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# How Can the Governance of the French Clusters (Pôles de Compétitivité) Improve SME's Competitiveness?

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## Abstract

This paper focuses on Pôles de compétitivité—the French competitiveness clusters (FCC)—which mobilize national and regional actors and resources for innovation. By reviewing the literature (academic, web and news articles, and official reports) published on the subject, the synthesis emphasizes a collective learning process leading to institutional change reflected by legitimization of SMEs as full-fledged innovation actor. Through reflexive governance of certain poles, centered on their own sustainability, the policy has produced learning at local and national level. It has generated knowledge that has brought transformation of operational tools and societal representations in support of innovation of SMEs. The originality of the article is to show that in the French societal context, new place dependencies within the Pôles are characterized by emergence of a new innovation model of SMEs mainly through collaboration with public research. This model differs from the innovation model of SMEs staying outside of the poles. It is built through intermediary organizations that offer regional filters for national and regional policy adaptation. A major limitation of the policy is the difficulty to enhance cooperation between innovative SMEs and leader firms in the territory mainly because of a lack of social regulation over the protection and share of knowledge assets. The paper contributes to the research on clusters in general.

## Keywords

Clusters, Competitiveness, Cooperation, SME, Knowledge, R&D, Innovation

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## 1. Introduction

The policy of French pôles de compétitivité (FCC) was launched in 2004 with an

officially announced strategic goal “to strengthen the industrial potential of France, to create favorable conditions for the emergence of new competitive activities and thereby to improve the attractiveness of local territories and to prevent de-localisation. The FCCs have the legal status of non-profit organizations defined by the French law of associations (1901). They have official governance bodies which are typically composed of an advisory board, and an executive board, including facilitation team, employed full time. Each cluster has defined its development strategy and organized actions that stimulate the emergence of collaborative research. Many clusters operational governance have been very innovative in their facilitator and local planning role. Typically, projects that emerge within the FCCs involve at least two enterprises and one research center. Specifically, it aims at supporting public-private R&D collaboration, paying specific attention to cooperation between small-sized enterprises and other actors of innovation (Barthet & Thoin, 2009).

At the national level, the FCC policy is conceived and managed by an operational center at inter-ministerial level (Interdepartmental work group<sup>1</sup>), with representatives of national bodies anchored in all regions (DGCIS, DIRECCTE).

The official label<sup>2</sup> of “Pôle de compétitivité” was delivered by the State to self-organized regional initiatives according to consistency of their strategic theme and target with historically anchored specialization. The FCC policy builds on structural reforms introduced since the eighties to maintain competitiveness of the French industry on globalizing markets.

The FCC policy seeks to overcome fragmentation and limits of technopoles and local productive systems. It distinguishes itself from these initiatives with respect to several aspects: 1) it supports cooperation and innovation at regional level around industrial or service specialization themes, 2) it is more coercive from the point of view of inclusion of diverse stakeholders (large companies, SMEs, public research, education and training, territorial authorities) 3) the FCC foster and preselect collaborative R&D projects to apply for national funding through calls for projects, 4) regular evaluation of the performance is part of the policy itself; 5) the policy is negotiated and planned between regional and national authorities in the French decentralization setting; vi) the FCC offer facilitating services, such as networking, information, emergence of project ideas or preparation of proposals.

After over 15 years of existence, a number of empirical studies assessed the

<sup>1</sup>The GTI includes the ministries and agencies involved in supporting the pôles: different ministries (planning, industry, research...), OSEO innovation—a private company representing the public service by the principle of subsidiarity, which supports employment and growth in French SMEs, the National Research Agency (ANR), the Caisse des Dépôts Group—a “public group serving general interest and economic development”, working directly with territorial decision-making authorities and local partners, Representative for the economic security and a group of qualified persons. At the third phase of the policy (2013-2018), regional governments have become directly integrated in the steering process and are present in three new coordination bodies: orientation committee and piloting committee at the national level, and coordination committees at regional levels.

<sup>2</sup>This also differentiates these organizations from the Canadian clusters.

direct impact of the policy of the FCC on individual firm performance but the results seem to be controversial. We believe the controversy arises from static approach in the policy analysis which does not grasp dynamic transformations occurring at different levels of policy making and strategy of actors. The fundamental limit is to search immediately for short-term individual performance without accounting for cluster formation and life-cycle and its articulation with evolving (or not) coalitions in territories. A dynamic analytical approach is needed to grasp co-evolving learning of diverse actors that may be spurred by the policy. Accounting for dynamics is important as it will potentially bring to the forefront transformation process of inherited industrial structures and emergence of new actors, coalitions and behaviors. More specifically, as the French industrial model has not considered medium-tech SMEs as full-fledged actors of innovation, the interest would be to understand how the FCC policy impacts their industrial position, legitimacy and innovation strategies.

The objective of this article is to describe how the FCC policy supports the repositioning of innovative SMEs in their relations with large enterprises—main contractors and with public research. To achieve this, the paper uses an analytical framework mixing approaches in political science on stakeholders with regional science focusing on localized dynamics and diversity of clusters in the same country. The article goes beyond the statistical vision of policy effects by providing analysis of interactive learning between three levels: centralized, de-concentrated and decentralized governments, intermediary organization and innovative SMEs. The theoretical model of the paper offers insights about how multi-level learning leads to changes in industrial structures and to creation of new place dependencies. The originality is to show that in the French societal context, new place dependencies are marked by the emergence of a new innovation model for SMEs and are built through intermediary organisations.

The article uses the results of selected scientific literature that provides empirical analysis of the French FCC policy: quantitative, mixed and qualitative studies published since the beginning of the policy. Institutional reports conducted at national and regional levels complement academic contributions and contribute to the evaluation of the FCC policy. The paper contributes to the research and analyses on clusters in general.

The rest of the paper is organized in the following way. Section 1 presents the analytical framework and Section 2 is connected to this by presenting results of the research which are then discussed in Section 3. Final conclusions are presented in the last section.

## **2. Analytical Framework**

This section provides an analytical framework to understand how the innovation model of the French SMEs has evolved through multi-level interactive learning. First, we present the structural conditions of the French innovative SMEs at the beginning of the FCC policy. Then we introduce the concepts of governance and

meta-governance in a cross-disciplinary perspective in order to analyse co-evolving learning of meta-governor at central and regional level, of intermediary organizations and of SMEs.

### 2.1. Societal Path Dependency of French Innovative SMEs

The post-war French industrial form of organization is not similar to that of the “third Italy” or that of the Gunbelt industrial organization in the United States. In France, SMEs have traditionally been recognized not as an actor of innovation nor as an actor directly contributing to productivity and growth. They have been positioned in post-war societal and economic division of labor characterized by several forms dependency.

First, technological SMEs have been vertically integrated with the parent companies of the French major enterprises located in the Paris (Ile-de-France) region to meet the new political, scientific and strategic orientations to build the French nation. Large enterprises used to take part in strategic choice and definition of public orders underpinning scientific and technological research with senior officials and directors of the main public research centers (CNRS, CEA, INRIA, etc.), mainly in the military sector. This type of organization is what various authors call mission-oriented R&D (Thèves, Benedetto, & Larédo, 2007; Foray, 2002; Verdier, 2006; Dosso, 2014).

