HAL
open science

Anatomy of a techno-creative community – the role of brokers, places, and events in the emergence of projection mapping in Nantes

Etienne Capron, Dominique Sagot-Duvauroux, Raphaël Suire

To cite this version:

Etienne Capron, Dominique Sagot-Duvauroux, Raphaël Suire. Anatomy of a techno-creative community – the role of brokers, places, and events in the emergence of projection mapping in Nantes. European Planning Studies, 2021, pp.1-22. 10.1080/09654313.2021.1959901 . halshs-03323847

HAL Id: halshs-03323847

https://shs.hal.science/halshs-03323847v1

Submitted on 23 Aug 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Anatomy of a techno-creative community – the role of brokers, places, and events in the emergence of projection mapping in Nantes[1]

Etienne Capron (GRANEM, University of Angers)*
Dominique Sagot-Duvauroux (GRANEM, University of Angers)
Raphaël Suire (LEMNA, University of Nantes)

July 2021
Word count: 9 040 words (including bibliography)

Abstract

This article aims to study the role of brokers, places, and events in the structuring of a community of innovation whose practice is at the intersection of art and technology - projection mapping. Using an exploratory case study, we observe the relationships between the different actors who form a community, sharing a common interest in a techno-creative practice - but whose collective innovation dynamic is only in its beginnings and remains unstable. We document the critical role of places and events as intermediary platforms for these actors. This reveals preferential circulations - patterns of moves among a set of focal locations in the city for a community – and the crucial role of these locations in communities' emergence.

Keywords: techno-creative innovation; community; network analysis; places; events; brokers.

JEL Code : D85, O32, R11, Z10

Introduction

The past two decades have seen a multiplication of regional policies based on cultural and creative industries support (Boix et al., 2016). Related economic sectors (mainly art, media, digital technologies, video games, etc.) have become a major source of employment, yet also produce many external effects for other sectors (Sedita et al., 2017). At the same time, they deeply transform territories in three interwoven dimensions: urban transformation through the embellishment of deprived areas; demography of population through the influx of creative and knowledge workers; and economic transformation through convergence toward knowledge intensive economic sectors (Scott, 2014). However, the spatial coexistence of (un-)related creative sectors does bring new opportunities for regional cross-specialization (Frenken et al.,

[1] The authors wish to thank the RFI West Creative Industries (RESET project) and the Agence Nationale de la Recherche (SCANEA project - n°ANR-18-CE22-0012) for their financial support. We are also grateful to the participants of the Rethinking culture and creativity in the technological era workshop in Florence, and to the two anonymous reviewers for their insightful comments and suggestions.
* : corresponding author. Email address: etienne.capron@univ-angers.fr

2007; Janssen & Frenken, 2019), and the co-location of different activities could open up a wider, more sustainable range of anchored possibilities for regional development.

Few studies have documented how some related sectors overlap and produce novelties at their respective knowledge borders, even though there is strong interest in this (Content & Frenken, 2016). Furthermore, empirical papers reveal valuable potential in the food industry (Davids & Frenken, 2018) and in offshore gas and wind energy (Ingstrup & Menzel, 2019) – though very little is known about how Cultural and Creative Industries (CCI) cross over. Contexts in which STEM (Sciences, Technologies, Engineering, Mathematics) and artistic activities are co-located are rarely studied. Rodriguez-Pose and Lee (2020) provided insights at the city level, showing that cities in which both types of activities are present are particularly innovative when both knowledge fields intersect.

In line with this idea, innovations are increasingly based on both symbolic and synthetic knowledge bases (Asheim, 2007). Video games (Grandadam, et al., 2013) or medias (Martin & Moodysson, 2011) are good examples of this tendency. However, studies are mostly conducted at the macro or organizational levels (international, national, regional). This contribution aims to fill some gaps, firstly by specifying the concept of 'techno-creative' activities and innovations– those at the knowledge frontier of arts and digital technologies – and secondly by pointing out the crucial roles played by brokers, places, and events in the emergence of these novelties. Consequently, this paper enriches the literature on community-based knowledge creation and contribute to a recent stream of literature dealing with the role of places and events in the structure and evolution of knowledge communities. By doing this, we offer some perspectives and practical implications for policy makers and creative community managers on the way some communities of innovation can be organized and sustained.

This paper is based on an exploratory in-depth case study (Yin, 2014) of the projection mapping community in Nantes (France) as an example of a localized, emergent techno-creative activity. This innovation combines symbolic and synthetic knowledge and is associated with several types of creatives (architects, video-jockeys, artists). Our results identify *preferential circulation* (PC) of community members, which can be defined as the pattern of attendance of innovators among a set of locations in the city. A fragmented community is revealed and to some extent this fragmentation comes with an emerging but also unstable collective dynamic. Our analysis shows that the community attends a multiplicity of places and events (in terms of size, specialization, etc.), and that access to the resources provided by these platforms is not open to all in the same way. Once emerging activities have been detected by public institutions, a policy of material and economic support could benefit their structuring (provision of

workspace, logistical assistance, financing of long-term residencies, etc.). Our analysis also confirms the importance of knowledge and geographical brokers located at the intersection of distinct knowledge fields to initiate new techno-creative practices (Sgourev, 2015).

The paper is organized as follows: the first part frames the theoretical approach, from which we derive our research questions. The second part is dedicated to methodology, building on semi-directive interviews. The collected data allows us to conduct network analysis. The third part is devoted to the results, which are discussed in the fourth part, and our conclusion highlights implication for policy makers.

Theoretical background

Research on the knowledge-based economy has introduced the notion of knowledge bases in order to specify how innovation processes operate (Asheim, 2007). Within this framework, each activity is associated to a knowledge base, according to the industrial sector it belongs to, its degree of tacitness, and the skills it requires (Cooke, 2007; Martin & Moodysson, 2011). The literature describes three types of knowledge bases: *analytical*, which is more associated with science-based industries (fundamental research, biotechnology, nanotechnology, etc.) and involves a rational, deductive thinking approach that leads to the creation of highly codified scientific knowledge; *symbolic*, which is related to CCI and art because it refers to the creation of knowledge of high aesthetic value, embedded in cultural systems of interpretation and having a strong tacit dimension – thus, very context-dependent; and *synthetic*, which is based on combining existing knowledge in order to apply solutions to functional, specific problems (e.g. engineering). Depending on the activity, one knowledge base is dominant, and this affects how new knowledge is integrated and created. As pointed out by Rodriguez-Pose and Lee (2020), the amalgamation of activities belonging to both the Science Technology Engineering Mathematics (based on synthetic and/or analytical knowledge) and creative/Art sectors[2] could spur innovation at the city level. To define activities that combine synthetic and symbolic knowledge to produce innovations, we use the term techno-creative. This covers a wide variety of activities that use these two knowledge bases to varying degrees.

While some knowledge is indeed produced by formal organizations (Balland et al., 2020), not all of it is created by them. Indeed, a plurality of actors having an interest in a

[2] So called, STEAM based Innovation.

particular field participate in the creation of knowledge. Scholars define these as communities – sets of individuals who regularly and voluntarily exchange information about a common interest or a shared goal within a knowledge field (Amin & Cohendet, 2004). Though these autonomous, informal collectives are not necessarily oriented around market production, they first and foremost share interests, opinions, and practices about whatever it is that brings them together. The role of communities in the processes of knowledge creation is important, because the diverse interactions between members allow for the transfer of (formal and/or informal) knowledge specific to each field and the formation of shared visions (Bathelt & Cohendet, 2014 ; Cohendet et al, 2021). Each community has its own cognitive space, constructs in which knowledge and ideas are transferred, translated, and articulated. Cognitive spaces help to guide the future development of a practice or knowledge (Cohendet et al., 2010; Capdevila et al., 2018).

This broad definition can be refined by distinguishing between two typical types of communities: Communities of Practice (CoPs) focus on sharing best practice in a specific area of knowledge (Lave & Wenger, 1991). Because they share the same existing practice, members of these communities also share a common interest in a problem or topic. They use common standards, routines and tools that enable them to understand each other. Thus, we assume CoPs emerge from technological/technical innovations and the various individuals who are interested in them and appropriate them. Epistemic Communities (EC) are focused on the creation, codification and dissemination of new knowledge or ideas (Haas, 1992). EC members compare their diverse knowledge sets, to create or update new knowledge and develop a framework with which to interpret it. They therefore share normative frameworks, visions on the validity of knowledge and preferred approaches for its creation. In substance, communities thus refer to networks of individuals who interact regularly, share collective interests and norms. The boundaries of communities are blurred and evolve over time as members become more or less involved. In emerging fields, practices are mostly based on experimentation and prototyping. Bricolage and exploration might be some dominant means of learning (Suire, 2019). Theoretically, the difference between CoPs and ECs lies in how they produce knowledge (deliberately for EC, through their practices for CoPs), and in the ability of ECs to create a cognitive space (Capdevila et al., 2018). But in reality, members of CoPs and ECs can spill over into a single community, collectively producing something new by combining knowledge, adjusting or initiating practices, developing an interpretative framework, and actively disseminating knowledge through practices (Capdevila et al., 2018). For this study, we

therefore consider communities that develop both new knowledge and practices, particularly because they combine knowledge from distinct bases (synthetic and symbolic).

