Introduction
The objective of this paper is to analyze the social-economic trajectory of three Local Production Systems in Central Mexico related to textiles, pottery craft1 and fireworks, in order to better understand the difficulties that local actors experience when they attempt to improve their economic and social performance.

First, we analyze the economic and social characteristics that define Local Production Systems. The second section outlines the antecedents of regional economic policies in Mexico and their implications for the conformation of an archipelago of production systems in Central Mexico, while the third examines the production processes, actors, conflicts and processes of negotiation that define governance in the three case studies. In the final section, we develop a debate on the challenges and possible solutions that producers and their associations confront as they seek to improve socioeconomic performance in their territories.

1. Cooperation and competition in coordinating production: challenges for Local Production Systems

From the perspective of development policy, the phenomenon called Local Production Systems (LPS) has been identified indistinctly as ‘endogenous’ or ‘local’ development. This conception of economic development vindicates a more complex vision of the interrelation among territory, economy and social structure, which highlights the specificity of productive organization in local spaces (Mendez, 1997; Courlet and Pecqueur, 2013).

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1 Talavera is a type of Maiolica pottery characterized by a milky-white glaze and the use of blue, yellow, black, green, orange and mauve colors.

2 Proto-industries are linked to dispersed rural production, the dynamics of which are characterized by interdependence between agriculture and industry, as suggested by Mendels (Miño, 1999).

3 In one of the later modifications of the DO, effectuated 11 September 2003, the municipality of San Pablo del Monte (in Tlaxcala state) was included under the argument that the earliest employees of the ceramic workshops in Puebla were from there, so preserving the procedure for manufacturing this style of pottery was largely due to master producers from that locality.
Local Production Systems (LPS) are characterized by the implementation of flexible specialization as their principal model of productive organization, where competition and cooperation result from negotiations and coordination among actors and businesses of distinct dimensions (Garófoli, 1994; Courlet and Pecqueur, 2013). The principal features of these systems are: a) a geographical concentration of small and medium-sized industries that specialize in one production sector, joined in a production chain through exchanges inside and outside the market; b) knowledge, both tacit and formal, of techniques and production cycles (i.e., diffuse professionalization) that results from labor experience rooted in history and expressed in family-based activities and a certain work ethic; c) a complex, heterogeneous division of labor that favors interdependence among businesses; d) linkages between local producers and national and international markets that extend beyond the strictly local ambience; and, e) a network of local public and private institutions that regulate relations among economic agents (Becattini, 1994; Garófoli, 1994; Courlet and Pecqueur, 2013).

In synthesis, the development of LPS is largely defined by the sociocultural environment of territory that local actors construct through relations of coordination and/or negotiation that are consolidated in institutional agreements and/or arrangements that then guide their actions and regulate their economic transactions.

Two fundamental forms of coordination that articulate LPS are vertical and horizontal relations which define the type of territorial governance. The former are constituted at the base of system organization through the configuration of the production and commercialization chains that make up their structure. Horizontal relations, in turn, integrate businesses with similar dimensions and characteristics, but also reflect a complex form of coordination that depends largely on local sociocultural contexts, and so may favor—or inhibit—the cooperation that stimulates the formation of productive and learning networks, and thus influence system performance as a whole. The integration of productive processes in LPS is made possible by sub-contracting agreements, relations between producers and suppliers, and their links to markets (Pietrobelli and Olarte, 2002; Oyelaran-Oyeyinka, 2001; Schmitz, 1989; Robertson and Langlois, 1995).

Sub-contracting agreements are crucial mechanisms in the development of a division of labor that fosters the emergence of economies that are “external” to the business, but internal to the system. The form that sub-contracting acquires is determined by the level of coordination and the degree of complexity of the externalized activity. It begins in a
standard form, but can achieve the maximum level of coordination among multiple
actors through collective sub-contracting (Rama, Ferguson and Melero, 2003).
Standard sub-contracting is based on a minimal degree of coordination among the
productive units involved in the agreement because the externalized activity does not
require as much specialization or capital investment since it centers on a standardized
product (Rama, Ferguson and Melero, 2003). Trust is another key factor for the
development of cooperation and coordination in sub-contracting relations, though in
this case it is circumstantial. In the cases of textile, ceramic and fireworks production
analyzed below it is this type of sub-contracting that predominates (Roma, Ferguson
and Melero, 2003; Belussi, 2001; Staber and Morrison, 1999).
The development of a system of competitive, well-articulated suppliers in the territory
enables the LPS to respond to the demands of global markets by reducing the risks and
costs of production in the face of growing uncertainty generated by market changes
producers and suppliers significantly influence the generation of ‘economies of scale’ at
the territorial level (Pietrobelli and Olarte, 2002; Oyelaran-Oyeyinka, 2001). In
addition, producers play a hierarchical role by establishing the production and quality
parameters that suppliers must satisfy (Inamizu and Wakabayashi, 2009; Salmi,
The relations of commercialization and/or distribution constitute key mechanisms for
the positioning of LPS in the market. The relation of producers to markets can take
three main forms: 1) through coordination with specialized agents in the market who
have broad knowledge of demand; 2) through associations of enterprises with similar
production capacities that jointly distribute their products and so exert greater control
over markets; and, 3) individual businesses that forge direct contact with markets in an
attempt to obtain greater returns though it is primarily the clients who define the
parameters of product quality and price (Rabellotti, 1995, 1997, 2006; Oyelaran-
Oyeyinka, 2001; Erdil and Cetin, 2008).
Commercialization relations between specialized agents and small businesses often
generate a hierarchical structure of governance in which small production units are
subordinated to the interests of market agents (Humphrey and Schmitz, 2002;
Pietrobelli and Olarte, 2002; Knorringa, 1999).
Horizontal coordination, meanwhile, develops in LPS through relations established by
businesses that participate in the same phase of the productive process, have similar
productive capacities, and conduct activities related to a specific market niche. These relations structure a horizontal form of governance that obeys a more equitable logic in which no dominant hierarchy emerges among the businesses involved because coordination is the fruit of their collective actions. The main horizontal relations cited in the literature in relation to LPS are: cooperation, competition, and learning.