Second, SMEs remain isolated from public research, rather supplying locally established production plants of large firms as atomized industrial sub-contractors. This situation is referred to as inter-firm Taylorism: the large firm gives very detailed specifications for the job that needs to be done, and the subcontractor executes. This established model of industrial production, shared between employers and employees’ unions was based on mass production by large, vertically integrated corporations to guarantee flexible specialization and competitiveness in an increasingly volatile post-Fordist economy (Salais & Storper, 1993; Tremblay, 2017).

Third, starting from mid-80s, forms of territorial models of innovations in some regions, like the Technopoles and Localized Production Systems have emerged and have been in the focus in evolutionist and regional science research. The Technopoles were locally managed organizations for high technology development dedicated to promoting high tech companies and R&D organization on a well-defined and located specific area, inspired by the well-known Silicon Valley and Road 128 experiences. However, authors pointed out that local authorities lacked strategic vision and focused on providing cheap and aesthetic industrial buildings in attempt to attract either a large public research unit or a subsidiary of a large multinational company. In this sense, this policy was rather seen as a new form of urban space management than an innovation support device. The localized micro-networks were mainly structured around allogenous nationalized and multi-national large firms creating spin-offs and went through rationalization of centralized State programs; Inter-firm relations tended to be rare, while

spontaneous relations between SMEs and public research existed only in Grenoble, rather seen as a French exception (*ibid.*). Furthermore, Technopoles were in most cases disconnected from the traditional local industrial basis historically considered as non-innovative, thus producing an effect what some authors called “high tech cathedrals in the desert” or isolated high tech firms. In short, the Technopole policy device did not create agglomeration effect (Krugman, 1991) and “cross-fertilization” for high-tech firms, including SMEs, while there were some experiences of collaboration in training or other activities (Scott, 2000; Thorelli, 1986; Rhéaume and Tremblay, 2020).

Later, the policy of Local Production Systems was launched in 1997 to support collaboration between enterprises of the same territory and promotion of resource pooling between SMEs (training, marketing, and technology transfer). The effect of the SPL policy on firm performance is reported as non-significant in quantitative studies (Duranton et al., 2010; Martin et al., 2011), while qualitative studies highlight the effect of trust building in these French style “industrial districts” (Tremblay, 2017; Tremblay et al., 2016). The French apparel industry evolved from hierarchic relations in localized districts to horizontal collaboration between SMEs connected to globalizing networks to maintain competitive advantage.

The limits of these territorial models of innovation can be better understood when one takes into account complex and historical relations between firms and the social structures and institutions of particular localities (Tremblay et al. 2016; Tremblay, 2021). Additionally, local dependencies should be analyzed in broader national innovation systems, especially in States where government action is dominantly exercised at the central level. The French peculiarity is local spatial structuring as a result of different cumulative processes. For example, Technopoles emerge under strong local impulse of political personalities who seek support and resources from the central government while strategic development of new technologies and distribution of related resources continue to be centrally defined. This is also the case of Local Production Systems, which are supported by DATAR—a decentralized governmental body in charge of territorial development designed to support declining industries and focused on technological transfer and not on support for innovation and R&D capacities of SMEs. More generally, the regional governments still define their development strategy under the authority of the representatives of the central government in regions. They have low legitimacy with respect to local governments and undergo the competition for territorial attractiveness between regions and between territories within the same region.

Thus, the Technopoles and the Local Production Systems policies could not evolve into regional innovation systems (Cooke & Morgan, 1998; Cooke, 2004; Edquist et al., 2004; Asheim et al., 2005) to take advantage of cooperation for innovation at the regional level while connecting to global networks through local and regional planning and support. These results are consistent with the main

postulates of evolutionary economic geography arguing that spatial patterns are deeply embedded in processes laid down in the past and that uneven spatial distribution of resources in the past shapes future growth and, subsequently, diverse evolution patterns (Boschma & Lambooy, 1999). The FCC policy inherits from the path dependency of the arms-length relationship between larger firms, technological SMEs and public research and multi-level institutional organization. In this context, under what conditions is it possible to deconstruct the established societal trajectory? We postulate that the concept of governance and meta-governance sheds light on processes of rule negotiation and collective learning that progressively lead to construction of new interactions between the actors of innovation.

## 2.2. Regional Governance and Meta-Governance in Clusters

In defining the concept of governance and meta-governance, we establish an analytical continuity between investigation of industrial dynamics in regional studies on the one hand and on the other state administrative system and its evolution. This interdisciplinary perspective brings to the forefront the dynamic relationship that may exist between the central state policy and the innovation potential of regions (Asheim, 2001; Asheim et al., 2005).

Regional studies address the issue of public policy mainly at the regional level and uses the notion of governance in the sense of regulation by market, firm or public-private network, for example, (Cooke & Morgan, 1998) or borrows the definition from political science, where the approach is to discuss how combinations of institutional dimensions, organizational characteristics of firms and organizational dimensions of policy governance impact the innovation or creative potential of regions and firms (Motaghi and Tremblay, 2018). The role of the State policy is considered through the description of the degree of autonomy of regions at an infrastructural level. Less autonomous clusters and networks are associated with a higher support role of nation states (Cooke, 2004). Rodríguez-Pose & Comptour (2012) highlight the limits of State policies of clusters if adequate social (education, demography) and more general economic conditions (R&D, investment) are not in place to support the transition from a cluster of firms into a regional system of innovation. Hence, an adaptation in policy-making is needed for the different types of clusters and regions. Following this approach, clusters may become a key policy tool in support of regional innovation if they are in the center of regional innovation systems. From this viewpoint, national policy is often considered as given and hardly adaptable to regional specificities. Political science literature shows that actors of policy network can better identify policy problems, imagine innovative solutions, and negotiate flexible responses to the complexity and variety of conditions (Tremblay, Klein and Fontan, 2016). However, networks may present weaknesses: joint-decision traps or inefficient decision-making capacity, lowest common denominator policy outputs or the potential to reinforce dominant powers. Using a case study of Australian

organic farming policy network, Daugbjerg and Fawcett show that in the absence of state steering, the networks characterized by a very loose construction and contested relationship among members have failed in producing production standards and norms for domestic market. Also, it appears that industrial actors in South Korea specialized in textile locked in a commonly shared strategy of traditional production and mercantilist entrepreneurship, harshly opposed State intervention aiming at industrial renewal. In the case of the French industrial relations, few historical industrial actors present in regions seem to have a dominant position in the definition of regional strategies, investment, or adaption of professional education with respect to their industrial needs (Gadille, Méhaut, & Courault, 2013).

Thus, the main issue in the French societal context is to bring dynamics to regional industrial networks which are used to hierarchical relations at regional level and top-down industrial nation state policy, even if the latter is now conducted in a decentralized context supported by the European policy (Hancke, 2002).

