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INNOVATION THROUGH PORTUGUESE AERONAUTICAL HERITAGE

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This study is developed in order to obtain a Master Degree in Management, specialised in Entrepreneurship and Innovation.

It aims to address a way to value and promote Portuguese aeronautical heritage to create and develop a non-traditional tourism product for Portugal destination.

Abstract

Tourism has been challenged by specialised and segmented consumers, which aim to diversify and enrich their experiences portfolio with distinctive products consumption, combining different services to ensure their whole travel expedition.

Besides, tourism products have global competitors. Hence their constant differentiation is critical to guarantee their success. However, tourism sector is dominated by micro and small enterprises, which could compromise their innovation capability and new products development. Therefore, firms' collaboration, appealing at innovation networks framework, have to be profusely applied in the tourism sector once it develops synergies, reduces costs, increases promotion, promotes knowledge creation and spreads out ideas generation.

Despite the growth in tourism literature, most innovation networks research is applied in technological sectors.

This study intends to analyse the development of a tourism product that values Portuguese aeronautical resources, considering a management model that enables continuous product adaptions/ creations that satisfies the changing demand.

This research aims to contribute to improve the state of the art through the development of knowledge in two different (and new) integrated research domains: i) explores the civil and military aeronautical heritage as a tourism resource to constitute a route through Portugal, where these assets exploration as a route all over the country could gain international relevance; ii) supports a tourism product management with the absorption of innovation networks frameworks.

As research results, the Portuguese Aeronautical Route addresses study goals and proposes a non-traditional product that could qualify Portuguese touristic offer.

It is an opportunity to promote the country as an aeronautical destination brand, supported by a multidestination route. Thus, a network combined with a route's framework enables a continuous resources valorisation and ensures sustainability by appealing at multiple organizations collaboration, which feeds innovation cycle and reinforces its strategy through its processes and marketing domains.

Key-Words: Innovation Networks; Tourism Product; Route; Aeronautical Heritage; Multi-method Qualitative Study

Resumo

O Turismo tem sido desafiado por consumidores especializados e segmentados, que ambicionam diversificar e enriquecer o seu portfólio de experiências com o consumo de produtos distintivos, que agregam diferentes serviços para assegurar toda a sua viagem.

Ademais, os produtos turísticos detêm uma concorrência global. Assim a sua constante diferenciação é crucial para alcançarem o sucesso. No entanto, o sector do turismo é pautado por micro e pequenas empresas, que pode comprometer a sua capacidade de inovação e o desenvolvimento de novos produtos. Pelo exposto, a colaboração entre entidades, recorrendo ao modelo de redes de inovação para, deveriam ser largamente aplicadas no sector do turismo uma vez que permitem desenvolver sinergias, reduzir custos, fomentar a divulgação, promover a criação de conhecimento e germina novas ideias.

Contudo, apesar dos desenvolvimentos na literatura do turismo, a maioria da investigação acerca de redes de inovação é aplicada em sectores tecnológicos.

Este estudo pretende analisar o desenvolvimento de um produto turístico que valoriza os recursos aeronáuticos portugueses, tendo em conta um modelo de gestão que assegura contínuas adaptações/ criações no produto que satisfaçam a procura exigente.

Esta investigação pretende superar o estado da arte atual ao desenvolver conhecimento em duas áreas de investigação distintas (e novas) e integradas: i) explora o espólio aeronáutico português, tanto civil como militar, enquanto recursos turísticos para constituir uma rota por Portugal, sendo que a exploração destes ativos num formato de rota por todo o país é internacionalmente inexistente; ii) suporta a gestão deste produto turístico com a aplicação de um modelo de redes de inovação.

Como resultados da investigação, a Rota Aeronáutica Portuguesa responde aos objectivos do estudo e propõe um produto turístico não-tradicional que poderia qualificar a oferta turística Portuguesa.

Seria uma oportunidade para promover o país com uma marca de destino aeronáutico e que se apoiaria numa rota de multi-destinos. Neste sentido, uma rede de inovação em conjunto com a aplicação de uma rota turística permite uma valorização contínua dos recursos e assegura a sua sustentabilidade ao apelar à colaboração entre múltiplas organizações, o que alimenta o ciclo de inovação e reforça a sua estratégia ao longo das áreas de processos e do marketing.

Palavras-Chave: Redes de Inovação; Produto Turístico; Rota; Espólio Aeronáutico; Estudo Qualitativo com Multimétodos

Acknowledgments

I'm delighted for having the opportunity of developing this study since it was a way to close ties and develop knowledge about aeronautical sector, in general, and planes, in particular. It is an older relish that I got from the time that my father used to take me to see all kinds of air shows events, Portuguese Air Force demonstrations, aircrafts training exercises, etc. He is an authentic passionate fan of aeronautics and during those weekends spent looking at the sky for long hours trying not to miss anything, I got infected from this passion and I distantly followed aeronautical entities development.

This study reflects its evolution and my personal interest in aeronautics, which I have to thank my father.

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Acronyms List

Adi – Agência de Inovação

AICEP – Agência para o Investimento e Comércio Externo de Portugal

FAP – Força Aérea Portuguesa

FCT – Fundação para a Ciência e a Tecnologia

GDP – Gross Domestic Product

IAPMEI – Instituto de Apoio às Pequenas e Médias Empresas e à Inovação

ICT – Information and Communications Technologies

ISCTE-IUL – ISCTE – Instituto Universitário de Lisboa

ISEG – Instituto Superior de Economia e Gestão

IST – Instituto Superior Técnico

KIBs – Knowledge Intensive Business Services

NPD – New Product Development

OECD – Organisation for Economic Co-operation and Development

R&D – Research and Development

SME – Small and Medium Enterprises

UNWTO – United Nations World Tourism Organisation

WTTC – World Travel and Tourism Council

WTO – World Tourism Organization

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1   Introduction

Tourism sector is one of the largest economy sectors of OECD countries as it contributes for their growth, income and for assuring 120 million of direct employment and another 125 million indirect jobs in related industries, around the world (World Economic Forum, 2013). In 2013, the total contribution of the tourism sector to the global economy rose to 9% of global GDP, estimated as US $6 trillion (World Economic Forum, 2013), and an annual growth rate of 4% is forecasted for the next ten years (WTTC, 2013).

Nowadays innovation is recognised as the principal motor to drive the economy as it is responsible to introduce growth cycles stimulated by new or significantly changes on products, processes, marketing or organizational methods (OECD, 2005).

Tourism, as a worldwide developed activity, either in underdeveloped economies or in mature economic countries, generates great competition. On the other hand, since travelling is an experience associated to pleasant feelings, demand is globally increasing. As travelling got to be a habit, there is a much more exigent demand.

Global macro trends driving tourism innovation have been studied by WTTC (2013). Global connectivity, population growth pressure, eco-limits and socio-economic development and well-being have been highlighted as the most relevant drivers.

Hence, tourism innovation has attracted adepts once it is necessary to improve its offer, even if it is for experience's diversity or service quality.

This research aims to present a distinctive tourism product for Portugal destination within a management model to ensure a holistic and integrated approach to guarantee its own sustainability.

In this sense, this study addresses two general questions: i) How can we create a tourism product that values aeronautical resources? ii) Is the innovation network model based management a way to ensure its sustainability?

In this context, this research intends to i) absorb management frameworks of innovation networks; ii) assimilate tourism innovation features; iii) identify and analyse national examples as previous research studies have already identified, in order to present evidence based information useful to contribute to this networking tourism product; iv) survey and select the main aeronautic assets to constitute an innovative tourism product; v) propose an integrated and networking tourism product, deeply focused on managing and developing its experiences for a plenty satisfaction of a niche tourist.

It analyses the opportunity of exploring a new tourism product, assuring valorisation of aeronautic resources and existent activities across the whole country to compound the Portuguese Aeronautical Route.

Its management framework is based on the theoretical approach of recent references about tourism networks and innovation networks. It intends to suggest a model to guarantee route's sustainability, assuring both the exploration and exploitation. In this context, this study improves the state of the art through the development of knowledge in two different (and new) integrated research domains: i) explores the civil and military aeronautic heritage as a tourism resource to constitute a route through Portugal, which is an offer internationally inexistent; ii) supports the management of a tourism product with the absorption of innovation networks frameworks, which are usually applied at technological sectors (Plaza, Galvez-Galvez, & Gonzalez-Flores, 2011). Moreover, this study aims to create value by studying this product as an opportunity for Portuguese tourism activity.

Furthermore, innovation networks literature rarely explores practical dimension to diffuse guidelines in order to define and manage them.

This multi-method qualitative study develops a cross fertilization between a technological and a touristic network, in order to extract several best practices to create and orchestrate a tourism innovation network. It is the key factor to develop a route supported by a strategy that explores innovation crossover. Its main domains such as organizations, processes and marketing are outlined by its partners and structure's network.

Despite tourism innovation networks literature being in its infancy, it is a solution to reverse lower collaboration among tourism players (Decelle, 2004) and establishes a global competitiveness since a single player does not have that capability but a heterogeneity collaboration assures risk mitigation for an innovation path; increases knowledge creation; reduces costs and gives the opportunity of promoting an umbrella brand, assuring a proliferative diffusion for more distant markets.

Therefore, this research is structured to promote a diffusion of different stages of innovation networks development. Firstly it states the main contributions in innovation networks and in tourism networks to develop an analysis throughout two Portuguese network cases: Aldeias do Xisto Network and COTEC Innovative SME Network, exploring the main dimensions of networks, such as their missions, their orchestrating functions, their design and innovation management, their operational practices and their impact.

In order to identify resources to support tourism product creation, unique aeronautical assets are stated. Also a benchmarking analysis is developed to extract contributions to increase

tourist experience on Sintra's Museu do Ar, in particular, and in Portuguese aviation museums is presented, in general.

Finally, it presents a chapter where all absorbed inputs along previous chapters are reflected into the Portuguese Aeronautical Route's conceptualisation.

Concluding, this research contributes to tourism innovation networks knowledge, appealing at aeronautical assets exploration as a way to improve Portuguese tourism offer. Similarly, it intends to present and analyse the Portuguese Aeronautical Route creation viability, once it could constitute an innovative tourism product to qualify Portugal destination and to attract a demand that appreciates aeronautical unique experiences.

2   Concepts Review and Appliance

2.1   Tourism and Tourism Product

According to UNWTO (2014), "Tourism is a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes".

Tourism is a result from combined factors: it has tangible and intangible components, which are enriched by sociological and cultural features. Offer and demand are exposed to a high level of heterogeneity (Carvalho & Costa, 2011). Tourism products' consumption has to be in a specific place where they are produced, once the client has to be proactive and comes to the destination (Weiermair, 2004) and "tourism products are 'experience goods' *par excellence*, validated *ex post* facto by consumers" (Decelle, 2004).

Likewise tourism is a "coordination-intensive industry in which different products/ services (transportation, accommodation and so on) are bundled together to form a final product" (Yang, 2012).

As tourism experiences depend on a combination of different suppliers' services where each of them can provide a range of facilities to increase tourists' satisfaction, their delimitations are difficult to establish.

The tourism activity is a service of services. Thus, tourism product definition and boundaries are fuzzy and difficult to unfold, especially because tourists have a major role on defining where a product starts and where it ends. Thus tourists often perceive value-added of tourism products as an amalgam of different services (Yang, 2012), selecting them according to their expectations of a "total experience" (Framke, 2002).

Nowadays tourism faces the challenge of providing so many products diversity as the quickly dynamic tourists' needs (Yang, 2012) and to evolve tourism products it integrates a wide range of suppliers (Rigall-I-Torrent & Fluvià, 2011).

A network of organizations' services from the public, private and non-profit sectors are required to compose a product, once tourists expects a perfect combination between private suppliers' services and public characteristics (Rigall-I-Torrent & Fluvià, 2011).

Developing new tourism products and evolving the existing ones by integrating new components is one of the main focuses on tourism development once it is the result of destination's effort to respond to the tourist's changing demand (Framke, 2002).

Therefore, tourism innovation is crucial to offer "much more splendid and abundant tourism experiences, which improve tourists' satisfaction and enhance tourism industry's competiveness and development." (Yang, 2012, p. 1348).

2.2   Innovation

Nowadays innovation is recognised as the principal

enabler to drive the economy and also became a *cliché* into firm's performance context.

Innovation is introduced by Schumpeter (1934) as an economic concept where he refers that if we had a stationary world, without innovation and economic development, competition eventually would reduce profits to "normal" levels. On the other hand, he describes that a dynamic cycle, within a developing economy, above-normal profits are often the reward for innovation.

This concept is largely accepted and literature evidences that innovation has become a polyvalent and complex concept that achieved different approaches, such as: R&D and innovation (Arrow, 1962); technical innovation to induce economic long waves (Freeman & Soete, 1982);   service innovation (Barras, 1986); entrepreneurship (Drucker P. F., 1985); absorptive capacity (Cohen & Levintbal, 1990); clusters and strategic competition (Porter, 1998) innovation networks (Powell & Grodal, 2005) and others.

Presently, innovation is stated by OECD, in Oslo Manual, as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations." (OECD, 2005, p. 46).

Furthermore, innovation can be seen when enterprises adopt one or a combination of several categories.

Therefore, innovation concept has evolved, as an economic phenomenon, and contributed to increase the way companies and its organizational architecture sees their strategy, performance, competitiveness, their macro environment and their relations with internal and external linkages.

2.3   Tourism Innovation

Tourism is a complex industry that has similarities with other activities like service industries as retailing, banking, recreation and with industrial models, which apply marketing of services (Decelle, 2004). However its specific characteristics encourage researchers to study innovation in tourism sector (Carvalho & Costa, 2011).

Tourism reveals special features (Hjalager, 2002; 2009; 2010) that are highlighted hereafter and restrict innovation management: i) Tourism is linked to specific localities, so spatial context is determinant for innovation (Hjalager, 2010); ii) Labour force is relatively unskilled (OECD, 2006); iii) Tourism is dominated by micro and small enterprises and innovation capacity is closely related with the size enterprise (Hjalager, 2002); iv) Tourism firms are more sensitive to competition from their partners than to benefits of cooperating with them (Decelle, 2004), consequently, collaboration is almost inexistent, provided by intermediary organisations (Hjalager, 2002); v) Dissemination of knowledge is compromised with preconditions such as: • staff at all levels receives little or no industry-relevant training; • labour turnover in tourism exceeds that in most sectors of the economy with seasonality and its short-term contracts; • the sector attracts young people to work and for a short period of time; vi) tourism has low salaries and non-standard working conditions; vii) major entrepreneurs who invest in tourism come from other different sectors; viii) talents retention in the industry is quite low (Hjalager, 2002).

However, these does not mean tourism does not have innovation but that it is quite often conducted by old and large tourism enterprises (Hjalager, 2002). Unlike, tourism SMEs could explore constellations in collaborative structures to arise its innovation handicap (Hjalager, 2002).

As referred previously, tourism products involve multiple suppliers. The coordination between them and distributors, to assure a value-added chain, is crucial to their success (Yang, 2012).

Hence, networks can be seen as a path to foster tourism products innovation, which stimulate new tourism demand and spreads out the word-of-mouth (Yang, 2012).

In fact, Hjalager (2002) adjusted Abernathy-Clark model (1985) to tourism innovation. Originally, it was applied into automobiles industry to list main competitive ingredients to produce architectural, niche, regular or revolutionary innovations. Tourism innovation can absorb innovation network frameworks since it is a motor to climb those different innovation types.

As the determinants of innovation can be found outside the tourism core sector (Hjalager, 2002), tourism also enables innovation through other sectors once they explore its (tourism) generated externalities (COTEC Portugal, 2009). It clarifies the necessity of developing innovation through the interaction with other agents that might not be directly related to the tourism industry (Carvalho & Costa, 2011).

2.4   Innovation networks

A theoretical and practical approach was designed in order to introduce innovation networks definition, diversity and its importance, aspects presented from d) to g) to develop a sustainable network, according to Dhanaraj & Parkhe (2006) dimensions.

Despite knowledge management being considered by Dhanaraj and Parkhe (2006) an orchestration domain, networks literature reveals that knowledge management is a key issue (Nonaka & Takeuchi, 1995; Powell & Grodal, 2005; Sorenson, Rivkin, & Fleming, 2006; Tidd & Bessant, 2009) so this research analyses it as a separate field since it contributes largely into a network success.

Finally, this literature review highlights practical evidences that are required to constitute innovation networks, where their main contributions are stated on Table 1.

Table 1 – Principal Contributions of Innovation Networks

	Authors	Contribution
Innovation Networks Framework	Powell and Grodal (2005)	Networks innovation's types and its main dimensions
	Dhanaraj and Parkhe (2006)	Innovation Network's orchestration framework as a triple challenge: a) Network Design; b) Orchestration Process; c) Innovation outcome
	Ahrweiler and Keane (2013)	Innovation Networks as a tripartite framework along three levels: ideas (Concept Level), people (Individual Level) and social structures (Social-Organizational Level) and the interactions between these levels

Conditions to Implement and Manage Innovation Networks	Nonaka and Takeuchi (1995)	Creating new knowledge as a way to innovate new services and products
	Ahuja (2000)	Importance of network's structural holes for innovation performance
	Bessant and Tsekouras (2001)	Networks as a learning system where its regular practices implementation and revision determine its 'success'
	Dhanaraj and Parkhe (2006)	Knowledge mobility, innovation appropriability and network stability as the core tasks of orchestration's innovation networks
	Sol, Beers and Wals (2013)	Trust and commitment as mandatory variables of interactions on networks innovation
	Kastelle and Steen (2014)	Implement techniques to measure and analyse networks dynamics as a complete network: a much larger system than interactions between individuals.

Source: Pires, R. (2014)

a) Innovation Networks definition

Firms, as institutions composed by people, integrating different departments where each person has its own skills, recognise the importance of combining different human profiles in order to promote a cultural cohesion (Dyer, Gregersen, & Christensen, 2009).

Also, people, as social beings, have contacts and belong to groups as a way of taking enormous advantages such as: absorbing and transmitting experiences; learning; catching different points of view and enriching themselves with knowledge transfer. As the number of groups they belong grow larger, they tend to form clusters of relationships and the more they live among clusters, the more exposed they'll be to different ideas (Baer, 2013). Hence, the more linkages they have, the more innovative they will be and extend their own knowledge domains (Dyer, Gregersen, & Christensen, 2009).

Actually, networking is one of five skills of 'true innovators' (Dyer, Gregersen, & Christensen, 2009) and as an organization retains networking people, networks scales up at higher levels (Kastelle & Steen, 2014). Thus, "networks are an essential element of innovation." (Kastelle & Steen, 2014, p. 102).

On interorganizational sphere, networks are a means by which organizations can pool or exchange resources, and jointly develop new ideas and skills (Powell & Grodal, 2005).

Furthermore, innovation networks require members from different areas and organizations, where participants will share throughout the innovation process until the product/ service's implementation (Ahrweiler & Keane, 2013).

Organizations with broader networks are exposed to more experiences, different competences and added opportunities (Beckman & Haunschild, 2002). Innovation occurs in a creative environment exposition, among different organizational mind sets, not within a single organization knowledge neither appealing to its own skill base (Powell & Grodal, 2005).

Consequently, an innovation network is a combination of organizations, thus it is like an organization itself because it involves the interplay of people and ideas to create new commercially–realizable products, processes and organizational structures (Ahrweiler & Keane, 2013).

In fact, "smart firms have always recognised the importance of linkages and connections – getting close to customers to understand their needs, working with suppliers to deliver innovative solutions, linking up with collaborators, research centres, even competitors, to build and operate innovation systems" (Tidd & Bessant, 2009, p. 282).

Collective efficiency, collective learning, collective risk taking and the intersection of different knowledge sets are major arguments why organizations want to push for greater levels of networking in their innovation processes (Tidd & Bessant, 2009).

b) Types of Innovation Networks

Networks emerge between the flexibility and autonomy of markets and the force and control of organizational authority (Powell W. W., 1990), where different networks types emerge, varying its purposes, duration, stability, ties (Powell & Grodal, 2005) and its boundaries. A network can be closed, which has a clearly definable boundary other firms are, or can be open, that does not has pre-defined boundaries (Kastelle & Steen, 2014).

Both external and internal factors influences networks framework (Powell & Grodal, 2005; Dodgson, 2014; Kastelle & Steen, 2014).

However, Grabher and Powell (2004) identify four different types of networks, according to their temporal stability and forms of governance: informal networks (based on shared experience); project networks (short-term combinations to accomplish specific tasks); regional networks (where spatial propinquity helps sustain a common community); and business networks (purposive, strategic alliances between two parties) (in Powell and Grodal (2005)).

c) Innovation Networks Impact

Generating impact means creating benefits and adding value to network's partners and to its environment.