Relations of cooperation form the basis of long-term entrepreneurial agreements and/or arrangements founded upon the trust that economic actors develop through continuous interaction. Cooperative networks may develop either formally, through agreements in writing that produce legal regulations that govern economic transactions among actors, or informally, when sustained primarily by trust and sociocultural values linked to the fact that all the actors involved belong to the same community and/or territory (Knorringa and Stamer, 1998; Staber, 1998; Staber and Morrison, 1999; Erdil and Cetin, 2008).

According to Knorringa (1999) and Knorringa y Meyer Stamer (1998), the two main benefits that businesses obtain from cooperation are: 1) reduced transaction costs since formal collaboration agreements among businesses tend to be costly in terms of time and money; and, 2) problem-resolution in relation to competition, since collaboration among actors can propitiate the emergence of dense, long-term socio-productive networks that generate an ambience of trust.

An equilibrium between cooperation and competition in LPS occurs when the economic actors successfully establish joint actions guided by norms and rules that inhibit unfair practices and, as a result, regulate relations among businesses so as to erect parameters of competition based on quality (Staber, 1998; Rabellotti, 1995, 1997, 2006; Dei Ottati, 1994). Bengtsson and Kock (1999), meanwhile, argue that multiple weak or strong inter-enterprise relations can co-exist in a territory to evidence the complexity of the process of evolution of interactions among economic actors and produce very diverse forms of governance.

One of the most important forms of cooperation for the functioning of LPS requires that economic agents in the territory conduct collective actions by transferring information, knowledge and technology to enable the development of innovations and, therefore, higher levels of specialization that may translate into increased competitiveness (Helmsing, 2001). Transfers of knowledge in LPS can materialize through cooperative relations that can be informal or formal in nature. Territories where the knowledge that defines system specialization is principally ‘tacit’ present processes of collective
learning based on unwritten agreements of cooperation, but this complicates codifying knowledge that would help increase the system’s level of competitiveness. In contrast, formal learning networks make it possible to implement research activities with an eye to producing new technology and new knowledge, two key aspects of development (Knorringa and Meyer-Stamer, 1998; Saravi, 1997; Staber, 1998; Pietrobelli and Olarte, 2002; Inkpen and Tsang, 2005).

Developing relations of cooperation and coordination depends greatly on the features of the sociocultural ambience that define the configuration of the LPS. In this regard, Pilon and DeBresson (2001) affirm that achieving adequate diffusion of innovations in a territory depends on three determining elements: 1) the shared identity of actors, all of whom belong to the same community or territory; 2) the trust that becomes the foundation of collective actions; and, 3) the reciprocity that allows strong ties of cooperation to develop. According to these authors, the synergic interrelation among these elements reduces transaction costs while fostering the emergence and diffusion of innovations in the territory.

Knorringa and Meyer-Stamer (1998) add that in territories marked by distrust due to failed experiences of cooperation and a pronounced opportunism practiced by actors, there may emerge an industrial atmosphere characterized by the isolation of businesses through vertical integration that only encourages individual work while inhibiting the future development of collective actions.

Uzzi (1997), in turn, recognizes that the strong dependence of businesses on the local sociocultural context can produce negative effects on individual performance and the competitiveness of the activity in which they participate, including: 1) difficulties in generating innovations due to the redundancy of personal relations among enterprises, which impedes detecting new market tendencies; and, 2) a “lock-in” logic in entrepreneurial networks that results from deep involvement by local socio-productive networks, and inhibits establishing links with external actors that could be sources of new information and resources that might help confront changing market demands.

In summary, vertical and horizontal coordination, and combinations of the two, can generate highly-complex forms of territorial economic organization. Vertical coordination is defined by the hierarchical actors involved in the process, who largely determine the conditions and parameters of economic governance. In this regard, the State plays a central role in the governance of territories by creating a general framework of policies and rules that propel the coordination of decisions and actions.
from the national level down to regional and local venues. However, in order for vertical policies to really have a significant impact on development, horizontal coordination is crucial since it permits the formation of networks and alliances among actors (public and private) with shared interests related to negotiations over resources and/or activities in a given territory, and participates actively in creating policies that affect their interests.

