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DRAFT

Temporary Clusters and Knowledge Creation: The Case of Tourism@

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Abstract

The present paper focuses on an event called Tourism@. This major event gathers the main actors of e-tourism and is dedicated to the usages of ICT in the tourism industry. It appears as a unique international trade fair in Europe for start up innovative companies, high tech SMEs, academic research, as well as large multinationals. Since 2001, Tourism@' specificities lie in the fact that each year the event includes the organization of a competition rewarding projects for their creativity and commitment in developing and implementing either new technologies or new uses for the tourism industry. Tourism@ is analyzed as a specific empirical case of temporary cluster, i.e. a hotspot of intense knowledge exchange, network building and idea generation, related to the tourism industry. Two arguments support this choice. On the one hand, the tourism industry has been one of the most innovative activities related to the development of ICT. On the other hand, stated by Maskell et al. (2005), 'identifying, selecting, approaching and interacting with new partners is a tricky and costly process' and, we think, even more in the tourism industry. Indeed, the tourism industry is structured by dispersed activities in nature, time and space that need to be combined and assembled dynamically, and gather actors highly distant in the physical as well as in the cognitive sense. Therefore, the analysis of a temporary cluster devoted to this 'dispersed' activity is particularly relevant.
The paper is structured as follows. The first section will define the tourism sector as a sectoral system of production and innovation, and will trace the constraints associated to innovation in this activity. It defines the temporary clusters as a unique locus to favor interactions and knowledge creation in these activities. Section two will present the Tourism@ case study; the methodology used and will develop the statistical analysis of the database. The paper benefits from an exhaustive database of the projects presented, allowing to build information on knowledge bases, technologies, uses and markets targeted overtime. The analysis of the database evidences that the Tourism@ trade fair, in the role of a temporary cluster, enables to develop or implement innovative solutions, supports technology transfers and backs the creation of new markets as well as the fostering of horizontal and vertical relations between stakeholders.

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1. Introduction

The present paper focuses on an event called Tourism@. This major event gathers the main actors of e-tourism and is dedicated to the usages of ICT in the tourism industry. It appears as a unique international trade fair in Europe for start up innovative companies, high tech SMEs, academic research, as well as large multinationals. Since 2001, Tourism@' specificities lie in the fact that each year the event includes the organization of a competition rewarding projects for their creativity and commitment in developing and implementing either new technologies or new uses for the tourism industry. Tourism@ is analyzed as a specific empirical case of temporary cluster, i.e. a hotspot of intense knowledge exchange, network building and idea generation, related to the tourism industry. Two arguments support this choice. On the one hand, the tourism industry has been one of the most innovative activities related to the development of ICT. On the other hand, stated by Maskell et al. (2005), 'identifying, selecting, approaching and interacting with new partners is a tricky and costly process' and, we think, even more in the tourism industry. Indeed, the tourism industry is structured by dispersed activities in nature, time and space that need to be combined and assembled dynamically, and gather actors highly distant in the physical as well as in the cognitive sense. Therefore, the analysis of a temporary cluster devoted to this 'dispersed' activity is particularly relevant.

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2. Innovation and clusters in tourism sectoral system

Tourism has been the locus of an intense innovation activity over the last twenty years, even more strengthened by the emergence of information and communication technologies. Innovation in services has been shown to be an important characteristic of the contemporary economies (Miles, 2001, Tether and Metcalfe, 2003), and tourism is certainly one of the main innovative sector in services. The weight of tourism in the economy incites to question this issue. With roughly 11 % of the world total employment or GDP, tourism is indeed often presented as the first worldwide industry; in addition, international tourism receipts represent approximately 6 % of worldwide exports of goods and services (when considering

service exports exclusively, the share of tourism exports increases to nearly 30 %) (WTO, 2008). This economic strength of tourism, associated to a strong potential of growth[1], has induced deep competitive processes and significant industrial reorganization mainly fed by innovation.

Innovation has taken different forms. Basic organizational innovations often implemented by new entrants and based on opportunities given by new technologies of communication; in airlines and transportation services, the emergence of the low costs companies is an example.

Internet has been for these innovators a dynamic device to access directly to the consumers: it underlies the processes of disintermediation and deconstruction of the traditional value chains in tourism. The low costs have thus inaugurated e-commerce, and basically the processes of reorganization of the industry, of changes in the division of labor, which have rapidly impacted on all the actors of the industry, and which are the main consequence of the uses of internet (Porter, 2001). But how to apprehend and arrange the changes induced by internet in service activities?

ICT have indeed considerably impacted tourism (Buhalis, 1998; Wade, Raffour, 2000) and technological innovations have been very important for the redefinition of the industry's organisation these last years. Tourism has pioneered the development of e-commerce and the related technologies; its share has been up to 50% on the whole e-activities. The growth of e-tourism has been also up to 50% per year on the recent period. The development of the internet goes with the main trends of the contemporaneous consumer society, unforeseen purchases dedicated to leisure are increasing, as travel has become commonplace. The internet allows also to document in depth projects dedicated to precise and planned destinations. Most of the firms of the sector have shown important rate of growth of the activity; internet is not only a source of information, it is also an important vector of transactions. But the uses of internet do not only amount to the renewal of the relations between supply and demand, they have allowed above all the emergence of new relations *between* consumers (forum of discussions, advices, communities) and *between* suppliers (new organization of the industry).

These different facts sound quite obvious. Still what is precisely tourism? How the sector or the industry are defined? And more difficult how innovations emerge and can diffuse? A tourist can be easily defined: it is any person travelling to and staying in places outside its usual environment for at least one night, and not more than one consecutive year. But tourism?

2.1. Tourism framework : a sectoral system

Tourism does not follow the usual rules of economic theory; it is not a sector in the usual sense, documented at some level of the International Standard Industrial Classification. Indeed, tourism gathers all the activities dedicated to the satisfaction of the needs of the tourists' needs, and borrows to a multitude

[1] UNWTO's *Tourism 2020 Vision* forecasts that international arrivals are expected to reach nearly 1.6 billion by the year 2020,

of other activities. Products addressing tourists are complex and heterogeneous, they constitute a combination of elements separated in time and space (Caccomo and Solonandrasana, 2001), often packages assembling interrelated products and services (transport, accommodation services, leisure services...). This notion of packaging and bundling is the core of the activity. The definition of the packages can gather very heterogeneous agents: huge multinationals and micro family firms, high tech and low tech activities. Contrary to traditional good sectors, where resources are transformed to be delivered to the customers, here, the tourists have to go by themselves to the resources: whatever their intrinsic qualities, the resources acquire an economic value only with the organization of the traveling of the tourists and the development of the activity (Spizzichino, 1991). Tourist products and services are often experience goods. Therefore, the quality or utility are not known *ex ante* by the consumers; a system of advices and critics is thus necessary to the formalization of choices (Gensollen, 2003).

Thus, tourism differs from the traditional notion of sector usually found in the nomenclatures of activities (Leiper, 1979, Wilson, 1998), the definition of the production side has always been a problem (Longhi, 2003). According Leiper (1979), the tourism industry should gather the firms which purposely undertake *the joint coordination of their activities for the purpose of servicing the tourists*. The coordination of the activities is the basic issue, the analysis of the actors and their interactions have thus to be prioritized. The definition of the sector does not result from the criterion of technological substitutability usually used in the definition of the sectoral nomenclatures, but from the organizational complementarity and interdependence between actors and group of actors sharing the responsibility and planning tourists flows (Tremblay, 1998).

Consequently, the concept of system has emerged by itself as the analytical framework to cope with activity and changes at work in tourism. This sectoral dimension, relevant for the representation of the tourist industry, owes mainly to the works of Leiper (1979) and Malerba (2001, 2002).

Tourism can be considered as a sectoral system because it involves directly or indirectly numerous actors or group of actors interrelated by a complex set of market and non market relations (Leiper, 1979). The behavior of these actors or group of actors is shaped by institutions, such as laws, rules, norms. More than the elements of the system as such, the basic problem is the nature of the systemic relations and interactions in the production and distribution of the products, in the innovative processes implemented, and the dynamics they involve on tourism.

