies to create and/or add value to tourism products and experiences but the success of digitalization depends on the capacity of the tourism sector to share, learn and collaborate" (Dredge et al., 2018, p. 6).

Compared with other productive sectors, tourism presents a fragmented offer and its sub-sectors are inherently *labour.intensive,* namely characterized by humanization and direct contact with clients. Therefore, by nature, reluctant to innovation and digitalization (Meyer and Mayer, 2015). Moreover, tourism sub-sectors are different among them in terms of resources, access to finance, skills, culture, etc.

That means that for the tourism organizations, the path towards DT is complex and challenging.

Therefore, to guarantee an effective DT process in tourism organizations, a holistic vision that contemplates and engage the whole sector is needed. As in other sectors, even more in tourism, therefore, the DT must be a process not only linked to technological development, but to the development and promotion of an integrated ecosystem, based on innovative solutions, that involves and creates value for all parties involved.

In the following, the impact of technologies and related evolution over time is discussed to understand how tourism and tourism organizations are approaching to DT.

Technology and digital innovations are changing the world, the habits and the market-dominant logics. The new Era of technologies led to the birth of Industry 4.0. The term, coined for the manufacturing sector, identifies the ability to harmoniously integrate new digital technologies and new managerial approaches with traditional technologies and methods of doing business, in order to pursue the new levels of productivity required by the market (Lasi et al., 2014). Nowadays, the term Industry 4.0 has also been extended to the other economic sectors, and it is moreover accompanied by the term Business 4.0. It refers to the attitude of evolving business practices through DT and open innovation (Ibarra et al., 2018).

Therefore, tourism, having characteristics common to both industry and service sector, is likewise affected by profound transformation due to the technological evolution. Specifically, three key phases can be identified regarding the transformation of the sector based on the evolution of technologies (Xiang and Fesenmaier, 2017). The first phase boils down to the diffusion of the Internet (1990-2000). During this phase, technologies were conceived as supporting tools for the incremental improvement of internal operations. First attempts of digitization of tourism offer were made through the creation of websites that substituted traditional paper-based catalogues. At the same time, reservation and distribution systems become web-based. Therefore, online transactions made easy the growth of the industry.

The second phase reflects the consolidation of digital business ecosystems. In these times (2000-2010), thanks to the spreading of technologies, travellers become more informed and aware of their needs. So, virtual marketplaces proliferated to allow customers to become protagonists of their travel and influencer for future travellers. OTA replaced traditional agencies, and innovative startups like Airbnb and TripAdvisor enter the market in a disruptive manner.

The last and current phase (from 2010) coincides with the development and spreading of cloud computing, Virtual Reality (VR), GPS, wearable technologies, and other technologies that allow a real-time integration between digital and physical worlds.

The combination of traditional tourism offer, with web and social media platforms, offers relevant opportunities to develop new products and services, to innovate or create new business models, and to guarantee growth and sustainable advantage to resilient and proactive organizations aware of the market change and ready to adapt their business.

The described evolution of technologies results in a transformation of the sector (Table 2) that sometimes impacts in a disruptive way. Then, it requires new ways of planning and configuring destinations; new business models, value chains and ecosystems; evolved and new roles for customers

and producers and tourism organizations in general (Dredge et al., 2018).

Analytics, big data, cloud computing, and other emerging and enabling technologies, as well as new habits and customers' behaviours, has given way to emerging trends like platformization, prosumerization and business virtualization (Gimpel and Westerman, 2012). Innovative companies and startups that have proven to be aware of the context, resilient and visionary had the chance to enter the market in a disruptive way. On the contrary, those organizations who ignored this reconfiguration, have been completely replaced, or in the alternative, they suffer heavy pressures to make adjustments and reconfigure businesses. This, to highlight the criticality of DT in the current business landscape again. Moreover, technological advancements lead to a reconceptualization of destination configurations. Now, thanks to the interconnection between physical and digital world it is possible to reimagine and customize visitor experience, enhance new models of destinations like rural areas, hamlets, and in general those second-rate destinations victims of the fragmentation of the sector.

In this new context, the role of visitors, tourism operators and producers are changing. Visitors are becoming prosumers, and they require an active involvement during the experience they want to live and buy. Therefore, producers, based on that, need to rethink services and offers, as well as tourism organizations, should act more as facilitators and promotors of iterative dialogues between actors involved.

In definitive, as perceived from the above discussion, an effective and targeted DT require "a collaborative network and learning environment be established so that SMEs can be inspired by technology-savvy businesses both in and outside tourism and can learn and collaborate together" (Dredge et al., 2018, p.10). Moreover, technologies and digital innovation even though they can be new, they rarely impact radically on a market or ecosystem. What has the potential to be radical and disruptive is the way by which they are exploited. So, the logic behind technologies and the business model deriving from their usage and application. Hence, the concept of BMI.

The next paragraph discusses the concept of BMI with a particular focus on BMI in tourism.

2.4 Business Model Innovation

The way how technology and DT are exploited may result in change, evolution and innovation of processes, services, people and employees' interaction and jobs.
Companies are investing in technology and processes to generate and develop new ideas, solutions, and products. However, most of them do not face the problem of accompanying these activities with those related to the BMI. A new technology, if introduced in the market with two different business models, led to two completely different results, sometimes opposed to each other. Therefore, the importance of resorting to investment in skills for the development of an innovative capacity useful to manage technology and to innovate business models emerge even more. The attitude to innovate business models is essential to become resilient and ready to evolve and adapt to the context's changes and to manage new-tech solutions that are even more frequently introduced in the market.

The development of business models and the BMI are concepts strictly related, and who are receiving growing attention in the last years (Chesbrough, 2007; Amit and Zott, 2012). To tackle the topic and to understand how DT affects BMI of organizations and tourism sector, the comprehension of the concepts, drivers and paths existing to improve them is required. In this paragraph, after defining the concept of business model, a focus on DT of business models and BMI will be treated paying attention to drivers, typologies, effects of BMI. Finally, a frame explaining the emerging business models in tourism will be discussed.

2.4.1 The concept of Business Model

The growing attention to the development and innovation of business models is due mostly to the spreading of the digital economy (Wirtz 2000; Chesbrough 2010).
Competitive dynamics in digital markets are entirely changed. Globalization, the fast development of new technologies, DT of business, deregulation of productive sectors resulted in a more complex, unpredictable, challenging and competitive landscape. Organizations interested in keeping or gaining a competitive advantage, as discussed in the previous paragraph, are subject to heavy pressures for change to adapt businesses to the evolving scenario.
In this regard, the business model lends itself to the answer of companies aiming at managing change in their businesses to surf the unpredictability and variability of the context. Thus, business model management contributes to support organizations in the development of new solutions, business ideas,

analyze the context and internal processes to foster the improvement of strategies and infrastructures. Therefore, the business model is conceived as the core of organizational activities, supporting the management in the analysis of critical factors and the consequent adaptation of business activities (Wirtz, 2019).

The concept, especially in recent years, has been widely discussed among scholars. The academic literature counts several reviews focused on the origins, evolutions, ontology of the concept to propose working definitions (Wirtz, 2010; Zott et al., 2011; Klang et al., 2014; Massa et al., 2017).

Definitions start from the first, found in the literature and provided by Timmers (1998), until that by Osterwalder and Pigneur (2010) who is the most acknowledged in business practice thanks to the business model canvas tools, developed in the same work.

Therefore, according to Timmers (1998, p.4), a business model is "an architecture for products, services and information flows, including a description of various business actors and their roles; a description of the potential benefits for the various business actors; and a description of sources of revenues". Osterwalder and Pigneur (2010, p. 14), instead, state that "A business model describes the rationale of how an organization creates, delivers, and captures value".

Moreover, Wirtz (2010), in the book "Digital Business Models" after a more in-depth study on the topic, resumes in chronologic order, as shown in Table 3, the most relevant definitions emerged from the literature. Therefore, this research in the next sections, refers to business model according to the definition provided by Wirtz (2019, p. 13): "A business model is simplified and aggregated representation of the relevant activities of a company. It describes how marketable information, products and/or services are generated through a company's value-added component. In addition to the value creation architecture, strategic, customer and market components are considered in order to realize the overriding objective of generating and preserving a competitive advantage."

Furthermore, the author (2019, p. 14) refers to business model management as "Business model management is an instrument for the governance of a company and comprises all target-oriented activities concerning the design, implementation, modification and adaptation as well as the control of a business model, in order to realize the principal objective of generating and securing competitive advantages."

Definition	*Source*
The second concept, the operating business model oriented to the customer benefit, describes the synergy of operating processes, management systems, organizational structure and business culture which allows a company to make good on its promise of service. To be more precise, this involves the systems, infrastructures, and the environment with the aid of which the customer benefit can be realized. The promise of service is the business objective; the costumer value-oriented operative business model by contrast constitutes the means with which this purpose is achieved	Treacy and Wiersema (1997), p. 10
An architecture for products, services and information flows, including a description of various business actors and their roles; A description of the potential benefits for the various business actors; and a description of sources of revenues	Timmers (1998), p. 4
Here, the term business model refers to the depiction of a company's internal production and incentive system. A business model shows in a highly simplified and aggregate form which resources play a role in the company and how the internal process of creating goods and services transforms these resources into marketable information, products and/or services. A business model therefore reveals the combination of production factors which should be used to implement the corporate strategy and the functions of the actors involved	Wirtz (2000c), p. 81
A business model is simply a business model that has been put into practice. A business concept comprises four major components: Core Strategy, Strategic Resources, Customer Interface, Value Network	Hamel (2000), p. 83
Operating business models are the real thing. An operating business model is the organization's core logic for creating value. The business model of a profit oriented enterprise explains how it makes money. Since organizations compete for customers and resources, a good business model highlights the distinctive activities and approaches that enable the firm to succeed—to attract customers, employees, and investors, and to deliver products and services profitably	Linder and Cantrell (2000), p. 5
A business model is an abstraction of how a business functions. […] What the business model will do is provide a simplified view of the business structure that will act as the basis for communication, improvements, or innovations, and define for the information system requirements that are necessary to support the business. It isn't necessary for a business model to capture an absolute picture of the business or to describe every business detail. […] The evolving models also help the developers structure and focus their thinking. Working with the models increases their understanding of the business and, hopefully, their awareness of new opportunities for improving business	Eriksson and Penker (2000), p. 2 et seq.
A business model depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities	Amit and Zott (2001), p. 493
A business model is comprised of four parts: a value proposition or "cluster" of value propositions, a marketspace offering, a unique and defendable resource system, and a financial model. The value proposition defines the choice of target segment, the choice of focal customer benefits, and a rationale for why the firm can deliver the benefit package significantly better than competitors. The offering entails a precise articulation of the products, services, and information that is provided by the firm.The resource system supports the specific set of capabilities and resources that will be engaged in by the firm to uniquely deliver the offering. The financial model is the various ways that the firm is proposing to generate revenue, enhance value, and grow	Rayport and Jaworski (2001), p. 109
Based on the review of existing literature, we would define a business model as consisting of the following causally related components, starting at the product market level: (1) customers, (2) competitors, (3) offering, (4) activities and organization, (5) resources and (6) factor and production input suppliers. The components are all cross-sectional and can be studied at a given point in time. To make this model complete, we also include (7) the managerial and organizational, longitudinal process component, which covers the dynamics of the business model and highlights the cognitive, cultural, learning and political constraints on purely rational changes of the model	Hedman and Kalling (2002), p. 113
A good business model remains essential to every successful organization, whether it's a new venture or an established player. […] Business models, though, are anything but arcane. They are, at heart, stories – stories that explain how enterprises work. A good business model answers Peter Ducker's age-old questions: Who is the customer? And what does the customer value? It also answers the fundamental questions every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost?	Magretta (2002), p. 3 et seq.
A business model is a framework for making money. It is the set of activities which a firm performs, how it performs them, and when it performs them so as to offer its customers benefits they want to earn a profit	Afuah and Tucci (2003), p. 3 et seq.
A business model is the set of which activities a firm performs, how it performs them, and when it performs them as it uses its resources to perform activities, given its industry, to create superior customer value (low-cost or differentiated products) and put itself in a position to appropriate the value	Afuah (2004), p. 9
A business model is a conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm. Therefore, we must consider which concepts and relationships allow a simplified description and representation of what value is provided to customers, how this is done and with which financial consequences	Osterwalder et al. (2005), p. 3
The business model is an abstract representation of an organization, be it conceptual, textual, and/or graphical, of all core interrelated architectural, and financial arrangements designed and developed by an organization presently and in future, as well as all core products and/or services the organization offers, or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives	Al-Debei et al. (2008), p. 7
A business model, from our point of view, consists of four interlocking elements that, taken together, create and deliver value. The most important to get right, by far, is the first. Customer value proposition, profit formula, key resources and key processes	Johnson et al. (2008), p. 52
Business models are not recipes or model or scale and role models, but can play any—or all—of these different roles for different firms and for different purpose: and will often play multiple roles at the same time	Baden-Fuller and Morgan (2010), p. 168
A business model, in essence, is a representation of how a business creates and delivers value, both for the customer and the company	Johnson (2010), p. 22
A business model describes the rationale of how an organization creates, delivers, and captures value	Osterwalder and Pigneur (2010), p. 14
A business model articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers. It also outlines the architecture of revenues, costs, and profits associated with the business enterprise delivering the value. […] In essence, a business model embodies nothing less than the organizational and financial 'architecture' of a business	Teece (2010), p. 173

Table 3 . Definitions of Business Model (From Wirtz, 2010)

The dimensions distinguishing a business model are related to customers, benefit, value-added, partner, and finance (Shalmo, 2013). The customers' dimension describes the customer segments, namely the different groups of people or organizations a company is interested in reaching; the channels, that is the means of communication and deliver for produced products and provided services; and customer relationships, thus the relationships that an organization activate with customers segments (Osterwalder and Pigneur, 2010).

The benefit dimension contemplates the product, services, and in general, the value proposition the organization aims to deliver to clients and stakeholders.

The value-added dimension is based on internal assets, in the form of processes, resources and challenging- and soft- skills required for the functioning of the business model.

Partner means the network of suppliers, competitors and non-competitors allies in contact with the organizations to contribute to the value proposition's accomplishment.

Finally, the financial dimension contemplates revenue streams and costs arising from business exploitation.

Therefore, according to Chesbrough and Rosenbloom (2002), a business model defines the value proposition; segments the market and adapts the revenue management system; organizes the supply chain, value chain and partnerships, as well as the positioning on the market and the strategic vision.

The careful and strategic combination of the above-described dimensions allows us to pursue two relevant functions: value creation and value capture (Chesbrough, 2007).

The value creation occurs through activities such as the procurement of raw materials to the production and delivery of products and services to satisfy the final recipient. Therefore, a business model aims to determine conditions to generate value for final customers, stakeholders, suppliers, partners, and in general, for all those subjects keeping contact with the organization. At the same time, for the sustainability of these activities in the long run, the value capture is mandatory. So, a company needs to hold value from the delivery of the abovementioned activities.

Furthermore, a business model is conceived to support decision-making and management.

Structuring a well-defined business model with a detailed definition of each dimension allows the collection of value-added information that enhance the quality of decisions and strategic operations. Therefore, a business model might guarantee the sustainability and competitive advantage of an organization, as well as allowing the possibility to make comparison and distinction between competitors (McKinsey, 2008). This to find potential market gaps or differentiation criteria that should stimulate change in the organization's business model to create and develop opportunities for the company.

Change and innovation in business models are even more conceived as strategic actions to favour the

survival and adaptation of organizations to the current evolutive business landscape. More than 70% of organizations declared they changed, adapted or innovated their business model to safeguard the company's competitiveness (IBM Institute for Business Value, 2008; Wirtz, 2010).

2.4.2 The concept of Business Model Innovation

The attention paid to the concept of BMI has heavily grown in the last years (Amit and Zott, 2012; Chesbrough, 2010). Goffin and Mitchell (2010), reviewing literature's contributions on the topic, classified three categories of drivers that prompted BMI: technological progress, dynamic market environment and challenging competition, and new customer needs.

With the arising of the Digital Era and related fast development of new technologies and innovations, several organizations were led to transform their business model in various ways (Capgemini, 2011). Some organizations innovate through an incremental modification of the existent business model. Others, through the creation and development of a new business model that reshapes the organizational boundaries. Finally, some companies aim at benefitting from the digital globalization to scale and to optimize services. They, for example, benefit from global shared services allowed by new technologies, to provide business from local to global markets.

Therefore, mere technology and related investments in buying them have not intrinsic value. The value depends on their exploitation through a business model. In fact, according to Chesbrough (2010, p. 354) "a mediocre technology pursued within a great business model may be more valuable than a great technology exploited via a mediocre business model". Thus, the quality of a business model and the ability to adapt or upgrade an existing business with an innovative application of technology should act as a differentiating factor enabling competitive advantage.

It is, in fact, more difficult for competitors imitate a set of activities and dimensions rather than single products, services or processes. Moreover, its innovativeness may result in the creation of a new market, or in the provision of attitudes to a company to find and exploit opportunities in existing markets (Amit and Zott, 2012).

In definitive, "Business model innovation is not about looking back, because the past indicates little about what is possible in terms of future business models. Business model innovation is not about looking to competitors, since business model innovation is not about copying or benchmarking, but about creating new mechanisms to create value and derive revenues. Rather, business model innovation is about challenging orthodoxies to design original models that meet unsatisfied, new, or hidden customer needs" (Osterwalder and Pigneur, 2010, p. 136).

Moreover, according to Wirtz (2011, p. 206) "Business model innovation describes the design process

for creating a widely new business model on the market, which is accompanied by an adjustment of the value proposition and/or the value constellation and seeks to generate or secure a sustainable competitive advantage."

In practice, following Amit and Zott (2012), BMI may occur in three ways and following four value drivers who enhance the possibility for a company to exploit value from a new business model.
The three ways, according to which BMI occurs are:

- 'new activity system content', namely when new activities were added;
- 'new activity system structure', that refers to the linking of activities in new ways;
- 'new activity system governance', so the change of roles and/or rules and/or responsibilities to perform an activity.

BMI value drivers, on the other hand, are novelty, lock-in, complementarities and efficiency.
Novelty refers to the level of BMI expressed by the exploited activities. Lock-in is related to the ability of the business model to promote a retaining of customers, employees or stakeholders regarding iterated processes or activities. Complementarities are related to the attitude of enhancing value from the interconnection of activities exploited through the business model. In this regard, the authors provide the example of Paypal, that once integrated into the eBay system, allowed greater ease in transactions that generated higher value for the company.
Finally, efficiency is related to those reconfigurations of business model's dimensions, in terms of processes, relationships and/or activities that favour a cost reduction for the organization.

Considering that BMI should be conceived as a case of innovation, Hauschildt and Salomo (2016) define four fundamental elements that are usually applied to the general concept of innovation, but that can also be considered and applied to BMI:

- Innovations imply a significant divergence from the original condition
- Innovation is the result of the generation and exploitation of an idea on the market
- Innovation might be generated through demand-pull or technology push logics, namely from the market demand or from new technology
- Innovation is the result of a structural process

2.4.3 Business Model Innovation in Tourism

Tourism, as a highly competitive sector, requires BMI as a differentiating factor to innovate the offer and to allow a tourism organization to take a leading role in the market.
Globalization of tourism flows, high competitiveness between destinations, sustainability, slow and smart tourism, the emergence of rural areas as new destinations, the development of new technologies

supporting travels, and new travellers' needs contributed over the time to the creation of new market segments, niches, as well as the possibility of identifying new products and services allowing organizations to answer the changing demand of new travellers efficiently. Therefore, new or upgraded business models are establishing in tourism as enabling factors determining the arising of innovation management and BMI in tourism.

Considering the study by Linton and Öberg (2020) who focusing on digitalization and destination location as relevant contextual factors, define a typology of business models in tourism organizations. Digitalization, thus, is considered as one of the driving forces of BMI who replace the ways of operating a business or generate a new basis for new businesses. On the other hand, destination location is intended as the attractive capacity depended on the interconnection and proximity of a tourism organization with a tourism destination (Prideaux, 2000; Henderson, 2006). Therefore, to benefit from the high availability of resources in terms of infrastructure, physical or human assets.
Based on that, the authors developed a framework that defines four types of tourism business models (Figure 4).

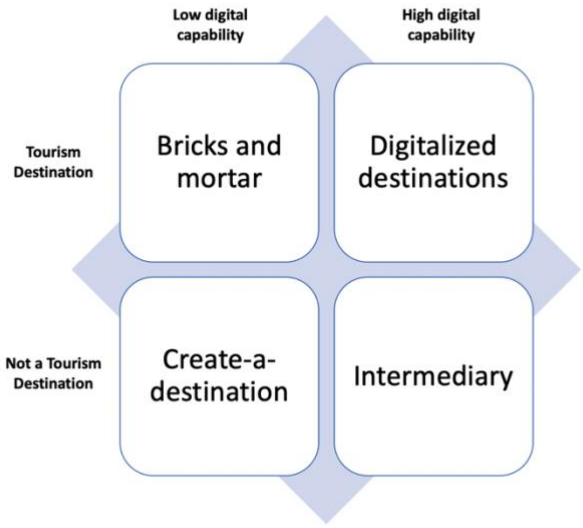

Figure 4 . Tourism Business Models (Adapted from Linton and Öberg, 2020)

The first typology is defined as 'Bricks and mortar', who calls to mind the features of the traditional and homonymous tourism business model (Livi, 2009). That is the case of those organizations established in an attractive destination representing, for tourists, the reason for the travel. The proximity to attractions or dedicated facilities is the base of the business model. Services and activities provided are the traditional ones, as the accommodation, incoming, and those related to the management of tourists' experience. Therefore, digital capabilities are not required.

Instead, in the areas where tourists usually are not attracted, organizations with medium digital capabilities may develop based on a 'Create-a-destination' business model. This kind of organizations develops the business in high-potential areas that are still out of the usual tourists' itineraries. Therefore, the attractiveness depends on the ability of the organization to communicate value proposition and offer, as well as the capacity to provides for unique experiences becoming the primary reason for travel. It may be the case of those hotels that offer unique experiences, like ice hotels, tree houses, etc.

The third typology of business model is related to those organizations who are not located in tourist areas but may be involved in tourism activities due to the high digital capabilities denoted. The 'Intermediary' business model includes P2P and digital activities. Therefore, organizations act as digital platforms fostering interconnections between travellers and destinations. Typical examples of this typology of companies are the booking platform like Booking.com, TripAdvisor, etc. Moreover, with the arising of the Sharing Economy business dynamics have been changed to the advantage of co-creation and tourism engagement (Schor, 2019). As a consequence, new platforms have emerged to connect customers and services' providers to co-create experiences and tourism offers.

The last business model is that of 'Digitalized destinations', namely destinations characterized by organizations with high digital capabilities that are interconnected in a digital ecosystem. These organizations offer advanced tourism experiences that are often integrated with advanced technologies such as big data, analytics, IoT, smart devices, etc., distinguishing the concept of smart tourism (Gretzel et al., 2015).

The critical activities are related to the collection, analysis and representation of data. These activities allow to increase the understanding of customers' needs and habits, to adapt the offer with even more customized products and services, as well as to guide management decisions. At the same time, core activities are related to the provision of innovative experiences that should act as attractors and differentiating factors (Chesbrough, 2007).

Once assumed the possible tourism business models, it becomes relevant to consider the business goal that in tourism, as in the other sectors are related to the value generation achievable through the improvement of performance, the understanding of the competitive landscape, and the development of products and services even more attractive. It follows that, due to the increased digitalization of businesses, the arising of the sharing economy, and the mutability of the business landscape, even for tourism companies, the need for digital innovation is critical. Tourism organizations need to become flexible, resilient, digital to adapt to new circumstances and redefine destinations (Schiuma, 2012; Santarsiero et al., 2020). Therefore, BMI should be pursued with different paths for each identified typology of business model, but it is not more recommended to neglect DT. Digital, in the current

scenario, has thus become for tourism a critical factor on par with destination attractiveness.
Moreover, in some cases, digital capabilities may also contribute to the development of a new concept of destinations, impacting more than attractiveness. It follows that the business models based on digital capabilities should be considered as one of the main goals for those tourism organizations interested in staying competitive and keeping a sustainable advantage. DT, in definitive, is a recommended path to achieve a good positioning in the market and to be able to satisfy and engage clients and travellers as they require in the Digital Era, and so in the age of Smart Tourism.

To identify the value drivers that may address BMI on the tourism sector, in the following, the BMI value drivers described in the previous paragraph (Amit and Zott, 2012) are reconsidered in terms of tourism.
In this regard, the novelty is intended as something no one has thought before, and that generate added value for the company. In the sense of tourism, for example, Airbnb introduced a new business model bringing novelties both for travellers and hosts. Travellers can now have among the option of choice, the apartment as a new accommodation facility. Moreover, lock-in is a common practice in tourism. Airlines and famous hotel chains dispose of loyalty programs to build a long-term relationship with clients. At the same time, many tourism organizations create a partnership with other businesses serving the same customer segment to enrich the value of generated activities, facilitating customers' life. Complementarities are in the same way common in tourism. This driver refers to those new business models interested by co-creation activities that engage customers in the production of experiences. Finally, efficiency refers to those activities that help the organization to reduce costs, and at the same time to innovate or enrich one of the business model's dimensions. For instance, tourism organizations that il line with the sustainability trend, install in the company energy-saving plants or devices, contributes to the cost-saving and the innovation of value proposition. In this case, for example, the company should pursue the mission of becoming an emission-free organization.

2.5 Challenges for Tourism Organisations

The capacity to innovate represents one of the most relevant factors determining the development of a productive sector. Looking at a global scenario where the demand is evolving, the tourism flows are changing, the average age is growing as well as the income, and the sustainability's challenges are becoming even more pressing, new technologies and new digital innovation in general, are modifying the supply chain heavily (Fereidouni and Kawa, 2019). Data about technology and digital innovation implementation in tourism companies are encouraging due to the growing number of organisations who have implemented ERP (Enterprise Resource Planning) and CRM (Customer Relationship

Management) systems. These data record a growth of 18% and 11% respectively, in the Italian tourism sector (Dredge et al., 2018). However, at the same time, digital innovation is interesting companies, mostly in terms of digitalisation and digitisation rather than DT. Indeed, coining the term provided by Westerman et al. (2014), few are the 'digital master' tourism organisations.
However, innovation in tourism includes aspects that go beyond the mere concept of technology innovation, namely the ability to develop or innovate a business model to exploit new technologies and to adapt the business to the emerging trends (e.g. sustainability, co-creation, prosumerization, etc.), as well as the attitude to manage and develop new innovative solutions to keep the pace of change (Gimpel and Westerman, 2012). Therefore, DT and BMI are vital challenges to look forward.

However, what is the real scenario of the tourism sector? Furthermore, why, how, and with which results, tourism organisations approach to DT and BMI? These are the critical questions this study, through a critical literature review on this topic, aims to answer at this stage.

Considering the study by Dredge et al. (2018) commissioned by the European Commission's EASME to examine the challenges and opportunities of digital innovation in tourism, the reasons leading organisations to approach to DT may be grouped into five categories.
The most relevant are those related to the search for improvement of the web presence and the growth opportunities. Then, other reasons are those related to the potential of digital innovation to exploit future opportunities and to find new solutions to face the seasonality as one of the critical challenges for tourism businesses. Then, the will of improving networks.
These reasons highlight the optimistic perception of digital innovation. Organisations seem to consider DT as a powerful solution enabling growth and performance improvement, in terms of cost reduction and satisfaction of the demand. Moreover, the willingness of improving networks reflects the importance that organisations pay to relationships, supply chains, and the establishment of a dialogue with the ecosystem's actors and customers.

Furthermore, organisations approaching DT and more in general Digital Innovation believe that investments on technologies will return in terms of the following typologies of benefits: Customer acquisition; improve online brand visibility; expand international reach; improve service quality; increase visitor satisfaction (Dredge et al., 2018).

In this regard, it is possible to state that DT enables BMI and the generation of new business models. Moreover, the careful implementation of digital innovation may improve the quality and accessibility of new products, services, and experiences.

In the specific, successful implementation of digital innovation in tourism may occur in examples of the resolution of problems like crowding or social distancing, especially during the Covid-19 pandemic. Mobile apps equipped with GPS or live assistance may suggest new, unusual and less beaten tourist paths. These solutions may also result in strategies to value rural areas, to generate new tourist destinations and/or to safeguard the cultural heritage (UNWTO, 2020).

Another relevant aspect coming out of Dredge et al. (2018) is the distinct organisations' attitude to digital innovation based on the internal levels of digitalisation. Organisations with a low level of digitalisation are only interested in improving internal processes and productivity. On the contrary, organisations with an adequate level of digitalisation, and so, those who have already experimented digital innovations implementation are aware of the resulting potential and impact. Therefore, they are interested in increasing the level of trying to pursue BMI to find new opportunities and generate innovative solutions.

It follows that a sort of roadmaps towards the complete digitalisation is pursued. However, a lack in terms of awareness of DT and innovation potential emerge as well. From the analysis emerged that the same awareness is an aspect that is developed ongoing. In fact, from the second step, organisations seem to be more open to understanding the potential of BMI, and they aim more frequently to extend and scale the business to a global level.

In this regard, and in line with that described in the previous paragraphs, it appears that the DT is more like a journey that requires a structured and gradual roadmap rather than an instant implementation. However, this is not an easy process, and it hides various risks, difficulties and barriers. The first of which is the lack of plenty of awareness of DT potential. It is indeed gained during the process exploitation. This, however, denotes a barrier deterring organisations, SMEs in particular, to program such investments.

In the following, a focus on the relevant barriers to digital innovation is proposed.