The development of fruitful governance for territorial development requires great complementarity between the dynamics of vertical and horizontal coordination to promote a decision-making process that integrates the multiple visions and interests of the actors involved in different productive processes and territorial scales (Davoudi et al., 2008).

2. Central Mexico, an archipelago of Local Production Systems

The policy of Import Substitution (ISI for its initials in Spanish) that Mexico implemented in the 1940s triggered the concentration of populations and industrial activities in three principal urban centers: Mexico City, Monterrey and Guadalajara. Later, from 1953 to 1986, this was followed by a program which spurred construction of industrial parks and cities (Garza, 1992) that produced a decentralization of industry in an attempt to reduce regional disparities created by the excessive concentration of economic activities and people in Mexico City (Rosales, 1999).

Since the 1980s, when Mexico’s macroeconomic policy came to be characterized by a greater aperture to markets and reduced state intervention, important transformations were seen in the patterns of population distribution, the formation of cities of diverse sizes and, especially, the re-organization of LPS. Then, in the decade of 1990, Mexico witnessed the marked expansion of out-sourcing businesses (maquiladoras) and sub-contracting, fostered primarily by the NAFTA Agreement, which contributed to a diffuse process of industrialization combined with existing artisanal production. Today, rural localities in central Mexico combine agricultural activities with manufacturing and services because the region has become increasingly interconnected and inter-linked in the economic sphere (Galindo and Delgado, 2006).

The emergence of multiple, diverse LPS is a consequence of the exploitation of this proximity and superimposition of urban and rural environments that become visible upon observing the interrelations between the local scale of municipalities and the broader regional context composed of cities of various sizes (Map 1).
Map 1. Central region of Mexico showing the localities analyzed.
At the local scale, one can understand the dynamics generated because of the way in which producers, businesses and institutions became coordinated and organized over time. The regional perspective, in turn, allows us to comprehend processes of structural economic change, such as the diffuse industrialization that defines new territorial orders where the ongoing phenomena of urban-rural interrelation occur. The antecedents of artisanal activity and the changes generated by diffuse industrialization allow us to understand these processes of formation and the challenges of economic coordination in the case studies examined.

_Tlaxcala, antecedents and the reconfiguration of textile production and confection_

Textile production in Tlaxcala has a long tradition that dates back to pre-Hispanic peoples and was enriched by Spanish colonization which added not only new materials, such as silk and wool, but also introduced novel techniques and forms of work organization.

The socioeconomic system that gave rise to the conformation of an intermediation, commercialization and industrialization network in the textile sector spanning the states of Puebla and Tlaxcala in the period from 1570-to-1620 was the _repartimiento_. In that system, large-scale merchants in Mexico, Puebla and Veracruz sent money and goods (such as alcoholic drinks and candle wax) to merchants operating in the provinces who sold them in indigenous communities. In exchange those merchants obtained local products—such as cotton cloth and other fabrics—that they sent back to the large mercantile centers (Miño Grijalva, 1999).

Over time, textile industrialization in the Puebla-Tlaxcala region developed principally through the interrelation of factories (called _obrajes_) and domestic producers who maintained a tight interdependence between agriculture and industry. According to Miño Grijalva (1999) the _obrajes_ and household production (_trabajo a domicilio_) were elements of the process of proto-industrialization\(^2\) that characterized industrial development in Tlaxcala.

By the decade of the 1990s, the industrial structure of Tlaxcala was characterized by: 1) _mass production factories_ that supplied national and international markets; 2) _semi-

\(^2\) Proto-industries are linked to dispersed rural production, the dynamics of which are characterized by interdependence between agriculture and industry, as suggested by Mendels (Miño, 1999).
industrialized workshops (talleres) that produced for large national companies (i.e., out-sourcers); and, 3) artisanal production destined –like out-sourcing– for regional (Rendón, 1996) or international markets, as in the case of the municipality of Contla (Rosales, 2003).

Pottery production in Puebla and San Pablo del Monte, Tlaxcala: the origins of a productive system

From Colonial times, the city of Puebla has been one of the most important manufacturing centers in Mexico, a place where textiles, leather goods and ceramic – especially Talavera-style– are produced. Indeed, the latter is one of the most widely-recognized artisanal activities both nationally and internationally (Quintana, 1971).

By the 17th century, no building there could do without mosaic tiles (azulejos) in its decorations. Of course, that increased demand and, as a result, the number of ceramic workshops (locerías) and artisans and apprentices who worked in them. In Colonial times, the decision was taken to “regulate this trade” and form a guild that would make it possible, on the one hand, to establish guidelines for commercialization and standardizing the teaching of the trade, and, on the other, introduce rules to control the production and sale of artisanal products in the market, thus protecting the interests of artisans organized in the guilds that functioned from the 17th century into the early 18th (Peón and Cortina, 1973; Cervantes, 1939).

As time passed, however, the Talavera workshops gradually disappeared as Puebla’s pottery-makers turned to producing only everyday, inferior-quality ceramic products. This situation changed in the mid-20th century, however, thanks to the impetus of workshops owned by Antonio Espinosa and Isauro Uriarte, who rescued traditional designs and techniques (Ventosa, 1971; Cortina, 1999).

