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Understanding the institutional innovation process through ANT highlighted by the proximities of resources

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Résumé

Les conditions d'émergence d'une démarche entrepreneuriale d'accompagnement de l'innovation au sein d'une CCI Territoriale sont étudiés, et plus particulièrement les proximités de ressources qui ont façonné le réseau d'acteurs d'un dispositif institutionnel. Celui-ci a été initié par un porteur externe qui, soutenu et contraint par un ensemble de facteurs, a construit un réseau sociotechnique pour l'accompagnement des projets d'innovation associant un étudiant, un chercheur et la PME.

Mots clés : innovation institutionnelle, entreprenariat en secteur public, théorie de la traduction, proximités de ressources.

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Abstract: This paper examines the conditions that led to the emergence of device supporting innovation for SMEs such an entrepreneurial approach within a local Chamber of Commerce, especially the proximities of resources that have shaped the network of actors in the institutional framework. This device was initiated by an external leader that was supported and constrained by a range of factors, and built a sociotechnical network support for innovation projects involving a student, a researcher and SMEs..

Key-words: institutional innovation, entrepreneurship in the public sector, Actor-network theory, nearby resources.

Introduction

The success of new products is one of the key drivers of growth for companies. This success depends on a number of factors, and in particular the way in which innovation is apprehended and managed within organizations (Gotteland *et al.,* 2007). Innovation has been the subject of numerous academic publications taking different, generally complementary but sometimes contradictory, points of view. This abundant literature does, however, point to two conceptions whereby innovation is considered either as a product, or as a process through which an idea is transformed into a good or service recognized as new. Callon and Latour (1989) developed the actor-network theory, which considers innovation as a process during which human and non-human "actants" interact, thus fostering the diffusion of innovation. In some instances, such as when innovation is disruptive, this diffusion can require or generate new institutional market rules, at which point the innovation becomes *institutional* (Di Maggio, 1988). As an example, the diffusion of photographic technique became institutional when Kodak began to be largely followed by a group of competitors (Attarça and Lassalle-de Salins, 2013). Thomas Edison diffused centralized electricity generation (Akrich *et al.,* 1988, p.6) by adapting the gas supply rules, which is characteristic of institutional innovation. In addition, innovations within institutional frameworks are also considered to be institutional innovations, in so far as they modify the rules and operating standards of one or more stakeholders and institutions.

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In order to study how the innovation process generates changes in the market environment, it seems pertinent to look at the process that makes it possible to create institutional innovations. The present article therefore sets out to understand how an institutional innovation process involving interacting actors takes shape and develops.

When an urgent need for administrative innovation emerges, the state and/or local authorities can create the necessary conditions to promote an innovative reaction to respond to it (Hafsi *et al.,* 2007). A local chamber of commerce, aware that innovation support needs to be adapted to match entrepreneurs' requirements, decided to promote the conditions for an innovative initiative aimed at Small- and Medium-sized Enterprises (SMEs). The resulting initiative is called Prim'Innov and involves a student and researcher working in tandem. This cooperation and connection between companies, local authorities and universities is not new, since it is the foundation of competitiveness clusters based on the Triple Helix concept. This concept postulates that the academic research sphere is the convergence point of the university-industry-government partnership that triggers a momentum for growth (Leydesdorff and Etzkowitz, 1998).

Prim'Innov is remarkable for several reasons: it was a first-mover in terms of innovation support for SMEs, for which it won an award in 2012[2]; it succeeded in applying in SMEs – and in a very concrete way taking a bottom-up approach – the Triple Helix model that had until then been mostly restricted to competitiveness clusters.

In as much as the collaborative dimension and network approach determine the success and adoption of institutional innovations, studying the origins of this kind of initiative seems like a good way to understand the success factors behind an innovation. The object of the present article is to study the factors that led to the emergence of a particular entrepreneurial approach at a chamber of commerce, along with the proximities of resources that influenced the network of actors involved in this institutional initiative. This case study brings an opportunity to look closely at the inception of an innovation, institutional in this case, as a social construction applying the actor-network theory enhanced by input from the network economy, and more particularly, the analysis of resource proximities. This analysis framework is developed in the first part, followed by the qualitative methodology required by this kind of framework. A third part is devoted to an analysis of the inception of the Prim'Innov initiative.

1. Theoretical framework

The concept of institution comprises different characteristics in the abundant literature on the subject. Generally, it can refer to thinking, persistent behaviour patterns, rules, normative models, informational and/or cognitive devices or public interest organizations. Institutions may be described as: "*any common reference or shared knowledge along with the influencing, constraining and reproduction devices associated with it, that make collective action possible"* and for the same authors, institutional innovation "*consists in a substantial modification of this initial ensemble, in an incremental or discontinuous fashion"* (Rizopoulos and Kichou, 2001, p. 139). The forces that come together for this kind of innovation can result from a spontaneous process generated by technical progress, by a non-intentional institutional endogenous inception, or by an endogenous evolution initiated by actors, such as the case presented in this article. Indeed, according to North (1994), interaction between institutions triggers institutional innovation in as much as it determines the opportunities within a society, organizations and stakeholder groups in order to take advantage of the opportunities thus created. Thus, it seems that institutional innovation comes closer to the meaning of innovation developed in the actor-network theory, and retained here as a process emerging within a network of *actants*[3]. The notion of the

[2] Special Jury Prize at the second university-company gatherings in 2012

[3] The term "*actant*" is associated with the actor-network theory, which postulates a symmetry

conception/diffusion of innovation is thus closely connected to the social construction of the network and to an organization's capacity to foster social interactions, negotiations and learning in order to rapidly turn innovation into development.

1.1 Collective action at the heart of the innova-tion process

Roux and Remy (2008) developed the application of ANT to marketing. It can be used to shed light on the contexts, mechanisms and devices by which a social reality, in this case an innovation, takes shape. This theory postulates that an innovation is built from successive controversies resolved as a result of operations undertaken by actors.