Freidouni et al. (2019) in their research, identify three main categories of gaps, linked to technology, productivity and regulatory.

The impact of digital innovation and technology advancement is acknowledged (Hinings et al., 2018; Schiuma, 2012). Latest inventions and the fast technological progress of the past years contributed to improve performance, reduce costs and waste, enhance communication, as well as the management. However, if technological progress has a positive impact on the market side, for companies, it may become a high barrier. Quality standards become higher; competitiveness is rigid. Therefore, digital technologies became a dependency, a discriminating factor without which is even more challenging to compete. The required large investments penalise SMEs in particular and accentuate most the digital

divide between large and small companies. The same logic is replied in the tourism destinations scenario. There, small and secondary destinations denote more difficulties in keeping the pace of change and implementing required digital solutions.

This divide is moreover accentuated by the ability to manage data and knowledge, that in the current business landscapes, are the factors which are influencing most the productivity (Carlucci et al., 2004; Schiuma, 2012). Tourism digital platforms, for example, have entered disruptively the market thanks to their capacity to manage data and orient decisions to meet the demand better. Therefore, companies, as well as destinations, that will continue keeping a traditional management system ignoring the change in demand, context and processes, will be locked out of the market. The World Economic Forum (2019) in fact, estimates a loss of 940.000 jobs in the hotel industry in the next ten years due to change in consumers behaviours. Travellers prefer apartments and short terms of staying rather than a traditional hotel. Therefore, without the innovation of business models to adapt businesses to the new demand, the whole industry will suffer from a massive crisis. In this regard, the recurring to digital platforms or tools, allowing the analysis of data may support companies in anticipating trends and adjusting the offer before the crisis.

Ascertained the strategic relevance of DT, the difficulties in implementing this process are sometimes accentuated by the regulatory system that does not follow the same pace of technological progress. New services made possible by new emerging technologies are not yet disciplined by the law because they are facing issues never treated before. Therefore, some services are perceived as dangerous, and their development is heavily slowed down.

On the contrary, for relatively new services like the e-commerce whose regulatory has been disciplined, rules appear stricter and challenging to be followed by the SMEs that are so forced to desist in strengthening their turnover. (esempi)

Another relevant obstacle on which SMEs, in particular, occur and that is strictly related to the lack of awareness of the potential of DT, is the need for training to learn how to exploit and manage a new technology once it has been introduced in the company (Dredge et al., 2018). New technologies require dedicated technical skills and competencies that often SMEs lack. So, training sessions are necessary to understand how technologies work, but at the same time also to approach the right technology and to divulge it, as well as involve the entire company in the implementation and diffusion process. Therefore, the training should be considered as a deterring barrier for organisations that also lack time and finance to execute this activity.

Especially when a company does not understand the importance and potential of DT, it perceives the expense required as a cost rather than an investment. Then, considering that SMEs, often family-run highly populate the tourism sector, the lack of financial resources joined to the lack of awareness and

knowledge on this topic are the biggest stumbling block.

Besides, these obstacles are followed by the 'We have always done in this way' syndrome (Zimmerman, 2019) that affect those companies who believe that their current level of digitalisation is enough. Companies declare that, without any analysis or benchmarking activity.

This is an intangible obstacle that may have a crucial impact on organisations who do not have a clear vision and lack of context analysis. This because the real key challenge for companies is business, and the improvement of productivity, not the mere digitalisation. It follows that DT, in this scenario, is the recommended path to achieve competitive advantage.

Moreover, the rapid pace of change and the fast evolution of digital solution decrease the technologies' lifecycle and make easier their obsolescence undermining the efficacy of the investments. Therefore, understand the right technology for the business and the right level of digitalisation is a delicate challenge that requires qualified support.

2.6 Discussions

2.6.1 Support and fostering Digital Transformation and Business Model Innovation

DT and BMI are essential for organizations competing in this particular business landscape (Berman 2012; Schallmo et al., 2017). These processes favour the enhancement of productivity, performance, as well as the implementation of product, process and business models' innovations that are otherwise impossible to achieve. However, tourism innovation is not an easy process. On the contrary, it entails risks, and it is affected by barriers, difficulties and obstacles mining the exploitation.

From the literature, a lack of knowledge and awareness of the potential of investments in this field has emerged. Besides, costs for change, training and technology implementation proved to be high for most of tourism SMEs. All the more if these costs are linked to the abovementioned lack of awareness.

However, DT is not only about technology (Nonaka and Takeuchi, 2019). The fast development of digital technologies and solutions, raise the efficiency standards, increase the speed of market dynamics, and decrease the product lifecycle (Schiuma, 2012). Moreover, consumers are evolving in prosumers aiming at getting engaged in co-creation processes of products, services, and experiences. Their needs and habits are changing, as well as the ways and speed of exploiting goods. Therefore, innovation rapidly and easily becomes joint and replaced by new emergent innovative solutions. It follows that organizations operating in the digital ecosystem have to become resilient, proactive and able to evolve in the same way the competitive landscape does. Innovation, then, must be recurrent, cyclical. Continuous innovation is required and has to be pursued through a holistic engagement of the whole organization, stakeholders, and customers, rather than just of top management and dedicated facilities. Each actor engaged in innovation must be aware of the organization's vision, goals, and

strategies in order to be able to effectively contribute and generate value (Lianto et al., 2018; Nonaka and Takeuchi, 2019).

Moreover, innovation is increasingly digital and data-driven, and frequently organizations have to embark on a digital innovation journey and not without problems.

The fast development of digital technologies contributes to the generation of a high amount of data, information, and knowledge that increase even more the innovation barriers and accelerate the pace of change. To effectively understand and manage technology, codify and exploit generated knowledge, specialized skills and new governance models are required (Joshi et al., 2010). However, even if equipped with high tech infrastructure, and skilled staff, current innovation actors, like R&D labs, or innovation centres, are not able anymore to sustain and enhance the innovation capacity of companies (Capgemini, 2017). These environments are still conceived as separate entities and are not able to guarantee a stakeholders' commitment and a prolific dialogue with the entire organization. Employees, due to a mismatch in terms of digital skills and awareness, are not able to understand the reasons and potential of new technology implementation and shift.

Digital innovation, indeed, is not only about technology innovation. It is more about the innovation of knowledge and cultural attitudes. Therefore, a further challenge in the digital ecosystem is the promotion and definition of conditions, roadmaps and management models for the implementation of digital innovation strategies, to manage digital knowledge and foster continuous innovation (Bharadwaj et al., 2013; Nonaka and Takeuchi, 2019). A mindset, therefore, composed of skills and attitudes necessary for the management of new digital solutions that, in the future, will be even more numerous and frequent, is required. Furthermore, companies used to invest in technologies and processes to generate and develop new digital solutions. For these organizations often concerns do not arise regarding the accompanying of these activities with BMI ones. However, if a new technology were introduced in a new market through two different business model, it leads to completely opposite results. Therefore, it emerges the importance of investments in innovation capacity development in order to manage these technologies and innovate organizations' business models to face context changes and continuously new digital solutions. What is needed is then a digital innovation capacity understood as the attitude to innovate and managing digital innovations.

In the next paragraph, the concept of Digital Innovation Capacity is explained in details.

2.6.2 The Digital Innovation Capacity of an Organisations

The concept of Innovation capacity draws to it the interest of various scholars over the years who addressed the topic under multiple perspectives (Biemans, 1992; Nonaka and Takeuchi, 1995;

Davenport and Prusak, 1998; Neely, 1998; 2000; 2012; Hurley et al., 2004; Hurley and Hult, 1998; Szeto, 2000). From a management perspective, it is conceived as the ability to manage resources to foster the development of new ideas, products and solutions. From the marketing perspective, it means the attitude of understanding market dynamics to adapt or generate marketable products. From a network perspective, it emerges from collaboration or cooperation with stakeholders to develop new solutions. Lastly, and from a recent point of view, the technology perspective identifies the innovation capacity as the ability to implement new digital solutions for the development of new products or services.

In the specific, Neely (2000, p. 6) defines the innovation capacity as "The internal potential of a firm to generate new ideas, identify new market opportunities and implement marketable innovations by leveraging on existing resources of capabilities". Therefore, the organization's ability to innovate is determined by its internal potential to innovate, namely its innovation capacity. In this regard, it is the potential to generate innovative solutions. It depends on the resources, skills, capabilities in possess of the organization, and that should be managed to identify and exploit opportunities (Barney 1986; Neely 1998; Teece and Pisano, 1994).

Coherently, and synthesizing the previous analyzed perspectives and definitions, Szeto (2000) seems to provide the most valuable contribution according to the purpose of this research. The author identifies the innovation capacity as a relevant factor for the continuous improvement of firm competitiveness. Thus, according to the knowledge creation perspective, the innovation capacity should be referred to a part of the knowledge creation process (Nonaka and Takeuchi, 1995; Davenport and Prusak, 1998) where knowledge "is generated within the dimensions of epistemology and ontology that fuels continuous innovation" (Szeto, 2000, p. 149).

In this regard, and considering the fast advancement of technologies, the ontological and epistemological questions require to be conceived as essential as well as strictly correlated with the concepts of continuous innovation, digital, knowledge, and digital capabilities. Precisely, fundamental questions are moving from whether the disruptive impact of digital will come, to when it will come focusing the attention on the concept of digital innovation and related ability in its management and development.

The concept of digital innovation is thus timelier than ever. It is defined as a product, process, or business model that is perceived as new, and that requires some significant changes on the part of adopters and is embodied in or enabled by IT (Fichman et al., 2014; Yooet al., 2010).

Therefore, the competitiveness of an organization in the digital era will depend on their ability and capacity to develop and manage digital innovations. In this regard, and attested a lack in the literature,

this study provides a working definition of digital innovation capacity, intended as the "Degree of digital innovations actually produced or adopted by an organization".

The definition considers the existing innovation capacity literature and new features introduced with the arising of the digital era. In the following, the critical factors influencing the digital innovation capacity of an organization are discussed (Figure 5).

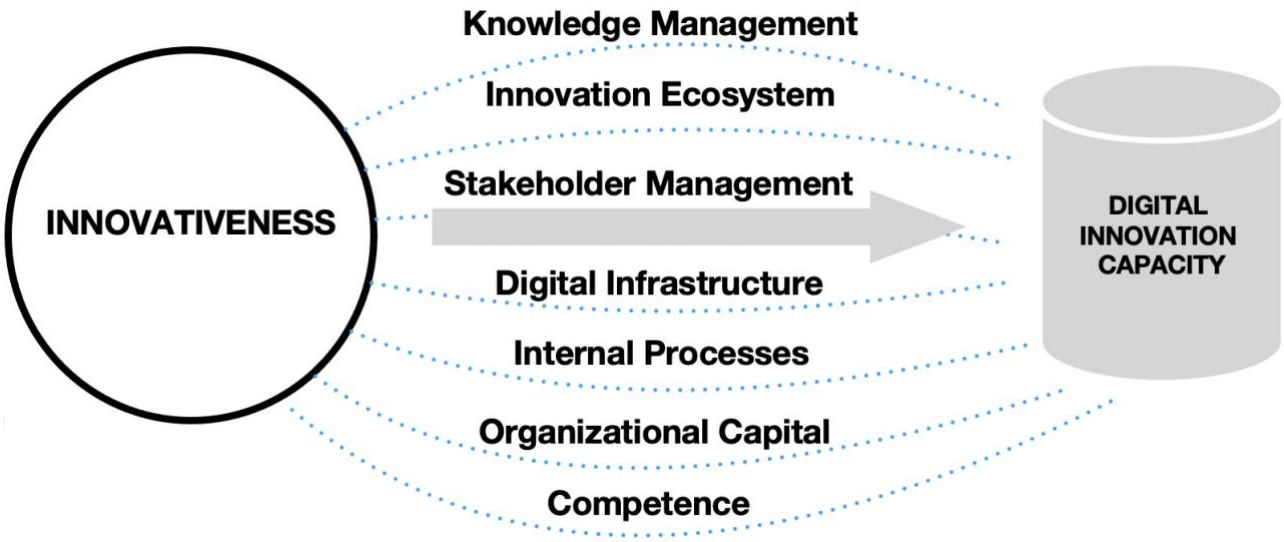

Figure 5 . Factors influencing the Digital Innovation Capacity of an Organisation.

The culture plays a crucial role in the development of a firm's capacity to innovate. It influences the modus operandi of an organisation and the relationships among the firm's employees.

Companies with an adequate innovation capacity have a strong culture, a clear and shared mission and purpose, a well-crafted strategy and a business philosophy of continuous and iterative improvements. Highly innovative companies are distinguished by openness, pragmatism, flexibility, and consistent communications aimed at engaging employees and stakeholders and fostering a holistic system encouraging innovation. Moreover, these organisations have also an open, multi-functional and multi-level team-based style of working, empowered employees at all levels and managers who demonstrated a strong personal commitment to innovation (Neely and Hii, 2014).

The resources are intended as the set of assets and skills, which are employed to create or support the organisations' competitive advantage. Competing companies differ in terms of their resource endowment, and hence differences emerge in terms of competitive advantage and innovation performance (Lavie, 2006).

Competence is intended as the ability to develop and exploit innovative ideas. In this vein, competence includes abilities such as integrating market opportunities with technological abilities, creative problem-solving skills, sharing tacit knowledge and experimentation. The competence of an

organisation, often lies in its processes, strategies, assets, and resources. The role of management is to analyse the context, combine market opportunities with organisation's competence to produce innovations (Von Krogh, et al. 2000).

The **Innovation Ecosystem** is related to the opportunities related to the positive externalities of a relational system. Innovative companies are those who consider customers and suppliers as sources of ideas. Maturing regular interactions with R&D, marketing, production, sales and other organisational units are relevant for cross-fertilisation and contributing to generate innovation. Moreover, these organisations build relations with investors and public institutions to get funds for innovation activities and projects. **Networking** activities are strictly related to this aspect. These initiatives influence the ability to innovate, acting as a way for importing external knowledge. Networking is relevant, especially for organisations approaching open innovation dynamics. The interaction with external stakeholders produces inspiring inputs enabling innovation attitudes.

Knowledge management is the foundation upon which innovative ideas are generated. In this regard, innovation is considered a comprehensive process of learning, searching and exploring. This process results in the reduction of uncertainties of innovation activities. Thus, innovations involve the combination of new and old ideas and knowledge to result in new products, techniques, forms of organisation and new markets (Neely and Hii, 2014).

The Internal Processes may represent a source of innovation for highly innovative companies always sought to generate and capture new ideas. For example, employee suggestion schemes and bottom-up approaches were widespread, as well as creative processes and the culture of failure.

These factors are an enabler of the development of a digital innovation capacity. However, sometimes they are not easy to manage and raise, especially for SMEs that in the tourism sector are the most populous category. At the same time, the learning and training costs that are required for the successful management and implementation of digital innovation are higher and not suitable for all. Added to this is the lack of time to dedicate to these activities that aggravate the situation. SMEs employees and managers are engaged in ordinary activities that for them have priority.

Nowadays, where technologies keep faster the pace of change, and digital innovations require a mindset, namely a digital innovation capacity to be effectively implemented to increase the level of company’s performance, companies, SMEs in particular, need support in carrying out these activities. Looking at the academic literature in the field of innovation management and at the practice, some intermediaries, in the form of innovation laboratories, innovation centres or hubs, technology demonstrator, R&D centres, etc. appear as a recurring solution to support organizations in the implementation of emerging digital solutions and innovation activities (Capgemini, 2017; Osorio et al., 2018; Memon et al., 2018).

These forms of support have not always produced the expected results (Capgemini, 2017). Sometimes organizations benefit from these labs only to put on "tech company clothes and trying to look more like a startup" (Tucker, 2017) resulting in mere technology demonstrator isolated from the rest of the organization. However, the progress, the technology evolution, and the competitive landscapes ask for resilient companies that surf on innovation trends and can manage technology to stay competitive. Thus organizations needs, seem to be more related to gaining support from labs in developing attitudes in managing digital solutions, rather than forming a team and organizational units for developing or acquiring even new technology. Employees need to understand the reasons for implementing new technology and changing their everyday routines and processes. Therefore, a holistic engagement and a sharing of vision, strategy, and a plan to implement digital innovation are required. Companies need, thus, support in developing a digital innovation capacity that helps them in maturing an innovative behaviour during its three main phases, namely knowledge generation, internal acceptance, and diffusion (Scott and Bruce, 1994; Klerkx et al., 2009; Neely, 2012).
In this regard, a new generation of Innovation Labs is arising among innovative organizations looking to stay relevant and in line with new market and innovation dynamics (Ahuja, 2019).

This research, thus, aims to focus intensely on the topic of Innovation Labs. From the next chapter, through a systematic literature review, the phenomenon is analyzed in detail to understand key features, services provided, goals and reasons to recur to these labs, strengths and weaknesses, as well as to define the concept better and to identify the potential and address future research streams. In this regard, from a preliminary perspective, these labs seem to be conceived as organizational units (internal or external to the organization) implemented mostly in well-structured organizations. Therefore, the research aims furthermore to understand the phenomenon better, also through practical investigations aimed at assessing the productivity of these labs for SMEs, and the tourism sector, that is composed mostly by SMEs.
Considering the needs for a democratization of the innovation (Holly, 2012) that is particularly felt by tourism organizations, as well as the development of new innovative trends like co-creation and human-centred innovation that in the tourism sector, where differentiation is one of the most essential factors, innovate successfully and significantly develop innovative capacity is fundamental for the gaining of competitive advantage.

3. Understanding the phenomenon of Innovation Labs: a Systematic Literature Review

3.1 Theoretical perspectives of Innovation Labs

The notion of Innovation Lab has been introduced in the management literature to distinguish the creation of organisations' spaces dedicated to supporting, in different ways, the enhancement of innovation capabilities, and for developing and testing innovative ideas and solutions. Lewis and Moultrie (2005) define an Innovation Lab as a dedicated facility that encourages creative behaviours and promoting innovative projects by providing appropriate resources. Similarly, Magadley and Birdy (2009) point out the role of creative spaces to enhance innovation and describe an Innovation Lab as a physical environment in which employees can engage with each other to explore and extend their creative thinking beyond and above usual boundaries. So the identification of the physical space dedicated to the development of creative and innovative skills is generally defined as the main feature of Innovations Labs (Bloom and Faulkner, 2016; D'Auria et al., 2017; Schmidt and Brinks, 2017). Magadley and Birdi (2009) state that there is a direct relationship between creative spaces, innovation and performance. Accordingly, an Innovation Lab is considered as a collaborative ideation space that helps organisations to break down the walls of the traditional laboratories and enable different people to get involved in creative and innovative activities. Not only employees but also the users and other potential stakeholders get involved in the activities of an Innovation Lab. A first fundamental distinguishing feature of Innovation Labs is that they are innovative spaces enabling organisations to embrace the paradigm of open innovation, user-driven innovation, and collaborative innovation by overcoming hierarchy and by promoting stakeholders participation into the co-creation of potentially successful innovations (Lewis and Moultrie, 2005, Memon et al., 2018; Osorio et al., 2019; Schmidt et al., 2015).

However, as pointed out by some authors, when just focusing on the creation of innovative spaces, Innovation Labs may become a kind of "*innovation theatre"* rather than an "*engine*" to successfully spur and support the development of the organisation's innovative behaviour. The idea of innovation theatre denotes that a significant pitfall of Innovation Labs is that they can be implemented mainly as promotional actions to demonstrate innovation. Instead, to be designed and implemented as management initiatives focusing on developing the capacity for innovation of an organisation (Blank, 2013). An Innovation Labs should foremost a management initiative to affect organisational behaviour in terms of propensity to innovation (Lewis and Moultrie, 2005; Magadley and Birdi 2009; Memon et

al., 2018; Zurbriggen and Lago, 2019). For this reason, Innovation Labs' activities must be aligned with the organisation' vision and strategic goals (Fecher et al., 2018; Osorio et al., 2019). The alignment between an organisation's strategy and the goals of an innovative space is one of the critical features of successful Innovation Labs. A further crucial aspect is the assessment of the stakeholders' engagement and satisfaction (Bogers, 2018; De Silva et al., 2019; Whicher and Crick, 2019).

To fully understand how innovation labs can foster organisations innovation capacity development, it is essential to adopt a holistic approach which combines and integrates different perspectives of analysis (Memon et al., 2018). For this reason, it is proposed a critical analysis of the management literature adopting a systematic literature review to identify the critical interpretative dimensions and characteristics of Innovation Labs.

3.2 Systematic Literature Review

The choice of conducting a literature review to understand a phenomenon or a key topic better and provide insights to inform scholars, policy and practice, is a crucial process both for scholars and practitioners. The methodology was conceived for medical studies, but it was then extended also to management research and other fields.

There are three typologies of literature review: traditional, narrative or systematic. The most relevant difference among them is that in the systematic review, the research is more comprehensive and rigorous (Tranfield et al. 2003). Moreover, systematic reviews are characterized by the adoption of scientific processes to reduce bias. Literature searches followed by detailed analysis, insights and conclusions are adopted to increase the validity (Cook et al., 1997).

Management reviews are often narrative. This element has been, over the time, a source of criticism due to the lack of critical evaluation and to the selection of inclusion criteria only based on the researchers' biases (Fink, 1998).

"Systematic reviews have traditionally been applied in fields and disciplines privileging a positivist and quantitative tradition", but Tranfield et al. (2003) in their study highlighted the key aspects to consider to translate the model to the management field.

In this research, considering the rigour of the systematic literature review methods and the recommendations provided by Tranfield et al. (2003), a systematic literature review of Innovation Labs has been conducted to provide a clear comprehension of the topic debating the State of the Art, and the best evidence for informing practice and research, with the broader aim to propose a working definition of Innovation Labs and a description of existing typologies and related key features.

In the following, the key stages distinguishing the methodology are described in details. In the next

session, the conducted review process is illustrated, and the results are discussed.

3.2.1 The three stages of a Systematic Literature Review

According to Tranfield et al. (2003) a typical systematic literature review process is constituted by three main stages and 9 sub-phases.

Figure 6 . The three stages of a Systematic Literature Review (Adapted from Tranfield et al., 2003)

Stage I: planning the review

The first step preparatory for the revision is the establishment of a panel of experts. Experts should be selected on the basis of their experience and background related to the field to investigate as well as to the research methodology. An element that may increase the quality of the panel might be the engagement of practitioners operating in the field of analysis.

The aim of the panel is that of contributing to fuel debates during the research and solve doubts regarding inclusion or exclusion of studies.

Then, the review process begins with an iterative cycle of definition, identification, discussion, and alignment (Clarke and Oxman, 2001). Scoping studies need to be therefore conducted to examine and

evaluate the literature, considering perspectives adopted by previous studies, and for the detailed definition of the subject of the research. At this point, the review question should be definitely determined, and the review protocol should be formalized. The production of the protocol is relevant to guarantee objectivity through detailed descriptions of the stages and processes to do. Therefore, the protocol may include the RQs, the inclusion and exclusion criteria, the reasons for selecting from a database instead of another, etc.

What is important is to include in the protocol a "conceptual discussion of the research problem and a statement of the problem's significance rather than a defined RQ" (Tranfield et al., 2003, p. 215).

Reviews are considered a gradual process of exploration, discovery and development. In this regard, they require a flexible approach that allows to modify and explain, on progress and based on the gathered data, the direction of the study. Therefore, a more rigid approach that predefines all the activities is not recommended. In definitive, the protocol should be determined, allowing the researchers to question and upset the study ongoing, avoiding biases.

Stage II: conducting the review

The conduction of a systematic literature review requires the definition of keywords and search terms. These come out from the previous scoping study. Then, the search strings should be decided as well as the search strategy described in detail to allow future replications. This phase output is the production of a list of papers that will constitute the basis for the review. The articles are selected after comparison with inclusion and exclusion criteria. These criteria allow to increase the quality of the review and to guarantee that the choice is not based on the researcher's biases; more than one reviewer should carry out this phase.

Each reviewer, at this point, is demanded to review the citations founded during the search. Most relevant sources will be selected to further analysis carried out through the reading of the full text. After this step, sources should be chosen for the review, and reasons justifying the exclusion of others should be explained. At this point, the quality of studies should be assessed. In management research, compared to medical studies, is more difficult the evaluation through a rigorous method. Generally, management researchers consider the quality and rating of a journal to determine the relevance of a study.

The next step of this phase provides for data extraction and monitoring process to limit human errors. A good practice is that of employ double extraction processes, with at least two evaluators who analyze and debate on the results.

Lastly, research synthesis relates to the activities of resuming and integrating findings on different studies or RQs (Cooper et al., 2019). Various methods of research synthesis exist. The most known is the narrative review. It consists of identifying and resuming what has been written in a given field.

Alternatively, there is the meta-analysis who integrates different data to increase the statistical dimension of an effect.

In management research, generally, the researchers are more interested in understanding concepts, phenomenon, attitudes and processes. Different interpretative lenses are given, and the way of measure are rarely the same from research to another. Therefore, a narrative review is a more recurred methodology in management studies.

Some additional methods have been introduced as a middle ground between narrative reviews and meta-analysis. According to Pawson (2001), realist synthesis contributes to an understanding of phenomenon and circumstances on what is working and for whom. The other method is the meta-synthesis that according to Sandelowski et al. (1997), should be generally employed to interpret, generalize and develop theories after the comparison between studies. That is to transfer to practitioners and policymakers results that should have an impact.

Stage III: reporting and dissemination

The final output of a systematic literature review is the synthesis of a set of research papers selected and analyzed during the previously described phases. In management research, two reports are generally produced. The first provides an extended descriptive analysis of the field of study that is conducted through extraction forms, such as 'who are the authors', 'where the contributions come from', 'it is possible to divide the field into categories?', etc.

Then, researchers are required to report the results of thematic analysis. This action should be performed identifying key emerging themes, RQs, or outlining what is known and what comes out from the extraction forms. Regardless of categories identified for the tabulation, this phase requires a debate across the various analyzed contributions to justify and base conclusions and insights.

In definitive, systematic literature review is revealed as a powerful method to employ evidence resulting from research to inform decision-makers and to favour a clear understanding of a given topic. Therefore, it should be considered a tool to promote and encourage a dialogue among science, practice and policy (Nutley et al., 2002; Tranfield et al., 2003).

3.3 Innovation Labs: A Systematic Literature Review

The analysis of vast amounts of data and articles offered by the management literature presents some difficulties, mainly when the attempt is to systematise and summarise such contributions (Crossan and Apraydin, 2010). One of the answers to this challenge is to adopt an analytical review approach and to carry out a systematic analysis of the literature's contributions (Ginsberg and Venkatraman, 1985). In particular, for the task of analysing the characteristics of Innovation Labs, we adopt the approach proposed by Tranfield et al. (2003) suggesting the systematic literature review as an effective method to perform an analytical examination of the most significant contributions defining and characterising a contingent understanding of a conceptual theme. The systematic literature review is acknowledged as an analytical approach to contribute to theory building. Adopting an explicit algorithm, it provides clear, transparent and reproducible processes that allow to find, synthesise and evaluate insights and evidence from the literature (Cillo et al., 2019). Three main steps are adopted as follows: data collection, data analysis and data synthesis.

The data collection can be performed by adopting different methods. Traditionally, scholars search for data use strings and keywords through an appropriate algorithm within a single database (Cillo et al., 2019) or multiple databases (Hossain, 2019). Alternatively, it is possible to focus on the existing literature of the article selection and engage experts that suggest significant works to be referred (Crossan and Apraydin, 2010). Intending to build a comprehensive understanding of the characteristics of Innovation Labs, the approach proposed by Hossain et al. (2019) has been adopted. This approach considers a searching method by consulting relevant works in multiple databases and specifically: Web of Science (WoS) and Scopus. They are acknowledged as complete databases for academic papers (Falagas, 2008). The final set of works to be considered has been defined, identifying all relevant articles and removing duplicate papers.

Following the data selection, the next steps are data analysis and synthesis applied to the collected data. Different ways to proceed can be identified based on the review process' objectives. For this reason, two perspectives of analysis have been adopted as the main interpretative dimensions of an Innovation Lab. Then, the consolidation of the analysed data allows examining the review results through descriptive methods.

3.3.1 Methodology Description

The difference between a systematic review and a traditional narrative review is the comprehensive research which is carried out (Tranfield et al., 2003). Given the plurality of terms used interchangeably to refer to Innovation Labs, it has been adopted a broader selection requirement to include all the significant studies. The key selected research strings are as follows: "innovation lab*", "innovation space*". The use of the asterisk is aimed at accessing and selecting relevant works.
First, a search on the Web of Science database was run, looking for articles published from 1990 to 2019. The focus was limited to the search articles indexed in the Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), and Emerging Sources Citation Index (ESCI). They represent the primary databases of the scientific field, including management-related areas, enabling to retrieve high-quality publications. Conference papers and articles not written in English, book chapters and special issue editorials were excluded.
Other criteria used to include/exclude papers are listed below:

- Different perspectives on innovation management and entrepreneurship were included, such as creative behaviour, working climate, architectural perspectives, and performance measurement.
- Papers disclosing empirical research using case studies, surveys, and so on, were included.
- Works based on the impact of Innovation Labs in other fields (such as public sector, and school) were included only if focusing on the role and functioning mechanisms such as space, structure, infrastructure, methods, innovation process, and outcomes evaluation.
- All duplicate papers from different sources were identified and removed.