Uriarte’s workshop became one of the most important in Puebla and hired large contingents of workers from the city, as well as artisans from localities in neighboring states like San Pablo del Monte, Tlaxcala, who soon learned the trade there. Artisans from Puebla and San Pablo del Monte thus gained first-hand knowledge of how to elaborate Talavera-style ceramics, and this allowed them to acquire the capacity to open their own workshops, either in Puebla or back home in San Pablo del Monte.

Today, the revalorization of this ceramic style is due primarily to the difficulty in finding tin-based pottery that is not mass-produced. Although artisanal products with characteristics quite similar to those from Puebla can be found in several states in
Mexico, the latter is the most highly-prized. Proof of this was the opening of various factories in the 1990s and their revitalization when producers organized to obtain the certification known as ‘Denomination of Origin’

The drive to pursue the ‘Denomination of Origin’ (DO4) for Talavera-style pottery began in 1990 as part of a campaign to protect the industry from the intrusion of a wide variety of imitations, some made in Mexico, others in China. Six manufacturers – Casa Padierna, La Concepción, La Trinidad, Loza Blanca y Azulejos Puebla, S.A., Talavera Cesar Torres and Uriarte Talavera – approached the state government for support and thus began the process of obtaining the ‘Denomination’ (Rojas, 1999). After some modifications and precisions involving the localities where production was taking place, the ‘Denomination of Origen’ (DO) was published in 1997 for “Talavera de Puebla or talavera poblana”, specifying that it was produced exclusively in the municipalities of Atlizco, Cholula, Puebla and Tecali3 (Rojas 1999).

Later the “Official Mexican Norms for Talavera Pottery” (Norma Oficial Mexicana de Talavera) was drafted with the help of the Laboratory of the Faculty of Chemical Sciences at the Benemérita Universidad Autónoma de Puebla. That document was published in Mexico’s official bulletin, the Diario Oficial de la Federación, and included recognition of the “Ceramic tile Regulatory Council” (Consejo Regulador de Talavera) as the only organism qualified to verify and certify the quality of ceramic products (Rojas 1999). Since the declaration of the DO we can distinguish three large groups of pottery-makers that converge in the three municipalities mentioned above (Table 1).

This diversification of artisanal production led to an increased presence in local, national and international markets while also stimulating a resurgence of an activity that had practically disappeared just a few years before. However, as we shall see below, while it clearly benefited one group of artisans it also contributed to the exclusion of other ceramic producers.

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3 In one of the later modifications of the DO, effectuated 11 September 2003, the municipality of San Pablo del Monte (in Tlaxcala state) was included under the argument that the earliest employees of the ceramic workshops in Puebla were from there, so preserving the procedure for manufacturing this style of pottery was largely due to master producers from that locality.
During the Colonial period, gunpowder production was controlled, indeed monopolized, by the Vice-regal government, and concentrated principally in the Royal Gunpowder Factory (Real Fábrica de Pólvora) in Chapultepec, within the limits of Mexico City.
(Córdoba, 2000; Carranza and De la Hoz, 2000). However, the frequent accidents involving gunpowder that occurred in cities in the 17th and 18th centuries eventually convinced the government of the need to establish ordinances and prohibitions that forced gunpowder workshops and factories to re-locate to the outskirts of urban areas or to remote areas of the city (Carranza and De la Hoz, 2000; Calderón, 2012).

The relocation of gunpowder production from Mexico City towards more distant zones, together with the emergence of pyrotechnic production as a significant source of employment in communities where agriculture was clearly declining in the 19th century, spurred a spread of the fireworks trade into the central region that often took the form of small agglomerations of family-based workshops. “The social conditions that propelled the development of fireworks activity in Tultepec were the increase in demand for the product in local and regional markets and the precarious economic situation of the population devoted to agricultural activities” (Vázquez, 2001:54).

In the 20th century, fireworks production in Tultepec underwent a process of expansion and diversification that resulted in the division into two specialized branches: 1) the aforementioned castles (castillería) that had developed in the municipality from the outset of fireworks production; and, 2) the ‘toy’ products spurred by the growing demand for fireworks rockets specially during civic celebrations. This second branch made a wide variety of products available to children and adolescents (Table 2) at the same time as its growth broadened diffusion of the pyrotechnics trade in Tultepec, because fireworks rockets were much less complex in terms of handling the gunpowder and producing the desired lighting effects. Obviously, this meant lower start-up costs for workshops and facilitated the entry of more and more local families into the activity.
In this way, fireworks production eventually came to represent the principal source of employment in the municipality of Tultepec. However, in the past 23 years a series of exogenous contingencies has arisen that is affecting quite significantly the development of fireworks production and commercialization in Tultepec. The issues involved include regulation of the activity by the federal government,\(^4\) the spreading urbanization of the municipality due mainly to the expansion of the metropolitan area of Mexico City, and

\(^4\) The federal government regulates fireworks production through the Federal Firearms and Explosives Law, in effect since 1972. It exerts firm control over all phases of production, commercialization and distribution, and applies the same normative framework to this activity and actions related to the use of firearms and explosives. Hence, pyrotechnics does not have its own regulations which would take into account the interests and needs of producers in economic and commercial terms instead of reducing the entire matter to questions of safety.
increased competition from national producers and Chinese imports in local markets (Vázquez, 2001; Guerrero, 2008; and fieldwork).