From then on, if we consider techno-creative innovation as a combination of synthetic and symbolic knowledge, we explore the dynamics that are driving this process. This requires keeping in mind the embedding of social relations, i.e. belonging to the same social realm (Granovetter, 1985). The structure and composition of an actor's social network is important because the social capital it constitutes is an important resource for action (Coleman, 1988; Burt, 2004). Too much homogeneity could limit access to new ideas or opportunities, whereas ties that are too weak (or even non-existent) could limit confidence - and thus exchanges of tacit knowledge. In addition, the emergence of a techno-creative community implies that its members share the same cognitive space. The capacity of actors to adopt behaviours in line with the established practices, values, or ideals, is therefore crucial. Thus, where actors are strongly interconnected and interact frequently, shared values and understandings emerge (Jones et al., 1997). But even in a context in which local actors share a single, abiding, geographical space, new combinations involving both synthetic and symbolic knowledge are not guaranteed. We therefore need a more precise investigation of territorial configurations, as these could play a vital role in the emergence and development of communities.

The crucial roles of places, events, and brokers

We analyse the endogenous elements of a territory that can promote crossovers (whether directly or indirectly). We draw on two platforms, places and events, identified in the middleground literature (Cohendet et al., 2009; 2010; 2021). Our approach is inspired by the -*grounds* model, but we do not apply this framework, which focuses on platforms of vertical intermediation between informal (*underground*) creative activities and the formal institutions of a territory (*upperground*). However, we focus on places and events in the idea that they can join distinct communities horizontally. We also add brokers (Gould & Fernandez, 1989) to develop our own framework.

The first element is *place*: an abiding physical location in which individuals can socialize and share information, and in which social and cognitive flows densify (Rantisi & Leslie, 2010). Following the notion of third-places (Oldenburg, 1989), these offer a favourable context for social interactions and knowledge exchanges. A wide variety of places can play this role, whether for production or diffusion, niche- or mainstream-oriented (Kloosterman, 2014): cafés, restaurants, artist-run spaces, fab-labs, etc. The third-place function is created by the

community in making it its focal point, and these places can play a crucial role in the process of creation and/or diffusion of innovations. More precisely, the main function of these places can differ from one location to another: creation/production, social interaction, learning or exploitation of knowledge, etc. We also assume that places may be more or less open to exploitation depending on whether they are institutionalized and highly visible, requiring more accomplished productions for a wider audience, or explorative, niche-oriented places where there are more experimentations.

The second element is *event*: whether regular or not, events act as temporary clusters, gathering actors from different territories for a short period of time (Maskell et al., 2006; Torre, 2008). By allowing face-to-face encounters, events offer an opportunity to create new social relations (Rantisi, 2014). Where they have a worldwide audience, these favour global pipelines, and events provide communities with access to new trends, knowledge, and peer reviews, consequently building local buzz (Rantisi, 2014). Another crucial characteristic is the field-configuration role an event can have (Schüßler et al., 2015). In those cases, events constitute an important intermediary for creating networks, developing shared standards and visions, and thus have a strong configuring influence for local communities.

Several contributions also emphasis the crucial role played by social networks in the creation and diffusion of creative productions (Burt, 2004; Uzzi & Spiro, 2005). The ability of some actors to connect individuals with different knowledge can therefore be crucial for innovation (Nedkovski & Guerci, 2021). Following Gould and Fernandez (1989), brokers are structurally defined as individuals who connect otherwise disconnected alters, whether or not these people belong to a single organization or field. Moreover, we must take into account their agency and active intermediation effort (Foster & Ocejo, 2013). Brokers serve as 'bridges' between different part of a social realm, especially distinct communities, thereby transforming the dynamics of interaction between actors. Thus, depending on the situation, a broker can exploit the disconnection of actors to his advantage (Burt, 2004), or conversely connect the different actors in his network (Obstfeld, 2005). Brokers' knowledge translation role can also be crucial (Foster & Ocejo, 2013). The role of brokers has been studied in contexts of emergence in artistic fields, highlighting the crucial factor of accessing influential actors and bridging different social worlds and views (Sgourev, 2015; Lingo & O'Mahony, 2010).

The challenge for developing a techno-creative community is to identify the bridges that bring together communities with synthetic knowledge and others with symbolic knowledge. Previous research may have focused on the role of brokers, places, and events independently,

or within a particular knowledge domain. Here, we study how these elements all combined contribute to modify the structure of communities, to promote interactions, and ultimately to foster innovation at the intersection of two knowledge fields. We have supposed (1) that places, events, and brokers can both reduce social distance and promote exploration at the frontier of artistic and technological activities. The social embedding leads to the emergence of a cognitive space common to the members of a community. However, (2) the heterogeneity of actors, their values and their approaches to practice can be obstacles to the constitution of an innovation community. We rely on an empirical study to determine their role in structuring a community of mappers within an ecosystem that combines technological and artistic activities.

Methodology and data

Field and object of the study

Since we were observing a social phenomenon *in situ*, we chose to adopt a qualitative research design based on an explorative case study, which allowed us to focus on less-studied phenomenon (Yin, 2014). As our field for this study, we chose Nantes - a city located in western France which, over the past 30 years, has developed a strategy of territorial and economic development based on cultural events (Ambrosino et al., 2016). More recently, with the creation of a dedicated cluster (Schieb-Bienfait et al., 2018), the city has focused on attracting the CCI sectors, including digital and tech activities. Nantes was also named European Capital of Innovation in 2019, in recognition of its whole strategy of supporting innovative activities. These two trajectories have recently crossed one another, providing a context that fits the scope of our study[3]. In addition, certain places and events initiated by the city are actively seeking to foster crossovers between arts and technology, underlining the desire to develop activities at the intersection of these sectors.

As we study cases where synthetic and symbolic knowledge must be combined in one way or another, we chose projection mapping - a practice defined as projections of still or moving images onto volumes, using dedicated software and technology (Watier, 2018). Mappers are the individuals who create content for projection, but also manage the technical aspect of it. Depending on their practice, they can create specific technological devices to meet their needs. Therefore, innovations of this community can be more aesthetic (based on new symbolic knowledge) or mostly technological (based on synthetic knowledge), but they always

[3] According to the Agence d'urbanisme de la région nantaise (AURAN), the city has around 26,300 jobs in digital technologies and services (2019), and around 31,000 jobs in the cultural and creative industries (2019).

combine both types of knowledge. Also, we stress that these innovators are not necessarily intermediaries between a tech community and an artist community. Rather, they are on the edge of the two knowledge fields, using a greater or lesser degree of synthetic and symbolic knowledge in their practices.

Primary and secondary data

Data collection was carried out initially by analyzing documents and followed by semi-directed interviews. The analysis of documents from several sources (venues programmes, mappers websites and social media pages) allowed us to identify the local community but not always the links between members. It also allowed us to locate several places and events they attend. Then, we interviewed 17 mappers to obtain more data. The interviews focused on two themes: their individual practice (what tools and processes are used), and the social, spatial, and cognitive resources they mobilize (what places and events they attend and why they do so, with whom they collaborate, etc.). We also asked interviewees to hierarchize places, events, and members of the community as main resources for meeting other members, nurturing their inspiration, learning, experimenting, and sharing their creations. To have an additional view on the community we also interviewed actors having some interest in projection mapping, but whose reasons for participating in the community lie elsewhere: event organization, position in a cultural venue, etc. These five interviews provided us with different, though complementary data about this practice in the local context. The period during which we conducted the interviews spans from September 2019 to March 2020. During this time, new creations were presented, new relations were formed, and integration of these data into our work seemed to be of interest. In total, we conducted 22 interviews and identified 40 individuals, although it was not possible to meet everyone[4]. The data also includes 38 places and 12 events identified with document analysis and cited by interviewees as resources for their practice and/or locations they regularly attend. Finally, through the interview's transcriptions and documents, we found 132 links[5] within the community, 257 links between community members and places, and 96 links between community members and events, which are then used for network analysis.

[4] Some mappers could have been overlooked because of being isolated, or invisible to the people we interviewed. We were also unable to interview some for material reasons (they were not in the area, or unavailable during the study period).
[5] For more details on the definition of links, see the Appendix.