As a result, initially, through the research strings, 158 papers were selected. After applying the selection criteria, 127 papers were identified. Then, we exported this information as a CSV file, saved in a temporary folder and opened into a spreadsheet to remove irrelevant information (such as DOI number). Then, reading the title, keywords, and abstracts of identified papers, and full text, we selected the essential documents for the research's purpose. The notion of Innovation Labs has been approached from several views and under diverse dimensions. Therefore, to best investigate the topic, we included studies that consider different perspectives and excluded those not aligned with defined selections criteria. Thus, we refined our cohort to 60 critical articles on the subject.
Then research in the Scopus database was run, using the same research as mentioned above strings. Four hundred seventy-one papers resulted from this research. Then, applying keywords and selection criteria, we exported as a CSV file 233 articles. Opening them into a spreadsheet, we first removed the

papers that duplicated those already filtered from the Web of Science database and by reading the remaining articles, we selected 44 papers. So, in total, 104 articles (60+44) were identified for the in-depth critical analysis of the extant literature. The selected 104 papers were critically scrutinised in parallel by the responsible of this research.

Figure 7 depicts the steps of the search process and the number of selected studies on each level. To synthesise the extracted data, following our interpretative lenses (see Section 3.3.2), the insights extracted by the articles were organised according to two main perspectives, namely, space and infrastructure, and strategy and management.

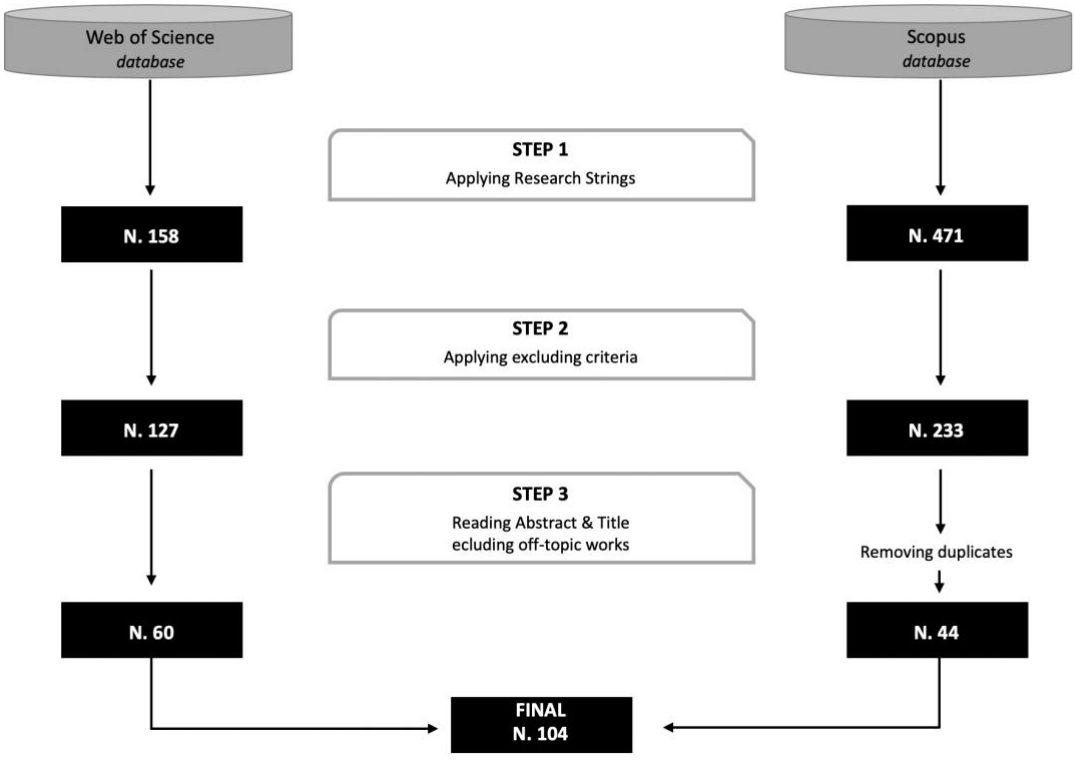

Figure 7 . Steps of the research process and number of selected papers

3.3.2 Descriptive statistics

The descriptive statistics suggest that the Innovation Lab is a recent topic. Figure 8 illustrates the number of selected papers published per years. Although the review period considered is from 1990 to 2019, it is clear how relevant articles have been issued starting from 2005. Moreover, 64 papers (61,5%) were published in the last four years. This shows the growing interest in the topic.

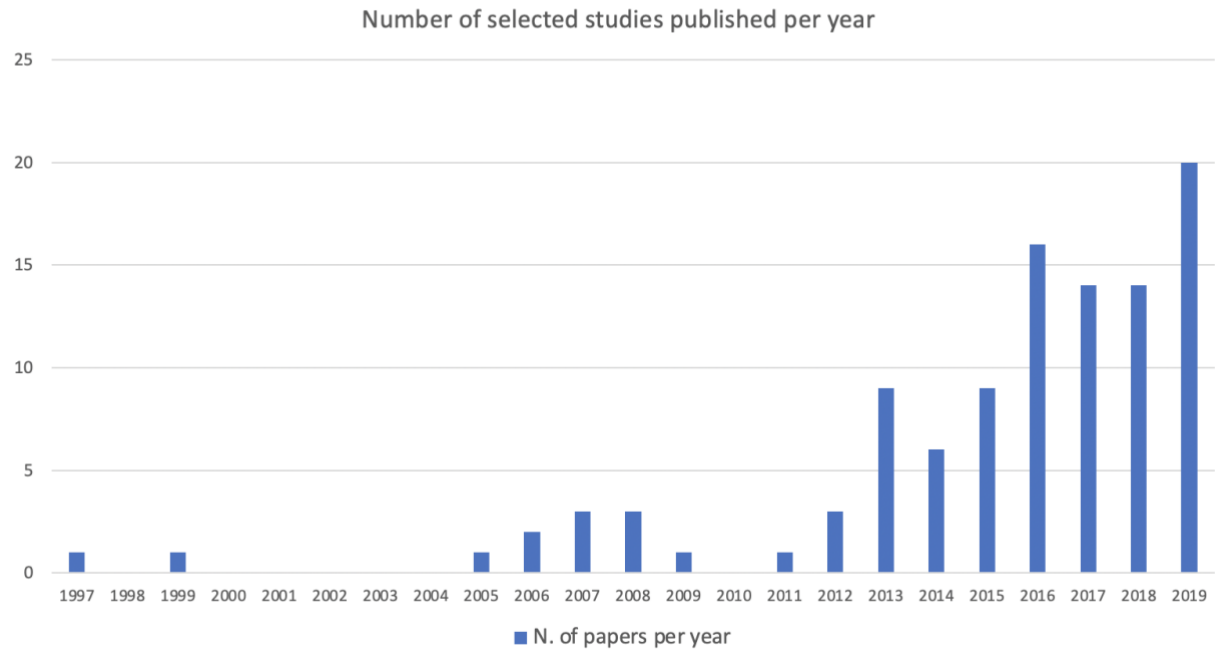

Figure 8 . Number of selected studies published per year

The results of the analysis, looking at the geographical distribution of the articles (Figure 9), reveal that countries with the highest number of articles on the topic have authors from USA (24 articles) and UK (15 articles). Moreover, a significant interest in the topic can be observed in the European Area. Scholars from European countries like Germany, Spain, Italy, Sweden, Denmark, France shape the bar chart with a considerable number of published articles. At the same time, and although the number of published papers is not equally high for all the countries listed, the bar chart reveals that the phenomenon of Innovation Labs is an emerging topic at global level. Selected papers come from 27 different countries (Figure 3 shows countries with at least two published articles).

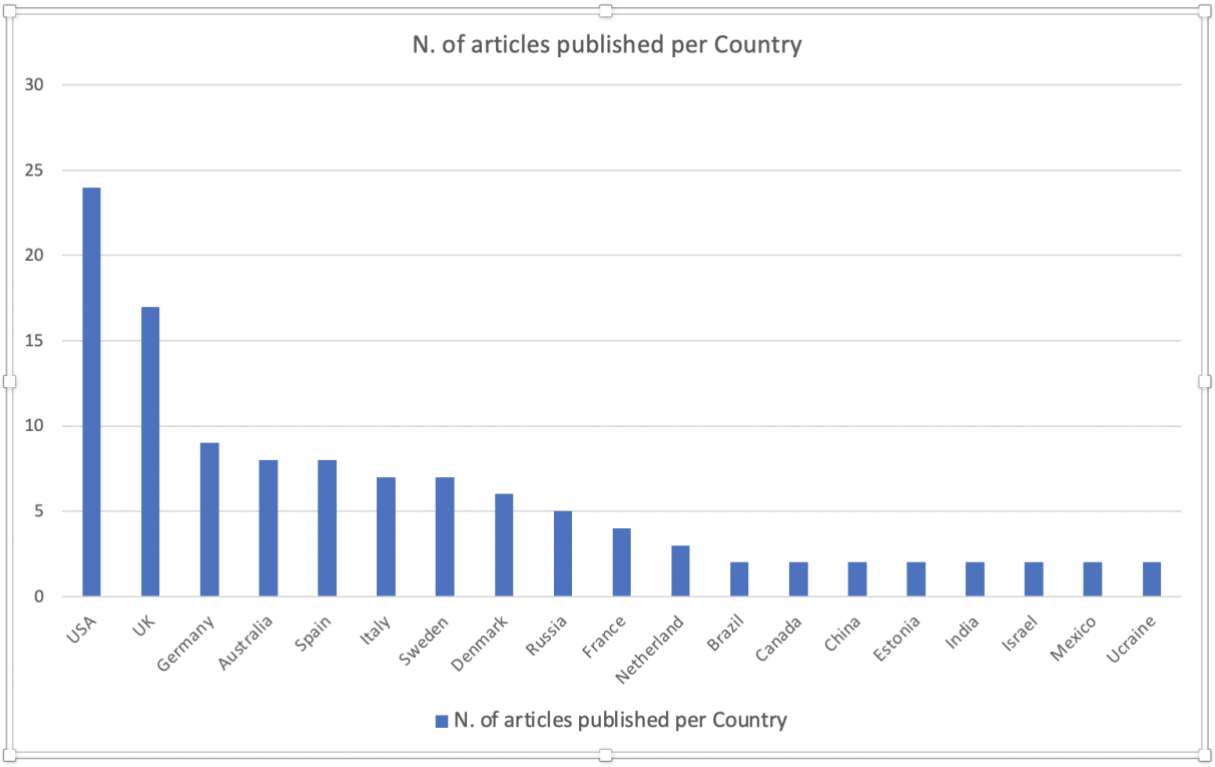

Figure 9 . Number of articles published per country

The Innovation Lab concept, considering research areas (Figure 10), appears to be covered in different fields. The most common research area is the *"Business and Management"* with 34% of selected articles. This shows the growing interest of scholars and organisations in developing Innovation Labs and understanding related management issues. *"Engineering"* and *"Urban studies"* fields (26% of selected articles) find great interest, primarily if aimed at examining structural and infrastructural Innovation Labs' dimensions. Therefore, related studies are aimed at investigating relations among technologies, tools, spaces and innovation. The rest of the research areas like *"Healthcare"*, *"Public Administration"*, and *"Arts & Humanities"*, show the plurality of fields of application of these managerial and organizational initiatives. The Innovation Labs emerged as management initiatives for the innovation capacity development of organizations of various sizes, both public and private, and operating in multiple areas.

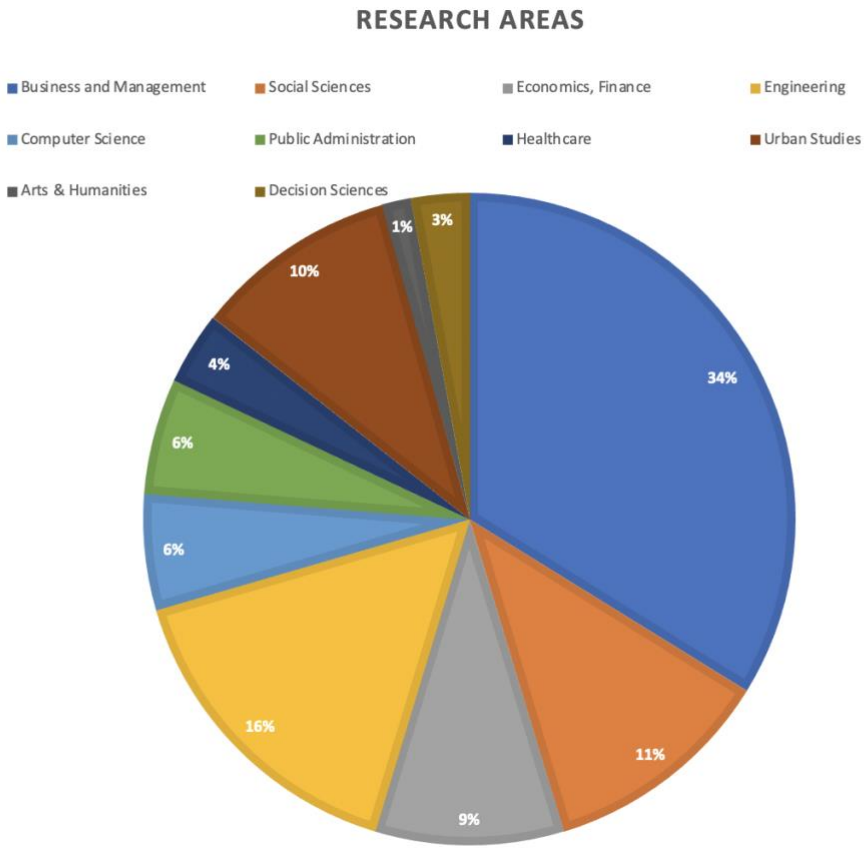

Figure 10 . Published Articles per Research Area

3.3.3 Literature insights to characterize Innovation Labs

The critical review of the selected papers suggests that the Innovation Labs' characteristics can be analysed, adopting two main perspectives of assessment. An Innovation Lab is distinguished by the nature of its innovation space and by the specific adopted governance approach. The innovative space includes the infrastructures and the features of the atmosphere characterising the Innovation Lab. Different authors have stressed the importance of the infrastructural dimensions, spatial configuration, and especially of the physical spaces as critical dimensions of an innovation lab as an innovative space fostering innovation dynamic (Lewis and Moultrie, 2005; Moultrie et al., 2007; Magadley and Birdi, 2009). At the same time, governance comprises the strategy and management approaches adopted to drive the Innovation Labs activities. Indeed, the strategic and management operation's logic of Innovation Labs is acknowledged as essential factors of success (Caccamo, 2020; Fecher et al., 2018; McGann et al., 2018; Memon et al., 2018; Osorio et al., 2019; Whicher and Crick, 2019).

In the following sections, distinguishing, on the one hand, *Space & Infrastructure*, and on the other hand, *Strategy & Management*, as key interpretative lenses the essential characteristics of Innovations Labs are outlined.

3.3.3.1 Space & Infrastructure

The Innovation Labs seem to emerge as the organisations' answer to the need of creating dedicated, innovative space shaping a creative atmosphere and providing equipment and technologies for experimentation. The importance of creating specialised physical, virtual, hybrid and relational innovation spaces has been already acknowledged in the management literature (Lewis and Moultrie, 2005; Magadley and Birdi, 2009; Memon, 2018). Scholars have discussed the positive relationship between space, creativity, innovative behaviour, and creative capacity (Bloom and Faulkner, 2016; D'Auria et al., 2017; Timeus and Gascò, 2018). Care and attention to detail about the layout, furniture, decorations, tangible and intangible infrastructures positively impact on user's innovative behaviour, working climate, and contribute to the activation and implementation of creative processes (Dearlove, 2006; Schmidt et al., 2014; Schmidt and Brinks, 2017). From the literature review emerges that three main sub-categories are characterising the space of an Innovation Lab: space design, the tangible infrastructure and the intangible infrastructure.

Space Design

John Kao (2002), comparing an Innovation Lab with an artist's atelier, state that innovation to be developed, requires a home, a place where to practice the discipline, interact with people, ideas and technologies, and where the creative process is the main focus. In this regard, the physical environment of Innovation Labs conceived as a dedicated, distinct workspace, is designed to create a collaborative ambience that stimulates creativity and provides opportunities to promote the out-of-the-box thinking, participatory culture, skills development, and community building (Magadley and Birdi, 2009; Schmidt and Brinks, 2017; Osorio et al., 2019).

According to Lewis and Moultrie (2005), to stimulate an innovative behaviour and an excellent working climate, the Innovation Lab needs to be designed in a such a way that reduces hierarchy and promotes participation, as well as enables and accepts failure acknowledging it as an opportunity of learning and growth.

Focusing on the design dimension, several case examples of Innovation Labs can be identified. For example, the *Royal Mail Innovation Laboratory* has been created paying particular attention to layout, décor, lighting, colours, and preferring single or multiple open space rooms with curved walls, round tables, exhibition stages, cooking and refreshing areas (Lewis and Moultrie, 2005; Moultrie et al., 2007). The scope is the creation of a dislocation effect that leads users to break away from the ordinary working environment, enabling playfulness, debate and idea generation (Osorio et al., 2019). The creation of innovative space allows the democratisation of innovation in which users are involved in the space according to their needs and desires (Bogers, 2018; Tonurist et al., 2017). Accordingly, the

central tacit assumption is that Innovation Labs should be conceived around people rather than just focusing on the space for the sake of space (Fecher et al., 2018). Then the Innovation Lab becomes a workspace promoting boundaryless and flexibility. In this regard, a specific configuration is the mobile Innovation Labs, where facilities are available temporarily, and the layout comes after tangible and intangible infrastructures (Saegebrecht et al., 2019).

Tangible Infrastructure

Another essential structural component of Innovation Labs is the availability of specific tangible infrastructure in terms of equipment, digital technologies, and technical resources. The use of innovative technologies is seen as a means to activate collaboration and to support facilitation mechanisms, procure materials, gain external know-how, also remotely, and outsource processes quickly (Fecher et al., 2018; Morel et al., 2016; Ponce et al., 2019). The tangible infrastructures include a wide range of equipment such as whiteboards, writing spaces comprehensive of cards, post-it, markers, moveable barriers, canvas, cubicles, 3D walls, furnish open and co-working spaces, creativity and prototyping rooms, testing rooms, and immersive rooms, just to name the most common technologies (Lewis and Moultrie, 2005; Osorio et al., 2019; Rohrbeck et al., 2015).

Innovation Labs increasingly are characterised by being the home of digital technologies. They support organisations in the understanding of the DT processes by making available advanced digital technologies as a prototype or test. The digital technologies include software, digital platforms and high-tech tools. The technologies that are considered particularly relevant are those that promote collaboration and creativity among users and support brainstorming, visualisation and participant observation (Lewis and Moultrie, 2005). They enable corporate foresight (Rohrbeck et al., 2015); drive idea generation, collection and evaluation (Carstensen and Bason, 2012); support modelling, simulation, testing and prototyping (Memon et al., 2018); and contribute to the exploitation of the whole innovation process.

Intangible Infrastructure

An essential dimension of Innovation Labs' success is the atmosphere, which is created within the Lab. It can be defined as the energy distinguishing the space. It is essential to engage people because of conducive of motivation for action. For the creation of the atmosphere, it is crucial the role played by facilitators of the creative and innovative processes taking place in the space (Fecher et al., 2018). Magadley and Birdy (2009) point out that the success of an Innovation Lab depends upon the users, the way they are engaged within the facility, and how they interact with management and other stakeholders. Indeed, the facilitator is responsible for managing relational dynamics, that are conducive of collaboration, co-creation, creative and innovative thinking. Facilitators act as mediators in the

creative and innovation processes (Lewis and Moultrie, 2005; Memon et al., 2018). They bring methodologies, support teambuilding, and train users through brainstorming activities, problem-solving, idea generation, prototyping, feedback collection, and so on. So, although the role and level of responsibility of facilitators are Innovation Lab-specific, their skills work as catalysers to involve and empower participants and stakeholders, tailoring sessions based on their needs and expectations and leading them towards the production of valuable results (Carstensen and Bason, 2012).

Other key actors contributing to the creation of an Innovation Lab's atmosphere and activities are designers, operators and users (Gey et al., 2013). Designers are generally responsible for the definition of the layout and the definition of the resources, tools and equipment needed to develop the creative activities. They define the aesthetic features of the space that it is how people will be stimulated to use their senses to learn and work in the space. Some designers also act as facilitators by adopting problem-solving methodologies such as design thinking. Operators work in the Innovation Lab, and they are responsible for managing ordinary activities, such as functional or administrative tasks. They play an essential role as a catalyser of energy. Finally, the users that are engaged as the actors and the customers of the innovation processes. They are those who need to be supported by facilitators to stimulate creativity and innovative thinking and to be engaged in the development and exploitation of innovative outputs.

3.3.3.2 Strategy & Management

Although an Innovation Lab is usually identified with an innovative space (Moultrie et al., 2007; Peschl and Fundneider, 2014) its success is not merely related to the quality and innovative solutions chosen to set up the space, but mainly to the strategic and management approaches governing the creative and innovative processes taking place in the space. There are indicative case examples of Innovation Labs that have been closed because just focusing on the creation of a cool, creative and innovative space, rather than paying attention to the creation of an environment where creativity, imagination, and innovation processes could flourish. Different case studies of failures in managing the activities of the Innovation Lab can be recalled. For example, the Microsoft's Silicon Valley Research Lab was closed down on 2014, the Disney's Research Lab was stopped on 2016, the Coca Cola's Founder Initiative terminated on 2016, and the Adecco's Ignite Lab was shut down on 2016 (Fecher et al., 2018). These case examples denote how an Innovation Lab could be just conceived as a kind of *'theatre of innovation'* where eventually cutting-edge technologies are showcased with pride but lacking a strategic vision of their role as catalysers of organisational innovation development capacity (Blank, 2013).

Carstensen and Bason (2012) state that Innovation Labs should be designed and planned not merely as a showcase, but rather than as a management initiative to respond to users' needs and to meet

stakeholders' aspirations about developing innovative solutions to current problems and future challenges. Therefore, the creation of an innovation space must respond to organisations' strategic vision of growing innovation capacity. So, the scope of an Innovation Lab covers the creation of an environment which stimulates creative and critical thinking, imagination and intuition, and supports the development of innovation processes (Berger and Brem, 2016; Peschl and Fundneider, 2014; Thorpe and Rhodes, 2018). So, it is essential to outline the purposes, objectives and working mechanisms of Innovation Labs.

Purposes and Objectives

Innovation Labs have to be designed and planned with a specific strategic purpose, responding to the organisation's strategic vision (Osorio et al., 2019). The purpose of an Innovation Lab defines its essence (Memon et al., 2018). It refers to the kind of innovation output and innovation processes that an organisation aims to achieve by implementing or participating in an Innovation Lab.

The nature of the innovation stimulated by an Innovation Lab can be incremental, radical or discontinuous. It can focus on different organisational innovation dimensions such as the employee's entrepreneurial skills and attitudes; the corporate culture and organisational behaviour; the idea generation for problem-solving; the product and service development; the improvement of business processes; the BMI; and the DT (Aloini and Martini, 2013; Boyles, 2016; Moller, 2007; Schmidt et al., 2014; Williamson, 2015).

An Innovation Lab is a management initiative that helps organisations to dedicate time and promote a working climate and atmosphere for innovation (Gey et al., 2013). It creates an environment in which different organisations' stakeholders can be engaged to exercise creative and entrepreneurial skills to generate new ideas and explore new solutions and opportunities (McGann et al., 2018; Morel et al., 2016; Whicher and Crick, 2019). To achieve its objectives an Innovation Lab uses creative facilitation activities. They cover areas such as assessment and creative thinking for problem-solving, challenges identification to be transformed into opportunities, generation of new ideas to be tested, reviewed, developed, exploited and delivered to produce new products, services, solutions driving organisations' value creation (Fecher et al., 2018; Osorio et al., 2019). For this reason, they apply appropriate methods, such as lean, agile, and service design methodologies (McGann et al., 2018).

Innovation Labs also play an essential role to support organisations and communities in assuming critical and proactive behaviour to understand and anticipate environmental trends, to deal with significant challenges and problems, and to understand and handle DT (Rohrbeck et al., 2015; Schmidt et al., 2014). It can house knowledge management activities aimed to codify and to capitalise knowledge starting from experiences, empirical researches and real best practices (Carstensen and Bason, 2012; Lee and Ma, 2019). The overall scope of an Innovation Lab is to support the development

of innovation capacity at different levels of an organisation such as individuals, teams, communities, networks, and local ecosystems (Timeus and Gascò, 2018).

The focus can be on a specific business sector or can be multidisciplinary (Memon et al., 2018). So, example of Innovation Labs can be found in different industries such as business, research, university and school, healthcare, politics, tourism, arts and humanities (Carstensen and Bason, 2012; Meyer et al., 2014; Rohrbeck et al., 2015; Saegebrecht et al., 2019; Whicher and Crick, 2019). Potentially, their application can be extended to any sector in need of facing challenges requiring the development of creative and innovative culture, behaviour and competences.

The nature of people or users involved in Innovation Labs is vast. It can include employees and managers from private and public organisations, large and SMEs firms, NGOs and public administrations, entrepreneurs and start-uppers, researchers, students, citizens and policymakers.

The environment created by Innovation Labs tends to be heterogeneous and interdisciplinary (Magadley and Birdi, 2009; Memon et al., 2018). People with different background and expertise can be involved with the scope of activating cross-fertilisation dynamics stimulating creative and innovative thinking (Bogers, 2018; Morel et al., 2016; Pitt-Catsouphes et al., 2013). So, an Innovation Lab adopts the principles of the user-centred and open innovation paradigms and aim to engage users in co-creation, participation and feedback exchanges (De Silva et al., 2019; Fecher et al., 2018; Whicher and Crick, 2019). The creation of an environment based on cross-fertilisation and diversity improves the efficiency and efficacy of the innovation process, optimising time and resource allocation, and enhancing the likelihood of generating innovative solutions.

Management Dynamics

The analysis of academic literature reveals various attempts to describe the stages characterising the setting, implementation and exploitation of Innovation Lab's activities (Magadley and Birdy, 2009; Lewis and Moultrie, 2015; Carstensen and Bason, 2012; Gey et al., 2013; Morel et al., 2016; Fecher et al., 2018; Osorio et al., 2018; Turrin, 2019).

Some studies are built considering the innovation lab a physical space. They are aimed at understanding how strategic intentions at the early stages of design and functioning affect capabilities and performance of these environments. These studies are moreover aimed at highlighting the influence of the physical space in the performance of Innovation Labs. In the specific, Osorio et al. (2018) propose a framework based on five dimensions (i.e. strategic intention; the process of creation; physical space; the process of use; innovation outcomes) updating the previous developed by Moultrie et al. (2007), to understand and assess the role of the physical environment in innovation.

Another study framing Innovation Labs, from the same perspective, has been conducted by Gey et al. (2013). They identify, through structuration theory and a meta-structuring approach, four main stages

distinguishing an Innovation Lab. The first stage is called strategic intention, and it aims to identify needs and innovation potential of an organisation. The second stage is that of analysis and specification. It concerns with all activities focusing on the specification of the possible topics of research activities, including the goals and form of collaboration as well as the assessment of technical feasibility and resources needed. Moreover, at this step, it is suggested to identify companies with related needs, problems or interests to create a potential consortium for running the innovation lab to share costs and experience. It is also essential to identify the needed skills and to find ways of accessing those competencies and experiences. The output of the second stage is the production of a full project plan to be used for the next step. The third stage, then, is the realisation. Here, users operate by getting firsthand involved in the project's implementation following appropriate methodologies. The Innovation Lab's activities conclude with the sustainability stage, providing results' evaluation under defined criteria and metrics according to the initial objectives.

Other studies, on the other hand, focus on the management of the projects planned during Innovation Labs activities. In this regard, Carstensen and Bason (2012), through the case study of MindLab, i.e. an Innovation Lab focused on service and policy innovation, identify seven key phases, namely: project focus; learning about the users; analysis; idea and concept development; concept testing; the communication of results; and impact measurement. Similar to this perspective, Morel et al. (2016) propose a further valuable case study. They analyse the Innovation Lab set by Renault and pointed out that it is managed following the Collaborative Lifecycle Activities scheme (Co-LCA), a five steps process aimed to guide the implementation of collaborative innovation processes. The activities start with the exploration phase, during which the innovation peculiarity and issues are investigated. Then, engaging stakeholders, users are engaged in trying to elucidate the issues with specific tools and during specific events (e.g. workshop). The process continues with the evaluation phase, during which benefits and outcomes are measured. Finally, it concludes with the extended phase, aimed at codifying knowledge and new processes to improve routines and enrich partnerships.

The weakness of these models is the lack of an implementation phase, namely a phase during which the innovative solutions generated during the activities are implemented in the organisation (Carstensen and Bason, 2012). In this regard, the described model disclaims responsibility for this phase to the participant organisation. In this way, the Innovation Lab result in a project or creative exercise instead of a management initiative planned according to the organisation and aimed to develop an innovation capacity. Therefore, Innovation Labs not managing the implementation phase appears as unproductive and often may result in mere technology demonstrator or closed-door R&D labs that are conceived as separate entities in respect to the rest of the organisation (Turrin, 2019).

To fill this gap, and to observe the Innovation Lab from a participant perspective, Fecher et al. (2018) identify three primary stages distinguishing Innovation Labs' activities, namely pre-lab, lab, and post-

lab. In this regard, they state that the setup of any activity should contemplate desk analysis before and after the implementation so that it is possible to assess the real effectiveness of the targeted initiative. The first phase, the prelab, focuses on the definition of the strategic purpose of the Innovation Lab's activity by outlining the specific intents to be achieved together with the identification of the main activities to implement. Moreover, in the first phase, a reflection on the characteristics of the users to get involved, to what extent to perform stakeholder management and what kind of community to create, should be made. The understanding of the dynamics among users and their linkage with the environment are crucial (Magadley and Birdy, 2009). So, in this phase top management, facilitators and designers are responsible for shaping a working climate aimed at favouring a community-based openness, flexibility and collaboration (Schmidt and Brinks, 2017). The scope is the creation of an atmosphere which enables cross-functional, highly-skilled and motivated users to be engaged to work towards shared goals (Lewis and Moultrie, 2005; Osorio, 2019).