3. The dilemmas of coordination and local governance

3.1 Difficulties in integrating the textile production chain in Tlaxcala

The historical conformation of the textile trade in Tlaxcala promoted the interrelation of diverse work regimens which came to form production chains that included cottage industries, wage labor, and part- or full-time employment. This process encouraged flexibility in terms of both wages and labor processes. Over time, and a succession of technological changes, entrepreneurs maintained or transformed their labor systems, products, and the markets for which they were destined.

Spanish entrepreneurs in Santa Ana Chiautempan, some originally from Cataluña but with residence in Mexico that could be traced back several generations, had the economic wherewithal to make large capital investments and sustain traditional companies like Lanera Moderna, Telafil, and Textiles Castro, as well as such modern companies as Unilan and Providencia. In 1985 and 1986, the government of Spain, through the mediation of its embassy in Mexico, channeled a series of loans called ‘King’s Credits’ (Créditos del Rey) to Spanish businessmen living in Mexico (interview with the General Manager of Telafil). With those resources Spanish machinery and equipment vendors were able to finance –indirectly– fellow entrepreneurs in Tlaxcala and Puebla. Indeed, Spanish entrepreneurs in Tlaxcala’s textile industry have continually renewed their machinery and designs in order to maintain the mass production that allows them to sell in the markets with the highest demand. To give but one example, in 2007 La Providencia purchased licenses from the Walt Disney Company allowing them to stamp the images of his most well-known cartoon characters on their bedspreads and blankets; this in response to the changing tastes of consumers. Of course, its sales soon began to increase.

A second important group of medium-sized and small businessmen, located principally on the outskirts of the municipalities of Santa Ana Chiautempan, Tlaxcala and Contla, combined productive and commercial activities so successfully that they were able to consolidate the organization of semi-industrialized workshops (Heath, 1982). Artisans in the municipality of Contla, meanwhile, sent out feelers to markets in the United States in an attempt to press the advantage of the artisanal character of their products.
and to find buyers for items that were difficult to sell in the national market. In this case, a man surnamed Tapia became the lead distributor of artisanal textiles produced in the locality. During frequent trips to the U.S. as an illegal immigrant, he got to know textile marketing. Eventually, he decided to return home and set himself up as a distributor thanks to his knowledge of the needs of North American markets. First, he negotiated agreements with Wal-Mart to commercialize artisanal textiles, then, in 1989, he began the process of exporting artisanal products from Contla to the U.S., though it was not until the year 1990 that he finally obtained the ALTEX certification granted by Mexico’s Department of Commerce and Industrial Development (SECOFI) to support his commercial activity (Table 3).

In the 1990s, the suspension of the tariffs applied to the textile industry stipulated in the North American Free Trade Agreement (NAFTA) was one process that radically transformed the socio-productive organization of textile manufacturing in Tlaxcala. That accord generated extensive networks of production among out-sourcers of all sizes organized in accordance with the distribution of work by commercializing firms located in several states in Central Mexico that were keenly interested in gaining entry to U.S. and Canadian markets.

The clothing industry was the most dynamic branch of textile production and the one that underwent the fastest transformation. Soon all kinds of out-sourcing operations were springing up, from small, informal workshops devoted exclusively to assembling the various pieces of shirts, skirts or dresses provided by middlemen in Puebla or Mexico City—who then commercialized the merchandise in the U.S.—to medium-sized and large garment industries that conducted the processes of planning, cutting and sewing products thanks to their links with large department stores in Mexico’s northern neighbor
According to the President of the Chamber of the Clothing Industry, two principal types of out-sourcers were established, distinguished by their market relations and the productive processes they performed. The garment industries that concentrated the entire process of planning, cutting and sewing items of clothing forged links to different regional or national markets, including popular markets and department store chains like Comercial Mexicana, Gigante, Aurrera, or even more prestigious establishments,
such as Liverpool, Palacio de Hierro and Sears. The second type varied greatly in size, though small and micro-industries predominated. They were devoted almost exclusively to simply assembling pieces of clothing provided by large distributors in Puebla or Mexico City following their instructions. Those finished products would then be exported to the U.S.

Similar to the aforementioned intermediary in Contla, clothes manufacturers in Puebla, the State of Mexico and Mexico City that participated in the “Temporary Importation Program for Producing Articles for Export” (Programa de Importación Temporal para producir Artículos de Exportación, or PITEX), organized the production and distribution of work in those different-sized out-sourcing industries in order to satisfy the demand they perceived. These intermediaries in the garment industry established contacts with businesses in the U.S., especially in San Diego, Los Angeles and San Antonio, Texas. The medium, small and micro garment industries that entered the chain contacted those enterprises through the recommendations of family members or friends that had worked for the distributors.

This myriad of out-sourcing companies in the garment industry came to form important industrial corridors between the municipalities of Calpulalpan and Apizaco in Tlaxcala, and Tizatlán and Tehuacán in Puebla. The main difficulties involved in establishing production chains that included small and micro-, formal and informal, industries in those municipalities arose from the problems that the latter encountered as they strove to comply with the quality norms defined by the distribution companies. The result was a division of the out-sourcing network into “industrial” and “domestic” types (González, 1991).

