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Local Clusters in Global Chains: The Causes and Consequences of Export Dynamism in Torreon's Blue Jeans Industry

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Summary. — Using a case study of the export-oriented blue jeans industry in Torreon, Mexico, the authors discuss the role of US buyers in promoting full-package apparel production. While the networks associated with this model yield better development outcomes for firms and workers than those typical of the *maquila* industry, the Torreon cluster is not adequately described as a "high road" industrial district. The global commodity chains framework is used to assess the developmental implications of the apparel industry's growth in Torreon. By emphasizing the relationship between producers and foreign buyers, this approach provides a useful way to bridge the global–local divide in the literature on industrial clusters in developing countries. © 2001 Elsevier Science Ltd. All rights reserved.

Key words — apparel and textile industries, global commodity chains, industrial districts, *maquiladoras*, Mexico, North America

1. INTRODUCTION

The decade of the 1980s witnessed the widespread adoption of export-led growth strategies and neoliberal policies prescribing open markets and privatization programs in much of the developing world. Development research in the 1990s focused primarily on the implications of these trends for the industrializing countries that are increasingly integrated into global markets. The abandonment of import-substituting strategies, which were influenced by the neomarxist and dependency theories of the 1960s and 1970s, and the implementation of far-reaching reforms corresponding to a new economic model have led to a watershed in development studies. Researchers and policymakers alike confront the challenge of how to analyze the link between the global and the local. Latin America is a case in point. Spirited debates have arisen about the local development outcomes associated with the adoption of neoliberal reforms in this region and what theories and paradigms can best explain these outcomes (Dussel Peters, 2000; Reinhardt & Peres, 2000).

Our paper contributes to this debate by focusing on one dynamic exporting cluster in Mexico, a country that has undergone a rapid and radical economic restructuring over the past decade. Across a wide variety of sectors, Mexico's exports have been booming since the implementation of the North American Free Trade Agreement (NAFTA) in 1994, increasing from $51.8 billion in 1993 to $166.4 billion in 2000 (SECOFI, 2001). Aside from impressive export growth, Mexico has also managed to achieve many of the other objectives associated with Latin America's new economic model: a stable currency, modest inflation, and plentiful direct foreign investment. Perhaps most important, the presidential election of July 2000, which saw the historic victory of

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opposition candidate Vicente Fox, provided evidence that Mexico's decades long transition to genuine democracy from one-party rule has been consolidated.

Despite the seeming abundance of good news, there is a growing sense that all is not well in Mexico. While the liberalization strategy that Mexico enthusiastically embraced in the 1990s has been successful in its own terms, critics have pointed out that Mexico's shift from an import-substituting industrialization strategy to an export-led growth model has been associated with a more unequal income distribution and falling real wages for the majority of the country's workers (De la Garza, 1994; Dussel Peters, 2000; Robinson, 1998–99). The most dynamic sector of the Mexican economy in terms of exports and job creation is the *maquila* industry of in-bond plants, while small and medium enterprises have been hard hit by the country's rapid liberalization. NAFTA skeptics claim that the trade agreement, and the export-led growth model it represents, are leading to the "*maquilization* of Mexico," with the entire country becoming converted into an export-processing zone for low value-added activities benefiting large corporations on both sides of the border. This position contends that the economic growth associated with the post-NAFTA era does not represent positive development outcomes for the majority of Mexican workers or firms.

In this paper, we report on one of the most vibrant sectors within Mexico—the export-oriented apparel industry—and one of the most rapidly growing production centers within that industry, the region surrounding the city of Torreon in northern Mexico. In Section 2, we lay out the theoretical debates involving two main paradigms in developmental studies—the industrial districts and global commodity chains (GCC) perspectives—and we indicate how they frame our case. Section 3 explains why we have chosen Torreon as our empirical focus and addresses the relevance of the *maquila* sector for our study. Section 4 discusses our methodology and Section 5 analyzes our findings, focusing on the emergence of post-NAFTA, full-package networks for apparel production that link local manufacturers in Torreon to a new set of US customers. In Section 6 we examine the local developmental outcomes associated with the emergence of full-package networks in Torreon. In the final section, we reassess the industrial districts and GCC approaches in light of the data presented in this paper. The industrial districts literature, which emphasizes the importance of local institutions and dynamics in promoting competitiveness, has been influential in shaping research on clusters in developing country contexts. We argue that studies of such clusters should be supplemented by a GCC perspective that privileges the dynamics of global industries and the role of foreign buyers in linking local firms into crossborder networks.

2. CLUSTERS AND CHAINS: COMPETING OR COMPLEMENTARY APPROACHES TO UNDERSTANDING DEVELOPMENT?

Throughout the late 1980s and 1990s, the industrial districts model generated significant enthusiasm in development circles. Using a Weberian ideal type based primarily on the experiences of small and medium enterprises in the Emilia-Romagna region of the so-called Third Italy, the industrial districts literature sought to explain how geographically bounded and sectorally specialized clusters of firms combined successful export performance of primarily labor-intensive, light manufacturing goods, such as footwear and apparel, with relatively high wages paid to a skilled work force (Sengenberger & Pyke, 1991). Although it emerged from a distinct social, cultural, and economic context, researchers wondered if the industrial districts model might provide clusters of firms in developing countries a "high road" to development as well.

A special issue of *World Development* (Humphrey, 1995a) was dedicated to this question. The focus on industrial districts was accompanied by a review of recent literature on Japanese manufacturing methods and the lean production model most closely associated with Toyota. The various contributors to the special issue examined the applicability of these two models—industrial districts and lean production—in developing-country contexts. What makes both models distinctive is their focus on interfirm networks. While lean production involves reorganizing vertical interfirm relationships along the supply chain, the industrial districts model emphasizes the importance of horizontal networks between firms located within the cluster: "The crucial characteristic of an industrial district is its organization.... It is the firm as part of, and depending on, a collective network which perhaps more than

anything else incapsulates the essence of the district's character'' (Pyke & Sengenberger, 1992, p. 1).

A second special issue of *World Development* (Schmitz & Nadvi, 1999a) devoted to the topic of industrial clusters in developing countries sought to ''specify the circumstances in which clustering boosts industrial growth and competitiveness'' (Schmitz & Nadvi, 1999b, p. 1503). In the 1999 special issue, the earlier discussion of lean production as a phenomenon associated with Japanese manufacturing methods, such as Just-in-Time and Total Quality Management, was not reintroduced. [1] Similarly, there was a move away from the terminology and specificity of the industrial districts model in favor of a more inclusive and flexible approach to the study of clusters. [2] The strongest research finding to emerge from this second group of studies was the need to focus on linkages *external* to the cluster. While early formulations of the industrial districts model emphasized the importance of intracluster networks, the empirical work on clusters, particularly in developing countries, suggests that the way in which firms in clusters are linked to external actors has significant implications for the cluster's performance and local development.