A high value innovation network is a result of the following success factors: third-party gatekeepers; financial leverage; proactive partner engagement; and heterogeneous partners (Levén, Holmström, & Mathiassen, 2014), which similarly must be organised by common criteria such as activity, dimension and collaborative innovation strategy.

Networks lead to various benefits with respect to information diffusion, resource sharing, access to specialised assets and interorganizational learning (Powell & Grodal, 2005).

New product diffusion is also promoted by networks but this is severely affected by its typology, which determines its speed and reach. Peres (2014) emphasises the importance of high network connectivity and strong hubs.

Furthermore, networks create value outcomes in business markets (Corsaro, Ramos, Henneberg, & Naudé, 2012) and change the "landscape of competition" (Eklinder-Frick, Eriksson, & Hallén, 2012, p. 800) since firms gain capabilities and resources to develop new products and processes that will influence broader networks, enabling innovation within and across countries (Mendonça, 2009).

Networks development requires and raises the absorptive capacity (Cohen & Levintbal, 1990) to allow collaboration, which changes value-chain and the way (at multi-level hierarchies) entities cooperate with their suppliers, customers, competitors, research organizations and, finally, the performance of technologically new or improved products (Tsai, 2009).

Finally, networks have obtained relevance (Powell & Grodal, 2005) because it is a shared (formal or informal) structure that addresses the main three levels of innovation management: definition of its scope; managing its changing nature; and merging disciplines, levels of analysis, and research methods (Dodgson, Gann, & Phillips, 2014).

On the other hand, networks allow "important interactive factors, such as feedback loops, co-creation, and the non-linear nature of idea diffusion" (Kastelle & Steen, 2014, p. 116). From individual relationships – 'ego-networks' - it evolved to 'complete networks', considering multi-level interactions (Kastelle & Steen, 2014) that sustains the network model of NPD (Trott, 2012, p. 442). As innovation progressed, it has evolved from a linear to a multi-channel interactive learning model, where firm's environment, other actors and the knowledge pools determine their relevance for innovation management performance (Caraça, Lundvall, & Mendonça, 2009) and, consequently, for networks impact.

d) Networks design and structure

A network is composed by a number of positions or nodes, occupied by firms, business units, universities, governments, customers or other actors, and links or interactions between these nodes. Networks can be tight or loose, depending on the quantity (number), quality (intensity) and type (closeness to core activities) of the interactions or links (Tidd, Bessant, & Pavitt, 2005).

Despite its importance to assure companies competitiveness, the shape of a network is so important as its partners (Baer, 2013). Its connections, knowledge flow, complexity, diffusion processes, social proximity, ties strength, governance model and its management innovation are the main causes that dictate its results and sustainability (Powell & Grodal, 2005; Sorenson, Rivkin, & Fleming, 2006; Tidd, Bessant, & Pavitt, 2005).

Networks design is composed by interdependent linkages between three spheres: membership, structure and position (Dhanaraj & Parkhe, 2006). Thus, each domain influences others and a balance between them to design a network is necessary.

Networks membership deals with the diversity and its size, which will define its dynamic, the value and potential knowledge it can afford to its partners. Thus, its members and its interactions are necessarily related with its potential outcomes (Levén, Holmström, & Mathiassen, 2014) and with the opportunities it can expect.

The structure is related with network's density and autonomy between its socio-economic systems (Saviotti, 2009) . Leadership is a key piece to pull together the dispersed resources and capabilities of network members (Dhanaraj & Parkhe, 2006). Network position refers to the "centrality, confidence and status ascribed to the hub by the network members" (Levén, Holmström, & Mathiassen, 2014, p. 158). Thus, it influences the dynamic process of social learning and its inherent trust and commitment through the (inter)actions (Sol, Beers, & Wals, 2013).

e) Networks Orchestration

Network orchestration is defined as the set of actions deliberated by the hub firm to create and extract value from the network (Dhanaraj & Parkhe, 2006).

In this sense, strong or weak ties influence networks collaboration therefore orchestration and innovation outcomes. Strong ties are based on common interests, sharing considerable information and reinforcing existing views. Weak ties introduce novelty with different ideas and by introducing new information (Powell & Grodal, 2005).

To clarify, consider the example where A and B, and simultaneously B and C, have both strong ties. However, A and C do not know each other, so B becomes a bridge, and a weak tie between A and C is born.

Still, structural holes (as it is between A and C) offer great opportunities for innovation (Ahuja, 2000) and different types of relationships enrich networks, since strong ties provide rich and detailed information, and weak ties provide better access to non-redundant information (Powell & Grodal, 2005).

These confirm the need to orchestrate ties and members' diversity, where Powell and Grodal (2005) state that young and small firms extract larger benefits from collaborative relationships than bigger firms do.

As networks evolves, gradual adjustments are expected in their external environment and with inter-system transitions, induced by fluctuations, which bring discontinuous changes, giving rise to the emergence of new structures/ networks (Saviotti, 2009).

Additionally, Dhanaraj and Parkhe (2006) consider that orchestration: i) potentiate the knowledge mobility, which is dispersed along members; ii) manage innovation appropriability to explore innovation with patents, copyrights and trademarks to capture profit's network, which goes further than each organization interests; iii) and promote the network stability to conduct value creation.

However, stability needs to be managed because if it exists a cost reduction will appear, enabling adaptation and agility capacities (Lorenzoni & Lipparini, 1999), but if it has more instability, it increases disruptive innovation output (Dhanaraj & Parkhe, 2006).

f) Knowledge Management

Knowledge is relevant information that derives from education, context and experience, where both values and skills contribute to acknowledge capabilities creation (Leonard & Barton, 2014).

Although the importance of existent knowledge, Nonaka and Takeuchi (1995) denote that new "organizational knowledge creation" is determinant for success. It results on a combination of different competences to redefine both problems and solutions to re-adapt organizations to get their competitiveness and empower innovation (Nonaka & Takeuchi, 1995).

Knowledge creation enables more sustainable practices and policies (Sol, Beers, & Wals, 2013) along a cyclical interactive process where tacit knowledge is mobilised in the pursuit of

creative innovation, which requires socialization, externalization, combination and internalization (Nonaka & Takeuchi, 1995).

Hence, using knowledge to affirm distinct business (Drucker P. , 1964) and to promote innovation (Sorenson, Rivkin, & Fleming, 2006) involves four dimensions, according to Leonard and Barton (2014): i) identify employee knowledge and skills; ii) explore technical systems that embodied proprietary knowledge; iii) implement managerial systems such as processes of knowledge creation and control; iv) and formulate values and norms to create and explore existent (tacit or explicit) knowledge.

As tacit knowledge has an experiential component, it is more competitively valuable but also becomes more difficult to convey to others (Leonard & Barton, 2014).

Hence, common knowledge creation and sharing is the currency to upgrade continuously (Nonaka & Takeuchi, 1995). It appeals at complementary assets (Powell & Grodal, 2005) and enables significant innovatory outputs (Dhanaraj & Parkhe, 2006).

Managing knowledge through innovation networks requires a detailed framework, where an interactive platform and an activity plan supports it in order to sustain its interactions and information exchange that will be disseminated through members and embodied in products/ services/ systems (Nonaka & Takeuchi, 1995).

In this sense, knowledge transfer needs to be managed since it can be negatively affected by both the nature of knowledge and the differences in organizational culture (Simonin, 1999).

According to Powell and Grodal (2005), information transfer on networks varies with:

i) Type of knowledge, where explicit knowledge is relatively easy to transfer in contrast with tacit knowledge;

ii) Language, which has to be common among all network members to establish an efficient communication;

iii) Network's age, as its development suggests a learning curve to assimilate codification knowledge processes, which determine flows of information exchange and how mental models are built and shared between its partners, facilitating communication and spreading out ideas. The more mature it gets, trust increases and transaction costs reduces (Tidd, Bessant, & Pavitt, 2005) as the negative effects of experience and complexity knowledge tend to disappear (Powell & Grodal, 2005).

At last, knowledge is central to delineate networks framework but it is also fundamental to orchestrate the type of networks it will be developed into, for instance to define ties strength, social proximity, networks dynamic, members autonomy and diversity.

g) Innovation Management Practices

Innovation management practices involve the development of continuous initiatives in order to implement and evolve innovation strategy, which allows network's goals achievement.

It progressed from internal capabilities focus, controlling all the process since emerging ideas until their market deliver, to a model of open innovation (Chesbrough, 2003).

Boundaries between internal and external environment are more porous since companies have the ability to coordinate a process where ideas arise at the market and explores channels outside their current business (Chesbrough, 2003).

Ideas and knowledge should be at the top of priorities in order to stimulate their proper exploration. If they are not, they will be lost (Chesbrough, 2003) and an opportunity to emerge value through markets will disappear.

In this sense, innovation networks with their collaboration, sharing and co-creation model are a way to pop up knowledge valorisation in order to develop products and services that satisfy customers' needs.

Orchestrating innovation networks implies a coordination of network activities by a hub firm without hierarchical authority (Dhanaraj & Parkhe, 2006) in order to empower its members to work effectively together (Dodgson, 2014) and to achieve network's purposes.

Bessant and Tsekouras (2001) defend that there are operational variables, which determine how the network will actually operate:

Table 2 – Network's Operational Variables

Variables	Influences and Impact on Networks
Co-ordination and Facilitation	Formal inputs are necessary to help energise and co-ordinate their operation. The role of 'network broker' is complex and requires a combination of energy and enthusiasm, credibility within the network and an ability to facilitate processes and to articulate their learning needs.
Measurement Framework	Define what will constitute the network's 'success' and consequently what are those metrics and how often they will be measured.
Operating Arrangements	Review the mechanisms whereby learning can take place to assure its continuous improvement. This involves a selection from a range of options - workshops, visits, newsletters or others - and also determine their frequency, organisation, location, contents, etc.
Operating channels	Review the channels in use to diffuse knowledge/ enable learning such as meetings, structured interactions, etc. and match it with its performance measures.
Resources	Define what resources - people, learning materials, etc. - are available

	or can be developed to support the network.
Blocks and Barriers	Identify and manage factors which inhibit the network's successful operation, including lack of motivation to learn, communication difficulties, blocking behaviour by key individuals or groups, etc.
Enabling tools and techniques	Define interventions which can help deal with some of these blocks. For example, training, organisational development inputs, facilitation, benchmarking, etc.

Source: Bessant and Tsekouras (2001)

Additionally, information and communication technologies facilitate the network's learning process and its operations since it has a marked impact in processing and diffusing information (Bessant & Tsekouras, 2001).

Finally, implementing and managing networks success depends on a complex system between those variables, which has to be combined and reviewed regularly along all its actions, members and also considering the external environment, which fosters or restricts innovation processes.

2.5 Tourism Networks

Despite the study of innovation networks having started on industrial context, the importance of tourism networks have grown for researchers (Shih, 2006; Plaza, Galvez-Galvez, & Gonzalez-Flores, 2011; Kimbu & Ngoasong, 2013).

Table 3 – Main Contributions of Tourism Networks Research

Authors	Contribution
Palmer and Bejou (1995)	Present tourism destinations as many local alliances to constitute products based on interdependency among stakeholders
Hjalager (2002)	Highlights obstacles to tourism innovation processes and knowledge transfer
Novelli, Schmitz and Spencer (2006)	Networks and clusters as a way to improve tourism product for tourists specific requirements
OECD (2006)	Present tourism network as a tool to foster innovation by exploring external linkages and informal networks on tourism products and destinations
Cooper and Baggio (2008)	Refer the necessity of being collaborative in competitive destinations, by emphasizing the relationships that form a value-creation system instead of weak interactions between tourism product stakeholders
Plaza, Galvez-Galvez and	Present main conditions to orchestrate a tourism network and apply them

Gonzalez-Flores (2011)	on a case study to measure results
Pinto and Kastenholz (2011)	Defend tourism network as a tool to manage and for marketing destinations
Strobl and Peters (2013)	Highlights the importance of entrepreneurial reputation of actors, strong ties' density and informal relationships between actors for destination network success
WTTC (2013)	Recognise that tourism has to adopt an holistic approach, which is necessary to look beyond competitive boundaries and to develop new collaborations
Hoarau and Kline (2014)	Defend that tourism innovation processes can be fostered by co-creation model and knowledge sharing as tourism experience is co-created by all stakeholders involved

Source: Pires, R. (2014)

a) Relevance and Benefits of Tourism Innovation Networks

Tourism Networks enable the best possible exploitation of 'place advantages' and conducts to synergies in an inherently complex tourism offering (Pinto & Kastenholz, 2011). This can be promotional cost reduction; extending markets (Cai, 2002); improving complementary firms, which may not necessarily be involved in the same sector, or simply working for their own interests (improve sales and profits) and for the visitors/customers benefits (improve experience) (Novelli, Schmitz, & Spencer, 2006).

Therefore, collaboration (WTTC, 2011) and external innovation network (OECD, 2006) enable innovative solutions, both in a competitive and a sustainable manner (WTTC, 2013; World Economic Forum, 2013). In fact, coordinated moments are necessary to debate and think creatively to adjust at constant changes (World Economic Forum, 2013).

Under Eureka initiative, an intergovernmental association, exists a collaborative tourism project where public and private entities jointly interchange information, spreads out new technologies for the improvement and sustainability of tourism, facilitating the creation, application and diffusion of the outcomes (EUREKA Network, 2010).

Likewise, sustainability is central to promote tourism development supported by people, planet and profits needs (WTTC, 2013) where education, knowledge management and institutional development are key factors (UNWTO, 2011a) and governance by network facilitates innovation process (UNWTO, 2011b).

b) Networks as a Destination Marketing Strategy

Although tourism networks serve multiple purposes like facilitating package of related products through alliances (Miguéns, 2009), "most of the collaboration tends to involve destination marketing driven by territorial authorities." (Decelle, 2004, p. 11).

Destinations are amalgams of tourism products as a way to offer an integrated experience to consumers (Buhalis, 2000) as a single entity, many times under a brand (Pinto & Kastenholz, 2011), and ultimately they are provided locally (Buhalis, 2000).

Destinations have inter-related firms promoting its tourism products, which develop a "co-marketing alliance" (Palmer & Bejou, 1995, p. 618), so networks acquired their relevance on tourism innovation (Palmer & Bejou, 1995; Decelle, 2004; Novelli, Schmitz, & Spencer, 2006; Shih, 2006; Cooper & Baggio, 2008; Miguéns, 2009; Hjalager, 2010; Pinto & Kastenholz, 2011).

As long as the integrated tourism supplies change, tourist behaviour adjusts (Novelli, Schmitz, & Spencer, 2006). He expects to satisfy his needs by consuming a network of services to obtain a complete experience (Buhalis, 2000; Novelli, Schmitz, & Spencer, 2006).

However, for a single and small company it is difficult to coordinate in a highly complex environment. Its effective response would be service offerings articulation within a network and developing synergies with a single brand. It maximises the outcome for tourists and companies (Pinto & Kastenholz, 2011).

Actually, WTTC awarded destination networks such as the Alpine Pearls[1] in 2011, the Destination Røros[2] in 2012 and the Peaks of Balkans[3] in 2013, where multi-stakeholder enables a common policy to promote sustainable tourism products, qualify their endogenous resources and articulate a distinctive offer. Despite of being specific regional cooperation, they cross borders and in case of the Alpine Pearls they stretch across six countries.

c) Tourism Networks' Emerging Needs

Although interorganizational networks have reached attention from researchers (Pinto & Kastenholz, 2011) and reveal their importance for organizations performance, these collaborations "are embodied in destinations (…) as loosely articulated groups of independent suppliers linked together to deliver the overall product." (Cooper & Baggio, 2008, p. 171). Consequently, they disclose weak interactions.

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[1] http://www.wttc.org/site_media/uploads/downloads/Alpine_Pearls.pdf, on 28th April, 2014
[2] http://www.wttc.org/site_media/uploads/downloads/2012_Case_Study_Destination_Roros.pdf, on 28th April, 2014
[3] http://www.wttc.org/tourismfortomorrow/winners-finalists/2013-winners-finalists/peaks-balkans-kosovo/, on 28th April, 2014

Likewise Cooper and Baggio (2008) refer that research has ignored the content and dynamics of network operation, so it should point useful methodologies about them.

This research addresses listed limitations on tourism networks research, once it proposes the main dimensions to implement and manage networks[4] to support a sustainable tourism product development.

Similarly, "in some cases the competitive advantage of a destination depends on its predictability" (OECD, 2006, p. 128) and not on a planned innovation, which compromises long term results and competitiveness.

Previous innovation networks'[5] learnings about their operation and management need to be adapted to tourism reality. As knowledge is the basis of a firm/ network, Hjalager (2002) proposes a knowledge transfer channel as a broader model, which is crucial to understand the push and pull mechanisms (Hjalager, 2002) to conduct innovation processes.

In fact, main networks operational variables mentioned previously[6] were applied at a tourism network: CICtourGUNE, a Competence Research Centre for Tourism. Through some measures it was possible to conclude that SMEs tourism innovation depends critically on the knowledge intensive business services (KIBs), such as ICTs, software development, R&D, and non-technological innovations. Also, tourism industry relies on cooperation in order to effectively sell tourism experiences and destinations, despite collaborative efforts in tourism being still limited (Plaza, Galvez-Galvez, & Gonzalez-Flores, 2011).

Moreover it should go further and evolve from a centralised destination stakeholders participation to a decentralised structure to ensure effective tourism development (Kimbu & Ngoasong, 2013).

2.6   Network Approach to Tourism

This network approach to tourism aims to analyse the best practices and impact of two Portuguese network's cases, which were identified among interviewed entities, in order to extract guidelines to address the tourism networks improvement necessity, as Chapter 2.5 states.

To analyse their innovation management and to develop an empiric comparing study, considering Network's Operational Variables[7], developed by Bessant and Tsekouras (2001).

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[4] In Table 2
[5] In Table 2
[6] In Table 2
[7] In Table 2

Aldeias do Xisto network (henceforth "Aldeias do Xisto") was identified for being a tourism network that developed a product, in Portugal centre's region, considering local different firms and involving local community, fostering cooperation and externalizing its impact through other sectors. COTEC Innovative SME (henceforth "Innovative SME") is a network based on innovative and technological companies, which is a reference for its orchestrating and innovation management practices, members' collaboration and for fostering their internationalization.

In this research an innovative way to achieve results is applied, by engaging two distinct sectors to address how tourism innovation networks can be further developed in specific and innovative domains. Thus, it intends to learn and apply practices from other sectors since both have to accomplish the main dimensions of networks: Networks Design and Structure; Networks Orchestration; Knowledge Management; and Innovation Management Practices.

As literature on tourism networks are on its infancy (Novelli, Schmitz, & Spencer, 2006; Shih, 2006), this study intends to explore externalities from different sectors and institutions as they are "strategic keys" to produce innovation (COTEC Portugal, 2009) and "non-technological innovations are becoming crucial (for instance, learning by doing)" (Plaza, Galvez-Galvez, & Gonzalez-Flores, 2011, p. 464).

As sectors differ completely it is not possible to compare them, so it learns and extracts practical experienced suggestions, which are strategic keys to improve the Portuguese Aeronautical Route but considering specific features of tourism industry[8].

Aldeias do Xisto Network

The Aldeias do Xisto network was born as an initiative in 2001 during the 3rd European Funding Program, through its nuclear region: Pinhal Interior.

As stated by Aldeias do Xisto interviewee, it is "a network of networks"[9], which was focused on its great potential, such as its villages, its water courses and its Nature environment and landscapes, to start composing and developing Aldeias do Xisto product and brand.

Once its main goal was to create a common identity supported by its schist villages (Silva M. , 2009) through diverse municipal territories, between 2000 and 2002, the network constitution started among city councils and in 2007 they had attracted 24 villages, and increased to 27.

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[8] As stated in the sub-chapter c), in Tourism Innovation Concept Review
[9] Stated by an interviewee on 13th February, 2014

The adhesion of each village was made through a plan presentation, where inhabitants, business owners and city councils defined actions they intended to take in order to requalify their territory and to constitute this tourism product.

Soon, it extended the Aldeias do Xisto network to explore their local traditional knowledge, art crafts and gastronomy. It also increased combined programs of accommodation and tourist activities as a way to diversify tourism offer.

To create a brand destination, this formal network congregates both private and public partners. In 2007 its coordination and facilitation entity was shaped: ADXTUR – Agência para o Desenvolvimento Turístico das Aldeias do Xisto[10] (henceforth "ADXTUR"). It is a nonprofit private entity that represents all stakeholders, such as: associations and organizations; city councils; local community, which is visited regularly by 9 people of ADXTUR team to understand their interests and needs to incorporate them on network's decisions; and private agents, as Tourism Group, which is composed by 57 firms of accommodation, restaurants and leisure; and Craft Group, which includes 25 craftsmen, shopkeepers and workshops.