The historical combination of domestic, artisanal work with the mechanized textile industry endowed this branch of manufacturing in Tlaxcala with an enormous capacity to adapt to market contingencies. Far from depending on the utilization of high or flexible technologies, or modern methods of work organization, their adaptability and willingness to change were based fundamentally on what we might call a process of ‘defensive flexibilization’, characterized by minimal levels of investment, the use of low- or unskilled labor that meant expelling some workers, an extension of the working-day, and the deterioration of wage conditions and the quality of life of laborers.

The heterogeneous nature of the capital, sub-contracting arrangements, and technologies between the textile and garment sectors impeded their respective chambers of commerce from acting as instances of coordination among producers. In the Textile
Chamber of the Puebla-Tlaxcala region businessmen from Puebla have managed the group largely for their own benefit while relegating the interests of entrepreneurs from Tlaxcala to a distant second place (Heath, 1982 and fieldwork).

Another problem that plagues industries in Tlaxcala arose from differences in wealth and power between textile entrepreneurs and garment-producers that have generated an unequal capacity to negotiate with the state government. This inequality is visible in the organization of their respective Chambers of Industry. Moreover, the different branches of production have distinct objectives; that is, the textile entrepreneurs are more interested in obtaining credits to purchase machinery and improving commercialization conditions, but those involved in the clothing industry direct their efforts towards broadening their markets through agreements with department stores or by producing for U.S. and Canadian distributors.

The textile entrepreneurs directed their attention towards markets in the U.S. and organized vertical relations of production (colloquially called the “complete package”). Because they had long produced fabrics, it proved quite easy for them to integrate other stages of the process, such as cutting and sewing machinery, in order to produce finished items of clothing (interview with the President of the Chamber of the Textile Industry for Puebla-Tlaxcala in Tlaxcala). In contrast, entrepreneurs in the clothing industry were more interested in organizing Work Distribution Centers for export-oriented out-sourcing businesses (interview with the President of the Chamber of the Clothing Industry, Tlaxcala Delegation). The function of those centers was to establish a reception area that would concentrate the demand for out-sourcing services for apparel destined for the U.S. That action made it possible to organize the production of the micro and small garment-making businesses.

In the context of a community with a long history of ethnic differences between indigenous and Spanish groups, contrasting levels of capital investment, and the niches it has occupied in the structure of textile production –i.e., artisanal or industrial– we can only speak of a limited or constrained trust in the interior of certain interest groups. And this reality impedes integrating horizontal and vertical coordination among businesses. While sub-contracting relations do exist between different-sized enterprises in the various branches of textile production, the ideal situation would be one of broad productive independence where all stages of the process are carried out inside one
business. But this vision of industrial organization is limited to individual and family initiative, and by no means promotes the coordination of production.

3.2. The configuration of the Talavera ceramics production system

Although the three groups of pottery-makers mentioned above (see Table 1) elaborate artisanal products of varying quality, they all conserve the same production process, differentiated only by their designs and application of various mineral-based or synthetic glazes. Here, the entire production process takes place inside their workshops so it is highly unlikely that horizontal production chains will emerge involving sub-contracting arrangements. What one observes among these artisans, in contrast, is the socialization of tacit knowledge translated into flexibility of work that allows them to sustain their productive units in times of crisis.

However, when we examine the vertical relations of each group the story is quite different, because thanks to the organization among producers and the support of the respective local and state governments in Puebla and Tlaxcala important institutional arrangements were established in relation to the organization of socio-productive relations in the local space, as will be shown below.

By mid-1990s, these ceramic producers found themselves in a difficult economic squeeze brought on by the commercial aperture that facilitated the entry into local markets of products similar to their pottery styles at very low prices. This led the representatives of a small group of producers in the city of Puebla to approach the government and the state university for help in seeking the DO. That process took almost two years as the artisans had to define the process for elaborating their ceramics and determine the geographic limits within which this artisanal product could be elaborated (Table 4).
The drafting of the production specifications in official standards that were ratified by the Regulatory Council allowed this group of artisans to place their products in a select market of potential buyers with the means to pay the cost of certified pottery. By the late 1990s the group had achieved fame and its artisanal works were being exhibited in museums in Mexico and abroad.\(^5\)

The case of these certified pottery-makers reveals an important process of coordination among producers, local governments and universities that led to the establishment of new institutional arrangements. While clearly successful, the process unfortunately excluded a large group of producers who were unable to satisfy the production standards demanded.

Although the locality of San Pablo del Monte was included in the DO zone later on, producers there opted to constitute a new association. They named it *Tlapa: loza tradicional* (“Tlapa: Traditional Ceramics”). This group also received support from the local government for the parallel production of ceramics with traditional designs related to export markets where the commercialization of artisanal products demands that they be free of lead and tin.

\(^5\) Unfortunately, full compliance with the specifications for elaborating original ceramics impeded entry into export markets where the commercialization of artisanal products demands that they be free of lead and tin.
to the culture of Tlaxcala and artisanal products showing motifs similar to those seen in the Talavera and white pottery styles.