Network analysis

We chose to divide our analysis into three distinct networks: one devoted to interpersonal relations (social network), another to relations between members of the community and the places they attend (bi-partite network), and the last to relations between members of the community and the events they attend (bi-partite network). In each case, we identify market relationships – that is, when a contract is made regarding the creation, production, or diffusion of projection mapping content (i.e. customer-supplier relationship), and non-market relationships – which can take the form of friendship, exchange of knowledge, ideas or advice, co-creation or collaboration, lending of tools. For analytical reasons, we have separated the types of relationships each time, but in reality they are embedded (Granovetter, 1985) and may overlap where two actors have both market and non-market links, since the one may be the consequence of the other. Following Uzzi and Spiro (2005), we consider that a link connects two places or two events if a member of the community attends both places/events. Based on attendance data for the locations identified through interviews and document analysis, and the transformation of the bi-partite graphs into unipartite graphs, we obtain one network made up of places, and another made up of events. This is what we call *preferential circulation* (PC): the individual and collective patterns of attendance among a set of places/events. It reflects the choices, habits, and selection of multiple specific resources (social, economic, cognitive, and material) located in places and events, which are needed to innovate. In total, we come up with six non-directed networks, which we analyse separately and compare based on their structural properties.

Various structural analyses of the network were conducted,[6] starting with degree centrality (the number of links a node has, noted k afterwards), which indicates how well connected a node is in a network, based on whether it has a low or high number of links. We also measured betweenness centrality, which describes the number of times a node is on the shortest path connecting any pair of nodes in the network. This allowed us to identify potential brokers within the social network, as well as intermediary places and events in the other two networks. We also use density - the ratio of the number of existing links to the number of potential links - to specify the cohesion of the network. Lastly, we used degree correlation, which reflects the assortativity of nodes: the idea that nodes having a similar degree connect to each other. A positive coefficient means that nodes sharing the same properties (here, high

[6] Data analysis was conducted with the *igraph* package of R software.

degree centrality) connect to each other. Assortativity provides a finer understanding of the degree of structural homophily in the network (Crespo et al., 2014).

Results

Social networks

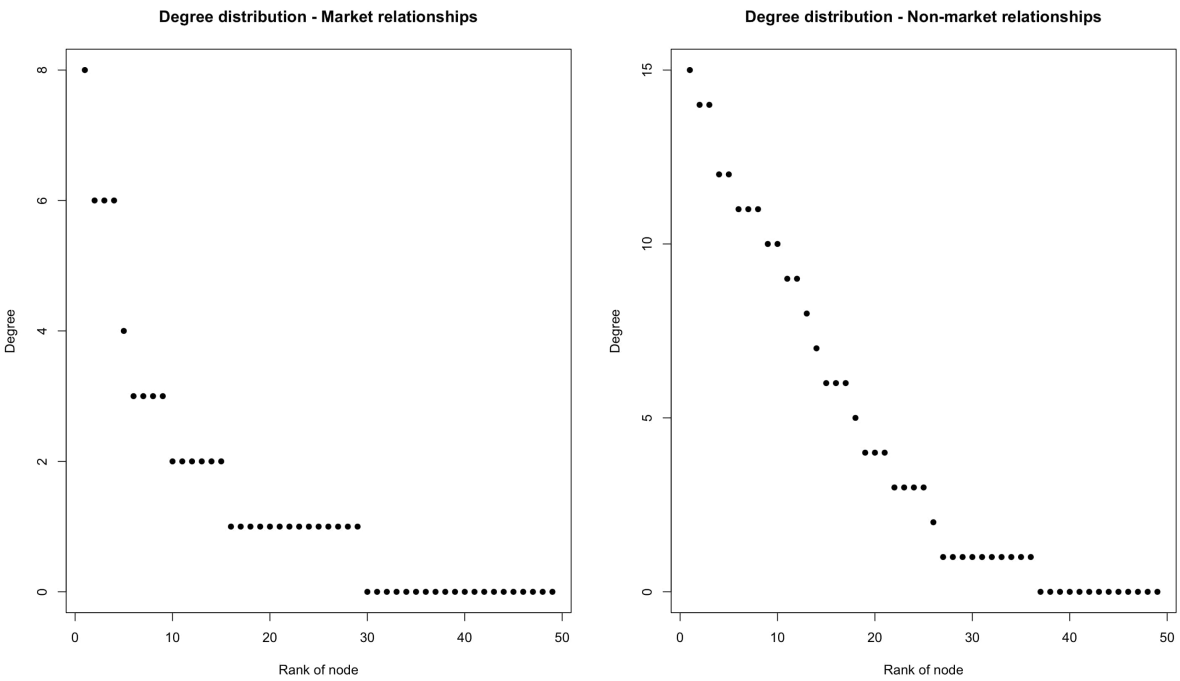
Actors we interviewed live and work in the same city, have the same techno-creative practice (namely the creation and projection of mappings) and share interests in its development and tools. Thus, we would expect that they constitute a community of practice. However, our interviews highlight that the goals and orientations associated to their practice are not homogeneous – they vary, depending on the actors. For example, a former video editor explains that he "*only does it for musicians, with bands, or for live electronic music from time to time*" (interview with a video-jockey [VJ], January 2020), whereas an artist will have an approach based on "*installations, sometimes interactive, sometimes not. It depends if it makes sense or not for me. [...] I work with lasers for example, I do 3D with lasers*." (interview with an artist, November 2019). Representations of the field, aesthetic values attributed to the productions, and conventions regulating the practice are not shared by all.

Instead of a unified network, we have identified three communities, each with a different vision of projection mapping. Links are stronger within than between communities (Burt, 2004), especially for those who organize themselves into collectives and meet often to carry out their projects. The first community is made up of mappers from the School of Architecture, mainly former students. Among them, some actors created collectives to carry out their projects. The second is composed of artists (involved in video, digital and lighting arts) and their technical staff, who use projection techniques in their creations. Some of these people are in an art collective and work together regularly. In the whole network, the only engineer we have identified is a member of this collective. His role seems to be crucial in developing technological tools: "*he is not necessarily going to claim an artistic position, that's not what he is, but at the same time he will share a lot. These days he is developing our own control cards for LEDs that do not exist on the market, we have improved all the systems.*" (interview with an artist, November 2019). This assimilation of synthetic and symbolic knowledge is significant for techno-creative innovation. The third community is made of VJs working in clubs and music venues. They mainly use this technique to enhance the festive atmosphere. In their case, there is no collective and relations are more irregular. As one VJ describes his relationship with another mapper: "*I was invited, he was invited, and we were already talking*

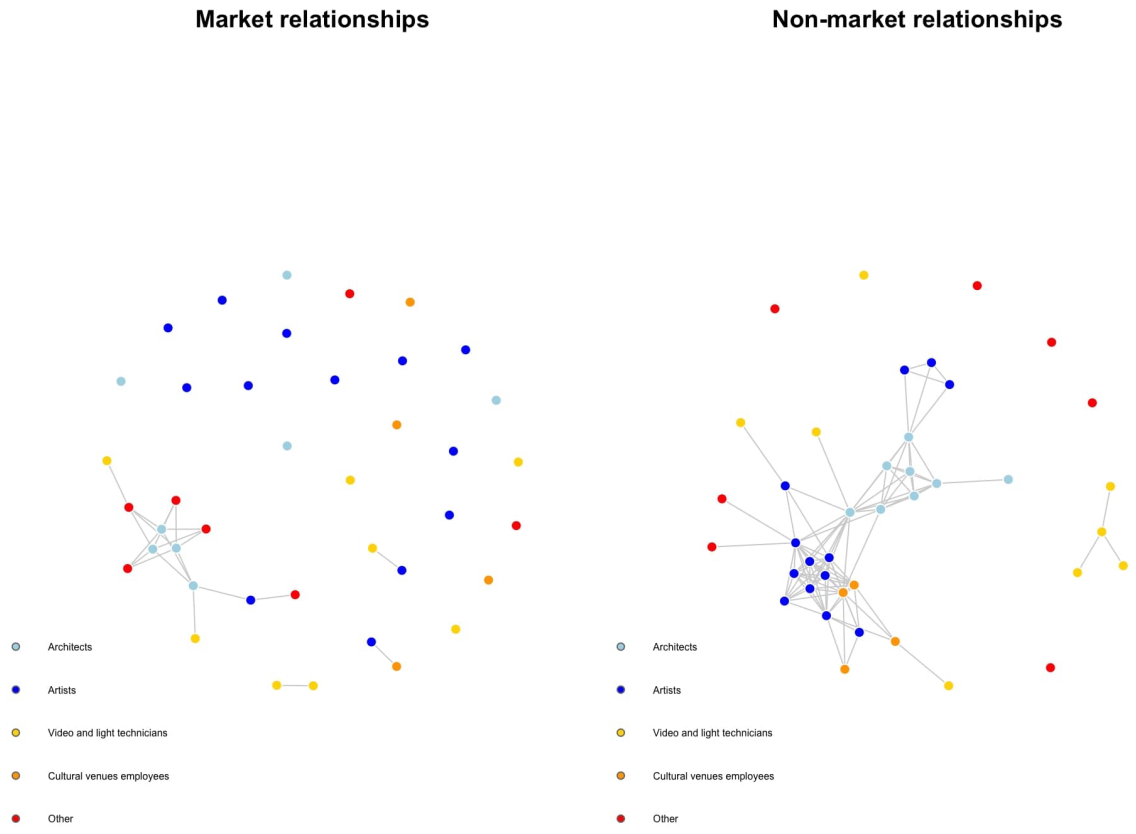
a little bit on Facebook before I think. It allowed us to meet in real life. But then we haven't seen each other much since…" (interview with a VJ, November 2019).