The second phase, the lab, denotes the set of activities affecting the innovation processes. This stage can be a further breakdown in three sub-phases: research, ideation, and prototyping (Fecher et al., 2018). The idea is that users should be engaged in the innovation processes at three different levels of actions. First, they should get involved in the research to get an understanding of the problems, challenges, and opportunities to be addressed. Second, users should be engaged in generating new ideas and possible creative solutions. This is the ideation stage when possible solutions are selected. Finally, the third stage is about testing and prototyping the identified and selected potential solutions. Finally, in the third phase, the post-lab is aimed at the integration of the solutions within the organisation. The integration of the Innovation Lab's outcomes in the organisational life is challenging because it clashes with typical innovation barriers, such as lack of employees' awareness, and resistance to changes (Hadjimanolis, 1999; Madrid-Guijarro et al., 2009). The engagement of mentors and sponsors is a relevant activity to manage this phase well. (Fecher et al., 2018). Mentors are responsible for ensuring the conformity of projects with the organisation's interests, and sponsors represent the direct link with the organisation.

In definitive, despite the growing interest in Innovation Labs found in literature, few studies have been focused on managerial aspects. Most of them have been oriented to describe the potential of a creative space to foster creativity and innovation. In fact, the first proposed framework was aimed at understanding how to measure this impact and how to set up this kind of space. Then, especially with the emergence of innovation trends, such as co-creation, user-driven innovation, human-centred approach, lean and open innovation, the focus has been shifted to a participant's perspective. This to highlight aspects and critical factors of favouring a space and climate prone to innovation and able to allow an active engagement of actors involved. At the same time, contemplating a participant's

perspective, the interest in assessing the effectiveness of an Innovation Labs in terms of innovation capacity development and innovative solutions generation emerged. In fact, according to Fecher et al. (2018), the implementation of innovative solutions generated during Innovation Labs activities become a critical issue. Most of the traditional Innovation Labs do not manage this phase, keeping the implementation's control to participants organisations. However, in this way, Innovation Labs show weaknesses and result conceived as separate organisational units, often not able to guarantee a stakeholders' commitment and a prolific dialogue with the entire organisation and with the surrounding ecosystem, and this view led to the failure of most of them (Turrin, 2019).

In the last years, a new generation of Innovation Labs with open doors, following emerging innovation trends and based on a digital innovation strategy, rather than just separate organisational units equipped as mere creative space plenty of high-tech tools is emerging as the expression of a valuable solution for organisations interested in gaining a sustainable advantage and increase performance (Trucker, 2017). In this perspective, and considered the conducted review and the lack of studies paying attention to this growing phenomenon, the need to deeper investigate the management perspective of an Innovation Lab is current and relevant.

3.3.4 Towards a taxonomy of Innovation Labs

An Innovation Lab can take many different forms by integrating and combining alternative features of the space, infrastructure, management and strategy. Therefore, the notion of Innovation Lab can be considered as an umbrella concept, including alternative forms of innovative spaces.

The analysis of the literature reveals that different labels have been coined and used to describe Innovation Labs (Memon et al., 2018; Schmidt and Brinks, 2017). The key labels of innovation spaces introduced in the management literature to describe Innovation Labs can be listed as follows: Accelerator, Co-creation Lab, Consultancy Lab, Coworking Lab, Design Lab, Experimentation Lab, Fablab, Health Innovation Lab, Incubator, Living Lab, Maker Lab, Making mad Lab, Manufacturing Lab, Network Coordinator, Open Government Lab, Open Innovation Lab, Organizational Innovation Lab, Policy Innovation Lab, Process Innovation Lab, Product Innovation Lab, Public Collaboration Lab, Public Innovation Lab, R&D Lab, Service Innovation Lab, Social Innovation Lab, Systemic Innovation Lab. All different interpretive ideas share the perspective that the creation of a space can be configurated as a lab where experiments and participatory processes adopting critical and creative thinking takes place. Considering Innovations Labs' features and alternative forms is possible to propose a taxonomy as summarised in Table 4. The proposed taxonomy broadens previous studies provided by Memon et al. (2018) and Schmidt and Brinks (2017) by considering more references and categories of labs.

Categories	References	Domains	Purpose
Working Lab	(Aloini et al., 2013; Memon et al., 2018; Nichols et al., 2017; Schmidt et al., 2014; Schmidt and Brinks, 2017).	Individual and micro enterprises	Offering a new workstyle and collaboration opportunities engaging entrepreneurs in a shared working environment
Fabrication Lab	(Bell et al., 2014; Kim et al., 2016; Memon et al., 2018; Osorio et al., 2019; Pancholi et al., 2019; Pera and Viglia, 2015; Schmidt et al., 2014; Schmidt and Brinks, 2017).	Communities of creatives, makers designers, researchers	Democratizing accesses to the tools for innovation and digital fabrication
Firm-driven Innovation Lab	(Bloom and Faulkner, 2016; Kim et al., 2016; Møller, 2007; Morel et al., 2018; Rohrbeck et al., 2015)	Private organisations	Making available to users dedicated cross-feritilisation spaces, tools and resources to focus on the development of profitable innovative solutions
Public-driven Innovation Lab	(Carstensen and Bason, 2012; Davis and Somers, 2018; Lee and Ma, 2019; McGann et al., 2018; Tasca et al., 2019; Timeus and Gascò, 2018; Tonurist et al., 2017; Thorpe and Rhodes, 2018; Williamson, 2015; Unceta et al., 2019; Zurbiggen and Lago, 2019)	Public Institutions Social Innovation	Addressing social and public challenges engaging stakeholders and fostering collaborative approaches
Investors-driven Innovation Lab	(Ariza-Mortes and Muniz, 2013; Berger and Brem, 2016; De Silva and Wright, 2019; Schmidt and Brinks, 2017; Schmidt et al., 2014)	Private and Public Investors	Identifying potential scalable business ideas and contributing to their fast growth
Academic-driven Innovation Lab	(Morales-Avalos and Hereia-Escorza, 2019; Ponce et al., 2019; Saegebrecht et al., 2019; Thorpe and Rhodes, 2018)	Universities, schools, research centres	Increasing students' skills in entrepreneurship and innovation; building bridges between students and companies, and between academic research and business; and accelerating the time-to-market of research results
Living Lab	(Almirall et al., 2012; Gryszkiewicz et al., 2016; Jernsand, 2019; Kusiak, 2007; Schuurman and Tõnurist, 2016)	Public Institutions and private organisations	Developing and testing hypothesis and solutions in a real-life environment, by working closely with final users

Table 4 . Innovation Labs' Taxonomy

Working labs are usually designed paying attention to physical, virtual and relational spaces to shape a creative working environment outside the traditional boundaries (Aloini et al., 2013; Memon et al., 2018; Nichols et al., 2017; Schmidt et al., 2014; Schmidt and Brinks, 2017). Working labs provide to users such as practitioners, freelance, single and micro-entrepreneurs, digital and nomad workers, and startups open and flexible time and space, infrastructures and services to enable out-of-the-box thinking. Coworking labs represent the most popular form of working labs. They differ from simple coworking spaces because they don't just provide desktops for users. Coworking labs offer a new work

style that allows independent activities to work in a shared working environment. In a coworking lab, spatial and virtual platforms and collaboration formats (such as workshop, meeting events, and open day) are promoted to favour community building and the adoption and exchange of open and collaboration values. Spaces are furnished with shared equipment for ordinary activities (i.e., printers, fax, internet, kitchen, etc.), and high- or low-tech multidisciplinary tools. In addition to the infrastructure, services in terms of business consultancy and professional support are usually available. A coworking lab is generally profit-oriented. Workplaces are rented to users who tend to have high turn-over. Working labs can also take the form of network coordinators (Aloini et al., 2013; Zivkovic, 2018). A network coordinator contributes to the innovation development by building connections among organisations, stakeholders, students, talents with expertise in the same field and operating towards a shared purpose. They work like physical, virtual, and relational platforms offering services like skills and deal matching, exchange of business contacts, organising networking events, helping the discovery of partners, and facilitating collaborations and meetings.

Fabrication labs, such as fablabs, makerlabs, hackerspaces, manufacturing labs are open and shared spaces for ideas and practices that are equipped with technologies and tools for digital fabrication where users and final consumers co-design and co-create physical components of innovation (Kim et al., 2016; Memon et al., 2018; Osorio et al., 2019; Pancholi et al., 2019; Pera and Viglia, 2015; Schmidt et al., 2014; Schmidt and Brinks, 2017). Within these labs, knowledge sharing, creativity, and experimentation are promoted using high-end technologies (such as 3d printers, laser cutter, industrial robot, vinyl cutter, and vacuum press), textures, and materials.

The typical users of fabrication labs are individual, scientists, engineers, educators, students, professionals, SMEs, public institutions and communities of creatives, fabricators, makers, hobbyists, artists that share and pursue the shared mission of democratising tools for innovation (Schmidt et al., 2014; Fablab foundation, 2019).

The Manchester Digital Laboratory (MadLab), for example, is a community innovation space where digital innovations and inventions are promoted and realised by communities of creatives, makers and thinkers from Manchester and the UK's North West. Bell et al. define MadLab as *"a Technical and Scientific Service (TSS) organisation that provides innovators supporting services and infrastructure to realise their imagination"* (2014, p. 46). This Lab offers support to different activities ranging from the assistance to the use of tools for prototyping, programming, hacking, filmmaking, and so on, to learning opportunities to acquire digital skills and well as demonstrator of technologies and the organisation of workshops and events to present and show innovative creations to peers and communities (MadLAb, 2019). The MadLab acts an "*organisation as a prototype*" aiming to engage employees, stakeholders and communities in various activities organised by the Lab (Bell et al., 2014).

It promotes co-creation and open innovation approaches that allow the creation and delivery of value to communities by gaining feedback and data that are deployed to improve activities and provided services continuously.

Firm-driven Innovation Labs, can be considered as an organisational initiative aimed at exploiting innovation development processes enhancing both internal and external competences (Bloom and Faulkner, 2016; Kim et al., 2016; Møller, 2007; Morel et al., 2018; Rohrbeck et al., 2015). Multinational companies generally establish these labs, but a separate organisational and management structure characterises them. Firm-driven innovation labs have dedicated facilities, sometimes also external to the primary owners' building. The scope is to make available to users a private and boundaryless workspace where they can devote time to innovation and promote the engagement of external partners and experts. Therefore, users are selected both from employees and from external stakeholders (consultants, designers, SMEs, freelancers, researchers, startups, etc.) to create a cross-fertilisation innovation space where they can take advantage of company-related resources and infrastructures. Often, these practices result in long term partnerships, talents' recruitment, and expansion of the firm's network. In this perspective, the organisation can support knowledge exploration and creation.

Firm-driven Innovation Labs tend to be focused on innovation projects that contribute to the improvement of the effectiveness, productivity, and sustainability of the company. They facilitate the development and integration of new solutions to demand-oriented challenges and internal problem-solving. They are focused on a specific issue to be solved, and because of their focus they are very often labelled as 'Product innovation lab', 'Process innovation lab' or 'Service innovation lab'. Accordingly, within these labs, selected users work for researching market opportunities, develop, prototype, and test new concepts and ideas that can help organisations to face challenges such as DT, internationalisation, and BMI.

A case in point is the Telekom Innovation Labs (T-Labs) that have been established by Deutsche Telekom (Rohrbeck et al., 2015). T-Labs have based in Berlin, Darmstadt, Beer Sheva, Budapest, and Vienna. The company adopts a collaborative approach engaging researchers, universities, startups, investors, and corporate innovation hubs, to work together for developing resilience and adaptability to keep pace with fast-changes of communication services and cutting-edge technologies. Therefore, the T-Labs' purpose is to spur and sustain a proactive behaviour for generating new products, specifically, in the fields of Blockchain, Intelligence, and Experience, and contributing to influence the future of communication services. In the specific, T-Labs' activities concern the development of Proof of Concepts (PoCs) and Minimum Viable Products (MVPs) that aim to solve real customer problems and to support corporate foresight activities. Heterogeneous teams work together to develop and deliver

technology-based solutions to Deutsche Telekom business partners, and to act as a social enabler for sustainable social development.

Public-driven Innovation Labs, are initiatives organised by public entities (ranging from municipalities to national ministries) aimed at addressing social and civic challenges through experimental and innovative methods that engage stakeholders and promote co-creation, co-design, and collaborative approaches. The term 'Public-driven Innovation Labs' synthesise the multitude of terms, such as 'Public sector Innovation Lab', 'Government Innovation Lab', 'Policy Lab', 'Social Innovation Lab', that are cab be found in literature to refer to labs with similar purposes of impacting and operating in the public sector (Davis and Somers, 2018; Lee and Ma, 2019; McGann et al., 2018; Tasca et al., 2019; Timeus and Gascò, 2018; Tonurist et al., 2017; Thorpe and Rhodes, 2018; Williamson, 2015; Unceta et al., 2019; Zurbiggen and Lago, 2019). They may take the form of dedicated teams, structures, or entities that work towards social innovation and social transformation goals during ongoing initiatives, temporary projects, or singular events. Public-driven innovation labs address citizens' needs by developing new and improved products or services, by suggesting novel policies aimed at changing the way governments operate. These labs are conceived as proper 'island of experimentation' (Tõnurist et al., 2017, p. 8). They aim to develop and test new social innovation solutions, among other things, the attempts to promote democratisation, empower civil servants, prepare prospective and observatory studies, organise workshops to engage citizens participation and support digital government strategy.

A relevant case example is MindLab, a Public Policy Innovation Lab established by Denmark's Ministries of Business & Growth, Taxation, and Employment (Carstensen and Bason, 2012). The Lab engages citizens and businesses so they can develop a mutual understanding of their reciprocal needs and develop new solutions for society. The MindLab is advocated as *"The Danish State's Centre of Excellence for user-driven innovation"* (Carstensen and Bason, 2012; p.10). To accomplish this mission, the MindLab employs operators with skills in facilitation, team building, policy development, and innovation management. They manage a long-term project, whose main fields of intervention are services and policies for innovation, especially in the sphere of taxation, digital services, entrepreneurship, employment, and workplace safety. The Lab's activities consist of developing, analysing and testing new ideas addressing users' needs, delivering solutions to their final destination, and evaluating and measuring the impact. The projects take place in a creative white and light space designed by Danish artists and adopt mobile office furniture, new technologies, and think thank space with walls covered by whiteboards.

Investors-driven Innovation Labs, are organisational initiatives aimed at identifying potential

scalable business ideas and contributing to their fast growth, from the seed to the exit phase (Ariza-Mortes and Muniz, 2013; Berger and Brem, 2016; De Silva and Wright, 2019; Schmidt and Brinks, 2017; Schmidt et al., 2014). These labs are usually managed by investors (such as venture capitalists, private equity, and business angels) that invest, in the form of exchange for ownership equity, in promising new businesses. Alternatively, they are managed by large companies that invest in emerging startups to vertically integrate their supply chain or production processes. To facilitate the growth and the success of emerging businesses, investors provide adjunctive services as well as money. They may help through their expertise, in the form of mentoring, coaching services, or training programs.
Moreover, they may provide coworking space for a limited period, and they can organise networking opportunities in the form of meetings, workshops, or events, to build new partnerships or accelerate market entry. Examples of Investor-driven Innovation Lab are accelerators or incubators. Accelerators are more interested in selecting business ideas or early-stage startups in return for a small amount of equity. After the selection, the programs may last from weeks to months, during which young entrepreneurs work with the support of mentors, to the business model validation and the construction and test of an MVP with the aim of understanding time-to-market and go-to-market strategies. Incubators select early growth startups with a validated business model. They offer a creative and boundaryless working environment where open innovation dynamics are promoted.

Academic-driven Innovation Labs, are managed by universities, schools, or research centres and students, as well as researchers, who are the primary users (Morales-Avalos and Hereia-Escorza, 2019; Ponce et al., 2019; Saegebrecht et al., 2019; Thorpe and Rhodes, 2018). Usually, they are not profit-oriented, and they operate for academic purposes. They can contribute to the development of students' skills in entrepreneurship and innovation; to creating job opportunities for students involving them in working side by side with companies trying to develop solutions to given challenges; to building bridges between research and market; to accelerating the time-to-market of research results. Academic-driven innovation labs often use to strengthen partnerships with external stakeholders, like private or public organisations. The aim is to build a win-win system where academic institutions could benefit from sponsorships, opportunities for students, and for getting results from research activities. On the other side, stakeholders gain external knowledge, fresh ideas from different perspectives to integrate, if possible, in the early stages of innovation processes. Academic-driven innovation labs take the form of temporary programs, that may become permanent following the obtainment of an external sponsorship. Labs activities foresee training programs, thematic workshops, meetups, and networking events, brainstorming sessions, testbeds, ideas competitions, and hackathon or Bootcamp co-organized with external organisations and aimed at addressing their needs.
An excellent example of an Academic-driven Innovation Lab is the Innovation Lab developed at

Tecnologico de Monterrey. It promotes open technology and entrepreneurship among engineering students, trying to address the problem of lack of production of marketable products due to a lack of collaboration with other innovative facilities and firms. This through the overlap of four innovation facilities that can change according to product requirements. These labs are aimed to improve students' innovation and learning processes and promote positive relationships between universities and firms (Ponce et al., 2019).

Living Labs, are innovative interaction spaces where stakeholders from public or private organisations, citizens, consumers, designers or researchers are involved as co-creators to work together to create, prototype, develop and test creative and innovative products or services in real-life environments (Jernsand, 2019; Kusiak, 2007; Schuurman and Tõnurist, 2016). A Living Lab is characterised by the provision of specialised and technological tools that are useful for testing hypothesis through observation of users' habits and experimentation in real-life environments (Almirall et al., 2012). Living Labs promote user-driven, open and collaborative innovation for detecting problems and challenges, and consequently developing useful solutions.
Usually, Living Labs are part of a network, as the *European Network of Living Labs (ENoLL).* This is one of the aspects that opened up debates among scholars regarding the consideration of Living Labs as an Innovation Lab's category. Even if Living Labs share several characteristics with Innovation Labs, they differ in various points. Gryszkiewicz et al. (2016) point out that Living Labs operate within real-life contexts, while Innovation Labs not necessarily. Living Labs aims to solve real and pragmatic issues while Innovation Labs aim at fostering out-of-the-box thinking bringing users out from their ordinary boundaries, boosting creative and innovative potential of users.

What is not an Innovation Lab

In the literature, it is possible to distinguish other categories of organisational initiatives that present similarities to Innovation Labs although it cannot be classified as such (Gryszkiewicz et al., 2016). **Innovation Hubs**, for instance, differ from Innovation Labs because they provide users with access to a network and related services. Furthermore, the primary focus is not the direct production innovation outputs and services, but to support and promote networking activities that can favour the development of innovation. **Corporate R&D Labs**, namely in-house divisions for creative thinking and innovation development, cannot be considered too as Innovation Labs, unless they adopt the logic and approaches of open and collaborative innovation by engaging external stakeholders in the innovation process. **Communities of practice** can be defined as groups of people who share the same expertise and interests cooperating to yield knowledge and enhance the sense of belonging in a group.

So they differ from Innovation Labs, which primary goal is to bring together and engage heterogeneous stakeholders.

Innovation Labs are not **Innovation Networks**, like business or professional networks. Indeed, Innovation networks are created to bring together actors with the aim of sharing information and eventually create partnership and opportunities to improve innovation performance in a broader sense. Innovation Labs, therefore, may be considered more like a network orchestrator than a network coordinator, because they create partnerships and networking opportunities with clear objectives, through targeted invitation and defined roles and functions. Finally, **Innovation Task-forces** cannot be considered to as Innovation Labs, because they adopt a reactive approach in answer to crises. On the contrary, Innovation Labs promote proactive strategies aimed at proposing solutions and ideas answering current or future trends, challenges and opportunities, to guarantee the long-term sustainability of organisations.

3.3.5 Discussions

The research, at this stage, providing a systematic analysis of Innovation Labs corroborates studies highlighting the positive impact of innovative spaces on organisations' innovation capacity development (Bloom and Faulkner, 2016; D'Auria et al., 2017). The conducted critical analysis of the literature suggests that for a successful implementation of Innovations Labs, paying attention to the design of the space and their tangible and intangible infrastructure is not the only aspect that matters. The focus on the strategy and management of an Innovation Lab, as emerged from the review, is therefore a key aspect to consider, as well as making sure that Innovation Labs' purposes and functional roles are aligned with organizations' vision and strategic objectives.

Furthermore, the review highlights that the management literature lacks a holistic understanding of Innovation Labs. It emerges that the term "Innovation Lab" is conceived as an umbrella concept, and the notion denotes different forms that can be described through the proposed taxonomy of Table 1.

Moreover, considering that from the review emerged the need of focusing on managerial and functioning aspects of an Innovation Lab to understand how it is generally managed, what are the key characterizing phases, critical recommendations, and key factors, in the following the research focuses on the analysis of multiple case studies of Innovation Labs. This approach has been conducted to propose a management framework that combines theoretical insights with the empirical evidence. Moreover, the adoption of qualitative approaches can further shed light on the specific characteristics of Innovation Labs and particularly on the enabling and hampering factors defining their successful implementation.

4. Inside the Innovation Labs: A multiple-case study approach

The literature review has led to propose as an output a conceptual framework that summarizes the critical aspects of an Innovation Lab in terms of spatial & infrastructural and strategic & managerial dimensions. Relevant contributions in the literature correspond to each dimension, except for the sub-category relating to the management aspects of an Innovation Lab. In this case, the contributions found in the literature are mostly related to operating logics rather than to management dimensions that can then be generalized and replicable in other similar laboratories and therefore useful to scholars and professionals. What emerges is that in any case the attention paid to this issue, whose interest is always growing, is mostly related to aspects related to the impact that a physical space dedicated to innovation can reserve for organizational development dynamics. It is, therefore, necessary, in line with the objectives of this research, to further investigate the managerial dimensions of innovation labs to enrich insights emerging from literature, and to formulate a theory, with a grounded approach, which can be useful for academics and managers at to realize and profitably manage this type of initiative.
Furthermore, the validation of theoretical patterns emerged from the literature, through empirical and investigative approaches considering an assortment of practical cases, is also relevant. This is because the empirical studies found still require further investigations as they are limited to a restricted number and contexts of initiatives of this kind.

In this vein, in the next paragraphs, a multiple case study approach is described. It is aimed at:

- Validate emerged literature patterns;
- Enrich literature in terms of managerial approaches;
- Propose a management framework describing key phases and relevant issues for effective management of Innovation Labs as catalysts of digital innovation.

This chapter structures sections dedicated to introducing and describing the methodology adopted (par 4.1), to findings in which cases are analysed individually and then compared to propose the framework and a working definition, (par 4.2) and to final discussions (4.3).

4.1 Methodology: Multiple case study analysis

The case study is a systematic methodology in the qualitative research paradigm (Creswell, 1998). It aims to provide a comprehensive understanding of the phenomenon under investigation and to develop

theories starting from insights and regularities in the observed events (Fidel, 1984). Compared with analytical methods, case studies that put the researcher into the event under review may offer a more direct experience and a more truthful picture of the phenomenon (Marshall and Rossman, 1999).
Furthermore, a case study is an investigation of a bordered context or situation, that might consider an unusual condition, or that may describe a recurrent situation that can be adopted as a model to generalise insights and make them replicable (Creswell, 1998).
In the following and in line with the RQs and propositions, the multiple-case study methodology (Yin, 2014) is adopted. The benefits of applying multiple-case study have been described in several previous studies, and they are attributable mostly to the attitude of answering how and why questions, as well as to their richness of information (Eisenhardt, 1989; Ellram, 1996; Yin, 2009). Specifically, for the current research, this approach is judged to be the most appropriate due to the following reasons.

First, qualitative analysis carried out through case study methodology is suitable for broad, complex, and not yet fully defined concepts, like that of Innovation Labs still is (Oh, et al. 2016; Gomes, et al. 2018).
Moreover, this methodology well fit to answer wide RQs, usually expressed in terms of "why" or "how" (Yin, 2014). In this empirical investigation, the main objectives are: understanding the "how" an Innovation Labs is managed, and "why" these labs are instituted, for which purposes and objectives, as well as what are the key aspects to consider for developing such initiatives.
Furthermore, case studies research is also well-suited for the analysis of complex fields that should be too complex with surveys, as often did in the field of Innovation Labs (Yin, 2009; Memon et al., 2014; 2018).
Lastly, employing multiple case studies fits well with current research stream on Innovation Labs. In this regard and considering the emergence of the topic and the lack of systematisation of results, the literature suggests focusing more on empirical research (Memon et al., Osorio et al., 2018). Current academic literature counts several single cases (Fecher et al., 2020; Magadley and Birdi, 2009; Zivkovic, 2018) or web-based studies (Memon et al., 2014) to analyse specific issues.
Broadening the panel of cases to consider, might be helpful to provide a clear understanding of the phenomenon and fill the literature's gaps mentioned above.

It follows that this section is structured in the form of a multiple case study analysis, aimed at assessing and validating the insights gathered from the above conducted systematic literature review and focusing more on managerial dimensions. This analysis has the broader aim of providing a more precise understanding of the phenomenon and proposing a management framework. The framework, combining insights effectively from the literature review and data and methods based on multiple case-

study approaches, will inform scholars and practitioners with guidelines and practical evidence on the development and exploitation of Innovation Labs fostering digital innovation capacity and promoting DT and BMI.

According to these aims, the research develops the multiple case study analysis following Yin (2014) in defining problems, purposes, methodological details.

The problems faced in this phase deal with the second and third RQs. They are, therefore aimed at discovering enriching knowledge in the field of Innovation Labs and to deeper investigate the managerial dimensions. In this regard, the multiple case study analysis contributes to:

- Observe and understand the configuration of nine Innovation Labs;
- Identify the key aspects of Innovation Labs in terms of two critical dimensions: space and infrastructural (e.g. space design, tangible infrastructure, intangible infrastructure), and strategy (purposes and objectives) comparing the theoretical framework emerged from the literature review with empirical insights;
- Analyze the managerial dimensions of nine Innovation Labs;
- Propose an Innovation Lab's management framework.

Concerning the methodological details, in the following unit of analysis, sample selection, data collection and data analysis are described in detail.

4.1.1 Unit of Analysis and Sample Selection

The unit of analysis of this empirical investigation consists of a set of nine Innovation Labs. The labs are attributable to more of the typologies identified through the literature review (see Table 4).

Specifically, the typologies analysed are one working lab; two academic-driven Innovation Lab; two private-driven Innovation Labs; one fabrication lab; one investors-driven Innovation Lab; two public-driven Innovation Labs. Furthermore, the Innovation Labs under analysis differ in terms of structure: three are internal to the organisations, and six of them are external or hybrid.

This aspect is part of the originality of the carried out research. Most of the previous studies in the field consider internal Innovation Labs, leaving aside new emerging configurations that require investigation to increase the understanding of the phenomenon (Turrin, 2019).

For the study, the sample selection is drawn from the Innovation Labs operating in the Tampere region in Finland. This choice is tied to the research period carried out at the Tampere University, during which arose the opportunity to explore and discover a district where innovation dynamics spread across all the organisations. The region is full of Innovation Labs of various kinds. The selection of the Innovation Labs to analyse has therefore drawn trying to consider a heterogeneous sample pool, including most of the typologies identified in the literature review. This approach is consistent with the

concept of *"theoretical sampling"* fostering the consideration of cases which turn out to be representative of a phenomenon (Strauss and Corbin, 1998).

Access to the sample group was gained through contacts suggestions provided by colleagues from the Tampere University, and personal contacts found on the web. Contacts have been made directly with Innovation Labs' managers and administrators. All the people contacted expressed interest in the research and willingness to get involved, and schedule an appointment to open the doors of their Innovation Labs.

Innovation Labs' Typology	Working Lab	Fabrication Lab	Firm-driven Innovation Lab	Public-Driven Innovation Lab	Investors-driven Innovation Lab	Academic-driven Innovation Lab	Living Lab
Case Study	**Case G**	**Case F**	**Case B; Case H**	**Case A; Case D**	**Case C**	**Case E; Case I**	**Case D**

Table 5 . Case Studies: Innovation Labs' typologies

4.1.2 Data collection

For this empirical investigation, a 'case' is defined as a single semi-structured interview with an Innovation Lab's manager, preceded by a visit of the lab during which spaces and routines have been observed. Data were collected from the nine Innovation Labs' managers over a three-month research period spent in Tampere. Interviews were based on a pre-tested protocol, including twenty questions focusing on structural and managerial dimensions of the lab, according to the patterns identified through the literature review (cf. par. 3.3.3).

The development of each case, allowed to gather primary and secondary data to guarantee a triangulation based on multiple sources of proof (Yin, 2014).

At the end of each visit and interview, results were transcribed, and notes were reported into a structured database created to maintain track of evidence, and make easier the discussion and the comparison of different analysed cases. Each case is, therefore, analysed before conducting the subsequent. This approach allows pursuing a literal replication confirming the earlier investigations, as well as a theoretical replication to confirm or confute patterns identified until then (Yin, 1994). It follows that reflections made after each interview arouse new perspectives and new questions to investigate in the subsequent analysis. Therefore, the interview protocol is conceived as open to upgrades and adjustments based on the evolution of the investigation. The researcher removed

questions that appeared confusing or decontextualised and added some emergent relevant new.