Turning to the white pottery artisans based in Puebla, we find that they were dissatisfied with the DO and so formed another association, this one called the Unión de artesanos de cerámica poblana ("Union of Puebla Ceramic Artisans). Well-ensconced in the important Parian market (one of the most important artisans’ markets in Puebla), they commercialized their products through the Fondo Nacional de las Artes ("National Foundation of the Arts", or FONART). Their dynamics of coordination have proven successful, as shown by the DO and their producer organizations; however, disputes caused by their initiatives made local governance more difficult due to conflicts of interest among different ceramic producers in the territory.

3.3. Dynamics of the fireworks productive system in Tultepec, State of Mexico

The configuration of the fireworks productive system in Tultepec is determined by family relations, as producers internalize virtually the entire production process in their workshops, while decentralizing only those activities that do not threaten their profits. In this sense, they adopt a logic of subsistence in the market, one result of which is that vertical relations in this LPS are poorly-consolidated. This hinders the formation of production chains that could generate economies of scale, while simultaneously increasing levels of uncertainty and mistrust that propitiate even greater disarticulation. In this regard, sub-contracting relations in Tultepec develop precariously due to the low level of capitalization typical of local workshops. They consist mainly of informal, short-term agreements that impede the flow of information between workshops of different sizes that could stimulate the elaboration of more specialized products. This kind of sub-contracting has only limited effects on the performance of the LPS, for it fails to promote incremental innovations that might add value to local products (Table 5).

Another complicating factor in this case is the minimal level of coordination between suppliers and producers, because this compromises the supply network’s capacity to guarantee timely deliveries of inputs and/or to provide raw materials that could reduce the risks of accidents, production times and perhaps even costs. The exact nature of the relations of these local producers with the market differs between the two branches of production involved. Thus, workshops devoted to ‘toy’ production have only limited market access and distribute their products primarily on a local or regional scale. Also, they are highly dependent on middlemen and/or monopolists (acaparadores) who seize
control of sales. The castle-makers (castilleros), in contrast, enjoy direct links to their clients and so have no need to involve external commercializing agents. This allows them to broaden their markets and obtain higher profits (Table 5).

The precarious articulation of this LPS reflects two principal forms of the organization of horizontal relations in Tultepec: a) the intra-familiar type, which limits the diffusion of knowledge in the system and impedes coordination among economic actors from different families; and, b) the community type, manifested in informal relations of cooperation in reaction to spontaneous or circumstantial situations, such as religious festivals or accidents, thus impeding forms of coordination that might potentialize the development of long-term horizontal networks.

While these family and community ties have permitted informal cooperation and the transmission of the tacit knowledge across various generations, producers’ excessive dependence on intra-family networks severely limits coordination among them that could lead to the emergence of local networks of cooperation and learning that would propel a division of labor in the territory which, in turn, would enable greater diffusion of information and knowledge, while also increasing the benefits that accrue from this activity at the local level.

TABLE 5. Sub-contracting and commercialization relations in the fireworks production system.

We identified two contingencies (Helmsing and Ellinger, 2011) that caused significant changes in the normativity of pyrotechnics production in Mexico and reconfigured the institutional environment of Tultepec through the emergence of new associations and local government agencies. The first contingency was the accident that occurred inside the fireworks market at La Merced in Mexico City in 1988. That event led the federal government to impose a much stricter regulation on the fireworks sector, to force producers to relocate their workshops to zones far-removed from urban areas, and to prohibit the sale of fireworks in the nation’s capital, which was by far the largest market for the pyrotechnics produced in Tultepec due to the strong demand for such materials in the metropolitan area and to the ease of access since Tultepec is quite close to Mexico City. One result of the severe crisis triggered by this contingency was the formation of two associations that represented the interests of key groups involved in fireworks production: 1) the Grupo Agroindustrias sought to obtain resources from the
state government to construct workshops that would satisfy SEDENA’s new norms; and, 2) the Asociación de los Comerciantes began negotiations with the state and federal governments to reactivate the sale of fireworks in Mexico City’s markets.

However, the contingency that brought about the most profound changes in the institutional environment of Tultepec were the accidents that occurred in the San Rafael neighborhood of that municipality, and in Celaya, Guanajuato, because they propitiated an even stricter regulation of fireworks activities by the federal government. In response, collective actions were undertaken that materialized in the creation of an agency of the municipal government responsible for supporting fireworks production, and the formation of the association called Pirotécnicos Unidos de Tultepec (“United Fireworks Producers of Tultepec”, or PUT), which represented an important advance in terms of coordinating and fostering cohesion inside the fireworks guild of that municipality.

“United Fireworks Producers of Tultepec” was created to represent local producers in national-level negotiations concerning a new set of proposed standards that would recognize pyrotechnics production as an artisanal activity, thus establishing an explicit separation from the use of gunpowder to make firearms and explosives. The integration of the fireworks guild through PUT’s actions also made it possible to attend to one of the most serious problems facing this sector: the unfair competition that prevailed in local markets. Through its close relationship with the directors of the San Pablito Market, PUT facilitated negotiations and coordination among the different interest groups in that market designed to establish standard prices and agreements to consume only the products of local artisans while blocking the entrance of products from other areas of Mexico or from China, which were being sold at much lower prices.

