

## **Institutional and Governance Practices as Mediating Variables in the Development of Innovation within Clusters**

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**ABSTRACT:** The globalization of value chains has generated an extreme intensification of competition. Researchers highlight two essential characteristics: innovation and competitiveness. Currently, clustering policy is one of the most used territorial strategies by industrial and technological companies to improve innovation performance levels.

The objective of this work is to support the idea of a positive relationship between spatial agglomeration of production activities in the form of a cluster and innovation, conditioned by mediating factors. Specifically, the hypothesis defended is that institutional and governance practices favor the emergence and diffusion of innovation within the cluster.

The research question mobilizes several basic theories: location theory to present the structural determinants of innovation in clusters, institutional theory to legitimize cluster interactions, organizational theory to present governance practices essential for good management of interactions in favor of innovation, and innovation theories.

The field of study chosen was the emergence of the clustering policy in Morocco, whose main objective is to help set up innovative projects. This thesis work is guided by the main problem of whether concrete institutional and governance practices implemented by the clusters contribute to innovation.

Data collected from a sample of companies from three Moroccan clusters are analyzed using the structural equation method (PLS-SEM). The empirical results highlight the existence of a positive relationship between industrial cluster membership and innovation performance, reinforced by the mediating role of institutional practices and the existence of governance unity.

**KEYWORDS:** Clustering policy, industrial district, externalities of agglomerations, institutional creation, governance in clusters, innovation.

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### **INTRUCTION:**

In the dynamic and competitive economic world, companies must make efforts to research and develop new knowledge in order to create and maintain a competitive advantage. Currently, the clustering policy is one of the most commonly used territorial strategies by industrial and technological companies. This study supports the idea of a positive relationship between the spatial agglomeration of production activities in the form of a cluster and the development of innovation.

Regional agglomerations of industrial activity have long been recognized as potential sources of innovation and general economic growth. At the turn of the twentieth century, proximity was necessary for rapid communication and cooperation between companies. It is, therefore, not surprising that Marshall (1890, 1919) explained the advantages of industrial districts and the location of particular industries. Although transportation and communication revolutions have reduced the need for businesses to operate in close proximity to each other, researchers argue that "locality matters" (Schmitz, 2006).

Several empirical studies have shown that the geographic concentration of companies and institutions such as universities and research institutes promotes the appearance and faster dissemination of innovations (Baptista, 2000; Folta et al., 2006). Among the abundant works that have sought to identify the determinants of innovation linked to the spatial agglomeration of activities, three main trends can be distinguished:

The Marshallian current: Several works are based on the concept of agglomeration externality, developed by Marshall (1890, 1920) in his study of Anglo-Saxon industrial districts. Positive externalities affect the know-how of workers, proximity to customers and suppliers, and access to intangible resources (knowledge externalities) (Krugman, 1996; Storper, 2008).

The current of Porter clusters: Porter's work (1990) on "technological" clusters based on the Silicon Valley model introduces a more strategic dimension of the actors who seek to take advantage of it by choosing to locate in proximity to their competitors and suppliers to develop their innovation. Interactions, which result in ambiguous relations of cooperation and competition between a variety of actors such as companies, competitors, universities, research laboratories, are at the heart of the innovation performance of companies.

## **Institutional and Governance Practices as Mediating Variables in the Development of Innovation Within Clusters**

The third current of determinants of innovation, based on the knowledge economy, goes beyond the notions of externalities and competition to introduce an institutional dimension based on the exchange of knowledge and the dynamics of learning within the cluster to facilitate the construction of new knowledge (Lundvall, 1992; Morgan, 1997; Maskell and Malmberg, 1999; Maskell, 2001).

Previous work on clusters has focused on describing the positive externalities of these agglomerations, whether pecuniary or knowledge-related. In other words, belonging to a cluster leads directly to innovation performance. In this study, we will break down this relationship between belonging to a cluster and the development of innovation into two types of effects, direct and indirect, by involving a managerial dimension in the cluster through the integration of institutional practices and the existence of control units as mediating variables.

Institutional practices are understood as a set of norms, habits, routines, rules, and laws that regulate and stabilize the relationships and interactions between cluster member organizations (Coriat and Weinstein, 2002).

Some observers have focused on the regional context in which the industry operates, emphasizing the importance of local governance, especially meso-level politics (Messner, 2004; Scott, 2002; Scott and Storper, 2003; Storper, 1995). Novice works, still largely in the minority, attempt to measure the effect of the cluster on the innovation capacity of member companies and highlight the importance of governance in developing a collaborative dynamic within the cluster (De Propriis and Wei, 2007; Bell et al., 2009; Nambisan and Sawhney, 2011; Berthinier-Poncet, 2012; Bocquet and Mothe, 2015; Cusin and Loubaresse, 2015).

Companies do more than produce goods and services; they are repositories of knowledge and skills. They are organizations with specific routines, dependent on trajectory, and limited by uncertainty in the pursuit of innovation and production activities (Nelson and Winter, 1982). The interest of cluster governance comes from its role in regulating and coordinating interactions between heterogeneous actors without hierarchical links (Bocquet and Mothe, 2009). However, the structural characteristics of certain clusters can even constitute obstacles to the creation of a collective dynamic in the absence of appropriate governance.