Akrich, Callon and Latour (1988) consider innovation as a complex, non-linear process with an uncertain future. This innovation process is a joint action based on mobilising actants (humans and non-humans) possessing varied, sometimes antagonistic, rationalities. Like change, this is an iterative process comprising a succession of unforeseeable challenges and transformations with which a series of *actants*, i.e. a network, finds itself involved. Akrich, Callon and Latour (1988) show that compromise is the fruit of joint elaboration and increasingly broad interessement that allows the network to adapt the innovation but also implement it through "*spokespersons*". The diffusion of innovation thus results from a spiralling movement of adaptations, interessement and successive enrolments of actors and actants.

ANT researchers essentially report on how human actors make alliances to carry out their project, mobilising non-humans and developing them. Thus, following the analysis framework described by Callon (1986), the innovation process can be examined in four stages:

1. Problematization: an actor analyzes a situation, defines the problem and suggests a solution.
2. Interessement: other actors become interested in the proposed solution. They modify their affiliation to a certain group in favour of the new actor.
3. Enrolment: the solution is jointly accepted as a new concept. A new network of interests is thus created.
4. Mobilisation: the new network initiates its action with a view to achieving the proposed solution.

To attain a stable relationship and reach the objective set, the actants must aim at an "*obligatory passage point*" in order to channel the varied interests into a single direction. This leads to the creation of a "*black box*" in which the translation processes act automatically without being renegotiated case by case.

Another of their major contributions involves considering objects within social dynamics, in the name of the generalised symmetry between human and non-human actants. Thus, sociologists attribute them with a social actor role just like human actors. In some cases, the object serves as an intermediate (Vinck, 1999) or mediator (Cochoy, 2002) to take part in the finalized action or in coordination mechanisms: intervening either in the time split (passage from one stage to another in the innovation process) or the social split (connection between two actors from different spheres). Star and Griesemer (1989) have in fact developed the concept of boundary objects[4]. Whereas intermediate objects (Vinck, 1999) illustrate the translation work of an actor (the innovator as defined by Schumpeter) serving as a mediation tool to enrol other actors or to stabilize the structure of the network around a socio-technical measure, boundary objects bear witness to numerous translations, as well as to the joint cooperation between the network

between human and non-human actors; between the social and the natural. Thus, in the same network, human and non-human actors interconnect and find themselves in turn at the origin of transformations and/or find themselves changed by the socio-technical network thus created.

[4] A boundary object is any concrete or abstract artefact, e.g. a deontology code.

actors. Thus, boundary objects are also subject to inertia, breaches and debates between the actors. Boundary objects on the one hand call for a more dynamic reading of the innovation process, and on the other hand make it possible to put the user back into the process.

Once objects are defined according to the perception of human actors and their use within the network, they need to be integrated into the innovation process, not as actants on the same level as human actors, but rather as resources, as suggested by Grossetti (2006). Similarly, it seems more pertinent to focus not on the actors themselves or their actual interactions, but rather on the way in which connections are created between actors, along the lines of Grossetti and Bès (2003).

1.2 Analysis framework taken from ANT and enriched by the dynamics of resource and coordination proximities

Grossetti and Bès (2003) belong to a branch of research in socioeconomics known as the "school of proximities", the aim of which is to extend the analysis made by ANT, in particular to understand how controversies are resolved throughout the innovation process. In resolving controversies, ANT examines the power games between actors and their pursuit of their own interests. Its understanding of actors remains highly rational, perhaps due to the basic postulate of a general symmetry between human and non-human actors (a move from technical aspects to scientific or social aspects involves no change in register). Consequently, actors become almost dehumanized, and reduced to interests and objectives. Yet many authors, such as (Simon, 1955; March, 1978; Olson, 1978; Giddens, 1991) demonstrated some time ago that actors possess limited rationality and, more recently, authors from the school of proximities have shown that rationality is situated. This is because actors are different and possess a margin for manoeuvre in line with their psychological makeup, the historico-social continuity, the interdependence of an individual's desires compared to those of other individuals, their organization and, more generally, the social environment in which they evolve (Pecqueur and Soulage, 1992; Pecqueur and Zimmermann, 2004).

Reproducing an individual's actions and decisions should allow us to understand the mechanisms crucial to solving controversies throughout the innovation process. Given that proximity dynamics centre on what connects actors, they should highlight what the actors rely on to resolve tensions and controversies.

The work done by Grossetti and Bès (2003) shows that the connection between actors is created by the proximities that exist between them, which can be different in nature and may concern both resources and elements of coordination.

Applied to the conception/diffusion of innovation, the proximity economy's starting point would be the innovator as described by Schumpeter. This innovator will initially attempt to form strategic pairwise alliances with other individuals (from other organizations) in order to expand the sharing and creation of knowledge and extend the network through successions of bilateral alliances. Following the example of (Grossetti and Best, 2003), the network dynamics appear to be imbued with alternate mechanisms that embed (Granovetter, 1985) and decouple (White, 2002) individuals in the network. The notion of proximity allows us to rank actor types and confer objects and mediations with a specific role in the process, as shown by the actor-network theory.

Different types of proximity exist, and the literature on proximity dynamics reveals that connections and interactions are made easier not just by actors' interpersonal history (as shown by Gotteland *et al.,* 2007) through their familiarity when working on an innovation project, but also by their proximities, which are not restricted to spatial proximity, but can extend to socioeconomic proximities (Bouba-Olga et Grossetti, 2008). Socioeconomic proximities can be split into resource proximities and coordination proximities. Figure 1 presents a fairly detailed typology of the different proximities that can be put into operation set out by (Krupicka 2013).

