Transforming the Governance of Economic Development: The Case of the Ornamental Stones Sector in Espírito Santo

Karen Chapple, Pedro Peterson, and Robert Daughters
University of California, Berkeley

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Executive Summary

Clusters, or agglomerations of interconnected businesses and institutions, drive regional competitiveness, but at the same time create new challenges for territorial governance and economic development. Though clusters emerge organically out of regional advantages, they typically require some public sector involvement in order to sustain their growth. Given ongoing shifts from government to "governance," this involvement increasingly takes the form of a public-private management model (PPMM). Yet, developing an appropriate PPMM can prove difficult because of the many competing interests, or fragmentation, within the cluster.

This study examines the governance of the ornamental stones sector in Espírito Santo, a state in southeastern Brazil. Dominating this sector is a cluster, concentrated around the southern municipality of Cachoeiro de Itapemirim, that includes machinery and other support firms and institutions as well. This is one of four projects in which the National Confederation of Industries (CNI) is collaborating with the Multilateral Investment Fund (MIF) to improve global competitiveness through more effective territorial governance. It illustrates some of the challenges these institutions have experienced in shifting from a past focus on clusters and business networks to a more territorial economic development approach. The aim of the Espírito Santo project case is to improve the global competitiveness of the ornamental stones sector by promoting collective efforts by the public and private sectors to modernize production, improve logistics, and develop marketing.

The organization of the current governance effort combines the evolving conceptualization of cluster policies in Brazil[1] with the MIF's emerging approach to territorial governance for economic development. In the MIF's "Promoting Local Competitiveness" policy, most local economic development (or territorial competitiveness) operations consist of strengthening productive and area development networks, and providing matching grants for public-private joint investments for business development and innovation and in support of strategic sectors. The foundations of the ornamental stones cluster in Cachoeiro -- a strong, private-sector led business association, an active technology center committed to improving the competitiveness of local firms, and support from local and State-level public agencies -- made it a promising case for MIF investment. The extensive involvement of non-state actors – in this case, nonprofit entities that represent private actors – also made this case a potential exemplar of good governance and the democratization of development. Finally, the state's difficult terrain and poor infrastructure create interesting challenges for the territorial governance of economic development.

Historically one of the poorest states in Brazil, Espírito Santo was for many decades an agriculture region specializing in coffee-growing. In 1957, the first quarries began extracting marble, and the sector grew rapidly. The region developed new specializations in stone cutting, polishing, and finishing, and also in related sectors such as machine and equipment manufacturing. By 2010, over two-thirds of Brazil's stone exports came from the state, with about half of the product going to the United States. Currently, there are about 36,000 jobs in the stones sector, with granite extraction mostly in the northern part of the state (near the municipality of Nova Venécia) and marble extraction and processing particularly concentrated in Cachoeiro de Itapemirim and its surrounding municipalities. The State's capital, Vitória, plays important administrative and logistical roles, and its metropolitan region

includes dozens of small workshops that transform the polished stones into final consumer products. Supporting the sector generally are many different institutions, most notably a trade association (Sindirochas), a technology center (CETEMAG), and an array of government agencies.

Though the sector grew steadily in the boom decade of the 2000s, the global economic crisis in 2008 brought a key turning point. Overreliance on the US market created a need to diversify markets, and global competition, particularly cheap products from the Chinese, suggested that it was time for regional producers to shift up the value chain. Although exports have rebounded since the crisis, these new challenges bring a new level of organizational complexity. In addition, the sector faces bottlenecks in multiple arenas: most importantly, environmental issues such as the disposal of residues from the production process, logistics issues which hinder the transport of blocks overseas, inefficiencies in the production process, and lack of domestic demand. Although the sector continues to grow, this growth may not be sustainable without concerted collective efforts aimed at improved governance of the sector across the entire state.

Espírito Santo benefits not just from a concentration of entrepreneurs and institutions, but also the legacy of earlier governance projects. Can it fashion these assets into viable governance for territorial economic development and global competitiveness? Based on open-ended interviews with almost 30 stakeholders, this study describes the governance structure that has evolved in the past decade, with the goal of eliciting lessons for PPMMs – and future MIF investments. Specifically, we look at how the PPMM accomplishes local economic development goals.

Conceptual framework

The existing literature is largely silent on the ways in which joint action (which we take to mean "governance") can expand external economies through public-private interactions that increase the collective efficiency of regions. We develop our conceptual framework based first on Jessop's (1998) ideas of metagovernance and governance failure, adding in the notion of collective efficiency from the work on cluster governance (Schmitz 1999, Giuliani et al. 2005). We see metagovernance as a deliberate effort to directly coordinate a broader set of self-coordinated activities across networks. Such networks might exist in an economic sector, spatial territory, or other system, and will consist of both firms and related institutions. Individual networks are reflexively self-organized, meaning that they develop a common language and vision around an issue, but also that they learn from failure and continuously adapt their behavior accordingly. This creates collective efficiency, or effective joint action either horizontally -- between stakeholders in equivalent positions (such as firms) – or vertically, in hierarchies (as between suppliers and producers). Where coordination and learning across these networks is occurring, there is metagovernance.

In the Espírito Santo case, we can see the development of governance mechanisms that transmit knowledge among firms and between firms and other actors in the cluster and more broadly in the statewide sector. These mechanisms are primarily associations or networks – some horizontal, some vertical, most functioning in small groups -- with an ability to articulate problems and models, develop consensus about solutions, and conduct joint action related to an array of problems (environmental, trade, marketing, etc.). At the same time, however, the broader vision developed for the whole sector is lacking, and many stakeholders perceive governance efforts as benefiting only narrow groups and

ignoring conflicts between the needs of different actors. This creates an "oversimplification" of the cluster's diversity of interests (Jessop 1998). Although simplification is important in order to improve understanding and gain buy-in, it may reduce complexity so much that the model does not reflect the variety of the real world. Metagovernance in this case, therefore, has had great difficulty developing collective learning and vision. As we show, this metagovernance failure manifests itself in attempts to solve a variety of broad economic development bottlenecks (including issues of the environment, logistics, supply chain, export market, labor, and more).

The role of space is particularly relevant in the Espírito Santo case because of the mismatch between the cluster, which is centered on Cachoeiro de Itapemirim, and the CNI/MIF program, which is organized to include the entire statewide ornamental stones sector. Thus, there is ambiguity in establishing a proper geographic scale for developing policies and partnerships. It also affects the ability to forge a shared vision for the sector. The physical distance between stakeholders hinders communication and participation in governance, and as a result, leaders tend to narrow their goals, ignore conflicts, or oversimplify the bottlenecks.

How Governance Works

The current governance effort benefits from the precedent of a previous effort, led by the Brazilian Small and Micro-Enterprise Agency (SEBRAE) in the mid-2000s called RedeRochas. That project created working groups that facilitated firm learning and developed projects with broad buy-in. It also launched a strategic planning process that surfaced several key goals for the sector: most importantly, developing management capacity, but also marketing, environmental issues, and technological innovation. In essence, the groups supported collective efficiency, in the form of joint action across firms in horizontal networks.

On the public sector side, managing the project for CNI/MIF is FINDES/IEL, the state affiliate of CNI. Numerous other federal and state economic development and workforce development agencies, most prominently the state's development bank (BANDES), are also involved, as well as the municipal government in Cachoeiro de Itapemirim. The project also benefits from the support of multiple effective private actors, such as SindiRochas, CETEMAG, and the sector's credit cooperative (CrediRochas). Another key actor is CentroRochas, the sector's export logistics association.

The CNI/MIF collaboration in Espírito Santo has attempted to recapture some of the successes of RedeRochas, particularly in fostering collective actions among firms, and close coordination with the public sector in certain areas (such as environmental regulation). In addition, it is designed to work with all firms, not predominantly micro and small enterprises (as had been RedeRochas), and expand governance to include a broader array of institutions. The project's leadership hopes to incorporate an explicitly territorial focus to the governance efforts. To accomplish this, the project has cast a broad net, inviting 19 institutions to join the Steering Committee, including public actors from the State and municipal governments, trade associations, and the employees' labor union (a description of each actor is included below). However, continuing RedeRochas' work has proven challenging partly because of changes in recent years, for instance, the growth of large firms, and the growing diversity of the maturing cluster, which creates divergent interests.

Given that the CNI/MIF program is still underway, it is too early to make broad conclusions about the current governance process, or even evaluate outcomes. However, several successes and failures of recent projects, most occurring before the current program, suggest lessons for the future. Some projects have required mostly horizontal coordination, as for instance firms organized for joint action to solve environmental problems such as sludge disposal or urban land use conflicts, often with some vertical support, from higher-level government agencies. Others are best characterized as vertical – for instance, technology transfer from research institutes to firms, or interventions to improve supply chains or exports. The most successful efforts typically combine both horizontal and vertical action in order to facilitate learning or simply reach agreement about goals. However, even the most effective governance efforts have so far failed to bridge the three critical divides in the sector: firm type, size, or location within the region.

Conclusion: Effective Governance in the E.S. Ornamental Stones Sector

The most effective governance processes will develop collective learning in order to enable feedback, and also will result in a vision that is shared across stakeholders, a vision that simplifies models and practices but still reflects the complexity of the sector (Jessop 1998). In Espírito Santo, local, regional, and national actors have cooperated in many projects that have succeeded in helping the sector upgrade in both process and product. Yet, governance has as of yet failed to develop an effective governance mechanism that can foster a common vision or purpose across the many different stakeholder groups. Rather than working to reconcile interests that differ across different constituencies and sub-territories, the governance structure tends instead to oversimplify differences among actors, choosing to represent a subset of firms rather than to address difficult conflicts of interest. Exacerbating this issue is the project's focus on discrete technical projects that just benefit a few firms in a short timeframe, rather than taking the time to carefully develop broader goals. Further, there is confusion about the organizational structure of the project, specifically, the extent to which it is explicitly continuing RedeRochas' work. We argue that the PPMM has an opportunity to facilitate collective action across multiple arenas and groups with different issues at stake in order to overcome functional and spatial fragmentation and facilitate learning from failure and cooperation. This might occur by three means: first, by clarifying the geographic focus and organizational structure of the project; second, by providing carrots to smaller firms to encourage broader participation in the governance, and third, by devoting more time and resources to developing cluster governance rather than on discrete projects. This improved coordination will create *metagovernance* for territorial economic development (Jessop 1998).

The current governance effort, led by CNI/MIF in close cooperation with Sindirochas, has begun with innovation and technology transfer relative to the cutting and polishing of stone blocks and disposition of residues. Although the project scope includes governance efforts (some not yet underway), in some ways the technology transfer projects are the lowest-hanging fruit for obtaining tangible results quickly. Improving technology is key to global competition, but it falls short as the primary governance goal; it is benefitting a few firms, but not solving the bottlenecks that affect the growth and sustainability of the entire sector. In Espírito Santo, and even only in Cachoeiro, the heart of the sector, local, regional, and national actors have failed to develop the common vision that is so

critical to developing a strategy and a brand for the region's stone products, as well as dealing with environmental issues like sludge disposal. Likewise, the sector lacks both vertical and horizontal cooperation (Schmitz 1999). Although quasi-hierarchical relationships with suppliers and buyers have helped some firms to upgrade in both process and product, the sector overall lacks the collective efficiency that could lead to functional upgrading, i.e., the transition to higher value-added production (Giuliani, Pietrobelli, & Rabellotti 2005). A few firms are able to move up the value chain and access new markets, while most struggle to maintain market share in an ever more competitive environment.

In the absence of collective action that joins together the majority of firms, the common vision that is formulated oversimplifies the various interests, some of them conflicting. One example is the disconnect between producers and suppliers that slows the development and use of sophisticated machinery; although some individual firms benefit from strong relationships with input manufacturers such as machinery firms, this vertical cooperation is rare. Likewise, many large firms pursue their own market connections and trade protections rather than invest in more cooperative efforts. Even a simple metric meant to cross-cut the sector, like "increased exports," can fail as a common vision if some players (in this case, the small firms), do not benefit. A measure that carefully measured change in the domestic market might be more appropriate.

Though associations with a narrow focus – such as AAMOL, Cetemag, and the São Joaquim Industrial District outside of Cachoeiro– work effectively on behalf of their own members, they are fragmented, so little cross-association learning and governance take place. The insular entrepreneurial culture and geography of the region (with governance efforts focusing mostly on Cachoeiro but not its neighboring municipalities) compound the challenge of collective action, as successful joint action in one municipality rarely spills over to another.

These multiple fracture lines – between firm types and the state's subregions – suggest that Espírito Santo is not functioning like a classic Marshallian industrial district – a point emphasized by many interviewees. It also differs from a hub-and-spoke organization in that larger firms tend to dominate the earlier phases of the production chain (extraction and cutting/polishing), and smaller firms manufacture the final consumer products. In other words, larger, more profitable firms are the suppliers of inputs (polished slabs) for the stones workshops, which tend to be micro and small enterprises operating with very low margins. Increasingly, vertically integrated firms are reluctant to cooperate and tend to dominate local resources. The focus of SindiRochas on their needs is not an intentional strategy but reflects these local power dynamics and results in the loss of its legitimacy as the representative of the sector. Because sector governance, by SindiRochas and its partners, has focused on many small, albeit successful, projects that each benefits only a few firms, the governance process has actually reinforced the fragmentation of interests. This suggests a need to think carefully about the type of sector policy that will best be able to support this form of industrial district.

Although the current governance effort is attempting to be inclusive, it is perceived as coming from above, rather than emerging from a shared vision. Thus, it as yet lacks governance mechanisms to facilitate the collective learning, both vertical and horizontal, so key to metagovernance. Clearly, as Schmitz (1999) and Sepulveda (2008) suggest, a public sector champion (or several) are needed to ensure that locals are able to obtain support from the multiple levels of government with access to

resources. However, as structured under APL policy, and even under the current CNI/MIF arrangement, local actors need not achieve widespread consensus in order to mobilize support. To win funding, actors such as CETEMAG tend to present shovel-ready projects from a list prepared by consultants. Though these projects are likely to result in productivity improvements for the firms that directly benefit, they are essentially the low-hanging fruit of the economic development process. To address the many bottlenecks of the sector, stakeholders will have to go through the much harder work of building consensus across firms.

In order to achieve this kind of metagovernance for territorial economic development, stakeholders will need to work together more effectively to develop a common vision. As was done in a strategic planning process for the marble cluster in Macael, Spain, this vision should come from below, to motivate firms resistant to collaboration and participation in the provision of collective goods. This might involve developing a strategic plan for action that provides tangible (and low-conflict) benefits to a broad segment of the ornamental stones sector, for instance, supporting the broad-based growth of the sector by diversifying markets, dealing with common bottlenecks, strengthening local supply chains, and improving production processes that lower costs across the full spectrum of businesses, not just for a few. This means a new start for the CNI/MIF program, to devote more project resources to governance processes, in a longer timeframe.

To develop a capacity to focus on broader issues will require the governance to incorporate complexity of interests and conflict, such that it gains legitimacy with all actors, even when they are the "losers" in particular decisions. For the CNI/MIF program, this may mean moving forward from its coordination of the governance effort with SindiRochas. Instead of allying itself so closely with SindiRochas, the project might try to facilitate collective action across the many different groups, or to draw from a broader set of firms than is currently represented by the SindiRochas leadership. Small firm executives are typically too busy to see the purpose in participating in associations, but incorporating them into the governance could benefit the entire sector; for instance, small firms often have more flexibility in production because of less stringent regulations. The elements of metagovernance are in place; there are many different self-coordinating networks, such as AAMOL, CTR, the São Joaquim Industrial District, SindiRochas, Sindifer, the remaining RedeRochas working groups, and so forth, which would benefit from CNI/MIF engaging in a broader effort to facilitate learning and visioning.

One concrete step towards this would be to clarify the geography and scope of the governance effort. If the goal is to shift from sectoral economic development to territorial economic development, stakeholders need to decide whether to focus efforts on the needs of the Cachoeiro cluster, which already has a territorial focus, or to initiate a broader effort across the state. . In other words, what is the most relevant and effective territory to focus on? The answer to this question is beyond the scope of this report, but what this case makes clear is that a territorial governance project needs to be explicit about its geographic extent. If it is truly to address needs across the state – a focus that will be necessary if sustainability is a goal -- then the complexity of the project increases significantly. For instance, addressing an environmental issue like sludge disposal will mean not just supporting discrete

associations in Cachoeiro and Nova Venecia but sharing information and technology among associations as well as coordinating with other related sectors such as trucking and construction.

In a sense, the top-down federal APL approach has left a legacy that may be impeding the transformation to more of an endogenous economic development strategy. . A truly endogenous and territorial approach would acknowledge and build upon existing strengths, coordinating between ornamental stones and other sectors with related interests. If the initiative is to include the whole state systematically, to address the fragmentation of firm interests, and to coordinate across sectors to enable a more territorial approach, the CNI/FINDES/IEL will need more resources to address diverse firm needs.