Moreover, the analysis of each case focused on structural dimensions and managerial dynamics, contributes to the identification of Innovation Lab's distinguishing aspects and management phases. In this vein, after the first three cases, a management model was beginning to emerge. Therefore, the subsequent cases have been conducted starting from this model and to verify or refuse it. New questions added to the protocol were based on emerged phases of the model, to assess their relevance or inconsistency. This with the broader aim of proposing an Innovation Labs' management framework. This approach has proved to be relevant to pursue a literal replication to validate emerging insights. However, to guarantee a theoretical replication and to propose a reliable model, these issues had been expanded in the last analysed cases and made reflections.

The attitude to adapt the data collection process to the evolution of the research is one of the critical advantages of adopting the multiple-case study methodology (Yin, 2014).

The RQs leading to this empirical investigation focused on the 'how' an Innovation Lab is structured and managed. Once the first part of the analysis demonstrated a theoretical replication of structural aspects of an Innovation Lab, according to the above-described approach, it had been possible, in the second part, to focus more on managerial dimensions. This allowed the researcher to gather more information and evidence, and therefore to build theory around a topic still fuzzy debated in the literature.

In definitive, the multiple-case study design guaranteed a rigorous approach for gathering and analysing data. A diagram of the process adopted in the investigation is shown in Figure 11.

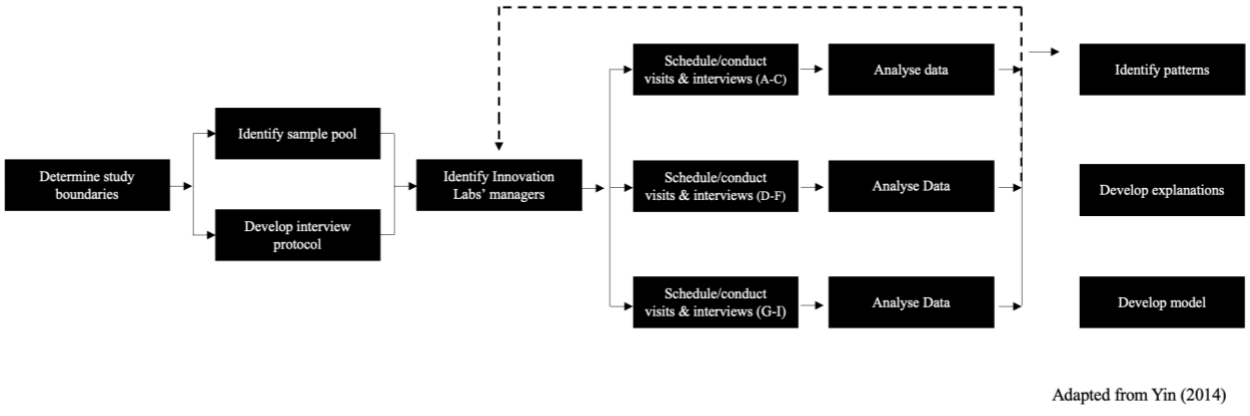

Figure 11 . Multiple-Case study design

As shown in figure 11 the replication strategy allowed the identification of possible patterns from data and the possibility to go back to the field to more in-depth explore and gather more reliable insights. This is mostly due to the rigorous approach provided by the multiple-case study approach that ensures the verification of the explanation given to the phenomenon under study directly during the research process. This process, constituted by data collection, analysis, comparison, and revision, is called 'constant comparative' method (Strasuss and Corbin, 1998).

4.1.3 Data analysis

The analysis of the collected data takes place following the same scheme hypothesized for the interview protocol and following the adjustments that have been implemented during the interviews. The objectives of the case study analysis can be traced back to two levels of analysis: the first, aimed at validating the patterns found in the literature review. Then to find confirmations or denials on the conceptual framework illustrated above. To pursue this objective, the data analysis will be carried out through a comparative discussion of the evidence that emerged across the various cases analyzed and then through compared analysis and triangulation with the data arising from the literature review. The cases will then be compared concerning space design, tangible and intangible infrastructure, as well as aims and objectives.

The second objective corresponds to the second level of analysis, that is to formulate a theory with a grounded-based approach which triangulates data with the revised literature, and which aspires to fill an evident emerged gap. From the review of the cases, that analyses the insights collected according to a purely managerial dimension of Innovation Labs, then a management model is proposed. It will be able to provide strategic guidelines for the correct management and dissemination of these initiatives. This contribution, for the benefits of both academics and practitioners, will also result in a more significant and more detailed reading of the phenomenon and will provide an updated framework concerning the definition and critical aspects taking into account the latest trends in the field of innovation management. In response to this objective, the results will be discussed individually, case by case, and the resulting evidence will then be compared to codify the distinctive features and phases that characterize a potential management model of Innovation Labs.

	I level of analysis	II level of analysis		
	INFRASTRUCTURAL DIMENSIONS		**MANAGERIAL DIMENSIONS**	
Space Design	How is space conceived? How is the design's relevance?	Purpose & Objectives	What is the mission? What are the key goals? What is the reason it was developed?	**Benchmark to the literature**
Tangible Infrastructure	What are the essential tools? How is the lab equipped? How is the furniture's relevance? How is the platform's relevance?	Managerial Dynamics	How the Lab is managed? What are the critical phases/activities/processes?	Literature Gaps to further Investigate
Intangible Infrastructure	What is the facilitator's role? How is the working climates' relevance?			

Table 6 . Multiple-Case Study: level of analysis

In this vein, each case is analyzed from time to time at the end of the interview and visit. This approach allows encoding the notes taken and transcribing interviews first to identify interesting ideas concerning the objectives set in advance. These insights will influence subsequent interviews. In case some of these insights prove to be relevant, they can also lead to a review of the initial protocol. Little relevant or misleading questions are thus excluded, and/or new ones for which further investigations are required were added.

According to this approach, insights related to the structural dimensions demonstrated a confirmation and repetitiveness in a recurring and systematic way after first cases. Therefore, the dimension has then been investigated in a less thorough way in subsequent cases. Questions, then, were quickly asked to obtain a rapid confirmation or denial of the issues that emerged up to that moment. In this way, the effort of optimizing time and participants' attention has been made to investigate the critical theme of the analysis: the managerial dimensions of the labs.

In this perspective, relevant managerial aspects emerged, as well, after the first conducted interviews. In this vein, subsequent interviews started from these emerged ideas, to search for confirmation or denial and to begin formulating a theory of a lab's management model. This model starts to take shape after the second round of interviews. Consequently, the third cycle is aimed at strengthening this theory. So the model is inserted in the interviews' protocol, and it is shown to the participants to seek confirmations or collect feedback to improve it and make it more reliable and therefore replicable.

The data analysis process consisted of a thorough analysis of the interview transcripts and then triangulating results with secondary data. It was conceived as a sequential process. The first step involved a review of notes gathered during each interview and immediately after it to bring out new concepts and insights. Then, the transcripts have been reviewed and coded manually. The process of coding, namely the analytic procedure for data exanimation to attribute meaning to notes, have been conducted based on a deductive approach. Therefore, the choice of codes reflects the analyzed literature, especially regarding the structural dimensions. Then, pursuing a literal and theoretical replication, and based on insights gathered and reinforced during interviews, managerial dimensions had been coded during framework construction, refinement and integration.
Considering the sequentiality of the process and that each new interview would begin only after reviewed the previous one, new notes gathering from each case were compared with those related to the last case. The comparison allowed to confirm or refute the evidence. In the case of refusing, earlier cases were reviewed again according to the new emerging perspective. This approach, distinguishing multiple-case study methodology, favours more profound reflections on the latest part of the data analysis process (Yin, 2014).

Each transcribed interview was interpreted, taking into consideration the patterns that emerged from the literature review. Thus, in line with them, the data analysis has been developed as follows:

- Identify, confirming or refusing, the structural dimensions of an Innovation Lab in terms of space design, tangible or intangible infrastructure;
- Understand the purpose and objectives, as well as the nature of the visited lab;
- Analyze the configuration, the functioning and the managerial dynamics of the Innovation Labs;
- Develop the Innovation Lab’s management framework.

Preliminary aspects distinguishing an Innovation Lab emerged from the previous conducted systematic literature review. These aspects were validated by insights that came out from the conducted interviews with the observed Innovation Labs' managers. Furthermore, particular attention had been paid to managerial dimensions that resulted in a relevant literature gap.
The first three observed labs, as well as the first three interviewed managers, represented an important starting point, helpful to confirm structural patterns and to bring out evidence on managerial dimensions. In the specific, the first cases revealed a recurrency in most of the patterns in terms of space, tangible and intangible infrastructure, that confirmed the outputs of the literature review. At the same time, new inspiring attitudes and routines of these labs emerged as worthy of more in-depth investigations. In response to this, the researcher focused the subsequent visits more on the functioning

and governance of these labs rather than structural aspects that seemed to be relatively standard in the field. During the theoretical replication phase, thus, the researcher found confirming evidence for the relevance and recurrency of some phases that justified the proposition of a management framework explaining the logics behind an Innovation Lab.
Moving on the last cases, the identified patterns were even more predictable. This aspect contributed to a more precise and more comprehensive understanding of the phenomenon. It followed that each new insight was gathered to strengthen the evidence and the validity and reliability of the interpretation of the collected data.
Based on that, and combining insights effectively from literature review and methods based on multiple case-study approaches, the Innovation Lab's management framework was developed. The combination of these insights guaranteed a better theory triangulation.
Moreover, during the explanation-building process, some inconsistencies not fitting in the model were found. In this regard, related data had been reviewed and coded internally, to value insights and make them best suited to the model and generalizable to the context.
Finally, triangulated check with each participant was used to confirm the conclusions of the study and to guard against the possibility of researcher bias and reactivity.

4.2 Findings

Data supporting the results of a case study can be presented in different ways, such as through category matrices, in which sub-categories are highlighted; frameworks, diagrams, flowcharts, etc. However, one of the potentially most relevant tools that the writer of a case study report can use is to report the participant's words used during the interview. This brings the reader into the participant's world and reports a context useful for understanding the phenomenon studied (Yin, 2014).

As mentioned in the previous paragraph, the data analysis was carried out following two main levels of analysis: space & infrastructure, and strategy & management. In the following lines, for each level of analysis, the main results resulting from the joint analysis of the cases carried out will be described. The next sections will be structured as follows:
- Purpose and objectives;
- Space & infrastructure;
- Management dynamics.

The first two parts are described through compared analysis of cases studies to validate or refute and

update the patterns identified in the literature. The last aspect is instead analyzed first individually, with a specific focus on each case study. Subsequently, the results of each case are reviewed with a view to compared analysis in order to identify common traits and codify the critical phases characterizing an Innovation Labs model that explains its key management processes.

4.2.1 Purposes and objectives

The literature review denotes how an Innovation Lab can be conceived with the aim of stimulating the entrepreneurial attitude of employees, students, or individuals involved in general; to therefore favour innovative behaviour and an (organisational) culture inclined to innovation; to stimulate the generation of ideas and product innovation, service process, and/or business models; to facilitate DT processes (Aloini and Martini, 2013; Boyles, 2016; Moller, 2007; Schmidt et al., 2014; Williamson, 2015).
The overall scope of an Innovation Lab is to support the development of innovation capacity at different levels of an organisation such as individuals, teams, communities, networks, and local ecosystems (Timeus and Gascò, 2018).

About what emerged from the literature, it is interesting to show how the analysis of the case studies largely confirms these findings. The cases analysed concern laboratories conceived based on aims and objectives similar to those indicated above.
Specifically, three out of nine workshops focus on training and developing entrepreneurial attitudes and innovative capacity. Four others are more focused on stimulating the idea generation as a function of the product, process or service innovations, and/or business models, and therefore improving organisational productivity.

Below is a table containing the individual cases and their respective purposes and objectives for further information.

Case Study	**Purposes and Objectives**
Case A	Boosting the innovative thinking of their members (people, organizations, startups), and support the development of innovation projects. Its broader goal is supporting startup and entrepreneurship mindset, so the development of an innovative capacity of people and organizations to foster the subsequent development of a multitude of startups and unite them in a collaborative ecosystem.
Case B	Speeding up the time to market boosting digital transformation and disruption in organisations belonging to their community. The overall aim of this Innovation Lab is making leaders and winners meet, thus, bring companies and research together to develop

	and exploit joint innovation projects.
Case C	Helping to increase the number of startups in the region through coaching, mentorship, training and organizing networking events and prize competitions.
Case D	Promoting the chances of success of healthcare professionals and offer their expertise to startups and established companies, healthcare developers, clinicians and researchers. The lab promotes a wide range of networking opportunities, finding partners and implementing joint development projects to test and develop business ideas in the healthcare.
Case E	Offering events, training programs and additional studies to develop entrepreneurial skills and attitudes, and they also support an entrepreneurial way of doing things, sparing those who want to become entrepreneurs and those with an idea for an innovation.
Case F	Giving participants some practice to make them know that not every theory works in practice. Helping users in increasing awareness on prototyping and in managing tools for testing and developing business ideas.
Case G	Activating cross-fertilisation dynamics for fruitful innovations in a co-working space.
Case H	Helping global and local organisations build future-proof businesses and design victorious business models and futures strategies
Case I	Fostering entrepreneurial attitudes and mindset in students at the beginning of their studies, giving them the opportunity to build a real startup and working on it.

Table 7 . Multiple-case study: purposes and objectives of analysed Innovation Labs

It is also interesting to note that many of the analyzed laboratories deal with several purposes and objectives at the same time. Therefore the main objective of the Innovation Labs, that is to produce innovation and stimulate the development of the innovative capacity, can be pursued through the sequential fulfilment of the various purposes mentioned above. This led to a cyclical model based on the components of the innovative process and related aims: favouring the acquisition or the convoy of the skills and attitudes required to stimulate the generation of ideas and the start of innovation dynamics for improvement and/or development of products, processes, services and/or business models that can guarantee the greater competitiveness of the organization, community or ecosystem towards which the generated value is destined.

Furthermore, another interesting aspect to consider is that almost all the Innovation Labs visited are conceived, in adition, as co-creation and open innovation platforms. These platforms are aimed at the promotion of networking and partnership activities between organizations and to ensure interaction for the development of joint innovation projects that mutually fill the gaps of every single organization. This emerging configuration is due to the evolution and configuration of the competitive landscape. Current scenario is mostly populated by SMEs. For them it becomes difficult to set up internal and exclusive innovation centres. They have known gaps in terms of finances, resources and skills, and

they are not always able to devote the right energy to innovation. As a result, external or hybrid Innovation Labs are increasing in the form of platforms acting as innovation intermediaries trying to transform gaps into opportunities deriving from collaboration processes. This aspect is proposed in addition to the literature review's insights, whose dated studies are often related to internal Innovation Labs instituted especially in large companies. This, among other things, denotes the original contribution of this research, which aims to provide useful insights and which take into account the current emerging dynamics in innovation management and in the contemporary competitive scenario. This aspect also led the current research to further investigate the phenomenon and sets the prerogatives to test and consider the solution as potentially valid also to promote innovation dynamics in the tourism and cultural sector. This sector is heavily populated by SMEs, often also family-run, and for the same problems, tourism organisations are failing keeping pace of change and technological evolution. Therefore, they need innovative management solutions to regain competitiveness.

4.2.2 Space & Infrastructure

This dimension is the one most addressed in the literature, as the concept of Innovation Labs has developed over the years purely as spaces dedicated to innovation, emphasizing the relationship between setting up spaces and stimulating the creative thinking of individuals and entire organizations (Lewis and Moultrie, 2005; Magadley and Birdi, 2009; Memon, 2018; Bloom and Faulkner, 2016; D'Auria et al., 2017; Timeus and Gascò, 2018; Dearlove, 2006; Schmidt et al., 2014; Schmidt and Brinks, 2017).

As already discussed previously, however, among the objectives of this empirical investigation lies that of further validating this section of the literature by exploring in person and from an empirical point of view more case studies to confirm the evidence that emerged. In the reviewed literature, in fact, empirical approaches are mainly related to a single case study or the exploration of internal Innovation Labs based on closed R&D dynamics. This original contribution is aligned with data emerged from the previous paragraph which shows how the latest recent configurations of Innovation Labs are external to organizations and much more inclined to dynamics of collaboration, networking and open innovation. Consequently, it was deemed necessary to investigate the spatial and infrastructural dimension further to validate and possibly update the relevant evidence.

The cases conducted are jointly analyzed below, comparing them with the results of the review.

Space Design

According to the literature, Innovation Labs are conceived as spaces in which the actors involved are stimulated by an organizational climate prone to innovation that reduces hierarchies and admits failure as an opportunity for growth and learning. For this purpose, some design aspects become relevant: the importance of the layout, the preparation of coloured open spaces, with unique lights and furniture and walls with rounded corners; areas for socialization, such as cooking and refreshing areas (Lewis and Moultrie, 2005; Moultrie et al., 2007; Osorio

et al., 2019; Bogers, 2018; Tonurist et al., 2017; Fecher et al., 2018).

The observation of the spaces in the visited Innovation Labs shows, roughly in all, the propensity to create open space environments designed in a very creative way and predisposed to cooking and refreshing areas in which to seek socialization.

However, talking with the managers of the various Innovation Labs, a very interesting aspect emerged: the importance of physical space itself has been gradually diminishing in recent years. This is for several reasons. First of all, for a change in the dynamics of the competitive context. With the progress of technology and related ease of access, as we have already seen, hybrid configurations of innovation labs that provide services remotely are also taking hold. In this vein, the research for collaborations even with potential partners, experts in a particular field, who are on the other side of the world and who until a few years ago were unattainable, is now possible. Similarly, the services provided by an Innovation Lab, especially those relating to training and idea generation, become much more scalable because they can be enjoyed remotely by many more participants.

Furthermore, the importance of physical space is becoming less relevant also because managers have previously found an aptitude to be conceived more as exhibition spaces than as workplaces in which to dedicate themselves to innovation. Innovation labs were therefore often seen as separate organizational units in which to "exhibit the latest technologies and cutting-edge tools, and in which scientists, experts and geeks closed themselves up to invent new solutions". The strategic vision connected to the innovative activities in progress was not understood and shared with the rest of the organization.

It was, therefore, essential to start reconfiguring the Innovation Lab concept in a new perspective according to which space is seen more metaphorically.

Space is, therefore, as for the 'case 1', a place in which to train, discuss and meet dedicating time to innovation. But to guarantee the same perception to all, it was co-created by the participants themselves, so that everyone truly considers themselves protagonists of the innovation processes that will arise within it.

For case 2 and 5, instead, the physical space exists, but it is secondary respect to the virtual one, that becomes the core space. These labs that used to innovate in more specialized and niche sectors, therefore take advantage of technological evolution to develop virtual places for exchange, collaboration and interaction for the development of joint projects between experts from various parts of the world.

The new configurations, therefore, contemplate the space as a physical place, but at the same time, a virtual and relational one. Here, the organizational climate, the ability to involve the participants and the attitude to make the laboratory perceived as an internal and open organizational unit are more important. This unit works at the service of all to generate innovative solutions that meet the needs of users, employees, stakeholders, organization and ecosystem. The Innovation Labs are therefore conceived as workplaces, dedicated to innovation in which enter to "get your hands dirty, experiment, contaminate and create relationships from which key ideas and inspirations can arise to trigger innovative dynamics".

Tangible Infrastructure

The tangible infrastructure, as emerged from the literature, consists of equipment, digital technologies, and technical resources (Morel et al., 2016; Ponce et al., 2019, Rohrbeck et al., 2015).
In the conducted cases, confirmations concerning what emerged from the previous research activity were found. In fact, all the spaces visited are furnished with equipment to facilitate workshops creatively and innovatively. There were, therefore, mobile blackboards, glass walls, post-its and markers everywhere, as well as portable tables for teamwork, modular spaces, TVs, projectors and screens, etc.
Besides, in the digital age, innovation cannot be separated from the use of cutting-edge technologies. In this sense, the spaces are all equipped with state-of-the-art technologies beneficial for experimentation, prototyping and testing activities.
Finally, a very interesting aspect is linked to the emergence of hybrid forms of Innovation labs that also operate in virtual mode. For these laboratories the digital infrastructure becomes essential to activate relational dynamics, of involvement and collaboration, acting as a digital platform and therefore as a digital intermediary of innovation; both to electronically support creative processes of team building, brainstorming, idea generation, problem-solving, etc.
In this sense, it was very interesting to see firsthand the efficiency and potential of digital tools to support the various phases of the innovative and creative process, from the divergent to the convergent phase.

Intangible Infrastructure

The intangible infrastructure, even from the analysed cases, is confirmed the essential dimension on which the success of an Innovation Lab depends. This dimension is strictly linked with the others described above.
The intangible infrastructure is intended in terms of human, relational and organisational resources. It influences the ability to favour a climate prone to innovation, to make an Innovation Lab a physical, virtual and relational space that become cohesive with the entire organisation, and to involve as best as possible the participant by transmitting them strategic vision, reasons and objectives.
In particular, the figure of the facilitator confirms its fundamental role. This figure, present in all the laboratories analysed, is responsible for managing relational dynamics, facilitating team building, co-creation processes and conducting activities aimed at developing an innovative capacity.
Alongside the facilitator, following what emerged from the literature, designers and operators work for carrying out the critical activities of the lab. Furthermore, as equals with the facilitator, there are users. They are the real protagonists and feeders of the innovation dynamics of the organisations involved. Their potential must be unlocked by the ability of the facilitator, who should favour relational (open innovation, user-driven innovation, co-creation) and organisational (innovative methodologies, innovation culture, brand identity) dynamics.

4.2.3 Management Dynamics

Empirically investigating the management aspects of an Innovation Lab is the other objective of this research.

In the literature, fuzzy attempts to address the issue have been found, and some frameworks have been proposed (see par. 3.3.3.2). However, these frameworks, prove to be more inclined to the Innovation Lab's operational logics, expressed in terms of exploitation of physical space and/or impact of the creative process in the dynamics of innovation development within an organisation.
The focus of this research, on the contrary, aims to understand the management dynamics of an Innovation Lab to provide a useful framework for scholars and practitioners to replicate and implement these initiatives aimed at encouraging BMI and DT in organisations.
Below, according to this perspective, the case studies will be analysed individually and then, their comparison will lead to coding the distinctive phases of an Innovation Lab management process, and a management framework will be proposed.

Case A

Case A has been conducted in a public-driven Innovation Lab in the form of a co-creation platform which aims to boost the innovative thinking of their members (people, organizations, startups), and support the development of innovation projects. Its broader goal is supporting startup and entrepreneurship mindset, so the development of an innovative capacity of people and organizations to foster the subsequent development of a multitude of startups and unite them in a collaborative ecosystem.
They created the network/ecosystem to help and support the startups, their new commerce and contents. They unite single players as startups, small companies or entrepreneurs, investors, hubs, co-working spaces, official sites, educational institutions.

To pursue its objectives, the Innovation Lab, under a management perspective, is organized as follows. The activities begin with the choice of projects on which to focus interests and investments. In this regard, people contact the lab and propose their projects. After an initial interview, admitted applicants are divided into different teams based on similar interests, values, and goals, and project leaders are selected. Each project leader, with the support of the facilitator, assesses the resources needed for their project. At this point, the main focus is that of *"enabling things and make people do what they like"*. Therefore, they engage users, providing them with a community where to find the help they need, as well as a cosy and friendly physical and virtual space where to organize meetings, events and projects. Here, people can benefit from an international community developed over the years. It is inclusive and composed of people of different backgrounds, culture, know-how and expertise.
Once resources have been found and collaborations have built, the Innovation Labs' activities follow providing support to each phase of project development. The support is commensurate with the expertise of the applicants. Their targets are students with ideas, early stages startups, big companies.

To support different phases, they organize or help people to test and prototype business ideas, to apply for startup competitions and to connect with business angels or venture capitalists to get funded.

Case B

Case B has been carried out in a firm-driven Innovation Lab, designed in the form of a co-creation platform for speeding up the time to market boosting DT and disruption in organisations belonging to their community. The overall aim of this Innovation Lab is making leaders and winners meet, thus, bring companies and research together to develop and exploit joint innovation projects.

They provide services according to three main categories: Program & Project; Co-Creation; and Network.

To reach their goals, they meet staff, companies and stakeholders involved or interested in being involved in the community once a year to understand needs or topics worthy of investments.

They find a couple of hot issues that companies want to focus on/ invest in. In this process, they act as intermediaries and facilitators. They provide companies and research institutions with different optional programs, projects or academies (e.g., demo booster initiatives, testbeds, machine learning academy, postdoc programs, DT paths, etc.) aimed at facilitating the development of the innovative solutions.

Moreover, facilitators discuss with companies and research institutions involved. Big companies often share their problems, and the Innovation Lab do a matchmaking work with research institutions and smaller companies to find potential solutions and suitable collaborations. (DT and data sharing solutions). The Innovation Lab can also provide insights concerning the kind of technologies to use to solve their problems.

At his point, once each leading organisation is aware of projects innovation phases to develop, the activities are run outside the lab, so inside the boundaries of the partner organisation.

This phase is carried out following a co-creation approach involving research institutions and professionals. The participants work following the project or the program chosen and, in the meantime, they can participate to seminars organised by the Innovation Lab concerning the hot topics to foster continuous learning mechanisms and to the benefit of constant support from the lab.

Then, the next step seems to represent the core business for the lab under analysis. Here, they aim to speed up the time to market of new digital solutions developed by companies. In this regard, the lab facilitates networking activities during which large companies are helped to vertically integrate, within their supply chain, solutions provided by startups, SMEs, or talents. For example, through the *'Demobooster'* service, they help companies *"Hunting for killers applications, Minimum Viable Products (MVPs)* and *Proof of Concepts (PoCs)* through strategic partnerships.

Finally, last routines are related to collecting feedback at the end of each activity and conducting systematic surveys with shareholders and stakeholders. Data gained from surveys and the abovementioned discussions with shareholders, allow the Innovation Lab to detect challenges from which develop and address ordinary activities.

Case C

Case C is about an investor-driven Innovation Lab supporting early stages startups with intensive coaching and mentoring programs. They select startups teams that already have a business idea and a prototype and support them until they get the first customers. They are conceived as a community-driven accelerator; whose mission is to help to increase the number of startups in the region. Moreover, they believe in the mantra *"Been there – done that"* experience. For this reason, their coaches and mentors are startup founders themselves who have experienced going through the journey their participants are going through.

The activities are managed by a facilitator who promotes the program through different channels (WOM, presentations at university, events, social media marketing etc.).

Then, startuppers, students, researchers, entrepreneurs and other different people apply to the program (alone or in a team) and present their idea and a prototype. So, coaches, mentors, business angels and experts evaluate the ideas following four different criteria: general idea potential, team composition, scalability and commitment. Then they select the ideas that will be developed during the acceleration process. The facilitators create a welcoming and inclusive atmosphere in the open spaces of the lab. The facilitators are committed to making people comfortable even with emotional struggles. They are always supportive and motivate all the participants.

To increase the knowledge and competences of the participants, and to give them stimuli, the program offers them different events, mandatory and optional workshops, bootcamps and other activities. For different needs, various packages of resources and tools are offered.

The participants are involved in the development process of their idea. The acceleration program offers, during a six weeks program, support (coaching and mentoring), innovative tools and methodologies (for prototyping, validation and testing – lean methodology etc.) and the access to a good network of stakeholders.

During the six weeks program, participants can present their ideas and prototypes to many different stakeholders (investors, CEO, startups founders, community, marketing experts, freelancers etc.) during organized events.

The facilitators follow the paths of the startups after the end of the program. Some KPIs indicators to take into consideration are sales, functional MPVs, commercialization, channels, websites and so on. They also collect feedback from the startuppers.

Case D

Case D is built around a public-driven Innovation Lab, operating in the healthcare sector. The lab brings together healthcare companies, clinicians, researchers, developers, and consumers and end-users. Working together is a vital resource that gives ideas a basis to grow and develop. Community, openness and innovation are the fundamental principles of the lab. The needs of the community shape activities, so everyone can influence supply and events.

They want to promote the chances of success of healthcare professionals and offer their expertise to startups and established companies, healthcare developers, clinicians and researchers. The lab has facilities and a wide range of networking opportunities, finding partners and implementing joint development projects.

In the specific, activities are managed as follows.

The coordinators of health lab, following a plan made by the municipality, select challenges provided by the hospital and companies that can solve the problems. They do this by exploiting their network and contacts.

Startups, students, companies and private people that want to participate in the program fill a form and highlight their aims and mission. If some people and consultants want to promote their services, they are rejected because they aren't a value-added for the community. Startups are often more open and motivated and want to cooperate with bigger companies. The atmosphere of the lab has to be motivating and innovative, and all participants work together in a co-creation approach.

Companies and people interested in developing their ideas can count on the support and the feedbacks of all the professionals involved in the community. Even though the development process of the idea happens within each company, the community provide feedbacks in all the phases (idea testing/ idea specification).

Once that the companies develop their MVP, they can make a usability test and validate their prototype thanks to simulation room that have the same equipment of the real rooms and virtual simulators (the hospital university owns that). The supportive services provided by health lab are training sessions, lectures, workshops and events.

Within the community, participants can find more prominent players that want to commercialize their product/ service or other different ways to do it.

In the end, the evaluation happens through the analysis of feedback and questionnaires. In the future,

they aim to use more innovative tools.

Case E

Case E has been conducted with an academic-driven Innovation Lab. They offer events, training programs and additional studies to develop entrepreneurial skills and attitudes, and they also support an entrepreneurial way of doing things, sparing those who want to become entrepreneurs and those with an idea for an innovation.

To do so, they define a strategic management approach to reach their goals. Their scope is also to increase the participants' loyalty and retention. (e.g. If they participate in 6-weeks-long programs, the Innovation Labs' team try to engage them in the long run.)