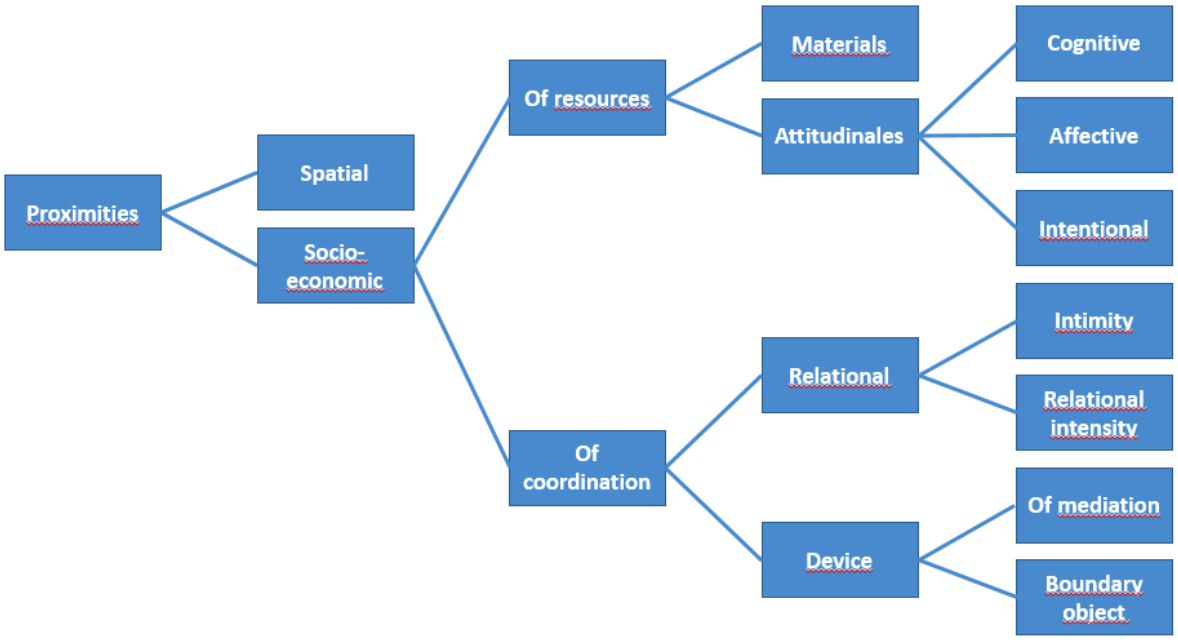

Figure 1. Typology of resources

The first step is to distinguish spatial proximities from non-spatial proximities. When talking about proximity dynamics, the most intuitive, and ostensibly most obvious proximity is spatial. Here we use the term coined by Bouba-Olga and Grossetti (2008) since it is a measure that can be apprehended in terms of geographical distance, transportation costs, and communication costs. For non-spatial proximity, we use the term adopted by Bouba-Olga and Grossetti (2008), i.e. *socioeconomic proximity*, which perfectly corresponds to the meaning of innovation as a *sociotechnical* device. This *socioeconomic* proximity can be split into resources and coordination elements.

At the level of individuals, there are two ways to evaluate what brings two people together: the first is based on an analysis of their individual characteristics, independently of the coordination possibilities at their disposal: this involves evaluating the extent to which they resemble each other or are complementary, in terms of their activities or the resources at their disposal. The second way to evaluate what brings two people together consists in analyzing what facilitates or hinders their coordination, independently from individual characteristics: this requires centring the analysis on the networks or arrangements that structure the coordination.

Bouba-Olga and Grossetti (2008) distinguish two resource proximities that may be:

1. Material, in as far as the individuals are similar or complementary in terms of the resources at their disposal (assets, income, qualifications, social status, etc.). This is standard social proximity as defined by Bourdieu.
2. Cognitive, which refers to an idea of similar or complementary values, projects, routines, conventions, etc. This proximity concerns what goes on in actors' minds and manifests itself through their actions and words. It seems pertinent to refine this concept and add to it by distinguishing three categories of non-material proximities, which we shall call attitudinal proximities:
    - Cognitive proximities: concerning beliefs, knowledge, values, traditions, habitus, etc. which are the expression of beliefs that are rooted, or even incorporated into the actor's mind.
    - Affective proximities: related to preferences, feelings, etc. based on the affective dimension of the actor's mind.

- Intentional proximities: inherent to tactics, outcomes, intentions, etc. that reveal the actor's calculated and strategic approaches.

These resources are able to structure the network by coordinating the action of the actors it comprises. In addition, these two types of resource combine together to give meaning to objects, which also then modify practices, representations and knowledge.

Bouba-Olga and Grossetti (2008) distinguish two types of coordination. The first of these is made up of social networks: the structure formed by the aggregation of personal relations influences exchanges and coordination possibilities. The position of the different actors in the network defines what they call a relational proximity. This typology can be refined by distinguishing intimacy (or familiarity according to Gotteland *et al.*, 2007), which relates to mutual knowledge, from emotional intensity, which relates to commitment; thus picking up two of the four criteria identified by Granovetter to evaluate the strength of the connection between two actors (i.e. frequency of exchanges, reciprocal services, intimacy, and emotional intensity).

The ways that social connections are built, described above, fit into a conceptual framework of the inception of these connections with a view to conceiving/diffusing the innovation. These mechanisms will be studied in the case of the conception of an institutional initiative to support innovation in SMEs. This case will be analyzed using the ANT analysis framework, enchanced by socioeconomic proximities that consolidate the network and help stabilize it, during the conception phase and first few years of existence.

2. Research methodology

2.1 Presentation of the case study

The context of the case studied and a description of the initiative are presented in box 1.

Given that the objective of this study is to examine the complexity of interactions between network actors when conceiving an initiative, the most appropriate research method is the case study (Yin, 2003); this method is widely employed and particularly suited to the analysis framework of ANT. A case study "*is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used"* (Yin, 2003, p.25). This definition makes a distinction between case studies and experimentation, history and investigation. According to the author, a case study is appropriate, "*when 'how' and 'why' questions are being posed, when the investigator has little or no control over events and when the focus is on a contemporary phenomenon*" (Yin, 2003, p. 20). Case studies are therefore a methodological choice in relation with a particular study object (David, 2005). Stake (1994) distinguishes three types of case study: "collective", "intrinsic", and "instrumental". Collective case studies involve jointly and simultaneously studying a number of cases, while intrinsic and instrumental studies concern a particular case, either with a view to establishing the lines of new theoretical foundations (intrinsic), or to explore and validate the conceptual framework used (instrumental).

French Chambers of Commerce and Industry (CCIs) are key actors in providing support to business leaders. They inform, direct, advise and help new and experienced entrepreneurs in various ways. Faced with the increasing number of requests made to French CCIs (almost 300,000 per year) and keen to improve support for entrepreneurs, in 2010 the Territorial CCI created an institutional initiative to support innovation in SMEs, called Prim'Innov. This initiative is the result of a three-party agreement between the Territorial CCI, the University and the leader of the innovation project. Prim'Innov draws from the expertise of the University's research centres and resources at regional higher education establishments to develop new SME projects in the region. With input from a qualified team (expert researchers, doctoral students, engineers, Master's students), the initiative gives participating SMEs the opportunity to undertake a 5 to 6 month study to help develop their innovations through a customized support plan.