Figure 1 – The Aldeias do Xisto Network member's representations
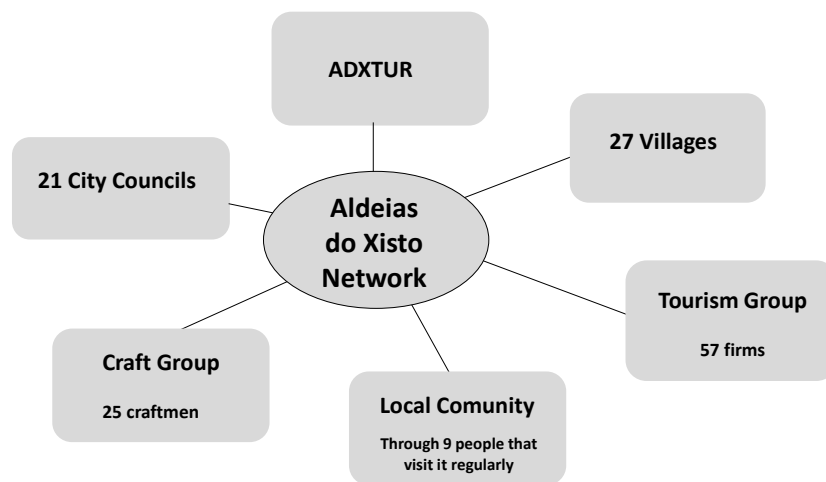
Source: Pires, R. (2014)

In terms of co-ordination, ADXTUR is composed by 2 nucleuses: Direction, which is responsible for supervising and making strategic decisions; and Technical Team, which has the necessary skills to enable tourism product's diversification, assuring the operationalization of the Direction's decisions. However, both orchestrate network in order to compose,

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[10] Own Translation: Agency for Tourism Development in Aldeias do Xisto

articulate and facilitate network linkages to assure its sustainability in economic, social and environmental domains (ADXTUR, 2009).

Nowadays, the Aldeias do Xisto network accounts approximately with 200 members, of which 89% are private entities and 11% are public.

At the beginning, members criteria was only related with their main business activity. If they were related, in a certain way, to local tourism they could belong to Aldeias do Xisto network. Nowadays, it has to be evaluated in a board meeting, in the presence of all network's associates, to appreciate its relevance to ensure product's standard quality and positioning.

COTEC Innovative SME Network

COTEC Portugal – Associação Empresarial para a Inovação was founded in 2003, following an initiative of the President of Portugal. It is a business association for innovation with the mission of "promoting the competitiveness of companies established in Portugal, through the development and the diffusion of a culture and a practice of innovation as well as of knowledge, especially that generated in our country"[11].

The COTEC Innovative SME Network was created in 2005 with 24 associates and has currently more than 220. It is composed by several technological sectors.

Criteria to become member of Innovative SME Network are: i) to have an annual turnover of 200.000€; ii) and to have an evaluation based on Innovation Scoring application in order to identify companies' innovation strategy vs. their innovation practices.

'Co-ordination and facilitation'[12] are promoted by COTEC Innovative SME Network, which is composed by an Executive Team and a Commission.

The Executive Team is the responsible for its daily management and organization, and the Commission, which acts as a consultancy and strategic advisory board, represents all the members' interests, has the responsibility to evaluate network admissions and exclusions.

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[11]http://www.cotecportugal.pt/index.php?option=com_content&task=blogcategory&id=69&Itemid=109,3rd April, 2014

[12] From Table 2

Figure 2 – Innovative SME Network Commission[13]
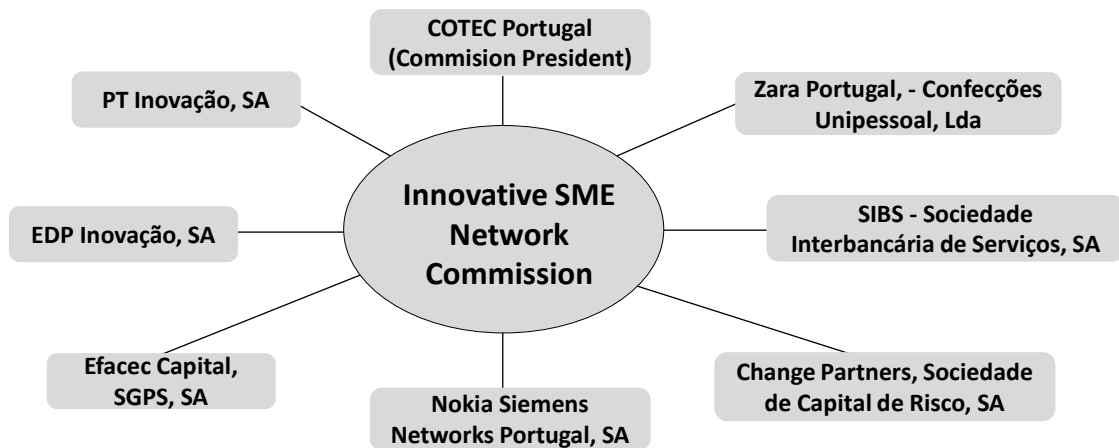
Source: Pires, R. (2014)

a) Networks' Missions

Aldeias do Xisto core mission is to promote an endogenous regional development of Pinhal Interior (ADXTUR, 2009), conducting a sustainable strategy to create a tourist destination to achieve four major goals: to preserve and disseminate territory's cultural scenery; to valorise its architectural heritage; to boost its socioeconomic context; and to revitalise its arts and crafts[14].

Innovative SME aims to promote and gain public recognition for its members, promoting value creation skills, right market attitude and encourages cooperation, through competences and innovation, which are both keys needed to succeed in today's changing world[15].

Networks have different goals, deeply associated with their activity's sector, which will influence all the following dimensions.

b) Networks' Orchestrating Functions

Both orchestration organizations are nonprofit private entities that represent all members interests and develop activities to pursue their missions. In both, members pay a monthly or annual fee, depending on associates' legal nature, to assure hub firm's maintenance and networks' sustainability.

Co-ordination and facilitation entities are impartial and objective, focused on networks results. Aldeias do Xisto has a Direction and Innovative SME has a commission, as

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[13]http://www.cotecportugal.pt/index.php?option=com_content&task=view&id=399&Itemid=193, 4th April, 2014
[14] http://aldeiasdoxisto.pt/content/rede, on 6th May, 2014
[15] http://www.cotecportugal.pt/index.php?option=com_content&task=blogcategory&id=58&Itemid=179, on 6th May, 2014

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mentioned, and both absorb member's interests and delegate daily activities development to its Technical Team (Aldeias do Xisto) and Executive Team (Innovative SME).

Depending on their missions, networks' functions reflect both scopes: Aldeias do Xisto is more focused on its products development to increase tourist experience; and Innovative SME purposes are to diffuse knowledge and to promote cooperation among its members and through innovative SMEs, to create and develop technological solutions.

This affects their strategies, since Aldeias do Xisto promotes itself as a unique brand in order to sell network's experiences but as an umbrella strategy, where each entity brand is above it. Innovative SME aims to increase network's visibility and credibility and, consequently, its belonging members, but each entity has its own brand and promotes separately, with the exception of cooperation projects that have their own names.

While Innovative SME disseminates practices and knowledge, its diffusion occurs at a horizontal level, covering its members, partners and players from similar technological domains; Aldeias do Xisto diffusion arises at a vertical level, through its chain value, pursuing a perfect articulation between its entities' offers, in order to promote and sell its experiences.

c) Network's Design and Innovation Management

As both networks promote collaboration to diversify knowledge and mobilise specific resources, interchanging them between internal and external environment, they can be understood as networks' examples of Open Innovation Model (Chesbrough, 2003) adoption.

Figure 3 – Innovation Management Model of Aldeias do Xisto
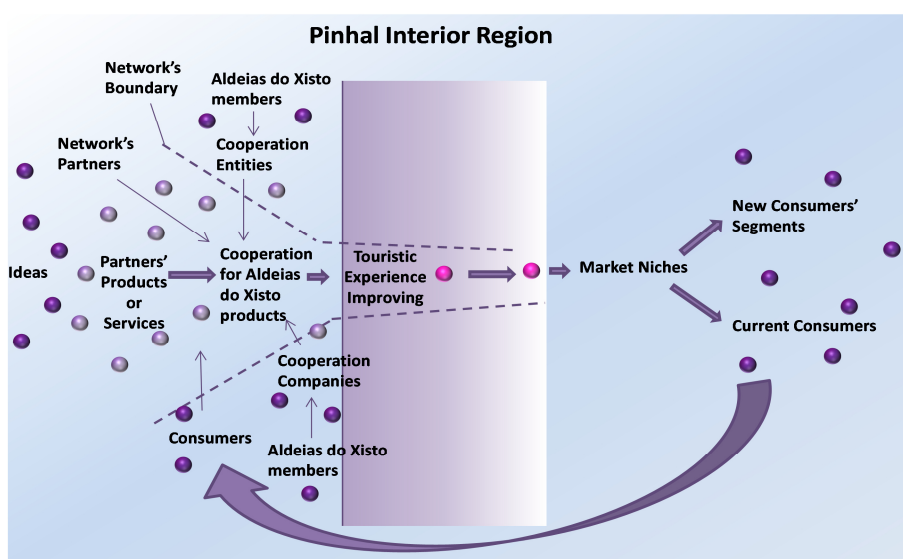
Source: Pires, R. (2014) based on Chesbrough model (2003)

Figure 4 – Innovation Management Model of Innovative SME
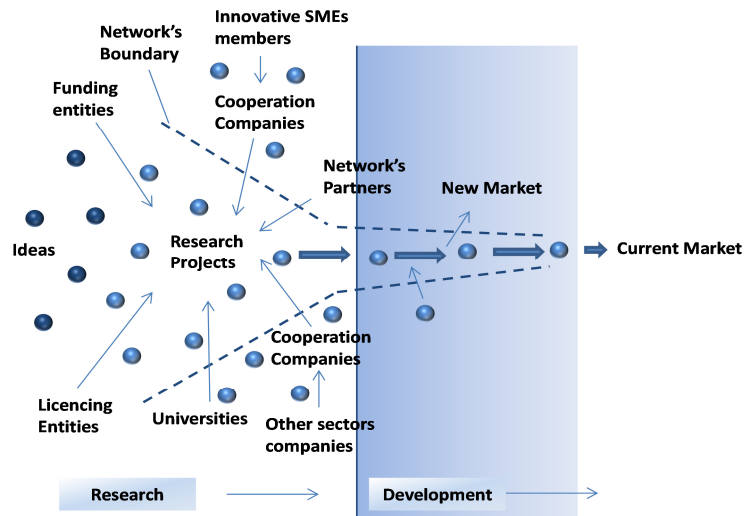
Source: Pires, R. (2014) based on Chesbrough model (2003)

Despite both valorising ideas, the impact of different sectors is clear in their exploration and development. As tourism products have to be consumed at the same place and time of its production, Aldeias do Xisto's model reveals time and spatial delimitations, where its collaboration cycle is instantly fed by consumers feedback (Greer & Lei, 2012).

Unlike Aldeias do Xisto, which attracts a large market but its products only exist in that region, Innovative SME can cooperate and diffuse its products on a global market, reallocating their production or distribution. Besides, to consider consumers ideas, information has to flow on the inverse way and has to do market research, it is not instant as it occurs in tourism.

d) Operational Practices

Both networks apply 'Resources' variables[16] in order to improve them continuously (Bessant & Tsekouras, 2001) and to enable stakeholders diversification to sustain synergies and develop resources to support network orchestrating that increases their results.

Monthly Aldeias do Xisto holds meetings with all representatives' members to evaluate the network's results, to verify the activity plans accomplishment, to create events schedule, to share and to propose new ideas and re-schedule actions for the next month.

Annually they evaluate financial results and when exists, for instance, promotional campaigns they perform informal evaluations, where spontaneous groups discuss them. 'Measurement Framework' variable is applied to evaluate action results.

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[16] From Table 2

Diffusion across all partners is mostly related to reporting and coordination of some activities, where "all information generated on diverse Commissions and Group Works must be shared among all members" (ADXTUR, 2009, p. 144).

Aldeias do Xisto's external diffusion is focused on its consumers therefore it develops a Newsletter to promote its events; it publishes the book "Carta Gastronómica das Aldeias do Xisto" to diffuse its gastronomy and attract tourists to taste its restaurants cuisine; it develops and updates the Website to publish its packages proposals or simply to promote its members offers.

In terms of Innovative SME Network, it regularly organises the 'Associate Day', which is an initiative through which a pre-selected associate receives other network members and shares its recent experiences and foresight analysis, enabling companies to acknowledge market trends and to develop capabilities and innovative solutions through all network. It strengthens interactions among associates and empowers network sustainability, which addresses problems jointly and with diverse perspectives and interests (Sol, Beers, & Wals, 2013).

There are annual meetings to present and debate some common issues, which they are interested in. The recent integrated network's companies are publicly announced and the results of SME Innovation Award applications are disseminated.

Workshops take place regularly in order to support associates in innovation management, internationalization, research opportunities, funding, etc.[17] and a few symposiums[18] have been developed.

Besides these specific Innovative SME initiatives, COTEC also promotes National COTEC Meetings on Innovation, COTEC Europe and Diaspora Award, where network associates can attend. More recently, a Community of Practices on Knowledge Management was also launched in which members of the Innovative SME can participate.

Like Innovative SME develops an activity plan that illustrates its concern with 'Operating Arrangements'[19], Aldeias do Xisto could apply a larger range of diverse solutions as this variable dictates.

In spite of Innovative SME schedule, it considers flexibility as a crucial characteristic on networks so it measures results quarterly and it re-schedules actions if necessary to change the network's course. However, "governance has to be focused on networks skills"[20].

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[17] http://www.cotecportugal.pt/index.php?searchword=workshop&option=com_search&Itemid=, 3rd April 2014
[18] http://www.cotecportugal.pt/index.php?searchword=symposium&option=com_search&Itemid=, 3rd April 2014
[19] From Table 2
[20] Interview realised on 20th February, 2014 at SME Innovative Network of COTEC Portugal

Meanwhile, both networks explore 'Operating Channels'[21] variables since they have Internet collaborative platforms, with restrict associates access. "Comunidade" is a platform where Aldeias do Xisto's members present, in its discussion forums, problems and issues related with network in order to interchange ideas and share possible solutions to enable learning processes.

Innovative SME platform is "Colaborar.COTEC", which has approximately 1,000 people sharing experiences, releasing challenges, announcing consortium ideas, exploring ways to cooperate, accessing to new knowledge and information and solving problems. It is an important tool to enable knowledge transfer and create a learning network, which creates a common support to increase innovation awareness, to exchange information or ideas, and to develop potential products/ services. This platform is, also, an intermediary between associates and the main players of National Innovation System, such as: Adi, FCT, IAPMEI, AICEP, etc.[22]

Aldeias do Xisto share knowledge and discusses themes/ problems mostly related with network operations and products. Unlike, Innovative SME which is more focused on knowledge dissemination/ absorption and on learning processes, so its organizational improvement is higher than what occurs in Aldeias do Xisto.

A study about Innovative SME was developed by an ISEG and ISCTE-IUL team (Simões & et al., 2010), which was then complemented by inquiries through its associates. Their results reveal "three main perceived advantages of participating and cooperating in the Network ('stimulus to innovate'; 'recognition and reputation'; and 'access to information') remained in place from 2008 to 2010, and all their relative frequencies increased" (Bento, Sousa, & Almeida, 2011, p. 112).

Analysing which are the main future activities that members suggest, it became possible to conclude that "workshops, SME innovation meetings and other events' are occurrences that should be repeated or even intensified." (Bento, Sousa, & Almeida, 2011, p. 122) because it occupied the same position as it was in the past.

In fact, these measures allowed to understand members motivation, which should be reflected in COTEC's activities and in its members relations within the Network (Bento, Sousa, & Almeida, 2011). 'Measurement Framework'[23] is important to define networks' future strategy

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[21] From Table 2

[22] http://www.cotecportugal.pt/index.php?option=com_content&task=view&id=2190&Itemid=422, 3rd April 2014

[23] From Table 2

and its activity plan and the relevance of knowing 'Blocks and Barriers'[24] "which inhibit the network's successful operation, including lack of motivation to learn" (Bessant & Tsekouras, 2001, p. 95).

Additionally, Innovative SME's associates recognise their initiatives importance to promote networks cohesion (Bento, Sousa, & Almeida, 2011).

e) Network's Impact

Since Aldeias do Xisto qualified regional territory and raised its development, supported by tourism activity, it stimulated entrepreneurship with FabLab implementation[25], which potentiates interactions between research entities and local technological companies to foster innovation and diffuse their development. Likewise, it achieved a rate of 0.56% of population fixing and its business' density increased 1%, both between 2009 and 2012 (ADXTUR, 2009).

Impacts of Innovative SME on its associates, comparing with country's companies from the same sectors, are vast. Economic profitability and financial strength; their management of available resources was more efficient; their greater liquidity and greater propensity for investment; and Net Sales with values about ten or more times higher are just a few examples of them (Bento, Sousa, & Oliveira, 2012).

To conclude, both networks, applying their orchestration practices and developing their specific initiatives, have increased their members' admissions, which is an usual performance network measure (Bessant & Tsekouras, 2001), and disclosed effects on their surrounding environment, where their externalities foster innovation and entrepreneurship in other sectors.

f) Main Network's Conclusions and Suggestions for Future Developments

Based on this empirical analysis and according to the application of Operational Variables developed by Bessant and Tsekouras (2001), Aldeias do Xisto is managed as a network, considering all members and regional interests. However, to analyse if it consents or refuses with Cooper and Baggio (2008) theory that tourism cooperation reveals weak interactions, it would be necessary to develop a Network Analysis to understand the nodes interdependence and interactions intensity among Aldeias do Xisto members (Kastelle & Steen, 2014). Further research is needed to analyse what kind of cooperation is 'embodied' on this destination (Cooper & Baggio, 2008).

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[24] From Table 2
[25] https://www.cm-fundao.pt/movetofundao/Living_Lab/fab_lab_xisto, on 12th May, 2014

Co-ordination and facilitation entities have similar shape. However their learning processes, tools and developed initiatives are different, also depending on their sectors. However, as Aldeias do Xisto's 'Operating Channels' learning processes are mainly supported by meetings and its platform, it could diversify tools and develop new channels, like promoting workshops, to transfer knowledge in order to intensify interactions that enable members' cooperation and co-creation products/ services.

To disrupt its practices, it could create a similar Innovative SME's dynamic where its associates receive other members on its own space and spread trends, processes, quality and hospitality management, which certainly would be reflected on their future developments. These meetings could even vary places, to break members' comfort zone and constrain routine, to foster creativity and build interactions' trust and commitment.

These sharing experiences suggestions are an opportunity to shape a destination brand and to develop standard level quality's services.

Innovative SME applies 'Operational Variables' extensively and should continue presenting a wide range of initiatives to raise members collaboration and motivation.

Aldeias do Xisto could spread out Measurement Framework in order to support initiatives' diversification and their results evaluation like Innovative SME Network does. Although its measurement concern, Innovative SME should develop, at least, bi-annual studies and inquiries in order to follow network evolution and its dynamic, as its control tends to decrease as it grows. Also, its structure, mainly its holes and interactions certainly have changed thus its orchestration have to adapt to these continuous upgrades.

Innovative SME is a mature network and to avoid its stagnation, it should develop networking with foreign networks of similar sectors or simply with other different sectors networks to stimulate its sustainability and its continuous improvement.

3   Methodology

Tourism is a complex phenomenon which entails social and economic views and assimilates different activities and players. So it needs "multidisciplinary focus" (Riley & Love, 2000, p. 167).

This research aims to address two general questions:

- How can we create a tourism product that values aeronautical resources?
- Is the innovation network model based management a way to ensure its sustainability?

Therefore, a qualitative research was developed because tourism research needs "more general perspectives" (Walle, 1997, p. 526), which considers the context, its associated interactions and multiple realities that accounts to explain the tourism phenomena (Riley & Love, 2000).

Consequently this study was designed to achieve five goals:

i)   absorb management frameworks of innovation networks;

ii)   assimilate tourism innovation features;

iii)   identify and analyse national reference case studies of innovation networks in order to present a practical guide to constitute this networking tourism product;

iv)   survey and select the main aeronautic assets to constitute an innovative tourism product;

v)   propose an integrated and networking tourism product, deeply focused on managing and developing its experiences for a plenty satisfaction of a niche tourist.

In addition, this study intends to contribute to present an example on how tourism sector can integrate innovative approaches, in spite of being characterised as "late starters in transferring the theory, concepts and methodologies already known and applied in other sectors for several decades" (Hjalager, 2010, p. 1).

To refine general theory and apply effective interventions in complex situations (Stoecker, 1991), an multi-method qualitative study was developed (see Appendix 2), considering inductive and deductive approaches. Inductive approach enabled a close interpretation of the research context (Saunders, Lewis, & Thornhill, 2009), to grasp tourism multiple realities and to allow tacit understanding of the phenomena (Riley & Love, 2000). Deductive approach allowed a data collection to support theory and the operationalisation of concepts (Saunders, Lewis, & Thornhill, 2009).