After Malerba (2001, p.3), the sector or the industry of tourism will be defined as a sectoral system of production and innovation (SSPI),

"*a set of new and established products for specific uses and the set of agents carrying out market and non-market interactions for the creation, production and sale of those products. The agents are individuals*

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compared to 898 million international tourist arrivals in 2007 (6.5% growth per year between 1950-2007).

and organizations at various levels of aggregation with specific learning processes, competences, organizational structure, beliefs, objectives and behaviors. They interact through processes of communication, exchange, cooperation, competition and command, and their interactions are shaped by institutions (rules and regulations). Over time, a sectoral system undergoes processes of change and transformation through the coevolution of its various elements".

According to Malerba (2001) or Metcalfe (2001), the SSPI can be characterized by a set of attributes or building blocks, which evolve over time, and specify the components of the system as well as their modes of interactions. These attributes are: the knowledge bases and learning processes, the organizations (firms and non-firms, networks), the institutions and the demand. The attributes help to understand that the sectoral system is an open system, with evolving boundaries mainly triggered by the innovation process; they also help to understand the constraints linked to the specificity of the tourism innovation process.

Knowledge bases and learning processes. Knowledge plays a basic role in production and innovation; any sector could be characterized by a specific knowledge base, technologies and inputs. The situation is very particular in tourism, as the knowledge bases have deeply evolved and have been renewed in the recent past. These evolutions are not only technological, they have been triggered by some of the agents of the systems and are related to competition between actors in the sharing of the value added produced by the activity. Different waves followed. The GDS (Global Distribution System) have made available their proprietary internal reservation systems to the travel agencies worldwide– their privileged customers – to offer direct access to the airlines flights and fares, but progressively to hotel reservation, rental cars, ferries, and the multiple services linked to tourism. The internet technologies have been next developed and given rise to the virtual travel agencies as well as to the low cost. Finally the mobile technologies have emerged and many applications have been developed in tourism, recently complemented by the RFD devices. Therefore, travel and tourism industries rest then on different and changing knowledge bases. The emergence of new knowledge bases is usually followed by the emergence of new actors, new relations or markets, by the transformation of existing markets. The boundaries of the systems are not predefined, but change over time with the evolution of the knowledge bases.

Actors and networks. The tourism sector is composed of very heterogeneous agents, characterized by specific learning processes, competencies, organization structures and behaviors. The boundaries between competition and cooperation have deeply evolved with the usages of the internet, resulting in the re-organization of the markets and the industry. Travel agencies and airlines for instance are now competing for the same customers, when they were closely associated in the past. New entrants are also a characteristic of the sector, which have impacted its organization as well as its technologies. The problem of heterogeneity is an important issue regarding innovation, as *a priori* decoupling between different

knowledge bases, different agents that have to be solved for creation as well as diffusion of new solutions and products and services. As the tourism product is complex, the industry has also to link firms which associate their specific competences to design a coherent product through the synchronization of their activities in time and space (Tremblay, 1999; Werthner and Klein, 1999).Agents interactions are also shaped by institutions, which includes rules, laws, standards… The tourism sector has been disrupted by tremendous changes because of deregulation of different kind. The sector was steadily organized by a system of fixed commission linking all the agents, from the airlines to the GDS and the travel agencies; this system has been dissolved and the sector is ruled by competition. Competition for the access to the client and organization of the market for information induced by the internet are key issues of the whole activity in tourism. New actors like mobile phone operators could play increased role in the future, and edict new rules ordered by m-tourism.

Demand. The importance of the knowledge bases, and singularly of the uses of internet on the dynamics of the system has been underlined. The role of demand, not often acknowledged in the systems approach, is of basic importance in tourism. It was in the past mainly controlled by the travel agency, but the internet has opened the access to the whole supply and the possibility for the consumers to build their own packages and in some sense to compete with the travel agencies. Tourism products are essentially experience goods, whose utility, quality, are uncertain and are only known *ex post*. The implementation of systems of information and signaling (critics, advices, brands, reputation...) is necessary to the working of the market. The unique mode of information of the consumers has been for a long time the top down model of information, from the suppliers to the consumers. With internet, new modes of formation of the demand have rapidly emerged though infomediation, i.e. exchanges of information *between* consumers on forums, personal sites, pages dedicated to critics and advices on professional tourist sites, portals.... The mediated communities that have grown have developed appropriate procedures allowing the *ex ante* evaluation of the utility provided by the experience goods. The importance of the phenomenon (Kozinets, 1999; Kim *et al,* 2004, Wang *et al.,* 2002) attests the emergence of a rationality which prioritizes cooperation and reciprocity through the usages of internet. The community of experience are not the only intervention of consumers in domains they had traditionally no access. They stand as a full-fledged actor of the industry: they can buy online air or train tickets directly to suppliers, but also build themselves their packages adding online the purchases of accommodation, on site transport, leisure... The consumers exchange and capitalize their experiences, they have a direct access to the quasi-totality of the services supplied, to the prices posted by the different suppliers, they can fulfill the transactions online. They can thus execute the tasks of research and bundling previously exclusively assigned to agencies and tour operators, through direct relations with services providers and suppliers. According Raffour (2002), the consumers are now 'consum-actors' actively involved in the different fields of usages of the internet,

sources of information or support of commercial transactions. The SSPI characterizing tourism is indeed facing deep recombination; the access to this enterprising consumer previously tacitly monopolized by the travel agencies is becoming the matter of competition for all the actors involved in the sectoral system. Contrarily to commonsense, with internet the access – market and non market – to the consumers is now more complex and costly than traditionally. But it is a necessary condition for future profits, for the viability of the activity of the firms. The consumers drive thus directly and indirectly the dynamics working in the sectoral system.

2.2. The dynamics of clusters and innovation

Innovation is the key word to characterize the tourism sector today. Knowledge bases are the backbones of the processes of change and innovation, and govern the evolution of the boundaries of the system as well as the nature of the new entrants. Indeed, knowledge bases are often external to the traditional tourism activities; they come from high tech firms in computer sciences, internet, database management… Innovation implies interactions between the traditional actors of tourism and the new entrants or with the engines of innovation in the sectors, more often the GDS. Diffusion of innovation implies confrontation with the professional of tourism. As put by Maskell *et al.* (2005), '*identifying, selecting, approaching and interacting with new partners is a tricky and costly process'*. This process is even more tricky and costly in the tourism industry; Tourism is characterized by heterogeneous products. In fact tourist's products are a combination of elements separated in time and space, assembling interrelated services and products (transport, accommodation, services, leisure services…). The coordination, the production and the distribution phases are therefore held by heterogeneous agents as well. In tourism the innovation process is indeed related to the creation of knowledge, where innovations are the results of try and errors processes mobilizing not formalized knowledge, or to the diffusion of knowledge, i.e. application of existing knowledge bases to new uses in tourism by innovators and subsequent diffusion in the profession. These processes imply face to face interactions between agents usually distant in the physical as well as cognitive sense. Some institutions have to emerge to solve this contradiction between the need of interactions and the physical and cognitive distance characterizing tourism.

In traditional sectors, clusters have been acknowledged to be the locus of these interactions under the formation of knowledge and the process of innovation. Indeed according to Porter (2000), clusters are "g*eographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions in particular fields that compete but also co-operate*". Clusters have been extensively shown to be the locus of competitiveness and local development; they are also more and more considered as basic in terms of knowledge creation and innovation. Thanks to face-to-face interactions and the creation of common languages and institutions, companies in the cluster exchange and create new knowledge. This process is particularly essential when uncertainty is high, and

when trial and error is necessary in the process of new product development (Solvell and Zander 1998, Spender 1996, Boari 2001). It is precisely in this last perspective that researchers emphasize on the impact of industrial clusters on innovation. Within the processes of innovation, the most complex process is the creation and sharing of knowledge (Conner, Prahalad et Grant, Spender 1996, Pavitt 2004). Following the knowledge-based-view theory, knowledge is socially constructed from information, and constantly renewed thanks to social interactions. This means that knowledge creation is a dynamic process that directly dependant on its social context (Nahapiet, Ghoshal, 1998 ; Granovetter, 1973; Coleman, 1988, Moran et Ghoshal,1996). Therefore knowledge creation process is all the more complex as it implies for companies to reach high levels of relational, technological, organisational and managerial competence.

That is the reason why one of the mot studied agglomeration benefits related to clusters concerns: *knowledge spillovers*. Lot of works are giving attention to the flows of tacit knowledge as a result of spatial proximity and networking. In this line of thinking the postulation is that companies gain profit from a clustered location through meeting colleagues repeatedly and in person allowing for the exchange of tacit knowledge. In fact while codified knowledge can be quite easily diffused thanks to any communication means, informal and tacit knowledge is spread rather accidentally. In fact, neither the transmitter nor the receiver knows in advance about its relevance before it is communicated (Saxenian 1994, Feldman 1994, Macdonald 1996). Thus, the exchange of informal knowledge accelerates technological advancement (Audretsch, Feldman 1996; Garnsey, Longhi 1998).