The program is based on the EntreComp framework and playbooks for entrepreneurship developed by the rectors of the Finnish universities.

Case E tries to engage potential applicants through info lectures provided by the students that have already participated in the innovative programs. They find some potential applicants on the university network and, to involve companies, they organize meetings in the city centre. Companies are partners, and they can provide their support to the students, as well as get new ideas and learn how to apply innovative solutions. Everything depends on knowledge sharing. The lab's team selects the applicants and creates heterogeneous teams based on people's background, mindset, skills, etc.

At this point, the lab proposes itself as a flexible basket of services. Everyone can choose the needed level. The services are innovative pilot programs (INDEF courses), C-Lab, innovation challenges, courses (e.g. Basic entrepreneurship study), mentoring, information and access to the spaces and the tools of the university lab.

Based on the experience of the participants, people can experiment and explore, understanding the importance of the problem solving, they can define their solution and work in an interdisciplinary team or, if they are more expert, they can unlearn and try new things. In the same way, companies can participate in meetings and lessons, depending on their free time. It is also available six months long mentorship programs for students and startups. Students gain credits from all the activities.

Lastly, they try to pay attention to assessment and evaluation. However, until now, this phase is based only on feedbacks and not on metrics. It is an intuitive process, but, in the long run, they aim to build a better evaluation tool.

Case F

Case F is a fabrication lab based on the idea to give participants some practice to make them know that not every theory works in practice. Their activities are based on fast and cheap prototyping.

This lab, in contrast to others, is only focused on the prototyping (modelling) phase. Users approach this lab only after having clarified previous steps like problem definition, idea generation, validation etc.
The lab supports the translation of an idea into a physical model. Who wants to use the lab can go there with his idea. The facilitators give him instructions to use the machinery.
Compared with other analysed labs, its process is shorter and specific to digital fabrication and prototyping.

Case G
Case G is a working Lab in which knowledge-intensive small and micro-sizes organisations co-operate to run their businesses and to activate cross-fertilisation dynamics for fruitful innovations. They use this space to had a greater network of peers and peers support from other companies. But also they support other services aimed at supporting their idea's development.

The spaces offered by the co-working lab are not just physical spaces but also innovative workspaces where to find a community and a cosy and motivational atmosphere (e.g. particular lightening simulating the Sun). The aim is to engage users and encourage them to work in a community.
To enter this community, organisations have to clear a selection. Companies hold a sort of interview where they explain the reasons why they want to join the lab. If they are not interested in networking and international growth, but only in obtaining a space where to work, the lab is not the right place for them.

The Innovation Lab provides, to the selected companies, growth and learning programs where they find a community, investors and different activities. The primary services offered are:
- Co-working spaces (cosy and innovative atmosphere);
- Events for networking and community;
- Consulting (hackathon, matchmaking sessions etc.);
- Growth & Learning (through managers and facilitators)

The consultants, in this lab, implement general plans that are efficient for all the organisations that participate. They develop a specific model with deadlines useful to keep the project alive (duration: from six months to six years). They also promote their offer in different ways, through newsletters and social media.
The solutions that companies develop are not always ideas that become business products/ services but

often are the growth and the training of already existing companies (innovation output). The lab also works as a sort of incubator, but mostly for more mature companies.
In the co-working space, they can find training, investors, trading agencies, new contacts, facilitators, business angels and sponsors. They follow the programs and participate in the organised activities/ events/ learning sessions/ hackathon/ pitching sessions with investors and so on. The growth does not happen just at a national level. For example, if they want to work in Italy, CT helps them to find the right contacts and people, demonstrating that the strength of the program is the community.

In the end, they do not measure the innovation outputs but just the number of members, companies, people, turnover etc.
Once an organisation grows, it finds more suitable and big spaces, leaving the lab. The fast-growing of a hosted company is a useful reference for the lab's manager, even if, at the same time, they lose participants.
Talking with the manager, lastly, emerged that the lab has a lack of evaluation tools. They don't evaluate the number of ideas coming from their co-working spaces. Even though, in the future, they think that it could be interesting to develop an infographic with all the information concerning the companies, the events etc. Right now, their evaluation activities are more based on objective metrics, like the number of members, companies, people, turnover.

Case H

Case H is built around a private-driven Innovation Lab, helping global and local organisations build future-proof businesses and design victorious business models and futures strategies. They also operate with students and general applicants to support them in the development of a digital innovation capacity. They aim to build a bridge between academia and industries to improve the system as a whole. The manager believes that "Both fields can flourish together and find new opportunities, not only to solve problems of today but more about problems and possibilities of the future. Moreover, he claims they are working for a long-term impact. Thus, they "are not thinking about what happens in a year or two years, but we are thinking about 5 years."

They develop their activities through a well-defined process structured in three temporal phases: before, during and after the process.
Before the process, they define according to participants what are the strategic intentions.
Organisations are asked to choose the phenomenon and the topics they are interested in at the moment. Companies cannot solve them by themselves; they need fresh eyes, a different point of view, that often young people may offer. *"They have been working for so long on the topics, with their perspectives,*

they need fresh air."

"Talking with a person from a different background creates some kinds of sparks". Therefore, organisations are prompted to think differently. The lab brings them together and helps the spark.

At this point, challenges are published on the online platform and participants are asked to select those fitting more with their skills and interests.

Now, the facilitator forms the team and organise a kick-off meeting to launch the project and organise workshops to lead teams towards a digital innovation process. During the process, teams are called to develop a business model, validate it through a lean approach oriented to gaining iterative feedback from the market. In particular, facilitators' main task is that of *"Make sure that what comes out, in the end, is not just a nice to have a thing".* Therefore, participants need to understand why the generated solutions are the right ones. Once understood, they work for the business model validation. Then, teams move to the realisation of a proof of concept that will be shown to the community.

At the end of this process, reflections and discussions activities are carried out among participants, organisations and facilitators to understand weaknesses and strengths of the generated solutions and especially to learn about the process to detect aspects requiring an improvement for following processes.

Case I

Case 'I 'is built in an academic-driven Innovation Labs conceived in a hybrid form. They work with students at the beginning of their studies to foster entrepreneurial attitudes and mindset. It is a particular academic program in the form of an Innovation Lab. Participants study and work at the same time. Once admitted in the lab, they build an entrepreneurial team, and they are asked to run a proper company. In this way, experiencing on-field with new-forming startups, participants are prompted to enable learning-by-doing mechanisms.

Management practices behind this lab may be synthesized as follows.

In the beginning, coaches and facilitators evaluate and select the students to involve in the project through different phases. They evaluate motivation, past experiences, way of writing, creativity and interactions with other people.

Then, selected participants chose to be involved in some courses to achieve basic competence and develop awareness and sense of belonging in the lab. In the meantime, participants are asked to participate in the "Belbin team role test", an automated and interactive tool for teambuilding.

Once teams have been formed, participants are asked to build a legal company.

Now, through a trial and error process, the team members develop different business ideas and innovative solutions with the scope to explore their interests and gain some money. They develop some

innovative projects, in various forms and fields of action.

In a "continuous learning perspective" the team are often engaged in training sessions with coaches and facilitators, to learn coaching and leadership competencies; and among team members, to share the knowledge learnt from theoretical and practical activities.

Every few months, the students present their signs of progress to the facilitators, and they support teams in growing as fast as possible to become able to walk on their own legs at the end of the program.

The last phase is aimed at evaluating the carried out activities and experiences to program the next steps and to improve the provided services.

4.2.4 Compared Analysis of Case Studies

In the previous paragraph, visited Innovation Labs have been analysed individually, focusing on the management dynamics. Now, in the following, a comparative analysis of the gathered evidence is proposed below.

It emerges that almost all the laboratories initially envisage a phase of context analysis aimed at understanding the strategic intentions on which to focus the innovation projects to develop, based on detected scenario's challenges and that require to be transformed into opportunities.

The choice of strategic intentions on which to focus the interventions generally results in two different forms. In some cases, it depends on participants (individuals and/or organisations) who approach the Innovation Lab to solve challenges, develop skills, generate innovative solutions or business ideas. These issues, after an initial assessment based on potential impact and generated value, are admitted to benefit from the assistance and services provided by the lab.

In other cases, however, and especially in internal Innovation Labs, the lab itself is responsible for the selection of the strategic intentions. The choice is made around a topic or challenge potentially relevant for the organisation on which it depends. Then, the lab opens to the external ecosystem to find partners and contributions in terms of resources and expertise, as well as, to enable cross-fertilisation dynamics driving new innovation processes.

At this point, or after the definition of the scope of the innovation process, a practice common to the various labs is the identification and definition of the resources necessary to carry out the hypothesised activities. They, thus, compose work teams, define specific training programs, identify required tools and equipment, plan events and activities for networking and the search for collaborations. These activities are customised based on the purposes and objectives of each laboratory.

Therefore, the labs aimed at fostering the development of skills will work to form heterogeneous teams and to define adequate training programs. Those focused more on promoting product or process innovations will operate to identify the best experts and tools, as well as to form the best teams. However, considering that all the labs act as innovation intermediaries, platforms, and relational places,

this phase also provides for the involvement of external actors. They used to be engaged to fill internal gaps and in any case to facilitate the stimulation of the creative process by addressing issues from different perspectives to the usual views of the organisation.
In this phase, the facilitator that is a figure familiar to all labs comes into play. It must guarantee the creation of a climate prone to innovation and facilitate co-creation processes that engage all the actors involved and that contribute to creating an alignment of goals and strategies.

Once the objectives and resources necessary to achieve them have been defined, the tendency is to start operational phases of development and exploitation of the innovative process. This phase represents the core business of an Innovation Lab, and the process is carried out in a different way depending on the type of laboratory under analysis. It might be therefore characterized by the willingness to generate skills, attitudes, products, services and consequently innovative digital solutions aimed at contributing to achieving the mission of the innovation lab: the development of innovative digital capacity, business models innovations and/or the promotion of DT processes that will improve the performance and competitiveness of the organization and the entire ecosystem.
An interesting and original aspect, especially compared to what emerged from the academic literature on the subject, is related to the subsequent phases of the innovative process. A recurrent trend, especially in labs conceived as a timely and non-continuous innovation management initiative, is that of losing control of the process and its impacts once it has been completed. After completing the process within the laboratory, the participants should introduce what they learned and/or generated within their routines. From the discussions with managers, this phase seemed to be hard to manage. Despite the common recognition of the relevance of supporting participants after the Innovation Lab's interventions, few are the labs that really exploit this activity. It is therefore interesting and valuable, to report the approaches adopted by those labs based on a model of interventions iterated over time, which provide support and coaching to participants, also and above all downstream of the idea development phase, allowing to maximize the goodness of innovation. This seems to happen mostly in laboratories where the sense of involvement transmitted is more significant and in which there is a strong alignment of objectives and strategies.

After this phase, and in any case, once concluded the activities of all the analysed labs, it is common practice to spend moments of reflection, feedback collection and discussion about the quality and outcomes of the activities carried out jointly. This phase seems therefore aimed to activate continuous learning mechanisms and to understand, from the participants' perspective, what are the criticalities, weaknesses and strengths of the adopted approaches, and to always improving the level of provided services. In the same way, participants take advantage of these moments to analyse any deviations

between set objectives and achieved results, and to consequently reprogram, where necessary, new joint paths.

Although this phase appears to be familiar to everyone, the lack of rigorous and structured methods for evaluating performance and measuring the generated impact is equally common. According to interviewees, the lack depends on the scarcity of time to devote to these processes and difficulty of tracking valid metrics. But it is, however, a common hot topic, on which managers seems working on, and for which they would be open to receive support. The only ones who have already adopted structured evaluation approaches are the public-driven innovation labs, which funded by public bodies, are periodically asked to report on their work. On the contrary, investor-driven innovation labs are more focused on metrics relating to the economic value generated by the organisations they have supported. These metrics appear indirectly connected to the goodness of the path undertaken jointly.

At the end of this comparative analysis, a strong recurrence, repetitiveness and replicability of some processes emerged. These processes can be framed as phases distinguishing an Innovation Lab's management model that will be proposed in the next paragraph.

This model summarizes the critical phases characterizing the correct management of an Innovation Lab. It represents a useful tool that generalizes the aspects mentioned above, to guarantee replicability, as well as to provide a clear understanding of a phenomenon on which the interests of academics and practitioners is growing more and more.

However, it should highlight how not all the analyzed Innovation Labs internally carry out all the phases mentioned above. Some of them are focused only on one or two processes, and they are then led to activate collaboration dynamics with other innovation labs operating within the same ecosystem to support the participating subjects in carrying out the entire innovation process. Consequently, the model proposed is comprehensive of all the phases that an organization should consider when it intends to develop innovation processes benefitting of the support of intermediaries such as Innovation Labs. In the case of an Innovation Lab is not equipped to provide support in every phase, inter-inno-labs collaborations are required (Memon et al., 2018).

The last aspect to consider is the shape of the model presented. A cyclical model is proposed as all respondents place a lot of emphasis on the reflection and final discussion phase. This attitude leads to the activation of continuous and incremental improvement cycles and to try to guide organizations in continuous innovation processes that are increasingly necessary to compete in the current continually evolving competitive scenario. Therefore, a cyclical model that also reflects the general objectives of the innovation lab, namely to develop an innovative capacity understood as an attitude to improve and always generate new innovative solutions.

4.2.5 A New Working Definition of Innovation Labs

Considering the revised literature and empirical investigations, some critical aspects distinguishing Innovation Labs have emerged. They came out following a readjustment of these entities to the even faster competitive landscape's evolution. The new scenario appears as characterized by strong technological and digital components which change the attitudes and habits of consumers and organizations. Therefore, innovation approaches and trends change in tandem. To ensure greater competitiveness for companies and control the risk of failure of investments in innovation, innovation management is now basically driven by dynamics of open innovation, user-driven innovation, co-creation and human-centred innovation.

Based on these emerging dynamics, new Innovation Labs' configurations are following the dynamics mentioned above and are opening the R&D doors to the rest of the organization and the entire ecosystem. An active engagement of employees, colleagues, users, and stakeholders, and the attitude of building external partnerships to optimize resources and efforts becomes relevant. Moreover, new configurations of labs are also following the latest digital trends, consequently adapting spaces and businesses.

In this regard, it is considered mandatory to propose a new definition of Innovation Labs, which considers all this and leads to reconsidering an emerging configuration of these structures in a more open key and more at the service of the ecosystem. It follows that Innovation Labs can be defined as ***a management initiative, aiming to create of an innovative space - which can take the form of a physical, virtual or hybrid environment – fostering creative and innovative thinking promoting and supporting user-driven and open innovation approaches, to facilitate stakeholders engagement in innovations processes, to better understand users' needs, to drive technology transformation, to imagine and defining innovation opportunities, and to develop new business solutions capturing and delivering value.***

4.2.6 The Innovation Labs' management framework

The multiple-case study has provided useful insights to understand the functioning and standard management practices of an Innovation Lab. The triangulation of these insights with those emerged from the systematic literature review, lead to the identification of five subsequent critical phases distinguishing the management of an Innovation Lab, i.e. *i) focusing, ii) engagement and enabling, iii)*

developing innovative solutions, iv) delivering and application support, and v) reviewing and consolidating.

The *'Focusing'* phase aims at defining strategic intentions, developing a shared vision, and identifying necessary resources to develop a project plan. The second phase, namely *'Engagement and Enabling'*, is devoted to the activation of facilitation mechanisms to engage users and encourage a working atmosphere that reduces hierarchy, provides stimuli to empathize with given challenges, and stimulates creativity and innovation (Lewis and Moultrie, 2005; Schmidt et al., 2015). Moreover, according to users' needs and pursued innovation goals, the Innovation Lab may act as an innovation intermediary to provide opportunities to build communities and partnerships with various stakeholders (Memon et al., 2018; Meyer et al., 2019). The phase of *'Developing innovative solutions'* starts once the challenges and objectives have been addressed. Here, traditional innovation management stages follow each other to exploit innovative projects transforming ideas into solutions or to develop innovative skills and mindset in users (Morel et al., 2016; Thorpe and Rhodes, 2018). During this phase, Innovation Labs should provide services like mentoring, coaching, or facilitating sessions with final users to gain feedback and control the risk of failure. Moreover, tools, equipment, and technologies for testing and prototyping should be made available under assistance.

After the innovation development, the *'Delivering and application support'* phase is aimed at delivering and/or applying the generated value. In this phase, Innovation Labs provide consulting or mentoring services, assisting users in activities like developing time-to-market, go-to-market or growth hacking strategies; codifying learned knowledge; or improving routines. Moreover, Innovation Lab may play a strategic role in building bridges between companies and markets (Fecher et al., 2018). The last phase is about *'Reviewing and consolidating'* where activities carried out are reviewed, and reflections come out. Final results from activities are compared with initial objectives to detect insights from which to learn and design new innovation activities and strategies.

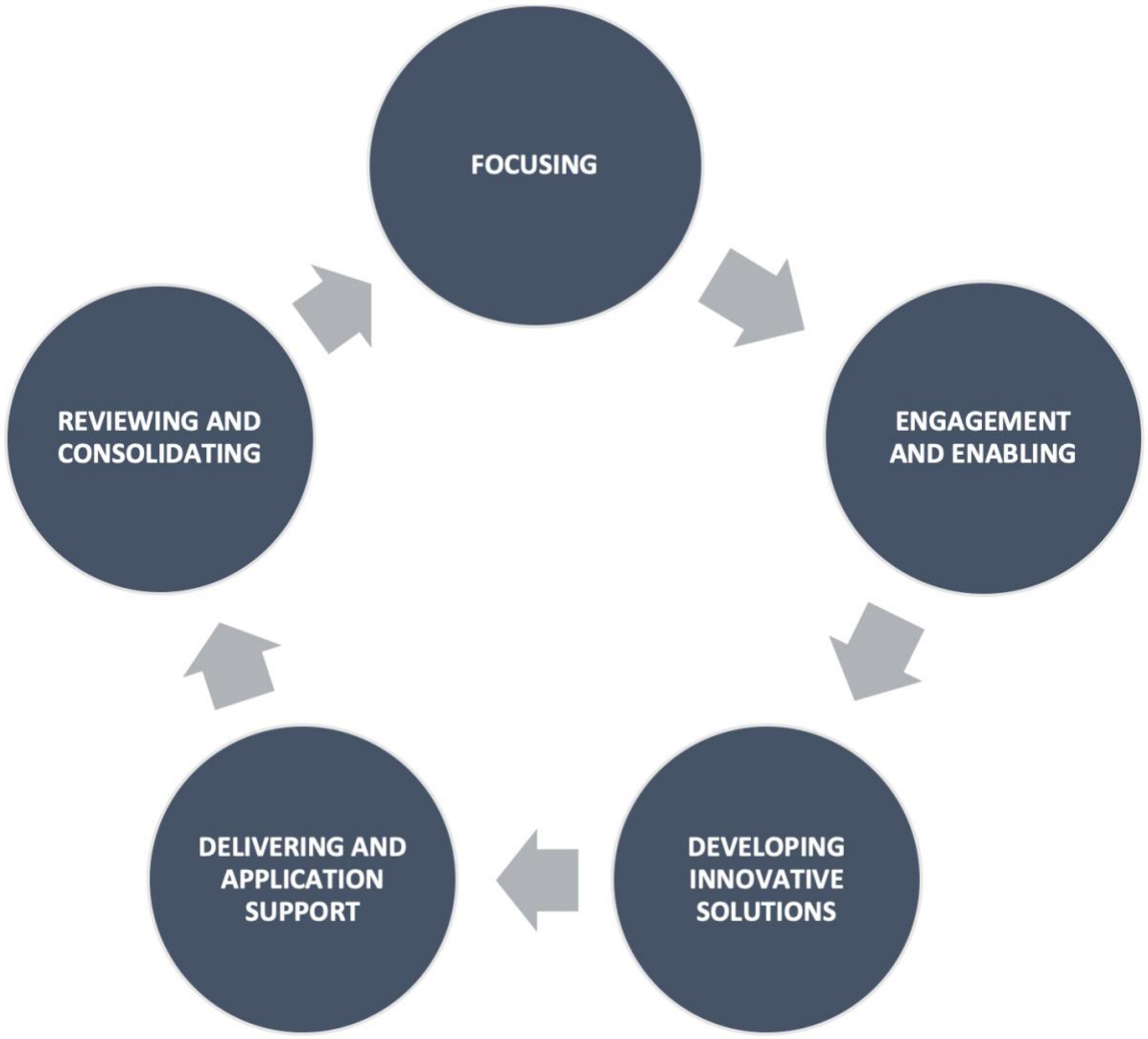

Figure 12 . "The Innovation Lab's management framework"

4.3 Discussions

The multiple-case study analysis was necessary to fill the gaps that emerged through the systematic literature review previously conducted.

It was, therefore, useful to validate, on a larger sample of Innovation Labs, the patterns relating to spatial and infrastructural dimensions that characterize this type of laboratory. Then, above all, it contributed to investigate further critical aspects related to the management of these laboratories. In this vein, following a comparative analysis of the results of the carried out cases, an Innovation Lab's management framework was proposed. It describes the critical phases for proper management of the laboratories. The framework contributes to increase knowledge and suggest theoretical and empirical guidelines on the field, useful both for academic and practitioners.

Besides, this research activity led to the emergence of other aspects of considerable relevance. By triangulating the empirical evidence with that resulting from the analysis of the literature, the evolution of the concept and configurations of Innovation Labs was evident. Therefore, a new and more up-to-date working definition was proposed considering the evolution of the competitive scenario and the latest emerging trends in innovation management that are characterising the current innovation processes, essential for companies that intend to develop a sustainable and lasting competitive advantage.

The exploration in this sense also leads to note how the Innovation Labs, previously conceived exclusively as closed research laboratories and for the exclusive internal use of the client companies, are opening the doors of R&D to generate open and co-created innovation processes. This new configuration leads to an increase in the effectiveness of these initiatives for well-established companies. They, benefiting from external collaborations, become able to speed up time-to-market and optimise resources, waste and risks, presents itself as a significant opportunity. Besides, this new configuration of Innovation Labs creates opportunities also for SMEs.

SMEs did not have until now the power, culture and resources to implement these initiatives internally. Thanks to these emerging conditions, they can finally benefit from Innovation Labs' support to grow and scale their businesses.

In this perspective, it is clear how research should continue to explore this opportunity to understand and evaluate the potential impact of Innovation Labs in productive contexts heavily populated by SMEs. The tourism and cultural sector, in particular, is by intrinsic nature populated by SMEs, often also family-run. These organisations, partly by culture and partly due to difficulties in terms of financial resources and skills, find severe problems in the transition to digital and innovating and adapting its dynamics to the evolution of the context. Consequently, in the following pages, the research will aim to investigate the phenomenon of Innovation Labs in the tourism and cultural sector to understand their potential and understand how they can contribute to fostering DT and the development of a digital innovation digital capacity of SMEs and tourism.

The research will also prove to be useful for further validating the proposed framework through practical experiments in direct collaboration with a company operating in the tourism sector.

5. Validating the Innovation Labs' Management Framework and assessing the Lab's potential in tourism and cultural sector: An Action Research project

The proposed Innovation Labs' management framework, aimed at supporting organisations in developing digital innovation capacity, managing digital innovations, DT and BMI, requires further empirical investigation to test and increase validity, reliability, and effectiveness.

Furthermore, considered the low prevalence of Innovation Labs in tourism and cultural organisations, with particular reference to the regional landscape, an empirical investigation is required to assess the model's efficacy to face sector's needs of BMI and to embrace digital innovation journeys, that are also amplified by Covid-19 pandemic.

In this regard, looking for a research methodology that worked for the purposes mentioned above, Action Research (AR) has been chosen.
AR results as a suitable methodology as it "aims to solve pertinent problems in a given context through democratic inquiry in which professional researchers collaborate with local stakeholders to seek and enact solutions to problems of major importance to the stakeholders" (Greenwood and Levin, 2008, p. 72).
Moreover, in this method "research is conducted on a theoretical basis, but since there is not enough previous information, actions may be taken to solve problems and simultaneously create sufficient knowledge to develop a theory or methodology that can be replicated elsewhere or, at least, in a similar research context" (Pereira et al., 2011, p. 98).

Therefore, this section entails an AR project carried considering as the 'development labs', an organisation operating in the tourism and cultural sector, and the Transforma Lab, an Innovation Lab for tourism and cultural organisations.

This chapter is structured as follows. Section 5.1 theoretically describes the methodology and explains the reasons to adopt AR methodology in this research. Section 5.2 describes the carried out project in details, and section 5.3 discusses findings in terms of Innovation Labs' contributions for innovation capacity development, DT, BMI; management framework validation; and in terms of the potential for tourism and cultural organisations and for change management in times of crisis.

5.1 The adoption of the AR in this research project

The choice to employ the AR methodology in the present study is due to a variety of reasons.
The first reason is the opportunity of contributing to the innovation capacity development of Welcome Lucania, namely the company involved in the project. Second, to a series of aspects that make the AR a suitable approach to conduct researches in the innovation management field.

As stated by several authors, this results in the most adapted method to employ when there is no rigid framework for the research, due mainly to the lack of information about what could be done if results lead in one way or another. The value results in that research inform practice and vice versa, making it adapt for situations in which there is no alternative other than beginning the work and then adjusting it as findings come in (Argyris, Putnam, & Smith, 1985; Checkland & Holwell, 1998; Eden & Huxham, 1996; Greenwood & Levin, 1998; Gummesson, 2000; Susman & Evered, 1978; Whyte, 1991).

Moreover, the questions investigated through the carried out AR fall within the field of Innovation Management. AR in Innovation Management is particularly suited to investigate events or issues typical of emergent contexts with the aim of transforming practices through interventions. Therefore, AR might contribute with useful data that are relevant to develop theories in Innovation Management (Ollila and Yström, 2020). The interconnection between theoretical and practical evidence in essential in Innovation Management (Ritala et al., 2018). Thanks to AR is possible to generate valuable and rigorous knowledge (Hodgkinson and Rousseau, 2009).
Three main benefits of conducting AR in Innovation Management are reported in literature. They relate to its potential of "*(1) providing closeness to living emergent systems, (2) generating rich insights, and (3) generating knowledge for both rigorous theory development and change in practice"* (Ollila and Yström, 2020, p. 398).

Furthermore, AR is a methodology that requires continuously engaging in trade-offs regarding researchers' thinking and acting. In this regard, critical challenges for researchers are outlined below.

Three challenges and suggestions to employing AR have been outlined: the process is both reflexive and progressive, the researcher is both an outsider and an insider, and the outcome is both general and specific. In particular, it is desirable:

1. Being able to reflect on emergent paths, and in the meantime, intervene to influence their

evolution and improvement. Therefore, there is a need for an excellent organization to have the time for reflections and encourage participants to generate knowledge and joint learning.

2. Getting involved and work only as an external researcher. The challenge is to find the right balance between being considered a stranger and part of the organization. However, it is fundamental not to get involved beyond the limits. The researcher, can't cross the line and feel an organization member, especially when it is about to make strategic decisions. In that case, it is crucial keeping a cool head, acting as external consultants not to compromise rigour and quality of research.
3. Generating results useful to inform both practice and academic research. This is possible through AR and the active engagement in the research process closely with practitioners, and gathering insights from practice to theorize resulting in theoretical models. At the same time, the model may be applied to provoke practical advancements, evolutions and innovations. Projects, execute and communicate, even engaging actors involved, are therefore relevant processes to understand what has been done and allow participants to understand that theory ins informed by practice and vice versa.

To conclude, no research approach is without limitations. The approach's noteworthy drawbacks are that it requires access to an organization willing to engage in practitioner-researcher collaboration (Israel et al., 1992). It is time-consuming, and it potentially generates overwhelming research data. Furthermore, practical limitations exist when studying AR on digital platforms as long as the researcher is immersed in platform actions.

When the goal is to study tacit aspects of practices and processes and the context is emergent or shifting, the potential of AR shines, as it enables the understanding of everyday actions by inquiring into individual's constructions of meaning (Coghlan, 2011) in formal and informal organizational processes and settings. Arguably, it is neither worthwhile nor appropriate to mobilize AR when the research does not explore aspects of organizational life or pursue change and improvement of practices by designing and making interventions as the benefits of the approach would appear only as impediments.

5.2 The Action Research Project

The section reports an AR project carried out in collaboration with a tourism SME, subsequently named *Welcome Lucanya*.

During the AR project, a research team in which I was involved, had the opportunity to interact with the company over a fragmented period of 15 months. Researchers and organisation defined the project's aim as developing and increasing the organisation's innovation capacity and gathering valuable insights about the effectiveness of the above-proposed Innovation Labs' management framework regarding potential application in tourism and cultural sector.

The **participant organisation** was particularly interested in understanding how to improve and launch an innovative digital product responding to the demand needs and current market challenges and trends in the market. Moreover, they accepted to be engaged in research to increase the organisation's digital innovation capacity. They were thus interested in becoming aware and capable of managing even new digital innovation and digital trends and experimenting with new management approaches that foster innovation, avoiding barriers and internal lack of finance, skills and resources.

From the other side, the **researchers** were prompted to carry out the AR project to the following reasons:

- validate the proposed management framework;
- test the cyclical model, the identified phases and to assess their effectiveness in practice;
- determine the efficacy of Innovation Labs in contributing to digital innovation capacity development, and fostering DT and BMI practices within organisations;
- demonstrate the adaptability of the framework to SMEs as well as to the tourism organisations.