### **I. Formal institutional practices in favor of innovation in clusters**

Institutional practices refer to "a set of common habits, norms, routines, established practices, rules or laws that regulate the relationships and interactions between individuals, groups, and organizations" (Edquist et al. Johnson, 1997, p.42).

According to Arikian (2009), three main factors can prevent the creation of knowledge in clusters:

The lack of opportunities for knowledge exchange,

The futility of these exchanges, and

The lack of a conducive institutional environment for cooperative relationships.

Lawrence and Suddaby (2006) identify nine sets of institutional practices grouped under three main dimensions: the political, normative, and cognitive dimensions. The political dimension echoes the mode of regulation of the collective actions of the actors, while the normative dimension calls upon the mode of coordination, and the cognitive dimension approaches the mode of knowledge management. We present the following structural determinants as the main characteristics of these three perspectives and sets of institutional practices.

The institutional framework plays a key role in the governance of relations between actors. Attached to the study of network governance, the institutional framework has been mobilized to explain the emerging modalities of selective cooperation between actors. This institutionalist point of view has been used in particular to understand the success of certain regions (Amin and Thrift, 1992). The strong institutional embeddedness of these regions makes it possible to understand the appearance of very localized poles of power in an increasingly globalized economic activity. Institutions, therefore, become essential actors of governance insofar as they manage these regulatory mechanisms by participating in the implementation of collective rules (by ensuring their execution) but also by constructing intentional rules and supplementing them when they are incomplete (Brousseau, 2000).

#### **I/1 The Political Dimension:**

The political dimension brings a cooperative framework and specifies the operating rules within the cluster. It corresponds to the institutional work of a political nature. The basis of the rules and determination of rights and borders for access to material resources are the subject of the political dimension of institutional work. The political arrangement is based on three sets of institutional practices that create a system of mutual reinforcement: practices of persuasion, the establishment of constitutive rules, and the methods of regulation.

Practices of persuasion aim to ensure the allocation of sufficient financial and material resources in the short and medium term to support mechanisms for innovation. Holding the practices of persuasion is a key element of institutional work in the movement where it allows actors to acquire social and political capital, relevance and material resources needed to establish new institutional structures and practices.

The implementation of constitutive rules involves the definition of "constitutive rules" (Scott, 1995), rules that facilitate rather than constrain institutional action. These rules define the boundaries of the cooperation framework within a cluster. These practices give

## **Institutional and Governance Practices as Mediating Variables in the Development of Innovation Within Clusters**

the latter a status and an identity that contribute to the construction of the legitimacy of the cluster as an organizational form (Human and Provan, 2000). The definition of membership rules, the creation of standards, and the certification of actors are necessary for the proper conduct of collaborative work within the cluster.

Modalities of regulation ("Vesting") correspond to the modalities of regulation of exchanges within the cluster. It is the "institutional work oriented towards the creation of structures of rules which confer property rights." We have entered this set of institutional practices under the notion of the formalization of the governance structure, the delegation or sharing of authority, and the establishment of disciplinary mechanisms. These aim to legitimize the clusters as an entity (Human and Provan, 2000), to better regulate power games, and thus ensure the smooth running of collaborative projects internal to the cluster. These practices stabilize relations between actors (Leloup et al., 2005), overcome the problems of uncertainty and opportunism specific to the creation of new knowledge (Brousseau, 2000), and stimulate the transfer of complex knowledge (Boschma, 2005). We find both the regulatory aspects of institutions – coercion and regulation of behavior (Scott, 1995) – and the establishment of rules, surveillance, and sanctions (rewards or punishments) in order to influence future behavior (North, 1990).

### **I/2 Normative Dimension:**

The normative dimension is based on the transformation, construction, and diffusion of norms, values, and common beliefs in order to generate a logic of similarity between the members of a cluster and to promote interactions and relations of cooperation and trust (Torre, 2006) to have a normative structure of institutions. Three sets of practices are detailed corresponding to this dimension:

Constructing identities aims to have a coherent and recognizable image that contributes to the construction of the legitimacy of the cluster internally (Human and Provan, 2000). Having a common identity of cluster actors is essential to influence innovation, not only because it reduces communication costs but also because it establishes implicit and explicit coordination rules and influences interactive learning (Kogut and Zander, 1996). The use of such practices is paramount in creating an institutional environment because identities describe the relationship between the actor and the field in which that actor operates.

Changing Normative Associations consists of identifying the habits of collaboration and the networks of influence existing sometimes before the formation of the cluster or having developed in parallel to mobilize them to create new benchmarks for collaboration to which all the cluster's stakeholders can adhere. The role of institutional work often leads to the creation of complementary or parallel institutions to existing institutions that facilitate the adoption of new practices, particularly in management

The governance structure of clusters manages the diversity and complementarity of the activities of the member companies and various actors in the cluster. This is achieved through the development of collective and individual actions, through meetings, formal or informal, between the actors. There are two types of governance - a governance dedicated to piloting (strategic governance) and one dedicated to animation (operational governance) which allows the emergence of representations, values shared between the actors and to implement actions intended to facilitate their interactions. Governance is considered as a central mechanism in the emergence of an institutional environment conducive to interactions and exchanges of knowledge between companies in the cluster. Governance is generally a system of decision-making entities that directs a certain area of activity, involving in particular a governance structure and a dynamism of the system and process. Corporate governance presents a hierarchical vision of the coordination of the relationships of actors within the organization, also making it possible to restore order, resolve conflicts and achieve mutual gains. However, the amplified cognitive and partnership approach focuses mainly on large organizations and the complexity of power games and conflicts of interest between the organization's stakeholders. The heterogeneity of actors, public institutions, small or multinational companies, research laboratories, public or private, universities, training centres, the proactive policies behind the creation of clusters explicitly raises the question of governance as a means of ensuring the management of the network and the consistency of the projects of the various partners.