In sum, clusters offer benefits related to **interactions**. In the context of a knowledge-based economy, most contemporary cluster approaches uppermost focus their studies on the effects of immaterial assets, and particularly knowledge creation.

Despite of the development of ICT, innovative activities have the tendency to cluster. According to a stream of research, this is due to the fact that tacit knowledge is at the origin of value creation, particularly in very innovative sectors. However, tacit knowledge are « sticky context-laden » (Asheim, Gertler 2005) i.e. that they only take sense in meaningful contexts. This is the reason why they are bound to organisational and geographic locations. Thus, spatial proximity enables interactions that favour the exchange of tacit knowledge thanks to physical encounters, informal and face-to-face exchanges that enhance trust between partners and a fast diffusion of new ideas.

This shows the growing importance of social interaction in the process of innovation. Besides, Porter (1998) has identified that interactions between competitors and collaborators in a cluster is a crucial element of cluster innovation dynamics. As far as the cluster combines competitors' competencies as well as partners' competencies of a same industry, innovation is stimulated by competitive action on a one hand, and by exchanges as well as confidence between co-operating firms on the other hand. In fact, rivalry between firms creates a lot of pressure because of mutual observation, search for good reputation, and comparisons. It pushes technological devices towards innovation. On the other hand, co-operation in

technological development encourages the achievement of next generation technology. In this perspective, clusters can be viewed as ideal incubators for innovation (Preissl, Solimene 2003).

What emerges is that interactions are the constitutive element of clusters. As suggested by Wilkinson *et al*. (1998), successful clusters are those, which successfully combine dense internal inter-firm interactions and synergies with external, and often global, networks.

Even if it is becoming common knowledge that geographical configuration of economic actors is fundamentally important in shaping the innovative capabilities of companies; there are still a lot of unresolved questions about the nature of knowledge and its link with spatial concentration. When some maintain the knowledge creation process continue to be localized thanks to the role of local institutions as well as geographical proximity (Asheim 1999, Markusen 1996), others argue that tacit knowledge has become increasingly codified and hence omnipresent, ultimately eroding the competitive advantage of high cost regions and nations (Maskell, 1998,1999). In fact, a lot of inter-firm relations do not take place within permanent clusters (Malecki and Oinas 1999, Amin and Cohendet 1999, 2004, Bathelt 2002, Malmberg and Power 2003, Gertler 2003, Clark and Tracey 2004), particularly regarding their innovation processes. Firms establish trans-local relationships (Grabher 2002b, Scott 2002, Powell et al. 2002, Owen-Smith and Powell 2004) or 'global pipelines' (Bathelt et al. 2004) to have access to different knowledge bases, competences, expert advices necessary for the viability of their innovation processes.

The recent literature on clusters demonstrates through empirical studies that the main interest of clusters is found in the fact that they are inserted into global industrial and commercial networks. Geographical proximity is necessary for coordination within a cluster but not sufficient. It contributes to clusters performance, but only if, on a one hand, there are other shared dimensions (cognitive, technological dimensions…), and on the other hand if clusters are based on the complementarities between global and local relations. In these systemic localised configurations, actors interact with members of the cluster that are closed to them, and in the same time, this local network constitute open systems that enable them to have access to external knowledge. These considerations lead us to reconsider Porter's cluster definition (above). Current research show that cluster performance does not only results from the quality of the interactions and coordination inside the cluster but also from external networks and cooperation with distant rivals or partners. The relevance of interaction structure is thus brought into question. As Rychen and Zimmermann (2006) point out, co-ordination does not always require durable geographical proximity. In spite of long geographical distance, many partners have succeeded to get involved in the interactions they needed. Besides, links can sometimes emerge through temporary encounters. All the more recent line of thoughts called the "economics of proximity" stress on the role of territorial embeddedness on the innovation process (Carrincazeaux, Lung, 1998; Torre, Rallet, 2005 and Picard, Rodet- Kroichvili, 2003). Rallet and Torre introduce the difference between geographical proximity and "organised proximity" (relational proximity based on shared interpretations, behaviour and belonging sentiment), arguing that it

is only by assembling them that a cluster can succeed in developing innovations and create a synergy between it members. But in most cases, there is spatial proximity without any "organised proximity". Breschi and Lissoni (2001) show on their part that tacit information flows are possible in "epistemic communities" where members are not co-located. This suggests that clusters should be considered as co-ordination structures less constrained by space and time: the two key aspects of clusters. Consequently, the main insight in studying the link between clusters and innovation appears to be the interaction dynamics they allow.

From this point of view, the analysis of local and global complementary interactions constitute the central point of analysis that can provide an explanation why clusters are considered as adapted configurations to take up the innovation challenge of the knowledge-based economy (Porter 1998; Debresson and Hu 1999; Rychen and Zimmermann 2006).

However, if the emergence of this critical literature enables to raise the question of the robustness of the links built by academic researchers between territorial embeddedness and innovation networks, nevertheless, there is no analysis that have tackled the question of the links between innovation network, the advantages of territorial embeddedness (specially localized knowledge spillovers), and the intrinsic constraints of sectoral innovation systems such as Tourism.

Regarding these insights, we have found that in the literature there is another form of cluster that can be mobilised.

2.3. Tourism and temporary clusters

Interestingly, a new form of organization, is similar to permanent clusters, but in a temporary, repeated and intensified form. Maskell, Bathelt and Malmberg (2004) even call it "temporary cluster". They start from the idea that:

"*Face-to-face interaction is widely held to be a necessary condition for establishing trustful relations and communicating sensitive, not well-established knowledge and information. It is sometimes overlooked, however, that while such interaction presupposes direct contact between individuals, such meetings need not necessarily be based on more or less permanently collocated firms. Global face-to-face interaction taking place at international professional gatherings such as trade fairs, conventions and conferences, in many ways functions as a substitute for the buzz of a permanent cluster and may even exceed it.*"

Thus, the question whether the spatial embeddedness of knowledge creation might be challenged by another type of organisational form has been raised in the literature (Asheim 2002, Grabher 2002). What are temporary clusters? Maskell et al. (2005) have presented the new concept of "temporary clusters" and "distant knowledge pipeline" in order to illustrate the functioning of MCEs (Meetings, Conventions and Exhibitions) showing that they are characterized with the same knowledge creation mechanism as "permanent clusters" but in a temporary and intensified form. Temporary clusters can be defined as:

"*hotspots of intensive and dedicated exchange of knowledge, network building and generation of new ideas. It gathers heterogeneous participants in the same spot enabling them to bring together their specific knowledge through intensive interactions".*

In fact, within congresses, exhibitions and trade fairs, companies introduce their latest innovations. These events enable companies to identify the borders of markets and industry. Particularly when it comes to a sectoral innovation such as Tourism, with moving frontiers and with a knowledge base that is constantly renewed and enriched. Such a sectoral innovation system can only evolve with an organisation that show flexible frontiers in terms of time and space as well as member's participation. That is why temporary clusters constitute the ideal configuration of interactions for such a sector.

Two insights about temporary clusters can constitute arguments why it is relevant to get concentrated on it when analyzing knowledge creation between distant entities:

First, those events can be considered as temporary clusters and compared with permanent clusters in so far as they are characterized by the same knowledge creation mechanisms as permanent clusters but in a temporary and intensified form.

Indeed, the concept of local buzz developed by Storper and Venables (2004) refers to « *the information and communication ecology created by numerous face-to-face (...). This buzz consists of specific information and continuous update of this information; intended and unanticipated learning processes in organized and accidental meetings, the application of the same interpretative schemes and mutual understanding of new knowledge and technologies; as well as shared cultural traditions and habits, which taken together makes interaction and learning less costly* » (Malmberg and Maskell 2005). These insights are constitutive of permanent clusters as well as temporary cluster. Temporary clusters allow vertical interactions along the value chain and horizontal interactions between competing companies. The exchanges between suppliers and consumers enable to capture the market tendencies and help them to take a decision concerning their future technological focus and their next investments. Companies intensify their social relations in order to attract collaborators that could help them to achieve their innovation, as well as new customers and they can gauge their reactions in front of competitor's products or service offers. Furthermore, such events gather together key employees of companies (and even the founders of companies), with similar understanding scheme, experience patterns and shared interests, without taking the physical localization of the company.