In addition to its interpersonal aspect, Prim'Innov introduces a new type of support and in particular a new support actor, i.e. the researcher. Ben Mahmoud-Jouini et al. (2010) showed the benefits of involving researchers in business support, since they carry out an intermediate role and thus bridge the gap between the entrepreneur and the support person. This approach won the initiative a national award in 2012, when it received the special jury prize from AEF (press agency specializing in education) for university-business relations in the Research and Innovation category.

Box 1. Presentation of the support role played by Prim'Innov

The first objective is to study an institutional innovation process in the making. The nature of this study is to verify the pertinence of combining an analysis of the innovation process employing ANT with a study of resource and coordination proximities in action; we therefore opted for an instrumental case study.

In addition, to boost the validity of the different types of data collected, we take a triangulation approach (Yin, 2003), i.e.:

- Public documents designed to promote the initiative to universities, students and professionals. Few in number, these are mostly flyers and public presentation items; in total 56 digital and paper documents produced by the different actors involved in the initiative and communication dispatches were collected and analyzed.
- Interviews with the main people involved in devising the initiative: eight interviews were carried out, some in two sessions; 7 in-depth, semi-structured interviews took place with the main actors involved in the initiative; these were fully transcribed. Since the aim is to understand the role played by socioeconomic proximities in this innovation process, we employed autobiographic methodology, i.e. accounts relating the creation of this initiative, as recommended by Sanseau (2005).
- Internal documents, like summaries of all of the projects over the past year: the results of the first three financial years of Prim'Innov were studied along with the list of the 69 companies that benefited from the initiative during this period.

The triangulation of data improves the pertinence of their interpretation, with more detailed tracking of the complexity of interactions between actors and their resources during each stage of the innovation process.

2.2 Analysis of data

The first step involved standardizing the information from the three different sources. For this reason, we only selected documents that allowed us to trace the collaboration between the different entities or actants, i.e. 25 public documents. Similarly, only the internal reviews of the University and territorial CCI were analyzed. They were sufficient to decrypt all of the information useful for understanding the collaboration between the different entities and the role of the actants. The data analysis took place in three stages:

1. A thematic analysis to encode items corresponding to controversies and resource or coordination proximities identified at the end of the first analysis phase

2. A contextualisation of events, social facts and connections between actors in line with an ANT analysis framework
3. An analysis of proximities allowed us to understand how to resolve controversies raised by the preceding analysis.

Given that the processed data are exclusively textual, that a thematic interview guide (Annex 1) was used for some of the collection, and that our case study approach is instrumental, the data analysis initially involved analyzing the thematic content (Miles and Hubermann, 2003) with the aim of identifying:

1. The different actors involved in creating and diffusing the initiative,
2. The different non-human actors that played a role in the process,
3. The different controversies that emerged at the various stages or loops of the process,
4. The resource or coordination proximities mobilised.

Following this analysis of thematic content, a second reading of the documents, following the framework devised by Callon (1986) allowed us to identify the four analysis phases, i.e. problematization, interesssement, enrolment and mobilisation.

Lastly, the proximities analysis allowed us to put into perspective the interplay between on the one side, actors, and their usage of non-human actants, and on the other side, the decisive role that they played in resolving the various controversies that arose during the loops of the institutional innovation process studied. Given that the project was territorial, geographical proximity was not discriminatory in this case, and so was not studied here.

3. Results

Although this study follows facts chronologically, they are analyzed through ANT, enhanced by looking at the resource and/or coordination proximities that allowed the innovation network to develop. This structure makes it possible to understand the spiral manner in which the sociotechnical initiative is built up around controversies, drawing from resource proximities.

3.1 First controversy mobilising the first coordination resource: the concept of a "tailor-made" job

The starting point for this initiative is that we might call a "combination of circumstances". When the territory's competitiveness cluster merged with another cluster in the Paris region, a number of local people lost their jobs, including the project leader. He was therefore looking for employment in his area of competence, i.e. accompanying collaborative partnerships between major industrials and research laboratories. His qualifications included several years' experience working in major industrial companies prior to the competitiveness cluster. A need for employment emerged.

At the same time, in early 2009, the Territorial CCI, which had recently changed Managing Director (MD), created the position of Junior Innovation Project Manager with the aim of developing a support service for SMEs. A need for skills emerged, which led to the first coordination resource, which was also a boundary object, i.e. a job offer.

Although the Territorial CCI's job offer might have satisfied the project leader's need for employment, it did not give itself the means to match its ambitions: partly because it did not integrate any interaction or direct contact with the local University, and partly because the position, with a low level of skills and responsibilities, did not correspond to the profile of the project leader, who appeared to be "over qualified". This friction point, or rather mismatch between the job on offer and the job sought, gave rise to the first controversy in the conception process of the Prim'Innov initiative.

To develop the job offer to match the project leader's profile required creating a project that required his skills and that would be useful to the Territorial CCI. The project leader thus decided to devise an initiative to support innovation in SMEs. This idea was totally new at the time and one of the first of its kind.

While initiatives to support business innovation were numerous in the region and spread between various institutional actors (the region, OSEO[5], CCI, CRITT[6], etc.), they only concerned finance, rather than actual support for entrepreneurs. In addition, the plethoric number of innovation aids available to companies created "*competitive domains…. at regional level*". The observation that there were "*too few operational actors to detect companies' potential for innovation*" indicated an opportunity corresponding to entrepreneurs' support requirements: not just for their innovation projects, but also for making their way through the administrative maze of innovation aids. In addition, the project leader had noted the wealth of laboratories and courses available at the local university. Although few large-scale industrials were located locally, he had observed a significant pool of SMEs with the potential for innovation. This pool was estimated at 1,500 companies throughout the region. Consequently, the project leader put together a support initiative based on the following rationale: "*Why, despite the number of research laboratories at the university, is it so difficult to work with them? And what could we build up around the activity of our SMEs?*" The initiative's positioning was decided.