In order to accomplish the validity and credibility of data (Yin, 2011) , different sources were integrated, combining primary and secondary data collection at all research levels.

Also, research techniques were selected to collect and analyse data to reach some conclusions which fit into general questions.

a) Data Collection

Secondary and primary data were collected in order to have a cross fertilization between these two sources, allowing a relation between them and the main study purposes, that enables the construction validity test.

To collect secondary data an extensive literature review was done. It allowed identifying major issues and challenges on the development of tourism products and on innovation networks theoretical approach.

Secondary data collection had the purpose of combining theory concepts with practical issues, which contributed to route's constitution and management. Thus, it kept the same order than.

Multiple sources were considered to collect various evidences, such as: papers from scientific, technological and management journals; papers from tourism research journals; scholar's studies; international and national institutions reports; internal institutions studies; books specialised on main concepts; national and international statistical data; institutions brochures; specialised magazines; site visits.

To gather primary (direct) data (Schlüter, 2003) some semi-structured interviews were done (see Appendix 1) lasting on average an hour each, along all levels of this research, as a way to corroborate with literature review.

Table 4 – Developed Interviews

Knowledge Topic	Number of entities interviewed	Interviewed Technic Description
i) Tourism Products / Routes	2	Both done via skype
ii) Portuguese aeronautical assets owners	5	3 were made in person and 2 were sent by email
iii) Portuguese innovation networks examples	2	One was made in person and the other one was sent by email
iv) Portuguese aeronautical route's potential partners	7	5 were made in person and 2 were sent by email

Source: Pires, R. (2014)

As each knowledge interview topic corresponds to a different research level, each of them has a specific purpose: i) to identify and understand how was the route/ product created and to retain the main practices of how it is managed; ii) to identify distinct Portuguese aeronautical assets with potential to be explored as tourism resources; iii) to recognise creation and operation networks, specially their dynamic governance and its innovation activities; iv) to identify potential partners for the Portuguese Aeronautical Route according to their relevance for route's offer and recognising their organizational innovation practices.

In order to complement primary data collection, non-participation observation was developed through visits at three nucleuses of Museu do Ar, which includes Museu da TAP and Museu da ANA, and also in Museu da ANA, located in Lisbon airport. This further methodology

allowed experiences appreciation, obtaining qualitative information to determine its touristic offer, hospitality reception and guiding visits, assets variety and exhibition display. These enabled the appliance of benchmarking methodology.

These multiple sources of evidence were selected into multi-depth level research in order to guarantee a convergence with facts, allowing multiple views of each fact that enabled its understanding and will conduct its future application on the route.

b) Data Analysis

Main techniques to analyse this qualitative data were summarising data and categorising data. Summarising data enabled to highlight relevant issues, "identify apparent relationships" between them and carrying on research in order to establish their validity and achieve answers to general questions.

Categorising data was developed to group data by themes/ codes that emerged from literature. These data groups supported data analysis framework, extracting inputs from primary data to address general questions and then combining it with secondary data evidences as a way to highlight several conclusions, supported by input of different sources, which defined the development of the Portuguese Aeronautical Route.

Collected Portuguese aeronautical assets information was submitted into a content analysis in order to evaluate interviewees' frequencies opinion. Then, these evidences were combined with secondary data in order to obtain and describe its relevance and uniqueness, once they are the basis to incorporate the Portuguese Aeronautical Route.

Furthermore, two Portuguese networks were identified, among interviewed entities and according to their best practices and their impact in order to develop an empiric comparative analysis between their practices and Bessant's Operational Variables. Hence, core orchestration practices of Aldeias do Xisto and COTEC Innovative SME networks were extracted and analysed and then were compared, considering each sector specific features to point out future developments. To develop the model of innovation network and apply it to the Portuguese Aeronautical Route, a cross-fertilization method between those different sectors networks were required, which fed its own model. Indeed, Hjalager (2010, p. 10) states that to build new empirical theories it is necessary to "take into consideration the distinctive features of tourism, and compare it with other sectors".

As Sintra's Museu Ar would be a key enabler of the Portuguese Aeronautical Route, it was important to identify its value. Thus, a benchmarking methodology was developed, comparing

it with world's best aviation museums as a way to enumerate its potential and to withdraw its future developments to increase its offer as a tourist experience.

To conclude, this research was developed appealing to mixed methods through its different levels to ensure its quality, considering its internal and external validity, its construction validity and its reliability. It pursued the methodology of a "qualitative research, suggesting that multivariate techniques were more appropriate for the complexity of hospitality issues" (Riley & Love, 2000, p. 168).

4   Aeronautical Heritage

Aeronautics is an international activity, which emerged on the beginning of the twentieth century, worldwide. It is a result of successive improvements on different knowledge (Arezes, 2010), where its compilation of "advances and innovations, including radar and aerospace" (Trott, 2012, p. 7) disrupted on the creation of the great innovation of the 20th century (AAVV, 2010, p. 32): the aeronautical phenomenon. Mathematics, physics and design are just a few subjects that helped to this aerodynamic achievement[26], enabling the world economies rising.

Portugal has a diverse aeronautical heritage, as stated in Portuguese history and reflected on international progresses, hastened by main events such as the Great Wars, but for Portugal the main aeronautic developments were speeded up during Portuguese Colonial War[27].

Portuguese aeronautic assets are defined by diversity from war machines to civilian airplanes, also including aviation as a leisure activity, for those who appreciate to fly and that vibrate with that experience.

In fact, "Technologies that have had a profound impact upon the conduct of war have, equally importantly, contributed to the speed and accessibility of civilian air transport" (Weaver, 2011, p. 677) that have a major economic impact and facilitated tourism.

Therefore, those who enjoy aircraft have something in common: the pleasure of flying and the delight of knowing a little more about these great machines, which were used for war but are nowadays related to traveling and are seen as a kind of a piece of art. It resulted in a perfect match between aeronautical engineering, already an exact science in 1920, and designers which developed their own ways of thinking and patterns (AAVV, 2010).

This study states aeronautical assets from the main aviation entities that enabled Portuguese aviation implementation and development. However, as the Portuguese aeronautical heritage

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[26] Based on an interviewee statement on 12th February 2014
[27] As quoted by an interviewee on 5th February 2014

is large and this research admits resources and time limitations, as stated on Chapter 6.1, further research must be done in order to identify, quantify and describe it in detail and where it is located.

4.1   Aero Club de Portugal

The history of Portuguese Aeronautic began in 1909, when Aero Club de Portugal was founded by a group of Army's Officers to promote the aeronautic development in Portugal, thereby its use by Portuguese Army.

Aero Club de Portugal is located in Lisbon and is a pioneer entity which represents International Aeronautics Federation in Portugal; it is also the responsible training entity for the largest number of civilian pilots in Portugal.

Its collection is mainly composed by aeronautical historical documentation, in its extensive aeronautic library, trophies and medals. Soon it will have the Memory Room.

It also owns a fleet of 8 airplanes and 2 gliders to train people who want to become a pilot or pilots who want to specialise, namely:

a)   Airplanes: 3 samples of Cessna 152 (Appendix 3), Cessna 172R (Appendix 4), Cessna 172S (Appendix 5), Piper Cherokee Arrow 200 (Appendix 6), OGMA Chipmunk Mk22 (Appendix 7), Socata Ms.893 Rallye Commodore (Appendix 8);

b)   Gliders: Grob 103 Twin II Acro (Appendix 9) and Grob 102 Astir CS Jens (Appendix 10).

They both operate in Tires and Ponte de Sôr Aerodromes.

4.2   SATA – Museu da Aviação

SATA emerged in 1941when its five founding members created the "Azorean Society for Air Travel Studies", whose aim was to end the isolation of the islands.

The strategic position of Azores, dignified its crucial role in Portuguese airlines history.

Its operational service took off on the 15th of June 1947, when a small Beechcraft aeroplane, symbolically named "Açor", made the first commercial flight.

After seventy years of history and six decades of flying, SATA holds an extensive aeronautics 'know-how' and also gathers aeronautical antiques such as: used airplane objects in Santana's Airport, which was the first airport of São Miguel island and remained active until 1969; tools; photographs and newspaper articles; airlines tickets and registrations; administrative documentation; some pilots, cabin crew and mechanics uniforms; stamps; a few SATA's souvenirs; and some control tower's material namely maps and measurement rules.

As these artefacts carry civilian and Azorean aviation history, SATA has signed a protocol with Ribeira Grande City Council to loan its collection and create the Museu da Aviação located in this city, which belongs to São Miguel Island. They recuited a team and started inventorying its collection in order to start structuring their museum but they do not have any prediction of its opening date[28].

4.3 Museu Aero Fénix

The Aero Fénix was created on 25th July 1995 and its aircraft collection is located in Santarém, mainly in Cosme Pedrógão Aerodrome. It is a non-governmental entity with the purpose of preserving and disclose Portuguese aeronautical heritage.

To achieve its mission goals, it disseminates aeronautical knowledge, promotes activities and also organises national and international conferences, meetings and aeronautical exhibitions.

The Aero Fenix's collection integrates approximately a hundred of bibliographic assets including aeronautical historic documentation, scientific papers and technical manuals, mainly about their own airplanes models; about 50 aeronautical objects since the 40s; 8 classical airplanes, 2 of which belong to its associates. As soon as Aero Fenix finishes the construction of Deperdussin's replica (estimated for 2016) its collection will have 9 samples.

Table 5 – Aero Fénix's Aircrafts

Airplanes	Date	Condition	Owner	Description
Cessna 140 (Appendix 11)	1946	Flight Condition	The associate Carlos Tomaz	It is a popular aircraft which was built in the United States after the World War II. It is the only specimen in Portugal
OGMA/De Havilland DHC-1 T Mk.21 Chipmunk	1956	Flight Condition	The Aero Fenix Museum	This aircraft model was in FAP service between 1951 and 1989. This sample is one of two authentic Chipmunk of Portugal and was built by Oficinas Gerais de Material Aeronáutico[29], in Alverca
Piper PA-22-108 Colt (Appendix 12)	1962	Flight Condition	The Aero Fenix Museum	It was operated by Aero Club of Portugal between 1962 and 2007, which achieved 12 thousand flight hours in 24,8 thousand flights. It is the only Colt that still flies in Portugal
Yakovlev 52 (Appendix 13)	1970	Flight Condition	The associate Pedro Cerveira Pinto	This Yak-52 was in service in the Soviet Air Force at the end of the Cold War and it is one of three samples that still fly in Portugal

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[28] According to Ribeira Grande City Council source, on 16th April, 2014
[29] General Aeronautical Material Workshops

Boeing Stearman A75N1 (Appendix 14)	1940	Being Restored	The Aero Fenix Museum	This biplane was in service in The United States Navy during World War II and it is the only specimen in Portugal
North American T-6G Texan (Appendix 15)	1951	Being Restored	The Aero Fenix Museum	This sample was used as a FAP aircraft and it is unique in Portugal
Max Holste 1521-M Broussard (Appendix 16)	1959	Stored	The Aero Fenix Museum	This lightweight aircraft was used by the French Army during 50s and 60s. This specimen took part in the Algerian War
Schleicher Ka-4 Rhoenlerche II	1970	Stored	The Aero Fenix Museum	This two-seat glider trainer was produced by Germans. This sample belonged to Braga's Aero Club and also to Aero Varela School and was responsible to institute many glider pilots
Deperdussin type B's replica	-	In construction	The Aero Fenix Museum	The Deperdussin type B was the first Portuguese military aircraft. Its replica's construction will enrich Portuguese aeronautical heritage and will enable to display one more classical aircraft in The Aero Fenix Museum. It will be used in World War I Centenary's Commemorations (2014-2018)

Source: Pires, R. (2014)[30]

For its rare and authentic aeronautical assets, the Aero Fenix Museum represents an important resource. It promotes a dynamic way to explore its heritage, which is mainly supported by promotion of flying experiences for enthusiasts and also to assist flying acrobatic expertise.

It also created the AeroNostalgia event, a Portuguese annual event, since 2004, which aims to concentrate classical aircrafts, exhibit them and performing an air show.

Additionally, it participates in Air Shows all over the country, such as Festival Aéreo de Viseu and Portugal Airshow, which happens in Évora; and in Spain, for instance Vigo International Air Show.

Finally, the Museu Aero Fenix is a kind of living museum which promotes a different way to appreciate aircrafts and does not have an exhibition area like others museums. Nonetheless, it will integrate one to display its objects.

4.4 Portuguese Air Force – Sintra, Ovar and Alverca's Museu do Ar nucleuses

The Museu do Ar opened on 1st July of 1971 in an old military aviation hangar, located in Alverca.

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[30] Based on interviewee's contribute, on 27th February, 2014

The Museu do Ar belongs to the Portuguese Air Force (henceforth "FAP") and reflects its concern on preserving its history and all its belongings that have been replaced by new technological aeronautical devices.

Its mission is to collect, preserve and prepare its historic aeronautical assets for public exhibition.

However, as its assets list swiftly extended, Alverca museum exhausted its capacity. FAP needed to integrate another structure to exhibit its recent collected assets. Therefore, they recovered a hangar in Sintra with an area of 3,500 m² and in 2009 the Museu do Ar got another nucleus, with triple of Alverca's capacity[31].

The implementation of this nucleus got ANA Aeroportos (henceforth "ANA ") and TAP - Air Portugal (henceforth "TAP") partnership – and the support of Sintra city council. Thereby the Museu do Ar achieved an overview throughout the Portuguese aeronautic history, revealing both the military and civil aviation evolution.

In 2011, Sintra's Museu do Ar premiered its second phase, which got an extension of 3.000m², as a result of the recovery and re-function of three historic hangars, which date back to 1920 to 1940 and were located in Vila Nova da Rainha, where the Aeronautical Army's School, the first aviation school in Portugal, was founded.

Meanwhile, in 2005 another nucleus on Aeródromo de Manobra nº1 was created, located on Ovar, which had the mission of exhibiting a thematic collection and demonstrating Air Force activities to young public.

The Museu do Ar is composed by a collection of 120 airplanes, some of them large; more than 10.000 inventoried antiques; tens of thousands items which are not accounted for; and also 8.000 reserved parts which belong at ANA and TAP collections (Araújo, 2013).

Despite the Museu do Ar being a military museum, it reflects a resume of national and international aeronautic as well as, addressing both military and civilian developments and achievements, unlike the majority of military museums. Consequently, the Museu do Ar demonstrates a rich collection, which has diversity and temporal sequence assets that determine its capacity to tell and show the most important facts of aviation history[32].

The Museu do Ar received almost 17.000 visitants in 2013[33]. It is a Portuguese aeronautical reference resource because it displays assets to reflect and instigate the aeronautical culture and passion.

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[31] Supported by https://www.emfa.pt/www/unidade-55-museu-do-ar, on 10th March 2014
[32] As stated by most interviewees
[33] As mentioned by an interviewee on 11th June 2014

Also, the museum includes an aeronautic library, which integrates more than 5.000 volumes, including periodic and monographs. However, this study will focus on exhibition assets as the main resource to develop the Portuguese Aeronautical Route.

The majority, and consequently, the Museu do Ar main assets are located in Sintra nucleus (see Appendix 17), which include approximately 46 aircrafts. 11 are in Ovar, 12 are in Alverca and other airplanes are displayed in different places such as: Alcochete, Monte Real, São Jacinto, Torres Vedras, Montijo, Porto, Constância and others[34].

Supported by interviews, it was possible to identify the most unique and distinctive aeronautical assets, from its large collection:

Table 6 – Most Unique FAP's Aeronautical Assets

Aeronautical Assets	Number of References
Santos-Dumont 14-bis replica (Appendix 18)	**3**
Junkers 52 (Appendix 19)	**3**
FIAT 91 (Appendix 20)	**2**
Avro 631 Cadet (Appendix 21)	**2**
De Havilland DH-89 Dragon Rapide (Appendix 22)	**2**
DC3 Dakota (Appendix 23)	1
F86	1
Allouette III	1
Blériot XI replica	1
Nord Noratlas	1
40s TAP simulator	1
Total	**18**

Source: Pires, R. (2014)

The most referred aircrafts are presented below.

a) Santos-Dumont 14-bis replica

Alberto Santos Dumont was born in Brazil, and then immigrated to France in 1891. He early created several aeronautic developments, with his improvements on ballooning and then on dirigibles.

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[34] According to an interviewee on 21st March 2014

In 1904 - a year after the Wright brothers made their first powered flight - he turned his attention to heavier-than-air flying[35] and in 1906 he developed 14-bis, a strange tail-first pusher biplane, but which achieved, on 12th November, the first aviation record on Europe, flying 220 meters in 21 seconds[36]. After the recent created Federation Aeronautique Internationale (the designated keeper of aviation records) observes it, the flight was credited as the first official powered flight in Europe.

The Museu do Ar exhibits a replica of a total of three existing 14-bis replicas around the world, which were offered by Brazilian Air Force in 2009. Its rarity justifies its uniqueness as Portuguese aeronautical heritage.

b) Junkers 52 (Ju52/3m)

The Junkers 52 originally was a single-engined later developed and fitted with three engines. This german trimotor aircraft was manufactured from 1932 to 1945 and "4.845 Junkers Ju 52/3m were built, more than any other European transport plane, before production came to a halt in 1947"[37]. It is a remarkable step on aviation because its "performance improved tremendously"[38] and it played a crucial role on war as a transport aircraft, serving in World War II as a main German war resource, and it served in FAP during Portuguese Colonial War. On civilian service, it flew over twelve air carriers as freight hauler and as an airline, including TAP and Deutsche Luft Hansa. "The Ju-52 could fly from Berlin to Rome in eight hours over the Alps, an impressive feat for contemporary aircraft"[39].

At the Museu do Ar Junkers 52 specimen is a genuine airplane, with the exception of its engine, which is the only part of this aircraft that is not original.

c) FIAT G91 R/4

Fiat G91 was the winner of the NATO competition in 1953 for a light fighter as standard equipment for Allied air forces. Thus, 657 aircrafts were produced between 1958 and 1974.

This Italian jet fighter aircraft performed its first flight on 9th August, 1956 but it only entered in operational service with the FAP in 1966.

This single-engine was capable of landing on a short runway and also on grass and ground so it was a tactic aircraft with great performance and reduced costs.

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[35] http://www.wright-brothers.org/History_Wing/History_of_the_Airplane/Doers_and_Dreamers/Doers_and_Dreamers_S.htm, on 20th March, 2014

[36] http://www.smithsonianeducation.org/scitech/impacto/graphic/aviation/alberto.html, on 20th March, 2014

[37] http://luftfartsmuseum.no/fly/junkers-ju-523m-2/, on 14th March, 2014

[38] http://www.ju52-3m.ch/about.htm, on 14th March, 2014

[39] http://www.ju52-3m.ch/about.htm, on 14th March of 2014

Thus, it was widely used by Portugal in the Portuguese Colonial War in Africa and no other country used it on a war scenario.

There are several Fiat G91 in museums around the world but for Portuguese people it is a reference for its remarkable service in Africa, especially for those who were in the war.

d) Avro 631 Cadet

The Avro Cadet was a single-engined British biplane trainer designed and built by Avro in the 1930s as a smaller development of the Avro Tutor for civil use.

Apart from being more economical than the Tutor, it was more expensive to run than competing two-seat light civil aircraft and was harder to hangar because of its lack of folding wings. Therefore, it was mainly used as a trainer for flying schools or the military.

It came to Military Portuguese Aeronautics in 1934 and was in service until 1952, when it was preserved to be displayed at the Museu do Ar.

There are only a few survivors around the world and the Museu do Ar exhibits one, as well as Australian and Ireland museums, the Portuguese sample is in great conservation conditions.

e) De Havilland DH-89 Dragon Rapide

The de Havilland Dragon Rapide DH-89 six/eight-passenger was a British passenger airliner of the 1930's that was first flown in 1934. This twin-engined, in its day, was one of the most widely-used air transports in the world.

The DH-89 remained in production for ten years, and a total of 728 were built but there are a few tens of them throughout the world and some are still flying.

An example of DH-89 Dragon Rapide, which was extensively used by FAP, for aerial photography in order to recognise the territory, evidences richness in the Museu do Ar collection.

Despite its main exhibition aircrafts, the Museu do Ar owns a historical squadron, which maintains and flies a Dornier Do-27, which is a German single-engine produced between 1955 and 1965. Its service in FAP started in 1961 and 146 aircrafts were acquired, whose the majority served in the Colonial War.

4.5   ANA Aeroportos – Museu da Ana

Lisbon Airport (see Appendix 24) opened in 1942, during World War II, when it was seen as a Portuguese geo-strategic position that enabled a quick connection to European, African and American destinations.