Secondly, companies are using temporary clusters in order to identify the frontiers and the limits of their knowledge. Temporary clusters provide them with the possibility to select potential partners that can give them access to a new pool of knowledge. In such events, meeting points, bars and restaurant become hot spot of exchanges and contract negotiations. Throughout years, communities of practice emerge. Such event can be viewed as a significant mean for the establishment of trans-local relations in common situations of incomplete knowledge and uncertainty.

Therefore, temporary clusters are complementary to permanent clusters in so far as they allow members to have access to a transient and intensive local buzz about the global vision of an industry. This outlines why temporary clusters can be s valuable to a sectoral system of innovation as tourism. Contrarily to other industrial sectors that can draw advantages thanks to clustering and spatial proximity, the tourism industry is not able to cluster as other sectors do. Precisely, no cluster in the tourism industry exists. This sectoral system of innovation is not supported by a local system of innovation. Nevertheless, as it has been outlined, interactions play a crucial role for knowledge creation and diffusion in the tourism industry. In fact, the tourism industry is a sectoral system of innovation that need really need knowledge exchange within the value chain. All the more as, each actor of the sector do not offer end products to consumers but mainly a part of a global offer. This shed the light on the importance of horizontal interactions, via the confrontation of innovations between professionals, as well as vertical interactions, via radical innovation that have to be diffused to the market. Consequently, other devices then a permanent cluster had to be found for this specific sector. Hence, temporary cluster become a necessary condition for vertical as well as horizontal knowledge exchange within the value chain. Temporary clusters are a determining mean in order to integrate local and global communication flows and connect distant pools of knowledge from companies throughout the world. They are a valuable mean for the reduction of information asymmetries and uncertainties in exchanges among participants from several parts of the world. Local buzz and global pipeline are thus, mutually reinforcing (Bathelt *et al.*, 2004

Therefore, the analysis of a temporary cluster dedicated to such a 'dispersed' activity as the tourism industry is particularly relevant. To this end, the paper aims at investigating a specific case of temporary cluster: the Tourism@ event.

3- Methodology

Considering the globalised environment in which tourism firms's operate, there is a growing interest in understanding the way businesses innovations are formed. Further attention is given to how increased synergies and productivity, knowledge transfer, production of innovation services and joint marketing take place. In this context, we analyze one specific empirical case of temporary organization related to the tourism industry: Tourism@.

3.1. Tourism@: a temporary and annual event

This major event gathers the main actors of e-tourism and is dedicated to the usages of ICT in the tourism industry. It is managed by French Riviera Chamber of Commerce and Telecom Valley association. Telecom Valley ® is a real cluster of Sciences and Technologies of Information and Communication of about 100 members representing in the region Provence-Alpes-Cote d'Azur. French Riviera was chosen to organize this event because of location interest. Indeed, it is the second French area welcomed tourists and

one of the most dynamic French scientific park. This geographical area allows firstly the establishment of dynamic network between technological and tourism firms (horizontal dynamic) and secondly the communication and exchange between members as major groups (IBM, Amadeus or KLM-Air France) and SMEs or start up on niche (vertical dynamic). It encourages partnerships to develop economic activities and stimulate synergies on the European and international markets.

Tourism@ appears as a unique international trade fair in Europe dedicated to start up innovative companies, high tech SMEs, academic research, as well as large multinationals. It is seen as a temporary cluster because it is a two-day geographically bounded concentration of businesses, that take place each year. It creates active channels for businesses transactions, dialogue and communication and enable the share of common opportunities and treats. Moreover, this event is seen as a framework providing tourism firms with innovative opportunities to operate locally and in a globalised business environment. Tourism@' specificity lies in the fact that it is also a unique international competition in Europe, Tourism Awards rewards creators and users of new applications in domains of mobility, e-business, on-line booking, multimedia, virtual visit, on-demand information, dynamic packaging via Internet, for their creativity and commitment in developing and implementing either new technologies or new uses for the tourism industry. Tourism@ rewards innovative projects those are not necessarily yet successful. The purpose of the competition is to promote the development of technological innovations for the tourism industry and to encourage tourism professionals to use innovative technology.

3.2. Tourism@ projects: data collection

Our study benefits from an exhaustive database of the projects presented, allowing us to analyze the knowledge bases, technologies, uses, and markets targeted overtime. Tourism@ provides a state-of-the-art of what are doing competitors each year. This gives us a better understanding of the market. Two kinds of innovative projects are rewarded:

- Best Technological Innovation to be used in the Tourism Industry : all creators of products and services that implement IT and innovative communication applications are eligible;
- Best use of Technology used in the Tourism Industry**:** eligible for this category are tourism professionals in the private or public sector who have successfully used IT and telecommunications applications.

Applications must meet strict requirements. They must demonstrate clear objectives and relevant to uses in tourism trade. They need to be original and have an innovative nature compared to existing alternatives with a potential for differentiation of the proposed new use. They must show the commercial value of the project and the business opportunities envisaged quantified and any patents and other protections of the technology or the trademark. The records must be turned mainly on tourism activities and must analyze the impact on the final score, professionals and the destination they may have. They must estimate the

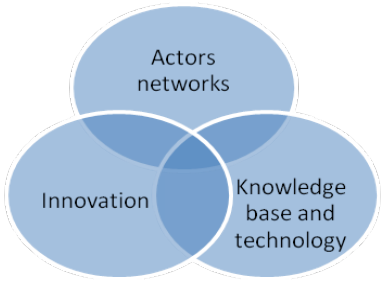
return on investment for the establishment of service or specify the solution and know-how and technological practices developed in the company.

Data was collected in the preliminary stage of research in order to find out about the main themes emerging and to learn about the market trends. The projects involved in this competition (176 since 2003) will be the basic elements of the temporal database we have build, in which the nature of the projects is extensively described. The information requested were twofold: general information about the team and the organization, the step of the project and technical information about the technology used, capabilities implemented, level of innovation.

3.3. Research process

In order to analyze the evolution of innovative activities in e-tourism, the initial step will be to characterize the projects through three main features: firstly, knowledge base and technologies, secondly actors and networks and their innovative intensity. The determination of these categories is threefold: from the conceptual framework previously; from the result of a collective interview conducting with technological and tourism market expert; and from a first lexical analysis. This technique focuses on the richness of the vocabulary used in the text and seeks to analyze the frequency of occurrence of words. The various units identified were grouped into categories according to their similarity. This phase has enabled us to achieve a ranking lexical and a ranking overall theme to determine trends and recurrences in the textual content. This step aims to clarify data so that we can respond to the analytical. Our analytical grid is divided into three part as shown in the figure 1. :

Figure 1: Analytical grid



Miles and Huberman (1991) stressed that the difficulty of the qualitative analysis, is that it works with words, which refer to multiple meanings. According to the authors, the mass of information that can be extracted from the documents of the database call for using a coding system.. The process of coding is to "*cut the text content in units of analysis and then classify them into categories defined in accordance with the purpose of research*" (Allard-Poesi, Drucker-Godard and Ehlinger, 2003, p. 460).

Two tools of **data analysis** were used: lexical analysis and correspondence analysis. The first one consists in describing and the second consists in exploring one to explore the data. We made a **textual analysis**

from the 176 innovative projects with Modalisa 6.0. The content analysis allows regrouping and organizing the information contained in these projects in order to make a comprehensive and descriptive "reading". The principle is to convert text into a set of categories or modalities which would allow a limited number of significant treatment. Thus, identifying the concepts and themes contained in the documents and their analysis allows to represent them first in an abbreviated form (annotations, summaries or abstracts indicative informative), in order to become acquainted with what we call condensation and then encrypted form, for easy retrieval. The researcher searches for structures and patterned regularities in the text and makes inferences on the basis of these regularities. We examine each projects that we characterize from the analysis grid. A second analysis consisted to integrate the temporal dimension in order to observe how knowledge diffusion could match. We used factor analytic techniques. This main application consists in reducing the number of variables and to detect structure in the relationships between variables. **Correspondence analysis** was used as an exploratory technique to analyze simple two-way and multi way tables containing measure of correspondence.

4. Results

The analysis of the database was threefold: knowledge base and technology; actors' network or uses; innovations.