Political science literature could help address this issue with the critical discussion about the concept of governance. In contrast to governments which traditionally entail centralized, top-down decision-making, governance is associated with network arrangements. It is seen as “the reflexive self-organization of independent actors involved in complex relations of reciprocal interdependence, with such self-organization being based on continuing dialogue and resource-sharing to develop mutually beneficial joint projects and to manage the contradictions and dilemmas inevitably involved in such situations. Governance organized on this basis need not entail a complete symmetry in power relations or complete equality in the distribution of benefits” (Jessop, 2003: p. 101). Governance networks require some basic regulation in order to function efficiently, and the State is seen as the most appropriate mediator, institutional designer, and integrator.

Beyond governance, meta-governance regards the changing nature of state—society relations and the empirical reality (or lack thereof) of pure network governance, particularly in the French context. Arguing that self-coordination is not sufficient and the state has to steer and secure coordination in governance, Jessop is one of the first scholars to offer the term “meta-governance” to capture how political authorities organize and manage network governance structures. This process is also referred to as governance “in the shadow of hierarchy” (Scharps, 1993) cited by Jessop (Jessop, 2003: p. 109). This metaphor describes state establishing “the ground rules for governance and the regulatory order in and through which governance partners can pursue their aims” (Jessop, 2000: p. 24). The meta-governance of networks is seen as a way to attaining the benefits of network governance, while averting its potential drawbacks, by retaining some degree of hierarchical control. In the innovation support policy area, such new forms of state—society relations represent new challenges for national in-



stitutions (Lundvall, 2002).

There has been increasing focus on how policy makers and public managers can improve the overall functioning of governance networks through meta-governance. The interactive school of governance puts an emphasis on softer tools for steering governance networks, whereas relational or state-centric scholars stress the role of hierarchical authority of the State over semi-state and non-state actors. However, the question of how public authorities can learn from and through the actors of governance networks has received scant attention. In the French context the question is how state managers can learn about meta-governance when working at centralized (ministerial) level and at deconcentrated (Government regional agencies) levels where they negotiate with territorial communities. Examination of this learning process is important to understand how the central State FCC policy can create bifurcation in societal path-dependency and transform place dependency of French clusters. In relation with the position of the French SMEs, the deconstruction of the historical paradigm of industrial organization would therefore be associated with legitimization of SMEs as a full-fledged actor of innovation.

### 2.3. Multi-Level Learning in the FCCs

To analyse how the transformation of the industrial position of the French SMEs and of place dependency occur, we postulate that three kinds of learning occur in the FCCs: 1) learning of the meta-governor from and with the actors of the governance network, including representatives of SMEs; 2) learning of the FCCs as intermediary organization in the governance network, and in particular of the operational management team of the FCCs; 3) within the governance network, learning of SMEs to build new opportunities to innovate.

- *Learning of meta-governors about SMEs in the FCCs*

We propose to specify three dimensions of learning of the meta-governors both at centralized (ministerial) level and at deconcentrated (Government regional agencies) level, borrowing from the stream of literature discussed above.

We suggest the two key dimensions include a reflexive orientation objectified by regular re-assessment of the extent to which current actions are producing desired outcomes and a negotiated and diversified repertoire of strategies, concepts and models to adjust “in the face of failure and turbulence in the policy environment” (Jessop, 2000: p. 31).

Related to the first dimension, the steering function of meta-governor is to define the ground rules for network activity, to organize and coordinate interactions and to rebalance power differentials (Jessop, 2000). Related to the steering function, is the function of accountability. Government is accountable for public policy before the electorate and is empowered to control and supervise the network actors. This reflexive orientation seems to be present in the FCCs: they are steered by the State through strategic roadmaps and performance contracts. Strategic roadmaps to define industrial positioning and performance contracts

are signed between the FCCs and State representatives and must clearly state the objectives and actions necessary for cluster's development as well as implementation schedule and indicators for monitoring their achievements. Steering is informed and adjusted with two processes. The first process is built on informal and formal meetings and reporting between the meta-governors at centralized (ministerial) level and at deconcentrated (Government regional agencies) level. Two representatives of public authorities—one from the central Government representatives in regions and one from regional governments—are members of the advisory board in each pôle. Information flows and confrontation of points of view is thus possible through this policy network. The second process is built on assessment procedures performed by independent private agencies and researchers. The assessment methods include quantitative and qualitative surveys<sup>3</sup>; the assessment criteria are co-constructed with the pôles and their members (BearingPoint SAS France; Technopolis; Erdyn, 2012). The policy is evaluated regularly; this was done in 2008, in 2012, and a new evaluation is ongoing.

The second dimension of negotiated and diversified repertoire is associated with democratic decision making and legitimacy function of meta-governor. Democratic decision making implies that government enhances democracy by including the voice of multiple stakeholders, who may be outsiders as, for example, French innovative SMEs operating in regions, and promoting compromise. Government can foster democratic legitimacy of governance networks—the credibility of their role in the policy process—by facilitating their transparency, fair process and effectiveness. In the case of the FCCs, our focus is on transparency, fair process and effectiveness in relation with innovative SMEs. It is important to analyze the role of intermediary organizations, which contribute to innovation and local development (Klein et al., 2020; Tremblay, 2017), object of the next section.

- *Learning of the intermediary organizations*

Theoretical contributions highlight provision of resources to bring together various actors who are not used to collaborate and who do not have the same level of legitimacy. This can be done by government given the depth of its resources and access to large professional bureaucracy. In the case of the FCCs, provision of resources relies on regional intermediary actors who have access to localized knowledge about place dependency and various identities. Within the learning region framework, Asheim (2001) also underscores the importance of “institutional thickness”, that is new forms of organization promoting innovative activity based cooperation and learning about cooperating, to ensure capability of self-organized learning (Dalum et al., 1995) and favor learning at loca-

<sup>3</sup>An online survey of members of the pôles was exploited to measure the results from the standpoint of its direct beneficiaries. It mobilized more than 5500 respondents. In addition, the activity, performance and dynamics projects in each of 71 clusters were studied. More than 1500 interviews were conducted with the animation teams and members of the pôles during field visits. Interviews with actors participating in the policy conception were conducted: 175 at regional level (regional authorities and State services) and 75 at the national level (ministries, agencies, enterprises, research organizations).

lized levels.

The FCCs can be understood as superstructures, whose objectives are to coordinate the flow of information to substructure firms or as innovation brokers facilitating co-production of technology and technology transfer (Ben Hassen and Tremblay, 2019; Tremblay, 2017). The FCCs can be assimilated to regional institutions that provide “surrogate ties” that substitute “bridging ties” lacking in firms within innovation networks (Ben Hassen and Tremblay, 2019; Tremblay, 2014). In line with Asheim (2001), the FCCs are also new forms of organization with employer-employee relations whose financial sustainability partially relies on knowledge intensive business services. These are related to coalition development for innovation and enterprise performance in the network. Their sustainability and performance are thus bound with their members’ satisfaction and with the performance assessment of the State and some issues related to work (Shearmur et al., 2021). Finding solutions to the double constraint in the position of intermediary constitutes a self-reflexive learning through trial and error. At a broader regional and national level, we assume that the FCCs are able to build regional innovation systems in France if they are able to transform SME’s social position. Conditional to this, patterns of rules must integrate peculiarities of French innovative SMEs. More specifically, the IP protection is an important issue for SMEs, to sustain their business, especially in asymmetric industrial power relation context.