Like several contributions to the second issue dealing with the impact of trade liberalization on developing-country clusters, Rabellotti (1999) examined the impact of Mexico's economic opening on one shoe cluster in Guadalajara. Focusing on the cooperative behavior of local firms, Rabellotti found that trade liberalization produced greater cooperation and increased horizontal and vertical linkages, and that this increased cooperation had a positive effect on firm performance. She also found that liberalization increased the heterogeneity within the cluster, and that exporting firms were favored by local suppliers. While only large manufacturers were able to develop direct links with US brokers because of the production volumes they require, the export dynamism generated by a few firms implied externalities for the cluster because production for export requires rapid access to quality inputs. This upgrading of the local supply base, although it disproportionately benefited the large exporting firms that initiated it, was a positive consequence of liberalization. Rabellotti concluded that trade liberalization produces positive externalities for the cluster, while also increasing heterogeneity within it, mainly due to the bifurcation of market channels between firms serving the domestic market and a few large exporters.

Hubert Schmitz's analysis of the footwear cluster in Brazil's Sinos Valley showed how the arrival of foreign buyers that handled the higher value-added activities of product development, marketing, and quality control introduced new price pressures within the cluster. He notes that while the industrial districts model provided a useful framework for his study, it is weak in two areas: ''it emphasizes specialization, i.e., differentiation by size; [and] it is strong on linkages internal to the cluster but weak on external linkages'' (Schmitz, 1995, p. 23). The importance of external linkages is sharply underscored in Schmitz's sequel to the Sinos Valley footwear case. His follow-up study showed that ''an ambitious upgrading project failed mainly because some of the leading and most influential entrepreneurs identified more with their main overseas customer than with their local colleagues'' (Schmitz, 1999, p. 1647). This connection between local producers and global buyers is viewed as a central research question (Schmitz, 2000).

These two special issues of *World Development* examined the value, first, of the lean production and industrial districts models in industrializing countries, and second, the role of clusters more generally in developing country contexts. Several key conclusions emerge from this research trajectory:

—The initial formulation of the industrial districts model was too stagnant and culture-bound to capture the variety and heterogeneity of developing country experiences;
—clusters in developing countries generally have a pronounced mix of small and large enterprises, and the larger firms are likely to yield disproportionate influence in the cluster;
—particularly in the context of trade liberalization in industrializing countries, vertical cooperation is high or growing within clusters;
—despite the emphasis placed on cooperative competition in the early industrial districts literature, bilateral horizontal cooperation is low or decreasing; and
—growth trajectories, firm performance, and local development outcomes are all to some extent dependent on the external links that connect enterprises in the cluster to foreign companies and/or markets.

The importance of external linkages, and the limited empirical attention given to these linkages to date, are often noted in the literature on clusters in developing countries. A useful antidote to this problem is the work on global commodity chains (GCC) (see Gereffi & Korzeniewicz, 1994). The GCC perspective starts from the premise that analyzing the dynamics and structure of global industries is a useful way to understand the local consequences of globalization for firms and workers. Commodity chains are composed of links that represent discrete, though interrelated, activities involved in the production and distribution of goods and services. In the case of the apparel industry, which is the empirical focus of our paper, the chain extends from raw materials (e.g., cotton or petrochemicals), to the production of natural or synthetic fibers and textiles, then to the design, cutting, assembly, laundering, and finishing of apparel, and, finally, to the distribution, marketing and retailing of garments (Appelbaum & Gereffi, 1994).

While the industrial districts approach tends to focus on the role of *institutions* in shaping local development outcomes, the commodity chains approach when applied to clusters focuses instead on *firms*, both in terms of foreign buyers and local producers. Each commodity chain is driven by lead firms that coordinate and control the organization of the production process. One of the key hypotheses of the commodity chains literature is that the type of lead firms that drive a commodity chain, and therefore the type of governance structure that characterizes it, will shape local development outcomes in those areas where the chains touch down (Gereffi, 1999). Thus, the extent to which export-oriented clusters in industrializing countries can achieve industrial upgrading objectives and positive developmental outcomes will depend on the way in which firms in these clusters become incorporated into global chains, who has power in particular chains, and how that power is exercised.

The value of the commodity chains framework to the research on clusters was identified by Humphrey, who called in the 1995 special issue of *World Development* for greater attention to the relationship between global chains and local development:

> Whether or not insertions into a commodity chain will create development potential for a cluster will depend on both its position in the chain and the capacity of firms and institutions to make use of or create sources of competitive advantage and opportunities for upgrading" (Humphrey, 1995b, p. 158).

The utility of the commodity chains framework was also underscored in a recent paper by Schmitz and Knorringa, who note that the GCC approach is useful in orienting studies of developing country clusters

> because it identifies the key feature of the context in which export manufacturers from developing countries tend to operate: they feed into chains which are organized by lead firms that source globally. However, this approach needs to be developed further in order to specify where local upgrading is facilitated or hindered by these global buyers (Schmitz & Knorringa, 1999, p. 23).

In this paper, we use the commodity chains framework to analyze the firm strategies, upgrading opportunities, and development outcomes associated with the Torreon blue jeans cluster. Ours is a two-part analysis. In the first part, we show how the arrival of new lead firms, in particular US retailers and marketers, have changed the organization of the local industry in Torreon by developing full-package networks with several of the most advanced and innovative apparel manufacturers in the cluster. This part of the Torreon story, in which the US buyers serve as a catalyst for the emergence of full-package networks, shows the importance of external links in changing the organizational dynamics of a cluster.

The second part of our analysis examines how these full-package networks, now the independent variable, shape firm performance, intracluster dynamics, and local development outcomes in Torreon. The difference between pre-NAFTA *maquila* networks and post-NAFTA full-package networks in terms of development outcomes is underscored. We explain what kinds of local linkages and industrial upgrading opportunities full-package networks provide in Torreon, as well as how the full-package shift affects firms and workers. In short, our analysis shows: (a) how the arrival of a new set of foreign lead firms affects the organization of the Torreon cluster and allows for the emergence of full-package networks; and (b) how these networks shape intracluster dynamics and development outcomes.

