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Collaborative and collective!

Reflexive coordination and the dynamics of open innovation in clusters

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Quotation

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Abstract:

Economic geography increasingly conceptualises "innovation as a collective action" (Storper, 1996). However, cluster literature often reduces the collective dimension to the circulation of knowledge between local-regional organisations based on various forms of (market, organisational, social, institutional or cognitive) coordination. This paper departs from this *grass-roots* perspective by discussing the role of collective actions in clusters, i.e. actions developed by a large number of cluster members acting *as a group*. Empirical evidence drawing on a study of three digital clusters in the Paris region shows that the cluster as a collective entity holds agency and - thanks to *reflexive coordination* - can contribute to open innovation - including innovation-seeking partnerships in the early stages of cluster lifecycles.

Key words:

open innovation, reflexive coordination, collaborative / collective actions, territory

1. Introduction

From the lobbying of public authorities to the branding of regional industry at international fairs, and from joint labour training initiatives to network building, many collective actions happen in clusters. However, they continue to be overlooked in most regional studies research. Industrial district approaches or Porter's perspective on clusters (1998) see them as merely forms accompanying the organisation-to-organisation interdependencies being forged between co-located agents. Similarly, the literature on innovation - from innovative *milieus* (Aydalot, 1986; Crevoisier, 2004) to regional innovation systems (Cooke, 2001b; 2005; Halbert, 2008a) - tends to reduce collective actions to late stage cluster developments (see the 'systemic qualitative dimension' of knowledge circulation in Menzel and Fornahl, 2010).

Storper's considerations on 'innovation as a collective action' (1996) hint at the underlying explanation for this: predominance is given to the countless interactions that occur between organisations of a local/regional system at *grass-roots level*. It is because co-located parties collaborate in innovation processes, and because these local-regional agents ceaselessly recombine their knowledge in new ventures over time, that a regional system is thought to develop a "total innovation capability" that exceeds the sum of its individual ventures. Collective innovation is thus mostly understood to be the *aggregation* of grass-roots collaborative innovation practices. According to Storper (1996), shared conventions facilitate the coordination of local-regional agents which gain a regional advantage thanks to such reflexive initiatives. The 'absorptive capacity' that is enhanced by the ceaseless recombination of otherwise scattered knowledge thus constitutes a key multiplier effect for a productive system (Cooke, 2005; Giuliani, 2005).

I do not aim to discuss the forms of grass-roots knowledge circulation in an innovation-driven economy. This paper will rather take issue with the role of *collective actions* in enhancing innovation in a given territory. It will also depart from the use of the term 'collective' as an aggregation of multiple and unstable collaborations between individual organisations that work together over a limited period of time. I consider collective actions as the process (and outcomes) of clustered organisations acting as a group¹. Collective actions will thenceforth be defined as *actions undertaken by a large number of organisations within a cluster (firms, public bodies, public research organisations and higher education institutions, associations, etc.) with the explicit aim of strengthening the internal and/or external functioning of a cluster.*

This opens up two questions. First, what is the role of collective, i.e. cluster-wide actions in the proliferation of the grass-roots interactions that characterise the diffusion of the open innovation paradigm to local-regional systems (Chesbrough, 2003; Cooke, 2005)? Second, against the linear assumption that organisation-to-organisation interactions eventually lead to more complex cluster-level actions (Maskell and Malmberg, 2007; Menzel and Fornahl, 2010), do collective actions occur at early emergence / growth stages of clusters and if so, to what extent do they actually bolster collaborative grass-roots interactions?

These questions point to a more general debate on the nature of coordination² in economic activity and to the agency of clustered organisations. In addition to already well-researched forms of coordination (market-based, organisational, social, institutional, cognitive), I will argue that collective actions contribute to a reflexive coordination in which local-regional organisations join forces because they consider themselves as belonging to a group (hence the

¹ Collaborative: produced by two or more parties working together. Collective: i) taken as a whole, aggregate; ii) done by organisations acting as a group (Source: New Oxford American Dictionary, 2005)

² Coordination: organisation of different elements of a complex activity to enable them to work together effectively (ibid.)

reflexive term). In accordance with the territorial approach (Crevoisier, 2009), the cluster is not merely a contextual environment, but rather a pivotal entity that guides the practices of local-regional organisations in their search for innovation. In this reflexive coordination process, local-regional actors *think and act as a situated group that defines its territory, both in terms of industrial specialisation and geographical location, and, in return, is partly defined by that territory which thus acts as an institution for the group as a whole*. The issue is thus not so much one of geographical proximity that facilitates collaboration at grass-roots level - as shown by the French School of proximity (Torre, 2006) - but of a *territory* (a city, a city-region, etc.) that becomes an institution, supporting the common strategies of clustered organisations.

The paper first discusses why grass-roots collaborative interaction has been favoured over collective actions in most research on territorial innovation (section 2). It then sets out to ground the analysis of collective actions in a discussion of the nature of coordination in innovation-driven clusters (section 3). This offers ways to link grass-roots interactions to collective cluster-level actions from a theoretical perspective by analysing the emergence and *modus operandi* of a 'reflexive coordination' process (section 4). This theoretical proposition is then empirically tested in the following sections based on three digital industry clusters in the Paris region (sections 5, 6 and 7). Findings show that, contrary to common assumptions, these clusters have shifted to high-intensity collaborations *as a reaction to* the development of collective actions. The concluding section sums up the main related theoretical and policy implications (section 8).

2 Marginal collective actions?

Collective actions may have been overlooked in current analyses of clusters, firstly because they have often been associated with the central State-sponsored innovation policies experimented in the 1960s and thereafter which culminated in '*Dirigiste* Innovation Systems' (Cooke, 2001a; Halbert, 2008a). Top-down governmental actions to develop regional innovation systems have had limited effects unless supported by other pre-existing factors (social networks and shared institutions, as discussed in Filippi and Torre, 2003). Their failure has been attributed to the concentration of investment on material infrastructure and on (the relocation of) Public Research Organisations (PROs), instead of on promoting the conditions for knowledge circulation. However, collective actions ought not to be disparaged merely on the basis of outdated prejudices. Policies aimed at bringing together science and industry at regional level have evolved. Although they may be criticised for their partial understanding of knowledge circulation under globalisation, the widespread use of cluster policies (Oxford Research, 2008) require a wholesale re-examination of the role of collective actions that *directly emanate from cluster members*, rather than from the central States.

Second, literature on regional innovation neglects the collective dimension of clusters if only because it focuses instead on the circulation of knowledge disseminated between organisations (Maskell, 2001; Bathelt *et al.*, 2004). This reflects the diffusion to the regional sciences of both the 'open innovation paradigm' that considers innovation as the outcome of knowledge circulation between heterogeneous agents (Chesbrough, 2003), and of the 'triple helix model' of innovation which stresses the role of cross-community interactions between industry, university and government (Etzkowitz, 2003). Interactions between heterogeneous organisations that harness and support 'regional knowledge capabilities' (Cooke, 2005) are

thus given preference. Agency is recognised at grass-roots level, where organisation-to-organisation collaborations occur, rather than at cluster (group or collective entity) level (Boschma, Frenken, 2006).