- *Learning of innovative SME*

Cluster’s inherent dynamics, like internal and external linkages Markusen (1996) and former relationships (Nooteboom, 2000) explain the global performance of clusters. A cluster’s life cycle partially depends on sector specificities and regional specificities (Doeringer & Terkia, 1995). In the French case, the FCCs were built on industrial relations structured at the national level through industrial and military planning since the 50s and industrial decentralization policy of the 80s that partly hybridized with previous territorial specialization dynamics at the regional level (Gadille & Machado, 2010). Before the launch of the FCC policy, there was no negotiation space between SMEs, large companies and academia in the French regions. There was weak collaboration between SMEs and public research institutions and high education institutions (Verdier, 2006) and concentration of funds distributed to a few selected “national champions” (Callon & Ferrary, 2006). Technological and process innovation in SMEs was underestimated and overlooked, except operating in selected sectors at the edge of technology (Younès, 2011). Not surprisingly, the beginning of the life-cycle of clusters that the FCC policy aimed to develop was marked by a weaker ability of SMEs to access state funding relatively to dominant actors of innovation, independently on the composition of the FCCs (Gallié, Glaser, Mérindol, & Weil, 2013; Tremblay and Yagoubi, 2021).

Various authors highlight that asymmetries between agents could be a key to understanding the formation of clusters and the management of technological

innovation (Lorenzoni, 1990; Markusen, 1996). International literature on clusters says little about the effect of the presence of large firms positioned as leaders in the formation of clusters or the role of public R&D organizations and universities on decision of SMEs to join a cluster or not, and engage in R&D collaboration. For SMEs, entering an asymmetric partnership, in terms of different size, but also in terms of different power, management, capabilities and organizational culture, is a challenge. Innovation and learning in small firms belonging to traditional sectors goes hand in hand with mundane day-to-day operations such as resource management, logistics, production organization, marketing, sales or distribution.

In asymmetric in R&D and buyer-supplier collaborations, the protection of knowledge assets of SMEs by informal (e.g. trust) and formal safeguards (e.g. contracting) is challenging (Hurmelinna et al., 2005). Unlike SMEs in biotech clusters where patent is a widespread source of knowledge protection, the majority of SMEs tend to deal with tacit knowledge (Olander et al., 2011). SMEs entering pôles face a trade-off between incentives to make knowledge explicit to orient and benefit from cooperation in collaborative R&D projects and vulnerabilities to knowledge protection created by the intimacies of exchange. Even SMEs which have continuous R&D activities, also with public research and universities, are reported to have difficulties in building their skills in IP management in collaborative context and in protecting output of their R&D effort. They rather consider that trust, communication and complementarity of objectives and activities are key factors for development of long term collaborations (*ibid.*, p. 38).

By providing financial incentives for research-industry collaboration the FCC policy is supposed to open opportunities for SMEs to collaborate and innovate (Tremblay, 2020, 2021; Wijesiri et al., 2020). But without a strong collective identity there is a risk for them to remain a dominated actor at the regional level in the policy making and coalition arrangements. The real effect of the public incentives is thus dependent on the capacity of SMEs to seize and rebuild collaboration and innovation opportunities while expressing their voice in the representative bodies of the pôles and through building their capacity to meet and to collaborate with actors with whom they are not used to collaborate. The learning of SMEs co-evolves with learning of the intermediary organization and that of the meta-governor. The effective role of clusters in strengthening regional competitive advantage relies on learning of these actors in building localized capabilities such as specialized resources, skills, institutions and common social and cultural values.

Using the theoretical input and debates presented in the various sections above, we present two propositions to guide the reading of the next sections of this article on the FCCs.

**Proposition 1:** *The FCC policy designed as meta-governance of governance networks enables learning of meta-governor and intermediary organization about*

*specificities of SMEs through day-to-day interactions and increased legitimacy of SMEs in the new localized spaces of the pôles.*

**Proposition 2:** *The FCC policy creates new opportunities for innovative SMEs to transform their innovation strategy. Creation of opportunities is underpinned by learning of SMEs to create new coalitions for innovation and evolution of social norms dealing with inclusiveness of coalitions and with IPR protection.*

Having presented the theoretical underpinnings of the article in the various sections above, especially as concerns the cluster literature, governance and co-operation issues, the next section presents the result of our analysis of the FCC policy.

### 3. Results

The results exposed here are based on the study of published qualitative and quantitative data—official reports and documents, scientific contributions, books, theses and “grey literature”. They are presented following a narrative and interpretivist approach to understand the evolution of collective behaviors, practices and beliefs against the background of tradition.

The effect of the new mode of governance introduced by FCCs on the SMEs’ position is analyzed focusing on the nature and the evolution of governance. The article then discusses a new emerging model of place dependency of SMEs, in relation with the institutional change to which the FCCs have contributed.

#### 3.1. Governance and Learning in the FCCs

The policy coordination process is organized into phases, with periodical and external assessment, mobilizing bottom up processes of quantitative and qualitative data collection. Parallel to its sanction function, it also intends to create conditions for institutional learning about and from policy actions, for policy readjustments. Phase 1, from 2004 to 2008 is defined as a “Project factory” with the main focus on the emergence of R&D collaborative projects. To reach this objective, each pôle has set a development strategy and actions to stimulate emergence of multi-party cooperative research. Typically, projects that emerge within the FCCs involve at least two enterprises and one research center. The second phase, running from 2009 to 2012 is defined as “Enhancement of the innovation ecosystem and support to enterprise growth”, based on results of the first assessment exercise. Between 2005 and late 2011, over 3000 R&D collaborative projects were subsidized via this policy.

- *Phase 1 (2004-mid 2008): Learning about R&D project factory.*

The meta-governance structure of the FCC policy comprised several actors who had divergent vision about innovation at national and regional levels. The vision of the central State agencies and Ministries, and in particular, Directorate-General for Competitiveness, Industry and Services (DGCIS) to orient the policy towards creation of cooperation between large companies—system architects and their potential “technology providers”. Alternatively, the decentralized

actors, in particular regional authorities, supported by the Interministerial Delegation of Land Planning and Regional Attractiveness (DATAR, former DIACT) insisted on the support for innovation articulated with territorial networking and anchorage (Tremblay, 2014). Spurring regional and territorial dynamics through innovation meant support to SMEs as key players. Tense discussions at the meta-governance level led to acceptance of the DGCIS to open the FCC policy to more diverse types of SMEs, not only high-tech SMEs. At the same time, the decentralized actors who were initially constrained to fund the projects with no possibility nor competences to select R&D projects of interest for regional development could negotiate their position. They progressively acquired expertise and took a more active position in the selection process of submitted R&D projects. Overall, the regional and local authorities allocated 750 million euros in 2005-2011 to the project of territorial and regional interest, additionally to State funds available through the FUI.