At that point, the project leader organized a meeting at the Territorial CCI to present his project. At the same time, he contacted the Vice-President for External Relations (VPRE) and the Vice-President for Research (VPR) at the University following the advice of the Regional Delegate for Research and Technology (DRRT) to discuss how to put the project into practice: "*Because for any project to work, two or three partners is better*". Actor-network theory allows us to analyze this first controversy:

Analysis phase	**Development**
Problematization	The project leader was the actor who determined the main lines of the initiative and identified the four actors, i.e. the Managing Director of the Territorial CCI, the VPR and the VPRE of the University, and the DRRT, who he had to unite around the project in order to create a job that corresponded to his qualifications with adequate remuneration.
Interessement	He then met each protagonist to present the main lines of his project and start collaborative work to design the initiative.
Enrolment	Each actor was gradually assigned with a role: the MD of the CCI became the employer of the project leader, who set up the initiative with the support of the Vice-Presidents, who helped him improve the way that the initiative operated and develop useful contacts through the human and financial means required for the project.
Mobilisation	The initiative gradually took shape until the arrival of a new controversy, i.e. the need for funds, since the support initiative also required significant financial participation from each of the actors.

Table 1: First loop of controversy in the innovation process

[5] public SME support agency

[6] Centre Régional d'Innovation et de Transfert de Technologies (regional centre for innovation and technology transfer)

To understand the circumstances that made this project possible, we examine the coordination and resource proximities that were at work in this first loop of the innovation process and that brought the four actors together:

Coordination proximities: the Territorial CCI's job offer constitutes a mediation device between two actors, the project leader and the Territorial CCI, since it allowed them to meet. Another coordination proximity of a relational type brought together the project leader and the VPR. The frequency of their meetings during this collaboration generated a relational intensity. It is worth noting here that this job offer does not constitute an *actant* in the ANT sense, but a coordination resource, in particular since it was the project leader who reshaped it. It was therefore a meeting point between the CCI's MD and the project leader, thus providing a basis for the preliminary discussion about creating the Prim'Innov initiative.

Moreover, coordination proximities (relational, relational intensity and intimacy) existed between the project leader and the DRRT, following their long period of collaboration at the competitiveness cluster.

Lastly, close relational and relational intensity coordination proximities brought together the two VPs at the University.

Proximities of material resources: this concerns the financial resources that brought together the MD of the Territorial CCI and the two VPs at the University. These material resources have the effect of involving the institutions that they represent.

Proximities of attitudinal resources: although the project leader did not know the new MD of the Territorial CCI, they shared an attitudinal resource proximity and more particularly a cognitive one – in so far as they were both aware of the shortfalls in innovation support for entrepreneurs in the region – and an intentional one through their desire to develop this missing support. In addition, attitudinal proximities brought together the project leader and the University's VPR. This is because of the proximity that developed between them during their collaboration at the competitiveness cluster. However, it was the cognitive and intentional attitudinal resources that proved crucial to constructing this project. In fact, the Vice-President for Research had initiated a similar partnership several years earlier when he ran a Master's level professional diploma (DESS), and developed partnerships between teachers/training researchers, student trainees and companies that were given support: "*The DESS offered a set-up that was fairly similar to Prim'Innov before its time*". Thanks to this partnership, the student received funds and found it easier to obtain employment, while the company gained a worker, and also an expert researcher devoted to an innovative project. After several successful years, a management change led to the demise of this type of partnership, which required significant investment and cold calling from the teaching team. Following this experience, the VPR shared the project leader's desire to strengthen the ties between the university and companies.

The closest attitudinal resource proximities are those that brought together the project leader and the DRRT. In fact, the men knew each other well, having worked together closely for three years on a research and application project involving hybrid engines for a large industrial in the automotive sector. The project leader acted as the intermediary with the I.U.T.[7], which the DRRT directed at the time. The pair therefore shared both cognitive and intentional resource proximities, and in particular affective ones, since a form of friendship developed between them.

Although the job offer published by the Territorial CCI acted as the trigger for the institutional innovation process, it appears here as a simple coordination element, as a mediation device that serves as a *pretext* for the actors' meeting and the basis for the negotiation of the project to be. This project was constructed thanks to the coordination and resource proximities that existed prior to the origins of the project. In fact, attitudinal resource proximities and strong relational

[7] Institut Universitaire de Technologie

coordination resources existed between three of the four central actors. These proximities established trust between the actors, reinforced by historico-social continuity.

3.2 Second controversy mobilising a new coordination resource and a new actor: the need for funds

The need for funds quickly emerged. Although the CCI and the University were prepared to provide some finance for the initiative, more significant funds were required to pay the project leader for his planning work, and the research laboratories and interns: "*We needed money… but didn't know where to start*". The project leader therefore looked for a new actor between the region and DIRECCTE[8]. After deliberation, he approached the latter, with the backing of the DRRT.

Using ANT, we analyze this second controversy, the results of which are set out in Table 2.

Following a three-party meeting with the CCI and the University, an application for EU funding was filed with DIRECCT: "*An application was put together and reviewed by two commissions, the second one on 8 December 2009… the work contract was signed on 22 December 2009 and the initiative was launched on 10 January 2010*". This application can be considered as an *actant* in the ANT sense since it caused the project to be better organized and structured, and imposed some of its contours. It was also an *obligatory passage point* for obtaining the additional EU funding that was crucial for this institutional innovation in the making. At the same time, this *obligatory passage point* created an irreversibility in the partnership between the three institutions, i.e. the University, the Territorial CCI and DIRECCTE.

Analysis phase	Development
Problematization	The project leader decided to integrate a new actor into the innovation process, DIRRECTE, with the DRRT's backing.
Interessement	He asked the DRRT to introduce the project to get the attention of the DIRRECTE's director.
Enrolment	DIRRECTE was given the role of official financer of the project; planning and set-up was the responsibility of the Territorial CCI through the intermediary of the project leader and the University through its laboratories.
Mobilisation	The initiative gradually took shape until the emergence of a new controversy, i.e. the need to mobilise researchers and interns to work on an initiative to support innovation in local SMEs. In fact, the entire initiative and the conditions for its success depended on them: they were the main actors.