3. THE NEW BLUE JEANS CAPITAL OF THE WORLD: MORE THAN MAQUILAS?

Torreon is a dynamic industrial cluster of 500,000 people in the northern Mexican state of Coahuila, about four hours by car from the Texas portion of the US border. It is located in the heart of the Laguna region, which is well known for its cotton and dairy products. The apparel industry in Torreon straddles the nearby municipalities of Gómez Palacio and Lerdo in the neighboring state of Durango. Following an economic recession in the early 1990s, Torreon has been one of the main beneficiaries of Mexico's recent export boom. Although the area is also home to other export-oriented manufacturing sectors, such as autoparts and machinery, the apparel industry has been the most dynamic in terms of exports and job creation.

Torreon is one of several rapidly growing post-NAFTA apparel production clusters in Mexico, reflecting the increased importance of this industry to the country's overall export profile in recent years. Mexico has emerged as a world-class player among global textile and apparel exporters during the second half of the 1990s. In 1991, Mexico was the seventh largest exporter of apparel to the United States. By the decade's close, Mexico toppled China to gain the number one spot, with the value of Mexican apparel exports increasing from $1.2 billion in 1990 to $8.8 billion in 1999 (SECOFI, 2001).

While overall apparel exports from Mexico have increased dramatically over the past five years, we focus on the leading item in Mexico's garment export repertoire: blue jeans. In 1999, the United States imported more than $2.6 billion of trousers from Mexico, accounting for 34% of total apparel imports from its southern neighbor (USITC, 2001). Torreon specializes in denim blue jeans, which account for the lion's share of cotton trousers. In 2000, firms in the Torreon area were producing an average of six million garments a week, of which 90% were exported. Jeans accounted for 75% of the exported apparel, and thus the region made over four million pairs of jeans each week. In contrast, El Paso, Texas—Torreon's predecessor as the blue jeans capital of the world and a major manufacturing center for Levi Strauss & Co. before the company closed its last factories there in 1999—produced two million pairs of jeans a week at its peak in the early 1980s. To keep pace with this dramatic increase in output, employment in Torreon's 360 apparel factories has grown considerably from 12,000 jobs in 1993 to an estimated 75,000 in 2000. In addition, the proportion of Mexican denim used in Torreon's exported blue jeans increased from a negligible 1–2% in 1993 to 15% in 2000, and the piece rates paid to firms for blue jean assembly rose two- to threefold (see Table 1).

We have chosen Torreon as the empirical focus of our paper because it is a leading apparel production cluster in Mexico, and the dynamism of Mexico's apparel exports in recent years suggests that it has been one of the industries most strongly affected by NAFTA. Some of the earliest research in the now vast *maquiladora* literature examined in-bond sewing plants along the border as exemplars of two characteristics that would become closely associated with the *maquilas*: a young, predominantly female workforce with low education and skill levels; and a highly routinized, low value-added manufacturing process that involved simple assembly of imported inputs. [3] Apparel plants outnumber all other *maquila* establishments and they employ more workers than any other *maquila* sector except electronics. In 1993, the year prior to NAFTA's implementation, there were 392 apparel *maquilas* with 64,000 workers. By 2000, there were 1,058 registered maquila plants in the apparel industry throughout Mexico, employing a total of 270,000 workers [4] (SECOFI, 2001).

Table 1. *Apparel industry indicators for Torreon /La Laguna*[a]

Variables	1993	1998	2000
Total output (garments per week)	500,000	4.0 million	6.0 million
Output per company (garments per week)	Max. 50,000	Max. 230,000	Max. 480,000
Mexican denim in export production	1–2%	5%	15%
Assembly price per piece	US$0.90–1.10	US$1.20–2.05	US$1.60–3.00
Employment	12,000	65,000	75,000

[a] Torreon is the center of La Laguna, a highly integrated economic region formed by two additional cities (Gomez Palacio and Lerdo) and several rural communities. Although each city is a distinct political entity, they form an integrated production zone.

If the industrial districts model provides a "high road" to competitiveness, the *maquiladora* industry has long been associated with a "low road" based on exploiting substantial wage differences between the United States and Mexico. The *maquiladoras* are in-bond factories that produce goods primarily from imported US inputs. [5] These goods are then re-exported for sale in the US market, with only a minimal duty paid on the value-added in Mexico. While proponents of the *maquiladora* regime assert that it is a valuable source of export revenue and job creation for Mexico, the program's critics claim that the *maquila* sector offers nothing but dead-end jobs, and traps developing countries into providing cheap labor for low value-added assembly operations. Because the vast majority of inputs are imported, it has been argued that the *maquilas* do not stimulate growth in the rest of the economy (Sklair, 1993). Furthermore, early work on the *maquilas* documented abusive or poor working conditions and suppression of workers' efforts to organize (Fernandez-Kelly, 1983; Iglesias Prieto, 1985).

The profile of the *maquila* sector has changed dramatically since it was established by the Border Industrialization Program in 1965. Although the *maquilas* were initially confined to the northern border, this geographical restriction was later relaxed and *maquila* plants now exist throughout the country. Recent studies contend that the *maquiladoras* have evolved from low-value added assembly plants to factories capable of more sophisticated manufacturing operations. This revisionist perspective emerged in the late 1980s and early 1990s, when researchers began to call attention to so-called second- and even third-generation *maquilas*. Although local inputs to the production process remain low, the mix of activities being performed by Mexican workers in the *maquilas* has become more diverse, expanding beyond the simple assembly operations associated with earlier plants. The sectoral focus of recent research includes autoparts production in northern Mexico, televisions and other electronics in Tijuana, and computers in Guadalajara. In each of these industries, the *maquilas* have matured from assembly sites based on cheap labor to manufacturing centers whose competitiveness derives from a combination of high productivity, good quality, and wages far below those prevailing north of the border (Carrillo, 1998; Gereffi, 1996, 2000; Shaiken & Herzenberg, 1987).

While the *maquilas* existed for almost three full decades prior to NAFTA, this in-bond sector of the Mexican economy has grown rapidly since NAFTA's passage. Over 400,000 *maquila* jobs were created during 1994–98, the first four years after the implementation of NAFTA (Buitelaar & Padilla, 2000). Growth in the *maquila* sector was accelerated by the devaluation of the Mexican peso in December 1994. The devaluation had the effect of making Mexican labor even cheaper for US firms and it has resulted in a major export boom since 1995. The rapid growth of the *maquila* sector has generated widespread debate in Mexico, which reflects not only the importance of this sector of the economy, but also the concern generated by Mexico's shift to an export-led development strategy in the context of trade liberalization and regional integration.