Cluster governance can take on three main facets: governance in the clusters as a means of coordination, governance in clusters as a means of regulation, and governance in clusters as a means of knowledge management. Governance is built and learned gradually in a structure or in an internal order resulting from constant interactions between actors. Governance is a specific form of coordination of economic activities that differs from the market and hierarchy.

Governance is defined as a mode of regulation between a plurality of actors. It is essential to create an institutional environment conducive to interactions and exchanges of knowledge between companies in the cluster. Therefore, the governance structure of clusters plays an important role in the management of knowledge dynamics, collective process of learning and knowledge creation. A growing literature on the governance of clusters recognizes the multiple meanings of this concept and distinguishes the different facets of governance in the cluster.

### **I/3. Cognitive dimension:**

The cognitive dimension of institutional work is based on institutional practices that pool and disseminate knowledge, creating knowledge specific to cluster members, thereby improving the absorptive capacity of member companies to withstand environmental pressures (Tallman et al., 2004). Companies need to find new external knowledge, assimilate it, and apply it for

## **Institutional and Governance Practices as Mediating Variables in the Development of Innovation Within Clusters**

commercial purposes. Following Cohen and Levinthal (1990) and Zahra and George (2002), we liken this "absorptive capacity" to "a dynamic capacity anchored in the processes and routines of the firm" (ibid, 186). Teece et al. (1997) proposed the concept of dynamic capabilities, referring to the ability to integrate, build, and reconfigure resources and skills in a turbulent environment. Absorptive capacity aims to integrate new knowledge, enabling the company to reconfigure its reserve of resources in an increasingly competitive and constantly changing environment (Boschma, 2005; Suire and Vicente, 2008). In this context, institutional practices aim to pool, disseminate, and create new knowledge between actors in the same organizational field. Three sets of practices relate to this last dimension of institutional creation.

The first set of practices is mimicry ("Mimicry"), which can be assimilated to practices that facilitate the understanding and adoption of new practices, particularly innovation, and also facilitate the understanding and acceptance of new institutions. Mimicry relies on existing practices to give legitimacy to new institutional practices.

The second set of practices is conceptualization ("Theorizing"), through which a common cognitive plan is elaborated by developing key concepts around which communication takes shape and constitutes a common pillar of knowledge. This also contributes to the development of the concepts and beliefs that underpin the new institutions. The establishment of brands or standards is essential because it baptizes and materializes the concepts to be followed in the new institutional environment.

The third set of practices is training practices ("Educating"), which consists of implementing actions that develop companies' absorption capacities through training and interactive learning. Incubators or universities are main and essential players in this set of practices. The design of new institutions often involves the development of new practices. Training practices thus provide actors with the knowledge and skills necessary to engage in new practices or interact in new structures (Bocquet and Mothe, 2010; Berthinier-Poncet et al. 2011).

### **II/ Practices and Forms of Governance in Clusters to Support Innovation**

Beyond the generic resources, which are the infrastructures developed for the reception of companies, the governance structure of the clusters is brought in to manage the diversity and complementarity of the activities of the member companies and various actors of the cluster. This is achieved through the development of collective and individual actions, formal or informal meetings between the actors, thematic meetings or seminars, and the exchange of information between members.

We can distinguish two types of governance - governance dedicated to piloting (strategic governance) and one dedicated to animation (operational governance) that allows the emergence of representations and shared values between the actors and the implementation of actions to facilitate their interactions. The associative governance is carried out by the governance structure itself, around a team in the absence of other institutions.

In our analysis of the development of innovation in clusters and the collective process of learning and knowledge creation, we will examine the important role that cluster governance can play in managing these knowledge dynamics. In this perspective, governance is considered a central mechanism in the emergence of an institutional environment conducive to interactions and exchanges of knowledge between companies in the cluster (Arkan, 2009).

Governance is generally a system of decision-making entities that directs a certain area of activity and involves, in particular, a governance structure and a dynamism of the system and process. It is also a management activity that has emerged repeatedly over the past twenty years, initially limited to companies facing changes in their structure and ownership ("corporate governance"), then expanding to relationships between firms (Richez-Battesti and Gianfaldoni, 2005).

Corporate governance, captured from the contractual approaches of the firm, essentially arises from disciplinary or contractual dimensions, for the purpose of controlling and delimiting the powers of managers (Charreaux, 1997). It presents a hierarchical vision of coordinating the relationships of actors within the organization, which can restore order, resolve conflicts, and achieve mutual gains (Williamson, 1996). However, this approach does not take into account the creation of collective value intrinsic to the innovation process, leading some authors to propose integrating a cognitive dimension, especially at the start of innovation projects due to greater uncertainty (Charreaux, 2004; Wirtz, 2006).