With the exponential growth of passengers, between 1950 and 1970, airliners were improving, so airports management also needed to develop in order to support the increase of flight consumers. In 1978 ANA, EP was founded and in 1999 ANA, EP was converted to ANA, SA to assume a competitive business strategy to the present moment.

The ANA Museum opened in 2006, in the Lisbon Airport's main entrance, in an exhibition area of 300m². With a collection assembled for over 20 years it comprises more than 2,000 pieces of recognised historical and scientific value, mainly flight traffic control equipment and their telecommunications, and a vast archive of supporting documents with over 15,000 photographs.

Currently it maintains a nucleus in the airport and other into Sintra's Museu do Ar.

Despite being all original pieces which were conserved and maintained in function, the 'Follow Me' (see Appendix 25) is an emblematic piece from the end of the 60s that gained an international prize. They were originally *Mini Moke* cars with the purpose of helping airplane circulation and parking. This sample is unique and is still working.

4.6   TAP Air Portugal – Museu da TAP

TAP was created in March, 1945 and started operating with its first two 21 passenger DC-3 Dakota aeroplanes.

In its second year it promoted its first pilot course to get into full operating capacity and in 1946 it opened its first route, between Lisbon and Madrid. After 18 years it achieved one million passengers and in 1967 it was the first European airline exclusively operating with jet aircrafts.

Travelling by plane was getting a main stream activity – not only for wealthy people – where people were recognizing its comfort, time saving and a good alternative for train trips.

These impulses determined the constant evolution with "more aerodynamic and with better performance airliners, routes were diversified and the board service improved and got more sophisticated."[40] (Arezes, 2010).

Then, in 1975, TAP's nationalisation occurred, and it got highly qualified crews and after successive progresses, TAP accomplished "sky giants"[41] (Arezes, 2010) fleet, with its A340 Airbus received in 1994.

From a beginning of two DC-3 Dakota (see Appendix 23), with propeller engines, and requiring four crew members in its cockpit and a 21 passengers capacity; TAP has come a

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[40] Own translation
[41] Own translation of Adelina Arezes expression in Preface of Coleção História da Aviação: O Negócio dos Ares

long way that culminates with its recent A340 Airbus fleet, equipped with on-board computers, only requires two crew members to maneuver it and has a 274 passengers capacity[42] (Arezes, 2010).

Hence, after forty years of existence Museu da TAP opened near TAP's head office but soon closed and re-opened in 1997 (Ramos, 2013). However it had a reduced space and it became impossible to organise events.

With the tri-partied protocol formalization between TAP, ANA Aeroportos and FAP, Museu da TAP was transferred to the Sintra nucleus of the Museu do Ar[43].

TAP's collection counts with approximately 29 thousands of objects, mainly: 4,900 artistic assets; 23,600 bibliographic assets; and 155 scientific and technic items (Ramos, 2013).

While some objects are at TAP's exhibition area, in the Museu do Ar in Sintra (see Appendix 17), others have been handed out through TAP's world delegations and others are in TAP museum's reserve (Ramos, 2013). Also, "the TAP Documentation Section and Museum Archives will remain in the TAP enclosure adjacent to Lisbon Airport."[44]

From its large collection, a couple of TAP's assets were identified for their rarity:

a) The Link Trainer (Appendix 26), which arrived at TAP in 1945 and was used to train World War II pilots. It is considered as the "grandfather" of the flight simulator and was in service between 1948 and 1960;

b) Antimagnetic umbrella (Appendix 27), which was built by TAP and was used in the 50s by whom, near airplanes, read the compass information.

Both of them are in TAP's exhibition area in the Museu do Ar (see Appendix 17 to identify the Museu do Ar's plan).

However, TAP has a rich collection and Ramos (2013) highlights the following assets:

Table 7 – Main Aeronautical TAP's Assets

Assets	Relevance
DC-3 Dakota (Appendix 23)	First TAP's airplane, which performed its first routes to Porto, Madrid and established overseas colonies connections
Link Trainer (Appendix 26)	It is a famous object for preparing the World War II pilots. It is the oldest large asset of TAP's exhibition
Caravelle Simulator	Caravelle simulator arrived at TAP in 1962 and turned the jet era in Portuguese aviation a reality. The Caravelle TAP CS-CTA was the first TAP's jet airliner

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[42] Own translation
[43] http://www.tapportugal.com/Info/en/fleet-history/museum
[44] Source: http://www.tapportugal.com/Info/en/fleet-history/museum

Super Constellation's "nose"(Appendix 28)	The Lockheed Super Constellation was a success all over the world. TAP had 7 specimen of this airliner, which flew in 50s decade

<div align="right">Source: (Ramos, 2013)</div>

4.7 Sintra's Museu do Ar Benchmarking Application: a tool to empower the Portuguese Aeronautical Route

In Portugal, aeronautical offer is mainly focused on aviation museums. Thus, they are strategic elements to implement an organised touristic offer. That is why it is important to apply a benchmarking methodology, which analyses and evaluates Sintra's Museu do Ar positioning.

With an area of 3,000m² of extension, Sintra's nucleus reveals a rich and diverse collection (Araújo, 2013), integrating both civil and military assets with FAP, ANA and TAP's exhibitions, and it is the main exhibition area of the Museu do Ar[45]. According with these criteria, it can be considered as a national aviation museum (Araújo, 2013).

Hence, it is going to be compared with its World competitors once its relevance and conditions allow improvement outputs to empower this museum into a tourist experience, which can be replicated on other Portuguese aviation museums.

On the other hand, Portuguese aeronautical museums have been poorly explored as a tourism resource. Instead, they have been mostly seen as a way to tell the story of military and civilian airplanes evolution to local and regional communities, besides their potential to attract niche market tourists.

To explore their potential they must be affiliated to other aeronautical and space attractions, supported by further research. In the meantime, in order to enable tourism services on aviation museums it is necessary to display some facilities and address demand needs (Buhalis, 2000).

Additionally, once museums become tourist attractions another perspective of museums competition is needed because besides its operating it inserts in a global market (Buhalis, 2000; Novelli, Schmitz, & Spencer, 2006), thus there is a local and global competition.

To qualify a touristic offer based on aeronautical museums requires a consideration of global competitors in order to add value for both Portugal as a tourist destination and for an experienced demand who expects to see and interact with assets and heritage enriched by innovative experiences.

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[45] http://www.emfa.pt/www/po/musar/pagina-001.005-visitas, on 14th May, 2014

a) Benchmarking Application

In order to reflect international competitors' offer and extract their key factors for success, benchmarking was used to enable this analysis and to state main principles to qualify Portuguese aeronautical museums.

However, this analysis has to consider comparable and studied variables, which in this analysis, correspond to the main categories that conduct aviation museums to success, based on *Aviation Museums: An Important Contributor to the Travel and Tourism Industry* Report (ConsultEcon, Inc., 2006), with the exception of last 2 variables (see Appendix 29).

The analysed aviation museums sample correspond to the first five best aviation museums in the world, from an article of CNN[46] (Hinson & Donaldson, 2014), mainly (in descending order): Smithsonian National Air and Space Museum; Imperial War Museum Duxford; National Museum of the United States Air Force; Future of Flight Aviation Center and Boeing Tour; and French Air and Space Museum.

Table 8 – The World's Top 5 Museums and Sintra Nucleus of Museu do Ar Benchmarking Analysis

Variables/ Museums	Smithsonian Museum	IWM Duxford	National Museum of the USAF	Aviation Center and Boeing Tour	French Air and Space Museum	Sintra Nucleus of Museu do Ar
Region/ Country	Washington/ USA	Duxford/ UK	Ohio/ USA	Washington / USA	Le Bourget/ France	Sintra/ Portugal
Airport/ Aerodrome Location	X	X	X		X	X
Museum Collection	60,000 objects; > 1.75 million photographs; > 14,000 film and video titles	200 aircraft, tanks, military vehicles and boats	> 360 aircrafts and missiles on display	Boeing 747s, 767s, 777s, or 787s being assembled	19,595 items, including 150 aircraft	46 aircrafts, 5,000 bibliographic assets, Flight Equipments and Uniforms
Gift Shop	X	X	X	X	X	X
Food Service	X	X	X	X	X	*
Meeting Areas	X	X	X	X	X	X
Interactive Exhibits	X		X	X	X	
Dynamic Events Calendar	X	X	X		X	

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[46] http://edition.cnn.com/2014/02/07/travel/best-aviation-museums/, on 6th April, 2014

Educational Programming	X	X	X	X	X	
Air Shows		X	X		X	*
Public View's Restoration	X	X	X		X	
Professional Tour Guides	X	X	X	X (only in English)	X	*
Timetable	10 a.m. to 5.30 p.m. or 7.30 p.m. (extended hours)	Summer: 10 a.m. - 6 p.m. Winter: 10 a.m. - 4 p.m.	9 a.m. to 5 p.m.	8.30 a.m. to 5.30 p.m.	Summer: 10 a.m. - 6 p.m. Winter: 10 a.m. - 5 p.m.	10 a.m. to 5 p.m. from Tuesday to Sunday

Legend: * not available at the moment, despite having conditions to provide it; ☐ not available

Source: Pires, R. (2014)

When referred that 'Food Service' is not available at the moment, it means that it has prepared installations to provide that service, however it is not explored as so. With 'Air shows' variable the same happens as it has conditions to organise and receive air shows events but it has not happened, as studied on the following chapter.

In terms of 'Professional Tour Guides', it is important to state that despite guided tours not being one of its regular offers, Museu do Ar organises a few, which are created and conducted to diffuse the Portuguese aviation history and not as a tourist experience.

As this analysis focus the museum as a tourist attraction, it was considered that it was not available presently.

Comparing all collections, it is possible to conclude that Sintra Nucleus of Museu do Ar has a lower scale. Besides, it displays main conditions, such as a location near a tourist village as Sintra; an aerodrome location; meeting areas; and basis to organise airshows and display professional tour guides. Thus, it is possible to qualify it as a tourism resource, competing at an international level once it exhibits key factors for its success as a touristic offer.

Considering richness collection and its main conditions, Sintra's nucleus is a key enabler to implement and diffuse the Portuguese Aeronautical Route as it could both qualify its offer and also attract other Portuguese aviation museums to improve theirs.

b) **Considerations for Museu do Ar as a key enabler for the Portuguese Aeronautical Route**

Despite Sintra nucleus being the main structure of Museu do Ar, Alverca and Ovar complement it so it is important to analyse all nucleuses because each has its own schedules and resources. Besides, its decentralisation is a strategic way to increment visits and to allow public's aeronautical history fruition (Araújo, 2013), therefore improvement hints are crucial to develop the entire museum as a tourist experience. Supported by benchmarking analysis it was possible to identify critical variables for their success:

i) **Research** - Invest time and resources to constitute its completed archival collection and develop research through all its assets. It is important to urge and stimulate museum's offer.

ii) **Qualified Team** – it is crucial to create a qualified (Araújo, 2013) and multidisciplinary team in order to enable regular research; to develop systematic restoration activities as a way to recover some aircrafts and to return historic active aircraft samples; to potentiate a learning and experiential visit by 'Professional Tour Guides', in order to satisfy tourists needs.

Nowadays only Sintra's nucleus has some resources to guide tourist visits.

Alverca and Ovar have military structures and people that have limited knowledge about successive aeronautic improvements and who shows superficial knowledge about some aircraft details. Also they don't have further skills to promote customer service and hospitality.

Sintra's nucleus integrates its conservator, which creates circuits through exhibition and disseminates it to potentiate a few guided visits, which were previously reserved. Actually, guided tours are not a regular offer at the Museu do Ar as its prices table illustrates[47]. Mainly they provide it for group visits but for other segments there is no way to avoid self-guided tours and to obtain a continuous and fluent explanation of its assets.

Thus, it is insufficient to promote a tour guide in order to create a tourist experience and to correspond to different publics, who have different levels of knowledge and interests on national and international aeronautic achievements and who want to interact and learn about them.

iii) **Timetables** – Timetables differ from place to place, which is related to human resources availability. Sintra's timetable is from 10 a.m. to 5 p.m. from Tuesday to

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[47] http://www.emfa.pt/www/po/musar/pagina-001.005.004-bilheteira, on 10th April, 2014

Sunday, as stated. Alverca's nucleus is only open on Mondays, from 10 a.m. to 5 p.m.[48] and Ovar's nucleus has a timetable that goes from 10 a.m. to 4.30 p.m. from Monday to Friday and on weekends it is open from 10 a.m. until 6 p.m.[49]

They need to be similar and promote cohesion among 3 nucleuses because one complements the others. To promote plenty aeronautic assets fruition, their timetables must be homogenous. At least Alverca nucleus' timetable should be reviewed because a tourist cannot be disappointed when he/she decides to visit an attraction.

iv) **Accessibility** – Location is determinant on tourism attractions (Medlik, 2003) and accessibility influences visitors flow that an attraction/ destination can achieve (Keller, 2004). Sintra and Alverca have great accessibilities and independence from military structures but Ovar's nucleus has its exhibition area in a hangar in the middle of Ovar Air Base and it has indirect accesses, through little villages whit difficult accessibility.

v) **Airshows** – Museu do Ar used to promote frequent airshows but economic situation determined not enough conditions to maintain museum's operation and to retain its historical squadron, which owns a sample of Dornier Do-27[50]. Nevertheless, "Airshows and aviation events are often planned as important aspects of the offerings of an aviation museum" because they can attract "hundreds of thousands – even millions – of visitors" (ConsultEcon, Inc., 2006, p. 2).

Consequently, it should be developed and successively should increase its flying aircrafts, in order to create a dynamic touristic offer.

vi) **Collection** - Museu do Ar is one of the World's 20 best aviation museums, assuring a spotlight in a high developed sector of aerospace exploration and developing components and programs to keep Portugal flying[51] (Macário, 2010).

vii) **Languages** – To welcome and to be able to receive tourists it is crucial to display information in different languages. It is a way to include people on an experience, due to the fact that a language can be a barrier to diffuse knowledge and to promote programmed activities. Thus, at least information should be available on main languages that Museu do Ar's consumers speak.

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[48] https://www.emfa.pt/www/po/musar/pagina-006.001-nucleo-de-alverca#!prettyPhoto, on 10th April, 2014
[49] https://www.emfa.pt/www/po/musar/pagina-006.002-nucleo-de-ovar, on 10th April, 2014
[50] http://www.emfa.pt/www/po/musar/pagina-001.001.003-esquadrilha-historica, on 15th May, 2014
[51] Own translation

4.8   Main Aeronautical Heritage Conclusions

Even though this research is restricted to 6 entities, they reflected aeronautical evolution and are the main responsible for aeronautical culture in Portugal.

As the aim of this study is to promote aeronautical heritage valorisation, it is important to state the main developed initiatives to show national collections to local/ regional community but also to analyse what kind of external collaborations they have to qualify and to boost their collections. The initiatives considered for Museu da Aviação were based on information about its previsions so 'External Collaborations' were not possible to evaluate.

Table 9 – Aeronautical Heritage Valorisation

Initiatives[52]	Museu do Ar	Museu da ANA	Museu da TAP	Museu da Aviação	Museu Aero Fenix	Aero Club de Portugal
Exhibition	X	X	X	X		
Archive Availability	X	X	X	X[53]	X	X
Air Shows					X	
External Collaborations	X	X	X		X	X
Assets Exchange/ Transfer	X			X[54]	X	

Source: Pires, R. (2014)

The common resource among these entities is an 'Archive Availability', enabling people to consult its bibliographic collections in order to learn about aeronautical history or about aircrafts models.

Exhibition is assured by most entities except Aero Club de Portugal, which has mostly awards objects, as mentioned, and Museu Aero Fenix because it is a living museum, which has given priority for maintaining historic airplanes flying. That is why it is the only entity providing airshows and also allowing people flying, having an aeronautic experience associated to adrenaline. Still Museu Aero Fenix expects to exhibit its objects.

'External Collaborations' are present in almost all entities (except Museu da Aviação because it is not operating yet) but those collaborations are mainly with national entities and for individual situations, with the exception of tri-partied protocol between TAP, ANA Aeroportos and FAP, which cooperate and define strategies together twice a month.

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[52] Consult Appendix 30 to perceive initiatives description
[53] Supported by http://www.rtp.pt/noticias/index.php?article=599010&tm=4&layout=121&visual=49, on 17th April, 2014
[54] Supported by http://www.emfa.pt/www/noticia-483, on 17th April, 2014

It is also necessary to exclude Museu Aero Fenix, which collaborates with European Federation of Historic Aviation, and simultaneously represent it in Portugal since 2010; is affiliate of European Aviation Preservation Council; is member of European Airshow Council; and it is an associate of Network of European Museum Organisations.

This enables a regular knowledge exchange that improves internal capacities in different areas, "since restoration techniques until aerial operations risk analysis"[55].

Museu do Ar used to attend these conferences and meetings about aviation museums and it also values them but nowadays it is not their practice, due to cost reduction necessity.

'Assets exchange' can enrich a collection and Museu do Ar explores it extensively to raise its diversity and assure a unique collection.

Though is important to state each collection to identify Portuguese aeronautical heritage.

Table 10 – Entities' Collection Discrimination

Collection	Museu do Ar	Museu da ANA	Museu da TAP	Museu da Aviação	Museu Aero Fenix	Aero Club de Portugal
Aircrafts	120		X	X	8	10
Bibliographic	5,000	X	23,600	X	X	X
Photographs	X	15,000	X	X	X	
Uniforms	X	X		X	X	
Flight Traffic Control Equipment	X	X		X		
Telecommunications	X	X				
Artistic Assets			4,900			
Technical Items			155			
Trophies and Medals						X

Legend: X – not accounted for

Source: Pires, R. (2014)

'Bibliographic' and 'Photographs' are the most common types of assets in these collections and they are very important to complete research works about certain periods of aeronautical history or to develop more detailed theories about airplanes models.

'Aircrafts', which are the most attractive asset, are present in 5 collections, as Table 10 reveals. However, despite Museu da TAP and Museu do Ar being different collections, they

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[55] Own translation from interviewees contribute, on 27th February, 2014

are both exhibited in the same nucleus: in the Sintra's Museu do Ar, since their collaboration protocol.

All entities have relevant collections because of their diversity and representativeness, but as they do not have a complete inventory, is not possible to specify how many pieces they have in each category. Also, in their inventory they count the same type of asset in different categories. For instance, it is usual to integrate 'Photographs' in 'Bibliographic' category, as it also registers history. It is not uniformed and consequently, its discrimination is not detailed as needed to reveal its richness.

Concluding, entities have an extreme necessity of doing a full inventory of their pieces. Then, it is an opportunity to develop a collaborative project under the network, which enables two challenges:

a) As collections have many common categories, it is a chance to develop a complete inventory where entities could share knowledge and exchange research processes to categorise assets;

b) As each category has diverse types of assets, knowledge and collaboration are variables of an obligatory path to solve restoring challenges.

In spite of inventory restrictions, it is possible to conclude that these 6 entities own different collections. Although every single one tells its own history, if all were combined it would create a new and distinctive "tale".

All have in common the preservation value, in their cultural organization, so they are centrepieces to tell the story of Portuguese aeronautical culture.

Additionally, Portugal has unique assets, some are in their original form, and others are true rarities or belong to a few survivor samples. Portugal has the know-how to conserve, preserve and/ or to manoeuvre them, which determines the Portuguese potential to explore them as a dynamic assets and a tourist attraction.

Each entity has different assets, namely: i) FAP has the main military assets and aircrafts to compose Portuguese and international military aviation history; ii) ANA has a great heritage of telecommunication assets; iii) TAP has a diverse collection which tells the evolution of its uniforms, its crockery, its indoor technological developments to correspond to the international aviation standard improvements, etc.; iv) Aero Club de Portugal has trophies and medals that register the main events in Portuguese and international aviation events; v) and SATA has the main collection about its progresses and reveals its impact for Açores development.

Assets contemplation and fruition are necessary to contribute to a unanimous identity and to enrich the public and introduce them a diverse aeronautic and dynamic knowledge (Ramos, 2013).

Furthermore, it is possible to compile a great national collection and build a common identity that could be explored as a rich, unique, diverse and attractive tourism resources[56]. Consequently, Portuguese aeronautical heritage could be seen as a tourist attraction, combining different attractive sites and also appealing events, because "often the site and the event together combine to determine the tourist's choice" (Medlik, 2003, p. 168).

In terms of Sintra's Museu do Ar Benchmarking, it is possible to highlight that in spite of its lowest scale, in terms of installations it has the main categories (Aerodrome Location and Airshows conditions, which outperforms a few of sample aviation (see Table 8); Food Service capacity; and Meeting Areas) to raise its offer into an international market. As well it could pick up a part of Sintra's stable demand of 2 million visitants per year (Projecto SIAM, 2009), where foreign demand occupies a slice of 86% (Capital do Romantismo, 2011). Additionally, Sintra's touristic offer is widely supported by a qualification of its strategic Cultural and Natural Touring product (Projecto SIAM, 2009), so the opportunity to improve its experience remains.