We can therefore admit that the logic of similarity is strong within all communities as they share the same frames of reference, but the potential between communities is not necessarily fulfilled. Innovators have a common base of knowledge, basic skills, and interest in projection mapping, but tools, types of collaborations and frames of reference diverge. To some extent, this scattered community is characterized by ambiguity because there are multiple meanings associated with the practice, defended in a non-conflictual way by the actors (Sgourev, 2013).

We first analyse market relationships between the actors, plotted in Graph 1. This is represented as follows: a link is created if two have a customer-supplier relationship. We note that the network is assortative (0.0481872), i.e. positive degree correlation of nodes: here, this means that actors have market relationships with others who also have market relationships. In a word, business goes to business. The degree distribution of nodes indicates that most actors have few market relationships (degree max: 8) but a relatively higher number of non-market relationships (degree max: 15) (Figure 1 and 2).



Figures 1 and 21– Actors degree distribution for market and non-market relationships



Graph 1 and 2 – Market and non-market relationships among local actors

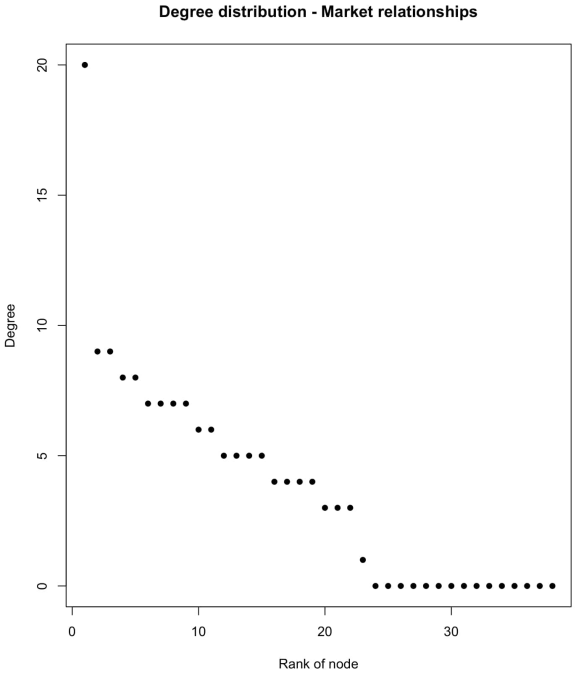
The second network represents non-market relationships. Here, a link is created if actors interact regularly, exchange knowledge or innovations together. Graph 2 highlights three clusters, each representing sub-components of the mappers' network, corresponding to the three communities we identified. Non-market relations account for 82.4% of all relations, revealing a higher number of non-market relationships than market relationships. Moreover, this network is assortative (0.2174976), though to a lesser extent than the previous one, and has a relatively low density (Table 1). This means that actors who are already highly connected have relationships with each other, while those who have few relationships are linked to them but suffer to have few relationships overall. Among identified actors, we identify a broker between the community of architects (to which she belongs) and some artists, as indicated by her high betweenness centrality (291.46 while the second highest score is 159.69). She is a former School of Architecture student who moved to Montreal as part of her training. There, she discovered projection mapping, met the founder of a festival, and later joined the organization

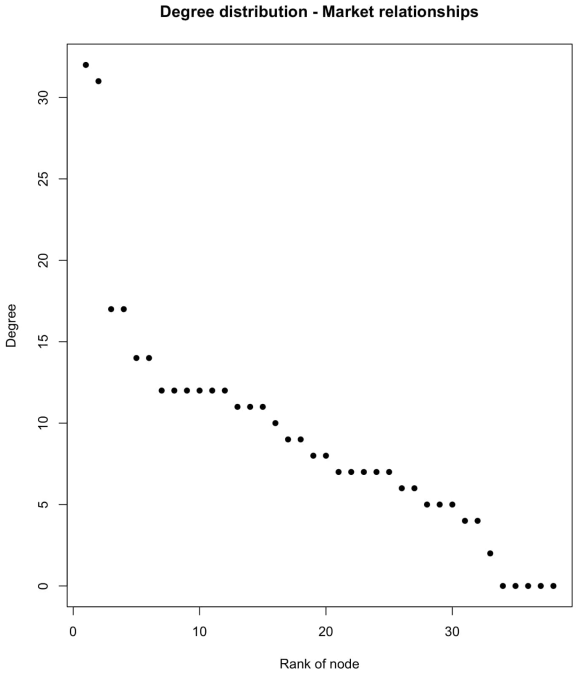
team. Following this experience, she returned to Nantes and (along with former student peers) and founded the collective that launched a local version of the festival[7]. To achieve this, she had therefore sought out local mappers, first through her own friendship network (former students at the architecture school) and then beyond. However, we point out that VJs are for the most part disconnected from the main component of the two networks.

Places networks and events networks:

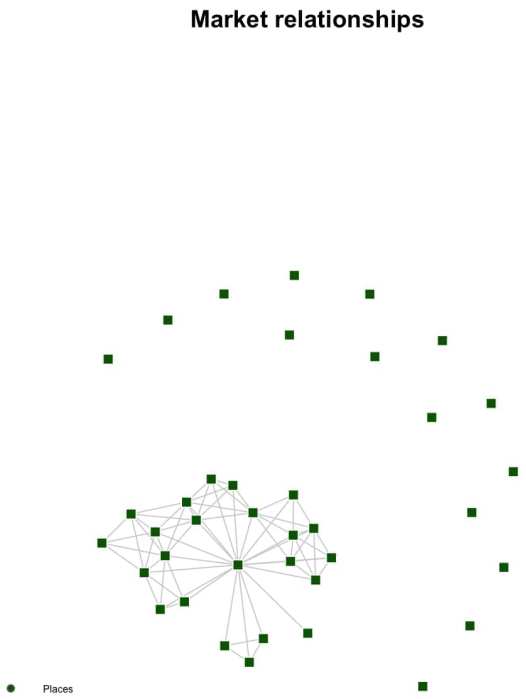
Next, we analyse the network of places attended for market reasons, here defined by the fact that an actor has a paid activity in a place (e.g. a residency or a performance). Thus, when an actor has a market activity in two places, a link is drawn between those two places. Graph 3 illustrates this relatively sparse network (Table 1), revealing that not all actors attend all the same places (if they did, we would get a complete network). Disconnected nodes represent the places where actors have no business activities. Nevertheless, one place seems to be at the core of the network, according to the betweenness centrality: Stereolux, a flagship cultural venue funded by local public institutions. Throughout the year, this venue programmes different types of events (e.g. live music, exhibitions, and performances… about 180 per year) and hosts artist residencies. However, not all mappers have the opportunity to work there and to be included in the agenda. Having a market relationship with this place allows a strong symbolic resource and is a part of the legitimation process, especially for peripheral actors (Grabher, 2018). As one artist with a longstanding relationship with the teams remarked *"Stereolux, you go there, you call them and tell them you need a room to work on something, frankly they'll do it. But to programme yourself…"* (interview with an artist, January 2020).

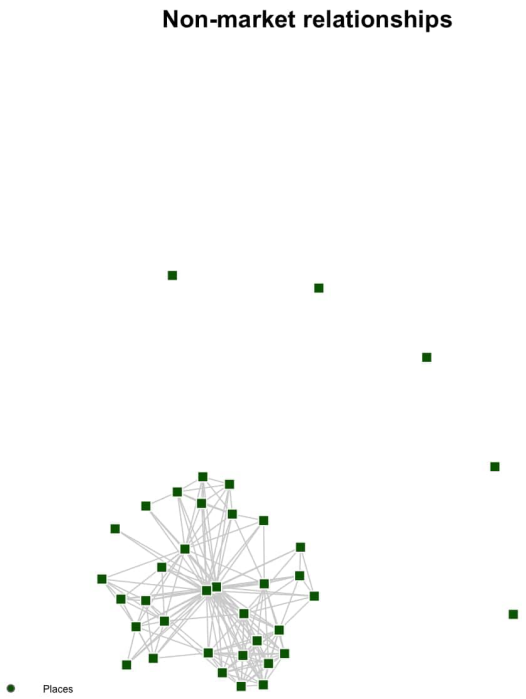
[7] For the moment, the first edition is postponed due to the Covid-19 pandemic.