Unfortunately, the sharp differences among producers with distinct levels of economic, social and political capital soon fractured the PUT, thus weakening the position of small producers in the negotiations over the new norms for fireworks production. At the same time, producers with greater capital began to forge alliances with manufacturers of similar scale at the national level, eventually forming a group that carried much greater

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6 The principal market for fireworks products in Tultepec, it has some 300 sellers with permits from SEDENA to commercialize and distribute pyrotechnics.
weight at the negotiating table with the federal government. The result was a proposal for a new set of norms that was much more in accord with their interests.\textsuperscript{7}

As a result of all the problems that PUT was facing, polarization within the local fireworks guild became even more acute, virtually eliminating any possibility of achieving coordination-cooperation among the different producer associations or creating the ambience of trust necessary to develop vertical and horizontal networks that could articulate the fireworks productive system and generate local economic development in the medium and long term.

The dynamics of governance in Tultepec reinforced the logic that existed behind the regulation of fireworks activity at the national level, based on a normativity applied ‘top-down’ by the SEDENA (a dependency of the central government) throughout the country that focused exclusively on questions of safety with no regard for the diverse universe of actors involved in this activity.

While it is true that the central government power is necessary to control the use of gunpowder and prevent accidents associated with its production and applications, it is equally evident that there has been a serious lack of coordination with regional and local governments in the construction of policies that could be more congruent with the specific realities of fireworks production in Tultepec and in the country as a whole.

The lack of coordination among producer associations caused by disputes between distinct interest groups that strive to obtain greater benefits through negotiations with different instances of government prevents any strengthening of the local fireworks guild and the possibility of constructing the local agency required to finally coordinate with the federal government and so participate more actively in the decision-making process that leads to policy formation for this sector at the national level.

4. Final reflections

These three Local Production Systems have several characteristics in common: a) a geographic agglomeration of workshops, supplier businesses and markets related to the activity; b) the formation of a local work market that, despite the precarious nature of labor relations, has permitted the diffusion of these trades thanks to the mobility of

\textsuperscript{7} Gabriel Méndez (representative of PUT) considers that the rupture of the association was propitiated by large producers seeking to modernize fireworks production by creating companies that integrate production and distribution with the capacity to sub-contract family workshops and/or distribute their products. This interviewee feels that small producers interpreted this proposal as a threat to their workshops, fearing they would be subordinated to larger businesses with only limited possibilities to intervene in decision-making in the sector. Due to the opposed interests of the groups that had formed PUT, the association could no longer represent the interests of the diverse groups of producers.
workers from one workshop to another, or through relations of family and community (friendship and ritual co-parenthood, or *compadrazgo*); c) incipient relations of vertical and horizontal coordination based on informal agreements between local producers; and, d) the presence of social and entrepreneurial organizations that function as representatives before instances of state and federal governments.

The three experiences analyzed have a great potential to develop collective sub-contracting relations with diverse small- and medium-scale workshops or businesses, and even with larger enterprises. Unfortunately, in most cases individual work and the performance of one activity in family-owned businesses is much more highly-valued, largely due to the predominance of opportunism and a history of failed collective initiatives (Knorringa and Meyer-Stamer, 1998). In the best-case scenarios what is achieved are standard, occasional, sub-contracting relations that entail no transfer of knowledge or technology.

In none of these cases were concrete collective actions undertaken to acquire inputs, to organize learning networks that could catalyze the teaching of the trade, or to improve the processes of production or design. Only sporadically does one observe alliances or associations set up to collectively distribute products or to broaden distribution markets on diverse scales. Although some individuals have been successful in forging links with specialized markets, it has been difficult for them to sustain those relations over time. Examples of this are the artisanal textile producers of Contla, the pottery producers of Puebla, and the small, informal pyrotechnics workshops. In most of these cases it has been impossible to eradicate dependence on external commercializing agents. One of the greatest difficulties and challenges for the future territorial development of the case studies analyzed herein will consist in extending relations of reciprocity and cooperation into the milieu of local industrial communities as an instrumented practice based on long-term commitments.

Another difficulty that must be overcome involves the constraints on trust and membership in certain ethnic or socioeconomic groups –particularly in the case of Tlaxcala– because these circumstances hinder economic transactions and, as a result, the construction of industrial communities capable of obtaining benefits for entire communities.

Also abundantly clear is the lack of coordination and/or coherence in the actions of the actors that intervene in levels of decision-making at different territorial scales (*i.e.*, local producer associations, municipal and state governments, or instances of the federal
government). On the one hand, this makes it difficult for the state to generate an adequate institutional framework that would increase the competitiveness of these LPS; on the other, it prevents greater participation by local actors in decision-making processes related to their livelihood. An adequate coordination of actors who participate at different scales would help resolve the principal problems observed at the local level, including: unfair competition, acquisition of quality inputs, limitations on exports, increasing imports of Chinese products, the inexistence of learning networks, and the absence of policies and strategies designed to improve working conditions in the small, informal workshops that operate in the cases analyzed.

The result of all these factors is that the problems of governance of these economic activities are characterized by limited cooperation in each territory examined and the absence of coordination and dialogue between local actors and different levels or instances of government.

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