The progressive registration of companies in inter-organizational networks, specifically in the context of innovation, has led to a broadening of the concept of governance and adopting a more relational or partnership dimension (Poppo and Zenger, 2002; Depret and Hamdouch, 2005), taking into account all the stakeholders, internal and external. However, the amplified cognitive and partnership approach focuses mainly on large organizations and the complexity of power games and conflicts of interest between the organization's stakeholders (De Propriis and Wei, 2007; Provan and Kenis, 2007), which highlights the complexity of the stakeholder games at work in the clusters.

The heterogeneity of actors (public institutions, small or multinational companies, research laboratories, public or private universities, training centers) and proactive policies behind the creation of clusters "explicitly raise the question of governance, as means of ensuring the management of the network and the consistency of the projects of the various partners" (Ehlinger et al., 2007, p. 156).

## Institutional and Governance Practices as Mediating Variables in the Development of Innovation Within Clusters

Corporate governance is difficult to define precisely enough for our research object. Therefore, we have borrowed from several currents of literature on governance elements that allow us to better account for the specificities of cluster governance. Clusters are often adopted by inter-organizational networks or "territorialized networks of organizations" (Ehlinger et al., 2007), so we have had recourse to works relating to the governance of networks. We have also mobilized the work of the French School of Proximity, which was the first to introduce the notion of territorial governance, and the work falling within the KBVC in relation to knowledge management within the cluster, the primary source of innovation.

A growing literature on the governance of clusters acknowledges the multiple meanings of this concept (Baron, 2003; Leloup et al., 2005; De Propriis and Wei, 2007). Cluster governance can take on three main facets: governance in clusters as a means of coordination, governance in clusters as a means of regulation, and governance in clusters as a means of knowledge management.

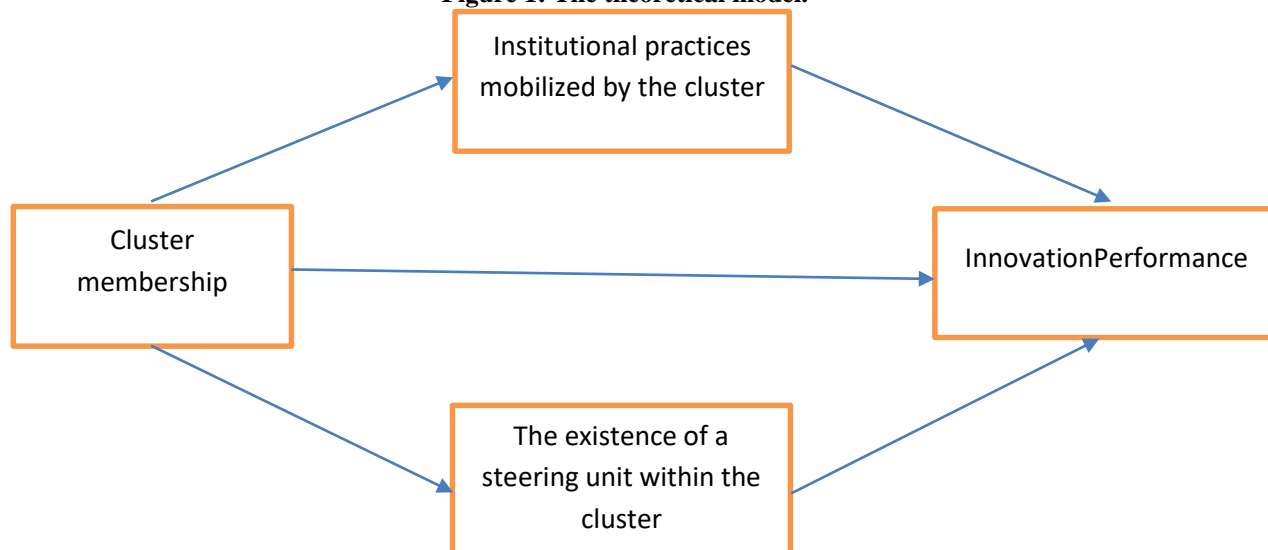
Governance in clusters as a means of coordination is a discipline studied by researchers in theory of the firm, organizations, and public management. According to Kooiman and van Vliet (1993), governance is built and learned gradually in a structure or in an internal order resulting from constant interactions between actors. Jessop (1998) also focuses on the notion of coordination by giving a broad definition of governance as "any mode of coordination of interdependent activities." A literature has developed in parallel on the governance of networks (Jones et al., 1997) defined as "a mode of coordination characterized by an informal social system rather than by a bureaucratic structure within companies and formal contractual relations between them" (ibid., p. 911). In this network approach, governance is a specific form of coordination of economic activities that differs from the market and hierarchy (Powell, 1990; Storper and Harrison, 1992).

Governance as a means of regularizing collective action is defined, in this perspective, as a mode of regulation between a plurality of actors (public or private, integrated or not in networks) in a situation of interaction according to different modes (more or less hierarchical, market, non-market or contractual), at different scales (from local to international). This governance is understood as a determinant of performance in the sense that it participates in the creation of a collective dynamic between heterogeneous actors lacking in resources and interaction capacities. If governance is therefore understood as a mode of regulation and coordination between actors, it is the result of bodies, of a strategic and/or operational nature (Mendez and Bardet, infra; Ehlinger et al. 2007).