Another step might be to develop a comprehensive program to attract small firms to the cluster governance. For instance, the CNI/MIF program might support CETEMAG or other key actors in the development of projects that specifically benefit small firms. Or, Sindirochas might offer pilot projects that meet the needs of small firms for credit or technical assistance (already identified in the RedeRochas strategic planning process), but require involvement in governance in return. Additionally, Sindirochas might dedicate seats on its board of directors specifically to small firms, especially ornamental stones workshops (marmorarias), and create a full-time staff position to recruit and work with small and micro-entrepreneurs.

An effort to coordinate across networks, or even simply to bring a broad cross-section of sector firms together to develop a vision for the region's future and plan more strategically for the sector's continued rapid growth, is challenging, presents high risk, and may fail. Without this metagovernance, the sector will survive; there are already many successful, albeit small, collective initiatives that have helped it to sustain its growth through crisis. But the alternative likely means that the ornamental stones sector will not reach its potential in the global market, and more importantly, will continue along the path of exclusion and unsustainable growth.

Introduction

Clusters, or agglomerations of interconnected businesses and institutions, drive regional competitiveness, but at the same time create new challenges for governance and territorial economic development. Though clusters emerge organically out of regional advantages, they typically require some public sector involvement in order to sustain their growth. Given ongoing shifts from government to "governance," this involvement increasingly takes the form of a public-private management model (PPMM). Yet, developing an appropriate PPMM can prove difficult because of the many competing interests, or fragmentation, within the cluster.

This study examines the governance of the ornamental stones sector in Espírito Santo, a state in southeastern Brazil. Dominating this sector is a cluster, concentrated in southern Espírito Santo, that includes machinery and other support firms and institutions as well.[2] This is one of four projects in which the National Confederation of Industries (CNI) is collaborating with the Multilateral Investment Fund (MIF) to improve global competitiveness through more effective territorial governance. It thus illustrates some of the challenges these institutions have experienced in shifting from a focus on clusters and business networks to a more territorial economic development. In each region, the PPMM is to bring together regional, business, and institutional stakeholders from the public and private sectors to develop an "integrated action model" that will promote the sector's competitive advantage.[3] Across all cases, the model seeks to strengthen the local production network, conduct specific business development initiatives, and promote collective solutions. In the Espírito Santo case, the project is to improve the global competitiveness of the ornamental stones sector by promoting collective efforts by the public and private sectors to modernize production, improve logistics, and develop marketing.

Historically one of the poorest states in Brazil, Espírito Santo was for many decades an agriculture region specializing in coffee-growing. In 1957, the first quarries began extracting marble, and the sector grew rapidly. The region developed new specializations in stone cutting, polishing, and finishing, and also in related sectors such as machine and equipment manufacturing. By 2010, over two-thirds of Brazil's stone exports came from the state, with about half of the product going to the United States. Currently, there are about 36,000 jobs in the stones sector, with granite extraction mostly in the northern part of the state (near the municipality of Nova Venécia) and marble extraction and processing particularly concentrated in Cachoeiro de Itapemirim and its surrounding municipalities. The State's capital, Vitória, plays important administrative and logistical roles, and its metropolitan region includes dozens of small workshops that transform the polished stones into final consumer products. Supporting the sector generally are many different institutions, most notably a trade association (Sindirochas), a technology center (CETEMAG), and an array of government agencies.

Though the sector grew steadily in the boom decade of the 2000s, the global economic crisis in 2008 brought a key turning point. Overreliance on the US market created a need to diversify markets, and global competition, particularly cheap products from the Chinese, suggested that it was time for regional producers to shift up the value chain. These new challenges bring a new level of organizational complexity. Although the sector continues to grow without improved governance, this growth may not be sustainable without concerted collective efforts across the entire state. Espírito Santo benefits not just from a concentration of entrepreneurs and institutions, but also the legacy of earlier governance

projects. Can it fashion these assets into viable governance for territorial economic development and global competitiveness?

Based on open-ended interviews with almost 30 stakeholders, this study describes the governance structure that has evolved in the past decade, with the goal of eliciting lessons for PPMMs – and future MIF investments. Specifically, we look at how the PPMM accomplishes local economic development goals. The most effective governance processes will develop collective learning in order to enable feedback, and also will result in a vision that is shared across stakeholders, a vision that simplifies models and practices but still reflects the complexity of the sector (Jessop 1998). In Espírito Santo, local, regional, and national actors have cooperated in many projects that have succeeded in helping the sector upgrade in both process and product. Yet, governance to date has as yet failed to develop an effective mechanism that can foster a common vision or purpose across the many different stakeholder groups. Rather than working to reconcile interests that differ across different constituencies and sub-territories, the governance structure tends instead to oversimplify differences among actors, choosing to represent a subset of firms rather than to address difficult conflicts of interest. Exacerbating this issue is the project's focus on discrete technical projects that just benefit a few firms in a short timeframe, rather than taking the time to carefully develop broader goals. Further, there is confusion about the organizational structure of the project, specifically, the extent to which it is explicitly continuing RedeRochas' work. The sector thus has not yet developed the *collective efficiency* that can aid functional upgrading, i.e., the transition to higher value-added production (Giuliani, Pietrobelli, & Rabellotti 2005; Schmitz 1999). We argue that the PPMM has an opportunity to facilitate collective action across multiple arenas and groups with different issues at stake in order to overcome functional and spatial fragmentation and facilitate learning from failure and cooperation. This might occur by three means: first, by clarifying the geographic focus and organizational structure of the project; second, by providing carrots to smaller firms to encourage broader participation in the governance, and third, by devoting more time and resources to expanding participation in cluster governance rather than on discrete projects. This improved coordination will create *metagovernance* for territorial economic development (Jessop 1998).

The following begins by examining the academic and professional literature on the governance of territorial economic development. We then offer a conceptual framework for analyzing the effectiveness of this governance. After describing the case background in more detail, we next discuss the governance efforts that have taken place in recent years. The next section revisits these efforts from the lens of metagovernance. A conclusion offers policy implications for the MIF and thoughts on sustainability.

The governance of territorial economic development: A review of the literature

To develop a framework, we review two literatures relevant to the governance of territorial economic development, the first on the territorial basis for innovation and competitiveness in a global economy and the second on the role of emerging modes of coordination of public and private actions that have come to be defined as "governance." Both the theoretical and applied work suggest the

convergence of economic development policy and territorial governance, which sets the stage for the new challenges for learning and coordination that the ornamental stones sector in Espírito Santo is experiencing.

In recent decades, subnational territories have assumed increasing importance as privileged spaces for analyzing economic development and growth. Regions have come to be seen as global nodes of innovation and information sharing and, at the same time, endogenous agglomeration dynamics and particular institutional settings have been understood as the source of external economies that create substantial competitive advantages. Successful regions are connected to the global economy via global value chains and maintain internal and endogenous dynamics that are key for the creation and attraction of competitive and innovative firms. Such an understanding has coincided with a widespread devolution, particularly in Latin America, of political, administrative, and financial powers from national to municipal and provincial/regional/state governments. Still, much economic policy continues to focus on national level investment plans and macroeconomic measures that ignore the role of regions in economic development.

A separate though related thread concerns new ways of investigating the relationship between state and market, moving beyond a duality of roles for public and private actors. This literature, also known as governance, emphasizes a much more fluid set of interactions between the public sector and a variety of private actors such as firms, NGOs, trade associations, labor unions, and private individuals in explaining economic development and policy outcomes. While the public-private fluidity that governance represents has often come to be seen as an answer to debates about "market failure" and "state failure", we seek to also understand the presence of "governance failure", particularly as it pertains to the territorial management of economic development. The importance of governance failure opens a new line of empirical analysis in governance studies concerned with the possibilities and limitations of public-private collaborations and governing networks.

Cluster policies in local and regional economic development

Abandoning the earlier focus on Ricardian ideas of comparative advantage, in recent years the most influential theories of territorial economic development have focused on the external economies generated through the spatial agglomeration of firms in particular territories such as the city or the region, with an emphasis on studying the role of local and regional institutions and knowledge sharing as an endogenous process that promotes innovation and economic growth. The dynamics behind these local and regional agglomerations have generated significant theoretical and policy interest throughout the world, particularly in Western Europe (Brusco 1982, Piore & Sabel 1984), the United States (Porter 1998, Motoyama 2008, Markusen 1996, Saxenian 1994), as well as many developing countries (Schmitz and Nadvi 1999)[4]. The literature on industrial districts in Italy and business clusters in the United States has had a particularly strong influence in economic development policy in Latin America starting in the 1990s and until today (Schmitz 1999b, Rabellotti 1999, Villaschi et al 2006, Cassiolato and Lastres 2006, Giuliani et al 2005). The emergence of cluster-based policies in the 1990s came after a period in which Latin American governments struggled to find ways to promote industrial development following the demise of policies favoring a strong state role, such as import substitution and the nationalization of

strategic industries.[5] Cluster theory provided a dynamic, private-sector led alternative economic development model based on innovation and market competition at the local and regional levels, and one in which the state played an important, but circumscribed role (Meyer-Stamer 1997; Sepulveda and Amin 2006).

Cluster-based economic development strategies can be traced back to the emergence of scholarly literature about industrial districts in the Emilia-Romagna region of Italy in the early 1980s (Brusco 1982, Piore & Sabel 1984). In North America, the concept of territorially based economic development gained prominence through Porter's (1998) work on business clusters, a term he uses to refer to "geographic concentrations of interconnected companies and institutions in a particular field" (p. 78). The geographic proximity allows for close interactions, both cooperative and competitive, among private and state actors, leading to global competitive advantages for individual firms as well as for the whole regions in which they are located. Although Porter's work was largely descriptive, practitioners often interpreted it as prescriptive guidelines for designing cluster governance (Motoyama 2008).

In the United States, the paradigmatic case of a successful innovative cluster is Silicon Valley where the presence of risk-taking entrepreneurs and venture capitalists, research institutions, and military funding transformed it into the world's leading high technology region. Saxenian (1994) argued that it was the learning process of an entire professional community that benefits from external economies and that was, along with regional culture and industrial structure, key to Silicon Valley's flexible "technical community." Silicon Valley's "high-tech formula" has been widely imitated in the US and abroad. However, Saxenian (1989) has argued that these attempts are likely to be unsuccessful because certain path-dependent foundations to Silicon Valley's success, such as the presence of strong domestic demand for technology, might not exist even in regions that contain most ingredients in the high-tech formula.

Other critics pointed out the narrow focus on Marshallian-type districts of small manufacturing firms (such as those in the Third Italy), ignoring the continued dominance of large firms (Harrison 1994). Markusen's (1996) influential critique of the literature on industrial districts expanded the debate about which types of regions could attract, retain, and grow economic activity in a post-Fordist economy, a quality she describes as "stickiness." She outlined alternative types of regional productive systems that might also engender sticky economic growth, such as regions composed of large firms and their small suppliers (a "hub-and-spoke" pattern), branch offices of outside corporations within industrial parks, or large-scale government institutions (state/federal government offices, university, military bases, and the like). These critiques resonate particularly in the Latin American context: for instance, Humphrey and Schmitz (2000) and Villaschi et al (2006) also identify successful "hub-and-spoke" clusters, made up of one large firm and several smaller supplier firms.

Economic development in the Latin American context

The rising interest in urban and regional economic governance in Latin America can be explained, at least partially, by two key factors (Chapple, Montero and Sosa 2013). First was the new

state configuration brought by decentralization processes that during the 1980s and 1990s empowered and opened up subnational governments throughout the subcontinent (Borja 2001, Montero and Samuels 2004, Falleti 2010), and second was the emphasis on territorial competitiveness and development policies promoted by many of the international development institutions present in the subcontinent in the last two decades

Following Falleti (2005), we interpret decentralization as a three-dimensional process that entails the transfer of authority (political decentralization), responsibilities (administrative decentralization) and resources (fiscal decentralization) from the national to subnational levels of government. Over the last three decades, Latin American countries witnessed an unprecedented rise of the role of subnational scales of governance in the formulation and implementation of public policies and in the administration of public resources. The novelty resided in the structural transformation of subnational governments from a mere administrative subdivision of the nation-state, run by appointed mayors and governors, to a new and more sophisticated entity run by elected officials. Subnational governance structures have become capable of making decisions and administering resources with relative autonomy from national desires and interests. Along with establishment of popular elections for regional officials, this decentralization has empowered subnational authorities to take initiatives in areas (such as economic and business development) that in the past were under the purview of the central government or local business associations.

This trend was reinforced by a policy shift within the international development community during the 90s that began to prioritize institutional modernization and "good governance" as a central part of the development process. The World Bank introduced this approach in the 1990s after the recognition of the failure of the Washington Consensus' emphasis on market mechanisms and privatization for the delivery of public goods and services. The institutional modernization consensus relied on the key assumption that development depends not just on markets but also on the effective functioning of the state, state institutions, and civil society (World Bank 1992, World Bank 1994, IDB 2002). This new consensus is influenced, on the one hand, by powerful critiques of structural adjustment by economists like Joseph Stiglitz (2003) and, on the other hand, by the New Institutional Economics (NIE), particularly Douglass North's influential book *Institutions, Institutional Change and Economic Performance*, which emphasized that the formal and informal 'rules of the game' were key in explaining long-run economic performance (North 1990, 107). NIE also emphasized path dependency, i.e., the role of history in institutional change.

Within the international development community this naturally led to a greater emphasis on policies and programs aimed at strengthening the institutional capacity of public sector institutions – including those recently created at the local and regional levels by decentralization reforms. Just as importantly, though, it also resulted in new approaches to public sector governance aimed not only at improving public service delivery, but at directly promoting business and economic development. As a result, often with the support of national institutional strengthening programs, local and state agencies in the region began in the 1990s to explore innovative avenues of collaboration with local business sectors and universities. Analyzing case studies from Brazil's northeast region, for example, Judith Tendler (1997) and Alfred Montero (2001) argue that, despite incentives to engage in clientelism and

rent-seeking, new state and municipal governments favored policies that engender efficient service delivery and economic growth, and that such strategies are largely replicable in other areas. These strategies focus on the establishment of networks of trust and reciprocity between public agencies and the private sector (individuals and firms) that discourage short-term rent-seeking behavior by state actors.

The evolution of business and territorial development policy at the IDB, particularly via its MIF, reflects this shift towards territorial governance of economic development Created at a time when the rest of the IDB was still under the influence of an anti- industrial policy perspective,[6] the MIF began quietly to explore innovative avenues for business development in the region. Its initial approach, starting in the late 1990s, was focused on the supply of business development services (BDS) to improve the access of small and medium enterprises (SMEs) to modern business management techniques. Although this strategy succeeded in important ways – for example, improving the productivity and product quality of beneficiary businesses; as well as strengthening the responsiveness of private institutions to the specific needs of SMEs – it soon became clear that there was not enough demand among potential SME clients to cover the operating costs of the centers, which were only offering generic technical assistance courses.

In response the MIF decided to shift its efforts away from BDS in the early 2000s, opting instead for a more focused approach, Productive Integration Projects (PIP), aimed at using regional business networks as its core mechanism for strengthening the competitiveness of SMEs. Typically, PIP operations focused on three lines of action: (i) improving linkages among firms – particularly the vertical linkages found in value or supply chains, (ii) providing demand-driven basic support services – such as training and finance- for network members, and (iii) encouraging collaborative initiatives aimed at boosting production and access to markets.

This new approach quickly proved successful and popular, with seventy business networks in 22 countries strengthened or created. With services tailored to specific sectors, firms launched joint initiatives such as branding, collective bidding, the creation of common points of sales, setting up unified procedures and productive mechanisms, and the incorporation of new production and product technologies. At the IDB, soon after the MIF put into practice its PIP policy, the loan operations side of the Bank began to formulate loan programs similar to the PIP operations, but at a considerably larger scale. This meant a shift in governance. By mandate, MIF operations can only work with the private sector, nongovernmental organizations, and autonomous public entities (not direct branches of government). However, borrowers of the Bank loans have all been either national or subnational government agencies – meaning that government institutions usually take a lead role in the governance of the largest cluster development initiatives in the region.

An evaluation of PIP projects (Dini, Ferraro & Gasaly 2007) pointed out that the cluster strengthening process cannot be sustained effectively without reaching out to strategic partners outside the immediate cluster – most importantly, the public sector and R&D institutions. As the support network for industrial clusters expands outward to include non-cluster partners, cluster development begins to turn into local economic development. This led the Bank, in 2007, to abandon its PIP policy in favor of an explicit LED policy, “Promoting local competitiveness,” as its central tool for

fostering growth of micro, small, and medium sized enterprises (IDB 2007). Since then, the MIF has partnered with local, regional and national entities in the majority of countries of the region, establishing LED strategies and programs in over 32 subnational regions. The current MIF approach is to build collaborative mechanisms among the major economic actors of a locality. This territorial governance is to overcome the obstacles to local economic growth and SME productivity that stem from weak institutions and ineffective regional collaborations.