Table 2. Second loop of the innovation process

Like in the first loop of the innovation process, coordination proximities and additional resources allow actors to resolve this controversy and move the project forward:

- Coordination proximities: in addition to those identified in the first loop come relational coordination proximities concerning the relational intensity that existed between the director of DIRRECTE and the DRRT who worked in the same building: "*I presented the project to what was then DRIRE* (former name of DIRECCTE)*, which was located on the floor above me*". Coordination proximities also played a decisive role in the pursuit of the project. While the application for EU funding constitutes an actant and an obligatory passage point, it is also a boundary object

[8] Regional directorate for companies, competition, consumption, work and employment

that provides an opportunity for the different social spheres of actors involved in the project to meet each other. Thus, the Prim'Innov initiative started to take a more formal structure. In addition, the DRRT also constituted a coordination proximity by playing the role of mediator between DIRECCTE's director and the project leader (who himself became a mediation device).

- Material resource proximities: as mentioned above, this involves financial resources that brought together the Territorial CCI, the University and DIRRECTE, which *ipso facto* became contractually bound partners.
- Attitudinal resource proximities: As the DRRT pointed out: "*He needed to be prominently visible to companies, and this project appealed to him, he wanted it, so I let him have it*". Thus, intentional resource proximities brought together the project leader and the director of DIRECCTE.

The funding application, as a coordination device, constituted a *boundary object*. Its collaborative process reinforced ties, while triggering a set of translations that boosted the project's development and made it more accomplished. At the same time, this *boundary object* paved the way and explicitly formalized the collaboration between the three parties, engaging these actors in a project in the making and thus creating an *irreversibility* in the innovation process. The funding application, with its constraints and limitations, is an *actant* that structures the collaboration between these three institutions.

The initiative was mobilised thanks to the coordinating mediation of the DRRT, who maintained strong attitudinal resource and relational coordination proximities with the project leader, as well as intense relational coordination proximities with the director of DIRECCTE. These last two actors had each developed a degree of trust in the DRRT and, consequently, met trustingly with a shared desire to initiate an unprecedented, high-impact project for innovation in SMEs. Their collaboration was thus facilitated by this human mediation.

3.3 Third controversy: how to encourage researchers and students to collaborate with companies

As ideas on how to build the initiative started to take shape, a controversy started to emerge connected to the active, voluntary participation of academics, the lynchpins of the Prim'Innov initiative. The support work required from university researchers corresponded more to planning than to research in the strict academic sense. The question thus arose of how to involve researchers and intern students in the initiative. This element is crucial in as far as the whole initiative depends on the action and work of these two categories of actor with SMEs. This saw the emergence of the notion of payment for interns, and funding of university researchers' personalized research, in place of remuneration, on a per diem basis. Nevertheless, this compensation did not appear sufficient to motivate the researchers to participate in the programme.

Another point is worth discussion, i.e. the identification of skills and resources at the University that correspond to the companies' various needs. To achieve this, a new position was created at the University to work in tandem with the project leader; the candidate in mind was a former I.U.T. collaborator responsible for corporate relations and thus familiar with research laboratories and companies.

Analysis phase	Development
Problematization	The project leader and the academic actors decided to include a new actor in the innovation process: a company relations coordinator. They also integrated two new actors, who, although not consulted or present, were considered in the project's development, i.e. researchers and interns.
Interessement	A position totally devoted to the Prim'Innov initiative was created at the University. Discussions were held on how to involve researchers and students in the initiative.
Enrolment	The project leader and the coordinator worked together to plan the set-up of future applications to join Prim'Innov. One of the pair was to promote the initiative to companies, while the other took care of the university and intern side. The researchers were to accompany entrepreneurs and supervise interns, who would provide advice to the companies. The interns would remain at the heart of the support process for SMEs, under the wings of a researcher, who would devote one tenth of his or her work to the initiative for the duration of the internship.
Mobilisation	The initiative slowly continued to take shape until a new controversy arose, i.e. how to ensure that other institutions accept the initiative so that it finds a place among existing initiatives, which SMEs nevertheless view as unsatisfactory.

Table 3. Third loop of the innovation process

Few new coordination or resource proximities appear at this stage of the innovation process:

- Coordination proximities existed already: both relational in terms of relational intensity, and intimate, between the project leader and the coordinator recruited by the University, due to their long period of collaboration at the competitiveness cluster.
- Material resource proximities are strengthened between the Territorial CCI and the University in as much as their employees will work together on preparing the Prim'Innov initiative.

The project leader's partner now took on the role of *spokesperson* for the initiative at the University's different research laboratories, with the project leader acting as *spokesperson* and promoter of the initiative to companies, as well as accompanying entrepreneurs on their innovation projects. Here once again, material resource proximities, as well as relational coordination, played a decisive role, essentially in the interessement and enrolment of the project-leader's partner, but also in facilitating the resolution of this controversy.

Getting to know and convincing the researchers called for an academic familiar with both the way that laboratories operate and entrepreneurial issues. To promote the initiative to companies and find eligible projects for support, Prim'Innov needed a coordinator from the CCI who was familiar with the regional economics and the problems of developing and financing innovation. More important still, these two people needed to be able to work together, which is why it was essential to choose individuals who shared professional relational proximities.

3.4 Fourth controversy: how to win the support of other institutions offering aid to innovating companies in the region

Before the official launch of Prim'Innov, some resistance became apparent from other institutions in the region, resulting in a final controversy in kicking off this initiative, i.e. how to lift the barriers created by other institutions offering aid for innovation in the region.

The study region is characterized by a lack of coordination between institutions (absence of a Regional Innovation Agency), and a form of competition between them. To gain the support of these different institutions, the members of the Prim'Innov network decided to create a Regional Innovation Committee (CRI) comprising the Territorial CCI, the University, DIRECCTE, the Regional Incubator, OSEO (public SME support agency) and the Network for Technological Development. The role of this committee is to select and steer the different projects applying for support from Prim'Innov. It decides whether companies are eligible for the Prim'Innov initiative or for another type of innovation aid. In addition, it guarantees the good management of support for innovation at SMEs and improves regional institutions' knowledge of applications since they work together to accompany the SMEs, overriding their competitiveness.