The School of Proximities (Gilly and Torre, 1999; Pecqueur and Zimmermann, 2004; Boschma, 2005; Torre and Rallet, 2005; Rallet and Torre, 2007; Carrincazeaux et al., 2008) presents a precise definition of territorial governance around a double organizational and institutional approach as an "institutional and organizational process of building compatibility between different modes of coordination between geographically close actors" (Colletis et al. 1999, p.34).

In clusters, innovation is largely based on the exchange of knowledge, implicit or codified, with frequent interaction between the organizations and the learning processes implemented in this context. Learning is defined as an interactive process of knowledge production shared by actors (firms and formal institutions), supported by organizational routines and systems of shared representations (Doloreux, 2002). The Knowledge-based View of Clusters – KBVC (Maskell,

**Figure 1: The theoretical model.**



The clusters that will be the subject of our study are: the Nouaceur Aeronautical Cluster, the Solar Cluster, and the CE3M Cluster. Motivation for the choice of clusters: The selected clusters are each specialized in a particular field of activity, yet they share some similarities. Indeed, the relationships between the stakeholders of the clusters are structured thanks to the role of interface played by governance structures whose functioning is almost identical. The latter are made up of the general assembly, the board of directors, the executive committee, thematic commissions, and a leadership team consisting of a general manager and project

## Institutional and Governance Practices as Mediating Variables in the Development of Innovation Within Clusters

managers. In addition, the members forming these clusters are diverse, including companies, the world of research and training, and other public institutions.

An electronic questionnaire is sent to all companies in each cluster, followed by two reminders. Respondents are part of senior or middle management. The exhaustive lists of member companies were provided to us by the animation structures, and in some cases, they are available on the websites accessible to all companies. The number of collected responses retained for analysis is 73 questionnaires. The overall response rate obtained from the useful sample is 40.11%. The distribution of responses is as follows: 16 SMEs belong to the aeronautical cluster, 14 to the solar cluster, and 11 to CE3M

**Table 1 – The three Clusters covered by the case studies**

The cluster	The area	Creation date
Cluster aéronautique Nouaceur	Aeronautics	2006
Cluster Solaire	Renewable energies	2014
Le cluster CE3M	Mechatronics and mechanical electronics	2010

### A) Operationalization of variables:

To ensure the translation of the concepts forming our model into their empirical reality, we base ourselves on existing measurements in the literature. The main indicators used to operationalize the construct "belonging to an industrial cluster" were inspired by the work of Niu (2010) and Niu et al. (2008). We added a new construct related to institutional practices, measured through a range of items developed by Lawrence and Suddaby (2006) and used in the context of a study conducted on French-style clusters by Anne Berthier-Poncet in 2013. The previous authors referred to the political dimension, normative dimension, and cognitive dimension of institutional creation work. The second latent variable concerns the relational role of networking provided by the governance structures with which the selected clusters are equipped, referring to the existence of a steering unit composed of a unit responsible for coordination, regulation, and knowledge management.

### B) Confirmation of measurement scales:

An exploratory factor analysis was conducted using SPSS software to verify the reliability and validity of the constructs. For all measures, respondents were asked to indicate the degree to which the statements characterize their companies using a five-point Likert scale ranging from very low to very high.

This factor analysis showed that the institutional practices construct is defined through three dimensions, namely the political dimension, the cognitive dimension, and the normative dimension.

The political dimension: To operationalize this concept, we used eight items proposed by other authors in previous publications. The results of the AFC under SPSS show that the factorial contributions of the measurement indicators are satisfactory (Table 2), with all values greater than 0.50. Regarding the measurement scale of this variable, its internal consistency is measured by Cronbach's  $\alpha$  (0.83), and confirmed by Jöreskog's  $\rho$ . The convergent validity of the construct is verified when each observed variable shares more variance with its construct than with its measurement error. The AFC results show that the values taken by Student's  $t$  are high, and the significance level is less than 1%.

The normative dimension: For this concept, we used three items: the construction of identities, the normative association, and the normative network. The AFC results showed that the factorial contributions of the indicators are all very satisfactory. Regarding the measurement scale of this variable, its internal consistency is measured by Cronbach's  $\alpha$  (0.73), and confirmed by Jöreskog's  $\rho$ . The convergent validity of the construct is verified when each observed variable shares more variance with its construct than with its measurement error. The AFC results show that the values taken by Student's  $t$  are high, and the significance level is less than 1%.

The cognitive dimension: The items used are practices of mimicry or imitation, practices of conceptualization or constitution of brands or standards, and finally, training practices. The results for the three constructs are summarized in the table below

**Table 2- Exploratory factor analysis of the construct: Institutional work**

The work of institutional creation	component 1	$\alpha$ de Cronbach	Variance explained
The political dimension			57,0 %
Lobbying actions	0,730	0,830	
A pivotal player	0,870		
Institutional involvement	0,680		
Institutional communication	0,570		
Professional unions	0,400		
Cluster Member Selection Standards	0,850		
Definition of the role and status of each member	0,760		

## Institutional and Governance Practices as Mediating Variables in the Development of Innovation Within Clusters

Definition of standards and certifications	0,910		
Régulations de l'autorité	0,780		
Disciplinary mechanisms	0,540		
The normative dimension			
The construction of identities	0,810	0,76	59%
Normative association	0,870		
The normative network	0,880		
The cognitive dimension			
Practices of mimicry or imitation	0,740	0,81	66%
Practices of conceptualization or constitution of brands or standards	0,930		
Training practices	0,970		