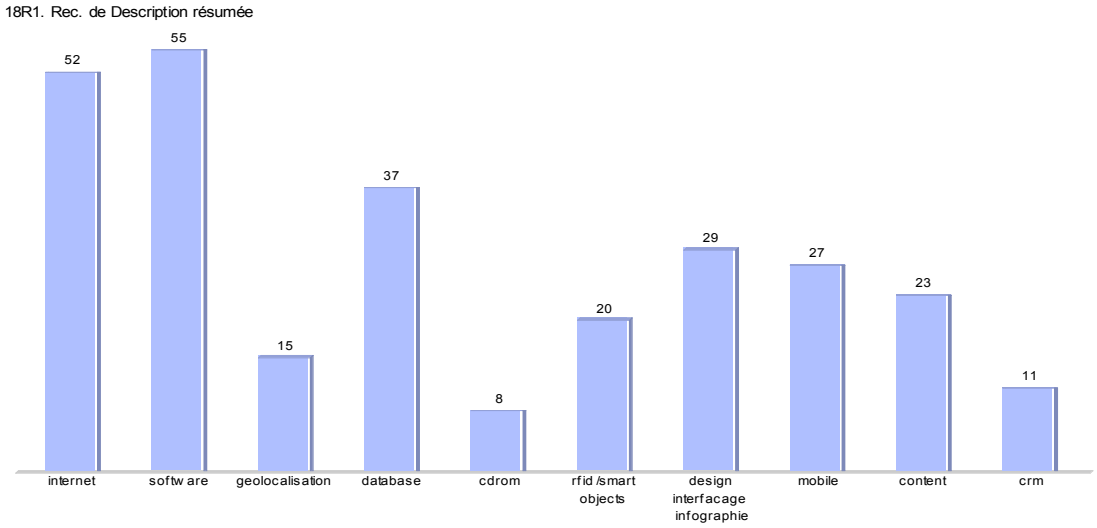
4.1. Knowledge base and technologies

The project database of Tourism@ has been analyzed in order to extract the different knowledge bases and technologies implemented in the projects, thanks to the attached project descriptions. Different families have been built. As shown in the following figure 2, software is the most represented technology. Many software projects are also associated to internet and database technologies. Internet and database are the two other dominant technologies. The projects exhibit the evolution of innovation in the tourism sector. For example, PricePilot project provides a database technology. PricePilote is an Internet Price Tracking solution developed for the tourism industry and tailored for the hostelry, car renting, ferries, cruises, flights, travel and vacation packages. It enables to: monitor the tariff offers and the availabilities on the websites of the operators (competitors, brokers, e-travel agencies…); follow the evolution of the offers : price modifications, terms and sales conditions; provide graphic analysis for reporting. Thus, it makes easier to: faster identify the best tariff offers, sort by terms of conditions, by prices, by operators; read with precision and to compare in real time, the tariff policies and the availabilities of selected operators; deduce the yield strategy and practices of selected operators.

Mobile and geolocalisation technologies are present, as well as projects emphasizing contents. An example of mobile and geolocalisation project is m-Companion. This last is an interactive platform for navigation and discovery of public areas. It provides walking and driving directions as well as user- and location-dependent information. The end-user equipment is light and affordable: in its simplest form, the

user needs nothing but his / her mobile handset. A basic handset is appropriate, because m-Companion provides vocal information: user interaction is based on speech recognition and speech synthesis. Call m-Companion, just say where you want to go and where you are starting from, and then follow the instructions! A satellite positioning receiver may be added as an option, in order to determine the user's position automatically and detect mistakes along the path. The service is provided by centralized servers connected to the Internet. No specific software or database is needed on the handset. Innovative technologies follow the evolution the general evolution of the technologies, from software to internet to telecommunication and mobile, the tourism being one of the first domains of application, and follow the evolution of the organization of the industry that can be empirically traced (Longhi, 2007).

Figure 2: Main technologies

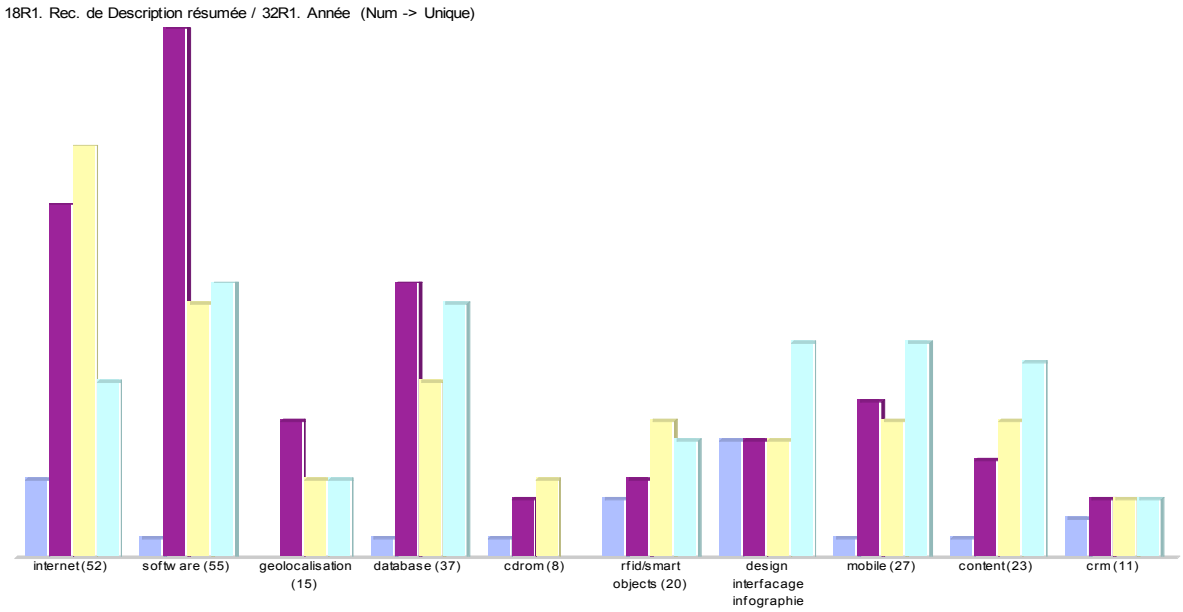


More interestingly, the evolution of the technologies over time gives an accurate indication of changes in tourism. The weight of software and internet has decreased overtime; the software has dominated the first years, certainly the end of proprietary technologies; in the following the applications are associated with other technologies. Internet innovative projects have been the second important wave of technologies, followed by the growth of database applications. Internet has opened the information and management systems of the firms, and the management of databases has turned strategic for them. This evolution matches the changes in the technologies spread out by the GDS, as well as the evolution of the relations of the travel agencies with the tour operators for instance, which settle directly their transactions.

The mobile technologies have also increased overtime, with the geolocalization application. As tourism has pioneered the development of e-commerce, it seems to pioneer also the telecommunication and mobile technologies. With the mobile, and the increased also of the RFID applications, innovation seems to have outgrown the technological changes related to the firms or the inter firms relations to concern directly the

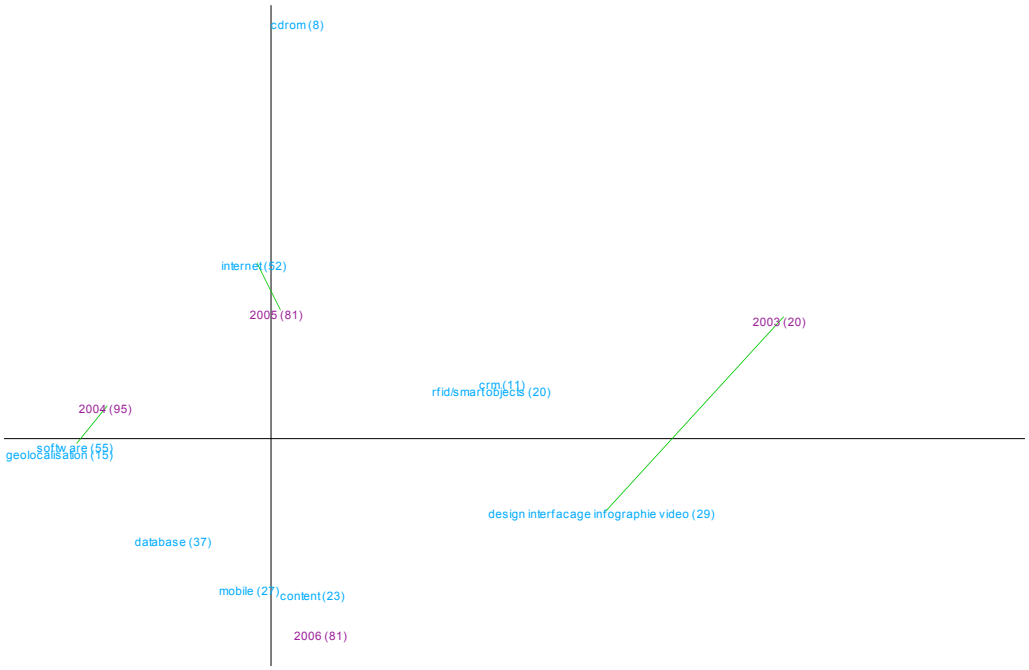
tourists.