In spite of its capacities, to really improve its tourism services it should evaluate some investment in research (i) and in a qualified team (ii), since research is the touristic offer sustainability, allowing knowledge of the details of each piece, and a qualified team enables a fruitful exploration of this knowledge to create a unique offer (Hjalager, 2010). Besides, human resources are the most valued asset in tourism activity (OECD, 2000). Both enable guided-tours, different circuits through exhibition spaces and a dynamic events calendar as a regular offer. It certainly attracts new tourists and induces repetition (ConsultEcon, Inc., 2006). Surveyed

Furthermore, museum volunteers' management and partnerships should be settled with universities to organise fellowships in areas such as: hospitality, quality services, conservation, tour guide, history, engineering, etc. It would spread knowledge and ideas exchange and development processes, evolving its services by considering multiple attendees profile, with low costs in return of practice experience providing.

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[56] Consult Appendix 31 to see main surveyed aeronautical resources

Concluding, more important than having a collection with potential, it is how it attracts people to visit and revisit it. That is why an innovation strategy is determinant since it is a tool to create value and distinct experiences, which potentiates motivation creation on visitors, assuring museum's sustainability.

FAP started collecting and preserving, with militaries dedicating their free time to preserve and restore aircrafts. Nowadays it discloses a diverse collection and its museum was created to expose and diffuse aeronautical assets, appealing its competences for maintaining its historical squadron and support research.

However, its expenses increased largely as long as its collection extended (Araújo, 2013) as aircrafts maintenance and restoration can be very expensive (ConsultEcon, Inc., 2006).

Despite Museu do Ar difficulties of space and funding limitations (Araújo, 2013) it should adjust its activity planning (WTTC, 2003) to increase its offer and positioning into an international level, because if it does not qualify its offer it does not get its distinctiveness and it will always be struggled by costs (Hjalager, 2010). On the other hand, embracing tourism as its strategic activity is a way to raise its yields, in a local perspective, and also to foster development of the Portuguese Aeronautical Route, ensuring benefits for all its partners (WTTC, 2003) by creating an inter-firm unique tourism product.

It needs to input resources like money and manpower (Hjalager, 2010) to improve it as a tourist experience and similarly ensure its sustainability, since product innovation and market extension guarantee its performance. Product's improvement enables exploration of existent market and by creating new products it boosts exploitation to achieve new and different market targets. Thus, a mix strategy of product and market increasing, guarantees the Portuguese Aeronautical Route success.

An enlargement of its size and/or facilities should be considered because it determines its potential attendance (ConsultEcon, Inc., 2006). It influences offered experience but also its operating cost so measuring and "planning for future operational needs is imperative to success" (ConsultEcon, Inc., 2006, p. 2).

Analysing the other two nucleuses of Museu do Ar, it is possible to conclude that Ovar and Alverca need more interventions to adjust to an international level because they were not submitted to successive upgrades as Sintra did.

Likewise Ovar's nucleus is affected by being integrated into a military structure and located in the middle of Ovar Air Base, with difficult accessibility, which in terms of defence is a strategy to manage its operation for territory's protection but in tourism terms it can be a constraint.

Extending this analysis through Portuguese aviation museums and comparing them with international sample of Table 8, it is possible to identify the path to improve aviation museums experience, mainly: i) to develop an 'Educational Programming' (Araújo, 2013) because "Attendance by school children can represent up to 50 percent of visitation." (ConsultEcon, Inc., 2006, p. 2); ii) to create an 'Interactive Exhibits' since it induces diversity in the visitor experience, but the 'story' told by a museum has to be designed to conduct its unique identity (ConsultEcon, Inc., 2006); iii) and a 'Dynamic Events Calendar' as changing exhibits are crucial to create attractiveness and repeat visitation. (ConsultEcon, Inc., 2006).

Besides, it would be important to develop collaboration with international aeronautical museums in order to surpass specific conservation challenges or reinvent exhibitions but maximizing resources; and with international aeronautical associations to improve knowledge. It would be a possible common path for Portuguese aeronautical museums, which jointly could achieve common objectives, share resources and improve knowledge about their activity or aeronautics to, consequently, increase experiences and differentiate their offer from global competitors, where international seminars and conferences enable to follow competitors' steps and global trends.

5   The Portuguese Aeronautical Route: a New Tourism Product Conceptualisation

As analysed previously, tourism products are amalgams of attractions, facilities and services consumed by tourists in destinations in order to fulfil their needs (Buhalis, 2000). Medlik (2003) defined it as an experience, which is a complex definition that includes the dimension of product's consumption ambiance, the product's composition itself and customer's intervention to consume it, which enables the cycle of consumers satisfaction and products creation.

Routes stimulate these combinations, beneficiating from multidestinations (Shih, 2006), multi attractions with their distinct "flavour" (Keller, 2004, p. 4) and multi players with their own interests. Articulating them with network features, would boost regional development based on social capital (Silva A. , 2011), pursuing a common goal to develop aeronautical tourism products and promoting their assets fruition.

Additionally, from Cultural Tourism, routes are the main product that tourists are interested in (Maia & Baptista, 2011).

As analysed in Chapter 4 little research conducted by aeronautical museums' is their primary weaknesses (Araújo, 2013; Ramos, 2013), resulting on low inventoried assets and knowledge

about their history as well as their cultural value (Vieira, 2008). This knowledge is a key resource to manage museum's regular operation and to qualify them as a tourist attraction, so it is important to value it.

As museums have this constraint, a network framework is an opportunity. It would promote knowledge exchange and collaboration activities on current pieces they are investigating, in order to complement their history with fewer resources; also to share techniques and methodologies about conservation, operation and maintenance of historic airplanes, as well as other assets; and, for instance, a specific training programme could be jointly developed in order to promote experience sharing and team building as members of the network.

Appealing to a route network framework ensures Portuguese Aeronautical Route's sustainability as it enables: members diversification collaboration, which allows different perspectives and resources; minimise organizations' limitations (as these described); solve problems and rise tourism products, allowing progresses on common knowledge, brand and singular experiences (Turismo de Portugal, 2012) to an experienced demand (Weiermair, 2004).

The network, which is responsible for speeding up product's reengineering and service quality (Turismo de Portugal, 2012), combined with the route's exploration, which is supported by an engagement of local aeronautical entities from multi destinations, improves innovation and promotes cohesion through firms, and consequently, their offer.

As competition is global (Turismo de Portugal, 2012) and most of aeronautical assets owners have small dimension, a collaborative model, sharing resources and knowledge, promotion and scale economies could be the solution to create a distinctive tourism product. Besides, including various destinations and multiple assets, allows theme routes creation and products development, enabling an offer focused on different targets, which goes from those who have curiosity about airplanes to an experienced pilot which wants to see what Portugal has to offer, and also from families to a couple of senior tourists.

This way the Portuguese Aeronautical Route offer is qualified, encouraging tourists to stay more time and, consequently, increasing country wealth, so it addresses "the challenge for the local entrepreneur is therefore to create additional customer value with new products." (Keller, 2004, p. 5).

Based on records, it has already occurred that tourists have visited Portugal to appreciate Portuguese Aeronautic Museums and some other aeronautic places they have specifically requested. However, it was impossible to prepare a memorable experience package for them as there was not an organised touristic offer. Instead, they had to research some assets and

asked to visit them. Thus, they visited what they found, not the best to exceed their expectations. Concluding, there is a market with motivation to visit these assets but there is not a product properly developed to explore this opportunity.

Consequently, the Portuguese Aeronautical Route is an opportunity to minimise these restrictions and to empower the distinctiveness of Portuguese aeronautical resources. As an example, it is possible to refer that from benchmarking analysis (in Chapter 4.7), Sintra's Museu do Ar integrates facilities to potentiate an experience at the level of its international competitors.

As an example, Hume City, a region of Australia that has aviation heritage aims to increase its awareness. In its future tourism planning, presents a development of non-traditional products strategy. By creating distinct attractions, supported by improvement of aeronautical experiences (Hume City Council, 2013) these non-traditional products qualify traditional ones, by appealing at synergies between them and exploring local resources and community in order to attract and satisfy niche markets.

On one hand, they recognise the importance of aviation-enthusiast niche market to compile an offer for them. On the other, they also identified the opportunity of developing a local network as a way to promote business opportunities and the growth of tourism products (Hume City Council, 2013).

Portugal has distinct aeronautical resources (as demonstrated on Chapter 4) and they are located throughout all its territory (see Appendix 31). The importance of these assets reinforces the need of articulating them, to develop a distinctive tourism product supported by a network framework, focused on aeronautical enthusiasts' motivation.

Concluding, this study intends to present this opportunity as a way to create value for Portugal destination, which can also be articulated with its traditional offer and its strategic products, such as city breaks, gastronomy and wines, cultural touring, and others (Turismo de Portugal, 2012) as one supports the others. All interconnected qualify Portuguese territory when a dynamic demand is requesting for diverse tourism products to induce tourists repurchase.

5.1 Aeronautical Enthusiasts: Consumer Behaviour

To satisfy a customer that has been changing and a tourist that wants more than just to look and see, but also to touch, feel and experience (Hume City Council, 2013), a unique combination of resources is needed to promote an authentic offer (Buhalis, 2000).

Thus, the Portuguese Aeronautical Route needs to articulate different entities in order to promote several experiences to satisfy this demanding tourist. Although they got more

segmented and specialised (Novelli, Schmitz, & Spencer, 2006), the common characteristic through all targets is the enthusiasm for aeronautics, adrenaline and appreciating sky experiences. Their main motivation to visit a destination is to enjoy different aeronautical assets and experiences. Consequently, a destination has to have something unique and distinct, apart from its competitors, to claim for this experienced and valuable segment (International Council of Air Shows, Inc., 2009).

a) Aviation Museums

As stated, aviation museums are key enablers to develop the Portuguese Aeronautical Route, so it is important to understand their visitors' motivation and how to attract them.

The resident/ visitor ratio depends on museum location, resident market size and proximity with the tourist destinations, which determines if the residents occupy a larger attendance than visitors or reversed positions (ConsultEcon, Inc., 2006). Thus, if museums have tourist destination proximity, they should attract and explore visitors' affluence.

ConsultEcon, Inc. (2006) study defines four main targets of aviation museums: military veterans, school groups, families and tourists.

i) Military veterans – It is an important target but its aging determines that museums depending widely on this target are very exposed to this emergent and progressive weakness. Consequently, museums have to diversify their offer, especially to attract young public. It is also important to focus on girls and mothers, specially known as the decision makers for their families' leisure activities (ConsultEcon, Inc., 2006).

As several museums expressed that expansions and investments to improve their exhibitions resulted in attendance increasing (ConsultEcon, Inc., 2006), is important to create attractive offers to achieve new targets, as mentioned.

ii) School Groups – To attract this target, an educational programming is crucial as well as a development of a dynamic calendar in order to repeat visitation and promote a progressive learning process for children of different ages, as it can be found on short holidays programs of Centros de Ciência Viva, which are focused on interactive and simple experiences to explain and demonstrate different phenomenon.

iii) Families – To promote experiences for families' segment, like in school groups, a dynamic calendar is needed and a program associated with interactive exhibits is expected to enable learning processes through all family members, adjusting at different knowledge specifications and different curiosity levels to fulfil their expectations.

iv) Tourists – This target aims to know and interact with unique and distinctive Portuguese aeronautic assets, because it is a niche market and the majority are experienced on other aeronautic museums. Its main motivation is to visit them to know about the specific Portuguese museums, which others do not have. As it is experienced and wants to learn more about aeronautic, the explanation level must be adequate to its specifications. Still, a cross between other target's offer like interactive exhibits, flight simulator, dynamic calendar, Imax experience, etc., increases value and potentiates a memorable experience, which enables their future recommendation for friends and family.

Each of these targets has different attending behaviour as school groups visits occurs on week days and families and veterans visit them mostly during the weekends. School groups and families visit them mostly at spring and autumn and in contrast huge tourists affluence happens during summer months (ConsultEcon, Inc., 2006) but it depends on its tourism destination.

To conclude, capability to attract school children is determinant because it can represent 50 percent of museum's total attendance, as mentioned. This combined with families, veterans and tourists visitors, all with distinct consuming behaviour, can stimulate its activity and constantly boost dynamic exhibition programs as it increases attendance rates and revenues, allowing reinvestments for their improving.

Because of their facility sizes aviation museums "can make excellent venues for events and facility rentals" (ConsultEcon, Inc., 2006, p. 3), for example Smithsonian displays venues for corporate events and promotes them as "an event like no other!"[57]. Thus, Portuguese aeronautic museums could explore this trend because this target became important for many aviation museums (ConsultEcon, Inc., 2006).

b) Air Shows

Air Shows represent a large industry (International Council of Air Shows, Inc., 2009) that attracts hundreds of thousands, or even millions, of visitors (ConsultEcon, Inc., 2006). A show that proposes value that cannot be found anywhere else, compiling activities from supersonic-speed military jets to gravity-defying aerobatic acts, parachutists, and a host of on-the-ground displays, enables "memories that truly last a lifetime" (International Council of Air Shows, Inc., 2009).

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[57] http://airandspace.si.edu/support/host-an-event/, on 1st July, 2014

According to International Council of Air Shows (2009) audience demographic and psychographic profile is well-educated, affluent families, and 53 percent of whom fit within the covered age gap from 30 to 50 years.

Additionally, air shows attract sponsorships from companies at a local and national level that wants to reach this segment.

5.2   Network's Structure of The Portuguese Aeronautical Route

As developed on the previous subdivision, to correspond to different segments of aeronautic enthusiasts and to satisfy a continuously changing demand, it is important to provide a network of services.

The main goal of this route is to promote Portuguese aeronautical culture, which is much beyond material assets' value (Vieira, 2008), so to convey this ambiance, different experiences are needed. Therefore, partners selection and network's structure has to correspond to these goals.

As extracted from cases analysed on Chapter 2.6, actors heterogeneity contributes positively for the development of collaborative innovation, such as knowledge integration, co-evolution of social and business relationships, and technological development, fostering creativity and making group interaction more effective (Corsaro, Cantù, & Tunisini, 2012). Thus, their core activities differ and their organizational features can vary among public, private, and academic actors on knowledge transfer. However heterogeneous actors promote network's cohesion and are more successful (Corsaro, Cantù, & Tunisini, 2012).

As occurred at Hume's City, city councils are crucial to implement new tourism products as they must speed up infrastructures, legal issues, processes facilitation and provide public characteristics such as cultural legacy, safety, environment preservation and streets cleanliness (Rigall-I-Torrent & Fluvià, 2011). Also, they should promote articulation with their local and traditional tourism products in order to support a strategy of cross selling between both, which enables tourist's destination competitiveness. Clearly, all aeronautical tourism products have to be articulated with others city councils.

Consequently, a constellation of aeronautic entities should be integrated and combined with organizations from tourism sector in order to compile a distinctive tourism product, representing all the value chain of the Portuguese Aeronautical Route.

Figure 5 – Portuguese Aeronautical Route's Structure
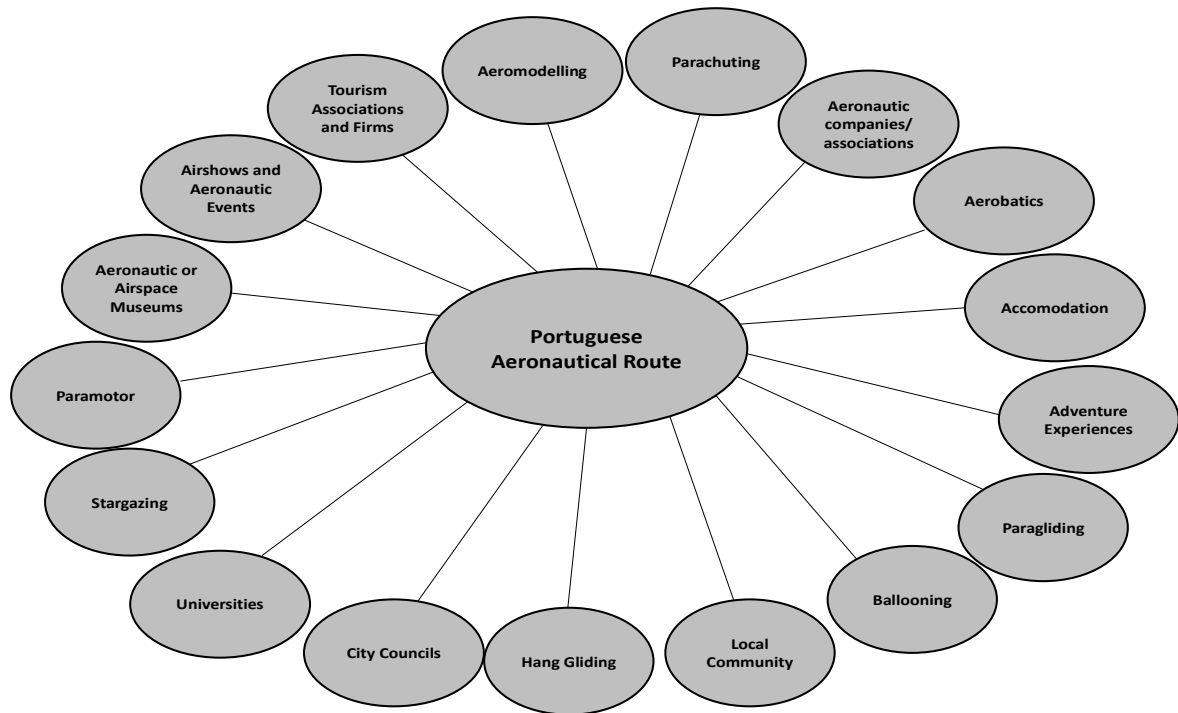
Source: Pires, R. (2014)

As happened with Aldeias do Xisto, it would be a network of networks as it would aggregate entities with common activity constituting sector's networks, which also would interact direct and indirectly with partners from other areas along the network.

Concluding, this figure clarifies the main domains it could integrate, attending to aeronautical entities profiles that exist in Portugal, in order to promote a polyvalent network, fostering and diversifying aeronautical experiences.

Supported by a preliminary research which is aimed to inventory aeronautical assets and experiences in Portugal, it is possible to reveal, as listed in Appendix 31, that they are dispersed along all its continental territory. Considering, also, that this product addresses airplanes or/and flying, allowing faster region interconnections while providing a global tourist experience across Portugal territory, it justifies the development of a national route.

From this preliminary study about 65 initiatives and entities were also inventoried, as possible partners, mainly from the aeronautical sector. From tourism sector they should be identified and selected by location, considering their contribution for this aeronautical tourism product. It is also important to bear in mind that partners selection must be developed according to regional product design and targets aimed, in order to aggregate specific restaurants, hotels, crafts, etc.

From this preparatory research, two relevant accommodations were identified, considering their concept connection with route's theme as one displays an ambiance related to airplanes and travel (i), and the other promotes a unique stay under Alentejo sky and stars (ii).

    i) TRYP Lisboa Aeroporto Hotel, a four star city hotel, located on the opposite of Lisbon Airport, with airplanes theme, displaying a replica of Blériot on its entrance, a bar balcony made by an airplane fuselage, rooms lamps with airplanes sculptures and desks with travel bags format (see Appendix 32);

    ii) L'AND Vineyards, a luxury wine resort located near Évora, in Alentejo region, which offers ten L'AND Sky Suites that allow the full opening of the ceiling of the room (see Appendix 33), promoting the observation of the dark night sky of Alentejo and seeing the cosmos as an unique experience (L'AND Vineyards, 2014).

In spite of promoting different concepts and aiming to reach different targets, both display unique experiences to satisfy their clients. Thus, heterogeneity entities ensure network's structure in order to foster innovation and guarantee a development of a new tourism product, which combine technological and hospitality knowledge, both key factors to compose the Portuguese Aeronautical Route.

5.3   A possible path to assemble the Portuguese Aeronautical Route

To develop a tourist route, Paula e Bastos (2002), , refer that there are four main steps: i) define which route would be implemented; ii) present which tourist attractions would compose the route; iii) do a geographic inventory and accessibilities to connect those tourist points; iv) and implement a program to delineate the route (in (Maia & Baptista, 2011)).

However, this study just contemplates stage i) and ii), as Chapter 6.1 refers, once this study proposes route's conceptualization, addressing a sustainable tourism way of exploring aeronautical assets.

These activities, clearly, feed networks' structure once the majority of networks' partners are both members and tourist attractions. Thus, its implementation has to consider both aspects.

As recommended on Chapter 4.7, a priority to constitute the route would be main aeronautical assets' owners, mainly Museu do Ar; Museu da ANA; Museu da TAP; Museu da Aviação; Museu Aerofenix; and Aero Club de Portugal, referred on Chapter 4, which should be supported by their history's assets research results.