It should be noted that the IDB's significant commitment to business and territorial development in the region mirrors similar lines of support by a number of other international organizations -- most especially European bilateral development agencies, USAID, as well as UNIDO, and ILO – who have become active providers of technical assistance and/or funding in support of joint public –private economic development initiatives at the local and regional level in Latin America.

The Rise of Governance

It is not possible to discuss urban and regional economic development today without referring to the idea of "governance," which has become a buzzword worldwide (Jessop 1997, Pike 2007, Pierre 2011). Despite its popularity in academic and policy-making circles, different authors and disciplines have advanced distinctive notions of what they mean by "governance." The general agreement seems to be that there is a new way of governing space in which NGOs, the private sector, and other non-state actors are given a more significant and active role in public decisions, policy-making, and planning. Governance makes use of networks, public-private partnerships and instruments such as strategic and participatory planning as opposed to top-down comprehensive planning and bureaucratic state institutions. As defined by Jessop (1998:29), governance is "self-organized steering of multiple agencies, institutions, and systems which are operationally autonomous from one another yet structurally coupled due to their mutual interdependence." In some policy arenas, such as clusters, governance can occur purely within the private sector, as networks of firms govern themselves cooperatively -- often in order to then coordinate more effectively with the public sector.

The idea of governance as self-organizing, interorganizational networks (Rhodes 1996) constitutes the origins of what Marinetto (2003) has called the Anglo-Governance School. This school is based on two key assumptions: 1) the gradual "hollowing out of the state" due to the privatization trends of the 1980s; and 2) a consequent "shift from government to governance," i.e., a shift from hierarchical and bureaucratic forms of state organization and public goods provision to a fragmented, decentralized and networked system. Despite its British theoretical origins, the concept of governance, however, has proven as a valuable analytical tool to move beyond binary categories such as public/private or state/society that have long dominated the study of the government and policy decisions. It is particularly useful in the Latin American context, where the timing of development and the nature of the involvement of non-state actors complicate the relationship between public and private sectors as conceptualized so simply in the US and British contexts.

For effective governance, actors will need to establish models and practices that simplify the complexity of their territory without disregarding existent conflicts or contradictions, develop the

capacity for dynamic interactive learning, and where possible establish a common strategic view. Further, as we will see, the actors will also need to develop a system of metagovernance to coordinate actions across space, time, and domains (Jessop 1998).

In contrast to the celebration of governance networks of the Anglo-governance school (Rhodes 1996), Jessop (1998) acknowledged the possibility of governance failure and developed the notion of *metagovernance* as a counter-process through which economic and political coordination is achieved against the possibilities of network failure. The idea of metagovernance brings back the state into governance theory as the "regulator of self-regulation"; metagovernance is "a way of enhancing coordinated governance in a fragmented political system based on a high degree of autonomy for a plurality of self-governing networks and institutions" (Sorensen 2006). It thus offers the possibility of directed coordination of self-coordinating networks. These ideas opened a new line of empirical analysis in governance studies concerned with governance and democratic accountability (Peters and Pierre 2004, Sorensen 2006) as well as with the possibilities and limitations of public-private partnerships as governance instruments (Pierre 1998, Bovaird 2004).

Since metagovernance can also fail, Jessop (2005, 4) suggests three inter-related strategies to avoid this:

1) Deliberate cultivation of a flexible repertoire (requisite variety) of responses.
2) Self-conscious monitoring and reflexivity about governance, its objects, and its outcomes
3) Self-reflexive 'irony', whereby participants in governance recognize the risks of failure but proceed as if success were possible.

Incorporating Governance Failure and Metagovernance in Economic Development Strategies

While governance as an analytical term has flourished in the last two decades and many economic development authors and theories are now incorporating it as a key ingredient of economic success, it remains unclear how the link between governance and economic development at the local and regional levels can be implemented in practice. Jessop (1998), for example, proposes to explore economic development as a case-study for his discussion of governance failure and metagovernance, but only does so in abstract, non-spatial ways. Cluster-based economic development strategies incorporate the two most important elements of the governance approach: a re-scaling of economic development policy to the subnational level and the shift from government to a more amorphous partnership between the state and various newly empowered actors, such as firms, trade associations, labor unions, NGOs, and private citizens, and thus provide fertile ground for investigating the interconnection between these two theoretical fields. Davoudi et al (2008) normatively describe the nexus of governance and economic development as a process of participatory employment of "territorial capital" (particularly "heritage goods" that cannot be easily reproduced elsewhere) in the interest of expanding economic activity within a region.

Related to Jessop's idea of governance mechanisms is Le Galès'(2011) emphasis on studying policy instruments as a way to better understand governance processes. Policy instruments are particular practices of power that are, in turn, able to change and structure governance systems and

public policy: “policy instruments embody particular policy frames and represent issues in particular ways. They are a form of power.... Rarely neutral devices, they produce specific effects… Instruments structure public policy and modes of governance according to their own logic” (Le Galès 2011, 143). For instance, given that clusters consist of a diverse array of actors connected in the effort to achieve global competitive advantage, cluster governance by definition requires extensive coordination. Yet, cluster policy, as it reflects market ideology, will also reinforce existing power structures and imbalances, as some actors will benefit more than others from intervention (Sepulveda 2008).

In the Latin American context, the cluster governance literature has often focused on “upgrading” or finding ways in which firms can gain lasting competitive advantage by switching to higher value niches within their chains (Giuliani, Pietrobelli, and Rabellotti 2005; Humphrey and Schmitz 2000; Schmitz and Nadvi 1999). The authors identify four types of upgrading that increase the competitive advantage of firms: (1) *process upgrading*: a more efficient use of inputs or the incorporation of new technologies or processes; (2) *product upgrading*: the production of more sophisticated goods with higher per-unit value; (3) *functional upgrading*: moving up the value chain into more valuable activities; and (4) *intersectoral upgrading*: applying knowledge and skills gained in one sector to production in a different, higher value-added sector. Similarly, neo-Schumpeterian literature emerging from Brazil focuses on the role of the public sector in disseminating innovation and knowledge sharing among firms through local production systems (*arranjos produtivos locais*, or APLs) as a basis for moving up global value chains and implementing “sticky” (in Markusen’s sense) strategies that will lead to broader regional economic development (Cassiolato and Lastres 2003, Villaschi et al 2006).

“Collective efficiency” facilitates the upgrading process within clusters (Schmitz 1999a), particularly for natural-resource based clusters (Giuliani, Pietrobelli, & Rabellotti 2005). Collective efficiency refers to the advantages that firms have from a combination of external economies and joint action (Schmitz 1999). External economies are “passive” or “incidental”, benefitting firms that are located in a given cluster. Joint action is a more deliberate effort of coordination with other actors within a cluster (competitors, suppliers) or a value chain (buyers) to pursue a common goal. The external economies arising from co-agglomeration are necessary, but insufficient for successful cluster upgrading. Successful clusters are able to adapt to external challenges and meet market demand only when their firms undertake joint action either horizontally (among peer firms) or vertically (among suppliers/buyers), as shown by Schmitz (1999b) for the case of the shoe manufacturing cluster in the Sinos Valley in southern Brazil. Villaschi et al (2006) found similar cooperation patterns in the effort to upgrade a hub-and-spoke metalworking cluster in Espírito Santo, in this case with state agencies providing important intermediation between small-scale suppliers and cluster “anchors” such as Companhia Vale do Rio Doce. In the Latin American context, particularly under conditions of macro-economic uncertainty, some firms may not have the capacity and resources to coordinate activity (Sepulveda 2008). In any case, the effectiveness and interest in collective efficiency will vary by sector (Giuliani, Pietrobelli, & Rabellotti 2005).

The concept of governance has also been used as an analytical device to investigate coordination among firms in global commodity chains (GCCs) and global value chains (GVCs). Gereffi (1994) in particular identifies different locational and coordination strategies for firms in “buyer-driven”

and “producer-driven” GCCs. In buyer-driven chains, for example, retailers like the Gap will explicitly coordinate locational decisions with competitors and suppliers in order to create a high-quality, dependable, and deeply networked supply chain. Producer-driven chains, such as those centrally controlled by manufacturers like automakers, tend to be more vertically integrated, with stronger management and interaction between suppliers and final producers. Gereffi, Humphrey, and Sturgeon (2005) argue that the internal organizational dynamic of a GVC, or its dominance by buyers or producers, dictates location choices, which are often coordinated between firms in the chain. The authors identify different types of governance of GVCs: from repeated market transactions between firms with little formal coordination to vertically integrated value chains coordinated by managerial control from headquarters to subsidiaries.

Cluster literature also highlights the need to establish a common vision among actors in the governance structure that will guide the growth of the whole cluster rather than just of individual businesses or subsectors of the cluster. Cooke and Higgins (2003), in fact, define clusters as agglomerations of firms whose growth is defined by a shared “developmental vision.” Similarly, Feldman et. al. (2005) argue that the maturation of a cluster requires a “shared vision of this community”, where entrepreneurs and public sector actors collaborate to develop a framework for cluster growth. This type of collaboration and visioning can take the form of narrow, short-term projects or broader initiatives to promote governance expansion and “thickening” of the cluster dynamics (for example, by the growth of intermediary services). An example of an effective visioning process in a stones cluster comes from Andalusia, where firm cooperation facilitated by the public sector resulted in a strategic plan and a successful marketing campaign for the Marble of Macael (Barzelay 1991). Led by the Institute of Industrial Promotion of Andalusia, the Macael Action Plan resulted in a fivefold increase in revenues in five years, due largely to firm upgrading from extraction to fabrication. The Institute was able to induce 150 family-owned firms to collaborate due to skilled leadership, negotiation, and political management. First, it offered to procure resources for capital equipment if firms worked together to develop a unanimous action plan. Second, it achieved a couple of easy wins that inspired the owners to develop a shared vision: it conducted a geologic survey that established the long-term market potential of the area, and it sponsored a field trip to Carrara to see a functioning cluster. As Barzelay (1991:279) describes it, “A vision is not so much a statement of objectives as a shared cognitive and affective image of a state of affairs that individuals sense is worth striving towards. Shared visions motivate individual and collective action and foster agreement on what operational steps should be taken.”

Next, it solved several infrastructural bottlenecks with broad benefits across the cluster and began the technological upgrading project, which provided subsidies for capital investments. By starting with such low-conflict projects, the governance of subsequent, more complex projects, such as establishing purchasing and marketing cooperatives, was able to survive higher levels of conflict. Seeing that the cluster had developed its own action plan and governance structure then helped to build investor confidence. As discussed below, the ornamental stones cluster in Cachoeiro has replicated some of the successes of the Macael cluster (such as the establishment of an important trade fair), but has been unable to incorporate important sectors of the cluster into the governance structure through a broad visioning process, as was done in Macael.

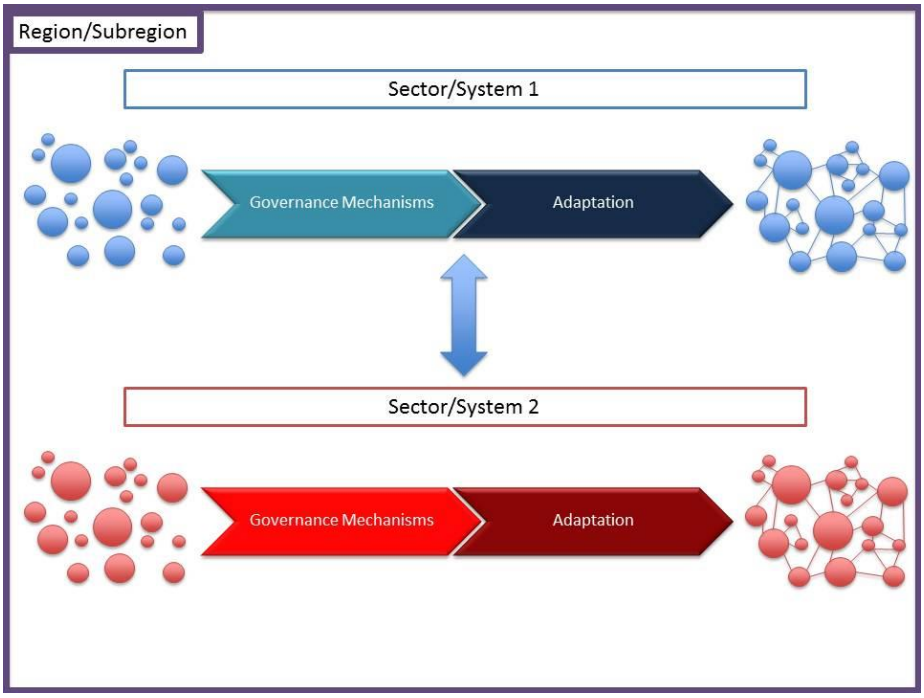
While the cluster literature acknowledges the importance of governance as an instrument to coordinate actions by the public and private sectors, the structure of this coordination has not been widely discussed. Even advocates of a strong public sector role (either local or via interaction among multiple levels of government) in cluster governance, such as Schmitz (1999b) and Sepulveda (2008), struggle to provide evidence for how the public sector has successfully championed clusters. Following Motoyama's (2008) critique of Porter's cluster theory as "static" and "descriptive", we see the Latin American literature on cluster governance (with its dual focuses on upgrading and innovation) as not being able to speak to the ways in which clusters emerge or evolve, or how public and private actors interact.[7] In Schmitz' concept of "collective efficiency" (1999a and 1999b), for example, "external economies" are "incidental" and distinct from the more deliberate "joint action." Joint action is mostly defined as interactions between firms in a regional agglomeration or a global value chain, not coordinated efforts between public and private actors such as firms, trade associations and the state. One exception in the literature is Sepulveda (2008), who shows how cluster firms in Tigre, Argentina were not interested in taking advantage of boiler-plate services provided by technical assistance providers, modeled after the top-down cluster service model of developed countries; instead, he recommends a more incremental approach customized to individual contexts.

Thus, existing literature is largely silent on the ways in which joint action (which we take to mean "governance") can expand external economies through public-private interactions that increase the collective efficiency of regions. Since these types of economies are "public goods" enjoyed by all firms within a region (Scott and Storper 2003, Montero 2001), the role of the state is a crucial, if undertheorized, element. In our conceptual framework, we fill this and other gaps in the literature, in particular how cluster governance works territorially and results in regional economic development.

Conceptual framework

We develop our conceptual framework based first on Jessop's (1998) ideas of metagovernance and governance failure, adding in the notion of collective efficiency from the work on cluster governance (Schmitz 1999, Giuliani et al. 2005). We see metagovernance as a deliberate effort to directly coordinate a broader set of self-coordinated activities across networks (Figure 1). Such networks might exist in an economic sector, spatial territory, or other system, and will consist of both firms and related institutions. Individual networks are reflexively self-organized, meaning that they develop a common language and vision around an issue, but also that they learn from failure and continuously adapt their behavior accordingly. This creates collective efficiency, or effective joint action either horizontally -- between stakeholders in equivalent positions (such as firms) – or vertically, in hierarchies (as between suppliers and producers). Where coordination and learning across these networks is occurring, there is metagovernance.

Figure 1. Metagovernance for regional economic development.