By placing the analysis solely at the micro-level of organisations, the collective dimension of a cluster's *modus operandi* may appear to have no more than limited *direct* impacts on innovation-driven collaboration-seeking agents. Recognising the possible need for collective actions to handle, for example, the marketing of a cluster's specific industrial know-how at international fairs is one thing, but analysing how collective actions can affect the proliferation of innovation-based projects between local start-ups and Public Research Organisations is quite another. I will argue that rejecting the *possibility of agency of local-regional actors constituted as a group*, i.e. as a geographically/industry specific collective, may hamper attempts to understand the role of collective actions in contemporary (clustered) economies.

Third, collective actions are often conceptualised as a latter-stage output of cluster developments, i.e. in the maturity and decline stages (Maskell and Malmberg, 2007; Menzel and Fornahl, 2010). The underlying assumption is that intense ground-level collaboration between organisations is a *pre-requisite* for collective actions - the size and heterogeneity of clusters, and the existence of interactions over time should prevail in the emergence of more complex collective actions. For example, there is an assumption that it is easier to have three organisations collaborating on a short-term research project than to have most members of a cluster implementing joint actions for the supposed benefit of all. This diachronic view (i.e., grass-roots collaborations first, cluster-level actions later), implicitly recognises that collective actions do not participate in the early stages of innovation enhancement. I would like to challenge this assumption on the basis that organisation-to-organisation interactions

and collective actions can be intrinsically linked because of a dynamic, non-linear circulation process between these two *levels* of action.

Before I turn to this point, I first need to discuss the theoretical implications of taking a collective level vantage point for our understanding of *coordination* in innovation-driven clusters.

3 Reflexive coordination in clusters

Research is overtly concerned with how organisations that increasingly follow an open innovation model, i.e. where innovation is thought to be the output of knowledge circulation (Maskell, 2001), find ways to *work together efficiently*. In short, the key research focus is on coordination (Lorenzen, 2002). Several parallel explanations have been put forward, and to a certain extent “re-combined”, to capture the variety of coordination mechanisms at work as debated in Boschma's reflections on proximity (2005), or within the theoretical developments on 'organised' and 'geographical' proximities (Rallet and Torre, 2005; Bouba-Olga and Grossetti, 2008). In a nutshell, the literature suggests five main coordination processes to explain how two or more co-located organisations can work together and innovate efficiently (for a summary, see Table n°1).

Market coordination is a loose form of coordination resulting from market transactions which are said to take place between rational actors with a utility maximisation rationale. Transactions can be either indirect as when, for example, the circulation of the labour force permits knowledge exchange between organisations (for a related discussion, see Maliranta *et al.*, 2009), or direct, as when knowledge circulates at a cost (intellectual property trading). Based on consideration of the nature of firm and transaction costs (Coase, 1937; Williamson, 1985), organisational or hierarchical coordination may facilitate knowledge circulation

within a cluster (Wenting, 2008) due to the importance of financial and/or industrial ties between certain organisations (joint-ventures, spin-offs, business alliances). Porter affirms that clusters successfully achieve market and hierarchical coordination by overcoming the so-called 'inflexibilities' of vertical integration and by supporting (more) stable interactions between buyers and sellers than market transactions can achieve (namely through building trust, Porter, 1998: 79). Shifting to individuals and Granovetter's 'strength of weak ties' perspective (1973), social networks provide an additional form of coordination. Although the relationship between geographical proximity and social distance is open to debate (Gordon and McCann, 2000), personal and professional inter-individual networks may facilitate the *social coordination* of clustered heterogeneous organisations (Banks *et al.*, 2000; Maskell and Lorenzen, 2004). *Institutional coordination* suggests that shared institutions contribute to the efficiency of regional systems (Storper, 1996, drawing on the theory of conventions) and to the emergence of clusters (Perez-Aleman, 2005). Common norms, habits, and formal / informal rules facilitate knowledge circulation between local-regional actors. *Cognitive coordination* assumes that cluster members may work together efficiently when they rely on the same cognitive categories (Lorenzen and Foss, 2003: 84) or belong to the same epistemic communities. This may be the case in clusters (Lissoni, 2001; Håkanson, 2005).

Table 1: A review of coordination processes in clusters

Type of coordination	Knowledge circulation based on...	Cluster as...	Inspired by
Market	i) direct commercial relations between buyers and sellers ii) indirect transactions (labour circulation)	a system of scattered but localised knowledge, accessible at a cost	Utility maximisation behaviour of rational agents.
Hierarchical / organisational	reduced transaction costs within organisations (joint-ventures, spin-offs, alliances)	a series of quasi-integrated organisations with privileged interaction channels	Transaction costs theory (Coase, Williamson)
Social	interpersonal relations and trust via professional and personal networks	networks of interlinked individuals	Inspired by the 'strength of weak ties' perspective (Granovetter)
Institutional	the mobilisation of habits, norms, rules	a shared system of conventions	Convention theory, institutionalist approaches
Cognitive	the definition of cognitive categories (similar theories, know-how, meta-representation, languages, etc.)	a system of interrelated epistemic communities	Epistemic communities, Networks of practices

Although these five types of coordination differ in their content and logics, they essentially consider coordination as a mechanism that enables individuals and organisations to improve their innovation capabilities through organisation-to-organisation collaboration. The joint efforts of a large number of cluster members who voluntarily engage in developing actions for the assumed benefit of the entire cluster constitute another specific form of coordination, and one that is *situated at a collective level*. Collective actions reflect a coordination mechanism whose scope is cluster-wide, regardless of whether they consist of the outcomes of organisations - or the intermediary groups that represent them (associations, public bodies, etc.) - acting together, or of individual organisations that answer a request for collective actions by providing a service (such as a meeting place, a networking event, etc.). This adds a third dimension to collaboration initiatives that otherwise occur in a bi-dimensional environment built around the longitudes and latitudes of geographically proximate organisations (see Figure n°1).