Thus, to start composing and identifying possible partners, they could mention aeronautical entities to become members as long as they start networking to achieve assets' details.

Besides, network's orchestration would not be assured by them, as it is developed on next point.

To constitute the route, as analysed on cases presented in Chapter 2.6, criteria has to be established (Maia & Baptista, 2011) in order to promote a sustainable tourism product and a united network, such as: i) be related to aeronautic theme at a certain way; ii) present distinct experiences and its own stories to involve tourists; iii) show collaboration experiences or be conscious to collaborate; iv) present a compatible timetable with tourists visits; v) present dominance of at least Portuguese and English. It should also be important to inquire entities what is their perception about aeronautic enthusiasts' tourists interests and what would be an exceptional offer/ composed product for them in order to evaluate their capability to provide tourism services and this is not their core activity. Additionally, by asking this, they could embrace this as a common goal they could achieve and their commitment increases, pursuing it, with network's partners, to offer an extraordinary experience.

As happens with COTEC Innovative SME Network, it would be crucial to assess entities annually in order to follow their evolution, their initiatives and their necessities in order to readjust network's dynamic and its path.

Likewise, if an entity would like to become a network's member, it had to present its application and evaluate themselves in these main criteria (from i) to v)). Also, route's team would evaluate entities in order to decide their possible adhesion.

To constitute the route, a regional combination of "various organizations and businesses in a geographically limited area" should be done "to harmoniously work together to achieve a common goal." (Pinto & Kastenholz, 2011, p. 217).

Thus, a creation of different regional products but all articulated, where each of them absorbs innovation network model, would compose the Portuguese Aeronautical Route. This way of articulating them would correspond to travellers' research behaviour, which decides their tourist routes destination based "not only on the connected and convenient roads among destinations but also on the complementarity of available resources and attractions" (Shih, 2006, p. 1038).

However, to orchestrate it, it is crucial to manage structural holes and closeness through all route, since each region possesses different opportunities and constrains (Shih, 2006) to create its own products. Still, a network at a national level can benefit from distinct innovation waves, varying from region to region, where one can infect the other, fostering innovation cycle and its outcomes over route's members. Yet, the Portuguese Aeronautical Route's main

purpose is to connect complementary activities, taking profit of their synergies to explore valuable assets and create a new tourism brand, under Portuguese tourist destination umbrella. As stated by Novelli, Schmitz & Spencer (2006, p. 1143), a goal for this type of networks is to "highlight the availability of certain activities in one destination or region and to get SMEs that would normally work in isolation to co-operate and build a successful tourism product in the locality".

This multiple networks articulation can be challenging, especially to effectively share both codified and tacit knowledge (Decelle, 2004), but it is a way to stimulate continuous services' innovation cycles, assuring sustainable development based on public actors and private stakeholders to improve social structures and protect resources (Brás, Costa, & Buhalis, 2010). Also, it is a way of promoting dynamic programs, creating thematic sub-routes and events calendar through regions.

5.4 Portuguese Aeronautical Route's Network Governance

Orchestration should be assured by a created independent entity, abolishing hierarchical structures and enabling fuzzy boundaries among members (Kastelle & Steen, 2014). Besides, as occurs on analysed networks' cases, this entity should be developed to create and manage network's agenda and also to represent all members' interests. Hence, a technical team and a commission would be needed to address both the creation of activities to promote interactions and to innovate (by team) and to decide strategy and network's investment priorities to prosecute its goals and analyse members' adhesion (by commission).

### Figure 6 – Network's Orchestration Representation
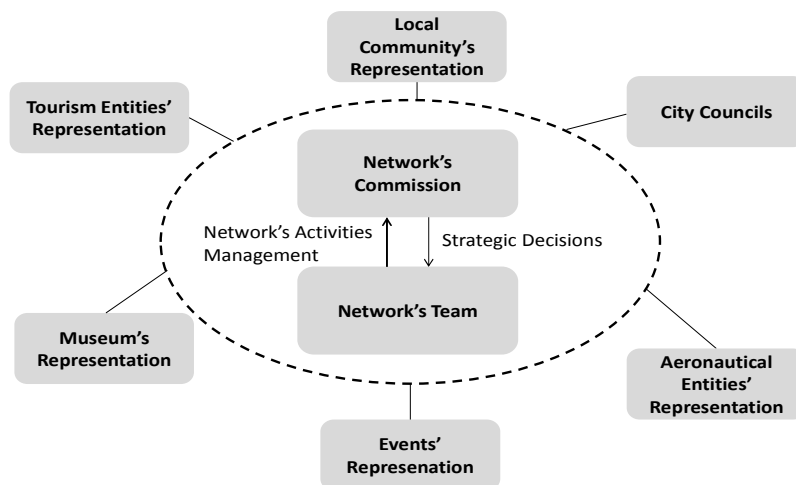
Source: Pires, R. (2014)

In the beginning the main aeronautical entities, identified on Chapter 4, should develop close interaction with the orchestrating entity as they would be like "ambassadors" of this route once they should collaborate with it to identify possible partners.

However, from these entities Museu da Aviação's cooperation should be carefully analysed once social proximity is a key factor to collaborate and to attend at network's activities to achieve its goals. As its location is in Azores, out of this study representation – which just includes continental Portugal, it should be submitted into a detailed analysis process.

Besides, at this starting stage, it would reflect closeness in its interactions map (see Figure 7), and as long as the network would increase, and activities would foster collaboration and proximity among members, these entities interactions would be dispersed along the network.

Figure 7 – Interactions Map of Beginning of Portuguese Aeronautical Route's
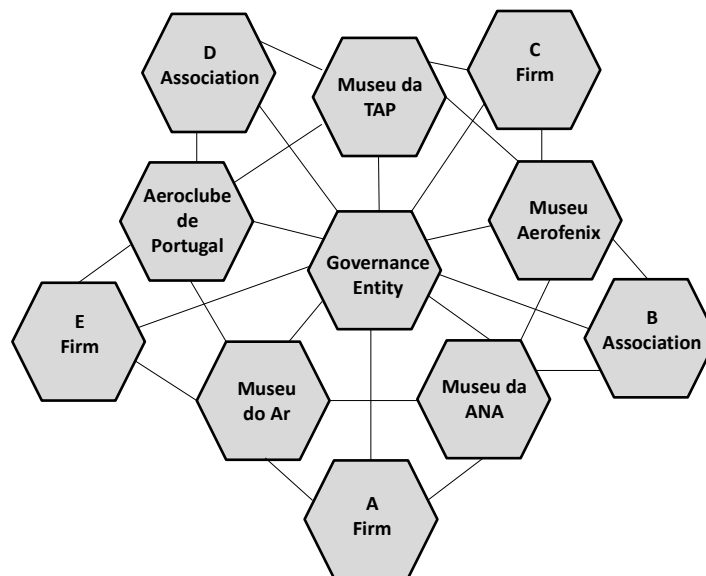
Note: ——— does not reflect interactions' intensity.

Source: Pires, R. (2014)

5.5 Route's Innovation Management

Tourism innovation networks' model is instantly fed when services are provided and consumers give their feedback/ suggestions, as Figure 3 demonstrates. However, its management has to consider the following recommendations:

Table 11 – Should Be Actions for Route's Innovation Management

Factors	Should be
Activities	Shaped to ensure network's cohesion
Associates	Managed to enable all its innovation cycle, absorbing external stimulus
Members	Scheduled with all members monthly and diversifying places to abolish comfort zone and to

Meetings	foster proximity once new ambiances enables connection
Commission Meetings	Organised trimonthly and also as network's developments dictate
Annual Event	Developed to promote the first 3 best products and the first 3 best marketing campaigns of the previous year, ranked by achieved points in criteria (as clients recommendations; entities collaboration; returns increase; etc.)
Knowledge Exchange	Enabled through cooperation projects among tourism and aeronautical firms, where specific knowledge of each area is shared to both create self-reliance in their capabilities and develop this product to satisfy this niche market.

Pires, R. (2014)

To reverse main blocks and barriers (Bessant & Tsekouras, 2001) network's orchestration should consider main suggestions:

i) employees and managers' should have a training plan (Decelle, 2004) to improve their skills and participate on innovation process as "everybody without exception must contribute" (Hjalager, 2002, p. 470) to it;

ii) network should be sensible to manage temporary employees, volunteers (Hjalager, 2010) and fellowships in order to obtain a balanced ratio. Turnover in tourism sector is the highest and employees are vital for knowledge, that is a base of a firm (Hjalager, 2002). Without its profusely exploration it constraints innovation process;

iii) develop ICT (Information and Communication Technologies) tools with restrict access for members to enable knowledge transfer (mostly codified knowledge (Ahrweiler & Keane, 2013)) and promote cooperation projects and collaborative tasks, and stimulate workshops and practical simulations where members are called to act/ to represent in order to enable tacit knowledge transfer. In fact, knowledge management needs to improve in tourism networks (Cooper & Baggio, 2008) and there is insufficient tacit knowledge in tourism SMEs that originates immediately imitated product-innovation (Decelle, 2004). Thus, companies should be encouraged to absorb external innovations and convert it into tacit knowledge, reversing this blocking variable and enabling the development of more disruptive innovations.

In fact, in this network, types of tacit knowledge could vary once it assimilates different specific domains as tourism, aeronautical history, know-how to conserve different materials to promote diverse assets preservation, etc. As a result, it is important to identify entities or individuals that have this main tacit knowledge as a way to articulate them to exchange experiences and develop further achievements.

Their collaboration would provide an opportunity to develop skills to acquire experience and absorb tools to develop tacit knowledge; hardly understood as an occasion to use this knowledge to take advantage of each other once all firms want to achieve the same goal. Together they would share codified knowledge, develop specific skills, share resources and convert external threats into opportunities once they jointly have more capacities to empower themselves, to qualify destination and compete internationally.

In order to define activities' agenda, a trimonthly network's evaluation is necessary to monitor its effects and to determine the next steps to implement others.

Despite these activities being fundamental to reverse barriers of tourism innovation, network should empower its critical success factors as improving internal network's communication, assuring efficient service to provide a package of experiences along diverse partners to tourists.

Similarly, to manage suggestions and complaints is a way to sustain innovation processes as they bring new ideas to improve services and to create new products, adjusted to tourists' needs and expectations. Monitoring suggestions management is determinant therefore further innovation outcomes can emerge immediately (as Figure 3 illustrates) or fosters the development of new products and services.

Finally, offer diversification is determinant to attend at different needs of diverse segments. Hence, members should cooperate to develop tourist's attractive experiences and also to induce them to repeat visitation.

Actually, one great advantage of promoting this route as a network is to diversify offer appealing to partners' skills and resources once they could complement each other and together develop distinctive experiences.

For instance, a collaboration between Aerospace Engineering students of Instituto Superior Técnico de Lisboa and Museu do Ar would certainly increase museum visitation experience as they learn about aerodynamic airplanes' performance, mechanical features, electronic communication systems, on-board computers operation, etc. and Museu do Ar to increase visits should improve its offer. Thus, a good match could be done where students could create activities to display at museum for different targets, such as:

i) appealing at basic materials and developing physic experiences, they could explain flying phenomena, demonstrating how it is possible and its associated security;

ii) by studying cooperatively with Museu do Ar's team about airplane's details or about their parts / pieces, they could develop advanced experiences to exhibit at experienced aeronautical enthusiasts;

iii) organising demonstrations / events with their developed aero models, which had competed in Air Cargo Challenge, an annual and international event created by these student's degree, which has the purpose of carrying the most weight possible in the competition.

iv) create workshops where all targets can participate to set up small airplanes or pieces of them, which could have different attending levels and would allow object personalization by visitors, to take them as souvenirs to remember this experience;

v) organise teambuilding activities, that could be promoted as an optional event's activity for business target, where each team would have to develop airplane's parts and at the end they should joint them and verify if it is possible to set up all airplane model. This activity would promote the importance of near partners' cooperation but also with all networking they are inserted. Thus, it would have a message to foster innovation into clients companies.

Concluding, these are a few ideas that justify importance of collaboration, which can result in authentic experiences.

By adding value at clients and at its members, the Portuguese Aeronautical Route could qualify Portugal as a destination with passion for aeronautics, sky and adrenaline. With these three vectors it could respond to different tourists needs, where some could enjoy an aerobatics fly experience because they love adrenaline, and others could learn and feel how hard was to build and develop airplanes.

5.6   Route's Marketing Strategy

Previous innovation management strategies intend to reverse the usual appliance of defensive strategies by tourism industry (Hjalager, 1997). Instead, its conceptualisation and implementation should foresee the employment of multiple types of innovation to assure a sustainable tourism (Hjalager, 1997).

As mentioned, tourism sector is attached to localities. Thus, tourists have to dislocate themselves to consume its products and enjoy what a destination has to offer. Additionally, tourism products are very intangible (experiences) and their consumption involves active participation of consumers.

Besides this route applies innovation management strategies into organizational and processes to develop an innovative amalgam of services/ products, an innovative marketing strategy is required to attract consumers; to "deliver" its product, matching their expectations; to constantly combine stakeholders for unique experiences; to manage tourists changing needs

and, consequently, to receive recommendations, which enables a destination image creation onto potential consumers' imaginary (Baloglu & McCleary, 1999) and fosters its sale.

Tourism marketing strategies "serve as stepping stones for increasing the value of products via innovation" (Weiermair, 2004, p. 3). It is critical to implement the innovation network framework and articulate all its processes and organizations, which determine its products success through innovation cycle, as Figure 8 illustrates.

Therefore, marketing has to be gingerly articulated with the other innovation types as it is a dynamic engine that complement and supports them, providing communication through all network's members and with clients; articulating this information with network's partners, to enable innovation cycle; leading logistics' tools to allow reservations over network; providing inputs for products improvement/ creation and also to follow each step of this process; analysing obsessively its market segments; and promoting its developments.

Figure 8 – Marketing Provision through Route's Innovation Cycle
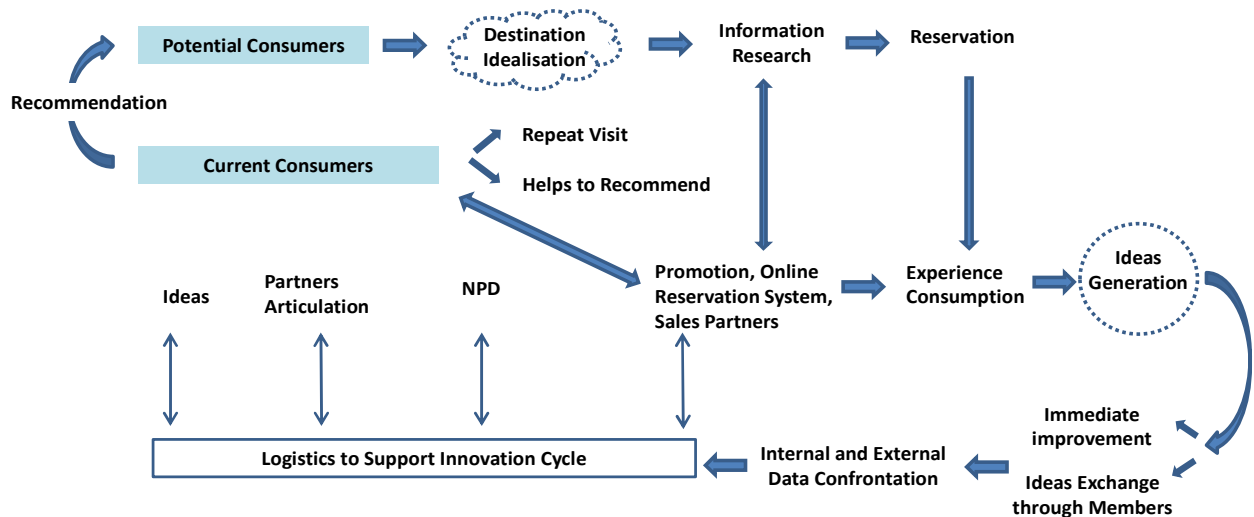
Source: Pires, R. (2014)

Concluding, the Portuguese Aeronautical Route is based on a network model that has a multiple innovation strategy, namely: organizational, processes and marketing. All of them pursue product's innovation and all should co-exist in each stage of route's innovation management since it is crucial to articulate it with route's goals.

5.7   Main Conclusions from the Portuguese Aeronautical Route

The Portuguese Aeronautical Route is an opportunity to assemble aeronautical heritage and existent activities into a diverse, authentic and multi-destination experience.

It would allow to achieve several targets and to correspond at different motivations.

Similarly it would boost research, especially in museums, about assets' history and their details, which would improve touristic offer.

By integrating air shows, it would be possible to attract visitors (as people have plenty motivation to attend to them) and to develop a cross-selling strategy with other activities along the route.

Its orchestration entity would be independent, purposely created to represent all its members' interests. Its structure would be composed by a mix of tourism and aeronautical entities, which would articulate networks of firms/ organizations with common activity's sector. It would foster the production of new knowledge and would increase the innovation production, co-creating solutions among both areas.

To implement the Portuguese Aeronautical Route a combination of different regional products are needed. Consequently there is a wide products' portfolio, which are constantly improved, or are created new ones, with the support of its innovation network framework. However, to manage it, involvement along route's members is crucial in order to reverse the existence of weak ties on tourism networks (Cooper & Baggio, 2008).

Also tools and channels diversification are relevant to raise members' trust and commitment, which affect their cohesion and, consequently, promotes effective knowledge transfer and enables learning processes that are converted into network's results. Besides, management of temporary human resources is urgent once tourism reveals one of the highest turnover rate and it restraints innovation processes.

Furthermore, the cooperation of all entities' staff – from managers to volunteers – on innovation processes are necessary as they are the basis to spread out an Innovation Management Model (based on Chesbrough (2003) Open Innovation Model) of the Portuguese Aeronautical Route (as occurs on Aldeias do Xisto – Figure 3). Consequently, it is the key to implement the innovation cycle model described on Figure 8, which is responsible to register clients suggestions, instigate ideas generation and resulting on new products development.

Besides new products creation, this model (Figure 8) goes further and supports the route's recommendation for new potential tourists and the repetition of effective clients as the innovation marketing strategy, combined with NPD, achieves different targets. Concluding,

NPD introduces novelty and communication plan is responsible to attract them. However a complement of innovation through processes and organizations are crucial to implement this multiple innovation model to ensure the Portuguese Aeronautical Route's sustainability.

6   Conclusions

Tourism sector is dominated by micro and small enterprises, which could compromise its innovation capability. Instead, it can explore different resources and constitute innovation networks in order to stimulate constant product development that will raise tourism development, addressing permanently diverse tourists' needs.

As aeronautical resources exhibit uniqueness and are displayed along Portugal territory, a national route to potentiate a full aeronautical experience, from history to an acrobatic flight, is a distinctive tourism product that would value Portuguese aeronautical resources and would develop Portuguese tourist destination. Also, this route has to develop regional aeronautical products, taking advantage of local natural resources that affects aeronautical performance like wind, clouds, etc., and also integrating local special products and attractions to enable a cross-selling between them and also to fulfil tourists needs totally.

Although tourism sector relying on cooperation to sell tourism experiences and destinations, tourism networks should go further to intensify interactions and share knowledge. A network framework allows risk sharing; different mind sets; costs reduction and enables a network of tourism distinctive services that experienced clients are expecting. Thus, an innovation network model provides an opportunity to assure sustainable tourism products. Also, it should involve technological domains in order to foster innovation, which enables more disruptive outputs.

Thus, the Portuguese Aeronautical Route, addressing a tourism innovation network, fulfils these considerations once both technological and hospitality domains are key factors for its success.

In this sense, developed analysis on both networks – Innovative SME and Aldeias do Xisto -, combining these different domains and extracting their best practices, ensured internal and external research validity and enabled guidelines for the Portuguese Aeronautical Route.

Supported by these networks analysis, it is possible to highlight that innovation networks need to develop mixed innovation initiatives to enable companies' participation and increase their members' admissions and disclose effects on their surrounding environment, where their externalities could promote innovation and entrepreneurship in other sectors.

Differently from technological domain, tourism products have to be consumed at the same place and time of its production. So tourism sector reveals an Innovation Management Model where its collaboration cycle is instantly updated with consumers' suggestions and ideas, to improve service quality and product development.

Based on Cooper and Baggio (2008) study and on Aldeias do Xisto appliance of 'Operating Channels' analysis, it is possible to conclude that tourism networks should diversify tools and develop new channels to support learning processes. Furthermore, tourism networks need to develop closer ties to intensify interactions that enable members' cooperation and co-creation of products/ services.

Therefore, to explore and articulate Portugal's different aeronautical resources, where each entity exhibits diversity among its assets' specialisation, it is determinant to develop a network framework to foster existing cooperation among interviewed entities, allowing exhibitions organization and activities co-creation.