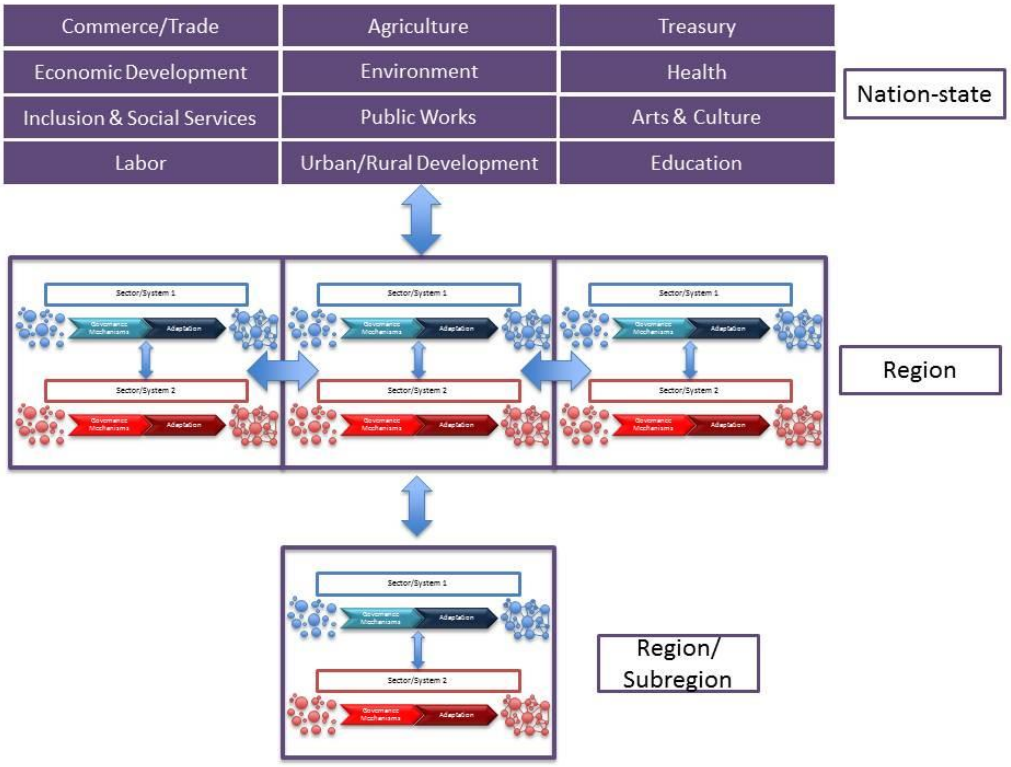
Governance mechanisms

In the Espírito Santo case, as we will see, we can see the development of governance mechanisms that transmit knowledge among firms and between firms and other actors in the cluster and more broadly in the statewide sector. These mechanisms are primarily associations or networks – some horizontal, some vertical, most functioning in small groups -- with an ability to articulate problems and models and develop consensus about solutions, i.e., learn, develop a shared vision, and adapt. This then makes it possible to conduct joint action related to an array of problems (environmental, trade, marketing, etc.). At the same time, however, the broader vision developed for the whole sector is lacking, and many stakeholders perceive governance efforts as benefiting only narrow groups and ignoring conflicts between the needs of different actors. This creates an "oversimplification" of the cluster's diversity of interests (Jessop 1998). Although simplification is important in order to improve understanding and gain buy-in, it may reduce complexity so much that the model does not reflect the variety of the real world. Metagovernance in this case, therefore, has had great difficulty developing collective learning and vision. As we show, the attempts of this project to solve a variety of broad economic development bottlenecks (including issues of the environment, logistics, supply chain, export market, labor, and more) each reveal some form of metagovernance failure.

Space

Space is generally undertheorized in the governance literature, yet the territorial dimensions of cluster governance and economic development are important to understand. In some cases, governance failure, or the inability to learn and adapt from failure, may be exacerbated by lack of spatial proximity. Spatial fragmentation exacerbates other differences between stakeholders and may render coordination practically impossible. In cluster governance, it may also result in collective actions that benefit only core firms, as peripheral players are marginalized. Fragmentation and unequal cluster participation across the state may also prevent subregions from reaching their endogenous potential, whether from natural endowments or social capital (Davoudi et al. 2008). Thus, effective metagovernance will coordinate sectors or systems within a subregion or region, as well as vertically from municipalities to the national level (Figure 2).

Figure 2. Horizontal and vertical metagovernance .



The role of space is particularly relevant in the Espírito Santo case because of the mismatch between the cluster, which is centered on Cachoeiro de Itapemirim, and the CNI/MIF program, which is organized to include the entire statewide ornamental stones sector. Thus, there is ambiguity in establishing a proper geographic scale for developing policies and partnerships. It also affects the ability to forge a shared vision for the sector.The physical distance between stakeholders hinders communication and participation in governance, and as a result, leaders tend to narrow their goals, ignore conflicts, or oversimplify the bottlenecks.

Metagovernance

The idea of metagovernance failure (Jessop 2005) also plays an important role in territorial economic development. To avoid failure, participants in governance must cultivate flexibility in responsiveness, monitor processes and results, and engage in "self-reflexive 'irony'", i.e. exhibit willingness to fail. This emphasis on flexibility, accountability and embrace of failure echoes narratives of successful regions like Silicon Valley (as well as Business 101 textbooks!). It also provides an interesting perspective in which to view the Espírito Santo case (as well as cluster policy more generally), since it suggests a role that may not be natural for the public sector members of the PPMM – and also that may contradict or undermine the provision of public goods.

Further thoughts on framework

The literature on governance by self-organizing networks tends to underemphasize power dynamics, both in terms of the role of the state and the internal dynamics of PPMMs, in part because of a simplistic, binary view of private vs. public. Yet, any analysis needs to acknowledge the unique power dynamics in the Brazilian context, where the national government plays a vigorous role in industrial policy, multi-national corporations wield considerable influence, and yet, participatory governance practices are rapidly dominating decision-making. Specifically, regional and national power dynamics are embedded in the ornamental stones cluster, so cluster policy by definition reflects (and may reinforce) these dynamics.

Finally, shifting from a description of how regional economies evolve to a prescription of how to conduct cluster governance is always challenging. It will be important to consider carefully how a new PPMM can insert itself into a cluster that has emerged – and governed itself – from both top down and bottom up heretofore.

Espírito Santo and the Cachoeiro ornamental stones cluster

National Institutional Context

Strategies to support clusters have become an important axis for economic and territorial development policy at the Federal, State, and municipal levels in Brazil. As discussed above, the spread of cluster policies in Brazil and elsewhere in Latin America during the late 1990s coincided with a diminishing of the role of the central government in national economic development. Local Production Systems (*arranjos produtivos locais*, or APLs) have been included in several national plans to promote innovation and economic development, including each of the Federal government's "Pluriannual Plans"[8]

since 2000 and the national industrial policies of each of the past three presidential administrations, most recently President Dilma Rousseff's "Greater Brazil Plan" (Plano Brasil Maior). The Federal government provides a broad definition of an APL as a "predominant productive activity" that is territorially-bounded, and whose firms exhibit forms of cooperation and a system of governance. In its early phases, APL policy was more or less synonymous with support for small- and micro-enterprise, and was therefore largely guided by the Brazilian Small and Micro-Enterprise Agency (SEBRAE), but has since broadened to include different configurations of clusters, including "hub-and-spoke" systems led by large firms. Currently, the Ministry of Development, Industry, and Foreign Trade (MDIC) coordinates a working group, GTP-APL, with state governments and other Federal agencies (including SEBRAE) that discusses and implements APL policy. Additionally, the Federal University of Rio de Janeiro (UFRJ) coordinates a multidisciplinary network of academics and practitioners (RedeSist) to generate and disseminate knowledge about various APL experiences throughout Brazil (Lastres and Cassiolato 2003).

The Federal government's APL policies are coordinated by MDIC, which works with other ministries, like Science, Technology and Innovation (MCTI), Federal agencies like CNI, SEBRAE, the National Industrial Apprenticeship Service (SENAI), and state governments. Aside from the working group, it partners with other institutions to provide services for businesses within APLs and to strengthen the governance of APLs. To improve management practices and build capacity within businesses, it provides consulting services. It works with financial institutions like the National Savings and Loan Bank (CAIXA), the National Development Bank (BNDES), and state development banks to extend lines of credit for businesses to incorporate new technologies. With MCTI, it engages the Federal university system to connect researchers with businesses and state and local governments. It also has a network of Federal Technical institutes to train the labor force, and the presence of an APL is an important criterion in the selection of which regions receive such institutes. APL policy does not play an important role in Federal decisions about infrastructure investments, although large-scale investment programs such as the Growth Acceleration Program (PAC), likely benefit clusters through improvements in transportation, logistics, housing, and education infrastructure.

After an initial euphoria around APLs and their potential for fostering innovation and market competitiveness for Brazilian firms in the early 2000s, there are currently efforts underway to re-think Federal policies in support of clusters, focusing primarily in the shortcomings and challenges from the "first generation" policies. There is wide recognition, for example, that Federal ministries like MDIC and the Ministry of National Integration, as well as government organizations like SEBRAE, were overly enthusiastic about the promise of clusters in incorporating industrial innovation and promoting territorial competitiveness. In multiple interviews, officials alluded to a "romanticization" of the role of APLs and their governance and described a willingness "to call any type of local production an APL." Federal subsidies to businesses in APLs also created incentives for state-level governments to overuse the label and strain to create governance mechanisms where they might not have made sense. As a result, Federal officials believe that places in which a strong cluster structure was present (such as Cachoeiro) benefited from APL policies, while efforts were not successful in regions where the public sector tried to build clusters from the ground up without significant private sector leadership. Currently, MDIC's "second generation" APL policies will target areas where they have had some success, particularly trying to strengthen private sector participation and "ownership" of the governance

structure, while revisiting their approach in regions where strong APL foundations are not present. SEBRAE, for example, has launched a territorial development initiative entitled "Territories of Citizenship" focusing small business growth specifically as a poverty alleviation strategy, rather than the global competitiveness approach that is central to APL policy.

The organization of the current governance effort combines the evolving conceptualization of APLs in Brazil with the MIF's emerging approach to territorial governance for economic development. In the MIF's "Promoting Local Competitiveness" policy, most local economic development (or territorial competitiveness) operations consist of strengthening productive and area development networks, and providing matching grants for public-private joint investments for business development and innovation and in support of strategic sectors. The foundations of the ornamental stones cluster in Cachoeiro -- a strong, private-sector led business association, an active technology center committed to improving the competitiveness of local firms, and support from local and State-level public agencies -- made it a promising case for MIF investment. The extensive involvement of non-state actors – in this case, nonprofit entities that represent private actors – also made this case a potential exemplar of good governance and the democratization of development. Table 1 lists the core and peripheral actors in the initiative at three levels (federal, state, and local). Interestingly, the state and local government columns are dominated by branches of federal government agencies (i.e., SEBRAE, SENAI, and CNI/FINDES/IEL). In the local category, all but two of the actors are located (or headquartered) in Cachoeiro de Itapemirim.

Table 1. Key Actors in Ornamental Stones Sector in Espírito Santo.

Federal		**State**			**Local**		
Executive Agencies	*Autonomous Agencies*	*Executive Agencies*	*Autonomous Agencies*	*Private Group*	*Executive Agencies*	*Autonomous Agencies*	*Private Group*
Ministry of Development, Industry, and	National Confederation of Industries (CNI)	**Economic Development Department**	**CNI affiliate (FINDES/IEL)**	**CentroRochas**	**Cachoeiro de Itapemirim Municipal**	**Local CNI/FINDES/IEL office**	**Ornamental Stones Trade Association (SindiRochas)***
Ministry of Science and Technology and Innovation (MCTI)	Brazilian Small and Micro-Enterprise Support Agency (SEBRAE)	**Environmental Management Department (IEMA)**	**SEBRAE affiliate**	Milanez & Milaneze (Trade Fair Organizers)		**Local SENAI office**	**Ornamental Stones Techology Center (CETEMAG)***
Ministry of Mines and Energy	National Development Bank (BNDES)	**Research Support Foundation (FAPES)**	**State Development Bank (BANDES)**				**Ornamental Stones Credit Cooperative (CrediRochas)***
Ministry of National Integration	National Industrial Apprenticeship Service (SENAI)						**Ornamental Stones Labor Union (SindiMarmore)***
Public Ministry	National Savings and Loan Bank (CAIXA)						**Residue Treatment Center in Cachoeiro (AAMOL)**
National Department of Mineral Production	Federal University System (UFES, UFRJ)						**Machinery Manufacturers Trade Association (Sindifer)****
							São Joaquim Industrial District Business Association
							Nova Venécia Ornamental Stones Trade Association (ETAPE)
							Nova Venécia Residue Treatment

Note: Formal CNI/MIF governance project participants in bold.
*Technically, these are statewide organizations, but their primary presence is in the Cachoeiro region.
**Statewide trade association for all machinery manufacturers. Their local office in Cachoeiro focuses primarily on ornamental stones, while other offices focus on other industries.

Regional Socio-Economic Context

Espírito Santo is a small state located in Southeastern Brazil, surrounded by the economically and politically powerful states of Rio de Janeiro, Minas Gerais, and Bahia. In 2010, it had a population of 3.5 million, of which roughly 40% live in the metropolitan region of the State's capital, Vitória. Following the national trend, Espírito Santo urbanized rapidly in the second half of the twentieth century and today has an almost identical percentage of its population living in urban areas (83%) as the rest of Brazil (84%), as shown in Table 2. Cachoeiro de Itapemirim has a population of 190,000, and its immediate region of southern Espirito Santo makes up 10% of the State's population (Instituto Jones dos Santos Neves 2008).

Table 2. Demographic Characteristics for Brazil, Espírito Santo, and Cachoeiro de Itapemirim

	2000			2010		
	Brazil	**Espirito Santo**	**Cachoeiro**	**Brazil**	**Espirito Santo**	**Cachoeiro**
Total Population	169,872,856	3,097,498	174,879	190,755,799	3,514,952	189,889
Population growth (%) (1)	1.88%	2.38%	2.00%	1.09%	1.19%	0.79%
Total area (Km^2)				8,502,729	46,098	877
Urban Population (% of total) (2)	81%	79%	89%	84%	83%	91%
Rural Population (%of total) (2)	19%	21%	11%	16%	17%	9%
Unemployment Rate (age 15-59)*	9.8%	9.3%		8.7%	8.3%	

*Data for 2001 and 2009

Source: IBGE Census and Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank).

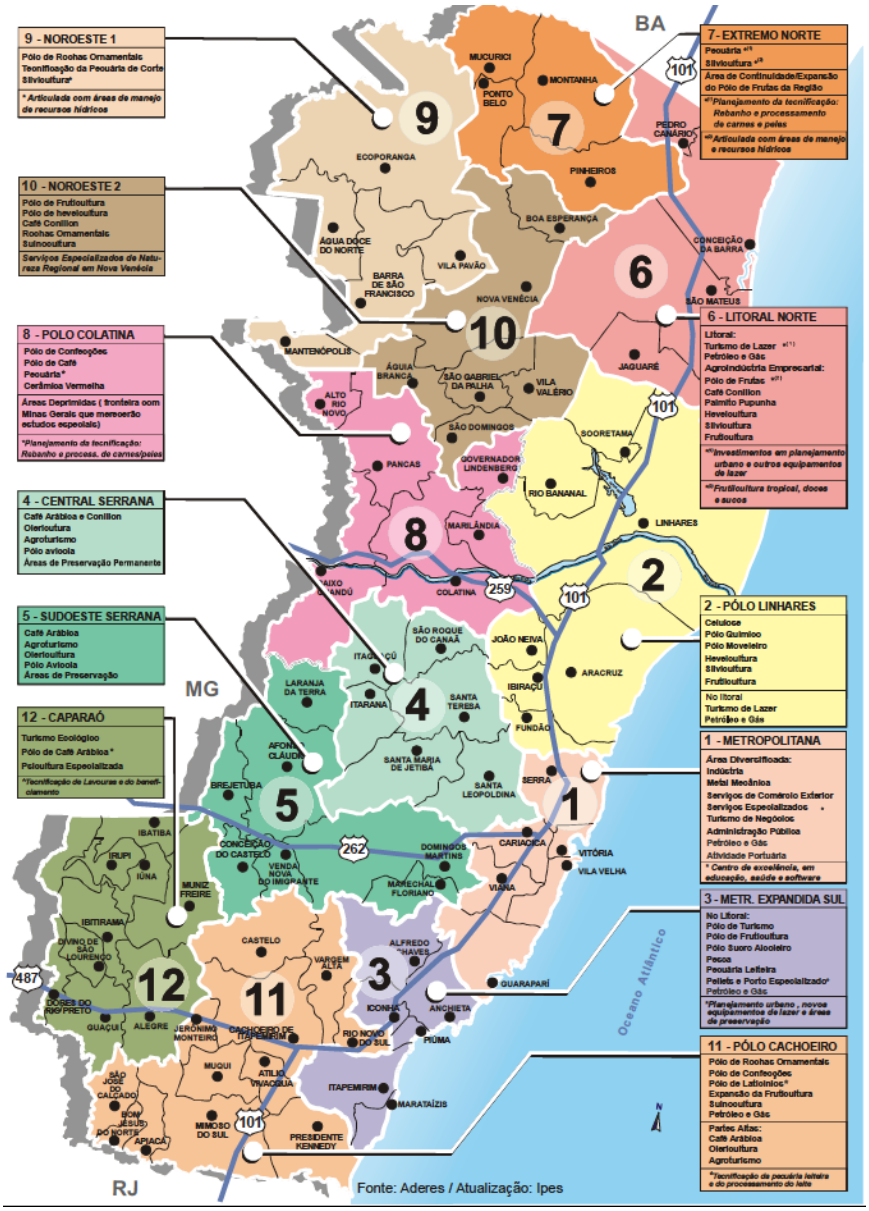
Espírito Santo's economy has grown steadily in the past two decades, outpacing even Brazil's growth rates. In 1995, GDP per capita was R$5,000 for both the State and the country, but by 2011 it had grown to $24,000 in Espírito Santo and R$21,000 in Brazil. The State had higher poverty rates than Brazil in the late 1980s (about 50% of the population compared to 45% for Brazil), but by 2010 it had decreased poverty to about 15% (4% of which is extreme poverty), compared to 25% poverty (9% extreme poverty) for the country as a whole (SEDES 2012). The State's unemployment rate, 8.3%, is also lower than the national rate of 8.7%.