Indeed, through discussions in the thematic groups (gathering cluster members to make emerge collaborative R&D projects) and the assessment process of R&D projects, it became clear that SMEs were much more diverse in terms of their innovation models. The first group comprises “science-based” SMEs—spin-offs from academic research, which have already been recognized as “technology providers” which showed resilience to relocation by performing incremental product or service innovation (Gadille, Méhaut, & Courault, 2013) (Gadille & Valette, 2012). The second category is composed of “engineer-based” SMEs, that is SMEs relying on innovation activities conducted by engineers and highly-skilled technicians (*ibid.*). The third group of SMEs are traditional subcontracting SMEs, like industrial mechanic, whose know-how relies mainly on quality, precision and reactivity of execution, some of which perform incremental product or service innovation (*ibid.*). These diverse SMEs bring diversity of knowledge and know-how and bring new opportunities for innovation in clusters and have needs in support for innovation processes which differ from the needs of large companies.

First, with no or little knowledge of the academic world, SMEs had limited human and financial capacities to take part in the activities. For example, although SMEs accounted for 85% of enterprise members, they were only 23% in Advisory Board & Executive board over the first policy period (DIACT, 2008: p. 25). Abundant financial support via FUI and ANR to attain the policy objective of “Project factory” was reported by SMEs and start-ups as ill-adapted and even prohibitive for their participation in 2 - 3 year long collaborative R&D projects (DIACT, 2008: p. 24). Although the subsidy rate of SMEs involved in a R&D projects was raised to 45% (compared to 30% for other companies), in 2005 the funding allocated to them accounted for 28% of the total amount of subsidies to enterprises (Marcon, 2008: pp. II-15). This observation created codified knowledge and incentives for further policy measures to support participation of SMEs in the FCCs and in collaborative R&D.

The facilitation teams initiated a set of measures, documented in the first phase assessment report (**Table 1**).

The reform of the R&D tax credit in 2008 was also performed in this context. Industrial Innovation Agency funding, mainly beneficial to large companies, was reformed into Innovation Stratégique Industrielle<sup>4</sup> (ISI) in 2008 and centered on supporting collaboration between SMEs and academia. A further tax reform conducted in 2009 introduced a tax reduction of social security contributions charged to enterprises employing personnel involved in research over a period of 72 months<sup>5</sup>.

The first policy phase also showed the degree of diversity of the industrial networks to favour continuous emergence of collaborative R&D ideas. We can distinguish three industrial configurations within the FCCs, based on results of case studies. The first configuration is clusters organized around one dominant actor (a large company or medium-sized enterprise) in one specific industry (**Marcon, 2008, pp. II-16**). Such an “anchor firm” acts as an expanded strategic center, with sub-contracting SMEs gravitating around and integrated into its value chain: PNB<sup>6</sup> (**Fen Chong, & Pallez, 2008**), S2E2<sup>7</sup> (**Chabault, 2011**), PASS<sup>8</sup> (**Mendez & Bardet, 2008**), and PFEIL<sup>9</sup> (**Fulconis & Joubert, 2009; Messenghem & Paradas, 2009**). As an example, in the S2E2 cluster, STS Microelectronics holds the central place. Besides hosting the cluster’s animation team and providing many resources (material and immaterial), the company is active in various governance positions (President of the Council of Foresight and Strategic Orientation, Vice-president of the Board) (**Chabault, 2011: p. 46**). In the second configuration, clusters are constructed as more expanded networks, composed of 2 or more very active large companies and numerous SMEs, originally mainly sub-contractors of one specific system and evolving towards diversification. In this configuration, the FCCs become spaces of hybridization of different value chains where SMEs’

**Table 1.** Measures in support to SMEs participation in R&D projects, in 2005-2008.

Specific tools to integrate SMEs into R&D projects	41 out of 71 FCCs
Mapping of active innovative SMEs with potential to integrate collaborative projects	43 out of 71 FCCs
Mentoring SMEs/large companies	9 out of 71 FCCs
Support to SME capitalization	31 out of 71 FCCs

Source: (**DIACT, 2008: p. 66**).

<sup>4</sup>Retrieved from

<http://blog.usinenouvelle.com/innovation/financement/pourquoi-si-peu-de-candidats-au-programme-isi-d%E2%80%99oseo/>

<sup>5</sup>LOI No. 2009-1674 of December, 30 2009, art. 59,

[http://www.impots.gouv.fr/portal/dgi/public/popup?espId=1&typePage=cpr02&docOid=documentstandard\\_5753](http://www.impots.gouv.fr/portal/dgi/public/popup?espId=1&typePage=cpr02&docOid=documentstandard_5753), accessed on December, 10 2016.

<sup>6</sup>Pôle Nucléaire Bourgogne—Cluster specialized in nuclear energy located in the Bourgogne region.

<sup>7</sup>Science et Système de l’Energie Electrique—Science and Electrical Power System.

<sup>8</sup>Pôle specialized in perfume, aroma and fragrances.

<sup>9</sup>Pôle specialised in agrifood industries.

develop technologies for one sector and adapt them to other sectors (Marcon, 2008). For instance, the following FCCs, SCS<sup>10</sup> (Gadille & Pelissier, 2009), (Mendez (dir.), 2008), Mer PACA<sup>11</sup> (Mendez (dir.), 2008), Pégase Aviation and Space (Gadille, Méhaut, & Courault, 2013), System@tic<sup>12</sup> (Corbel et al., 2011), (Younès, 2011), Cosmetic Valley<sup>13</sup> (Chabault, 2011) cover different industrial value chains offering opportunities for technological adaptation and market diversification.

In the third configuration, a small number of clusters gather numerous SMEs whose innovation strategy is not based on formal R&D research: Arve-Industries—covering complex machining and mecatronics sector (Boquet et al., 2009), Imaginove—gathering video games and movie production enterprises (Boquet et al., 2009).

At the end of the first period the FCCs were assessed with respect to a set of criteria, including number of collaborative R&D projects, dominance of founding members in governance structures, integration of SMEs, scope and diversity of research and facilitation activities. The results of the first assessment highlighted that FCCs configured around one dominant actor and narrowly focused on its industrial specialization and FCCs mainly consisting of SMEs performed poorly or had difficulties in creating “project factories”. Empirical case studies have also shown that too homogenous and vertically integrated networks or too heterogeneous and horizontally specialized networks encounter deadlocks in developing collaborative projects. In highly vertically integrated clusters narrowly focused on the historical markets of dominant lead firms, innovative SMEs had difficulties to be recognized as providers of assets offering market and research diversification (Gadille & Pelissier, 2009; Messenghem & Paradas, 2009; Fen Chong & Pallez, 2008; Chabault, 2011). In the diversified and heterogeneous clusters, composed mainly of SMEs, large firms’ orders are lacking to orient SMEs’ business diversification through innovation (Boquet et al., 2009).