Our study of Torreon provides an opportunity to contribute to this debate about Mexico's prospects for development in the NAFTA era, as well as to the literature on industrial clusters in developing countries. Does clustering and specialization in Torreon's apparel industry provide a "high road" to development, where firms can compete on nonprice factors such as quality and flexibility and the local workforce enjoys relatively high wages? Or does Torreon more closely resemble the old-style *maquila* model, where local production for export is confined to low-value added assembly activities, there are minimal backward linkages to suppliers, few horizontal networks connect firms, companies compete only on the basis of price, and unskilled workers receive low wages? Our research suggests that there has been a significant shift beyond the traditional model of *maquila* production in the region, but the outcomes for local firms and workers are mixed.

4. METHODOLOGY

Our on-site research in Torreon was conducted during two trips, each of about two weeks in duration, in July 1998 and July 2000. [6] Supplemental fieldwork during this two-year period consisted of interviews with US textile and apparel manufacturers in the United States that provided us with information about their global and North American strategies. Most of these companies are located in the Piedmont region of North Carolina, one of the major textile manufacturing centers in the United

States. [7] These interviews, carried out as part of an on-going, larger research project examining the restructuring of the North American apparel industry, provided an initial set of contacts in the Torreon region. The primary method of data collection consisted of open-ended strategic interviews with Mexican, US, and joint-venture firms, industry associations, and local government organizations, coupled with plant visits and factory tours. We also used secondary materials, including production and trade data and articles in local newspapers, to document recent changes in the industry. (For additional discussion of the strategic interviews we conducted, see Appendix A.)

Our 1998 sample included nine apparel companies and two textile mills. Of these 11 firms, two were subsidiaries of US multinational corporations, three were joint ventures between US and Mexican companies, and six were wholly-owned Mexican manufacturers. In our second visit to Torreon, we interviewed 10 apparel companies, including follow-up interviews with the six largest firms we talked with in 1998. This sample consisted of three subsidiaries of US apparel companies, one joint venture, and six wholly-owned Mexican companies. In both 1998 and 2000, we also interviewed the local branch of the national apparel industry association as well as officials in the local office of the federal government ministry concerned with commerce and industry. Given the disproportionate role played by foreign firms in the sector and our interest in understanding the power dynamics that exist in the industry, our study focused on the 10 largest apparel manufacturers in Torreon. Although about 360 different garment firms operate in the Laguna region, the 10 biggest companies in our sample in 2000 directly produced or coordinated about one-third of the total apparel output of the region. (See Appendix B for a list of the authors' interviews in Torreon.)

Interviews were conducted primarily in Spanish with the company's plant manager, director of foreign operations, or owner, and they lasted an average of two hours. The interviews were usually followed by a tour of the production facilities. In Torreon these included the traditional sewing factory, textile mills, laundries, finishing plants (where the garments are pressed, inspected for quality, and packed), and a distribution center. In addition to providing an opportunity to evaluate the working conditions and industrial relations (as suggested by plant floor interactions between the workers and managerial staff), these tours also permitted us to speak with additional informants, such as production trainers and line supervisors, whose perspectives on the operation complement the data collected in the initial interview.

5. TORREON'S NAFTA-ERA NETWORKS: THE ARRIVAL OF NEW LEAD FIRMS

The Laguna region where Torreon is located has long been a center for textile and apparel production. The presence in the region of one of the oldest textile companies in the country, Compañía Industrial de Parras, established the area early on as an important source of cotton-based textiles and apparel for the national market. From the beginning, firms in Torreon specialized in denim trousers, first as workwear for the area's growing industrial labor force and later as fashion apparel when blue jeans became a mainstream clothing staple. The early period of the cluster's development in the 1940s and 1950s coincided with an import-substituting industrialization strategy, protecting national companies in virtually every sector from foreign competition and essentially guaranteeing healthy profits to firms in the closed domestic market.

The opening of Mexico's economy with the country's accession to the General Agreement on Tariffs and Trade in 1986, along with major devaluations of the peso in 1982, 1985, and 1988, contributed to an extremely difficult period for apparel firms in Torreon and throughout the country. As the purchasing power of Mexican consumers decreased, they also faced a wide array of new and cost-competitive imported apparel products. Together these factors resulted in declining employment and output in Mexico's apparel and textile industries, with small and medium firms especially hard hit. While the domestic industry faced a period of crisis throughout the 1980s, the *maquila* sector of in-bond plants flourished, primarily along the border. Many of the local firms that had survived the leanest years in places like Torreon recognized that exporting was the only viable option for national producers, and so they too focused their attention on producing blue jeans for the US market.

The transition of many firms from domestic manufacturer to export producer transformed

the Torreon cluster. While several local companies had developed and marketed their own lines of jeans in the Mexican market, they quickly discovered that they could not meet the quality or quantity standards demanded by US buyers. Thus, they exported through the only mechanism that was available to them: they became *maquiladora* plants assembling jeans for the US market. The implementation of NAFTA in 1994 coincided with a sharp devaluation of the Mexican peso in December of the same year, from 3.4 to 6.8 pesos to one dollar. The immediate effect of the devaluation was to lower the relative cost of Mexican labor, expand manufactured exports, and thereby boost the country's *maquiladora* sector.

As a result of NAFTA, the Torreon apparel cluster has experienced a qualitative change in the type of networks connecting local firms to export markets. This transition is associated with the arrival of a new set of foreign buyers whose sourcing needs are different than those of the apparel manufacturers that used to dominate the region's export-oriented apparel production. Table 2 highlights the magnitude of this shift. In 1993, the major US customers for the blue jeans made in Torreon were four large manufacturers: Levi Strauss, Wrangler, Farah, and Sun Apparel. By 2000, these companies were joined by the top US retail chains (JC Penney, Sears, Kmart, Wal-Mart, and Target), the two leading specialty retailers for apparel (Gap and Limited), and the marketers who sell a wide range of fashionable brands (such as Liz Claiborne, Donna Karan, Tommy Hilfiger, Calvin Klein, and Polo/Ralph Lauren).

The contrast between manufacturers and other big buyers (retailers and marketers) in their capabilities and needs gives rise to the difference between assembly and full-package networks. Figure 1 shows the typical manufacturer-dominated assembly network, which was prevalent in Torreon from the mid-1980s to the mid-1990s. The assembly plants on the Mexican side of the border received cut parts from US manufacturers or brokers. In turn, these assembly plants often subcontracted out a portion of their production to smaller firms known as *submaquilas*. These cut parts were to be sewn into garments and then re-exported to the United States under the *maquila*/807 regime. The profile of foreign lead firms in Torreon at this time was undifferentiated—US manufacturers, most of whom had some production in their own plants north of the border—and there was no variation in the type

Table 2. *Main clients for Torreon apparel exports*[a]

Type of clients	1993	2000
Manufacturers	Farah (M) Sun Apparel (M)	Sun Apparel-Jones of NY (M) Aalfs (M) Kentucky Apparel (M) Grupo Libra (M) Siete Leguas (M) Red Kap (M)
Brand marketers	Levi's (BM, M) Wrangler (BM, M)	Levi's (BM, M) Wrangler (BM, M) Action West (BM, M) Polo (BM) Calvin Klein (BM) Liz Claiborne (BM) Old Navy (BM) Tommy Hilfiger (BM) Donna Karan (BM) Guess (BM) Chaps (BM)
Retailers		Gap (BM, R) The Limited (BM, R) K-Mart (R) Wal-Mart (R) JC Penney (R) Sears (R) Target (R)

[a] M: Manufacturers; BM: Brand Marketers; R: Retailers.