Figures 3 and 4 – Places degree distribution for market and non-market relationships



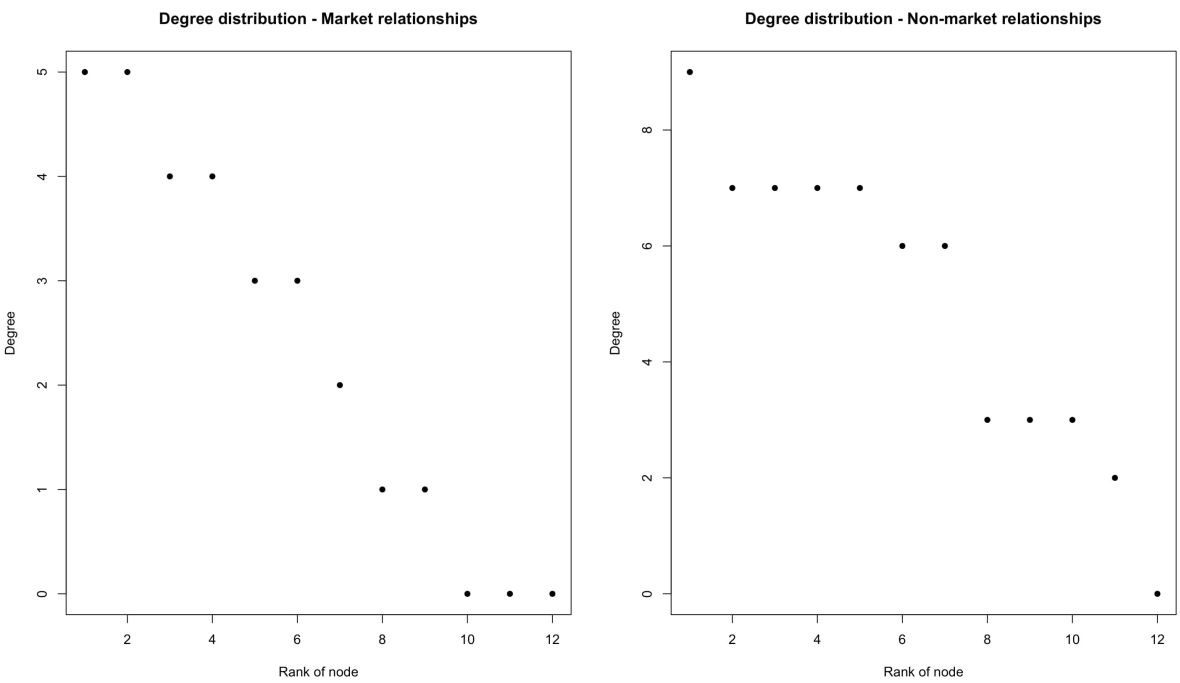


Graph 2 and 4 - PC among places for market and non-market relationships

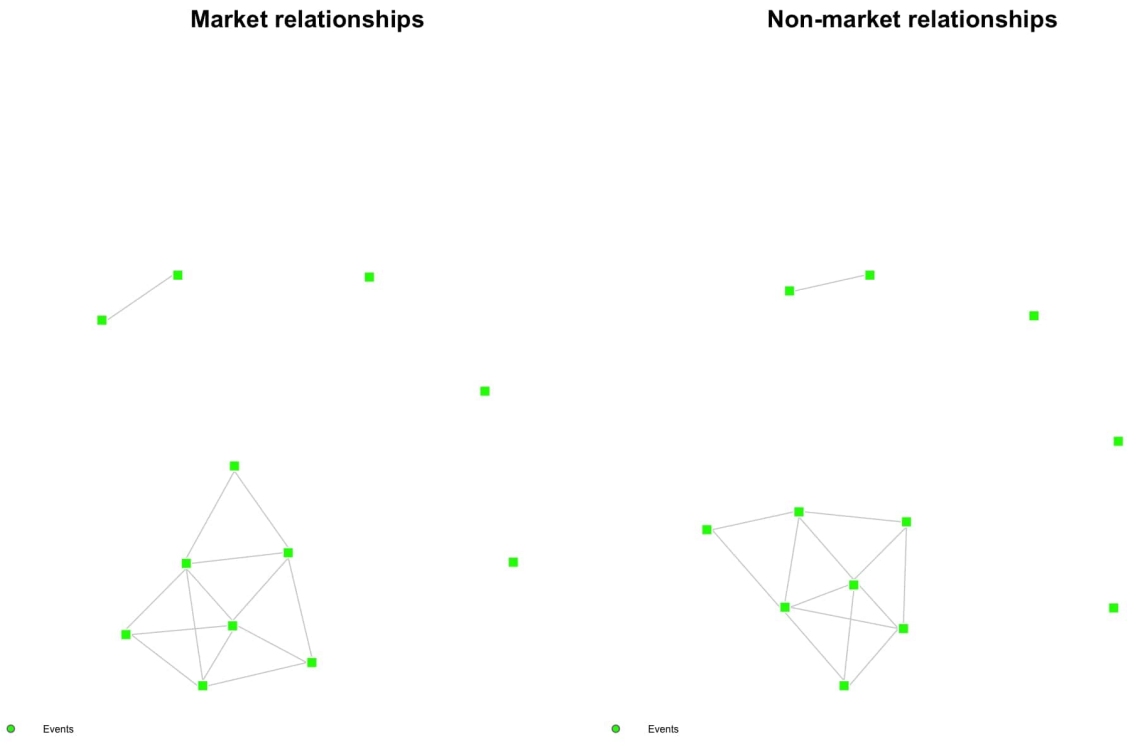
Regarding non-market relationships (e.g. attending an exhibition, meeting friends, experimenting in a studio), the distribution of degrees (Figure 4) shows that relationships are

more dispersed (i.e. are less concentrated around a single place) than for market relationships (Figure 3). However, two places (Stereolux and Lieu Unique, another flagship cultural venue) seem to be at the core of the PCs. The non-market relationships associated with places are visualized in Graph 4.

Regarding the events, we assume that a market relationship exists where a mapper performs during an event. As with places, a link is drawn between two events when an actor has paid activity with both. Results show a reduced number of events attended by innovators. Degree distribution indicates few opportunities for mappers to show their work at local events, since they attend few events likely to build market relationships (Figure 5). Actors who mostly have market relations with events are the artists, and these relations are articulated around two events organized by Stereolux's teams, Scopitone and Electrons Libres. This therefore confirms that this place is at the core of their PCs, as summed up by an artist *"in Nantes, there is above all Stereolux and Scopitone, who is the main actor, and who offers a lot of advantages to create things."* (interview with an artist, December 2019).



Figures 5 and 6 - Events degree distribution for market and non-market relationships



Graph 5 and 6 - PC among events for market and non-market relationships

Non-market relations, on the other hand, are more evenly distributed, revealing that actors attend various events (rather than just one), both in terms of size and content. Scopitone seems to be particularly attended by the members of the sample, as indicated by degree centrality (Figure 6). Graph 6 represents the network of events attended for non-market relationships.

	Density	Assortativity
Social Network		
- *Market relationships*	0.0289115	0.0481872
- *Non-market relationships*	0.0901360	0.2174976
Places Network		
- *Market relationships*	0.0995732	-0.249194
- *Non-market relationships*	0.2460882	-0.302084
Events Network		
- *Market relationships*	0.2121212	0.214035
- *Non-market relationships*	0.4545455	-0.244582

Table 1 – Structural analyses of the networks

Discussion

The challenges of creating techno-creative communities for territories may be to gain attractiveness, to differentiate, to develop a market, to overcome path dependency (Rodríguez-Pose & Lee, 2020; Frenken et al., 2007; Garud & Karnøe, 2001). Our questioning about the roles of brokers, places, and events in the emergence of innovative communities by combining art and technology finds several answers in the analysis of the results. It indicates that the actors have compatible heterogeneity, since they are similar on some points and distinct on others. Different actors share the same practices, but we found a dispersion of cognitive spaces, leading to the formation of different epistemic communities. This competition between approaches defended by the different communities is observed in the distinct attendance patterns of places and events (even if they share some). What the results show is the need to jointly study the bridging or bonding role of brokers, places, and events, since co-presence alone is not enough to develop techno-creative activities.