With relation to the emergence of collaborative projects, the facilitation teams of the FCCs learned to organize and facilitate working sessions to elaborate ideas of R&D projects. They also learned about the importance of other events to make collaboration emerge, for instance, networking and negotiation sessions between clients and sub-contractors or planning vocational training for R&D and technical personnel. These activities have become part of the service offer of the pôles, as part of self-financing revenues.

The outcome of the first policy phase for the metagovernor is learning about the necessity of policy adjustment to orient the second phase. The policy scope was enlarged to construction of innovation ecosystems, including, to support innovate capacities of SMEs.

<sup>10</sup>Solutions Communicantes Sécurisées—Secured Communicating Solutions specialized in micro-electronics, telecommunications software and multimedia.

<sup>11</sup>Mer PACA—cluster specialized in maritime security and safety, ship and nautical industry, marine energy and biological resources, environmental and coastal management.

<sup>12</sup>Cluster specialized in software and complex information systems.

<sup>13</sup>Cluster operating in the perfume sector.



- *Phase 2 (mid 2008-2012): from project factory to innovation ecosystem building*

Using the best practices benchmarked during the first phase, the meta-governor introduced strategic roadmaps and performance contracts in 2008 to orient the action of the FCCs towards: 1) further inclusion of SMEs 2) redefinition of the specialization of the FCCs towards more open research agendas, inter-regional and inter-FCCs cooperation. Additionally, growth contracts were signed between the FCCs and SMEs to accompany them in growth strategies, more conducive to their implication.

The second phase was marked by a larger definition of innovation, opened to organizational and marketing innovation. Consequently, additional innovation support activities and support to commercialization of innovation were strengthened. At the national level, recommendations were issued to enhance actions favorable to new opportunities for SMEs and to secure their innovation process. Following recommendations of the first assessment report, the FCCs set up additional actions, including adapted financial schemes for innovation in SMEs, support to international development and actions dealing with skill provision and intellectual property.

To meet the evolving needs of engineer-based and traditional SMEs in training of engineers to collaborate with technicians to innovate in day-to-day activities by testing, prototyping and experimenting, professional training and long-life-learning schemes were transformed in the first phase and further developed in the second phase. Provisional skills management was still assessed as under-developed, although significant progress has been made compared to the first policy period (BearingPoint SAS France; Technopolis; Erdyn, 2012, p. 50). A number of clusters have experimented programs aiming at enhancement of design skills and technical competences through territorial employment and competence management schemes<sup>14</sup> (Gadille et al., 2013; Calamel et al., 2011; Defélix et al., 2008). This process has contributed to a better knowledge and recognition of the specificity of SMEs to sustain their position in collaborative research.

Starting from the end of the phase 1 and during the second phase, policy actions addressing the intellectual property rights issue have been implemented. In collaboration with the National Industrial Property Institute (INPI), the policy makers issued the IP guide for clusters in 2008, addressing IP protection issues in a generic way (DGE, 2008). The DGCIS—General Directorate for Competitiveness, Industry and Services—one of the piloting organizations of the policy and the INPI signed an agreement defining the support of the INPI to the clusters on May 18, 2009<sup>15</sup>. At the end of 2012 policy makers issued a specific guide addressing collaborative R&D difficulties involving SMEs and public research

<sup>14</sup>GTEC—gestion territoriale des emplois et des compétences—territorial management of employment and provisional skills.

<sup>15</sup>Retrieved from

<http://competitivite.gouv.fr/un-ecosysteme-des-poles-pour-favoriser-l-innovation-et-la-croissance/la-propriete-industrielle-pi-313.html>

and universities, rather than large companies (INPI, 2012).

Local authorities and regional authorities learned to become more active in the meta-governance of the FCCs, also thanks to increased financial autonomy created by the new Contract for Projects between the State and the Regions (CPER) 2007-2013. The European logic that stresses the need to balance the aims of cohesion and competitiveness further strengthened the legitimacy of the regional and local support to competition and the attractiveness of place; the promotion of sustainable development; and social and territorial cohesion, including via the FCCs (*ibid.*). This became especially relevant in the second phase of the policy focussed on innovation ecosystems. Regional and local authorities provide about 40% of support, financial or in kind, to the intermediation and facilitation function of the FCCs.

Although the central state actors are increasingly sharing responsibility with regional and local authorities, they remain dominant in the policy orientation, shape and steer the trajectories of the FCCs. For example, in the region Rhône-Alpes, the contracts between the central State and the region are oriented towards support of the life science cluster and the FCCs Lyonbiopôle, Minealagic and the microelectronics sector in Grenoble. The regional local authorities have the possibility to select what projects to fund but only among projects that have been pre-selected by experts at the central level (Younès, 2011). In the context of the State shaping the innovation ecosystems, two French regions, PACA and Rhône-Alpes launched a regional policy of FCCs aiming at supporting clusters that are strategically important at regional and local levels but not in the focus of the central State.

In sum, the construction of the regional innovation eco-system depends on choices and vision of political elites operating in regions and territories and on the degree of their coalition with the central State. In some regions, coalitions between the clusters composed of big players operating in global value chains, the State and regional and local authorities focus strengthening competitiveness as the top priority. In other regions, regional and local authorities tend to balance the central State elitist strategy by providing support to FCCs to achieve more social and territorial cohesion and territorial attractiveness.

### 3.2. Emerging Model of SMEs Tied with Public Research

The policy and ecosystem transformation created opportunities for SMEs to change their strategies towards more collaboration with other actors of innovation. SMEs seized this opportunity to build new collaborations for innovation but their strategies were still embedded in inherited industrial structures. That is to say, from the social reliability viewpoint, they tended to collaborate with public research actors, themselves evolving towards more collaboration, partly under the effect of the policy.

Public research and educational institutions were given financial incentives to perform more in collaboration with private partners and valorisation of research.

Even though project-based funding still represents a relatively small share of State support to public research and education, between 10% and 14% of total funding (Cour des Comptes, 2013: p. 13), it has been marked by an increasing share of project-based funding, to allocate financial resources to priority topics and most competitive teams (*ibid.*). The financial incentive for academia to integrate the FCCs was carried out by ANR, which allocated 1.3 billion of euros to R&D collaboration of public research with enterprises (two thirds of which go to public research institutions), additionally to 1.5 billion made available from FUI, in the period from 2005 to 2013<sup>16</sup>. As a result, according to the second phase assessment report, nearly 70% of public research and educational institutions declared they created new partnerships with SMEs located in the same territory, compared to 50% with regards to large companies (BearingPoint SAS France; Technopolis; Erdyn, 2012: p. 135). As a spill-over effect, the National Scientific Research Center (CNRS) has launched Enhanced Partnership SMEs-Research Program (PR2) consisting in selling patents to SMEs at a low price, involving a risk-sharing mechanism for SMEs. Universities created subsidiaries for acceleration of knowledge transfer from academia to enterprises (mainly patents)—SATT—, which also take part in FCCs. According to estimates, the PR2 program produced 43 CNRS-SMEs agreements between the end of 2011, the year of the launch of the program, and end of 2012<sup>17</sup>.