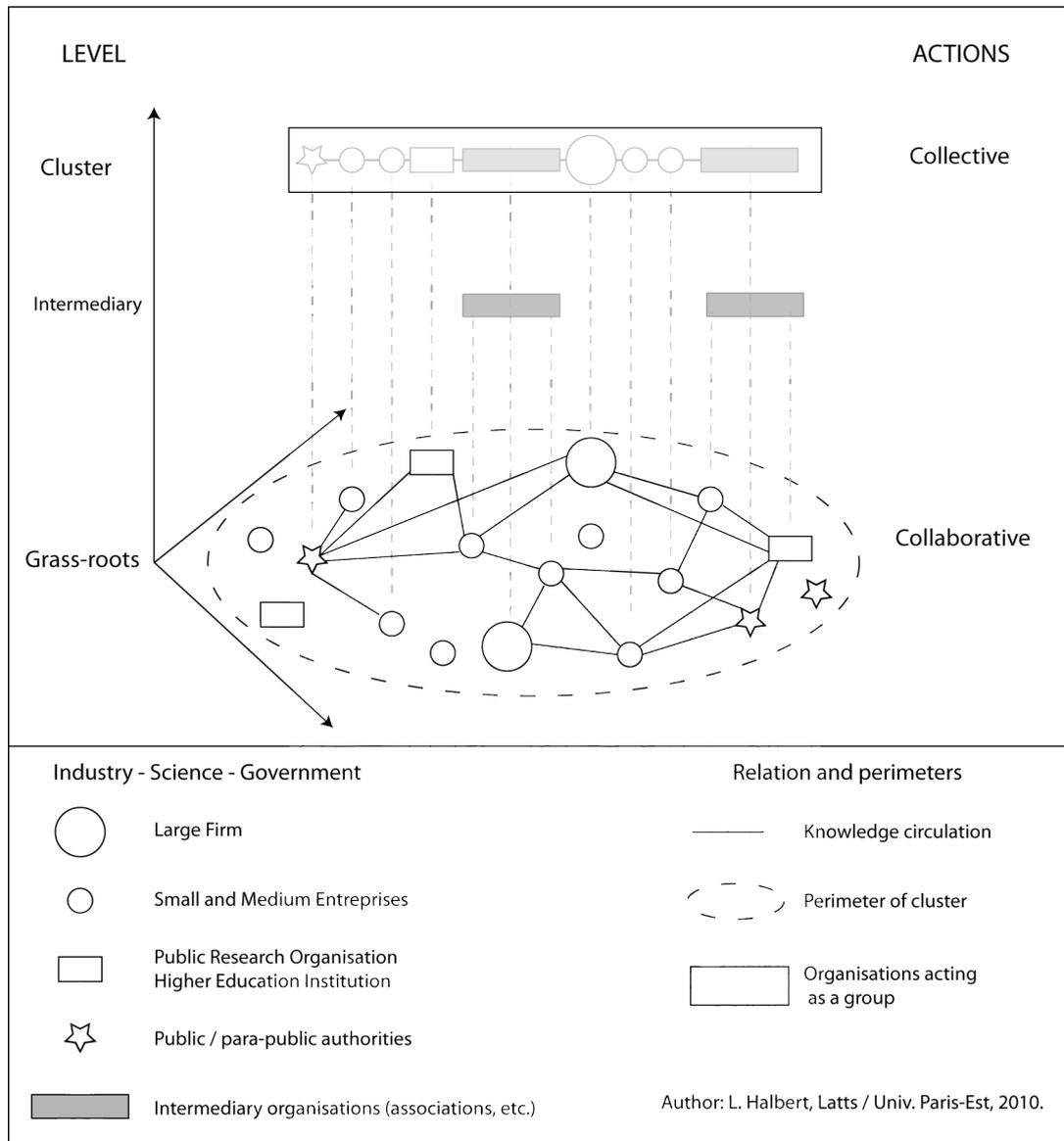


Figure 1: Clustered organisations as a group

Collective actions thus correspond to cluster members not only seeking ways to work together and exchange knowledge at the grass-roots level, as in other forms of coordination, but also questioning their own strategy/practices as a geographically/industry-specific collective entity. In addition to increasing their learning capabilities through organisation-to-organisation collaboration, local-regional organisations thus engage with the open innovation paradigm by focusing on the cluster as

a means of working together more efficiently. By ceaselessly analysing the cluster and developing collective initiatives, I consider that they forge a reflexive coordination process based on an intrinsically territorial understanding of innovation. In doing so, they simultaneously invite us to reconsider the role of geography in contemporary economic activities.

Indeed, the foundation of reflexive coordination consists in an attempt by organisations to engage directly with a cluster that they see as a territorial entity towards which it is worthwhile directing collective actions to tackle an industry's challenges. This then gives way to a form of institutionalisation in which the cluster becomes a shared reference and common horizon for many, if not most, local-regional organisations. This may result in supporting cooperative initiatives at organisation-to-organisation level, for example by encouraging cooperation within the territory rather than outside it. In this perspective, the cluster is more than the geographic space where firms happen to be (co-)located, it is also i) a network of heterogeneous organisations working together at both organisation-to-organisation *and* cluster level, ii) one of the strategic horizons shared by cluster members to define their identity and reflect upon their common future, and lastly iii) an experimentation forum where “communities of practices” can emerge.

This reflexive coordination impacts on both the external and internal workings of clusters. First, collective actions are living proof to all local-regional actors that collaboration can be fruitful and that it may be worth replicating it at other levels. Second, collective actions can boost the external recognition of a cluster both on global markets (a territorial brand or know-how identified with a particular place) and at supra-regional (national, European) level, if only because organisations are more audible when they speak as a group than individually. Third, from a more internal perspective, collective actions can significantly

contribute to improving the “absorptive capabilities” of local-regional agents by changing the general workings of the cluster, by strengthening the awareness and understanding between cluster members, or by encouraging the development of regular relations between them. Furthermore, some collective actions may even directly contribute to selecting and supporting collaborative *innovation*-based projects through a series of informal exchanges and/or formal tools (including financial incentives provided by public authorities). In this light, collective actions are direct and indirect components to foster the innovation potential and practices of a cluster. In other words, they may play a key yet underestimated role in the cluster's shift towards the open innovation paradigm. I will focus on three digital technology clusters in the Paris Region to provide an illustration.

4. Research protocol and methodology

Although they are part of a century-long tradition of producing visual images (Scott, 2000), the video game, web applications and animated movie industries in the Paris Region are still in the nascent/growth stages. The video games and web applications sectors emerged in the 1990s and 2000s and had to contend with the usual ups and downs of dot.com firms (particularly in the early 2000s when the dot.com bubble burst) while the animated movie industry has faced major technological and market changes, especially with the introduction of computer generated images and new competition from low cost labour countries. All three sectors can be said to be innovation-based (a high-degree of technological innovation and artistic creativity) with a global reach, although some cultural specificities may tend to nurture national and/or linguistic niche markets. They also display a highly “clustered” geography in France with Paris being the main centre of production. Key to our case study selection, the recent proliferation of projects targeting collaborative

organisation-to-organisation innovation provides a basis for analysing how local-regional organisations are shifting to a more open innovation paradigm. Furthermore, numerous collective actions can be observed. All this provides material for reflecting upon the nature of reflexive coordination.

To analyse both grass-roots and cluster-level actions, the research protocol has set out to create three databases (Box n°1, Table n°2) showing i) the geographies and degree of spatial clustering of these activities at national and infra-regional level, ii) the emergence and characteristics of grass-roots innovation-based collaborative initiatives, and iii) the different forms of collective action, again using a dynamic perspective in order to test the existence and conditions of a reflexive coordination process.