Researcher	Company
Does the Innovation Labs' is suitable for SMEs? and for tourist and cultural organisations?	How to launch in the market a product/service based on users' and demand's needs and calibrated on current context's trends and challenges?
Does the Innovation Labs' management framework, effectively contribute to the tourism and cultural organisations' digital innovation capacity development?	How to develop a digital innovation capacity enabling managing technological advancements, keeping the pace of change to stay competitive?
How the Innovation Lab can foster Digital Transformation and Business Model Innovation in tourism and cultural organisations?	How to empower innovation filling internal organisation's gaps in terms of financial, human resources and time to dedicate to innovation?

Table 8 . Action Research RQs

During this collaboration, the processes of context analysis, co-design, test, innovation and incremental improvement of a new digital innovation product to launch – then called *Lucanya* – were analysed and reflected through a circular AR process where the parties involved produced new insights and defined activities for further collaboration.

Furthermore, the broader aim of knowledge developed from AR is to "provide a better understanding in order to support and promote better managerial and organisational practices'' (Palshaugen 2009, p. 231).

It follows, that interaction between stakeholders, organisation's members and researchers are necessary. All actors engaged contribute with their knowledge bases to work around an issue collaboratively (Eikeland, 2007).

According to Flood (2001), ''systemic thinking is not an approach to action research, but a grounding for action research that may broaden action and deepen research'' (ibid., p. 143). In this vein, this research's theoretical framework offers a ''language repertoire'' for the AR project's interpretation work.

Moreover, considering the relevance of the collaboration between researchers and practitioners, continuous realignments in information, insights and phenomenon under study are necessary. Based on this, the study does not consider this collaboration a linear process to reach a clear predetermined goal. However, realignments of objectives were mandatory during the carried out research, in which each AR cycle was influenced by the prior.

In practice, the collaboration with the company started in March 2019 with an initial discussion on expectations and objectives, and to jointly define the respective RQs. In this vein, the collaboration between researchers and the organisation's team started with an observation phase to understand the business reality and the business idea they were developing. This activity was useful to understand the scenario in which the organisation were interested in competing in, its vision, strengths and eventual barriers and conflicts.

In the middle of the AR project phase, however, Covid-19 pandemic affected the world. The crisis, completely stopped tourism sector, heavily impacting on development dynamics, as well as on consumers, travellers, and communities' attitudes and behaviours. It follows that products, services, and tourism offer required further adjustments in order to stay competitive and enable development dynamics. The situation led to a more in-depth reflection phase between researcher and practitioners.

After a first period of standstill, clearly underlined the need to understanding of context dynamics to develop an attitude to transform challenges into opportunities. Therefore, the parties agreed by common accord to consider the pandemics as an opportunity. It has therefore decided to take the chance of leveraging innovation interventions in times of crisis to further reinforce the digital innovation capacity to align the on-site product to the new emerging market dynamics. In this way, the company would be placed in the condition of facing the lockdown immobility and become innovative and proactive also in times of crisis.

In this vein, the RQs have also been adjusted, as can be seen from the following table.

Researcher	Company
Does the Innovation Labs' is suitable for SMEs? and for tourist and cultural organisations?	How to launch in the market a product/service based on users' and demand's needs and calibrated on current context's trends and challenges?
Does the Innovation Labs' management framework, effectively contribute to the tourism and cultural organisations' digital innovation capacity development?	How to develop a digital innovation capacity enabling managing technological advancements, keeping the pace of change to stay competitive?
How the Innovation Lab can foster Digital Transformation and Business Model Innovation in tourism and cultural organisations?	How to empower innovation filling internal organisation's gaps in terms of financial, human resources and time to dedicate to innovation?
Is the Innovation Lab a valuable solution to foster innovation in times of crisis?	How to avoid the lockdown and try to innovate in times of crisis?

Table 9 . Action Research RQs: context re-alignment

Furthermore, the research design have been developed following Burns' (2007) design principles for systemic AR who describes it as ''an emergent research design, an exploratory inquiry phase, multiple inquiry streams operating at different levels, a structure for connecting organic inquiry to formal decision making, a process for identifying cross-cutting links across inquiry streams, a commitment to open boundary inquiry and the active development of distributed leadership'' (ibid., p. 85). The systemic AR designs described by Burns (2007) allow to inherently reflect context-relatedness. Therefore, the approach described above seemed to be aligned with the current research's theoretical perspective and to the related RQs.

In this vein, and considering the particular socio-economic situation due to the pandemic, the importance to reflect on the scenario and open to it resulted more relevant than it already was.
The new on-site product, *Lucany*a, indeed, was already conceived as a digital platform for local tourism promotion, and which provided for the participation through co-financing of municipalities in the region. To follow being considered marketable, *Lucanya*, required a rethinking based on new paradigms emerged due to the pandemic. Moreover, also the ways for promotion, and engagement of network required a reframe. The crisis and the lockdown, indeed, made hard the promotion in the traditional forms (e.g. fairs, meetings, etc.), and the call for funds to the municipalities, which priorities were changed.
Consequently, it was necessary to think in an innovative way, rethink the business model, and involve the territory as much as possible, both to collect feedback aimed at improving the product, and to gather partners willing to embrace the cause and make the project grow.

To do so, the parties decided to allow the participation of the organisation to the *Transforma Lab*, an Innovation Lab developed in the University to which I belong.
The *Transforma Lab*, during the pandemic, organised several initiatives, in the form of webinars, documentary analysis and online hackathons, with the broader aim to foster and enable organisations' and regional tourism ecosystem' digital innovation capacity, to promote DT and BMI for increasing the competitiveness and attractiveness of organisations and destination, even during the lockdown forced by the pandemic.
Welcome Lucania was directly involved in these activities, during which had the opportunity to:

- learn user-driven and human-centred approaches and practices to engage employees, users and stakeholders and to therefore identify context trends, challenges and opportunities;
- benefit from relational dynamics and promoted networking opportunities to generate opportunities for collaboration and innovation;
- exploit cross-fertilisation dynamics to stimulate organisation's innovative thinking and digital innovation capacity.

The Transforma Lab conceived as an Innovation Lab in the form of a managerial and organisational initiative for managing innovation capacity, which integrates three main dimensions: space, time and infrastructures for innovation.
The space for innovation can be physical or virtual or blended, combining physical and virtual components. The time for innovation is the organisation's dedicated time frame to innovation ranging from interventions, projects and programs. The infrastructure for innovation denotes the tangible and intangible resources available for innovation development capacity.

The scope of the TransformaLab is to spark, facilitate and grow the innovation thinking through the development of the enabling factors affecting the innovation capacity. It adopts the principles of the user-driven innovation, of the open innovation, of the agile- and lean-driven innovation, of the stakeholders-value orientation, of the participatory-driven innovation, design thinking and arts-based innovation approaches.
The TransformaLab identifies the challenges, delineates the opportunities and good/best practices, defines possible solutions and perform experimentation according to a continuous and validated learning iterative cycle. In particular, it tends to focus on the DT, and the development of new business models to improve the value creation dynamics in a sustainable way for all organisations' stakeholders.

In particular, the activities in which the company was involved, and carried out following open innovation, user-driven, and human-centred approaches, resulted in the production of three reports[1] identifying and disseminating i) the critical challenges of the regional tourism sector ii) the key opportunities, and iii) the possible innovative solutions to contribute to design and build a productive and sustainable future for tourism and cultural organisations and the entire regional tourism ecosystem. The third report has been published to resume the results and the business ideas generated during the online hackathon to which Welcome Lucania actively participated.
At the end of the hackathon, thus in the conclusion of the Transforma Lab activities, researchers and organisations made reflections on the quality and efficacy of the work done to detect limits and issues requiring further investigations, as well to orient and design future strategies.
In this regard, a second AR cycle was considered necessary to guarantee the company to exploit, test and implement in their boundaries and products the lesson learned and the business ideas generated during the hackathon. Researchers had then the opportunity to evaluate further the effectiveness and limits of the application of the Innovation Labs' management framework in tourism and cultural organisations. Moreover, it was possible to apply and then analyse the impact of the management framework both in an internal and external Innovation Lab. It was, therefore, possible to assess the lab's efficacy in fostering Digital Innovation Capacity development, DT and BMI of tourism and cultural organisation and the entire regional tourism ecosystem.

To resume, the AR project consisted of two cycles. A first cycle in which the company's involvement and participation in the Transforma Lab are examined.
A second cycle, on the other hand, fed by the results and reflections arising from the first, which focuses attention on the implementation of an Innovation Lab entirely dedicated to the company with a more

[1] The three reports have been published on the website of the Transforma Lab – www,transformalab.com

direct and calibrated involvement.

Based upon the proposed theoretical framework, the interventions initiated and conducted by outsiders cannot change prevailing elements of the corporate culture. The company, that should be considered as a self-referential system, will only accept changes that are self-generated inside the company by its members (Baitsch and Heideloff 1997).

Therefore, the study is designed as a gradual approach to the research field, which had a clear long-time focus on enhancing the organisation's digital innovation capacity. In a nutshell, the intensity of interventions has been increased gradually, and the collaboration with members of the organisation became closer within each AR cycle mutually completed (Fig. 13).

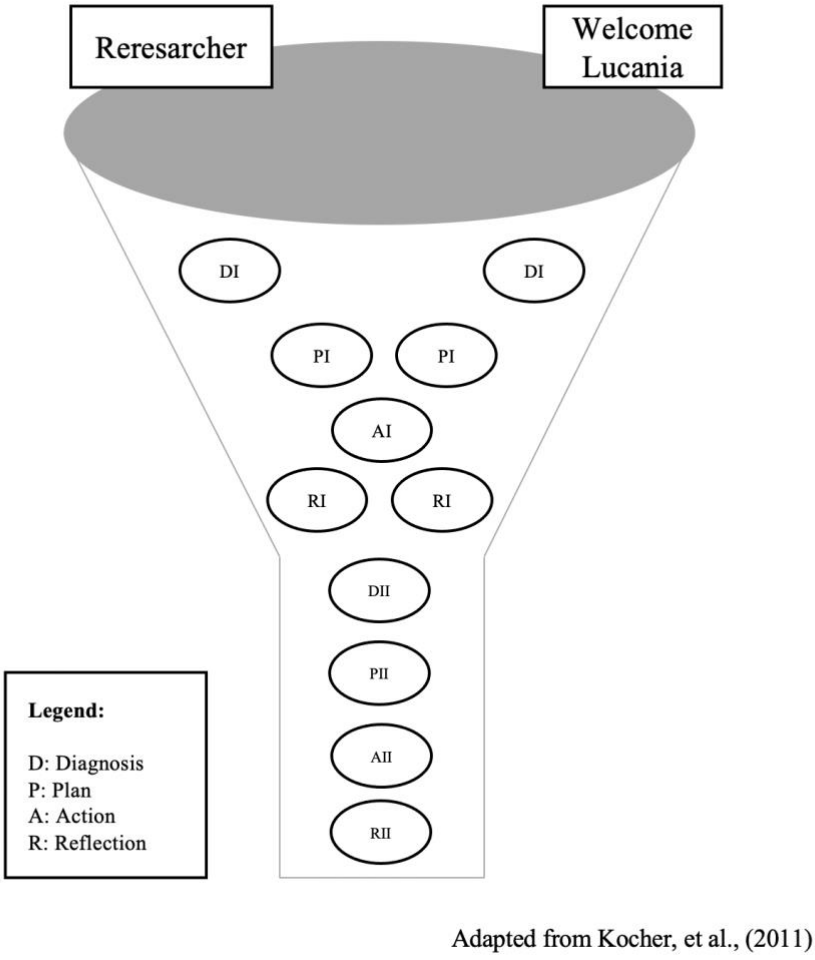

Figure 13 . Narrowing of collaboration in AR cycles

The study is based on several qualitative methods:

- *Narrative Interviews* (Kaudela-Baum and Endrissat, 2009), with Welcome Lucania CEO and its staff. The narrative interviews allow asking interviewees to tell stories instead of answering pre-determined questions. In this way, the interviewees decide the topics to deal with. So, the method allows gathering aspects that would otherwise remain hidden.
- *Observation* of Welcome Lucania routines and attitudes during everyday work, regarding the launch of the new digital product, and during the participation of the Transforma Lab. In the meantime, observations allowed to understand users' and stakeholders' needs and to analyze the context where the organization competed. Participant and context observation allow detecting aspects that narrative interviews would not have allowed to discover due to the potential irrelevance perceived by the interviewees regarding some issues (Kawulich, 2005).
- *Online webinars* have been organized mainly during the Transforma Lab to engage the local community, stakeholders and tourism organizations to understand in parallel with observation methods, the context and the market in which the organization were operating, and to detect as well emerging challenges, trends and opportunities.
- *Documentary analysis* was then conducted in parallel by the research team, reviewing tourism reports and documents related to the context situation to achieve a comprehensive context understanding (Prior, 2003).
- *Hackathon* organized at the end of the first cycle to generate innovative solutions based on the data gathered during the previous phases and activities. This method allowed to enable cross-fertilization and open innovation dynamics among participants and to stimulate their innovative thinking to consider new perspectives of analysis and generate solutions based on market needs and demand (Briscoe, 2014).
- *Focus groups*, organized during reflection phases with the Welcome Lucania staff to debate on results and gather insights for the right development and implementation of innovation processes.

Below, these AR cycles conducted in the *Welcome Lucania* AR project are described in detail. Table provides an overview of conducted AR cycles, highlighting the main goals for each phase both for the researcher and the company.

Action Research	Researcher	Welcome Lucania
Diagnosis I	Assessing the efficacy of emerging innovation paradigm	Context analysis to detect challenges and unsatisfied needs
Plan I	Focusing on the relevance of engagement and working climate prone to innovation	Transforming challenges into opportunities
Action I	Digital innovation capacity development	Stimulating innovative thinking for Idea generation
Reflection I	Feedback for the analysis	Feedback on generated business ideas and
Diagnosis II	Focusing on brainstorming and internal diffusion of lessons learned during cycle I	Ideas selection
Plan II	Assessing openness to innovation, networking	Forming innovation team
Action II	Focusing on lean approaches and iterative learning mechanisms	Testing, learning from users and developing solutions
Reflection II	Feedback for the analysis	Assessing products improvement and lessons learned

Table 10 . AR cycles overview

The next session will describe the company and the context where it operates, as well as the methodological and theoretical assumptions, which led to increase innovation capacity and innovate the on-site product.

5.2.1 Action Research at Welcome Lucania

The project has been carried out in collaboration with the company *"Welcome Lucania"*.
It is an organization aimed at contributing to the affirmation and enhancement of the environmental, landscape, artistic, historical and tourist resources of the Lucanian area. They operate as destination makers of development strategies for the marketing of food and wine products. They aim, therefore to enhance the uniqueness of the territory focusing on differentiating factors avoiding homologation or standardization of territory and/or products and/or experiences.
They choose to invest in Basilicata and promote the destination for the particularity of the territory and the intrinsic quality of products and landscapes. The uniqueness and genuineness of products, locations, accommodations and facilities produced and proposed by partners are the critical assets and the value propositions for travellers and customers.
The company operates offering incoming services and experiential tours around the region.
Welcome Lucania, in the person of the CEO Francesco Garofalo, denotes openness to innovation, collaboration and networking opportunities. Their vision is to provide the Basilicata region with a

tourism ecosystem promoting the value and culture of the territory, and able to compete at an international level. In this regard, they have in the pipeline the launch of a new innovative product: Lucanya, namely a digital tourism platform for the promotion of the Basilicata destination.

The platform is imagined to become an enabler of the development of the territorial and tourist offer of Basilicata region. A gateway to the territory, which promotes, with immediacy and ease of use, the relationship between tourist-territorial supply chain services, their suppliers and the possible users of the network. The platform is based on a new generation search engine, patented by Facilitylive, which puts the relevance of information at the centre of searches, improving the experience on the territory. The Lucanya platform is therefore conceived as an advanced promotional-marketing system for the tourist offer of Basilicata.

The platform will offer an experience of research, selection and purchase of local goods and services. It allows accessing with a single click a set of information, organized and immediately visible, without ever having to leave the results page. Through a simple search, it will be possible to satisfy users' needs in Basilicata: for example, a tourist can obtain in a single screen all the information organized in areas (widgets) that can be customized to organize and book his stay and not only.

The platform will be aimed at all those who want to "live the Basilicata experience" by purchasing tourist services, participating in events, exploring the Lucanian agri-food excellence chain and using the many services that will satisfy their needs. In summary, the platform is aimed at: - To the tourist who organizes his stay in Basilicata preparing to live a unique experience; - To the guest who crosses and experiences the territory for reasons other than tourism; - To the resident of Basilicata who wants to fully and immediately and easily experience the offer of his territory.

5.2.2 The first Action Research Cycle

The first cycle aims to demonstrate the validity of the Innovation Lab's management framework for the development of an organization's digital innovation capacity and to assess the benefits for the organisation's participation to the Tranforma Lab for detecting, by following user-driven, human-centred and open innovation approaches, competitive scenario's challenges and opportunities.

Furthermore, considering that in the first cycle an Innovation Lab acting at a macro level, transversally to several actors involved, is analyzed, it is also possible to evaluate the impact that this management initiative can have at an ecosystem level in terms of generation of innovative solutions, collaborations and activation of development dynamics. How, therefore, the Innovation Lab can help to generate a high level of innovative outputs that can have an impact on both an individual, organizational and ecosystem level. Furthermore, the first cycle aims at verifying what the approaches of this new

generation of Innovation labs that are increasingly establishing itself. It aims then at demonstrating the validity, the potential of Innovation Labs' activities to favour open innovation, search for networking opportunities and also to foster continuous social innovation dynamics enabling continuously, iterated and validated learning mechanisms.
This first cycle, as described above, takes place within the Transforma Lab, the Innovation Lab in which the Welcome Lucania company takes part.

The phases of the first AR cycle are described below.

Diagnosis 1: This observation phase includes all the activities related to the project, aimed at understanding the emerging and ongoing tourism scenario, and the emerging attitudes and challenges that arise from the pandemic. The activities are carried out following human-centred and user-driven paradigm. Thus, by involving a series of actors (including Welcome Lucania) operating in tourism: entrepreneurs, operators, public institutions, tourists and local communities.

Plan 1: The second phase is the planning phase. Therefore, once identified what the challenges of the sector are, the definition of what may be the opportunities begin. Then, a divergent phase of creative and innovative thinking is activated involving participants to understand the needs, especially those not satisfied, behind which business and innovation opportunities are hidden.

Action 1: The third phase is the action phase during which actions and opportunities are converted into solutions through creative and innovative activities. An online hackathon has been organized involving many actors. During the event, heterogeneous teams worked for generating a series of innovative solutions to propose to the community.

Reflection 1: In the last phase, a series of reflections are made to consolidate the model, understand what worked and what did not, and what should be improved. Here, reflections on the activation of mechanisms to generate new and better processes that enhance strengths and convert weaknesses into success factors are made.
It is necessary to specify how this phase of reflection could be conducted with all the actors involved in these early phases, as this cycle took place within the Transforma Lab. According to Neely (2012), the innovative capacity acts at the individual, organizational and ecosystem level.
This AR project, however, intends to analyze the impact of Innovation Labs at an organizational level. Precisely, therefore, the perspective of Welcome Lucania is considered. Consequently, the reflection activity is carried out with the CEO of the partner company and is aimed at understanding, from the

company's perspective, the effects deriving from taking part in an Innovation Lab. In particular, reflections, in this phase, are made on the effectiveness to adopt human-centred and user-driven approaches to understand the real needs of the territory. Besides, the potential for adopting open innovation approaches is analyzed. The analysis is then on the potential of exploiting, as in the hackathon, the various professionals present, creating mixed teams, also composed of professionals external to the company to stimulate creative thinking, create cross-fertilization dynamics to generate innovative solutions that take into account different perspectives, as well as the emerged challenges and needs.

Lastly, reflections are made to evaluate the innovative solutions generated during the hackathon to understand if someone is right for the product the company is planning to launch. This aspect enables a cyclical process requiring a new AR cycle in which a specific focus on the selection, test and development of selected potential innovative solutions is done.

5.2.3 The second Action Research Cycle

The second AR cycle starts from first cycle reflections and focuses attention on the implementation of an Innovation Lab entirely dedicated to the company with a more direct and calibrated involvement. While the first cycle aims more at understanding the dynamics of the market in which *Lucanya* wants to enter and compete and what are the dynamics dictated by the current emergency; the second phase more focuses on making and implementing innovative solutions within the product in the pipeline. The innovations, thanks to the first cycle's activities, are based on the users' perspective, on the opportunities offered and found by the analysis of the current scenario. In the second cycle, the activities will then turn to adapt and implement these solutions in the product under analysis through testing activities. This will involve improvements or innovations of the business model. Furthermore, through the exploitation of these innovative digital solutions, the company will be guided towards DT. Although the product in question is already a digital platform, however, the support of the other actors and users involved, allowed observing the scenario from different perspectives and will be useful for considering and implementing a whole series of digital services in the offer portfolio that allow to digitally transform the tourist, accommodation and destination offer.

Therefore, the activities carried out during this cycle were aimed to select potential digital innovative solutions to test, validate, develop and implement in the product *Lucanya.*

Below, the activites, that follow the traditional AR phases are described in details.

Diagnosis II: The second cycle starts with a first diagnosis and observation phase carried out in collaboration with the company, through focus groups to evaluate and definitively select the best

potential digital solutions generated during the online hackathon. The focus was, therefore, on selecting which of these may be suitable for the company to enable innovation and increase the portfolio of services provided by the innovative product that is implementing.

Plan II: This phase was exploited through the engagement of internal staff and external professionals and actors who proposed the selected solutions. The previous hackathon, therefore, enabled open innovation dynamics and the opportunity to find partners to optimize resources and time-to-market. The engagement of actors resulted in the formation of innovation teams for the planning and subsequent execution of activities to test and evaluate the technical and economic feasibility of the idea. Furthermore, to assess the marketability of solutions comparing their features with those required by the market and enabling adaptive processes to model solutions to the *Lucanya* mission and key features.

Action II: This phase is built on test activities during which iterative processes of continuous and validate learning with partners, users, clients, communities are carried out to learn about proposed solutions. Then, improved solutions are proposed to the Lucanya network to test the interest in approaching these new products or services. The output of this phase was the assessment of attractiveness, around proposed solutions, perceived by the network's organization, tourists, clients and ecosystem in general. Solutions that have aroused particular interest, have then adapted to the platform requirements and, thanks to the support of the Innovation Lab's facilitator and the technical assistance of actors involved, have been implemented in the digital platform.

The proposal of new solutions to the network aroused DT and BMI opportunity both for the network and the platform. *Lucanya* was initially conceived as a digital b2b platform, which core business depends on fees paid by the network's organization to gain spaces into the platform. Users and consumers may benefit for the platform as a showcase where gather information and interest around tourism opportunities and products. After this phase, thanks to the collected feedback and the openness to partners and customers, as well as to the implementation of new digital services, Welcome Lucania became able to extend the platform also in a b2c logic. Customers and travellers can therefore buy directly from the platform products, services and experiences they desire. Moreover, adapting the provided services to the new norms in times of pandemic, the platform can also exploit virtual experiences.

Moreover, the company had the opportunity to evaluate, test and implement new services allowing BMIs. New opportunities for consultancy never imagined before aroused. The platform, in a b2b perspective, may extend the services provided to the network. The inclusion in the network also of actors not directly involved in tourism and cultural sector, but also from interrelated sectors with expertise in digital, business, consultancy, etc. increased the attractiveness of the platform. In this way,

Lucanya also became a relational platform fostering collaborations, opportunities and enabler of development dynamics for the entire regional tourism and cultural sector.

Reflection II: This final phase includes reflections made by researchers and practitioners on the activities carried out during the second cycle but also taking into account those of the first one.
From reflections emerges that adopting a lean approach, based on testing, measuring, learning, and building (Ries, 2011), the company has managed to acquire the attitude to innovate and to develop a digital innovation capacity. During the first cycle, indeed, several potential digital innovative solutions have been generated thanks to the adoption of lean approaches based on open innovation, networking, human-centred and user-driven dynamics. Then, taking possession of these solutions and supported by researchers, the company's staff, while working on adapting solutions to Lucanya, had the opportunity to apply and further develop its digital innovation capacity. New improved solutions, therefore, emerged in the first phases of the second AR cycle, during focus groups in which staff brainstormed on proposed digital innovations.
The attitude for continuous and iterative learning has moreover been developed. The activities of comparison, engagement, exchange of feedback, enabling of acceptance and diffusion of new ideas, actively contributed to developing learning mechanisms that given the opportunity to autonomously improve even more the generated solutions and increasing product's competitiveness and attractiveness consequently.

5.3 Findings

This AR project aimed to empirically investigate the Innovation Lab's efficacy in developing and increasing the organisation's innovation capacity; and gathering valuable insights about the effectiveness of the above-proposed Innovation Labs' management framework regarding potential application in tourism and cultural sector and in times of crisis.
Above, different AR cycles are described. In particular, the carried out activities and achieved benefits are debated to demonstrate the proficient contribution of the Innovation Lab for the organisation involved.
Below, the usefulness and value generated by an Innovation Lab are discussed. These dimensions are analysed with regard to the research's goals to

1. Assess the efficacy of the Innovation Labs' management framework to foster Digital Innovation Capacity development, DT and BMI;
2. Demonstrate the potential of Innovation Labs in tourism and cultural sector;
3. Assess the utility of an Innovation Lab in times of crisis.

5.3.1 Innovation Labs for Digital Innovation Capacity Development, fostering Digital Transformation and Business Model Innovation

Among the objectives of this research was to demonstrate how the Innovation Lab could be considered a reasonable solution to stimulate the development of the digital innovation capacity of organizations and individuals.

As previously described, digital innovation capacity is seen as *"The internal potential of a firm to generate new ideas, identify new market opportunities and implement marketable innovations by leveraging on existing resources of capabilities"* (Neely, 2000, p. 6).

The AR Project conducted, in this sense, demonstrates how the Innovation Lab contributes to the development of digital innovation capacity considering the various perspectives that emerged from the literature: marketing, management and technology (Biemans, 1992; Nonaka and Takeuchi, 1995; Davenport and Prusak, 1998; Neely, 1998; 2000; 2012; Hurley et al., 2004; Hurley and Hult, 1998; Szeto, 2000).

From the marketing perspective, especially in the early stages of the proposed framework, the approach is often oriented to the market and the context analysis, to understand the dynamics and challenges that arise. This approach then makes it possible to maintain, throughout the cycle, a user-driven approach which guarantees that strategic choices and solutions to be generated and implemented are oriented to the users' and market's needs. In this way, producing marketable products, services and processes, the risk of failure will be controlled. For example, thanks to the Innovation Lab, during the participation to the webinars, the company was able to detect users' and market's unsatisfied needs that stimulated the generation and implementation of new services within the platform's prototype. These new services were then co-created with users, who had the opportunity to be involved in-person in testing, to provide useful feedback to make the services increasingly marketable.

From the management perspective, the Innovation Lab proves to be a useful model to support organizations in better managing the available resources or to act as an intermediary or networking platform to seek profitable and necessary collaborations for the development of innovative solutions useful for the development of the organization and the generation of value for stakeholders and the ecosystem. From this point of view, the research revealed how lean, open innovation and user-driven approaches, as well as the creation of an organizational climate prone to innovation and which considers failure as an opportunity for growth and learning, prove to be very helpful for enhancing and/or systematizing the resources available and necessary to activate development dynamics. In particular, during the research, the company was able to activate new collaborations with external

actors that made it possible to optimize internal processes and create more profitable services to be implemented on the platform. At the same time, it became possible to imagine and implement new services and offers that completely innovated the business model initially conceived.

Lastly, from the technology perspective, the Innovation Lab has shown that it can contribute fostering dynamics of DT and developing the ability to implement and manage the even new technologies that are continuously introduced on the market.

Welcome Lucania, in fact, thanks to research, riding the market trends and the new users' attitudes, understood the need to implement completely digital services that were previously carried out traditionally and analogically. For example, during the second AR cycle, the company tested the implementation of virtual tours that can be exploited directly from the platform. Previously, the platform served only as a showcase to promote tours and to inform visitors about the opportunity to book them. In this way, on the one hand, the company acquired the ability to manage and adapt to new emerging technologies, guaranteeing itself the opportunity to manage the pace of change and to seize the new opportunities offered by technological progress suddenly. On the other hand, it indirectly contributes to the development of the entire territorial tourism ecosystem, increasing its competitiveness. Therefore, by guaranteeing cutting-edge services that meet travellers' needs, the attractiveness of the destination is increased, and value is therefore generated for the ecosystem. In this way, even the company that acts as a territorial tourist platform will be more attractive to client companies who will be encouraged to be present on it to benefit from support in the provision of cutting-edge services.

The research, therefore, helped to demonstrate how the Innovation Lab contributes to the development of the digital innovation capacity. From the three perspectives analyzed, this management initiative based on human-centred principles of open innovation, user-driven innovation, supports organizations in acquiring an attitude to continuous digital innovation.

By always being vigilant about market developments, consumer habits, changes in demand, and being able to take appropriate approaches to the conscious management of ever new technologies, the organization will be able to become resilient and inclined to offer marketable solutions. At the same time, by opening the doors of the laboratories to the external ecosystem, the organization will be able to create collaborations and benefit from countless opportunities to increase productivity and competitiveness.

5.3.2 Innovation Labs in Tourism and Cultural sector

Another research's key objective was to demonstrate the potential of Innovation Labs in the tourism sector. In this regard, literature had shown how, despite the growing interest in the phenomenon in the various production sectors, limited applications were found in tourism. The few cases, indeed, refer to

the creation of living labs coordinated by public institutions and aimed at drafting policy guidelines to guide user-based development strategies (Castro-Spila et al., 2018; Guimont and Lapointe, 2016; Jernsand, 2019).