The CRI can be considered as the *obligatory passage point*, since it constitutes the focal point for each actor in the network with a view to helping them achieve their personal objectives. The director of DIRECCTE, the project leader and his academic partner pursue a common objective, i.e. to encourage the other regional institutions to support the Prim'Innov initiative; the regional university incubator wants companies to benefit from incubating such an initiative, thus extending their services; OSEO finds an advantage in keeping up to date with future projects likely to apply for funding.

Analysis phase	**Development**
Problematization	This involved the creation of the CRI and the new actors integrating the network, who accepted to play a consultation role in steering applications for the Prim'Innov initiative. Only the director of the Network for Technological Development refused to sit on the CRI, considering that the initiative was in competition with his action on the territory.
Interessement	One representative from each institution offering support to SME innovation was solicited to participate on the CRI.
Enrolment	Each Prim'Innov application must be examined by the CRI to judge the reliability of the requestor and whether the initiative corresponds to the SME's needs, and to allow the different institutions in the region to work together.
Mobilisation	The initiative can therefore be tested on SMEs developing an innovation or transformation project.

Table 4. Fourth loop of the innovation process

At this stage of the project, the proximities mobilised are essentially:

- Coordination proximities for initiatives coming under this CRI, which is not just a *boundary object*, but leads competing institutions to collaborate and make compromises on innovation projects that they evaluate together in a single session, rather than obliging the entrepreneur to make several applications to these different institutions.
- Cognitive and intentional attitudinal resource proximities through a common mission to support SMEs in their innovation projects. Resource proximities are also mobilised since a single application is assembled and examined by all of the institutions acting in a single commission: this involves sharing knowledge, and even creating knowledge.

This final controversy led to the finalization of the initiative by constituting the appropriate sociotechnical conditions for its development and diffusion. Given the particularly competitive

local context, the actors relied on resource and coordination proximities as well as attitudinal resource proximities – mostly cognitive and intentional – in order to rationalize a partnership that may have seemed *counter intuitive* given the circumstances. In addition, one of the arguments for getting actors interested and involved was the sharing and creation of knowledge on the subject of local innovation projects.

Thus finalized (as shown in figure 2), all that remained was for the project leader to *market* the initiative to companies, and for his academic partner to *promote* it to researchers at the University and course directors, in order to broadly disseminate the initiative to its targets, i.e. SMEs, Master's students and lecturer-researchers.

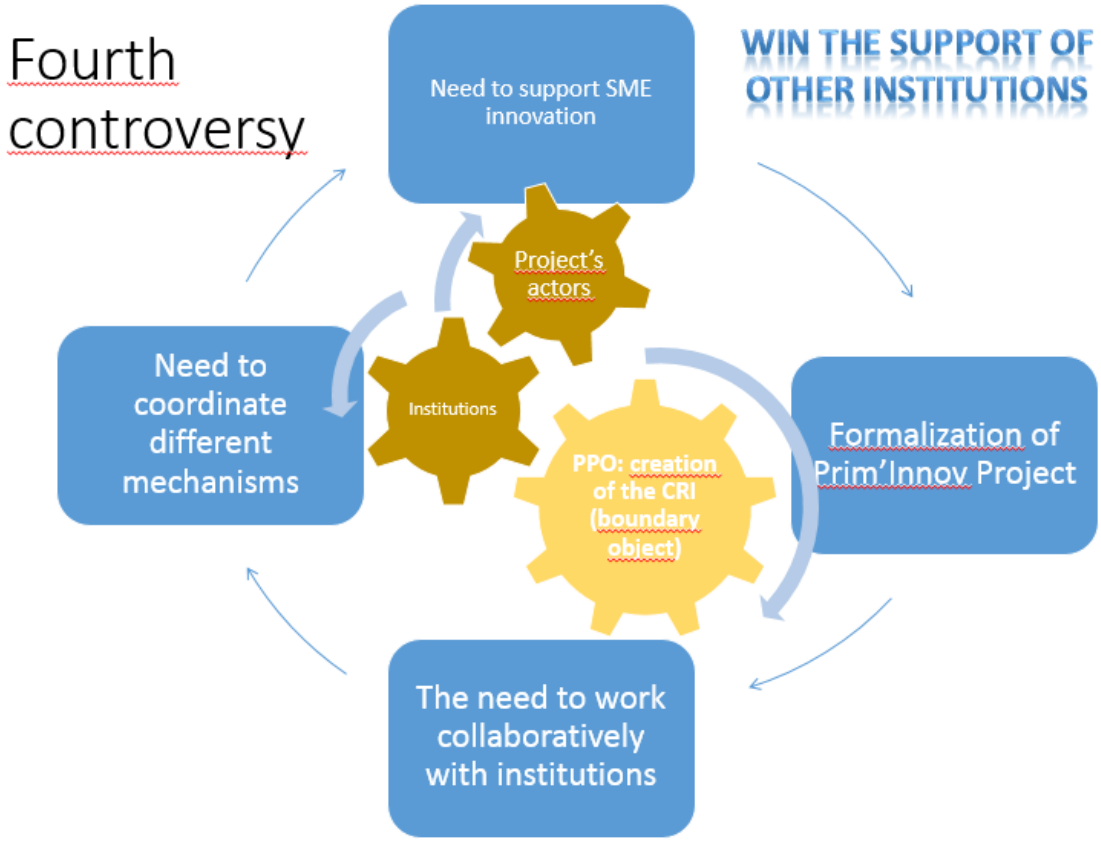

Figure 2. Finalized sociotechnical initiative

4. Discussion

The institutional innovation process studied develops in a spiral pattern, in which each loop is marked by the resolution of a new controversy that allows the project to evolve and expands its network. In line with the postulates of actor-network theory, this non-linear process leads the actors to:

- Adopt new behaviour: through personalized support and accompaniment for entrepreneurs, from identifying their needs to adopting the most appropriate support solution;
- Create new operating modes: through collaborative work involving the CCI and University coordinators; through the concerted work of institutions that usually compete to select and steer application projects;
- Create new knowledge: through the establishment of this institutional initiative, its operational modes and the creation of a CRI;

- Establish the appropriate social context for devising, and in particular diffusing, innovation.