Box n°1: Data collection and analyses

i) Mapping. Quantitative data on firms' location (sources: business directories, press, corporate documentation and dedicated websites) enabled mapping and provision of basic spatial statistics on clusters.

ii) Grass-roots initiatives. Collaborative inter-organisation, innovation-based projects were analysed in both quantitative and qualitative terms, including the number and nature of participants (large or small firms, Public Research Organisations, Higher Education Institutions, associations, public bodies, etc.), project content and the history of the partnerships. Sources mainly included the *Cap Digital Pôle de compétitivité* 100 innovative projects database for the 2006-07 period (the government-sponsored Paris Region-based 'competitive cluster') which was further enhanced by online research and interviews with industry professionals. Descriptive statistical techniques were conducted on the 70 collaborative projects related to the video game, animated movie and web applications sections of the database.

iii) Collective actions. Quantitative and qualitative data was collated on the type, size, diversity and content of collective actions. Sources included i) official documentation (firms, associations, public bodies); ii) participatory observations of over ten collective events held in 2007-08 (international fairs, networking activities); and iii) around 80 interviews with industry members, associations and public/para-public agencies (3 interview campaigns held in 2006, 2007 and 2008: semi-structured interviews of between 45 minutes and 2 hours long). Data were mostly processed using thematic analysis techniques (Blanchet and Gotman, 2003).

	Task	Level	Data content	Sources	Analysis
1	Mapping	Individual organisations	<ul style="list-style-type: none"> - Location of firms - Contextual data (name, size, sector, etc.) 	<ul style="list-style-type: none"> - Business directories - Websites - Press - Interviews 	Cartography and elementary spatial statistics
2	Analysis of collaborative innovation-based projects	Inter-organisation	<ul style="list-style-type: none"> - partners - contents - duration 	<ul style="list-style-type: none"> - 100 innovation-based projects (Cap Digital, 2008) - Websites - Interviews 	Descriptive statistics
3	Analysis of Collective actions	Cluster (many, if not most organisations)	<ul style="list-style-type: none"> - size - diversity - type - content 	<ul style="list-style-type: none"> - Official documentation - participatory observation - interviews (80+) 	Thematic analysis techniques

Tableau 2: Data collection and analysis

5. Clustered industries

Mapping the three digital content industries in France bears out their strong degree of concentration. Although there are no official statistics on the number and location of employees, this research highlights the preponderance of the Paris Region, and, to a lesser extent, a small number of generally large city-regions (Lyons, Marseille, Lille, Montpellier, Bordeaux and the smaller city of Angouleme). Following the general pattern of the TV and movie production industries (Camors and Soulard, 2006), the animated movie sector is the most concentrated with the Paris region accounting for three-quarters of all firms, followed a considerable way behind by Angouleme (8%). The video games industry is slightly less concentrated: the Paris region has around 55% of the 235 companies in our listings, while Lyons constitutes the second pole (11%), ahead of Lille, Montpellier Bordeaux and Marseille (3% each). The same analysis could not be conducted for the web applications sector due to the lack of relevant data sources and the wide-ranging types of companies involved. The geography may be more fragmented at national level because local market niches offer opportunities for regional web development firms. However, interviews with industry members and a press review hint that most firms dealing with national and international markets are concentrated in the Paris Region, in line with the location of demand.

Tableau 3 : Location of video games companies in French city-regions in 2009

City-Region	Number of firms	Share in national total (in %)
Paris	137	57.3
Lyon	26	10.9
Lille	8	3.3
Montpellier	8	3.3
Bordeaux	7	2.9
Marseille	7	2.9
Angouleme	4	1.7
Clermont-Ferrand	3	1.3
Nantes	3	1.3
Toulouse	3	1.3
Others	33	13.8
Total	239	100

Source: Author's data collection, including data from the AFJV online directory, 2009

Within the Paris Region itself, firms are highly clustered in the central part of the agglomeration. 80% of companies operating in the regional animated movie industry are located in Paris itself and the remainder in the inner suburbs. The same applies for the video games sector with a high concentration in the near-lying Parisian suburbs of Montreuil, Nanterre and Rueil-Malmaison and, above all, in the central and northern *arrondissements* (districts) of Paris itself, constituting the core creative cluster (Figure

n°3). The web applications sector follows a similar pattern with a particularly high concentration in the *Sentier*, the traditional Parisian textile district.