The institutional changes created new financial opportunities and network, legal and employment facilities offered by the clusters' facilitators for SMEs to innovate. Involvement of SMEs in collaborative R&D projects has evolved over two periods, as reported by two indicators: the share of SMEs in funding allocation and the share of SMEs among R&D partners.

The share of SMEs benefiting from allocated funding increased from 25% in 2005-2007 (DIACT, 2008: p. 32) to almost 37% in 2008-2011 (BearingPoint SAS France; Technopolis; Erdyn, 2012: p. 84). The share of SMEs among R&D partners increased from 25% in 2005 to 30% in 2006 and 2007, as a result of actions proposed by the competitiveness clusters to encourage SMEs participation.

These results converge with recent statistical studies (Bellego & Bernadet, 2014; Arrighi, 2014) and contrasts with controversial findings about the low effect of the French competitiveness cluster policy on enterprise performance (Fontagné et al., 2013, Martin et al., 2011). This allow us to state that the enhancement of formal institutional change favorable to SMEs, in coherence with cultural change (informal institutions) has led to a structural transformation of the innovation model of SMEs, which is a major transformation.

The study by (Bellego & Bernadet, 2014) focused on the impact of the policy of performance on the population of enterprises. More precisely, these are small (i.e. employing less than 250 employees) and mid-sized firms (i.e. employing less

<sup>16</sup>Retrieved from

<http://www.agence-nationale-recherche.fr/suivi-bilan/editions-2013-et-anterieures/valorisation-par-tenariat-et-competitivite/poles-de-competitivite/>

<sup>17</sup>Retrieved from

<http://www.lenouveleconomiste.fr/lesdossiers/louverture-du-cnrs-aux-pme-16438/>

than 5000 employees investing less than €16M in R&D). On average, the yearly relative effect of being a member of a cluster over the period between 2006 and 2009, compared to a similar enterprise outside of clusters, resulted in:

- Total R&D expenditures 76,000 euro superior to similar firms not members of the clusters;
- R&D direct public funding 30,000 euros higher;
- Credit d'Impôt Recherche (R&D tax credit) 33,000 euros higher and 11% more of the tax use;
- Increase of 0.7% of employment devoted to R&D.

The total effect of participation in the French clusters for this type of enterprises totals 400 million Euros of additional expenditures in R&D for the period of 2006-2009. These expenditures did not substitute R&D sub-contracting between enterprises. Finally, the FCC policy incentives did not create losses.

The statistical results indicate that *in order to differentiate from competitors, a group of small firms integrate the FCCs to cooperate with public research and education and competitors. They create more horizontal links within and outside of the territory. These are again two major results.*

Using Eurostat Community Innovation Survey 2012, (Arrighi, 2014) focuses on innovation in SMEs belonging to FCCs in three regions<sup>18</sup>. The study highlights the existence of two innovation strategies SMEs: to stay outside of clusters and to collaborate with other actors, which also tend to stay outside of the clusters or to join a cluster to collaborate with public research and educational institutions.

Among the group of SMEs that do not belong to a cluster only 28% develop their innovations through cooperation. Outside of the clusters, the most common partnerships are built with suppliers (30% of ties), clients (15%), consultants (5.5%) or other companies within the same group (28%). Competitors (5.5%), public research and higher education (16%) are less frequent partners (Arrighi, 2014: p. 3). At the same time, enterprises members of a French cluster cite higher education and public research laboratories as the main R&D partners (37%). Cooperation with clients (16%), with enterprises of the same group (12%), suppliers (12%) competitors (14%) and consultants (9%) are far less frequent (Arrighi, 2014: p. 3).

These results are similar with the analysis of factors conducive to R&D cooperation of French SMEs undertaken by (Olosutean, 2011), on the basis of the Community Innovation Survey 2004-2004. SMEs which have had prior R&D cooperation or who have outsourced their R&D activity are more likely to engage in collaboration with universities, public research organizations, consultants and competitors. When SMEs run innovation activities that do not rely on machine and knowledge acquisition, they are likely to collaborate with consumers, consultants, universities and public research laboratories (Olosutean, 2011: p. 201). Lack of internal or external financial resources and excessive innovation

<sup>18</sup>Pays de la Loire (including Nantes agglomeration), Rhône-Alpes (including Lyon agglomeration) and Provence-Alpes-Côte d'Azur (including Marseille and Nice agglomerations).

costs push SMEs to cooperate in R&D with public research organizations and universities (Olosutean, 2011: p. 202). Moreover, several contributions (Olosutean, 2011; Conseil Régional Auvergne, 2009; Bretagne Développement Innovation, 2008) advocate enhancement of R&D ties of SMEs with academia and other industrial partners as a mean for their internationalization.

Integration of SMEs into the clusters and into collaborative R&D has unveiled the complex issue of equitable sharing of the results of collaborative mode of knowledge production and commercialization (Gomez, 2008). The survey on intellectual property conducted by INPI and DGCIS in 2007 highlights great disparities and inequalities between highly structured large groups having their own model contracts in their favor, and other private or public actors. Cluster members are reluctant to communicate knowledge, techniques, contracts and tend to keep information secret (INPI & DGCIS, 2008). Younès shows that patents and published articles are indicators of excellence in academia; thus, it is difficult for public researchers to agree to give up their right to intellectual property (Younes, 2009). The tension also arises from the non-recognition by industrial partners of generic knowledge base of public researchers and of their capacity to define problems in terms going beyond the specific professional jargon of each company (Younes, 2009: p. 15). For industrial companies, an actor is eligible for shared ownership if he produces a part of a prototype (*ibid.*). Corbel et al. also show there is a “structural gap” in strategic positions of private enterprises and public research institutions that curb negotiations of IPR between them (Corbel et al., 2011).

SMEs have recurrent difficulties in negotiating their intellectual property with large companies in collaborative research projects (INPI & DGCIS, 2008). In this context, IPR management is paramount to emancipation and internationalization strategy of SMEs (Gadille & Schockaert, 2015). The structural relations and social norms between firms in vertical networks may explain the tendency of SMEs to collaborate with public research within the clusters (Arrighi, 2014). That is not to say tensions between public research and SMEs over the IP do not exist. They are rather related to the scope of knowledge codification and revealing. But collaboration between SMEs and public research institutions and universities has produced common understanding, reducing potential sources of tensions. Collaboration brings to public laboratories a stronger vision of “downstream” phases of innovation processes and makes them more realistic about negotiation of IPR (Corbel et al., 2011: p. 124). In a more secured relation with public research, SMEs can learn how to codify knowledge to gain visibility in national and international markets and to rip business value out of innovation activities. Using a case study of the pôle Végépolis centered on production of specialized plants located in the Maine-et-Loire region, SMEs members of the FCCs evolved from plant producers towards breeders by relying on pooling of plant genetics and use of predictive methods of varietal creation implemented by the public research organisation. An IP protection mechanism implemented by the FCC supported the collective innovation strategy: if the genetic material pooled

by several firms is used to create a new variety, the product is protected by shared plant breeders' rights and a common trademark. In one case, a firm can create new varieties by relying on its own genetic material, and it has full protection rights over the outcome. The varietal creation method is owned by the public research organisations and is not disclosed. The cluster intermediated the collaboration by organizing resource pooling, connecting firms and public research labs and enforcing property rights over the output of collaborative R&D processes.