The discovery of substantial reserves of petroleum and natural gas off the Espírito Santo coast has generated thousands of jobs, billions of dollars in private investment, and additional billions in royalties for State and municipal governments. The discoveries of the Peroá natural gas field in 1997 and the Jubarte "pre-salt" oil field in 2002 have had the greatest impact. According to the State's Economic Development Department (SEDES), production of natural gas and oil in Espírito Santo has increased tenfold since 2004, going from 40 to 400 thousand barrels of oil per day and from 1.3 to 14 million cubic meters of natural gas per day. The State's current economic development plan (*Novos Caminhos*, or "New Paths") created by Governor Renato Casagrande is an effort to attract private investment (much of it from foreign companies) into profitable commodities like oil and natural gas, and leverage public resources into diversifying the economic base, sectorally and geographically. With royalties from oil extraction, the State has created an infrastructure fund for municipalities that do not participate in the revenue-sharing from oil exploration. It plans to spend 20% of the state budget in infrastructure, which would be one of the highest rates in Brazil, according to SEDES.

The State has incorporated APL policy as an important instrument in the diversification of the economy, both aiming at the development of the interior of the state and the promotion of activities of higher value that utilize the state's natural resources, such as processing of ornamental stones, wood

furniture production and the like. As Villaschi and Felipe (2010) argue, the State's focus on local production systems as a tool for diversification of the economy has been in place since the collapse of the Espírito Santo's coffee industry in the 1960s, gaining the specific denomination of APLs in the early 2000s. Recently, the state has identified five APLs in particular for strategic investments: agricultural tourism in the state's central mountains, civil construction in the Vitória metropolitan region, wood and furniture in the Linhares region, apparel in the northwestern region, and ornamental stones in the Cachoeiro region. Figure 2 below provides more detail about the distribution of economic activities throughout the state:

Figure 2 Distribution of economic specializations throughout Espírito Santo



Source: SEBRAE (2006).

Ornamental Stones Cluster

As noted above, the ornamental stones sector is an important piece of Espírito Santo's economy and a focus of the State government's current economic development policy. According to SindiRochas, the ornamental stones sector accounts for 7% of the State's GDP. The territorial base of the cluster is the municipality of Cachoeiro de Itapemirim and its neighboring municipalities in southern Espírito Santo. This region is home to large marble deposits and includes firms that participate in all segments of the production chain. In the past three decades, other sectors have emerged to support the ornamental stones cluster, such as local production of machinery, specialized inputs, and services targeting ornamental stones production and sales, such as an annual international trade fair. Two other regions play important roles in this sector: northern Espírito Santo, particularly the municipality of Nova Venécia and its neighbors, provide much of the high-quality granite that is processed in Cachoeiro; and the Vitória Metropolitan Area includes hundreds of ornamental stones workshops (*marmorarias*), which provide an important market for polished slabs produced in Cachoeiro, as well as the regional shipping port and another large international trade fair.

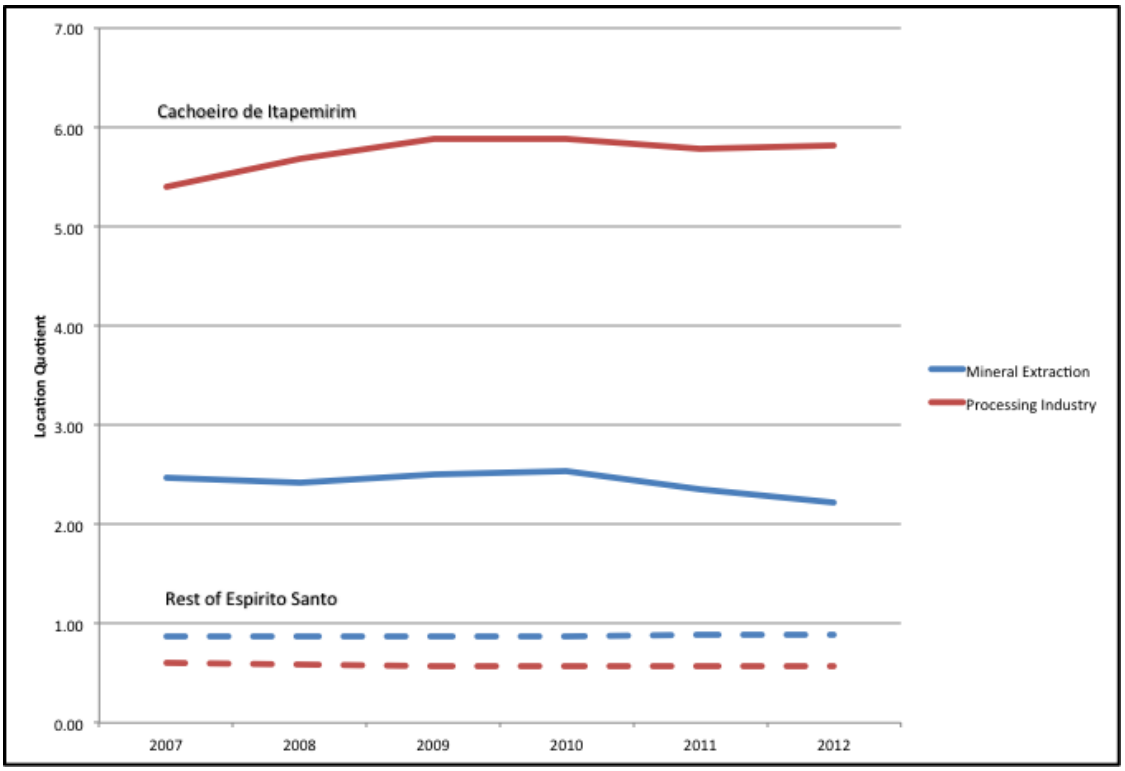
The ornamental stones production chain has four distinct phases. The first step is extraction of marble or granite blocks from quarries. In the second step, the blocks are cut into one-inch thick slabs in *teares*, after which they are polished and exported or sold to local stones workshops (*marmorarias*), where they are processed into sinks, countertops, furniture, and large tiles used in the construction sector. The first two phases (extraction and cutting) are capital intensive, benefiting in particular from the use of advanced technologies from Europe, such as the diamond cable, which allows for large productivity gains over conventional cutting methods like blades. These two phases tend to be dominated by medium-to-large firms, which often consolidate both activities (along with polishing) in-house. The next two phases, polishing and final processing, are more labor intensive and require specialized workers, thus resulting in smaller profit margins. These last two phases are largely made up of micro and small firms in a highly competitive market. (For the purposes of this case study, we use SEBRAE's definition for micro and small enterprises, i.e., whether the firm qualifies for the "simple" designation for tax purposes by having less than R$3.5 million in annual earnings.) Although there have been no recent detailed firm surveys of the ornamental stones sector in recent years, a 1998 survey analyzed by Villaschi and Sabadini (2000) shows that based on employees rather than earnings, 82% of firms in Espírito Santo were micro-enterprises, 16% were small, less than 2% were medium, and there were no large firms. This structure is almost identical to the overall national economy, where micro and small firms make up 98% of all industrial businesses (SEBRAE 2011). Although these numbers are out of date, and there likely has been an emergence of some large, exporting firms, the overall structure of the sector remains largely unchanged. Despite the prevalence of micro and small firms, larger firms have succeeded in dominating governance, a division which creates conflicts within the sector (as described further below).

Since the 1990s, there have been some important changes in the cluster. First, with the emergence of supporting activities and institutions, the cluster has thickened. For instance, a local machinery sector providing capital goods and maintenance services to all segments of the ornamental stones sector has grown, creating their own trade association in the early 1990s (MaquiRochas), which

in 2007 became an affiliate of the national trade association for metallurgy industries, Sindifer. Locally produced machinery still lags behind its European counterparts, requiring trade protection and tax subsidies from the Federal government to compete,[9] but it has shown important improvements in recent years, most recently the ability to produce and service diamond cable technology, with a small number of firms beginning to produce advanced "multi-cable" machines. Sindifer has also become engaged in the cluster governance.

Many firms within the ornamental stones cluster have also been able "upgrade" their production to activities in the value chain that generate higher returns; a process which Humphrey and Schmitz (2000) describe as *functional upgrading*. Over the past two decades, firms have moved from extraction of marble and granite blocks to processing activities, such as cutting blocks into slabs, and polishing slabs for export or final processing into consumer goods, thus "moving up" or upgrading along the global value chain (Gereffi 2004) of ornamental stones. Figure 3, for example, shows the location quotient since 2007 for "mineral extraction" and "processing of non-metallic mineral products" in the Cachoeiro region (including surrounding municipalities) compared to the rest of the state.[10] While clearly dominant in processing, the region has become slightly less specialized in mineral extraction, while specialization in processed products has slightly increased. This may suggest that firms within the cluster are focusing their activities beyond marble extraction. It should be noted that, in any case, the U.S. recession has not affected the extent of specialization in the region.

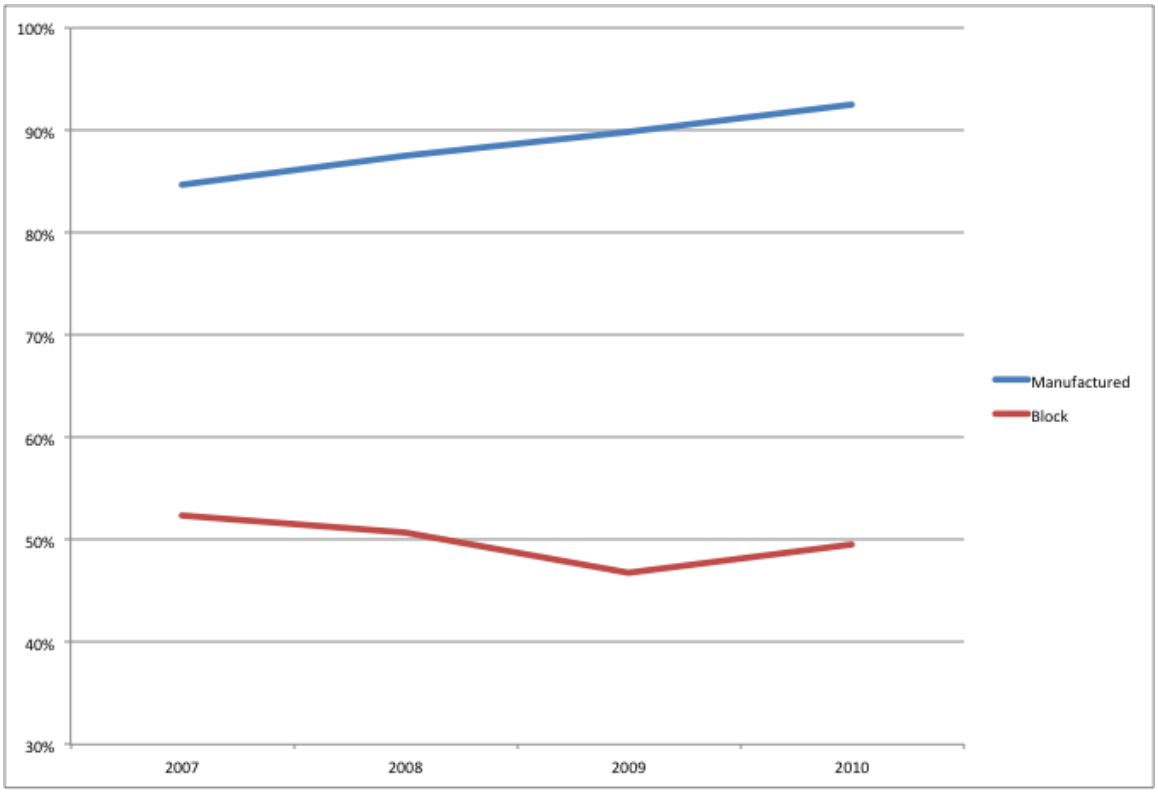
Figure 3. Location Quotients for Mineral Extraction and Non-Metallic Mineral Products Processing in Cachoeiro de Itapemirim Region, 2007-2012



Source: Cadastro Geral de Empregados e Desempregados (CAGED).

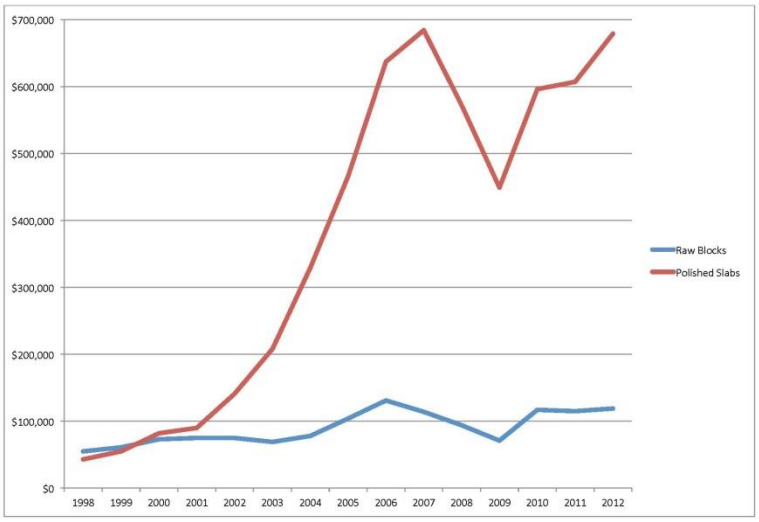
Similarly, export data from CentroRochas also shows that the proportion of exports coming from Espírito Santo has been shifting from blocks to manufactured products. Between 2007 and 2010, for example, while the proportion of Brazil's block exports coming from Espírito Santo has remained the same, the proportion of manufactured products grew steadily. In 2010, 92% of the exports in manufactured ornamental stones products (mostly polished slabs) came from Espírito Santo, as shown in Figure 4. Although there are no comparable earlier figures, Villaschi and Sabadini (2000) note that at the start of the millennium, firms were only beginning to explore ways to export polished slabs, as opposed to the raw blocks. By comparison, in 2012 Espírito Santo firms exported almost US$700 million in polished slabs and $110 million in blocks (Figure 5). The dollar amount of polished slabs exported in 2010 is lower than it was in 2007 ($620 million), but higher than in 2008 ($540 million) and 2009 ($420 million), which suggests that exports have rebounded after the crisis, despite the ongoing weak performance of the US economy. Exports of blocks also fell in 2008 and 2009, but were higher in 2010 than they had been prior to the crisis ($100 million). This suggests, again, the success of this sector, whether or not it can be attributed to governance efforts.

Figure 4. Proportion of Brazilian Ornamental Stones Exports (Blocks and Manufactured Products) Produced in Espírito Santo, 2007-2010.



Source: CentroRochas

Figure 5. Exports of Raw Blocks vs. Polished Slabs.



Key Bottlenecks

The recent successes in cluster upgrading notwithstanding, there are some significant bottlenecks still confronting the sector that will need to be addressed through collective action and improved governance. First we will discuss the bottlenecks that affect the ornamental stones sector specifically and then describe broader issues that impact the growth of the Espírito Santo economy.

The most crucial bottleneck that ornamental stones firms face in the short- and medium-term is the disposal of byproducts generated by the cutting of granite blocks into slabs. The process of cutting concrete slabs requires the addition of several toxic substances, including lime, which contaminate the wet sludge that remains as a byproduct. Starting in the early 2000s, Espírito Santo's environmental protection agency (IEMA), in partnership with the Federal Public Ministry,[11] began to enforce environmental legislation in the State, forcing firms to find adequate and safe areas to in which to dispose the materials. IEMA controls licensing and monitors environmental impacts, and has developed a rather adversarial relationship with firms in the sector since it has begun to regulate firms in the sector more closely Firms argue that IEMA's procedures are cumbersome and arbitrary, making it more costly for them to earn a profit. IEMA, on the other hand, argues that it tries to work closely with firm owners, that it rarely punishes businesses for non-compliance (only after repeated offenses), and that its work is necessary in this heavy-impact industry.