**Table 3 – Results of the exploratory factor analysis of latent variables**

Cluster membership	component 1	$\alpha$ de Cronbach	Variance explained
Geographic proximity	0,840	0,710	53,0
Infrastructure	0,780		
Territorial anchoring	0,670		
Training and research and development organization	0,90		
Institutional practices			Variance explained
Political dimension	0,76		0,56
Cognitive dimension	0,8		
Normative dimension	0,71		
The existence of a steering unit	component 1	$\alpha$ de Cronbach	Variance explained
Coordinating units	0,820	0,864	69,71
Units that provide regulation	0,771		
Units that ensure knowledge management	0,973		

The age of the cluster, its size, and its industrial sector are integrated as control variables, and they can be linked to the estimation of innovation performance (Oke et al., 2012). Size is measured by the number of member companies. The categories of the clusters are the aeronautical industry, renewable energies, and mechatronics.

### Validation of the measurement model:

Before estimating the relationships between the latent variables of the specified model, the PLS method first consists of validating the measurement model. A confirmatory factor analysis is thus carried out using Smart PLS 4.0 software to ensure the reliability of the measurement scales and the convergent and discriminant validity of the constructs, which are reflexive in nature.

Table 4 summarizes the results of the reliability and convergent validity assessment. The table shows that the values of the "Composite reliability" index, attesting to the reliability of the internal consistency of the measurements, are all between 0.7 and 0.9. These values are considered satisfactory according to Hair Jr, Hult, Ringle, and Sarstedt (2013). The convergent validity is also considered satisfactory, measured by the factorial contributions, which are all significant ( $>5$ ), and the AVE (average extracted variance), which all exceed the threshold of 0.5 recommended in the literature

**Table 4: Reliability and convergent validity of measurement scales**

The construct	Items	Reliability		Convergent Validity
		Loadings/ Weights	Composite reliability	AVE
Cluster membership	Geographic proximity	0,730	0.781	0,5625
	Infrastructure	0,777		
	Territorial anchoring	0,884		
	Training and research and development organization	0,758		
	Political dimension	0,836	0.820	0,5329
	Normative dimension	0,866		

## Institutional and Governance Practices as Mediating Variables in the Development of Innovation Within Clusters

The work of institutional creation	Normative dimension	0,866			
The existence of a steering unit	coordinating units	0,914	0,914	0,5041	
	units that provide regulation	0,944			
	units that ensure knowledge management	0,818			
Innovation performance	Development of new products and services	0,706	0,718	0,5913	
	Increase in the number of innovative projects	0,765			
	Reduction of the time required between the conception of an innovation and its introduction on the market	0,748			
	Rapid adoption of new emerging technologies in the industry	0,24			
Variables de contrôle					
Cluster size	Number of companies	1,000	1,000	1,000	1,000
The enclosure	Cluster age	1,000	1,000	1,000	1,000
Activity area	Type of industry	1,000	1,000	1,000	1,000

Grammatically corrected sentence: Through verification of the discriminant validity of the measurement instruments, we deduce that the construct captures a unique phenomenon that is not represented by the other constructs of the model. The first criterion is that of Fornell-Larcker, which represents the most conservative method, according to Hair et al. (2013). This method is based on a comparison between the square root of the AVE values and the correlations with the latent variables. It consists of verifying that the value of the square root of the mean variance extracted (AVE) of each construct is greater than its correlations with any others. The results in the following table attest to the discriminant validity of all the variables in our model.

**Table 5: Correlation between the constructs and the square root of the AVE**

	AVE	Age	1	2	3	4	5	6
Age	1	1						
Cluster membership	0.423	0.342	0.750					
Institutional practices	0.511	0.316	0.241	0.730				
Control unit	0.531	0.411	0.310	0.190	0.710			
Innovation performance	0.472	0.016	0.315	0.508	0.486	0.769		
Activity area	1.000	0.631	0.178	0.325	0.020	0.072	1.000	
Cluster size	1.000	1.000						

Another criterion used is the heterotrait-monotrait ratio (HTMT). Henseler, Ringle, and Sarstedt (2015) demonstrated through a simulation study that the previous approach does not reliably detect the lack of discriminant validity in common research situations. Therefore, these authors propose an alternative approach based on the multitrait-multimethod matrix to assess discriminant validity, namely the HTMT ratio of correlations. They showed the superior performance of this approach by means of a Monte Carlo simulation study in which they compared the new approach to the Fornell-Larcker criterion and the evaluation of (partial) cross-loadings. They recommend using the HTMT criterion to assess discriminant validity. If the HTMT value is less than 0.90, discriminant validity has been established between two reflective constructs. The following table presents all the HTMT values.