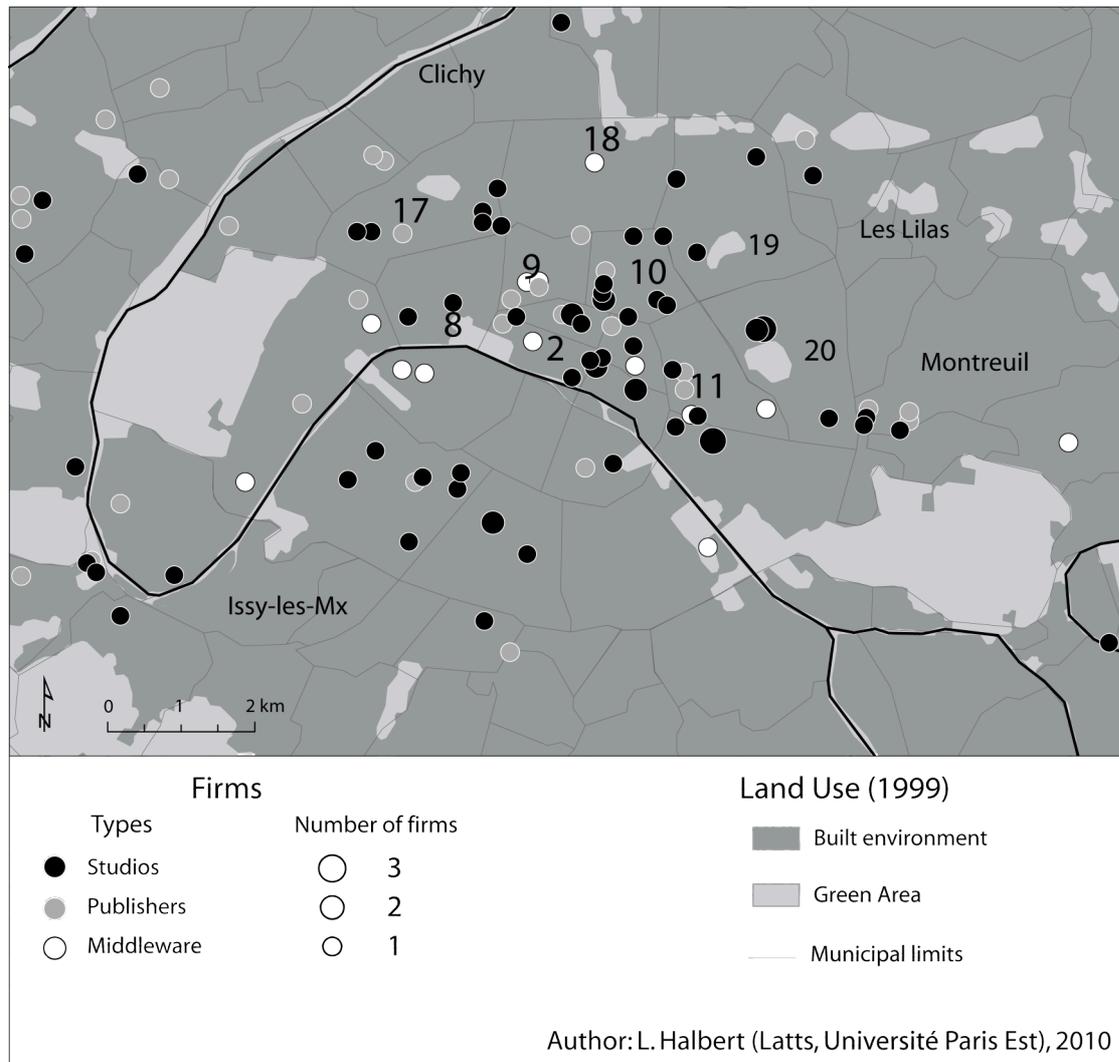


Figure 2: Location of video games firms in the central Paris Region in 2009

Although data collection over a long period of time remains difficult, a preliminary attempt for the video games and web applications sectors reveals that firms are essentially young. A large proportion are less than five years old, just like the many studios and multimedia agencies that develop applications for mobile phones or online animation. In spite of recent

local-regional policies in “secondary” city-regions, the Paris region remains the cradle and hub, further reinforcing the geographic concentration of these industries over time. Interviews show that this predominance is down to several factors: i) the location of higher degree training facilities (universities, *grandes écoles*, etc.) which often determines where young entrepreneurs initially choose to locate, ii) the location of skills (quantity and diversity), iii) the organisational effects of either voluntary or 'forced' spin-offs (the latter is a euphemism for attempts by employees who have been laid off to redevelop their own activity on-site) and iv) proximity to customers, suppliers and partners.

All in all, the Parisian digital industry sector displays the usual characteristics of cultural clusters, however I argue that it is only in the last three to five years that collaborative innovation projects have multiplied, implicitly testifying to an organisational shift over to a more open innovation model.

6. The recent proliferation of grass-roots innovation partnerships

Data collection on collaborative research projects in the digital content sector in the Paris region is facilitated by the corporate publicity of many stakeholders who wish to demonstrate their innovation capabilities and/or their ongoing support for innovative public and private organisations. The government-sponsored Paris Region-based *Pôle de compétitivité* (Cap Digital), which is dedicated to promoting collaborative innovation in the digital industry publishes a list of such projects (2006-07). By cross-checking this data with other sources of information³, around 70 collaborative, innovation-based projects, i.e.,

³ Press reviews, company websites, interviews with project investigators, etc.

involving two or more partnered organisations⁴, have been singled out. Data were collected based on size, types of partner involved (large or small firms, Public Research Organisations, Higher Education Institutions, public authorities, etc.), degree of heterogeneity (industry-university-government mix) and research content (upstream / downstream research, product / process innovation, etc.).

6.1. Small-scale cross-community collaboration

The analysis reveals that innovation-focused partnerships are predominantly small to medium-sized. Half have between 2 and 4 partners and a third between 5 and 9. The remainder reflect the few large-scale projects that comprise – in certain cases - over 20 partners. However, in these latter cases, interviews reveal that some organisations may actually remain dormant.

Cross-community interactions are predominant but rarely involve public authorities directly⁵. Three-quarters of all projects are actually between firms and Public Research Organisations (PROs) (see Figure n°4). This diversity of partners results in a wide-range of projects: from fundamental research (mostly inter-PRO) to applied research (PROs-Firms) and even to prototyping activities (inter-firm). Some projects involve explicitly developing new solutions / products for an emerging market while others aim at creating a pan-industry tool or platform to increase the general competitiveness of regional actors (such as Play All or HD3D-IIO). The numerous collaborative projects testify to the development of an open innovation model that not only results in local-regional firms working together, but in increased interactions with PROs and HEIs (Higher Education Institutions) as suggested by the triple helix model.

⁴ The remainder of the Cap digital 100 projects database is out of this research perimeter because it is made of innovation projects developed by a single organisation.

⁵ Public bodies are however financially involved in all innovative projects through either European, national and/or regional level funding.