For-profit landfills have become the primary destination of contaminated sludge from firms, but the availability of suitable sites, at a safe distance from water resources, is expected to be short-lived. SindiRochas and CETEMAG have also formed a not-for-profit corporation (the Monte Líbano Environmental Association, or AAMOL) through a memorandum of understanding with the Federal government and UFES, to explore ways to recycle the sludge. AAMOL has been able to use the sludge to produce concrete blocks that can be used for construction projects. However, the commercialization of

these blocks has proven challenging, and the scale of the project is nowhere near taking up all of the sludge that is generated in the State. A local official described the project as "conceptual," rather than a viable solution to this key environmental problem. In Nova Venécia, a group of 15 entrepreneurs formed the Residue Treatment Center (CTR) to take care of granite sludge produced by their firms. A truck from CTR picks up the sludge from the firms and brings it back to the "filter press", which removes most of the water from the waste. The water is then returned to each of the firms through underground canals for re-use. The filtered sludge is deposited in a landfill, which is roughly half-full, and is expected to be completely full in 5-6 years. As with AAMOL, this is not expected to be a long-term solution to the residue disposal problem. In addition to the problem of sludge disposal, the waste generated by *marmorarias* (unused stone fragments, fuel and solvents, etc.) also presents environmental problems, which are exacerbated since workshops are often located in residential areas. These problems often go unmonitored since many *marmorarias* operate informally.

Several interview respondents also noted that the process of receiving concessions for mining stones is time consuming and costly. In Brazil, mineral resources are public and managed by the Federal government. Therefore, private property cannot be exploited without concessions given by the National Department of Mineral Production (DNPM), which need to be renewed every four years (IDB 2008). Firm owners interviewed uniformly stated that the process can take two or more years, which can significantly delay the delivery of stones to the market by several years. Since the concession process is unpredictable and time consuming, exporting firms are unable to close deals with foreign buyers using samples from an unmined deposit. Without a committed market, opening new mining operations can be risky.

As mentioned above, the complications and expenses of adopting state-of-the-art technology have also been a major bottleneck for firms. Diamond cables, particularly multi-cable machines for cutting blocks into slabs, improve productivity by orders of magnitude over the traditional use of blades. The savings generated filter down through the value chain, helping all firms in the sector (for example, *marmorarias* can buy less expensive slabs). These technologies have been used and produced in Europe for more than 20 years, but even leading firms in the sector have not been able to incorporate them fully. Recently, local machinery firms have begun to manufacture these technologies and provide supporting services (like maintenance), but they still lag their European counterparts in quality and costs. This is also a source of conflict for the governance structure, as local machinery manufacturers seek trade protections from the Federal government, while ornamental stones producers prefer an easing of tariffs on imported machinery in order to lower production costs and increase productivity.

Lastly, the lack of strong domestic demand for "up-market" ornamental stones has also proven to be challenging for the sector. Specifically, firms believe that most Brazilian architects and interior designers are not well-trained for work with ornamental stones and generally prefer materials with which they are more familiar, like concrete, wood, and ceramics. They believe that other sectors, like ceramics, have done a better job of advertising their product to buildings trades professionals through publications, in-store presence, and trade fairs. At the low end of the market, the sector also suffers from competition from synthetic materials, like the composite Silestone, which is sold as a substitute for granite surfaces.

The ornamental stones sector also faces a number of bottlenecks that affect the overall Espírito Santo and national economies, primarily those related to logistics and the availability of skilled labor. Currently, the primary mode of transporting blocks, slabs, or finished products is the road network, particularly the highways connecting Cachoeiro with Vitória and the north of the State. The highways are narrow and in extremely poor condition, often generating significant delays in the delivery of blocks to manufacturers and in getting polished slabs and blocks to the Vitória port to be shipped. The rail system is ineffective and largely managed by the multinational corporation Vale do Rio Doce, which has shown little interest in providing direct services to the sector. However, the Federal government's "Growth Acceleration Program" is currently making significant investments in the Federal highway system, including doubling BR-101, which connects Cachoeiro with Vitória, the north of the State, and even the much larger ports in Rio de Janeiro and Santos. Firms and officials in Cachoeiro expect that this investment is likely to improve transportation conditions substantially. However, the region's ports will continue to create challenges for exporting firms.. The most widely used port, Vitória, has a large rock that makes it impossible for Panamex ships to come in and turn around, so firms can only rely on smaller ships for their exports. Additionally, because the water is not deep enough, ships cannot be filled to capacity, and so they usually need to make further stops in Rio and Santos before heading to northern markets, adding significant "days-at-sea" expenses. A new port is currently under construction in the municipality of Presidente Kennedy, on the border with Rio de Janeiro state, but it is being built primarily to serve "pre-salt" petroleum exploration.[12] There is also the perception that the Federal customs system is antiquated and incapable of handling the volume of exports leaving Vitória's ports in a timely fashion, which again adds expenses that exporters bear.

Another key bottleneck that is not unique to the ornamental stones sector, but that has been an impediment to its development is the lack of skilled labor, which is particularly detrimental to small *marmorarias*. In the past decade, there has emerged a small network of training providers, such as SENAI, which create curricula in partnership with industry actors like CETEMAG, SindiRochas, and SindiMarmore (the workers' union). SENAI also plays a role in helping manufacturers implement new technologies and qualifying new suppliers. However, much of the industrial training provided by SENAI is not targeted towards the ornamental stones sector, and therefore the training of workers tends to occur within firms (as is typical of the sector in the U.S. as well). The discovery of oil fields in Espírito Santo and Rio de Janeiro states, while a boon to these economies, has exacerbated the labor shortages, as oil platforms have created a strong demand for skilled industrial work, and giant firms like Petrobrás and its subcontractors are able to pay much more than the salaries offered by firms in the sector. The general industrial labor courses offered by SENAI, such as industrial painting, welding, and the like, have provided local workers with the training to get jobs in oil platforms while creating shortages for local firms from the stone sector. A related bottleneck is the question of worker safety, given the potential dangers of handling heavy stone blocks and slabs (a 10 cubic meter block can weigh 35 metric tons or more) and the antiquated machinery in many firms. SindiRochas, SindiMarmore, and Federal regulators have worked together on safety norms, including those for transporting goods on Federal highways, which leading to a decrease in the number of accidents and fatalities.

How Governance Works

Governance Background

Although the firms in the ornamental stones sector have had a representative trade association since the early 1970s, most actors date the establishment of a deliberate attempt to form a governance structure to the launching of the technology center, CETEMAG, in 1989, through a partnership between SindiRochas and the State development bank BANDES. This was the first concerted attempt to partner public and private actors to upgrade the sector. This included initiatives ranging from the incorporation of new technologies, exposing local entrepreneurs to global markets and emerging practices through organized trips to European trade fairs, and encouraging firms to move up the value chain/

In 2001, a partnership between the Federal Ministry of Science and Technology and several State and local actors formed RedeRochas with the intent of broadening the sector's governance and pursuing specific goals like increasing firm competitiveness, improving working conditions, and meeting environmental standards. RedeRochas was led by SEBRAE and SindiRochas and included a number of other important actors like BNDES, CrediRochas (the credit cooperative), MaqRochas (the machinery trade association, which later became SindiFer), SindiMármore (the employees' union), and CETEMAG coordinated by outside consultants (RedeRochas 2006). As discussed above, during this time, the Federal government was making a concerted effort to support industrial clusters through its APL policies, focusing particularly on fostering cooperation among firms, incorporating and generating innovative practices, and improving competitiveness. The governing body created a number of working groups, made up of individual firms and appropriate representatives from government agencies or universities, with specific targets such as workforce and managerial training, technological development, environmental preservation, financing, transport logistics, tax legislation, mining and environment, and marketing and communications. The "Continuous Improvements Working Group" (CIWG) provided a platform for firms to discuss common challenges related to the production process, and seek collective solutions. Through the CIWG and other working groups, RedeRochas developed projects that directly targeted small firms with low profit margins, such as collective purchasing agreements and hiring design consultants to work with *marmorarias* to improve the quality of their products.

According to Villaschi and Sabadini (2000), the RedeRochas working groups were successful in creating for the first time a spirit of horizontal cooperation between firms in the sector. In a 2003 survey, more than half of firms surveyed stated that they had worked collectively with other firms -- through the CIWG -- to improve their final products (RedeRochas 2006). Several actors interviewed in March and June 2012 confirmed that the pragmatic focus of the CIWG, with projects that directly benefited firms throughout the production chain, created the environment for the most collaborative period of the cluster's governance. Although the effectiveness of these working groups is probably the main reason that RedeRochas is perceived as a successful effort, it should be noted that they fell short of metagovernance, as there was neither coordination among groups nor a territorial focus.

Clusters can benefit from strategic planning processes that bring diverse interests to agreement, and in fact such a process for the marble producers in Andalusia, Spain, led skillfully by an intermediary, led to a shared vision for cluster development and governance (Barzelay 1991). Near the end of the

RedeRochas effort, in early 2008, it conducted a strategic planning process. Participants came to an agreement that the most important objective would be to improve management capacity of businesses. Four other issues were lower priorities -- marketing, environmental issues, technological innovation, and diversifying markets – while logistics, predatory competition, business default, and taxes were priorities for just a few participants. However, the governance efforts were cut short before the visioning exercise was completed and the group had a chance to formally produce a strategic plan. The current governance project has not yet attempted to convene a large number of firms, as was done in Andalusia, to develop an overarching vision for the sector (or to build on the strategic planning efforts started under RedeRochas). Instead, as we analyze later in the report, it has invested in largely technical projects conceived by consultants and a small number of firms. Of course, the common vision that results from a participatory process might be for technical solutions to address certain bottlenecks. The issue is that because many firms are not represented in the process, they do not consider themselves part of the governance effort, and may not support it.

In 2008, Federal funding for RedeRochas ceased, with the expectation that SindiRochas and its affiliates would take up the costs associated with maintaining the governance structure. According to stakeholders, lack of resources doomed RedeRochas, rather than change in the structure of the sector itself. This coincided with the international financial crisis precipitated by the real estate sector in the United States, which is the primary international market for Espírito Santo's ornamental stones. The decrease in exports pushed larger firms to turn to the domestic market, competing with smaller and non-exporting firms and overshadowing the collaborative spirit engendered by RedeRochas and its working groups. This, then, became one of the major schisms between small and large firms in the sector. During this period, SindiRochas was also in the middle of a shift in leadership, with a popular and active president being termed out. Lastly, SEBRAE's position as the primary public-sector interlocutor in RedeRochas had started to seem out of place due to its official mandate to support only micro and small businesses. Since larger firms played an important role in the leadership of SindiRochas, the focus on small firms may have alienated some groups. These factors all contributed to the demise of RedeRochas and its working groups, and joint action shifted to more ad hoc collaborations between certain firms on specific issues, rather than a broader systemic governance effort.

Why was the RedeRochas effort considered quite successful? Although this study did not conduct a systematic evaluation of that project, interviews suggested the importance of several factors. First, the working groups acted as a governance mechanism that specifically facilitated firm learning. Then, working groups developed projects that essentially simplified practices, such as the identification of bottlenecks in the production process, thus achieving buy-in. Finally, the groups supported collective efficiency, in the form of joint action across firms in horizontal networks. Yet, this incipient attempt at metagovernance did not take root, mostly because funding ended, but also because the effort mostly supported learning within, but not across, groups. Thus, a shared vision failed to emerge from the governance.

Private Actors in the Governance Structure

SindiRochas, the trade association for ornamental stones firms in Espírito Santo, is the most important private actor in the sector. It is officially recognized by all government agencies as the representative of all entrepreneurs within the sector for the purposes of policy negotiations, projects, partnerships, and the like. For example, SindiRochas negotiates with the State government over taxation policy for the sector and works closely with the Research Support Foundation (FAPES) to develop requests for proposals (RFPs) related to ornamental stones technology. SindiRochas actively works with local, State, and Federal agencies on policies related to the environmental impact of stones extraction, worker safety and health, transportation logistics, credit and finance, and the process of attaining concessions from the Federal government for mining. As the official association representing firm owners, SindiRochas is also charged with labor negotiations with the official employees' union, SindiMarmore, which is also involved in the governance structure.

Aside from its main office in Cachoeiro, SindiRochas maintains offices in Vitória and the northern municipalities of Nova Venécia and Barra de São Francisco. (The firms in each of the northern municipalities maintain their own regional associations, separate from SindiRochas.) SindiRochas represents firms from all phases of the ornamental stones production chain, from extraction to *marmorarias*, and firms of all sizes. According to its President, 50-60% of its members are micro and small enterprises. Although the current share of micro and small enterprises in the sector overall is unknown, Sindirocha's membership likely underrepresents small firms, which, as noted above, made up 98% of all firms in the sector in 2000 (Villaschi and Sabadini 2000). Moreover, the association's leadership is largely made up of owners of well established firms, which tend to be medium to large and active in extraction and cutting. Marmorarias are underrepresented in this leadership. This leads to a widespread perception that the association represents the interests of larger firms, while micro and small entrepreneurs are not its primary concern.

SindiRochas helped to found, and remains actively involved in, two supporting institutions: CETEMAG and CrediRochas. CETEMAG is the sector's technology center, which runs a variety of pilot projects with firms in Cachoeiro related to incorporating new technologies and practices. It also conducts training programs to help firms learn how to use new machinery. CrediRochas is the credit cooperative for the sector, which operates as a local affiliate of the National Credit Cooperative System (Sicoob). It offers affordable credit products to its members and is able to utilize its knowledge of the sector to provide flexibility to its members (such as its ability to accept stones-related machinery as collateral).

The private actor within the governance structure that operates most autonomously from SindiRochas is CentroRochas, the sector's export logistics association. CentroRochas is also a membership organization, formally associated with the national ornamental stones trade association, AbiRochas.[13] CentroRochas works as a lobbying organization at the State and Federal levels, pushing for investments in export infrastructure and changes in trade legislation favoring the ornamental stones sector. For example, CentroRochas recently lobbied the Federal Congress to include the ornamental stones sector in a list of exporting industries that will see abatements in their payroll taxes. The

association also provides courses for members on how to navigate trade legislation between Brazil, the United States, and other important markets.

Public Actors in the Governance Structure

The transition from RedeRochas to the new governance structure also signified a shift in leadership from SEBRAE to FINDES/IEL, the State affiliate of CNI and official partner of the IDB/MIF in the project. Some see this as a "natural progression" for the governance structure, particularly given CNI's broader mandate to represent manufacturing firms of all sizes.[14] SEBRAE continues to participate in the governance structure, but has taken a more complementary role, mostly advocating for policies and programs favoring micro and small businesses. FINDES/IEL has one staff member dedicated to this project, and through its Cachoeiro office manages its relationships with the various local actors. The Steering Committee for the governance structure meets at the Cachoeiro office on a quarterly basis. In addition to FINDES/IEL, CNI's workforce development agency, SENAI, plays an important role within the sector, though not in governance per se. In partnership with SindiRochas, SENAI provides incumbent worker training, or providing formal industrial training to sector workers who learned skills from their peers. As SENAI does not have specialized machinery for ornamental stones processing in its Cachoeiro campus, these courses are generally hosted by firms, with SindiRochas and SENAI sharing costs. SENAI also offers general industrial training for workers in activities like machinery operation, welding, industrial painting, and computer-aided design (CAD).

Several State-level agencies also play an important role in the governance structure. The department of economic development (SEDES), as described above, has targeted clusters as a tool to diversify the state's economy, from natural resource extraction to higher value manufactured goods. It has primarily relied on providing tax benefits to local firms through its "Competitiveness Contract." This contract, into which individual firms enter voluntarily, provides certain tax benefits, aimed primarily at medium-to-large businesses, in exchange for investments in managerial capacity, such as training in business strategy. It largely bypasses small firms that already pay lower taxes under the "simple tax" regime.[15] The State's environmental management agency (IEMA) issues operating licenses to firms in all segments of the sector, including machinery manufacturers. It also monitors firm activities to ensure compliance with environmental regulations, particularly with regards to disposal of industrial waste. However, it rarely sanctions firms severely for non-compliance.

BNDES, the State's development bank, has historically played a central role in the sector. It helped to launch CETEMAG in the early 1980s and has extended loans to firms to purchase equipment and incorporate new technologies. Their cluster support strategy focuses on the "densification" of the local productive chain, or encouraging local production of inputs and machinery. They also support local entrepreneurs traveling to international trade fairs, such as the one in Verona (Italy).

Cachoeiro de Itapemirim's municipal government is another important public actor in the cluster and its governance. Through its economic development department, it serves primarily as an intermediary between firms and the State government, which has stronger fiscal and regulatory instruments at its disposal. They have set up a "one stop shop" for entrepreneurs seeking to locate or

expand in Cachoeiro, providing streamlined permitting and guidance through the State's regulatory framework (particularly through IEMA). Its main policy lever is authority over land use and zoning within the Municipality. Through its Master Plan, it has attempted to solve land use conflicts between industrial and residential uses, directing new firms to locate in the São Joaquim Industrial District (ADIS), located in the outskirts of the city (discussed further below). It has also engaged in policies to provide adequate housing supply and public transportation for the cluster's labor force. Although the cluster extends to several other neighboring municipalities, there are no broad efforts to coordinate actions by local governments at a regional scale. This lack of coordination is not unusual among jurisdictions, frequently stemming from the ability of small municipalities to "free ride" on the activities of larger jurisdictions (like Cachoeiro).