Figure 3: chronological cross analysis of technologies



The following figure, which results from a correspondence analysis on the technologies and time, confirms these evolutions. The association of time with software, internet, and finally with mobile and content, shows that Tourism@ is at the core of innovation in tourism, and drive in some sense the services which will be deployed. The changes overtime shows also that the pace of the evolution is quite rapid, technological change in general and technological change in tourism are quasi simultaneous, tourism being one of the dominant field of usage. Tourism@ seems also to play its role of clusters, the successive waves shows the Tourism@ is a locus where competing firms confront their solutions, and were the potential partners can be reached. Finally, the increased share of contents shows that many technologies are now used by adopters, which develop innovative content projects dedicated to the tourists or the potential tourists, offering for instance information on the destinations. The evolution of the technologies overtime confirms the sequential arrival of new knowledge bases in the sector, and the rapidly evolving boundaries of the system in the recent period.

Figure 4: correspondence analysis of years and technologies



Tourism@ and tourism : temporary cluster, contribute to the evolution, recombination of the sectoral system. The projects anticipate perfectly the changes that occur in the sector after some time.

Cluster: horizontal, grapes of similar technologies at given dates, vertical, applications begin to emerge, diffusion to users and second round of innovative applications or projects dedicated to uses and tourists. Different phases of the innovation process can be traced in Tourism@.

4.2. Actors network and uses

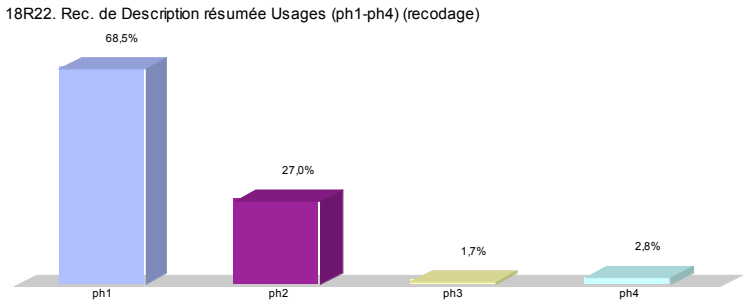
The tourism@ projects database has also been analysed in order to extract the evolution of technology uses and applications. This evolution is analysed over time, space and addressees.

Phases. Different phases have been identified. Phase 1 (ph1) corresponds to the activities and logistics before the purchase of the tourism service (i.e. for example the management of a heavy database, the coordination of sales etc.), Phase 2 (ph2) concerns the period during the travel or leisure (i.e. for instance the need for a geolocalization tool during a trekking or the need of an instantaneous advise for choosing a restaurant etc.), Phase 3 (ph3) after the purchase (i.e. CRM, service improvement or souvenirs products…), Phase 4 (ph4) concerns activities which are virtual and thus, not directly linked to the tourism industry's value chain (this phase mainly concerns entertainment). For instance the project "Tour guidé panoramique" is a multimedia presentation system featuring panoramic or standard animated photography

on the Internet for an online visit of touristic and leisure sites. As represented in the following chart XX, an overwhelming majority of technologies in the tourism industry are used in the 1st phase (ph1), i.e. that most technologies are mobilised before the purchase of the travel (68,5%).

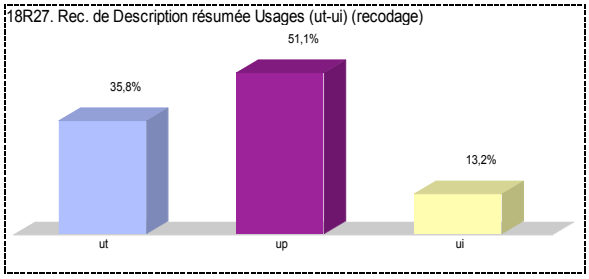
A preliminary analysis of the data reveals the following.
In the earlier study it was found that the tourism industry has a real problem of synchronization of activities in time and space. The different actors of the tourism sector and particularly the providers need to build a concurred offer. Consequently the lack of synchronization remains firstly in the activities before the purchase of the product or the service. The primary results show that the tourism@ event had enable the project handlers as well as the new entrants into the tourism sector to catch the needs and to understand the intrinsic features of the sector's evolution. With the advent of the Internet, the boundaries between competitors and partners have deeply changed leading to the necessity of a new rationality sustaining cooperation and reciprocity in the building of an offer. This consideration is even more striking as technologies addressing the activities anterior to the purchase represent 68,5% of the projects, which is a very explicit figure. For example, "Le Conseiller Virtuel™" is a project aiming at helping professionals to present touristic products to consumers. Thanks to dynamic information producted by each suppliers, and made available to them via an EDI plateform, sales teams and travel agencies can work more easily.
Therefore the networking of projects leaders in such an event seems even more crucial in order to capture what competencies of the different actors – competitors or collaborators- need to be combined dynamically.

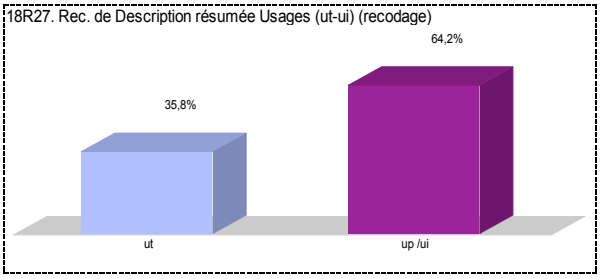
Figure 5: phase's description



Users. In order to analyse which technology address which target, and when, different users have been identified. Professional users (up) are tourism information desk, hotels, restaurants, guides publishers, owners of flat to rent, car rental professionals etc. Intermediary users (ui) represent travel agencies and computer technology services providers. And final users are the tourists (ut), the final customers. The chart n°XY shows that most technology applications (or uses) are addressing professional users (51,5%). And the percentage goes up to 64,2% when coupling professional users with intermediary users.

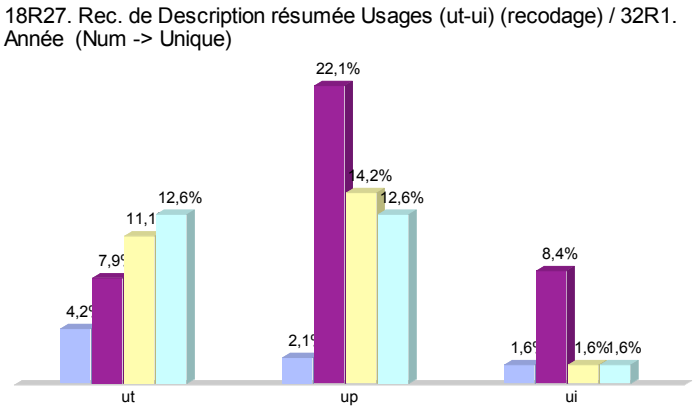
Figure 6.1 et 6.2: users description





However, figure XZ demonstrates a very clear increase of technology applications addressing the tourist as the years go by. Figures increase very regularly year after year. In fact, when only 4,2% of projects where addressing the tourist in 2003, figures reach almost 13% only three years after. In the same idea, from 2004 to 2006, technology applications addressing professional users decrease from 22,1% to 12,6%.