Then, this cooperation framework should progress among aeronautical entities to evolve knowledge and increase skills, which improve their daily activity and enable a touristic offer development, supported by a common dynamic activities calendar that beneficiates all partners.

In fact, as Sintra's Museu do Ar is considered the main aviation museum in Portugal, it could be a "key attraction" to enable the development of this aeronautical tourism product once it has the main installations categories to raise its offer into an international market.

Besides, Museu do Ar and other Portuguese aviation museums should foster their offers by developing Educational Programs, by creating Interactive Exhibits and by improving a Dynamic Events Calendar, to generate attractive capability and repeat visitation.

However, as long as the Portuguese Aeronautical Route would be developed it would integrate stakeholders from all domains, where combined offers would necessarily create dynamism into each entity calendar. It would similarly form a product that explores resources and entities to constitute unique experiences and would also enable a sustainable product which reinvents itself based on each entity offer or costumer's specifications, increasing its value and qualifying Portugal destination.

As a result, the Portuguese Aeronautical Route addresses two general questions: i) How can we create a tourism product that values aeronautical resources?; ii) Is the innovation network model based management a way to ensure its sustainability?, which is uncovered into this multi-method qualitative research. It suggests an exploration of existent aeronautical resources, activities and entities that could be qualified into tourist attractions, which all

connected would establish a route through Portuguese territory with a diversity of aeronautical spots to potentiate different experiences according to targets expectations. Hence, it suggests both the development of a non-traditional product to qualify Portugal tourist destination and to increase business competitiveness in these multiple small aeronautical players across the country.

In order to compound regional aeronautical products tourism firms and aeronautical entities combination would be necessary to structure the Portuguese Aeronautical Route, where all combined would articulate a national route, supported by a multi destination product management.

Likewise, the Portuguese Aeronautical Route should be based on an innovation network model that has a multiple innovation strategy, where its organizational, processes and marketing inputs are managed to assure constant product's innovation cycle. Thus, all should co-exist in each stage of route's innovation management since it is crucial to articulate it with route's goals, assuring both product's exploration and exploitation.

Collaboration with international entities should be developed in order to exchange embodied and tacit knowledge and also to create ties to foster innovation, enabling an expansion of this network into an international level and also allowing integration of the Portuguese Aeronautical Route with international resources.

6.1 Limitations

This research was enclosed by time and resources to collect and to analyse information about all aeronautical entities and their assets through the country. Also, museums had incomplete or diffused assets' data base. Therefore, there was a limitation of time to collect data about all their assets, thus it was considered the most unique or distinctive ones in order to be the basis to create value into the Portuguese Aeronautical Route.

Studying the possibility of developing a route and a network as a way to explore aeronautical resources are the main goals of this study. Thus, it excludes implementation task and also does not applies the stage of studying accessibilities to connect different tourist points and of implementing a program to delineate the route, as referred on chapter 5.3.

With limitations to access to information and also entities exhibiting constraint to develop assets research, it was impossible to identify who are those that have tacit knowledge about historic aeronautical assets.

Likewise, it was impossible to do personal interview at Sata since its headquarters were on Azores and this research was developed in continental Portugal territory. Thus, it was considered on this study but it is not mentioned as a sample because was impossible to extract comparable data.

6.2   Future Challenges

Future Research: To go further and list all potential Route's partners. Also, it would be crucial to create a data base that categorises each piece and discriminates its history and its interventions evolution to valorise it through Route's dynamic offer.

Museums Boosting: As a result of benchmarking application at Sintra's Museu do Ar, a collaboration model with universities was identified for Portuguese aviation museums in order to foster processes and hospitality procedures, which would improve its touristic offer. Similarly, it could cooperate with international museums networks.

Collaborative Activities: In order to reverse weak trust and commitment along tourism companies, network's activities should be diverse and challenging, breaking partners comfort zone to foster new ties creation along its members. Involvement is key in tourism networks.

Network's Evaluation: Future research to apply Network Analysis methodology is necessary to evaluate intensity of tourism networks interactions, which enable goals achievement.

Tourism Networks' Improvement: Tourism sector does not exhibit yet plenty innovation networks as technological sector discloses. Therefore, tourism networks should evolve to get a similar impact of technological sectors by reversing its current weak interactions and its low knowledge transfer. Networks should involve all organizations staff; assure a balanced ratio of temporary employees and manage them to enable knowledge transfer and promote ideas generation; promote collaborative projects and cooperation activities to develop close ties between network's members.

As developed previously, the Portuguese Aeronautical Route fits into general questions of this research, enabling the development of a distinctive tourism product and its innovation network framework is the answer to articulate all existent activities and entities to create an innovative tourism product. A future challenge would be to develop further steps to implement it and in its growing stage an articulation with a technological aeronautics cluster would be an extreme advantage. The Route would promote its products and the aeronautics cluster would increase Route's aeronautical tourist experiences.

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8   Appendices

Appendix 1 – List of Interviewees

Date	Entity	Name	Job Title
5th February, 2014	Portuguese Air Force	José Luís Romão Alves Mendes	Colonel Nav, Museu do Ar Director
5th February, 2014	Portuguese Air Force	Luísa Abreu	Lieutenant TPAA and Future Museu do Ar Conservator
7th February, 2014	Portuguese Air Force	Rui Alberto Gomes Bento Roque	Colonel TPAA and Portuguese Air Force Public Relations Chief
12th February, 2014	Portuguese Air Force	Mário Correia	Museu do Ar Conservator
12th February, 2014	ANA Aeroportos	Fátima Ribeiro	ANA's Heritage Responsible
13rd February, 2014	Aldeias do Xisto	Rui Simão	Aldeias do Xisto Director
17th February, 2014	Portuguese Air Force	António Carlos Mimoso e Carvalho	Lieutenant-General PilAv and Portuguese Air Force Historical and Cultural Commission President
17th February, 2014	TRYP Lisboa Aeroporto Hotel	Gonçalo Proença	Sub Director Geral at TRYP Lisboa Aeroporto Hotel
17th February, 2014	Associação Portuguesa de Aeronáutica e Espaço (IST)	Vitor Frade	Associação Portuguesa de Aeronáutica e Espaço President
19th February, 2014	Rota do Românico	Rosário Machado	Rota do Românico Director
20th February, 2014	COTEC	Carlos Cabeleira	Executive Team Manager of SME Innovative Network
21st February, 2014	Aero Club de Portugal	João Paulo Silva	Commission Assistant of Aero Club de Portugal
25st February, 2014	TAP Air Portugal	Adelina Arezes	TAP's Heritage Responsible
27th February, 2014	Museu Aero Fenix	Munkelt Gonçalves	Museu Aero Fenix Director
1st April,	CEDT – Centro de	Marco Marques	CEDT's Former Director

2014	Excelência em Desmaterialização de Transacções		

Appendix 2 – Developed Methodology Scheme
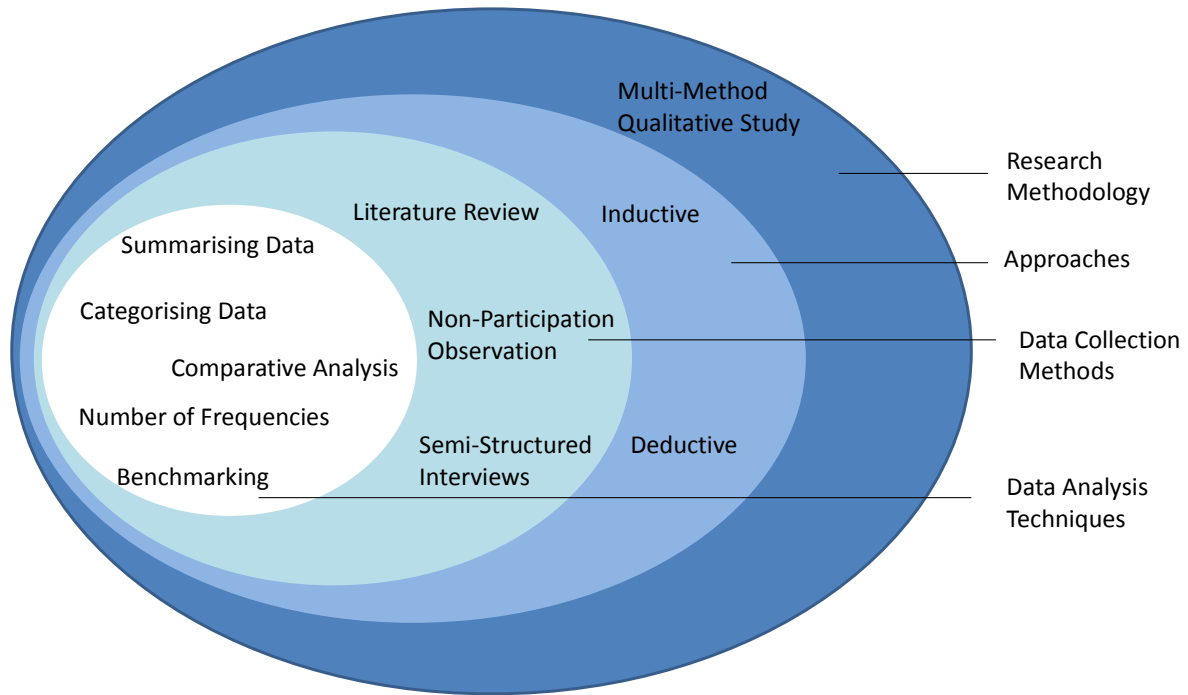
Source: Pires, R. (2014) based on The Research 'Onion' of Saunders, Lewis, & Thornhill (2008) in Saunders, Lewis, & Thornhill (2009)

Appendix 3 – Aero Club de Portugal's Cessna 152

Source: http://www.aecp.pt/product/cs-ayx/

Appendix 4 – Aero Club de Portugal's Cessna 172R

Source: http://www.aecp.pt/product/cs-dih/

Appendix 5 – Aero Club de Portugal's Cessna 172S

Source: http://www.aecp.pt/product/cs-ean/

Appendix 6 – Aero Club de Portugal's Piper Cherokee Arrow 200

Source: http://www.aecp.pt/product/cs-aeu/

Appendix 7 – Aero Club de Portugal's OGMA Chipmunk Mk22

Source: http://www.aecp.pt/product/d-ecpk/

Appendix 8 – Aero Club de Portugal's Socata Ms.893 Rallye Commodore

Source: http://www.aecp.pt/product/d-emzo/

Appendix 9 – Aero Club de Portugal's Grob 103 Twin II Acro

Source: http://www.aecp.pt/product/planador-cs-pbi/

Appendix 10 – Grob 102 Astir CS Jens

Source: http://www.aecp.pt/product/cs-pbu/

Appendix 11 – Cessna 140

Source: Museu Aero Fénix

Appendix 12 – Piper PA-22-108 Colt

Source: http://www.planespotters.net/Aviation_Photos/search.php?tag=Piper+PA-22+Tri-Pacer

Appendix 13 – Yakovlev 52

Source: http://www.kamov.net/russian-aircraft/yakovlev-yak-52/

Appendix 14 – Boeing Stearman A75N1

Source: http://www.aeronauta.com/aero.fenix/stearman.html

Appendix 15 – North American T-6 Texan's Museu do Ar Specimen

Source: http://en.wikipedia.org/wiki/File:T_6.JPG

Appendix 16 – Max Holste 1521-M Broussard

Source: http://www.airliners.net/photo/Portugal---Air/Max-Holste-MH-1521M/1919225/L/

Appendix 17 – Museu do Ar's Plant

Source: http://www.emfa.pt/www/po/musar/pagina-001.002.001-planta-do-museu

Appendix 18 – Santos-Dumont 14-bis Replica's Picture

Source: http://www.emfa.pt/www/po/musar/pagina-001.003.002.001-14-bis

Appendix 19 – Junkers 52's Picture

Source: http://www.fiddlersgreen.net/models/Aircraft/Junkers-Ju52.html

Appendix 20 – Picture of FIAT 91 R/4 with Characteristic Painting of NATO's Tiger Meets

Source: http://forum.worldofwarplanes.eu/index.php?/topic/1759-fiat-g91/

Appendix 21 – The Avro 631 Cadet's Museu do Ar Specimen

Source: http://aterrememportugal.blogspot.pt/2012/06/novos-voos-para-o-museu-do-ar.html

Appendix 22 – de Havilland DH-89 Dragon Rapides's Museu do Ar Specimen

Source: http://pt.wikipedia.org/wiki/Ficheiro:Dragon_Rapide.JPG

Appendix 23 – The DC-3 Dakota's TAP with Its First Painting, in 1946

Source: http://aterrememportugal.blogspot.pt/2012/06/novos-voos-para-o-museu-do-ar.html

Appendix 24 – Lisbon Airport in 1942

Source: http://restosdecoleccao.blogspot.pt/2013/06/aeroporto-de-lisboa-15.html

Appendix 25 – The Mini Moke as a Follow Me

Source: http://www.imcdb.org/vehicle_642038-Austin-Mini-Moke-1965.html

Appendix 26 – TAP's Link Trainer's Picture

Source: Pires, R. photograph (2014)

Appendix 27 – TAP's Antimagnetic Umbrella

Source: Pires, R. photograph (2014)

Appendix 28 – Exterior and Interior of Lockheed Super Constellation "Vasco da Gama"

Source: http://restosdecoleccao.blogspot.pt/2013/10/avioes-super-constellation-da-tap.html

Appendix 29 – Benchmarking of Museums Variables Description

The analysed variables correspond at the main domains of Aviation Museums: An Important Contributor to the Travel and Tourism Industry Report (ConsultEcon, Inc., 2006), with the exception of 'Professional Tour Guides' and 'Timetable' variables. Both variables were added

to compare with Sintra's Museu do Ar in order to improve it as a tourist experience. As hospitality people and timetables are key factors to receive tourists, they were added to take conclusions about Sintra's offer comparing it with the best world museums, to extract their best practices.

Museums Variables	Description
(1) Region/ Country	Specifies the region and country where the museum is located
(2) Airport/ Aerodrome Location	Refers if the museum is located near an airport or an aerodrome as it is an important variable to verify the possibility to realise airshows, which attracts lots of visitors
(3) Museum Collection	Specifies what museum's collection integrates, divided into its main categories of assets
(4) Gift Shop	Refers if the museum includes a gift shop
(5) Food Service	Reveals if the museum has a bar/ restaurant to serve snack and/ or meals during public's visit or events enjoyment
(6) Meeting Areas	Determines if museums include auditoriums or amphitheatre with capability for business presentations, to make speeches, seminars or conferences, etc.
(7) Interactive Exhibits	Refers to those exhibitions that are not static, which request the intervention of the public. It can vary from experiences like flight simulators or wind tunnels to "hands on" experiences
(8) Dynamic Events Calendar	Specifies if museums have regular activities diversification to attract different targets and also to make them repeat visitation
(9) Educational Programming	Means that museums include a planning with didactic activities and experiences that are specifically prepared to attract children with different ages, to appeal at their attendance into different ages. It enables their learning process about aeronautics
(10) Airshows	Specifies if museums have capability to organise and receive airshows into their installations
(11) Public View's Restoration	Discloses if museums display a specific area to watch restoring airplanes processes and other historical assets,

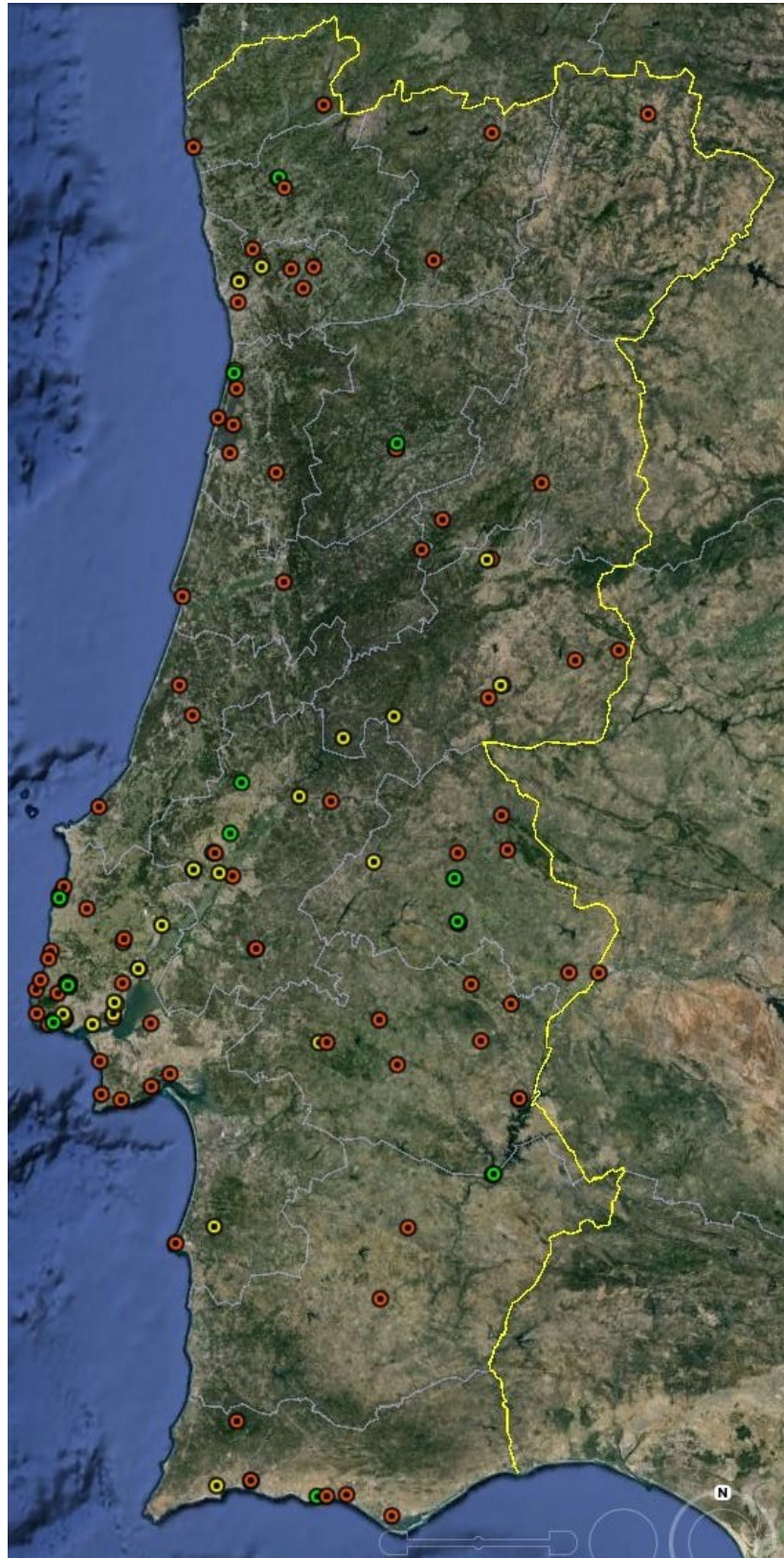|	
	where visitors can learn a little bit more about assets constitution and their materials, their conservation processes, etc.
(12) Professional Tour Guides	Refers if museums integrates professional tour guides through their exhibition area
(13) Timetable	Specifies what timetable the museum has

Source: Pires, R. (2014)

Appendix 30 – Initiatives Description of Aeronautical Heritage Valorisation

Initiatives	Description
(1) Exhibition	Reveals if entities include exhibition area
(2) Archive Availability	Determines if entities have archive to consult aeronautical documentation
(3) Air Shows	Exposes if they realise air shows
(4) External Collaborations	Determines if entities collaborate with other organizations
(5) Assets Exchange/ Transfer	Means if entities exchange assets with other firms/ organizations

Source: Pires, R. (2014)

Appendix 31 – Portuguese Aeronautical Activities and Heritage's Spots

Legend:

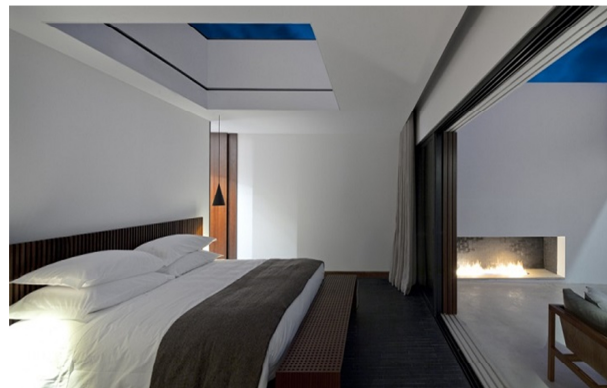Facilities Sites   Flight Places   Event Spots

Source: Pires, R. (2014)

Appendix 32 – Tryp Lisboa Aeroporto Hotel Photos

Source: Tryp Lisboa Aeroporto Hotel

Appendix 33 – L'AND Vineyards Photos

Source: L'And Vineyards and http://acidadenapontadosdedos.com/2012/12/28/land-vineyards-aqui-tao-perto/