The current governance of the ornamental stones cluster builds upon many previous efforts, and thus to a certain extent is following established rules of the game. This path dependence is evident in the project's power dynamics, participatory process, and adherence to federal APL policy. SindiRochas, long the dominant private actor, continues to set the agenda, often single-handedly. Once an organization has established itself as the voice of the industry, it is difficult for other voices to gain legitimacy. In a similar vein, RedeRochas established a collaborative approach with some positive results. The new governance efforts that are just beginning try in part to replicate the same approach, despite the challenges of participation with a larger group. Federal-level APL policy shapes overall cluster goals, even as it shifts into a "second generation" approach: for instance, sector actors continue to target projects for which federal funding incentivizes APL participation.

Yet, much has changed since SindiRochas, RedeRochas, and APL policy dominated the cluster conversation in Espírito Santo. Brazil's economy—though temporarily stalled—is benefiting from global demand for its natural resources. This demand has supported the growth of the ornamental stones sector despite its reliance on the U.S. market – yet also creates new challenges. Natural gas and oil producers compete for scarce resources, particularly labor and logistical capacity. At the same time, this activity is also driving domestic demand in the residentiary sector, such as construction, which in turn benefits ornamental stones. Moreover, their revenues are supporting new infrastructure development, particularly roads, critical to many ornamental stones firms. This rapid growth may warrant economy-wide intervention by the national government, such as renewed investments in human capital development. Meanwhile, the stones sector itself has changed, with more large producers focused on global exports. These challenges add up to an increasingly unequal playing field for firms in the sector. In this context, there is an opportunity to move forward with a new form of governance.

Current Governance Structure and Capacities

In 2008, MIF formed a partnership with CNI to strengthen territorial governance initiatives in four states, including Espírito Santo (the other three being Acre, Pernambuco, and Goiás). The four sites were chosen due to the presence of a strong cluster (APL) structure (in the cases of Espírito Santo and Acre) or for the emergence of cluster dynamics due to the establishment of a large firm, with the expectation of formation of a hub-and-spoke cluster pattern. For the Espírito Santo project, CNI's State

affiliate FINDES has worked through its management services division, the Insituto Euvaldo Lodi (IEL) in close collaboration with SindiRochas.

The CNI/MIF collaboration in Espírito Santo has attempted to recapture some of the successes of RedeRochas, particularly in fostering collective actions among firms, and close coordination with the public sector in certain areas (such as environmental regulation). In addition, it is designed to work with all firms, not just the micro and small enterprises, and expand governance to include a broader array of institutions, in order to shift into a more territorial governance. To accomplish this, the project has cast a broad net, inviting 19 institutions to join the Steering Committee, including public actors from the State and municipal governments, trade associations, and the employees' labor union (a description of each actor is included below). However, continuing RedeRochas' work has proven challenging partly because of changes in recent years, for instance, the growth of large firms, and the growing diversity of the maturing cluster, which creates divergent interests. Given that RedeRochas ended almost five years ago, it is difficult for overworked CNI/MIF staff to simply recreate it in place.

According to the donor's memorandum for the project, it includes three main components aimed at developing a broader territorial governance, supporting the cluster and private sector joint action, and building capacity for governance across civil society, public, and private sectors: "Strengthening the local production development network," "Business development initiatives in strategic sectors," and "Promotion of collective solutions" along with a monitoring and learning component (MIF 2008). The Steering Committee has been meeting quarterly since 2010 at the FINDES office in Cachoeiro. Much of the work it has conducted since then has been to establish the institutional and administrative groundwork to accomplish the project, such as hiring consultants, conducting preliminary studies, and defining specific projects to pursue. Five of these projects have been approved so far, four of which are underway: environmental certification of construction materials made up of ornamental stones processing residues; development of capability to produce diamond cables domestically; 3D simulator of indoor environments for stones applications; development of machinery for textured slab polishing; and development of improved machinery for high end cutting and polishing. Another six projects (including life cycle analysis of ornamental stones and its competitor products and a manual for distribution to architects and interior designers) have been identified but not yet approved by the IDB/MIF or national CNI teams (FINDES 2012). All of these projects have largely been developed by CETEMAG and will be implemented through partnerships between the technology center and individual firms (or small groups of 2-3 firms). The project recently received a two-year extension, through December 2013.

Though sector actors support leadership by CNI/FINDES/IEL (rather than SEBRAE) because it represents all industrial firms, how will that representation play out in practice? Given that the CNI/MIF program is still underway, it is too early to assess the current governance process. However, the next section looks at several successes and failures of recent governance projects -- some initiated or supported by CNI/MIF, others occurring beforehand or outside of the formal governance -- in order to draw lessons for the future.

Governance Projects and Issues

In recent years, actors in the State have launched many different projects to address bottlenecks in the sector, from environmental issues, to productivity, to exports. Some of these have been initiated by longstanding organizations like SindiRochas, while others involve small groups of cooperative firms; CNI/MIF funding currently supports some projects, while others draw on other resources.

Some projects have required mostly horizontal coordination, as for instance firms organized in joint action to solve environmental problems such as sludge disposal or urban land use conflicts, often with some vertical support, from higher-level government agencies. Others are best characterized as vertical – for instance, technology transfer from research institutes to firms, or interventions to improve supply chains or exports. The most successful efforts typically combine both horizontal and vertical action in order to facilitate learning or simply reach agreement about goals. However, even the most effective governance efforts fail to bridge the three critical divides in the sector: firm type, size, or location within the region.

Granite Sludge Disposal

Perhaps the clearest examples of collaboration between firms in the State have been efforts by firms in Cachoeiro and Nova Venécia to address the pressing issue of the disposal of granite sludge. In both cases, firms were responding to pressure from Federal and State regulators, which began to enforce environmental legislation in the early 2000s. This challenge was uniquely suited to joint action, as the costs of adequately disposing of granite sludge is prohibitively high for individual firms, and the availability of suitable sites for public or private landfills is limited. In Cachoeiro, a partnership between SindiRochas, CETEMAG, the Federal Public Ministry, and the State government formed AAMOL, a non-profit organization that runs a landfill for granite sludge and a project to re-use the sludge as construction materials such as concrete blocks and mortar. It provides a "filter press" [16] and a landfill to 75 firms and is actively involved in a trial program to recycle the sludge into construction materials. The trial program, which includes researchers from the Federal University in Vitória (UFES), has a goal of fully utilizing the sludge that has been deposited in the landfill. Similarly, in Nova Venécia, fifteen local firms set up the Residue Treatment Center (CTR) to receive and process their own granite sludge as well as that of an additional ten firms that pay a use fee. The water that is removed during filtering gets sent back through channels to the member firms, which can recycle it into the block cutting process. Joint action extends vertically as well, with the involvement of IEMA, which has written guidelines for disposal, issued licenses for landfills, and worked with AAMOL to find new uses for the byproduct.

AAMOL's model is a more ambitious attempt at joint action, seeking to utilize government resources such as innovation grants and partnerships with UFES researchers. CTR, on the other hand, does not engage proactively with the public sector, which could be explained by the physical distance between Nova Venécia and the centers of power in the sector (Cachoeiro and Vitória). Additionally, the mission of AAMOL is to find a sustainable solution to the sludge problem, with the goal of fully recycling all of the by-product, while CTR does not seem to have a plan beyond the six-year lifespan of its current landfill.

These projects are good examples of limited joint action by a small number of firms, spurred and supported by vertical action (federal regulation and research support). The projects provide a crucial service to firms, a landfill for disposal of the sludge, which would otherwise need to be deposited in private landfills. However, they benefit only member firms, which are mostly located nearby, and do not have the capacity to expand their operations to other firms. Due in part to the significant distance between the two areas (a six-hour drive), the two organizations also do not share information with one another and seem to not know much about each other's activities, suggesting that there is no sector-wide debate about how to address this issue. The region will eventually need to provide a long-term solution for the disposal problem, potentially a task for future governance processes.

São Joaquim Industrial District

The creation of the São Joaquim Industrial District is an example of a successful effort of public-private collaboration to address a sector-wide bottleneck. The growth of the industry and of the city had occurred in an unplanned fashion, leading to severe land use conflicts, such as heavy industrial uses alongside residences and neighborhood commerce. In order to address this problem, the Cachoeiro municipal government purchased a large tract of land outside in the outskirts of the city (on a road that leads to the municipality of Castelo), subdivided it into industrial lots, and sold them to firms at discounted rates. They also installed some infrastructure, like street lighting, some of which was financed through a State fund created with petroleum royalties. The various departments in the municipal government that have an interest in the Industrial District (public works, economic development, environment, etc) formed an internal working group to support the development of the area. SESI, CNI's social services agency, installed a technology center to teach computer classes to employees after work hours. Although not all firms have relocated, there are currently more than 80 firms located in the District, the vast majority of which are stones producers. At the municipal government's encouragement, they formed an association (ADIS) that is the main interlocutor of their interests. In an example of collaboration that is both horizontal and vertical, BNDES, working with SEDES and ADIS, developed a credit line specifically to fund relocation of firms to the district. Although this effort supports the heart of the ornamental stones cluster in Cachoeiro, and illustrates the potential role of the municipal government in economic development governance, it is not part of the CNI/MIF program, since MIF does not fund infrastructure projects.

Technology Transfer

As noted in the previous section, the establishment of CETEMAG is widely seen as the beginning of a deliberate attempt to form a governance structure for the benefit of the entire sector. CETEMAG was formed through a public-private collaboration between BANDES and SindiRochas and is currently located in a property donated by the Cachoeiro municipal government. Through both the RedeRochas and CNI/MIF governance structures, CETEMAG has been an important actor, working with public sector actors and entrepreneurs on technology-related projects. For example, CETEMAG is credited with helping the sector adopt the productivity enhancing diamond cable technology by providing training

courses for entrepreneurs and employees. The perception that CETEMAG is more of a "technical" actor, not involved in the sector's politics, gives the center some legitimacy among firms that do not necessarily trust a political organization like SindiRochas to represent their interests. However, despite the perception that CETEMAG engages in purely "technical" activities, some State-level actors noted that the center had indeed become somewhat of a political institution, with its vision largely overlapping with that of SindiRochas. Firms interviewed in Nova Venécia and Vitória also perceived CETEMAG to be an institution serving Cachoeiro firms only, and did not take advantage of the services provided by the center.

Critics also point out that the process by which projects are chosen may be divisive. Outside consultants or top leadership typically devise the projects, rather than the firms themselves. CETEMAG staff try to get as many projects as possible, often competing in a very short timeframe in a chase for government funds. Because they may need firms to put up matching funds, they do not favor undercapitalized firms. Since more projects help support more staff, there is little incentive to maintain projects. An alternative approach might be to survey firms to determine their needs, or link projects to strategic planning efforts as in the Macael case, or even just to follow up on the priorities outlined in RedeRochas' strategic planning process.

The sector has also been able to rely on assistance from the Federal University in Vitória (UFES) and FAPES for the incorporation of new technologies. FAPES in particular, has established a line of grants targeted directly towards economic development, giving priority to projects benefiting firms that are part of a sector. The foundation works with State and Federal institutions (SEBRAE, MDIC, MCTI, SEDES) to develop RFPs that promote the incorporation of new technologies. In order to be eligible to apply for funding, firms are required to work with academic institutions and researchers are required to partner with entrepreneurs, creating a clear incentive for the private sector and research centers to work together. Two current projects include funding for a firm that is trying to produce multi-cable technology in southern Espírito Santo and a project to utilize marble residues to treat soil acidity.

Most actors point to the various technology transfer projects as the biggest success of the governance process to date. CETEMAG is clearly an effective mechanism for collective learning; what is less clear is the extent to which benefits are shared across the stones sector.

Trade Fairs

Almost unanimously, interviewees noted that trade fairs have played a fundamental role in the success of the sector's upgrading efforts. Starting in the late 1980s, BNDES began financing trips for local entrepreneurs to visit major international fairs to give exposure to local ornamental stones. With support from the State and municipal governments, the events firm Milanez & Milaneze has held an ornamental stones trade fair in Cachoeiro since 1989 and in Vitória since 2003. The event in Cachoeiro is larger, attracting 25,000 visitors from every state in Brazil and 19 foreign countries (www.cachoeirostonefair.com.br). The Cachoeiro fair in particular has also served as an important meeting place for entrepreneurs to discuss issues affecting the whole sector, although one interviewee observed that these types of informal meetings are generally targeted towards larger firms. The

CNI/MIF program supports the participation of local entrepreneurs in the fair. The fairs include displays of upscale stones products as well as imported and domestic machinery and inputs. Although the fair organizers, Milanez and Milaneze, are not included in the formal governance structures of the CNI/MIF program (or RedeRochas previously), they are broadly seen as an important actor with legitimacy across all four subsectors. Thus, this is an example of an initiative that facilitates learning and the development of a shared vision along both horizontal and vertical dimensions: entrepreneurs gain access to both suppliers and markets, and the region's identity as a center of ornamental stones production is reinforced.

Broadening Export Base

Collective action has been unsuccessful in trying to incorporate small firms into the export base. As mentioned above, the sector has been able to grow its exports in the past two decades, particularly by exporting polished slabs. The firms that are able to participate in global markets, however, are only medium to large enterprises performing extraction, cutting, and polishing. Small-scale *marmorarias*, which make up the majority of all ornamental stones firms in the state, have generally not been able to break into international markets or luxury domestic markets (São Paulo and Rio de Janeiro, primarily). Through RedeRochas, SEBRAE attempted to form small groups of firms (less than 10) to hire design and marketing consultants with the goal of differentiating their products and making them more suitable for exports. These efforts were largely defeated by the financial crisis of 2007-2009, which severely affected the US real estate market, the largest importer of the sector's products. In the words of a marmoraria owner, the crisis "ended the foreign market." Since then, SEBRAE's goal has shifted towards the "internationalization" of micro and small enterprises in several sectors, or inserting these firms into broader global value chains, even if their final products are not themselves exported. This strategy seems ill-suited to the ornamental stones sector, however, as *marmorarias* produce the final consumer good, and thus have to compete with foreign buyers for their main input, polished slabs from larger firms.[17] This ineffective vertical coordination (i.e. between local and international firms) stems primarily from the inability to develop viable collective efficiency among different firm types (large versus small, integrated versus disintegrated). This also means that small firms may perceive the efforts by SindiRochas and others to support exports as undercutting their own business, exacerbating the perception that small firms are excluded from governance.

The Machinery Sector

In the cluster literature (e.g., Porter 1998 and Schmitz 1999), the emergence of intermediary and capital goods producers within close spatial proximity of the cluster's primary sector is key to the maturation of a given cluster. The strengthening of the machinery manufacturing sector in the Cachoeiro region during the 1990s and 2000s illustrates the ability of the cluster to begin replacing imports with locally produced capital goods.[18] As described above, the sector created its own trade association, which currently is associated with the Statewide association of machinery manufacturers, Sindifer. The emergence of the machinery sector in Cachoeiro has benefited from significant public

assistance (e.g., from BNDES). To this end, it targets loan products towards local production of capital goods, and the purchase of these goods by end users. In the ornamental stones cluster, this has meant investments in diamond cable technologies. FAPES has also played a role, partnering with firms and researchers to locally produce cutting edge technology, such as multi-cable machines. CETEMAG has been the natural partner for the machinery sector within the cluster, and Sindifer has a seat in the CETEMAG board.

There are, however, serious conflicts of interest between the ornamental stones and machinery sectors that have been challenging for horizontal cooperation efforts. The main issue, currently, is a conflict over the promotion of domestic producers of diamond cable machines, as local firms have not been able to compete on quality with imports from Europe or price with those from China. In a classic problem of local entrepreneurs suppressing backward linkages for fear of competition (Hirschman 1968), large ornamental stones firms have pushed for more favorable terms for imports, such as the elimination of tariffs on imported machinery. On the other hand, machinery manufacturers have sought trade protections and State and Federal subsidies for local production. Several interviewees noted that these conflicts worsened after the 2008 crisis, when ornamental stones firms sought ways to reduce their costs at the expense of machinery manufacturers. As a result, Sindifer only has an arms length relationship with SindiRochas and CETEMAG, and there was little evidence of direct cooperation among firms.

Poor Connections Across Space

Collective action has also been unable to improve, and has been made more difficult by the lack of coherent policy across the State's territory. As has been discussed, there is a mismatch between the APL policy (and CNI/MIF program), relying on state-level actors, and the subregions or municipalities where most of the effective joint action is taking place. The sector is dispersed throughout the state, with the cluster/APL based in Cachoeiro de Itapemirim (and surrounding municipalities in southern Espírito Santo) and two other nodes, Vitória and the north of the State, playing important economic, logistical, and/or political roles. On the private sector side, SindiRochas is the official trade association representing ornamental stones firms in the entire State. However, it has a strong presence in Cachoeiro only, and its offices in other regions do not play an important role. Thus, firms in Nova Venecia and Vitória are not well represented in the governance (or the CNI/MIF program). Relatedly, institutions like CETEMAG, CrediRochas, and AAMOL are based in Cachoeiro and are not seen as being valuable by firms in the other regions. It is not surprising, then, that the larger firms in other regions have formed their own trade associations to address their concerns, such as the Association of Stones Processing Enterprises (ETAPE) and the Residue Treatment Center (CTR) in Nova Venécia, both of which see themselves as entirely separate entities from their counterparts in Cachoeiro and communicate rarely due to the difficulty of travel. Therefore, there is no coordination between regions on an issue that affects the entire State and could benefit from knowledge-sharing, the disposal of granite sludge. Technology transfer presents a similar situation, with beneficiaries of CETEMAG's work concentrated in its vicinity.