The main contribution of this case is the fact that it illustrates the importance of proximity resources, both in devising an innovation and in creating the social context necessary for its diffusion, in particular for collaborative projects. Indeed, in inter-company collaborative projects, socioeconomic proximities play an essential role in the creation and consolidation of the network as a sociotechnical device. These resource proximities are fundamental during the first few years of the project, especially until it gains legitimacy and overcomes the social ties of its origins in order to solely follow a market path and pursue its development.

The results of the present study can be viewed in relation to the pitfalls inherent to the design of the research followed. Given that it involved an *a posteriori* study based on interviews (real-life accounts), some phenomena may emerge such as: rationalization *a posteriori*, selective memory of events, and simply the actor's subjective view. The comparison of the different interviews and the triangulation of data do, however, minimize these pitfalls.

Like all research, this work includes a number of limitations that open up new research perspectives. Firstly, the institutional innovation studied here results from an endogenous development initiated by actors; however, other cases of institutional innovation may arise, such as a spontaneous process generated by technical progress, or a non-intentional institutional endogenous inception, as identified by Rizopous and Kichou (2001). It would be interesting to study these other forms of institutional innovation to identify the forces at work, the controversies that arise, and the role of resource proximities in resolving them during the process.

In addition, the context was crucial to this process and it is worth verifying whether the spiral pattern and the role of proximities predominate in different contexts.

Proximities shed light on the mechanisms at work in resolving controversies and indicate the conditions for the success of this initiative. However, they could possibly lead to failure in some cases. Some perverse effects of these proximities could emerge. In particular, in the case of affective proximities, which can lock actors into a "role game" that makes it impossible to resolve controversies through irreversibility leading the process to a stable situation and success. Or on the contrary, some irreversibilities could crystallize the position of actants and lead to failure, due to a duty of "loyalty" to these proximities.

Another remarkable element in the present case is the essential role played by the project leader. He acted as a genuine institutional entrepreneur in as much as he was able to "*manipulate the elements in his environment*" (Pesqueux, 2011, p. 9) to devise a strategy for organizational change. Driven by a need for administrative innovation to counter the deficiencies of the existing initiatives in the eyes of entrepreneurs, he was able to bring together the conditions for the Prim'Innov initiative to emerge. It thus appears relevant to look closely at the figure of the institutional entrepreneur in a future research project.

Lastly, with the aim of generalizing the results obtained, and given that the process of devising and diffusing the studied initiative was extended during the first few years of its existence, and continues to develop, it would be interesting to adapt the methodological design to carry out an embedded case study. This would be a means to reconstitute the different facets and loops in the innovation process, as recommended by Muscat (2006).

Conclusion

Without any previous intention, the actors involved in this project fostered the emergence of a "triple helix" model: the Prim'Innov initiative sprung from a combination of specific needs and means to resolve a certain number of controversies between the three helices, i.e. the University, industry, and the government. Indeed, the project was born from a need to make up for the shortfalls of existing initiatives to support innovation in SMEs, from several key actors' experience of collaboration between companies, local authorities and universities,

and from the immersion experience of the intern/researcher tandem in the company of one of the key actors. As the project made progress, it was necessary to draw on these resource and coordination proximities, the foundations of which lay in the competitiveness cluster, thus facilitating the mimetic behaviour of solutions proposed to resolve the successive controversies that constituted a territorial innovation system. Employing the systemic approach of spatial economics, we illustrated the "non-passivity" of the territory, which became "*a tightly sprung system of actors"* (Moine, 2007, p.39) whose capacity to anticipate or react depends on the fluidity of the information circulating within this system, and that fluidity is optimized by the implementation of different resources.

This case is a good illustration of the spiral innovation process that is initially based on a core group of actors that bring together significant attitudinal resource and relational coordination proximities. This core then draws on mediation devices to extend the network to other actors before developing devices at the social boundaries of new actors in order to get them interested and enrol them in the innovation network, based on the actors' common objectives and despite their different interests. Given that it involves a collaborative project between actors who have engaged their organizations, this kind of process can be found in any institutional innovation process, in particular innovations at the origins of new markets, for example pioneers.

Lastly, we can affirm that this territory has created a trajectory of its territorial innovation system that has given rise to an "*innovative environment*" (Aydalot, 1986), which is a genuine "*combination, on a given geographical area, of companies, training centres and public or private research units involved in a partnership approach with the aim of identifying synergies around common projects of an innovative nature*" (Uzunidis, 2010, p.100).

In terms of managerial implications, this case study reveals that it is difficult to elaborate institutional innovation without drawing from a network of existing proximities. This points to the need to involve actor networks on the territory and construct a strategy for managing them. It also requires encouraging bottom-up approaches that, when they meet with top-down approaches (e.g. from the state), maximize their chances of gaining a foothold in the territory and thus of succeeding.

Drawing from socioeconomic proximities should make it easier for territorial managers to remedy shortfalls and deficiencies rather than superimposing another, redundant initiative in the territory, which would feed into the multiple layers frequently criticised by practitioners and observers of public policies.

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Annexe 1

Guide to Prim'Innov institutional interviews

Aim: To study the origins of the Prim'Innov initiative and how it fits in with regional, national and European initiatives (in the Science/Industry relation)

Themes	Further investigations
1) Context: Could you start by telling me a bit about the context in which Prim'Innov was created…	Historical, Political, Economic, Institutional, Legal, Who was involved in the project?
2) Why: What was the challenge at the time?	What were the needs?
3) Process: Can you tell me how it happened from your point of you?	Different stages, Critical points (controversies) The role of the actors, and more generally the actants
4) Interactions with other initiatives: Other institutional initiatives existed, and still do. Could you tell me how Prim'Innov fits in with these other initiatives?	At national, regional, European levels…
Prim'Innov today: How would you sum up Prim'Innov's achievements today?	Results Challenges Possible calling into question

Annex 2

Sample of people interviewed at the start of the Prim'Innov initiative

Institution	Position in 2010
Ministry for Research	Regional Delegate for Research and Technology
University of Poitiers	▪ Director of Poitiers IUT ▪ Vice-President for Research at the University of Poitiers ▪ Vice-President for External Relations at the University of Poitiers ▪ Company Relations Coordinator at Poitiers IUT
Chamber of Commerce and Industry of the Poitou-Charentes Region	Prim'Innov project leader
DIRECCTE	Head of Enterprise Economy Employment Division