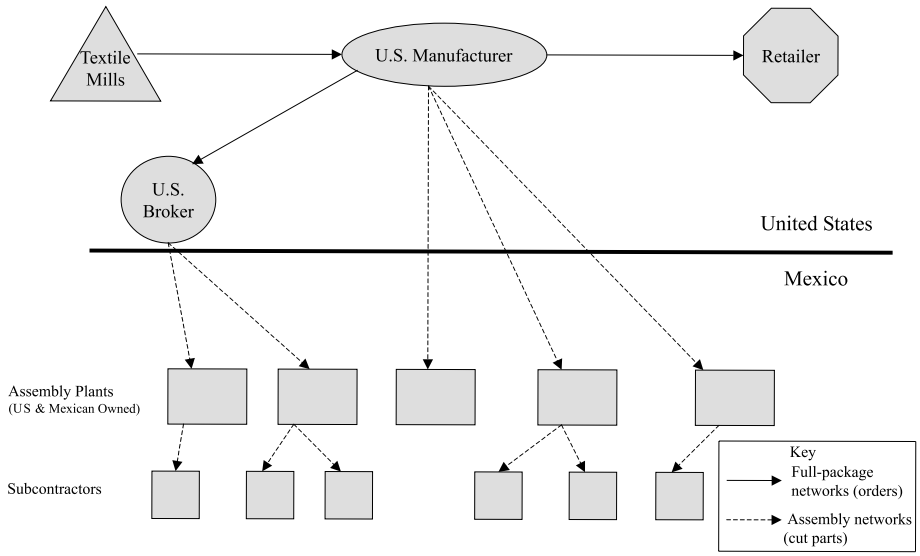

Figure 1. *Pre-NAFTA maquila networks in Torreon.*

of assembly networks these manufacturers established in the region.

In Figure 2, the assembly networks typical of the maquila phase have diversified to include the full-package networks characteristic of buyer-driven commodity chains. In this full-package model, a local manufacturer receives detailed specifications for garments from the buyer and the supplier is responsible for acquiring the inputs and coordinating all parts of the production process: the purchase of textiles, cutting, garment assembly, laundry and finishing, packaging, and distribution. Prior to NAFTA, the lead firms in the apparel

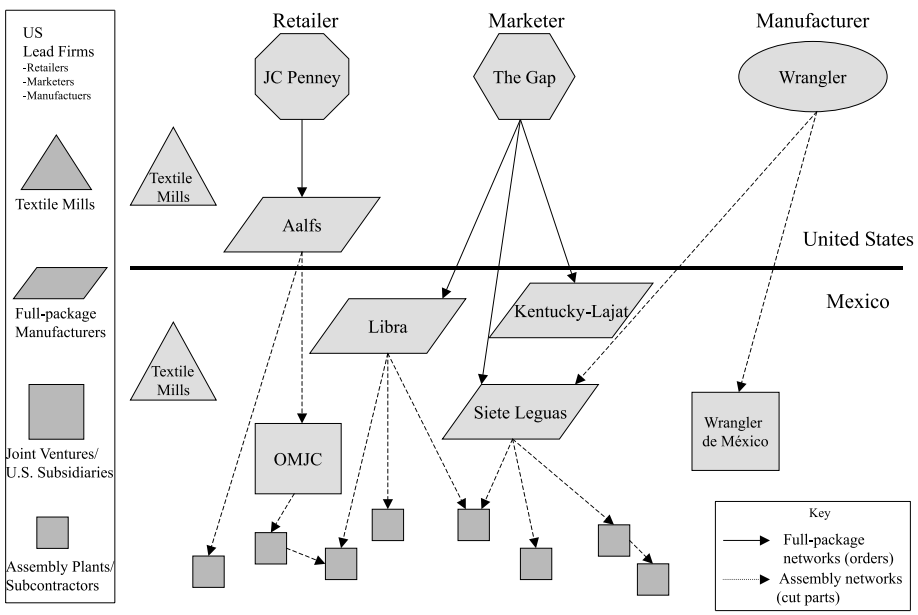

Figure 2. *Post-NAFTA full-package networks in Torreon.*

commodity chain (retailers, marketers, and branded manufacturers) sourced primarily from East Asia because countries such as Hong Kong, South Korea, and Taiwan were home to contract manufacturers that could producer orders for finished apparel according to these buyers' specifications [8] (Gereffi, 1999). After NAFTA, retailers and marketers became eager to transfer as much of this business to Mexico as possible because NAFTA's rules of origin give apparel produced under full-package arrangements the same preferential access to the US market as apparel exported under the *maquila*/807 regime, as long as it is manufactured from North American textile inputs (Gereffi & Bair, 1998). Buyers placing orders for full-package apparel in Mexico generally do not have to worry about tariffs or quotas, as they do when importing from other apparel exporting countries.

6. UPGRADING THROUGH NETWORKS: TORREON'S SUCCESS AND ITS LIMITATIONS

The arrival of a new set of foreign buyers changed the nature of Torreon's role in the apparel commodity chain: pure assembly networks typical of the maquila sector were replaced with a mix of assembly and full-package networks. In this section, we explain the relevance of these networks for local development outcomes, focusing on four areas: upgrading at the level of the industry, upgrading at the level of the firm, the hierarchical organization of Torreon's inter-firm networks, and the implications for labor.