The same can be said of coordination between public and private actors. Policies in support of APLs are created at the Federal and State levels, their implementation carried out by national

organizations like SEBRAE and CNI, and their State-level offices. However, their primary partner in the ornamental stones sector is SindiRochas, an association with strong local ties to Cachoeiro. The main access point for firms, individually or through SindiRochas, is the municipal government, which has few policies to support the sector as most tax, regulatory, and investment capabilities lie at the State level. In other words, a mismatch is occurring between the formal, state-wide, governance structure and the localized areas (primarily Cachoeiro and its vicinity) where the most effective governance is occurring. Lack of clarity about the geography and scope of governance efforts reinforces the fragmentation of the sector, as it is not clear whether governance is trying to benefit the entire state, or the heart of the cluster in Cachoeiro.

Conclusion: Effective Governance in the E.S. Ornamental Stones Sector

The current governance effort, led by CNI/MIF in close cooperation with Sindirochas, has begun with innovation and technology transfer relative to the cutting and polishing of stone blocks and disposition of residues. Although the project scope includes governance efforts (some not yet underway), in some ways the technology transfer projects are the lowest-hanging fruit for obtaining tangible results quickly. Improving technology is key to global competition, and works well to provide some quick "win-wins" to build confidence in governance, but it falls short as a primary goal; it is benefitting a few firms, but not solving the bottlenecks that affect the growth and sustainability of the entire sector. In Espírito Santo, and even only in Cachoeiro, the heart of the sector, local, regional, and national actors have as yet failed to develop the common vision that is so critical to developing a strategy and a brand for the region's stone products, as well as dealing with environmental issues like sludge disposal. Likewise, the sector lacks both vertical and horizontal cooperation (Schmitz 1999). While a few firms are able to move up the value chain and access new markets, most struggle to maintain market share in an ever more competitive environment.

In the absence of collective action that joins together the majority of firms, the common vision that is formulated oversimplifies the various interests, some of them conflicting. One example is the disconnect between producers and suppliers that slows the development and use of sophisticated machinery; although some individual firms benefit from strong relationships with input manufacturers such as machinery firms, this vertical cooperation is rare. Likewise, many large firms pursue their own market connections and trade protections rather than invest in more cooperative efforts. Even a simple metric meant to cross-cut the sector, like "increased exports," can fail as a common vision if some players (in this case, the small firms), do not benefit. A measure that carefully measured change in the domestic market might be more appropriate.

Though associations with a narrow focus – such as AAMOL, Cetemag, and the São Joaquim Industrial District outside of Cachoeiro– work effectively on behalf of their own members, they are fragmented, so little cross-association learning and governance take place. The insular entrepreneurial culture and geography of the region (with governance efforts focusing mostly on Cachoeiro) compound the challenge of collective action, as successful joint action in one municipality rarely spills over to another.

These multiple fracture lines – between firm types and the state's subregions – suggest that Espírito Santo is not functioning like a classic Marshallian industrial district – a point emphasized by many interviewees. It also differs from a hub-and-spoke organization in that larger firms tend to dominate the earlier phases of the production chain (extraction and cutting/polishing), and smaller firms manufacture the final consumer products. In other words, larger, more profitable firms are the suppliers of inputs (polished slabs) for the stones workshops, which tend to be micro and small enterprises operating with very low margins. Increasingly, vertically integrated firms are reluctant to cooperate and tend to dominate local resources. The focus of SindiRochas on their needs is not an intentional strategy but reflects these local power dynamics and results in the loss of its legitimacy as the representative of the sector. Because sector governance, by SindiRochas and its partners, has focused on many small, albeit successful, projects that each benefits only a few firms, the governance process has actually reinforced the fragmentation of interests. This suggests a need to think carefully about the type of sector policy that will best be able to support this form of industrial district.

Although the current governance effort is attempting to be inclusive, it is perceived as coming from above, rather than emerging from a shared vision. Thus, though there are multiple networks organized around particular issues, the governance as yet lacks specific mechanisms to coordinate across groups. With little collective learning from failure (either vertical or horizontal) occurring, actors do not understand how to adapt their behavior. Collective efficiency (and metagovernance) will not emerge unless actors find more common ground.

Clearly, as Schmitz (1999) and Sepulveda (2008) suggest, a public sector champion (or several) are needed to ensure that locals are able to obtain support from the multiple levels of government with access to resources. However, as structured under APL policy, and even under the current CNI/MIF arrangement, local actors need not achieve widespread consensus in order to mobilize support. To win funding, actors such as CETEMAG tend to present shovel-ready projects from a list prepared by consultants. Though these projects are likely to result in productivity improvements for the firms that directly benefit, they are essentially the low-hanging fruit of the economic development process. To address the many bottlenecks of the sector, stakeholders will have to go through the much harder work of building consensus across firms.

In order to achieve this kind of metagovernance for territorial economic development, stakeholders will need to work together more effectively to develop a common developmental vision. As in the Macael case, this vision should come from below, to motivate firms resistant to collaboration and participation in the provision of collective goods. This might involve developing a strategic plan for action that provides tangible (and low-conflict) benefits to a broad segment of the ornamental stones sector, for instance, supporting the broad-based growth of the sector by diversifying markets, dealing with common bottlenecks, strengthening local supply chains, and improving production processes that lower costs across the full spectrum of businesses, not just for a few. This means a new start for the CNI/MIF program, to devote more project resources to governance processes, in a longer timeframe.

One example of such broad territorial governance for economic development comes from the Silicon Valley Leadership Group in the U.S.. In the summer of 1977, David Packard convened CEOs from all over Silicon Valley under the premise that local employers should be actively involved in working with

the government to find solutions to issues of public goods like transportation, housing, permit streamlining, education, and the environment. Originally a group representing primarily electronics manufacturers, SVLG has grown into an influential organization representing 190 Silicon Valley employers employing a total of 250,000 people and drawn mostly from the high-tech and manufacturing sectors. SVLG acts in part as a lobbyist, but mostly as a government partner in addressing regional problems such as failing transportation infrastructure and shortages of affordable housing, primarily motivated by the common issue of rising labor costs. For instance, on the federal and state levels, the SVLG has actively supported legislation that assists first-time mortgage holders and punishes groups that try to stop the construction of affordable housing. The SVLG played a major role in advocating and lobbying for BART to San Jose, winning the passage of sales tax hikes in both 2000 and 2008. They were also successful in lobbying state voters for the passage of the California High-Speed Rail Act. In the City of San Jose, the SVLG has supported a program which constructs affordable housing for teachers in the Silicon Valley. Among other projects are Cool Commutes, a competition among the employees of large regional corporations to reduce greenhouse gasses; Green Building, to streamline cities' practices and standards for green building; market creation for Plug-In Hybrid Electric Vehicles (PHEVs) and Electric Vehicles (EVs); SolarTech, a business association for the solar industry; and Sustainable Silicon Valley, a nonprofit that promotes voluntary energy efficiency among small and medium sized businesses (SVLG 2009).

Thus, as these projects suggest, the organization focuses on developing collaborative solutions to both general regional bottlenecks like infrastructure problems and sector-specific issues such as developing a market for green products. As one long-term member stated at a recent SVLG event, "The very notion that leadership became a key word in this organization was an indicator that we had to focus very much not only on the future but also how to get there." Above all, SVLG's modus operandi is education of its members. For instance, to muster business support for state legislation to contain health costs in 1982, SVLG held a conference to educate its members, carefully excluding the health care lobby, and built consensus around the reforms (Bergthold 1984). Observers credit the high degree of corporate social responsibility in Silicon Valley, where corporations historically led the rest of California in cleaning up toxic waste sites, to the well-informed executives who realized that environmental regulation is inevitable (and also took advantage of the equity built up in property due to high price appreciation) (Scholz 1989).

There are important lessons here for the Espírito Santo case. First, many of the bottlenecks to be addressed in territorial economic development have to do with the provision of public goods in the environment, specifically, the development of infrastructure, the regulation of environmental quality, and the preparation of the labor force. To shift into a more territorial model, the ornamental stones governance initiative might also begin a more concerted campaign to address these broader issues, some of which came up in the RedeRochas strategic planning process. For instance, the initiative might conduct a branding effort around its development of environmentally sensitive technologies, such as the recycling of sludge. Second, given the broad need to develop better managerial capacity in individual firms, the initiative might focus on educating its members in industry competitiveness as a way to develop more buy-in into territorial governance. One opportunity to establish the legitimacy of the

initiative, just as the Leadership Group has developed its identity in Silicon Valley, is by connecting such education efforts to the highly successful stones fairs.

To develop a similar capacity to focus on broader issues will require the governance to incorporate complexity of interests and conflict, such that it gains legitimacy with all actors, even when they are the "losers" in particular decisions. For the CNI/MIF program, this may mean moving forward from its coordination of the governance effort with SindiRochas. Instead of allying itself so closely with SindiRochas, the project might try to facilitate collective action across the many different groups, or to draw from a broader set of firms than is currently represented by the SindiRochas leadership. Small firm executives are typically too busy to see the purpose in participating in associations, but incorporating them into the governance could benefit the entire sector; for instance, small firms often have more flexibility in production because of less stringent regulations. The elements of metagovernance are in place; there are many different self-coordinating networks, such as AAMOL, CTR, the São Joaquim Industrial District, SindiRochas, Sindifer, the remaining RedeRochas working groups, and so forth, which would benefit from CNI/MIF engaging in a broader effort to facilitate learning and visioning. The capacity that these networks have already built provides an invaluable example for the rest of the state.

One concrete step towards this would be to clarify the geography and scope of the governance effort. If the goal is to shift from sectoral economic development to territorial economic development, stakeholders need to decide whether to focus efforts on the needs of the Cachoeiro cluster, which already has a territorial focus, or to initiate a broader effort across the state. In other words, what is the most relevant and effective territory to focus on? The answer to this question is beyond the scope of this report, but what this case makes clear is that a territorial governance project needs to be explicit about its geographic extent. If it is truly to address needs across the state – a focus that will be necessary if sustainability is a goal -- then the complexity of the project increases significantly. For instance, addressing an environmental issue like sludge disposal will mean not just supporting discrete associations in Cachoeiro and Nova Venecia but sharing information and technology among associations as well as coordinating with other related sectors such as trucking and construction. The project will need to involve different stakeholders at the local and state level, not just those familiar with ornamental stones, for instance staff in economic development and public works departments.

In a sense, this is a legacy of the top-down federal APL approach that may be impeding the transformation to a more broad-based endogenous economic development strategy. A truly endogenous and territorial approach would acknowledge and build upon existing strengths, coordinating between ornamental stones and other sectors with related interests. If the initiative is to include the whole state systematically, to address the fragmentation of firm interests, and to coordinate across sectors to enable a more territorial approach, the CNI/FINDES/IEL will need more resources to address diverse firm needs. Before broadening to a territorial approach, it will be necessary to understand the array of policies and incentives in place already to support APLs. Over time, the APL support structure will need to be recast to support a more territorial governance.

Another step might be to develop a comprehensive program to attract small firms to the cluster governance. For instance, the CNI/MIF program might support CETEMAG or other key actors in the development of projects that specifically benefit small firms. Or, Sindirochas might offer pilot projects

that meet the needs of small firms for credit or technical assistance (already identified in the RedeRochas strategic planning process), but require involvement in governance in return. The governance efforts would also be strengthened by a broader representation of the sector within Sindirochas' leadership. The association might, for example, dedicate one or two of its board positions to marmorarias, or pay a full-time staff to run a division to recruit and address the concerns of marmoraria owners.

An effort to coordinate across networks, or even simply to bring a broad cross-section of sector firms together to develop a vision for the region's future and plan more strategically for the sector's continued rapid growth, is challenging, presents high risk, and may fail. Without this metagovernance, the sector will survive; there are already many successful, albeit small, collective initiatives that have helped it to sustain its growth through crisis. But the alternative likely means that the ornamental stones sector will not reach its potential in the global market, and more importantly, will continue along the path of exclusion and unsustainable growth.

The governance of the ornamental stones cluster raises issues of sustainability in multiple dimensions. First is the issue of environmental sustainability. At present, there is no long-term plan for disposing of the waste associated with block processing, no plan for landscape restoration after quarries are closed, and little knowledge even of the stone reserves remaining. What will become of the municipalities that specialize in extraction in fifty years' time? There may be ways to diversify the economy now so as to extend the life of the ornamental stones sector as well as the long term growth prospects of the regional economy.

Second is the issue of economic sustainability. If larger firms continue to grow at the expense of small firms, new firms will be discouraged from entering the sector and its dynamism will suffer. The evidence of this is anecdotal, since longitudinal data on firm size by sector is not available. Still, this sector has traditionally had few barriers to entry and attracted many immigrant entrepreneurs. This dynamic seems to be changing with the growth of vertically integrated firms, and it may mean a lost opportunity for local ownership and upward mobility.

Finally, there is the question of the sustainability of collective action. To date, although several small private-private joint action efforts have survived over time, most of the larger governance projects have required a repeated, substantial infusion of government (or MIF) funding in order to continue. In the long term, if such efforts are to be sustainable without significant external funding, they will require the buy-in of more private sector actors. This, in turn, will require governance to focus on goals that benefit more firms. In the end, it will be the ability to solve development bottlenecks across the state that creates sustainable territorial governance for economic development.

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[1] The Federal government has developed and implemented such policies under the rubric of "local production systems" (*arranjos produtivos locais*, or APLs).

[2] We use terms "cluster" and "sector" deliberately in this report to mean related, but different economic and geographic arrangements. The study focuses on the broader, statewide *sector*, encompassing ornamental stones extraction and processing firms, as well as related public-sector institutions. We also sometimes refer to the ornamental stones *cluster,* which specifically refers to the network of firms in the southern part of the state, around the municipality of Cachoeiro de Itapemirim. The cluster also includes firms in other sectors, such as machinery manufacturers, that provide services for ornamental stones firms.

[3] Funder's proposal, 2008.

[4] Schmitz and Nadvi (1999) provide the introduction for an entire issue of *World Development* dedicated to the analysis of the role of business clusters sectors on regional and national development in low- and middle-income countries.

[5] As Hirschman points out, however, at least in the cases of Brazil and Colombia, the critiques of ISI as thwarting the development of an export base may be unwarranted.

[6] As were the World Bank and other Washington consensus institutions – still heavily influenced by the neoliberal policies that dominated economic policymaking during the 1980s.

[7] Helmsing (2001) and Markusen (1996) both highlight a similar shortcoming in the literature on flexible specialization and Italy's industrial districts.

[8] Constitutionally mandated four-year national development plans.

[9] For example, BNDES provides 10-year financing for ornamental stones firms to purchase multi-cable machinery from Brazilian manufacturers.

[10] The location quotient is a measure of local specialization in a particular industry or sector. It is the proportion of local employment in a given sector divided by that same proportion at a greater aggregate scale; in this case, statewide employment in ornamental stones. A quotient of 1.00 means that the locality has the same proportion of employment in that sector as the rest of the state.

[11] The Public Ministry, considered Brazil's "fourth branch" of government, is responsible for prosecuting crimes in the public interest, and is particularly involved with environmental litigation (see McAllister 2008).

[12] "Pre-salt: refers to a layer of rock off the Brazilian coast with extensive oil reserves; it is located under a thick layer of salt.

[13] AbiRochas is a confederation of state trade associations. Due to a leadership dispute, SindiRochas broke off its association with AbiRochas in the mid-2000s.

[14] CNI is funded through a mandatory contribution paid by all industrial firms in Brazil that is levied progressively based on firm earnings.

[15] The State's main taxing instrument is the tax on the circulation of goods and services (the ICMS).

[16] The filter reduces humidity in the sludge to 30%, a level which is required for disposal into the landfills.

[17] Several interviewees compared the sector's structure to that of the wood furniture cluster sector in the municipality of Linhares, where bigger firms purchase inputs from smaller ones.

[18] The machinery sector targeted towards ornamental stones is located mostly in Cachoeiro. In other parts of Espírito Santo, concentrations of machinery firms focus on other activities, such as shipbuilding and oil exploration in Vitória (personal interview with Sindifer President, June 16, 2012).