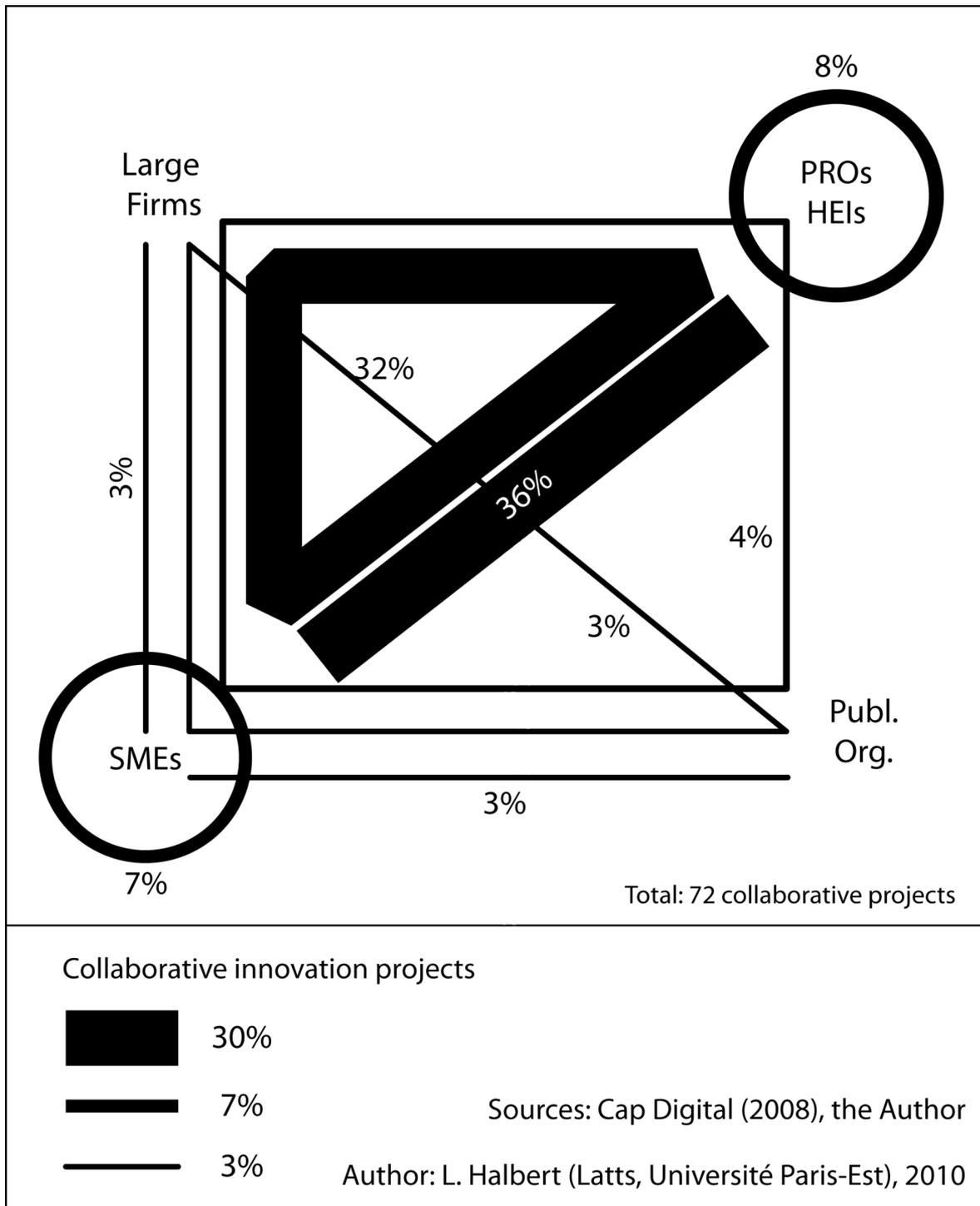


Figure 3: Collaborative projects (2006-07)

However, this rosy picture of buoyant diversity should not hide the difficulties in bringing together PROs and firms with distinct cultures, time constraints and end goals. Several interviews indicated that industry-science projects sometimes simply consist of combining two poorly related research projects (PRO-led fundamental research alongside a prototype development start-up).

6.2. The recent proliferation of innovative projects

Although there is obviously no quantitative data to account for these assertions, interviews with industry members and researchers, especially with 'senior' staff working in the field over the last 10 to 15 years, reveal two recent trends: a perceived growth in the number of collaborative innovation projects in the Paris region and the increasing share of science-industry partnerships among these projects.

Evidence gathered in the course of our interviews relates these trends first to a change in national and local-regional public policy that appears to provide increased support for territorially-based *cross-community* innovation projects, especially through dedicated national funding. A second explanation highlights a shift from a culture of secrecy and rivalry between competing firms with limited cooperation (barring very rudimentary forms such as beta-testing of software by a client-firm) to a common awareness that 'globalisation means that firms must work together' (interview n°19, CEO, Video Games). As another interview highlighted, collaboration may not merely help a company to reach its critical size on global markets (via business alliances), it can also improve its innovation capabilities by accessing the knowledge of others (interview n°22, CEO, Animated movie).

A similar change may be observed with respect to PROs. After having shown little interest in the business world in the late 1990s and early 2000s, several research units are now seizing opportunities presented by the national government and their own universities to develop partnerships with industry. Although PROs are used to long-distance cooperation initiatives within their own community of practices (i.e. European or global academic networks), interviews indicate that openness to partnerships with industry is mostly achieved with firms from the Paris Region. Gaining access to other communities (start-ups, larger firms) is thought to be easier inside rather than outside the cluster. Similarly, Paris-based firms tend to interact predominantly with local-regional PROs rather than with research institutions located elsewhere, in the rest of France or abroad. The cluster thus remains an appropriate scale for both smaller firms and for the locally-based research teams of larger firms (including TNCs) when they try to interact with PROs. This does not mean that knowledge circulation is restricted to the cluster: certain collaboration initiatives and many informal circulations, in fairs for example, take place outside the cluster (confirming the “global pipelines” assertion of Bathelt *et al.*, 2004). However, the predominance of “short-distance” collaboration initiatives is observed. This does not result only from the need for face-to-face contacts (Storper and Venables, 2004), although this obviously matters when several organisations transfer a part of their research operations and R&D teams to a common building (HD3D-IIO project). I would contend that this shift from a regional system of production with limited collaborative practices to proliferating cross-community research projects is also related to developments at the collective level of the cluster.

7. Collective actions and institution building

Regular, in-depth field observation is required to collect evidence on collective initiatives in the Paris Region. I have defined six variables (frequency, intensity, degree of formalisation, width, depth and content) to describe their characteristics (cf. Table n°4. For further information, see Halbert, 2008b).

Tableau 4: Collective actions in the digital content industry in the Paris Region over a ten-year period

Variables	Definition	Situation		Trend
		Initial	Current	
Intensity	Number of interactions*	Small	Medium (Animation) to High (Video games, Web)	Intensification
Frequency	Number of interactions over a period of time*	Low	Medium (Animation) to High (Video games, Web)	
Degree of formalisation	Existence of formal interaction*	Mostly Informal	Informal and formal	Formalisation
Width	Number of communities**	One (business)	Cross-community	Widening
Depth	Number of collective functions	One	Multiple	Deepening
Content	Types of collective functions	Limited (mostly lobbying of national/european authorities)	<ul style="list-style-type: none"> - Lobbying, - Workforce training/management, - Getting access to land (incubators, etc.), - Networking, - Industry/territory 	Diversification

			branding - <u>Innovation</u> <u>enhancement</u>	
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* Between many or most organisations of a regional industrial sector (Video games, web applications, animated movie)

** Communities understood as SMEs, Larger Enterprises, Business Organisations, Public Research Organisations, Higher Education Institutions, Public Agencies and Departments, Associations.

This analysis highlights an *ongoing organisational shift* at cluster level borne out in both the interviews and documentation collected from industry members and dating from the end of the 1990s in the video games industry, from around 2002-03 in the web applications sector, and a little later for the animated movie industry.

The *initial situation* was one of hardly any collective actions. The limited interactions taking place within the 'cluster' were mostly scattered, irregular and informal interactions occurring between firms. Inter-organisation coordination was based on workforce circulation associated with a high turnover rate and the temporary interactions synonymous with flexible production. Although inter-personal networks did exist, most interviewees say that they were rarely "used". In this pre-cluster stage, where organisations happened to be co-located but without having 'activated' the potential for collaboration (Rallet and Torre, 2005), possibilities for collective action were barely perceptible.

The last ten years have seen an organisational shift that can be characterised by five parallel trends: intensification, widening, deepening, increasing formalisation and diversification of collective actions (see Table n°4 and Halbert, 2008b). Local-regional business associations - often supported by public bodies (Paris Council, the Ile-de-France Region and central government departments) in addition to dedicated public policies - have

considerably extended the scope of collective actions, especially in the video games and web applications sectors. In the 1990s, the limited number of collective actions were mostly undertaken to serve the interests of fast-growing but poorly-structured business sectors like video games and web applications. The creation of national professional associations (Sell in 1995 or Apom in 2003 in the video games sector) has facilitated the emergence of lobbying initiatives initially at national level (which the government responded to positively through supportive measures including special funds for multimedia projects and tax breaks for R&D expenditure). Lobbying activity subsequently focused on the local-regional sphere, especially during the mandate of the current Mayor, Bertrand Delanoë, and has been bolstered by the support of the Paris Council and the development agency from the Ile-de-France region.