This approach is certainly interesting, but it only partially exploits the potential of the Innovation Labs described so far.

This low development is due in particular to the intrinsic characteristics of the sector, which has always been labour-intensive and has often shown an aversion to technological development. Digital innovations, indeed, risked distorting the tourist offer, whose main criterion for diversification was the human relationship with the tourist (OECD, 2020; Terry, 2016).

At the same time, the tourism and cultural sector is mainly populated by SMEs, even family-run. Consequently, the barriers to innovation and digital development are accentuated. There is a lack of economic, human resources, skills, culture and time to devote to innovation (Najda-Janoszka and Kopera, 2014; OECD, 2020; Rodriguez et al., 2014).

From the analysis of the literature and multiple-case study, however, it is clear how the change and evolution of the competitive scenario that increasingly focuses on open innovation, user-driven and co-creation approaches, leads to democratize innovation and make it accessible also to SMEs (Capgemini, 2017; Von Hippel, 2005). Similarly, technological evolution also follows these trends, and new digital solutions are increasingly oriented towards ensuring a direct relationship with users. This, in tourism, in particular, has considerable potential.

In this perspective, and considering that the scenario' change has also led to the emergence of new configurations of Innovation Labs, it was decided to apply this model, through the AR project described above, to a company operating in the tourism-cultural sector.

From the analysis of gathered empirical evidence, it emerges how the Innovation Lab can be conceived as an ideal tool to promote the democratization of innovation in tourism. It can represent the tool to support the innovation and BMI processes of SMEs in general, for which the barriers to innovation are more accentuated and which therefore are unable to carry out these processes independently.

From the same point of view, it is also suitable for supporting the processes of DTand democratization of technologies in cultural tourism organizations, at a time when it has become impossible for tourism to innovate by excluding the digital component.

In particular, the analysis of the case shows how the company involved has managed to undertake processes of DT and BMI of the product being launched. At the same time, it was supported in speeding up the time-to-market and in re-adapting the product based on the evolving scenario and consumers habits, as well as it was possible to generate and co-create new solutions and new services directly with tourists and local communities.

However, the most critical thing that highlights the potential of the development of Innovation Labs in

tourism is that by acting as platforms to favour the search for opportunities, co-creation, networking and collaborations, they enable the formation of a territorial ecosystem, which in the current context becomes a discriminating differential factor. In fact, in tourism, more than in other productive sectors, dialogue between sector operators and the promotion of public-private partnerships is a significant strategic development driver.

In the sector, indeed, the impact that each innovation and new service introduced has on the entire ecosystem is much more direct. In this regard, the example provided above is again useful.

During the second AR cycle, the company tested the implementation of virtual tours that can be used directly from the platform. Previously, the platform served only as a showcase to promote tours and to inform visitors that there was an opportunity to book them. In this way, on the one hand, the company has acquired the ability to manage and adapt to new emerging technologies, guaranteeing itself the opportunity to govern the pace of change and to seize the new opportunities offered by technological progress suddenly. On the other hand, it indirectly contributes to the development of the entire territorial tourism ecosystem, increasing its competitiveness. Therefore, by guaranteeing cutting-edge services that meet travellers' needs, the attractiveness of the destination is increased, and value is therefore generated for the ecosystem.

In the cultural tourism sector, the dynamics of value creation can also take place in the opposite direction. Each innovation or new solution proposed at the ecosystem or tourist destination level is also reflected in the private operators who can benefit from it if they seize the opportunity.

It follows that, in the tourism-cultural sector, Innovation Labs can be considered a tool for the democratization of innovation, to foster DT and, also and above all, to foster the development of an individual, organizational and ecosystemic digital innovation capacity.

5.3.3 Innovation Labs for crisis management

The last level of analysis of the research conducted concerns the option of considering the Innovation Lab also as a valuable solution to manage times of crisis. This hypothesis could be verified because, during the research conducted at the partner company, the Covid-19 pandemic broke out. The opportunity was, therefore, mutually taken to try to foster development dynamics through the creation of an Innovation Lab despite the forced lockdown.

What emerges by retracing the development of the various phases of the Innovation Labs management framework within the project is a possible overlap with the change management models.

The focusing phase, in which a context analysis is necessary to identify the strategic intentions and define the activities and key resources for the realisation, finds similarities with the initial phases of various models found in the literature (By, 2005; Kanter et al., 1995; Kotter, 1996; Luecke, 2003). Same thing for the engagement and enabling phase, in which it is necessary to involve the interested

parties and to foster a climate prone to innovation and the alignment of strategic visions. In change management, indeed, the first activities consist precisely in *'Analyse the organisation and its needs for change'* (Kanter et al., 1995). It continues with processes dedicated to *'Create a vision and a common direction'* (Kanter et al., 1995), or *'Developing a vision or strategy'* (Kotter, 1996), or *'Mobilise energy and commitment through joint identification of business problems and their solutions'* or *'Develop a shared vision of how to organise and manage for competitiveness'* (Luecke, 2003).
In practice, in the project carried out, during the *focusing* and the subsequent *engagement and enabling* phase of the first AR cycle, researchers worked through a desk and on-field research to identify all the critical challenges of the moment identified not only from the company's perspective but also considering that of the actors involved. This, thanks to the approaches that characterise the Innovation Labs has made it possible to grasp the main challenges and problems arising as a result of the pandemic on which to address the company's strategies.

The next *'Developing innovative solutions'* phase, which in change management can be assimilated to the *'Craft an implementation plan'* (Kanter et al., 1995) or *'Empowering broad-based action'* (Kotter, 1996), consists of the development phase in which the hypothesized change takes place. In this sense, innovation has been repeatedly defined as a *"Significative positive change"* (Berkun, 2013) or as *"A change in a product offering, service, business model or operations which meaningfully improves the experience of a large number of stakeholders"*(Carpenter, 2010).
In practice, in the first cycle of AR, in this phase, the challenges, through activities of stimulation of creative thinking and brainstorming, were transformed into opportunities. Then, during the hackathon, potential innovative solutions were generated, which then in the same phase of the second cycle of AR have been definitively realized.

Subsequently, the phase of delivering and application support is fundamental to the success of the initiative. It is similar to that of *'Anchoring new approaches in the culture'* (Kotter, 1996) or *'Start change at the periphery, then let it spread to other units without pushing it from the top'* (Luecke, 2003) that are typical of change management. At this stage, it is necessary to transfer innovation within the company to the various organizational units and ensure that it is understood and accepted by all.
This activity, in the second AR cycle, in particular, was done through a series of focus groups with the company staff, precisely to ensure the dissemination of the new solutions and business models generated.

Finally, both the Innovation Lab's management framework and the considered change management models, conclude with discussion and reflection phases aimed at summarizing what worked and what

did not. The last phase enables learning and continuous improvement dynamics, and also encourages the acquisition of an attitude to change, which also resides in the digital innovation capacity described above. It is deduced how the attitude to change is increasingly necessary for the current context. By acquiring this ability, the organization will be able to adapt quickly to the evolution of the context, to technological progress and in the long run, it will also be able to acquire proactive attitudes that will influence the change in the market.

6. Discussions

In this chapter, findings are discussed by RQs, thus articulating considerations, first on the tourism and cultural organisations' challenges to embrace DT and BMI, and models and approaches adopted. Then, entailing the RQ2 and RQ3, reasons leading considering Innovation Labs as a valuable solution to foster DT and BMI in tourism and cultural organisations are debated, looking at critical features, aims, proposed working definition and management model. The third point focuses on the RQ4, discussing the advantages of spreading this model in tourism and cultural organisations.

Discussing RQ1: How to foster Digital Transformation and Business Model Innovation in tourism and cultural organisations? What are the most relevant challenges and barriers? What are the recurrent models and approaches?

The conducted research contributed to the understanding of tourism and cultural organisations' challenges in embracing DT and BMI, as well as focusing on models and approaches often adopted to face them.

In this regard, a critical literature review in the fields led to consider DT and BMI as development drivers in the Digital Age (Westerman et al., 2014; Dredge et al., 2018).

Nowadays, technology advancements, namely cloud computing, Virtual Reality (VR), GPS, wearable technologies, and other similar technologies, allow a real-time integration between digital and physical worlds.

Therefore, new products and services, that were previously unimaginable, can be created to improve business performance and to innovate business models in terms of operations, revenue model, improvement of user experience as well as customers' and stakeholders' relationships.

Furthermore, since this is a sector in which organisations are firmly connected and dependent on the territorial ecosystem in which they operate, DT and the implementation of new digital solutions, as well as the innovation of business models also impact on the attractiveness and the competitiveness of the entire ecosystem. More innovative organisations, capable of providing services in line with the needs of consumers and communities, indeed, favour the development of an advanced tourism ecosystem that makes the destination much more attractive in the eyes of tourists and users.

The democratization of technologies and innovations and the emergence of user-driven and human-centred paradigms allow improving company performance by meeting the interests of users without altering the nature of organizations, whose differential value has always been the humanization of the

relationship with the customer. It follows that tourism and cultural organizations, even if labour-intensive and reluctant to digital, in the current competitive scenario acknowledge the importance of undertaking digital innovation paths to remain competitive.

Although the relevance of the phenomenon is known, the process is not simple because these organizations, most SMEs, even family-run, have many barriers in terms of lack of financial resources, skills, culture and even time to devote to innovation. It follows that one of the fundamental aspects that emerged from this first phase of research is the need for tourism and cultural organizations to be supported in the development of a digital innovation capacity fostering digital innovation journeys and BMI.

Among the models and approaches analysed, Innovation Labs are strongly emerging and capturing the interest of both academics and practitioners. They are defined as spaces for innovation conceived creatively, within which R&D&I activities are carried out that lead to the generation of innovative solutions to improve business performance (Lewis and Moultrie, 2005, Memon et al., 2018; Osorio et al., 2019; Schmidt et al., 2015).

This solution, however, despite the potential, is not pervasive in the tourism and cultural sector and SMEs in general, due to the barriers mentioned above.

The research, therefore, deeply explored the phenomenon, both from a theoretical and empirical point of view. In the next section, the results related to RQ2 and RQ3 are discussed, to understand how Innovation Labs can become a valid solution to favour DT and BMI in tourism.

Discussing RQ2 e RQ3: Why Innovation Labs could become a valuable solution to foster DT and BMI in tourism and cultural organisations? What is the State of the Art? What are the emergent Innovation Labs' configurations? What are their features and provided services? How do they work? What is the management model of an Innovation Lab?

In this phase, a systematic literature review and a multiple-case study approach have been conducted to investigate better and provide a clear understanding of the phenomenon, and to assess opportunities and validity to build theory around the development of Innovation Labs in tourism and cultural sector. Despite the growing attention around the topic, academic contributions had never been systematically reviewed. In this regard, a systematic literature review, following the approach proposed by Tranfield et al. (2003) has been carried out. A search on Web of Science and Scopus databases was performed, and after applying including and excluding criteria, 104 full papers were studied according to two main perspectives: Space & Infrastructures and Strategy and Management. Papers were thus analysed to identify the critical features of these labs in terms of physical space and its components like design, furniture, technical and digital equipment, as well as intangible infrastructure. In the second part of the

review, then, strategic and managerial aspects were detected in terms of reasons behind their development, key objectives, provided services and operational aspects.

It resulted that Innovation Labs has been defined in the literature as organisations' creative spaces equipped with the latest technologies and dedicated to supporting, in different ways, the enhancement of innovation capabilities, and for developing and testing innovative ideas and solutions (Lewis and Moultrie, 2005, Memon et al., 2018; Osorio et al., 2019; Schmidt et al., 2015).

Moreover, the detection of the Innovation Labs' distinguishing features led to the proposal of a taxonomy. Innovation Labs have been grouped into seven typologies according to their aims, users, functions, provided services and infrastructures: working labs, fabrication labs, firm-driven innovation labs, public-driven innovation labs, investors-driven innovation labs, academic-driven innovation labs, and living labs.

Furthermore, the conducted review led to the identification of critical literature gaps. Most of the analysed articles focused on the impact of physical creative spaces on organisations' innovation attitudes, avoiding the provision of guidelines or insights on their management. Moreover, several studies highlight the need for further empirical investigations as they are limited to a restricted number and contexts of such initiatives.

Therefore, a multiple-case study approach on nine Innovation Labs has been developed to enrich literature insights, validating the patterns that emerged from the literature review.

The multiple-case study has provided valuable insights to understand the functioning and recurrent management practices of an Innovation Lab. The triangulation of these insights with those emerged from the systematic literature review, led to the identification of five subsequent critical phases distinguishing the management of an Innovation Lab: i) focusing, ii) engagement and enabling, iii) developing innovative solutions, iv) delivering and application support, and v) reviewing and consolidating.

An Innovation Lab's management framework has then been proposed. The framework is conceived as a cyclical model aimed at leading organisations in continuous innovation processes that are increasingly required to stay competitive in the current evolving competitive landscape. Therefore, its shape reflects the general objectives of an Innovation Lab, namely, to develop a digital innovation capacity, understood as an attitude to improve and always generate new innovative solutions.

The framework, in definitive, contributes to increase knowledge and suggest theoretical and empirical guidelines on the field, fruitful both for academics and practitioners.

This research phase has led to the confirmation of many of the above-identified patterns, and at the same time has helped identify valuable insights, especially in terms of potential value to help to spread

the model in tourist and cultural organizations.

From the multiple-case study analysis, therefore, it emerges that compared to a series of dated studies that considered Innovation Labs mainly as physical spaces dedicated to innovation (Bloom and Faulkner, 2016; D'Auria et al., 2017; Schmidt and Brinks, 2017; Magadley and Birdi 2009), the importance of the structural component is currently waning. Physical spaces, nowadays, also due to technological development, are increasingly losing its centrality in the conception of Innovation Labs. This is for several reasons. First of all, for a change in the dynamics of the competitive context. With the progress of technology and related ease of access, as we have already seen, hybrid configurations of innovation labs that provide services remotely are also taking hold. In this vein, the research for collaborations, even with potential partners, experts in a particular field, who are on the other side of the world and who until a few years ago were unattainable, is now possible. Similarly, the services provided by an Innovation Lab, especially those relating to training and idea generation, become much more scalable because they can be experienced remotely by many more participants.

Furthermore, the importance of physical space is becoming less relevant also because managers have previously found an aptitude to be conceived more as exhibition spaces than as workplaces in which to dedicate themselves to innovation. Innovation labs were therefore often perceived as separate organizational units in which to "exhibit the latest technologies and cutting-edge tools, and in which scientists, experts and geeks closed themselves up to invent new solutions". The strategic vision connected to the innovative activities in progress was not understood and shared with the rest of the organization.

Lastly, it emerged that all the laboratories analysed are configured as relational platforms to facilitate interconnections with the ecosystem in which companies operate and to encourage open innovation approaches and activate continuous iterated learning processes with consumers and stakeholders.

This new concept was necessary for response to a series of previous Innovation Labs failures. The first Innovation Labs were conceived as organizational units isolated from the rest of the organization within which R&D&I functions were carried out with closed logics, which spoke little and ill with the external environment and with the rest of the organization. The resulting innovations were often not understood by the rest of the organization and were thus not adopted, leading to the failure of the initiatives. Furthermore, the closure to the external environment, often led to the production of innovative solutions, in terms of new products and/or services that did not consider the demand, increasing the risk of failure.

It was, therefore, essential to start reconfiguring the Innovation Lab concept from a new perspective according to which space is considered more metaphorically.

The new configurations, therefore, contemplate the space as a physical place, but simultaneously, a

virtual and relational one. Here, the organizational climate, the ability to involve the participants and the attitude to make the laboratory perceived as an internal and open organizational unit are more important. This unit works at the service of all to generate innovative solutions that meet the needs of users, employees, stakeholders, organization and ecosystems. The Innovation Labs are therefore conceived as workplaces, dedicated to innovation in which enter to brainstorm, test, build, measure and learn to generate ideas to trigger innovative dynamics.

Based on these emerging dynamics, new Innovation Labs' configurations are following the dynamics mentioned above and are opening the R&D doors to the rest of the organization and the entire ecosystem. An active engagement of employees, colleagues, users, and stakeholders, and the attitude of building external partnerships to optimize resources and efforts becomes relevant. Moreover, new configurations of labs are also following the latest digital trends, consequently adapting spaces and businesses.

In this regard, it is considered mandatory to propose a new definition of Innovation Labs, which considers all this and leads to reconsidering an emerging configuration of these structures in a more open key and more at the service of the ecosystem. It follows that Innovation Labs can be defined as ***a management initiative, aiming to create of an innovative space - which can take the form of a physical, virtual or hybrid environment – fostering creative and innovative thinking, promoting and supporting user-driven and open innovation approaches, to facilitate stakeholders engagement in innovations processes, to better understand users' needs, to drive technology transformation, to imagine and defining innovation opportunities, and to develop new business solutions capturing and delivering value.***

In definitive, analysing Innovation Labs more in-depth through a systematic literature review and a multiple-case study approach, a new configuration of labs emerged and was defined.
Innovation labs, previously conceived exclusively as closed research laboratories and for the exclusive internal use of the client companies, are opening the doors of R&D to generate open and co-created innovation processes. Moreover, Innovation Labs result not only as internal physical spaces but also as virtual or hybrid relational platforms acting as innovation intermediaries fostering digital innovation opportunities for several organisations.
This new configuration is therefore suitable both for more structured organisations and for SMEs and therefore for tourist and cultural organisations. These organisations, thanks to the adoption of open approaches aimed at seeking collaborations, will be able to receive support and undertake digital innovation journeys, finally breaking down the traditional barriers to innovation that have always

distinguished them.

Hence, the great potential for tourism and cultural organisations is ascertained. The next section thus discusses the results of the AR project conducted to verify, on-field, the impact of an Innovation Lab in a tourism organisation.

Discussing RQ4: How can an Innovation Lab contribute to the Digital Innovation Capacity development, Digital Transformation and Business Model Innovation in tourism and cultural organisations? How managing an Innovation Lab for this purpose?

This RQ has been answered through an AR project conducted in collaboration with an organization operating in the tourism sector and intending to launch a product on the market that meets the real needs of consumers and meets market demand. At the same time, the company was determined to acquire an aptitude for innovation that would allow it to remain competitive and to adapt promptly to the constant changes in the competitive environment. This is above all due to the Covid-19 pandemic, which severely impacts on the tourism and cultural sector.

Researchers were prompted to carry out the AR project to the following reasons:

- validate the proposed management framework;
- test the cyclical model, the identified phases and to assess their effectiveness in practice;
- determine the efficacy of Innovation Labs in contributing to digital innovation capacity development, and fostering DT and BMI practices within organisations;
- demonstrate the adaptability of the framework to SMEs as well as to the tourism organisations.

The AR project was divided into two cycles to facilitate a gradual and increasing involvement of the partner company. In the first cycle, therefore, the company was involved in an external Innovation Lab involving some tourism and cultural stakeholders. The initiative was aimed at fostering and enabling organisations' and regional tourism ecosystem' digital innovation capacity, to promote DT and BMI for increasing the competitiveness and attractiveness of organisations and destinations, even during the lockdown forced by the pandemic.

In particular, the company had the opportunity to:

- learn user-driven and human-centred approaches and practices engaging employees, users and stakeholders and to therefore identify context trends, challenges and opportunities;
- benefit from relational dynamics and promote networking opportunities to generate opportunities for collaboration and innovation;

- exploit cross-fertilisation dynamics to stimulate the organisation's innovative thinking and digital innovation capacity.

In the second cycle, on the other hand, the Innovation Lab's management framework was tested directly within the company with multiple purposes. First, to encourage further development of the generated ideas, taking into account the Innovation Lab' principles. Moreover, to favour the involvement of employees allowing them to understand and accept the produced innovations based on user-driven and human-centred dynamics that are useful to create a marketable product.

At the launch of the AR project, the organisation already had a product in the pipeline: a digital platform for regional tourism promotion.
After the activities carried out during the two cycles applying the framework, the product resulted significantly improved. Thanks to the continuous iteration with potential users and local communities, several services have been added, and others improved, taking into account the challenges and needs that emerged from the interaction with users.

The carried-out activities, and the related impacts produced by the Innovation Lab in favour of the company in terms of DT and BMI can be grouped into a framework useful for generalizing insights to the entire tourism and cultural sector (Figure 14).
Specifically, retracing the activities supported by the company as part of the AR project developed, it is possible to gather useful insights to promote the dissemination of the proposed tool in the tourism and cultural sector.
It is therefore clear that based on the phases characterizing the Innovation Labs' management framework and inspired by human-centred, user-driven approaches, will be possible to analyse the context to identify the problems, existing needs and define the critical challenges on which address future development/innovation strategies. Therefore, opening up to the external territorial ecosystem and opening the doors of R&D, following open innovation principles, through intra-sector and extra-sector benchmarking activities, it will be possible to identify best practices and emerging trends, which combined with the use of creative techniques, during focus groups, allow transforming challenges into opportunities. At this point, a process of designing and developing innovative solutions based on existing needs and existing knowledge, and which therefore generates knowledge and learning, can be developed.
This process contributes to the development of a digital innovation capacity and can lead to the generation of innovative solutions. In the case of the involved company, for instance, innovative products and services were generated to be implemented in the platform in the pipeline. These

innovations contributed to a precise realignment of the product to consumer needs and market dynamics, which especially due to the pandemic, became more and more digital-oriented and open to performing services remotely. This has also favoured multiple BMIs, as the new services conceived have opened up to many new opportunities both for the company involved and for companies operating in the ecosystem and interested in using the platform to promote their services.

In definitive, therefore, it emerges how the application of the proposed model in the tourism and cultural sector can contribute, through DT dynamics, to innovate business models in terms of operations, improvement of the user experience and relationships with users and stakeholders, and ultimately to increase the attractiveness and competitiveness of the entire ecosystem.

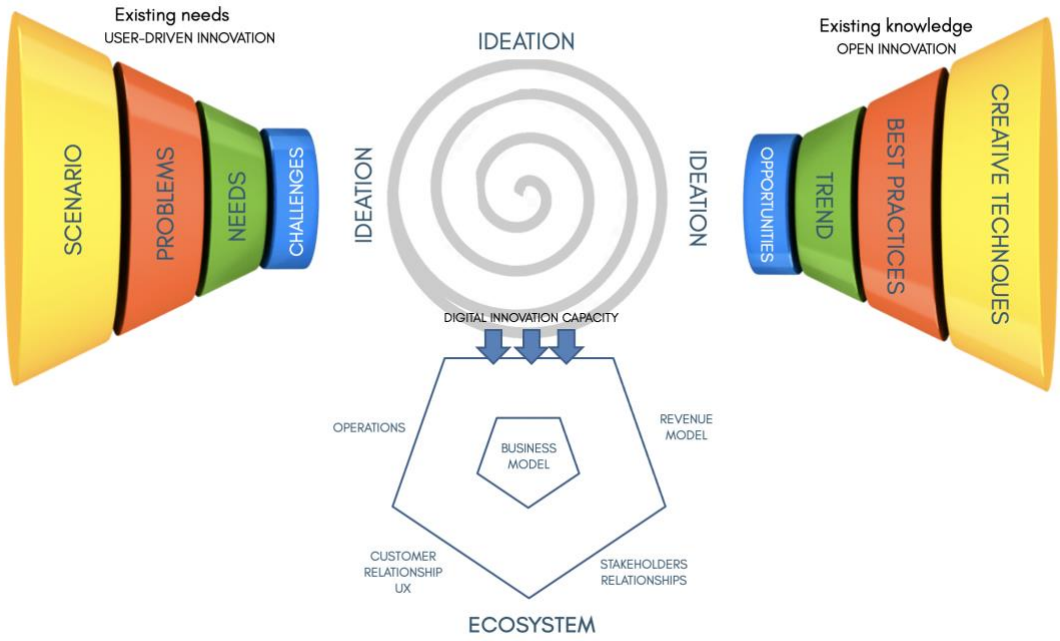

Figure 14 . The impacts of Innovation Labs in tourism and cultural organisations

7. Conclusions

7.1 Theoretical and Practical contributions

From a *theoretical perspective*, inserting in the emerging discussion in the innovation management and tourism innovation fields, this study faces the issue of developing a digital innovation capacity and fostering DT and BMI in tourism and cultural organisations. The study, thus, investigates the role of Innovation Labs as valuable solutions in this regard.

The analysis is conducted providing various original contributions.
The systematic literature review enriches knowledge and theory in this field, allowing a comprehensive understanding of the phenomenon, providing scholars with more in-depth investigations distinguishing critical features, functioning mechanisms, inspiring principles and following paradigms and methodologies. According to this, the emergent patterns provide a conceptual basis for the proposal of a taxonomy distinguishing seven recurrent typologies of Innovation Labs.

Moreover, the multiple-case study analysis allowed to enrich the insights gathered from the literature. The on-field analysis of nine Innovation Labs allowed a comprehensive empirical validation of above-identified patterns and a more in-depth investigation of Innovation Labs managerial dynamics. In this regard, an Innovation Labs management framework has been proposed to provide scholars and practitioners as well, with theoretical and practical findings on how to develop and manage these initiatives.
Then, AR contributed to enrich theories on tourism innovation management. This methodology is, indeed, particularly suited to investigate events or issues typical of emergent contexts to transform practices through interventions and build theory from it (Ollila and Yström, 2020). In particular, the projects led to developing theories on the contributions of Innovation Labs in fostering DT and BMI in tourism organisations. A further framework has been proposed to explain the impact produced by Innovation Labs initiatives in terms of BMI and DT in favour of tourism and cultural organisations. Lastly, the analysis of the AR project compared Innovation Labs' management framework with change management frameworks to detect alignments and to highlight insights to support researchers in considering the model as a tool to support innovation dynamics in times of crisis.
This research also has relevant *practical implications* since it provides managers and practitioners with an overview of the dimensions to be considered while designing and managing an Innovation Lab to

develop digital innovation capacity and foster DT and BMI in organisations, SMEs and tourism and cultural in particular. Expressly, managers and practitioners are provided with a framework supporting them designing and exploiting management initiatives aimed at embracing digital innovation journeys to generate marketable digital solutions, improve performance and develop a mindset continuous learning and innovation.
Moreover, SMEs, tourism and cultural organisations' managers are provided with a solution that, based on open innovation, user-driven and human-centred paradigms, allows them to face their traditional innovation barriers. Therefore, Innovation Labs become for them innovation intermediaries, in the form of relational platforms fostering opportunities for collaboration and innovation.

Furthermore, considering the specific conducted AR project, managers and practitioners may gather gathered insights on how to: i) improve and adapt pipeline solutions or to launch a product or services aligned with market trends and users' needs; ii) engage employees, users and stakeholders in co-creation activities to validate a pipeline solution; iii) stimulate idea generation to DT and BMI; iv) learn approaches to promote innovation in times of crisis; v) develop attitudes to innovate continuously.

Lastly, to practically exploit the research results, an academic spinoff has been established.
The Innocatalyst is an innovative startup in the form of an Innovation Labs built according to the proposed management framework. It aims to support organisations in the development of a sustainable digital innovation capacity. The spinoff adopts an organisational-management model based on the exploitation of the potential provided by DT and enabling technologies. It builds a content, instrumental and training platform for the supply of services for the management of innovation and the profitability and competitiveness improvement for private organisations, as well as citizen/user orientation for public organisations.
The embedded value for the market is linked to their ability to integrate from the operational point of view the principles and approaches of open innovation, user-driven innovation, participatory-driven innovation, agile and lean-driven innovation, stakeholders-value orientation, design thinking and arts-based innovation, and crowdsourcing of ideas, and skills and knowledge to encourage, facilitate and increase innovative thinking and innovative action of the organisation through the development of factors enabling innovative capacity.

7.2 Limitations and Future Research

The research presents some *limitations* mostly related to the methodologies adopted, that need to be acknowledged.
The systematic literature review has been carried out pursuing qualitative approaches and findings. It follows that papers selection and findings may have been affected by subjectivity. However, this approach has been followed to produce original contributions according to the identified research problems and questions.
Subjectivity may also occur referring to the multiple-case study analysis, even if the selection of cases happened scrupulously, attempting to include each identified typology of Innovation Labs.

Moreover, multiple-case study analysis may limit generalisation and validation. In this regard, the nine analysed Innovation Labs that focus on a single country (Finland) may do not guarantee a comprehensive sample allowing generalisation to other labs in other contexts.
Conscious of this limitation, the AR has been conducted in parallel to multiple-case study analysis to validate the framework exploiting the ongoing gathered insights.
AR also has limitations. Specifically, it would have been appropriate to conduct a third cycle to allow a focus on the impact generated by the Innovation Lab, even in the long-term. To date, it has not been, therefore, possible to verify the value generated by the solutions created and implemented in the company after the second AR cycle. Lastly, it was not even possible to verify the actual development of a digital innovation capacity, measurable by the volume of new solutions or opportunities generated in the long-term.

These limitations can address *future research*.
Further empirical, also quantitative, investigations could be developed to extend the sample and to allow a comprehensive validation of the framework.
Many Innovation Lab's managers or experts might be interviewed through a global survey to operationalise the dimensions identified in the model.

Moreover, a new AR cycle or a new comprehensive AR project should be conducted to complete the current research.
In this regard, it may be interesting focusing on evaluation dimensions of Innovation Labs.
Further studies may require the identification of key performance indicators and metrics, allowing a comprehensive evaluation of Innovation Labs activities and related to each phase of the Innovation Labs' management framework.

In the same way, it might be interesting developing robust indexes to assess the organisations' maturity in terms of digital innovation capacity, DT and Business Model sustainability. These indexes will, therefore, represent the assessment tools motivating and addressing Innovation Labs' interventions and organisations' development strategies.

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