(a) *Upgrading at the industry level*

Upgrading is clearly occurring at the industry level in Torreon as a result of full-package networks established by new lead firms. Prior to NAFTA, the only link in the apparel commodity chain that was strong in Torreon's export-oriented blue jeans cluster was assembly, since this was the activity that the *maquila*/807 regime encouraged. As more US buyers began to change their sourcing and production networks to take advantage of new activities gradually liberalized under NAFTA's phase-in schedule, other activities in the chain began to touch down in the region. Figure 3 shows the expansion of the apparel commodity chain in Torreon over 1993–2000. In 1993, the only link on the Mexican side was assembly; by 1996, textile production as well as the post-assembly stage of laundering and finishing, one of the first production processes liberalized under

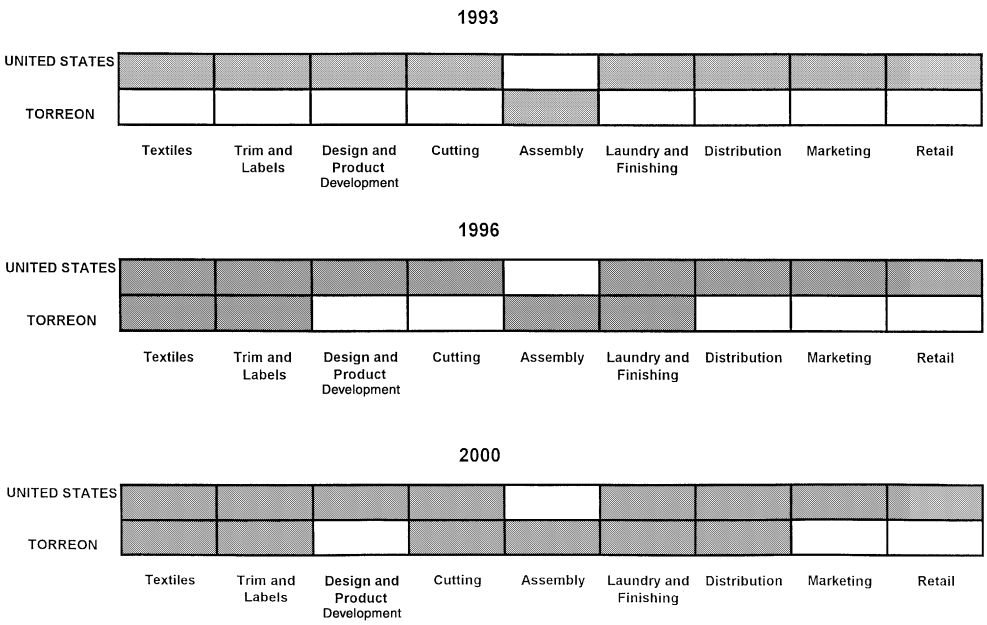

Figure 3. *US–Torreon apparel commodity chain activities and location.*

NAFTA, were added. In 2000, the full range of production activities was taking place in Torreon. The other links of the chain that have been transferred to Torreon mean that more backward linkages and value are being added in the region beyond the assembly activities that were dominant prior to the emergence of full-package networks.

Figure 3 shows that three links in the apparel commodity chain—design and product development, marketing, and retail—have remained predominantly in the United States. These are the highest value-added activities in the chain, and they are also the ones with significant barriers to entry closely guarded by the foreign firms that control them. US lead firms—whether manufacturers, marketers, or retailers—view these links of the commodity chain as core competencies, and they see design and product development in particular as critical in terms of differentiating their fashions and styles from competitors. A number of the full-package manufacturers in Torreon that we interviewed have begun to work more closely with their clients on product development, but this is generally confined to translating the buyer's specifications into practical knowledge that is necessary for production. [9]

No manufacturer in Torreon markets its own apparel brands in the United States, although some companies still have a presence in the domestic market, and no Torreon producer of a US brand is able to sell its branded output directly in Mexico (everything is exported to the United States). One company that we interviewed planned in the future to launch its own line of apparel in the US market, but the amount of capital necessary to promote and market a new brand makes such endeavors risky. Strategies that local firms are considering in order to reduce these risks include marketing their products specifically to Mexican-American or Mexican consumers in the United States (whose fashion preferences are presumably closer to their own), and targeting regional retail chains and boutiques, which have lower volume needs and are less likely to choose their suppliers based solely on price.

(b) *Upgrading at the firm level*

Upgrading is also occurring at the firm level in Torreon, although here the picture is more complex. A significant portion of full-package orders in Torreon is being handled by a small number of first-tier manufacturers with the capabilities and capital needed to coordinate full-package networks. Table 3 lists the top 10 firms in Torreon according to their production volume and the type of activities they perform. Four of these 10 firms are "full-package" manufacturers, meaning that they receive an order from a client and deliver a finished product. Four more are what may be termed "half-package" producers, meaning that they carry out all the production activities (cut, sew,

Table 3. *Top 10 apparel manufacturers in Torreon, Mexico—July 2000*

Rank	Firm	Capacity[a]	Employment	Capability[b]	Ownership
1	Wrangler	480,000	1,900	C, S, W	US subsidiary[c]
2	Kentucky–Lajat	400,000	5,500	F, C, S,W	Mexican[d]
3	Libra	400,000	5,000	F, C, S, W	Mexican
4	Siete Leguas	250,000	3,200	F, C, S,W	Mexican
5	Grupo Denim	245,000	3,300	C, S, W	Mexican
6	Maquilas Pami	240,000	3,800	C, S, W	US subsidiary[e]
7	Red Kap (RKI)	156,000	1,430	S	US subsidiary[f]
8	Pafer Huichita	150,000	2,450	F, C, S, W	Mexican
9	Grupo Impeccable	150,000	1,500	C, S,	Mexican
10	Original Mexican Jeans Co. (OMJC)	135,000	3,000	C, S, W	Joint venture[g]
Total		2,606,000	31,080		

[a] Pairs of jeans per week.

[b] Capabilities: F: fabric, C: cutting, S: sewing, W: washing and finishing.

[c] Wrangler's parent company is the VF Corporation.

[d] Kentucky–Lajat was set up in 1995 as a joint venture between Kentucky Apparel, a US-based jeans manufacturer, and the Lajat Group in Mexico, but Lajat bought out its US partner in July 1999.

[e] Maquilas Pami is owned by Sun Apparel, which was purchased by Jones Apparel of New York in 1998.

[f] Red Kap is a division of VF Workwear, Inc.

[g] OMJC is a joint venture between Aalfs, a US-based jeans manufacturer, and the Martín Group in Mexico.

and launder), but do not buy the fabric. The difference between full-package and half-package is indicated in Table 3, where the capabilities of some firms include an "F" denoting that they purchase the fabric for the orders they fill, while others have only C, S, and W listed for cut, sew, and wash, respectively.

All four of these full-package manufacturers—Kentucky-Lajat, Libra, Siete Leguas, and Pafer Huichita—are Mexican-owned companies. The emergence of local full-package companies competing alongside a US-owned contractor like Maquilas Pami (the sixth-largest manufacturer in Torreon and a subsidiary of Jones Apparel of New York) is significant. Having gained experience through *maquila* production for US clients and having earned the trust of foreign buyers, Mexican firms are now developing direct links to export markets. These full-package firms are upgrading by eliminating middlemen like brokers or trading companies, which allows them to enjoy the higher profits full-package production offers as compared to *maquila* orders.