Observed social networks are fragmented, and we can see that the communities are not well connected to each other. Some links exist between the architects and few artists, though we also note that the sub-component related to events and clubs is disconnected from the main component. As a cohesive network, an integrated community does not really exist. In the phase of emergence, the underlying network of an emerging community is often disconnected and scattered (Lazer & Friedman, 2007). Ambiguity related to the more valuable choice for creators and artists (Sgourev, 2013) or uncertainty related to the economic opportunity of innovations are usual macro-explanations for this issue. Here, we come with more detailed, micro-founded explanations of the observed fragmentation, which is mainly explained by cognitive distance and symbolic borders (Nooteboom, 2007).

Techno-creative innovations require overcoming two main obstacles: the knowledge gap in the use of techniques (synthetic knowledge) and the symbolic gap associated with aesthetic values and references (symbolic knowledge). We show that, between the different communities, even if all share the same practice, the level of deep technical knowledge is not the same, and the fact that some use less advanced techniques might result in negative evaluation by others. More importantly, the aesthetics and the objectives are not the same.

Artists use it within the framework of their artistic works, and their discourse is full of artistic references. They situate this in an art world (Becker, 1982) that has pre-formed conventions, and refer to this for their productions. Mappers in clubs use mapping to enhance a festive atmosphere already created by music and lights. The aesthetic vision is therefore not the same, and a kind of symbolic border separates club mappers from the others. Thus, a competition between at least two aesthetic visions (artists and club mappers) leads to a strong social bonding within the groups but a weak social bridging. We observe distinct epistemic communities, each with its own cognitive space and homogenous knowledge bases. These symbolic borders seem to be the most difficult to cross, forbidding at the same time the possibilities to share synthetic knowledge from a community to another. In many circumstances, an excess of bonding social capital can conduct to inertia (Antonietti & Boschma, 2018) and may hinder collective action (Crespo et al., 2014). An integrated projection mapping community probably suffers from a lack of visibility in part for these reasons.

As noted earlier, there is no unified projection mapping community in this territory as there are few relationships among the three communities and a boundary between the communities' cognitive spaces hindering a collective dynamic. Yet, there is a degree of heterophily between these actors that could be optimal for the development and diffusion of innovations (Rogers, 1983). There is a certain ambiguity as to the aesthetic framework to be developed and the common standards to be adopted. The fragmented network, with distinct orientations and identities of communities, could be a pre-condition likely to spur knowledge combination and framework reinterpretation (Sgourev, 2013), potentially initiating a distinct cognitive space. As previously stated, this structural fragmentation is also the signature of an emerging knowledge field that has typified the battle of standards observed in nascent technological sectors (Suire & Vicente, 2014). The question that appears here is related to the stability or instability of this collective dynamic. For projection mapping stakeholders, for local policy makers in charge of cultural sector, for local creative and cultural industry, the answers could be divergent, and this require further investigations.

We identify several elements that could help bring these actors together to gain a level of collective legitimacy and visibility, and by doing this we add some new elements to the literature by distinguishing simultaneously the role of brokers, places, and events relatively to each other and the way they modify structural properties of knowledge networks behind innovation communities. Brokers, places, and events also participate in the formation of

cognitive spaces, in their legitimization and in the visibility of techno-creative innovations brought by the communities notably by providing a connection with peers and audience.

Brokers: the main broker we identified has been able to bridge two previously disconnected parts of the network, and is now in a structural hole position (Burt, 2004). By linking with Stereolux, she identified other mappers belonging to the artists community. As noted by Foster and Ocejo (2013), the broker position involves a complex process in which an actor may play multiple roles (connecting actors, taking advantage of their position, translating different visions) and where motivation is crucial. In this instance, she has created strategic links with those actors she considers important and whose productions are both relevant and a match for her own vision of projection mapping (i.e. those created by architects and artists) - and would probably include these people in the festival programme. Crucially, through her previous position in Montreal, she has integrated the field and created global pipelines and imports knowledge, which feed the local buzz (Bathelt et al., 2004; Storper & Venables, 2004). Beyond her structural position in the network, both her vision of the practice and her role as organizer of the festival are crucial to connecting the two main sub-components of the network, through both strong and weak ties. Through her brokering actions, she transforms the structure of the network and participates strongly in the development of the community by creating new relationships and formalizing a shared cognitive space for members of two communities. This strength is simultaneously a weakness as soon as her disappearance or a decrease in her commitment can maintain a structural status quo. Besides, it does not seem to us to be a coincidence that she belongs to the group of architects. The School of Architecture is a place where both technical (*synthetic*) and artistic (*symbolic*) knowledge are taught. Mastery of these two knowledge bases could facilitate both the other actors' understanding and the interpretation/translation of knowledge. We believe that architects, because of their training, can play a critical bridging role. More broadly, the identification of actors whose practice combines several forms of knowledge seems to be important to decompartmentalize communities that are locked into their spaces.

Places: in this dynamic, places could also play an intermediation role in this context. We have observed different types of venues, with distinct characteristics, and enabling unequal possibilities. On the one hand there are multi-disciplinary, publicly funded and highly visible places. Their programming often relies on artists whose productions interweave the artistic and technological dimensions. Because many actors attend these places for their dense *("there's*

often something to see") and varied *("you don't always know what you're going to see"*) agenda of artistic events, they have high betweenness centrality in the non-market relationships network. These places, then, are open to a wide audience that includes mappers, allowing for inter-community interactions. These types of places could thus play a crucial role in promoting face-to-face meetings and helping structure a community. Most mappers belonging to the artists community have already worked there in residency and/or performed there - but the same is not true of members of other communities, who perform in niche places. Overall, these places provide fertile ground for a community at the intersection of arts and tech sectors to emerge. But, if interdisciplinary programming with arts and technology is a necessary condition for the development of a common framework and community embedding opportunities (*bridging* role), it is not sufficient in and of itself. The maintenance of a certain heterogeneity of places is however also necessary because this is what allows less visible actors to develop niches, experimentation, and to create stronger links together (*bonding* role). This is what we can observe in the places constituting focal locations for the different communities: a local music venue for VJs; the School of Architecture is a place where current and former students meet and is the venue of the forthcoming projection mapping festival; a shared workspace of a collective of artists, and another one where artists using projection mapping work. These last two are primarily dedicated to creation, as opposed to the dissemination of projection mapping for the two others. These places are at the core of the collective PCs of the different communities. This means that this is where they regularly meet, exchange ideas, do peer reviews, and consequently form their own cognitive space. Since they are not (or rarely) attended by other communities, knowledge spillovers do not happen. We can therefore see that for innovative communities and their spaces to develop (an initial condition for cross-fertilization), there must be focal places where bonding takes place, allowing the actors who attend them to develop their own approach and expertise.

Events: events (especially the forthcoming projection mapping festival, as the other events did not initiate lasting relations between the members of the different communities) could also play an important role locally. Though it has yet to take place, relationships have already been forged as the programme has been put together. As explained above, the organization has sought to combine the artistic and architectural approaches to projection mapping, and to this end has created a programme featuring members of both communities. One could hypothesize from such an event an increase in cross-fertilization of spaces and social bridging between

communities even if, as pointed out by Wilks (2011), this structural effect is contrasted. Indeed, if existing relationships can be reinforced during a festival (*bonding*), new relationship are more difficult to build (*bridging*).

The process of drawing up the programme could also be important to the local configuration of this practice. Following the literature focused on field-configuring events (Schüßler et al., 2015), this process links the macro-dynamics of the field (regarding trends and conventions) with local individual actions (building a common cognitive space). This is all the truer given that the person initiating the festival has established strong ties with other actors in the field elsewhere. An event with an editorialized program can both orient practice in a particular direction, promoting specific aesthetics, and organize moments of encounter for creators. It also offers an opportunity to meet the audience, which can in turn foster recognition and legitimization of the genre (Grabher et al., 2008).

Overall, we note that in PCs among the sample of places and events, some places/events are attended by one community and not others, for various reasons (proximity of place of work or residence, cultural tastes, etc.). What this reveals more broadly is the presence on a territory of communities which, in their constitution, are fragmented because of the competition around different spaces. Members of these communities are therefore facing a tradeoff between attending places and events associated specifically to their community's cognitive space (*bonding* logic) and attending places where several communities intersect (*bridging* logic). The former are where innovators belonging to distinct communities can meet and benefit from cross-fertilization. In a situation of co-presence of actors who can potentially collaborate in a techno-creative practice, we show that it is both necessary to have places where niches can structure themselves and places/events whose position on the edges of two knowledge fields allows cross-fertilization. Venues and events should therefore not be thought of as only hosting artistic content, but in places that would interest artists *and* engineers. To this end, arrangements where there would be art/tech hybridization of interest to both communities could stimulate the creation of links. It is in these cases that places and events have an intermediation role. Their ability to bring together network members and complement the role of brokers, therefore, depends as much on the attending habits as on their characteristics. The following figure wraps-up the main learnings of our framework and draws some levers for action for policy makers or community managers when it comes to structuring an innovation community.