**Table 5: HTMTs**

	Heterotrait-monotrait ratio (HTMT)
Existence of a steering unit -> Membership of a cluster	0,399
Innovation performance -> Cluster membership	0,680
Innovation performance -> Existence of a steering unit	0,541
Institutional practices -> Belonging to a cluster	0,704

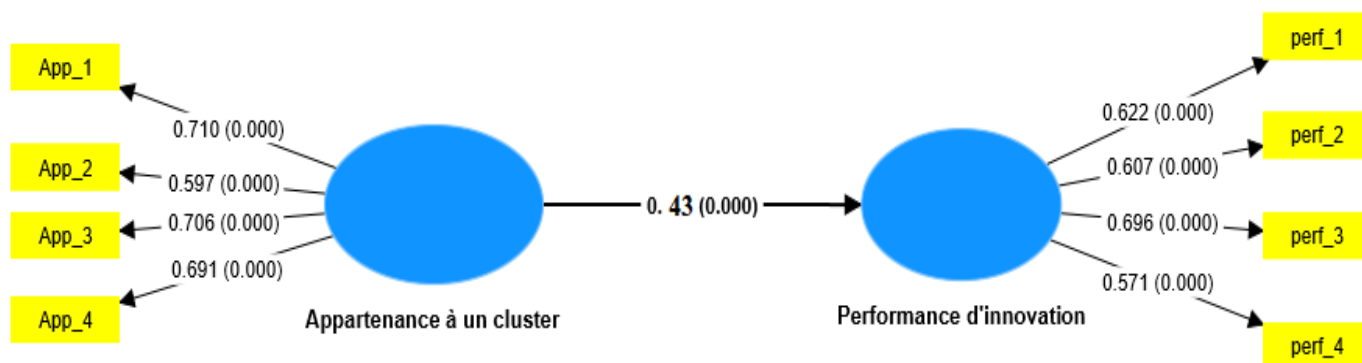


## Institutional and Governance Practices as Mediating Variables in the Development of Innovation Within Clusters

Institutional practices -> Existence of a steering unit	0,659
Institutional Practices -> Innovation Performance	0,801

In short, the criteria for evaluating convergent and discriminant validity that were used for validating the measurement model are satisfactory.

Results: After ensuring the validity of the measurement model, the next step is to test the structural model, also known as the internal model. This model replicates the theoretical relationships between latent variables, which will be compared with empirical data from the field of study. In this regard, we examine the validity of the hypotheses, distinguishing between direct and mediated relationships. This involves examining the significance of the standardized structural coefficients between constructs.



**Figure 2: Direct measurement model**

The previous figure illustrates the validation of hypothesis H2, which states that belonging to an industrial cluster has a positive and significant impact on innovation performance ( $\beta = 0.43$ ; with a significance level of 0%). This effect is controlled by the variables age, cluster size, and type of industry. Among these variables, only the type of industry has a positive effect on innovation performance ( $\beta = 0.288$ ;  $p = 0.018$ ). It is worth noting that different factors in different industries can affect the adoption of innovative practices and the performance of firms (Oke et al., 2012).

By integrating institutional practices and the existence of steering units as intermediate variables (as shown in Figure 3), we can better understand their importance in explaining innovation performance. Consistent with theoretical expectations, belonging to a cluster has a positive influence on innovation. Moreover, the results show that innovation performance is positively associated with institutional practices ( $\beta = 0.41$ ;  $p = 0.000$ ) and with a stronger effect with the existence of a steering unit ( $\beta = 0.63$ ;  $p = 0.000$ ).

As a result, we can fully validate the validity of sub-hypotheses H2 and H3. Note that the model explains 55% of the variance of the main endogenous construct "innovation performance." With regards to the mediating effect of institutional practices and the existence of a steering unit, the results show that the direct relationship (H1) between cluster membership and innovation performance is still significant in the absence of the two mediating variables (first condition).

The second condition requires that the independent variable exerts a significant effect on the mediating variables, which is confirmed by hypotheses H2 and H3. In a third regression that includes the dependent variable and the two mediators, the latter significantly influence innovation performance (third condition).