(c) *Vertical network structure and hierarchical organization of the industry*

While upgrading is occurring in Torreon, both at the level of the industry and for some specific firms, we are not sanguine about all the outcomes associated with the emergence of full-package networks in the region. Due to increasing concentration on both sides of the border, more orders are in the hands of fewer foreign buyers and they are being given to a relatively small number of Mexican suppliers. The social foundation of this concentration is revealed by the fact that six of the 10 firms listed in Table 3 are owned by family members related by blood or marriage.[10] This is particularly striking considering that three of the remaining four firms are subsidiaries of US corporations. Thus, the development of full-package networks in Torreon is primarily benefiting a wealthy domestic elite whose control over the local industry is being further strengthened by its exclusive access to the US customers placing orders in the region. While these orders are *received* by a few large, full-package manufacturers in Torreon, they are actually being *filled* by a burgeoning array of contractors and subcontractors organized into tiers of hierarchical networks controlled by the dominant firms in the cluster.

This hierarchical organization of the industry applies two sorts of pressures on local firms. First, the US buyers are benchmarking Mexican full-package manufacturers against other global suppliers. Consequently, these manufacturers are under pressure to reduce their production costs to a minimum in order to offer a competitive price. Second, these first-tier manufacturers then exert pressure on their subcontractors as they try to procure assembly services for the lowest possible price per piece. The end result of this vertical competitive dynamic is significant downward pressure on the manufacturers' profit margins, and consequently on workers' wages.

As noted in the previous section, several Mexican companies have emerged as leading full-package manufacturers in Torreon. To the extent that this puts ownership and control in local hands, it is a positive developmental outcome. But, these Mexican firms exert the same kinds of pressure and control on their local subcontractors as US-owned companies impose on them. From the perspective of the second- and third-tier suppliers in Torreon's assembly networks, the difference between receiving an order from a Mexican intermediary or a US buyer is probably negligible. To avoid being squeezed by the local full-package manufacturers, the obvious upgrading path for these subcontractors is to become full-package producers themselves, but this transition is difficult to make for two reasons. First, full-package business requires significant amounts of working capital to purchase piece goods (i.e., fabric), and credit is both scare and expensive in Mexico. Second, full-package manufacturers need direct links to US clients who are looking for their services, and access to this customer base is jealously guarded by the US and Mexican companies in Torreon that already have it.

(d) *Implications for labor*

How has the arrival of full-package networks coordinated by new US buyers affected workers in Torreon? We examined five main issues relating to the implications of this process for labor: (i) employment growth, (ii) skills upgrading of the local labor force, (iii) working conditions, (iv) unionization, and (v) wages. Dramatic employment growth in the apparel industry is the most obvious impact of Torreon's export boom on the local labor market. Apparel and textiles have become the major source of employment in the region. During 1993–98,

apparel jobs increased 300%, while during the same period employment in commerce and services only grew 3%, construction 80%, and the auto industry 100%. In 1993, the area employed 12,000 workers in the apparel and textile industries; by 2000, the number had grown to 75,000 (see Table 1). It is equally important to note that activities associated with the deepening of the supply chain—such as textile production, laundering, and cutting—are bringing new types of jobs to the region to complement the growing number of sewing workers.

The development of full-package networks in the cluster has resulted in some upgrading of the local skills base, as jobs in Torreon's cutting rooms and laundries entail more training and better pay than is offered to the average sewing machine operator. The different levels of investment that firms make in the human capital of workers reveal not just the varying complexity of specific jobs, but also the way in which gender stratifies the local labor market. During our fieldwork in Torreon, we saw only men working in the laundries and cutting rooms. While management would attribute this to the physically strenuous nature of the work, sex segregation also reflects the reluctance of companies to invest in enhancing the skills of female employees. Women workers are expected to remain in the workforce only until they begin families, typically withdrawing from the labor market in their mid-20s. Despite the fact that the ratio of male to female sewing machine operators in several of Torreon's larger plants is approaching 50%, the internal labor market within the factories continues to be stratified by gender in subtle ways. Male sewers are far more likely than female sewers to be promoted to higher-wage jobs in the cutting rooms or laundries, and often even the most difficult and best paying assembly line jobs, such as sewing the inseam in a jean, are given to men because supervisors believe they are more easily able to handle the heavy denim fabric.

Due to the tightness of the local labor market, turnover is high across every job category in Torreon's apparel industry. The average turnover rate in many of the sewing factories in Torreon was estimated at 10% *per week*. Thus, firms have little incentive to invest in training their workers. While there are more opportunities for skill upgrading than there would be in the absence of full-package networks, the boom in Torreon's apparel exports is characterized by very uneven development of the local labor force.

Our evidence from Torreon suggests that there has been an improvement in working conditions in the region associated with the arrival of US buyers that are sourcing their brand name apparel locally. The presence in the region of widely recognized clients with upscale labels (such as Calvin Klein, Polo, and Tommy Hilfiger) has prompted an improvement in working conditions. Large retailers and marketers do not want their brands associated with the exploitation of workers or with unsafe working conditions. Companies such as Gap and JC Penney have issued Codes of Conduct related not only to the final quality of the product, but also to the work process itself. Any plant or company that fails to fulfill these requirements, including compliance with local labor laws, safety practices, and even the conditions of the bathrooms, is in danger of losing its contracts. In addition, since most factories have been constructed since 1994, they were designed with modern standards to provide a relatively safe working environment with proper ventilation, lighting, ergonomic equipment, etc. In general, the working conditions of many of these new Mexican plants are not only better than those offered by local competitors, but frequently better than those in comparable US apparel factories.

Currently the topic of sweatshops is receiving a great deal of attention in both the academic and popular press, thanks to a number of publicity campaigns sponsored by various consumer organizations, student groups, and organized labor (National Interfaith Committee for Worker Justice, 1998; Ross & Kernaghan, 2000). Activists have called attention to the abusive working conditions that prevail in many sewing factories, both in the United States and abroad, and they challenge leading companies in the industry to do a better job of ensuring their apparel is produced in a sweat-free environment. A commodity chains approach has been implicit in many of these campaigns, as activists demand that US firms take responsibility for the working conditions prevailing in any plant where apparel bearing their label is produced, including subcontractors in developing countries. Blatant sweatshop conditions were not evident in any of the large plants we visited. Most of the factories appeared clean, well lit and ventilated, and reasonably efficient. They had Codes of Conduct from their clients displayed where workers could see them, although in at least

one case they were displayed in English. The visibility of these Codes in the plants that we visited increased between 1998 (when it was uncommon to see them posted in a factory) and 2000 (when posting them had become a standard practice).