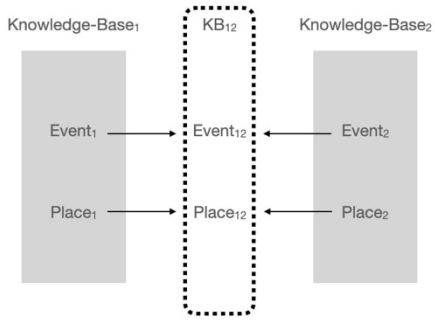


Figure 7 - Innovation Community structuring

When two different and related knowledge bases co-exist (KB_1, KB_2), we suggest that supporting ($event_1$, $place_1$) and/or ($place_2$, $event_2$) can help intra-community structuring. These are bonding strategies and help the community related to KB_1 (or KB_2) to be more visible. But we also suggest another way to structure the community by playing with bridging strategies. To this purpose, $event_{12}$ and/or $place_{12}$ can be supported since they are not natural outputs coming from rational behaviours of emerging innovators in search of legitimacy. Indeed, each member can choose to invest time, market and non-market relationships in their respective fields through places and events before attending other places/events associated to distinct fields. This must be considered if a policy maker wants to support techno-creative innovation. At best, these two strategies (bonding and bridging) might be sequential and cumulative, by first letting each community build a structure around their own focal places/events before designing inter-community places and/or events.

The literature has extensively documented the importance of knowledge broker (KB_{12}) and we suggest some new structural brokers with places and events. Obviously, it is beyond this paper to define what these boundary places and events are, but content mixing both knowledge bases are with no doubt a good start to sustain inter-community structuring. Furthermore, the interactions between knowledge brokers and structural brokers have to be investigated more deeply.

Conclusion

The literature has highlighted a strong potential for innovation at the intersection of the arts and technology sectors, but we show in this paper that the interplay of both knowledge and

related fields cannot be taken for granted. In the studied case, it does not yet take the form of an integrated innovation community, since different cognitive spaces are in competition. This fragmentation leads to some difficulties and notably those related to critical mass reaching, standardization and external attractivity.

The actors we studied share interests in a practice, with cognitive spaces that can potentially converge, and increasing social embeddedness could allow an innovation community to emerge. In addition to the role of brokers already documented in the literature, we identify the roles of bridging and bonding of places and events. These can play an important role in structuring a collective innovation dynamic, even serving as intra- and inter-community intermediation mechanisms. They allow a community to gain visibility and legitimacy. Places and their articulations in a spatialized network, therefore, appear necessary to facilitating the structuring of communities of innovation. By developing an ecosystemic vision, and given the bonding or bridging role we identified, our results echo the literature on communities and supports the need to develop places and events where actors evolving in distinct fields of knowledge can meet and develop a shared space.

How can we bring out innovation that crosses arts and technologies? Communities, places, and events are needed, but that is not enough. Brokers at the intersection of different fields of knowledge are necessary, and as such the role of architects is interesting since they manipulate both synthetic and symbolic knowledge. The role of these actors is crucial because it encompasses the embedding of distinct communities and the formation of common cognitive spaces, facilitating the exchange and combination of knowledge. This paves the way for further research on the dynamics of emerging innovative and localized community.

Bibliography

Ambrosino, C., Guillon, V., & Sagot-Duvauroux, D. 2016. Genius loci reloaded, The creative renaissance of Nantes and Saint Etienne. In P. Long & N. D. Morpeth (Eds.), ***Tourism and the Creative Industries: Theories, policies and practice***: 116–133. London: Routledge.

Amin, A., & Cohendet, P. 2004. ***Architectures of knowledge: Firms, capabilities, and communities***. Oxford, UK ; New York: Oxford University Press.

Antonietti, R., & Boschma, R. 2018. Social capital, resilience and regional diversification in Italy. ***Papers in Evolutionary Economic Geography (PEEG)***. no. 1804, Utrecht University, Department of Human Geography and Spatial Planning, Group Economic Geography. https://ideas.repec.org/p/egu/wpaper/1804.html.

Asheim, B. 2007. Differentiated knowledge bases and varieties of regional innovation systems. ***Innovation: The European Journal of Social Science Research***, 20(3): 223–241.

Balland, P.-A., Jara-Figueroa, C., Petralia, S. G., Steijn, M. P. A., Rigby, D. L., et al. 2020.

Complex economic activities concentrate in large cities. ***Nature Human Behaviour***, 4(3): 248–254.
Bathelt, H., & Cohendet, P. 2014. The creation of knowledge: Local building, global accessing and economic development—toward an agenda. ***Journal of Economic Geography***, 14(5): 869–882.
Bathelt, H., Malmberg, A., & Maskell, P. 2004. Clusters and knowledge: Local buzz, global pipelines and the process of knowledge creation. ***Progress in Human Geography***, 28(1): 31–56.
Becker, H. S. 1982. ***Art worlds*** (Nachdr). Berkeley: University of California Press.
Boix, R., Capone, F., De Propris, L., Lazzeretti, L., & Sanchez, D. 2016. Comparing creative industries in Europe. ***European Urban and Regional Studies***, 23(4): 935–940.
Burt, R. S. 2004. Structural Holes and Good Ideas. ***American Journal of Sociology***, 110(2): 349–399.
Capdevila, I., Cohendet, P., & Simon, L. 2018. From a local community to a global influence. How elBulli restaurant created a new epistemic movement in the world of haute cuisine. ***Industry and Innovation***, 25(5): 526–549.
Cohendet, P., Grandadam, D., & Simon, L. 2009. Economics and the ecology of creativity: Evidence from the popular music industry. ***International Review of Applied Economics***, 23(6): 709–722.
Cohendet, P., Grandadam, D., & Simon, L. 2010. The Anatomy of the Creative City. ***Industry & Innovation***, 17(1): 91–111.
Cohendet, P., Grandadam, D., & Suire, R. 2021. Reconsidering the dynamics of local knowledge creation: Middlegrounds and local innovation commons in the case of FabLabs. ***Zeitschrift Für Wirtschaftsgeographie***, 0(0): 000010151520200042.
Coleman, J. S. 1988. Social Capital in the Creation of Human Capital. ***American Journal of Sociology***, 94: S95–S120.
Content, J., & Frenken, K. 2016. Related variety and economic development: A literature review. ***European Planning Studies***, 24(12): 2097–2112.
Cooke, P. 2007. To Construct Regional Advantage from Innovation Systems First Build Policy Platforms. ***European Planning Studies***, 15(2): 179–194.
Crespo, J., Réquier-Desjardins, D., & Vicente, J. 2014. Why can collective action fail in Local Agri-food Systems? A social network analysis of cheese producers in Aculco, Mexico. ***Food Policy***, 46: 165–177.
Crespo, J., Suire, R., & Vicente, J. 2014. Lock-in or lock-out? How structural properties of knowledge networks affect regional resilience. ***Journal of Economic Geography***, 14(1): 199–219.
Davids, M., & Frenken, K. 2018. Proximity, knowledge base and the innovation process: Towards an integrated framework. ***Regional Studies***, 52(1): 23–34.
Foster, P., & Ocejo, R. E. 2013. Brokerage, Mediation, and Social Networks in the Creative Industries. In C. Jones, M. Lorenzen, & J. Sapsed (Eds.), ***The Oxford Handbook of Creative Industries***: 405–420. Oxford, UK ; New York: Oxford University Press.
Frenken, K., Van Oort, F., & Verburg, T. 2007. Related Variety, Unrelated Variety and Regional Economic Growth. ***Regional Studies***, 41(5): 685–697.
Garud, R., & Karnøe, P. 2001. Path Creation as a Process of Mindful Deviation. In R. Garud & P. Karnøe (Eds.), ***Path Dependence and Creation*** (Lawrence Erlbaum Associates): 1–40. Mahwah, N.J.: Lawrence Erlbaum Associates.
Gould, R. V., & Fernandez, R. M. 1989. Structures of Mediation: A Formal Approach to Brokerage in Transaction Networks. ***Sociological Methodology***, 19: 89.
Grabher, G. 2018. Marginality as strategy: Leveraging peripherality for creativity. ***Environment and Planning A: Economy and Space***, 50(8): 1785–1794.