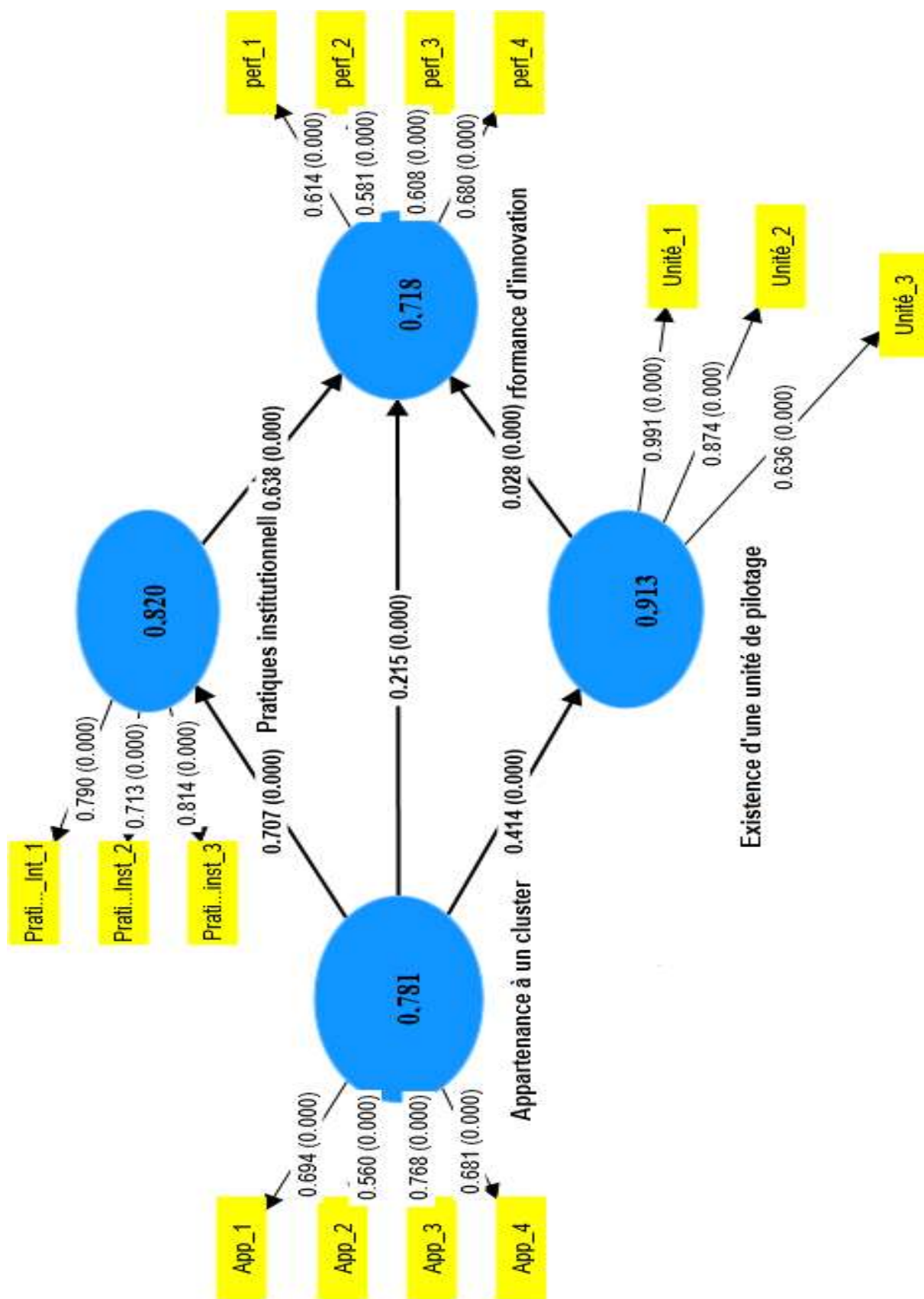


Figure 3: The structural model

We note from Figure 2 that the link between variable X (belonging to a cluster) and variable Y (performance of innovation), which was previously significant, becomes very weakly significant after the integration of the mediating variables ( $\beta = 0.028$ , at the 3% threshold).

## **Institutional and Governance Practices as Mediating Variables in the Development of Innovation Within Clusters**

Discussion and Conclusions on the Model: The research question posed in this study concerns the impact of belonging to industrial clusters on innovation performance, which is a subject of debate in the literature (Giuliani, 2005; Suire, Vicente, 2015; Terstriep et al., 2012), and previous empirical results that have tested it are divergent (Kukalis, 2010). This lack of homogeneity in the results indicates that the relationship between cluster membership and innovation performance is probably not direct.

In this sense, we break down this relationship into direct and indirect effects by involving institutional practices and the existence of a steering unit as mediating variables. The first direct effect tested in this research confirms that the member companies of the cluster are efficient in innovation. This corroborates Porter's key hypothesis (1998, 2008), which states that clusters positively affect the innovation of member firms.

Moreover, in the management literature, there is a consensus on the strategic role of institutional practices. According to Arikan (2009), three main factors can prevent the creation of knowledge in clusters: the lack of opportunities for knowledge exchange, the futility of such exchanges, and the lack of a conducive institutional environment for cooperative relations. Additionally, Arikan (2009) postulates that the existence of a steering unit would explain the innovation performance of companies. In this perspective, governance is also considered a central device in the emergence of an institutional environment suitable for interactions and exchanges of knowledge between companies in the cluster (Arikan, 2009).

Taking into account institutional practices and the existence of the steering unit that manages and facilitates interactions significantly improves the explained variance of innovation performance, which rises to 55%.

The main result of our research is the identification of the mediating role of institutional practices and the existence of the steering unit. The results obtained allowed us to notice that the effect of belonging to a cluster on innovation performance becomes less significant ( $\beta = 0.028$ , at the 3% threshold) in the presence of the two mediating variables. This means that the effect of involvement in the cluster on innovation performance is mediated (but not perfectly) by the two cooperation mechanisms. The latter are therefore much more than elements among others of the context of clusters (van Dijk, Sverrisson, 2003). They have a strategic scope and seem to be a prerequisite for the performance of companies in innovation.

### **General conclusion:**

In concluding this research thesis, we can assert that the clustering policy is a valuable strategy for promoting innovation in companies, regardless of their size or sector. This subject is currently attracting the attention of several researchers in location theory. Our work is situated within the clustering framework, which describes the interactions between member companies and various actors in terms of cooperation and competition. To achieve our objective, we have drawn on localization, institutional, organizational, and innovation theories. The level of analysis in our case relates to the network of organizations formed by the diversity and multiplicity of actors in the cluster.

However, we must not view the agglomeration of companies in a cluster as the sole factor that promotes innovation for member companies. Our work aims to explain the impact of institutional creation work on innovation, emphasizing the role of governance within the agglomeration to foster innovation in optimal conditions.

In addition to the benefits of spatial agglomeration on innovation development, the presence of a governing body is crucial in this group of heterogeneous actors for enhanced productivity and innovation. Our findings demonstrate that governance practices mobilized by each cluster facilitate interactions between different actors, thus enabling effective undertaking

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