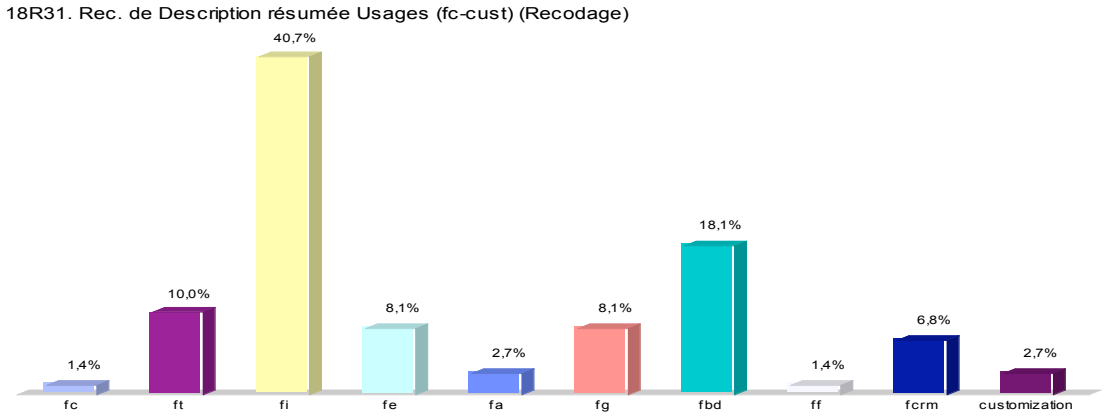
Figure 7: chronological cross analysis of users



In this event, the clustering of actors, even if temporary, is very intensive. In fact, the dynamics of such a meeting-conference-exhibition is based on mutual observation, constant comparison and the gathering of information and knowledge thanks to interactions and face-to-face exchanges. Providers can evaluate customers' reactions in front of their project proposal or in front of their competitors' project, on the spot, lively. In fact, main customers of these innovative projects are travel agencies and intermediaries for a large majority before final customers. This points out the fact that projects are instantaneously evaluated by sophisticated customers on site. Data analysis have shown a clear-cut orientation of uses towards final customers. Projects as "Voxinzebox" (that provides guided tours on mobile devices such as mobile phone, Pocket PC, MP3 players and Vidéo Ipod) or "Decizium" (that develops and markets an innovative decision support system to plan fully-customized trips automatically generated in accordance with a tourist's preferences, wishes and constraints). Address final consumers directly. This means that these interactions allowed the participants to capture market tendencies and help them to make a decision on their technological focus and future investments. From provider focused uses, projects leaders have moved towards final customers uses. Furthermore, some technologies that were addressing providers are later addressing tourists a few years after. This attests for a diffusion of technology that has succeeded and contributes to reinforce the suggestion that such events play the same role as temporary clusters in terms of exchange and diffusion of information and knowledge.

Functionalities. From the project database several functionalities of technology have been highlighted: Transaction functionality (ft) for payment and money transfer transactions, mainly online; Communication functionality (fc) for forums exchanges and discussions between customers and providers; Information functionality (fi) for the all functionalities linked to the flow of information; Entertainment functionality (fe) for functionalities aiming at distracting and diverting; Authentication functionality (fa) for the functionalities dedicated to certification, security, identification and traceability; CRM functionality (fcrm) for the customer relation management in order to develop loyalty and in order to offer more customised services and products; Governance functionality (fg) i.e. for all functionalities linked to the general management activities; Database functionality (fbd) for database management.; Formation and e-learning functionalities (ff) for all applications addressed to education, learning and formation mainly for employees; and eventually customization (customization) for personalized products and services offered by providers (dynamic personalised packages, on-demand tours etc.).The three main functionalities addressed are information by far, database management and transactions.

Figure 8: functionalities' description



As indicated in Part 1 (pp…) with the internet, the nature of the demand have changed and operate through infomediation, i.e. exchanges of information *between* consumers on forums, blogs, pages dedicated to critics and advices on professional tourist sites, portals.... This new form of demand has build up mediated communities and has developed very strong evaluation procedures. This has force the providers to deliver constantly renewed information, robust database management tools and very easy and secured transactions. The three main functionalities addressed are thus information by far, database management and transactions. These results adds further evidence that on a one hand, the new requirements of the evolving demand in a changing sector looking for selected, customized and structured information among the great deal of information they are facing with. On the other hand, in order to cope with such a complex demand, professionals and intermediaries need to collaborate and cooperate in technological development in order to achieve to capture and develop new technology applications and uses.

The temporary cluster therefore is the ideal configuration for participants to benefit from the local buzz (Stoper, Venables 2004), i.e. specific information and the continuous update of it, and at the same time the event enable them to select new partners that give them access to a new pool of knowledge (Malmberg et al. 2005).

4.3. Level of innovation

In order to map the various projects, we analyze the innovative aspect of the database. We define three kinds of innovation: product or service innovation, process innovation and marketing innovation.

Product or service innovations (70,7%) correspond to the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user

friendliness or other functional characteristics. Moreover, different degree of innovation exists between evolutionary incremental innovation projects and revolutionary radical innovation projects. So, we distinguished three level of innovation. Firstly, **market innovation (psm)** corresponding to major product innovation, that is a market into which the particular branch of firms of an industry in question has not previously entered, whether or not this market has existed before (14,9%). For example, Amadeus provides a project about hotel reservation and customer identification using RFID. Indeed, profile and location-based proof of concept prototype developed by Amadeus allowing a mobile device user to get hotels availabilities and book a hotel room. The mobile device being RFID tagged, the RFID code stored in the profile is then used to welcome the user in the hotel entrance and trigger the starting up of various appliances (light , coffee machine,…).

Then, **firms innovation (psf)**, that is one with which firms are not yet familiar and also innovation in firms refers to planned changes in a firm's activities with a view to improving the firm's performance (28,2%).

Finally, **applications innovation (psaf)** is when a simple product may be improved (in terms of improved performance or lower cost) through use of higher performance components or materials, or a complex product which consists of a number of integrated technical subsystems may be improved by partial changes to one of the subsystems (27,6%).

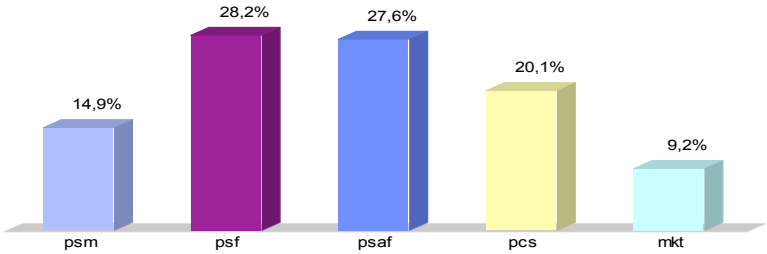
Process innovation (pcs) is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. Process innovations can be intended to decrease unit costs of production or delivery, to increase quality, or to produce or deliver new or significantly improved products (19,1%). It could be an organizational innovation refers to the creation or adoption of an idea or behavior new to the organization. For example, Hotels2Hotels society provides a project about hotel reservation network. H2H is a hotel reservation system that allows “hoteliers” to make reservations for consumers via a network's 24-hour intranet at other hotels when their own hotels are fully booked. This tool automatically calculates the distribution of commissions among the relevant partners. It eliminates intermediaries and makes use of yield management. In fact, this system gives network members total freedom to work with prices and margins. Equally, this system permits the hotelier to advise a client of other lodging possibilities when his own hotel is full and this helps develop customer loyalty. Sharing of information is instantly available and this in turn optimises the quality of the relationship between client and hotelier.

Marketing innovation (mkt) is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing (9,2%). Marketing innovations are aimed at better addressing customer needs, opening up new markets, or newly positioning a firm’s product on the market, with the objective of increasing the firm’s sales. For example, Fun&Fly is a Customer Relationship Management software package adapted to Travel Agency or Tour

Operator selling procedures. This system is a customer and potential client file management (mailing of newsletters and brochures to refine the distribution list), allows a quotation management (booking and creation of a travel book tanks to a single tool) and a loyalty programme (discounts according to level of loyalty and revenues generated).

Different innovations are represented in the following chart and show that the majority of innovations in the tourism industry are incremental.

Figure 9: criteria of innovation



The figure 10 is a longitudinal analysis of innovations; it crosses years and nature of innovation variables. An analysis of the data give us the following.