Localised practices that bring together SMEs and public research in collaborative relations enhanced by IP protection may become a social norm through multi-level learning processes about IPR sharing, management and valuation. Learning in the clusters about enhancement of intellectual property in asymmetric power relations is a key asset to create new place dependencies. Some French clusters already have activities of intermediation reducing information and transaction cost of IPR negotiation in public-private R&D relations (Gadille & Schockaert, 2015). Transformation of structural relations between firms through collaboration is a lengthy process, also relying on transformation of professional and organisational norms (Gadille & Valette, 2012).

#### 4. Discussion

Building on an analytical framework and statistical results as well as numerous case studies, the paper shows a shift in the innovation model of a number of SMEs members of FCCs. Compared to their counterparts which have not joined a cluster, these small and medium businesses built new types of relationships to innovate. This transformation reveals a change in the path-dependent construction of the industrial and societal legitimacy of the French SMEs. Deconstruction of the inherited model of national champions is illustrated by the recognition of SMEs as technology providers and legitimate R&D partners in the ecosystem, favoring horizontal partnerships and specialization. Greater legitimacy of SMEs is associated with their greater inclusion as a stakeholder in governance structures. As a result, they voice their needs in the process of building specific resources to sustain innovation paths in regional innovation networks, and are able to renegotiate coalitions. The first, and perhaps easiest, partnerships for SMEs were public research organizations and universities, since SMEs are not in an asymmetric position regarding commercialization of innovation. The same reasoning applies for building partnerships with competitors who have similar market penetration capacities. The FCC policy still has to overcome other difficulties in building new place dependency, associated with management and protection of knowledge in the asymmetric relationships between SMEs and global firms. It is a lengthy process and requires further transformation of formal and informal institutions that determine path dependency. This issue needs to be further explored and explained in regional science and to go beyond the traditional analysis of knowledge spillovers, particularly, in high-tech clusters.

The article highlights interactive learning of diverse actors involved in innovation processes. Our value added with regards the regional studies and science policy literature is to disentangle specific learning that specific actors—SMEs, public research, policy makers and intermediary organizations—undergo. Their interdependent learning leads to new place dependencies following path dependencies favoring connection of SMEs to global knowledge through collaboration with public research. Collective learning relies on the design of public policy where meta-governor defines and redefines rules conditioning its own learning and creating conditions for learning of other policy network actors. These rules comprise inclusiveness and assessment enabling negotiation, knowledge flow and adaptation of opportunities for collaboration and favoring transformation of the action space of the public policy.

We must recognize that a certain number of clusters and territories are subject to place dependencies that the cluster policy incentives have not been able to overcome. Capacity of SMEs to build new coalitions is dependent on territorial characteristics and power position of large firm architects in a given industrial sector. That is to say, local territories differ in their capacities to deconstruct the path dependent logic of “national champions”.

These conclusions are in line with the argument that there is a need to make greater distinctions in policymaking among different types of cluster, as different clusters in different contexts might require different types of intervention (Rodríguez-Pose & Comptour, 2012). In France, deconstruction of the dominant industrial model is in tension with the persistency of social stratification—relationship between engineers of large firms—system architects—and engineers and technicians working in SMEs. Emancipation of SMEs will be tangent to wiping out historical social stratification by reconsidering qualifications of entrepreneurs, corollary to renewing education programs in regions and territories.

The present contribution shows that, in order to grasp the effect of the policy of pôles on SMEs and their ecosystem, it is important to go beyond linear and uni-causal models of the effect of agglomeration on individual firm’s performance as it was done by Duranton et al. (2010). The concluding statements about the policy effect based on observation at one specific point of time seems too strong. The prediction of the effect of one cluster policy tool—pôles de compétitivité, centered on research, run at national and regional levels—based on observations from past cluster policy (SPL) centered on resource pooling and run at a more disaggregated territorial level, may be irrelevant.

## 5. Conclusion

The research has shown that SMEs which have had prior R&D cooperation or who have outsourced their R&D activity are more likely to engage in collaboration with universities, public research organizations, consultants and competitors. Often, lack of internal or external financial resources and excessive innova-

tion costs push SMEs to cooperate in R&D with public research organizations and universities. Some challenges remain: SMEs have recurrent difficulties in negotiating their intellectual property with large companies in collaborative research projects. However, collaboration between SMEs and public research institutions and universities has produced common understanding and reduced potential sources of tensions over the years.

The enhancement of formal institutional change favorable to SMEs, in coherence with cultural change (informal institutions) has thus led to a structural transformation of the innovation model of SMEs, which is a major transformation.

In the context of increasing pressure of globalization forces, high-income countries have opted for innovation-driven competitiveness policies, often centered on the pre-construction of clusters. The newly admitted rhetoric is that firms have to be able to absorb, understand and handle existing knowledge derived from other firms and/or public research as well as to co-create new knowledge with these partners to keep their competitive advantage.

Also, in the context of globalization and competition based on low cost, the capacity of enterprises, and SMEs in particular, to engage in localized collaborative projects with other partners, including public research organizations, determines competitiveness of knowledge-based economies. Our article focused on the policy of the FCCs as a tool to encourage R&D and industrial collaboration in territories.

The central question addressed in the article is how the clusters support the repositioning of innovative SMEs in their relations with large enterprises—main contractors and with public research. The paper borrowed from the concepts of path dependency and place dependency used in the regional studies literature as well as the concepts of governance and meta-governance used in the political sciences. We described how governance structures can reshape path dependency to transform place dependencies of clusters. In the French context, building on analysis of conditions for collaboration between economic actors and public research inherited from the past industrial and scientific policies, we described how industrial relations at national and local levels have gradually been reshaped through the design of reflexive governance and meta-governance of the pôles. The FCCs created new relational spaces for renegotiation of industrial and R&D relations through day-to-day exchanges favoring interactive learning of diverse actors, SMEs in particular. As a result, a new innovation model of French SMEs emerged, associated with creation of new horizontal linkages with academia and other competitors that previous policies had not managed to create. The new innovation model of SMEs thus marks new place dependencies where intermediary organizations offer an arena for collective rule negotiation and serve as regional filters for national and regional policy adaptation.

Despite a number of limits of the policy that we discussed in the previous section, the experience of the FCCs provides practice-based knowledge about con-



ditions for building new place dependencies favorable to SMEs. This experience can inform the new policy of Digital Innovation Hubs launched at the European level and implemented at regional levels.

By bringing into focus dynamic transformations occurring at different levels of policy making and strategy of actors, the article arguments in favor of dynamic approaches for assessment of policy impact. By doing so, we also show limits of static approaches in the policy analysis that search for short-term individual enterprises' performance without accounting for cluster formation and life-cycle and its articulation with evolving (or not) coalitions in territories.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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