Many other types of *territorial* collective actions were subsequently developed. Some aim to address pressing needs such as the provision of office space at reduced rates for new start-ups (multimedia incubators) or tackling potential future bottlenecks (shortage of skilled labour). Collective actions to improve coordination between local-regional organisations have also flourished: from networking and the steady growth in regular events such as BarCamps, MobileMondays or Cleantuesdays in the web applications sector, to territorial marketing drives to improve the image of the cluster and its attractiveness for international clients and investors, and, lastly, to support for innovation-based collaborative grass-roots projects. The 1.2 million euro 'Ile-de-France Video Game' collective initiative provides an illustration. With the support of the Ile-de-France region and the central government Regional Department for Industry and Research (*DRIRE Ile-de-France*), it aims at boosting the total exports of local-regional video games producers and at financing the initial stages of collaborative research development partnerships (seed money).

The territorial dimension is always present: the cluster, which is broadly understood as 'an industry located in a city-region' (interview n°8, CEO, Animated movie), is the common reference for the diverse communities effectively engaged in these collective strategies. For example, Silicon Sentier, a pivotal business association in the web applications sector defines itself as

"a regional association with around 100 firms in the Paris and Ile-de-France region. It is an exchange and visibility-oriented platform for innovative start-ups aiming to enhance experimental and 'cross-fertilisation' projects. Through its vision and actions, Silicon Sentier wishes to contribute to innovation, growth and employment in the Paris Region." (Silicon Sentier, official website, 06/11/09).

Collective actions reflect how local-regional actors perceive the cluster as a strategic issue. It is the subject of numerous meetings and intense reflections which result in cluster-wide programs open to most local-regional actors at a small cost or even free of charge. Coordination between local-regional actors thus strongly depends on their ability to tirelessly re-examine the cluster's own development and its position in fast-changing global markets.

8. Discussion and conclusion

The empirical findings provide an intrinsically dynamic overview of how clusters work and their link to collective actions and reflexive coordination.

Organisational shift: the emergence and multiplication of collective actions correspond to an organisational shift in which a cluster evolves from low-level collective actions, often

restricted to short-term lobbying activities, to high-intensity interactions grounded in wide-ranging activities (networking, branding of a place/industry, innovation enhancement, labour training, etc.).

Institutionalisation of the cluster: this organisational shift is linked to the adoption of an open innovation mode of development for which the cluster appears to be both the means and the end of collective actions. It is the means when heterogeneous local-regional actors make (further) use of their geographic proximity through collective actions. Yet, the cluster becomes also an end of collective actions when such actions transform the *external* and *internal* workings of the cluster. This happens either by strengthening its image *vis-à-vis* markets and supra-regional public authorities, or by reinforcing local-regional interdependencies and knowledge circulation between cluster members as summarised on Figure n°4. In the process, local-regional actors identify themselves in relation to a cluster that they perceive as being a relevant level of action. Because it becomes a shared reference that drives a common agenda, the cluster is thus progressively being institutionalised. By focusing on their existence and future as a geographically specific and industrially circumscribed group, cluster members forge a local-regional entity that sets out to develop more effective collective working practices. This corresponds to *reflexive* coordination, i.e. a process of coordination which treats clustered organisations and their interactions as subjects of reflection and action.

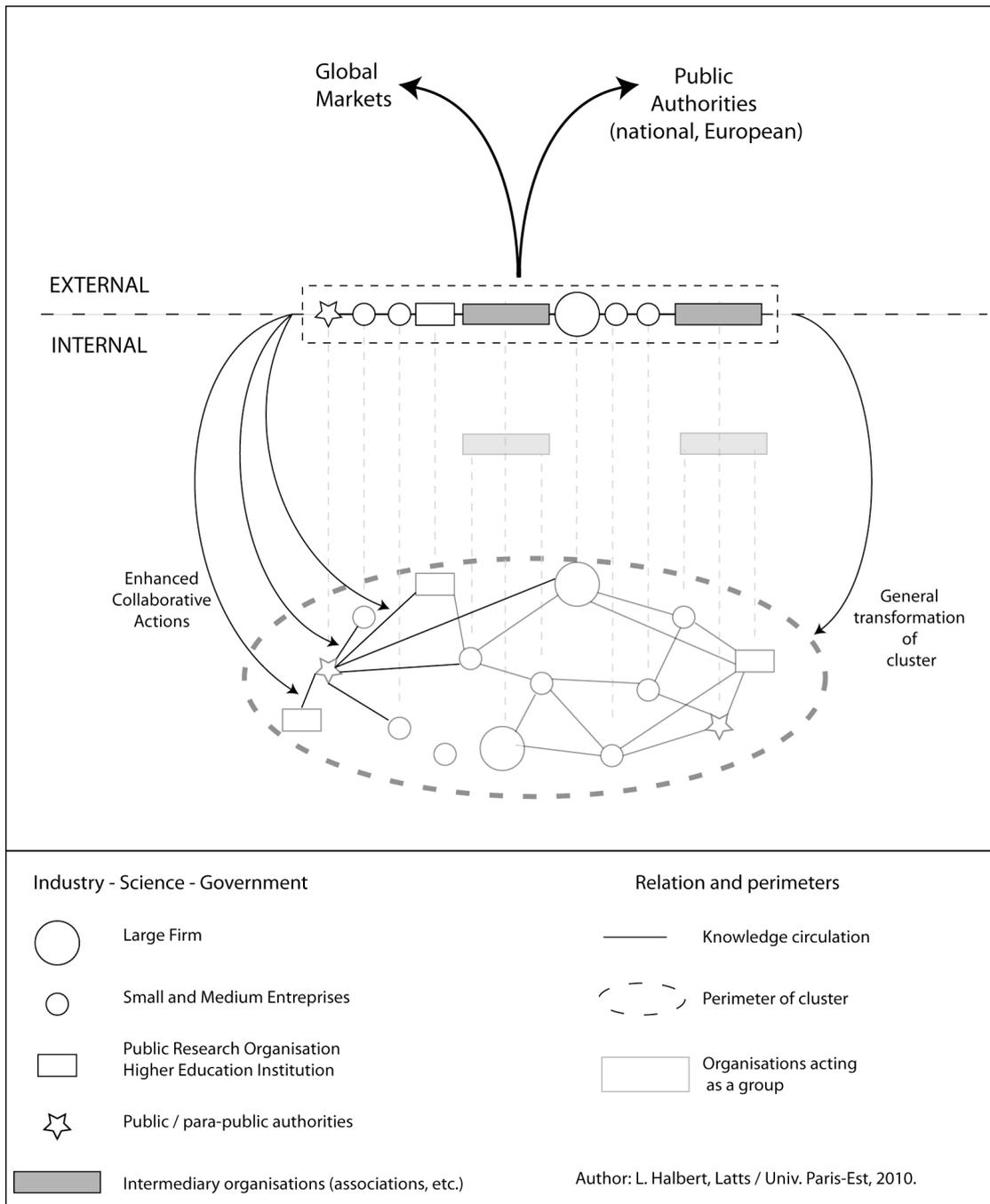


Figure 4 : Impacts of collective actions on the external/internal workings of clusters

Reflexive coordination: the empirical findings in the paper provide us with pointers for analysing the main characteristics of this form of coordination.