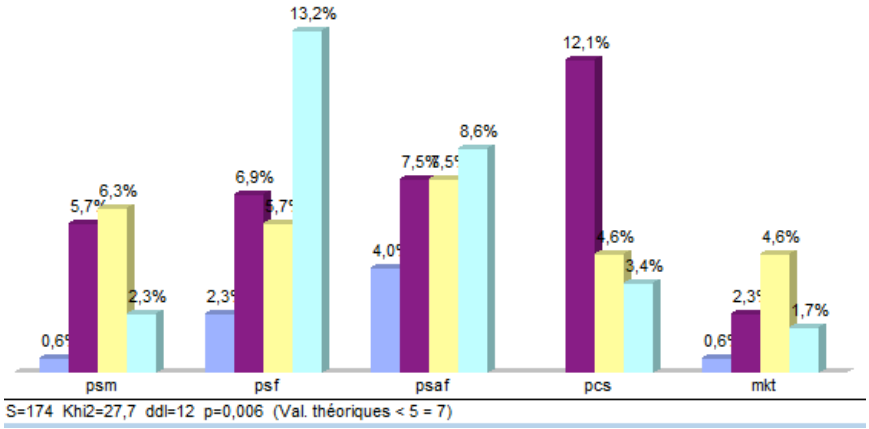
In 2004 and 2005, a large proportion of innovations are major. Moreover, innovations including process innovations and/or the business organization (12.1% in 2004) are representative. This fact match with the results of the use indicated that in 2004 many projects focused on functionality database management. Indeed information is the heart of the tourism industry (Sheldon, 1993; Buhalis, 1996; Werthner and Klein, 2004). The analytical complexity of this industry lies in the coexistence of different structures and sizes, craft and disorganized for some and industrialized for others. The firms cooperate more and more indirectly in achieving a final product that they do not fully mastered. The exchange of information is so central to this coordination mechanism. The streamlining of data is also a source of value creation (better knowledge of customers, better reactivity, customization, etc.) and then pushes engineers to develop systems innovations in the management of databases. In 2005 and 2006 fewer innovations are processual because it's becoming current.

The same figure gives us an idea of the diffusion of innovations. In 2006, we observe a strong growth, compared to previous years, of firm's innovation and applications innovation. The innovations have changed the stage from innovation in the market that use extended to the firm and users. We refer to Rogers (1995) who think there are five elements that determine the adoption and diffusion of new technology. *The relative advantage* is the degree to which an innovation is perceived as better than existing ones. It is not necessary that this innovation has far more advantages than others but what is

important is that the individual receives as advantageous. *The compatibility* is a measure of the degree to which innovation is perceived as being consistent with existing values, past experiences, social practices and standards of users. An idea that is incompatible with the values and standards would take longer to be adopted a consistent innovation. *The complexity* is a measure of the degree to which innovation is perceived as being difficult to understand and use. New ideas that are easy to understand will be adopted much more quickly than others who need to develop new skills before they can understand. *The testability* is the possibility of testing an innovation and change before committing to use it. The opportunity to test an innovation will enable potential users to have more confidence in the product because it has had an opportunity to learn to use it. *The observability* is the degree to which the results and benefits of innovation are clear. More results from the adoption of innovation will be clearer and more people adopt it easily.

So the variable time is crucial for the diffusion of innovation. The players need time to awareness and knowledge innovation in order to assess the degree of uncertainty related to this innovation as well as the benefits they can derive from it. Firms often adapt technology to their own needs, so the innovation may actually change in nature from the early adopters to the majority of users. More than the simple invention-innovation-diffusion model, innovation is a multilevel, non-linear processes that firms, entrepreneurs and users participate in to create successful and sustainable innovations.

Figure 10: longitudinal analysis of innovation



5. Final considerations and conclusion

The paper has focused on a particular event, Tourism@, which gathers each year since 2001 the main actors of innovation in e-tourism. This major event is dedicated to the usages of ICT and the internet in the tourism industry, and appears as a unique international trade fair in Europe dedicated to start up innovative companies, high tech SMEs, academic research, as well as large multinationals. Tourism@ is specific in

so far as firms submit innovation projects and not products as it is usually the case in such events. The paper rests on the in depth analysis of these projects to assess the role of Tourism@ in the tourism sector, considered as a sectoral sector of production and innovation. The projects have indeed been analyzed to build a database able to characterize the innovation process in the sectoral sector since 2001, i.e. to inform the knowledge bases and technologies, the agents involved in the coordination of the economic activities, the nature of the market addressed.

Tourism is a very specific sector, which gathers very heterogeneous and evolving knowledge bases and technologies, and even more heterogeneous and dispersed firms, from multinationals to very small firms, from high tech to low tech. The large physical, organizational and cognitive distances are a characteristic of the sectoral sector, deprived of the usual clusters to foster innovation.

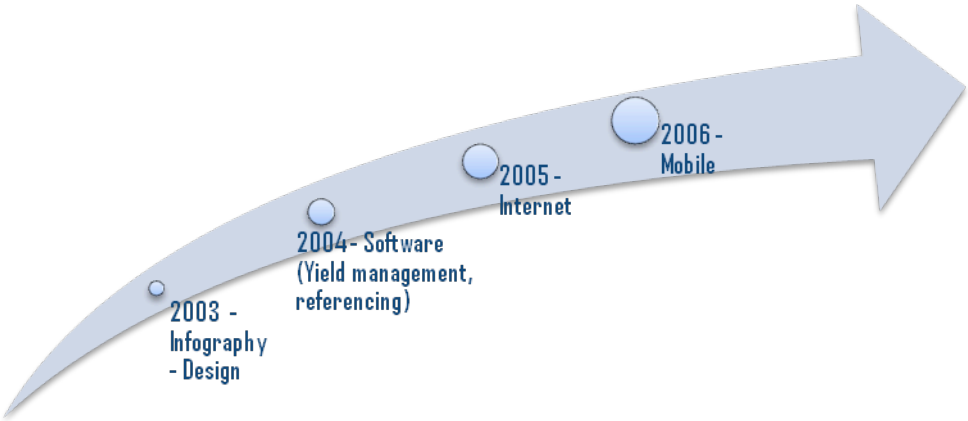
Professional gatherings like Tourism@ could, according to the words of Maskell, Bathelt and Malmberg (2004), support horizontal and vertical knowledge exchanges similar to permanent clusters, but in a temporary, repeated and intensified form. The hypothesis under the paper is that consequently Tourism@ could be considered as temporary clusters, helping to identify, select innovative projects, approach or interact with new partners, to access knowledge bases, technologies, or even applications which would have been impossible in another way at a reasonable cost. In a dynamic context of annual events, the repeated face to face temporary relations can result in trust and durable cooperation between different organizations.

The results of the analysis confirm the role of Tourism@ as a temporary cluster. The analysis of the dynamics over the three main dimensions characterizing the projects, market areas, technology and innovative intensity, shows that Tourism@ anticipate in some sense the evolution of the sector, and thus help to develop or implement innovative solutions, support technology transfers and the creation of new markets as well as the fostering of horizontal and vertical relations between stakeholders. The analysis of the projects over time has indeed evidenced the existence of clouds of technologies or uses characteristics each year: competing firms present and confront their solutions on an horizontal dimension. Tourism@ allow to implement the functions of observability and comparability defined in Malmberg and Maskell (2005) to characterize an innovative environment, and to process temporary neighborhood effects, which could result in inter-firm or network relations. to characterize the evolution of the nature of innovative activities in e-tourism. Secondly, it can be shown that Each year Tourism@ is characterized by many projects belonging to a particular technology or innovation, showing some kind of temporary self organization around specific themes, and by some projects in emergent fields. Some of the projects are indeed really ongoing projects, and some vertical relations could also be build thanks to the gathering of distant actors in a given place.

Another interesting result of the analysis is the movements of the clouds of projects over time in the different dimensions. The dynamics show the emergence of successive knowledge bases, corresponding to

the evolving frontier of the sectoral system, and the diffusion and generalization of the innovation in the industry. Typically, the software, internet, and mobile technologies have successively characterized the projects, and the emergence of contents in the end of the period shows that the technologies have been assimilated by the profession and are more and more dedicated to the tourist. These dynamics are confirmed by the uses. The services dedicated to the preparation of the transactions are dominant, but there is an increase of services dedicated to the period of the travel, going with the generalization of the mobile or RFID technologies. The projects were also mainly dedicated to professional, fostering the reconfiguration of the industry and of the firms relations to address the tourists in the last period. The evolution of functionality has supported this process. Finally, the analysis of innovation itself follows the same scheme, going from market innovation to applications overtime. The new knowledge bases have been assimilated, and move rapidly from the frontier to the whole industry. The diffusion and adoption of the emerging technologies and their rapid evolution towards the final users and the market are clearly evidenced by the projects. Tourism@ has thus been proved to provide to sectoral systems the main characteristics of a temporary cluster, anticipating through the competing projects the changes in the sector regarding knowledge creation and diffusion and innovation.

Figure 11: main technologies according to years



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