Grabher, G., Ibert, O., & Flohr, S. 2008. The Neglected King: The Customer in the New Knowledge Ecology of Innovation. ***Economic Geography***, 84(3): 253–280.
Grandadam, D., Cohendet, P., & Simon, L. 2013. Places, Spaces and the Dynamics of Creativity: The Video Game Industry in Montreal. ***Regional Studies***, 47(10): 1701–1714.
Granovetter, M. 1985. Economic Action and Social Structure: The Problem of Embeddedness. ***American Journal of Sociology***, 91(3): 481–510.
Haas, P. M. 1992. Introduction: Epistemic Communities and International Policy Coordination. ***International Organization***, 46(1): 1–35.
Ingstrup, M. B., & Menzel, M.-P. 2019. The emergence of relatedness between industries: The example of offshore oil and gas and offshore wind energy in Esbjerg, Denmark. ***Papers in Evolutionary Economic Geography***, 19(29).
Janssen, M. J., & Frenken, K. 2019. Cross-specialisation policy: Rationales and options for linking unrelated industries. ***Cambridge Journal of Regions, Economy and Society***, 12(2): 195–212.
Jones, C., Hesterly, W. S., & Borgatti, S. P. 1997. A General Theory of Network Governance: Exchange Conditions and Social Mechanisms. ***The Academy of Management Review***, 22(4): 911–945.
Kloosterman, R. C. 2014. Cultural Amenities: Large and Small, Mainstream and Niche—A Conceptual Framework for Cultural Planning in an Age of Austerity. ***European Planning Studies***, 22(12): 2510–2525.
Lave, J., & Wenger, E. 1991. ***Situated learning: Legitimate peripheral participation***. Cambridge [England] ; New York: Cambridge University Press.
Lazer, D., & Friedman, A. 2007. The Network Structure of Exploration and Exploitation. ***Administrative Science Quarterly***, 52(4): 667–694.
Lingo, E. L., & O'Mahony, S. 2010. Nexus Work: Brokerage on Creative Projects. ***Administrative Science Quarterly***, 55(1): 47–81.
Martin, R., & Moodysson, J. 2011. Innovation in Symbolic Industries: The Geography and Organization of Knowledge Sourcing. ***European Planning Studies***, 19(7): 1183–1203.
Maskell, P., Bathelt, H., & Malmberg, A. 2006. Building global knowledge pipelines: The role of temporary clusters. ***European Planning Studies***, 14(8): 997–1013.
Nedkovski, V., & Guerci, M. 2021. When homophilous ties matter: Social network brokerage and individuals' innovative behavior. ***European Management Journal***, in press.
Nooteboom, B. 2007. Cognitive Distance in and Between COP's and Firms: Where do Exploitation and Exploration take Place, and How are they Connected? ***Tilburg University - CentER Discussion Paper***, 2007–4: 25.
Obstfeld, D. 2005. Social Networks, the Tertius Iungens Orientation, and Involvement in Innovation. ***Administrative Science Quarterly***, 50(1): 100–130.
Oldenburg, R. 1989. ***The great good place: Cafés, coffee shops, community centers, beauty parlors, general stores, bars, hangouts, and how they get you through the day*** (1st ed). New York: Paragon House.
Rantisi, N. M. 2014. Exploring the role of industry intermediaries in the construction of 'Local Pipelines': The case of the Montreal Fur Garment Cluster and the rise of Fur–Fashion connections. ***Journal of Economic Geography***, 14(5): 955–971.
Rantisi, N. M., & Leslie, D. 2010. Materiality and Creative Production: The Case of the Mile End Neighborhood in Montréal. ***Environment and Planning A: Economy and Space***, 42(12): 2824–2841.
Rodríguez-Pose, A., & Lee, N. 2020. Hipsters vs. geeks? Creative workers, STEM and innovation in US cities. ***Cities***, 100: 102653.
Rogers, E. M. 1983. ***Diffusion of innovations***. New York: Free Press.
Schieb-Bienfait, N., Saives, A.-L., & Charles-Pauvers, B. 2018. Urban Creative and Cultural

Entrepreneurs: A Closer Look at Cultural Quarters and the Creative Clustering Process in Nantes (France). In E. Innerhofer, H. Pechlaner, & E. Borin (Eds.), ***Entrepreneurship in Culture and Creative Industries: Perspectives from Companies and Regions***: 341–353. Cham: Springer International Publishing.
Schüßler, E., Grabher, G., & Müller-Seitz, G. 2015. Field-Configuring Events: Arenas for Innovation and Learning? ***Industry and Innovation***, 22(3): 165–172.
Scott, A. J. 2014. Beyond the Creative City: Cognitive–Cultural Capitalism and the New Urbanism. ***Regional Studies***, 48(4): 565–578.
Sedita, S. R., Noni, I. D., & Pilotti, L. 2017. Out of the crisis: An empirical investigation of place-specific determinants of economic resilience. ***European Planning Studies***, 25(2): 155–180.
Sgourev, S. V. 2013. How Paris Gave Rise to Cubism (and Picasso): Ambiguity and Fragmentation in Radical Innovation. ***Organization Science***, 24(6): 1601–1617.
Sgourev, S. V. 2015. Brokerage as Catalysis: How Diaghilev's *Ballets Russes* Escalated Modernism. ***Organization Studies***, 36(3): 343–361.
Storper, M., & Venables, A. J. 2004. Buzz: Face-to-face contact and the urban economy. ***Journal of Economic Geography***, 4(4): 351–370.
Suire, R. 2019. Innovating by bricolage: How do firms diversify through knowledge interactions with FabLabs? ***Regional Studies***, 53(7): 1–12.
Suire, R., & Vicente, J. 2014. Clusters for life or life cycles of clusters: In search of the critical factors of clusters' resilience. ***Entrepreneurship & Regional Development***, 26(1–2): 142–164.
Torre, A. 2008. On the Role Played by Temporary Geographical Proximity in Knowledge Transmission. ***Regional Studies***, 42(6): 869–889.
Uzzi, B., & Spiro, J. 2005. Collaboration and Creativity: The Small World Problem. ***American Journal of Sociology***, 111(2): 447–504.
Watier, M. 2018. Video Mapping in Audiovisual Performances: Projecting the Club Scene Onto the Urban Space. ***Cinergie – Il Cinema e Le Altre Arti***, 7(14): 69–82.
Wilks, L. 2011. Bridging and bonding: Social capital at music festivals. ***Journal of Policy Research in Tourism, Leisure and Events***, 3(3): 281–297.
Yin, R. K. 2014. ***Case study research: Design and methods*** (Fifth edition). Los Angeles: SAGE.

Appendix

Sample for interviews:

For this study, 22 interviews were conducted, and respondents were divided into communities as follows:

- Architects: 8 (among which 4 belongs to a collective)
- Artists: 5 (among which 3 belongs to a collective)
- VJs : 4

Additional interviews were conducted with two different types of actors: local cultural venues employees and digital art experts (4), and a musical event organizer. For these actors we used another interview guide in order to have a complementary view of the local ecosystem. This allowed us to identify actors involved in this practice, places and events where projection-mapping is regularly used, and better understand the characteristics of the territory in terms of artistic activities.

Finally, informal discussions with an artist and a member of the architects' community, and observation at an event in June 2019 were also used to attest to social relationships.

Coding of the data:

We recorded and transcribed each interview in its entirety. The interview guide is in two parts: the first focuses on the creative process (what type of technology is used, how a project is conducted step-by-step, etc.) and the second focuses on the places and events attended and the respondent's ego-network.

The questions in the first part of the interview guide were used to distinguish between different types of creative processes, and to identify explicit (e.g., "I am an artist") or implicit (i.e., aesthetic sensibilities, artists cited...) references to categories. Thanks to this and the networks of relationships of each actor, we formed the three communities: architects, artists, VJs.

The second part of the guide allowed us to gather the data necessary for these network analyses. Individuals, locations and events were anonymized for these analyses. The relationships were formatted into a list of links connecting either individuals to each other, places to each other, or events to each other. We distinguish two types of networks:

- the social network, which concerns the relationships between members of the community. We establish a link between two actors when one or both of them claims to have a market or non-market relationship with the other. In addition to interviews (where a previous relationship can be omitted voluntarily or not), we used second-hand data (social media and website pages, event schedules, performance technical descriptions) to attest to a relationship between these actors: collaboration on a project, attendance at the same event, etc.

- the network of places and the network of events. For these networks, we follow Uzzi and Spiro (2005) and consider that a link can be established between two places (or two events) if an actor attends both locations. Here again we distinguish between market and non-market relationships. For example, if an actor A attends both place P1 and P2 to do a performance, a market link is created between these two locations. To proceed, we noted for each actor which places were cited in the interviews. Thus, for each actor, we link together the different places or events he or she attends. Finally, we aggregate these data to produce the final network that will then be studied. We also used second-hand data (social media and website pages, event schedules, work descriptions) to verify and complete these data. Thus, we consider that an

individual attends a place if he is on the programming of an event, if he has exhibited in a place, if he has done a performance in a club, etc.