First, it is not a static but a *dynamic and often self-reinforcing mechanism*. Collective actions reinforce the visibility and existence of the cluster as an entity. Conversely, the more internal and external visibility and recognition the cluster gets, the greater the number of collective actions that may be developed.

Second, reflexive coordination is not a substitute but rather *a complementary and interdependent process alongside other forms of coordination*. Firstly, it can harness other types of coordination (market, organisational, social, institutional, cognitive) to support the potential for collective actions. Secondly, it can also bolster other forms of coordination when collective actions strengthen social networks or when it participates in institution building. Thirdly, reflexive coordination *does not systematically arise in the mature phase of a cluster*. In three relatively young clusters, reflexive coordination and its accompanying collective actions may in fact have facilitated the organisational shift towards a more collaborative grass-roots open innovation model. This corresponds to a two-stage evolution (see Figure n°5) that departs from the initial situation, described above, of very low-intensity informal grass-roots level interactions and limited collective actions (referred as the pre-cluster stage).

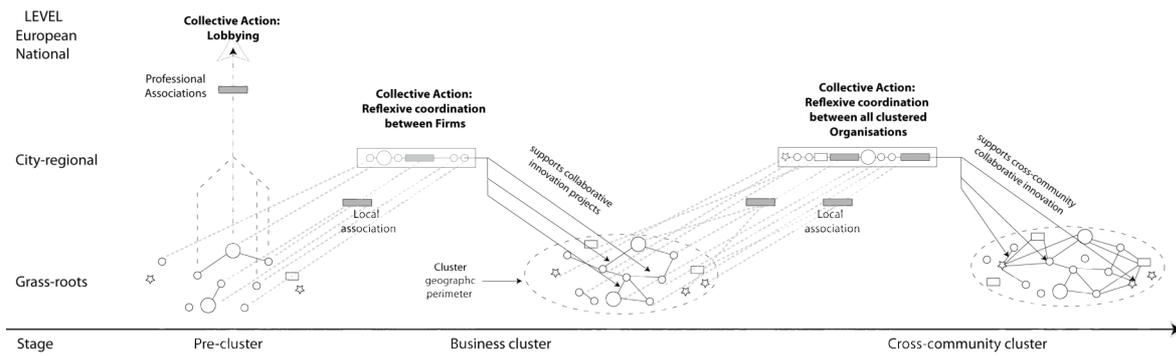


Figure 5 : Dynamic interactions between collective and collaborative actions

The first stage concerns the rise of *inter-firm* interdependencies. Territorially-based business organisations (like Silicon Sentier or Capital Games associations) develop lobbying initiatives targeting local-regional public bodies, as well as networking activities for clustered start-ups and firms. These collective actions strengthen the cluster's recognition by local-regional public and private actors. As a result, the number of collaborative organisation-to-organisation actions *between firms* increases. In a second stage, collective activities are rolled out to other communities (public bodies, Public Research Organisations, Higher Education Institutions, etc.): innovation enhancement becomes the predominant strategic goal of *cross-community reflexive coordination*. These cluster-wide collective actions have positive effects and stimulate innovation-based grass-roots partnerships between different communities. In other words, they are key in promoting the shift to the triple helix and open innovation model amply studied by the literature on regional innovation systems and clusters.

The web applications industry has gone through these stages in a relatively linear dynamic. The video games sector has passed more quickly to the *cross-community* cluster-wide stage because *inter-firm* collective actions were mostly undertaken at national-level, thus bypassing the local-regional stage of inter-firm lobbying. In the case of animated movies,

in addition to the importance of national lobbying, the experience of the two other sectors have helped it to develop simultaneous collective and collaborative actions, albeit within a much less extended framework so far. This highlights the workings of a 'learning' territory where replication from one sector to another can accelerate the adaptation of other industries.

Fourth, reflexive coordination enables to revise the *territorial dimension of innovation*. Geographic (Porter, 1998) and organised (Rallet and Torre, 2005) proximities are not solely a matter of dense interactions between co-localised organisations as a way of facilitating (tacit) grass-roots knowledge circulation (Bathelt *et al.*, 2004; Storper and Venables, 2004; Asheim *et al.*, 2007). The paper suggests that in the case of digital content industries, - but this result could possibly be extended to many other cultural/creative sectors and innovation-based activities -, innovation is also *supported by a cluster which is made up of collective actions*. This pleads for recognition of the territory as a space for joint action by local-regional players and which is conducive to the collaborative, organisation-to-organisation interactions familiar to the research literature that focuses on clusters.

Consequently, the theoretical proposition and empirical findings of this paper warrant a revised understanding of economic clustering and its relation to innovation. To paraphrase Storper (1996), I highlighted in the introduction that regional advantage is predominantly seen as the sum of the effects of local-regional organisations acting to develop innovation thanks to knowledge circulation and collaborative innovation. In addition to this, the *collective* entity formed by cluster members acting as a group may also hold some agency and contribute to further facilitating the coordination of local-regional organisations.

Acknowledging (and researching) a truly collective innovation paradigm - as opposed to collective innovation seen as the sum of grass-roots interactions - has important implications. In the context of economic clustering that is predominately taking place in large cities (Hall, 1998; Scott *et al.*, 2001) it has potential systemic effects because of replication and diffusion processes that may spread to other sectors. This is illustrated here with the multiplication of collaborative practices in the animated movie sector explicitly related to the replication of developments taking place in the web applications and video games sectors. It is also borne out in activities that are even less bound up with the digital content industries but with the same location in the Paris region. The world music industry which is also heavily concentrated in Paris has recently attempted to imitate the local-regional development of collective initiatives observed in the digital content sectors as a way of tackling the crisis in the record industry.

This hints at the underlying role of intermediary organisations that drive many of the collective actions that we have analysed. Whether we are dealing with local-regional business associations (Silicon Sentier, Capital Games), "public-private" initiatives such as the Cap Digital *Pôle de compétitivité*, or even some (para-)public agencies (development agencies), this research finds evidence of the contributions of such actors to strengthening the collective dimension of the cluster. Although the analysis of roles, cooperation and rivalry, and their interactions with public authorities, calls for further research, we would contend in concluding this paper that local-regional public policies may use such intermediary organisations – which they often support financially – to encourage an organisational shift towards a more collective and reflexive innovation model.

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