Because we primarily studied large firms, additional research is necessary to evaluate working conditions in the numerous smaller contractors and submaquilas in the Torreon region. Limited evidence from Torreon and fieldwork conducted elsewhere in Mexico suggests that small, lower-tier subcontractors generally have worse working conditions and lower wages (Bair, 2000, 2001).

While the arrival of new buyers has created jobs in Torreon and appears to have improved working conditions in some factories, the evidence in terms of wages and industrial relations is disturbing. The status of organized labor in the Torreon apparel industry mirrors the situation throughout Mexico. In tandem with the liberalization of the economy and in pursuit of the labor flexibility so prized by foreign firms, the Mexican government has reduced the power of unions to a minimum (Carrillo, 1994; De la Garza, 1994). The role of unions in the apparel industry in the Torreon region has been limited in many cases to helping the firms and their managers ''deal'' with the workers. Effective representation and collective bargaining have virtually disappeared and here, as elsewhere in Mexico, ''protection contracts'' (i.e., collective contracts signed with company-friendly ''unions,'' often without the knowledge of workers, designed to prevent the entrance of a genuine union) are the norm. In the absence of effective representation, workers exercise their limited power by moving from one company to another fairly often. They use their mobility as a source of bargaining to obtain small wage increases and nonmonetary benefits, such as transportation, free lunch, classes, raffles, and prizes. This is a benefit contingent, however, upon a continued high demand for labor.

In terms of wages, the evidence is more mixed. Workers in the apparel industry are paid according to a piece-rate system whereby they receive a base wage, which is typically a multiple of the local minimum wage, plus additional earnings ''per piece'' when they achieve certain productivity levels or fulfill set production quotas. It is widely agreed that Mexico's minimum wage, which varies by geographic region, is not a living wage, and consequently many companies pay a multiple of it, such as 1.5 times or two times the legally allowed minimum. When we completed our initial fieldwork in Torreon in July 1998, the local minimum wage was 182 pesos per week (US$ 21.00). Base wages in the companies we interviewed generally ranged between 220 and 280 pesos a week, but most workers earned more due to the piece rate system. Maximum average salaries ranged from 500 pesos (US$ 57.50) to 750 pesos (US$ 86.20) a week.

By July 2000, average sewing wages had risen in Torreon to around 650 pesos (US$ 68.40) a week. [11] Several of the firms interviewed reported that good sewers with high productivity were earning as much as 800–1,000 pesos (US$ 84.20 to $105.30) a week. [12] Companies repeatedly told us that in Torreon's tight labor market ''no one works for minimum wage'' and many of the sewers in the region's factories were earning well in excess of two times the legal minimum. Apparel wage increases in Torreon have generally been running ahead of inflation, which was about 12% in 1999. But, real wages are only now returning to the levels reached prior to the 1994 devaluation, which has led some analysts to conclude that many Mexican workers have actually experienced a decline in their standard of living over the past five years (The Economist, 2000).

Although the high turnover and tight labor market in Torreon have been driving wages up in the region's apparel plants, this trend has not gone unnoticed by the factory's owners. High and persistent turnover was repeatedly cited in our interviews as the most pressing problem employers face. In the summer of 1998, the employers initiated discussions among themselves in an effort to find a ''solution'' to the problem of rising wages as a result of Torreon's increasingly tight labor market. The employers particularly were concerned with the practice of companies pirating away each other's workers with wage increases. By July 2000, their efforts in this regard had not been successful. Some entrepreneurs in the local industry expressed resentment towards the foreign firms that arrived in Torreon after the passage of NAFTA. They complain that because foreign firms can afford to pay higher wages than their Mexican counterparts, they often hire away the better and more experienced workers whose skills the local companies have developed.

7. LESSONS FROM TORREON: THE VALUE OF A COMMODITY CHAINS PERSPECTIVE FOR RESEARCH ON CLUSTERS

Our analysis of the blue jeans industry in Torreon shows how the types of links that connect local firms to global chains shape development outcomes in export-oriented manufacturing. Recent literature on manufacturing clusters in developing countries has argued that the local-global link, and in particular the role of foreign buyers, is not well understood. Our study is intended to help fill this gap. The global commodity chains framework that we applied to the case of Torreon allows us to explore how the structure of competition within a global industry affects the experiences of local firms and workers in specific production locales.

Many of the factors that the industrial districts literature would expect to be important in explaining local outcomes in clusters were not evident in Torreon. For example, we found that networks in Torreon tended to be hierarchical and vertical as opposed to cooperative and horizontal. During the course of our conversations with owners and managers, we learned that trust and collaboration between companies in Torreon is very uncommon. One of our informants described the networks between local firms as a ''cadena de disconfianza,'' or a chain of distrust. ''Information here is not shared. If you want to know how many jeans are being made across the street, you have to bribe someone.'' Relations between companies often appear distant or even strained, not close and collaborative, despite the fact that several of the major firms are owned by relatives.

Several decades ago, researchers influenced by dependency theory claimed that transnational corporations had negative implications for local development in Latin America. They would not have been surprised by the low levels of trust, weak horizontal ties, and hierarchical networks that characterize Torreon's apparel exporting cluster. It is not accurate, however, to suggest that all foreign firms establish vertical networks that are uncooperative in nature, nor that all local companies build horizontal networks that promote collaboration and trust. The climate of distrust also affects relations among Mexican-owned firms. In fact, some of our informants spoke more favorably of the foreign clients they did business with on a regular basis than the local entrepreneurs with whom they competed for orders and workers. More research is needed to understand the boundaries of solidarity in clusters like Torreon, but it is clear that they are not determined solely by foreign versus domestic ownership, nor are they inevitably fostered by the existence of family ties.

Supporting institutions, such as trade associations and industry-specific educational/training programs, apparently have not played an important role in Torreon's emergence as a major blue jeans cluster. In the case of the local apparel industry association, its growth seems to have been more a response to Torreon's export boom than a cause of it. In short, the institutional environment characterizing the Torreon cluster is radically different from the stylized profile (e.g., trust and effective sanctions, strong sociocultural ties) found in the industrial districts model. In his valuable discussion of upgrading in exporting clusters, Schmitz notes, ''Strategic response to global competitive pressures cannot just rely on private joint action but require public agencies as catalysts or mediators'' (Schmitz, 2000, p. 15). Our research in Torreon yielded little evidence of private collaboration in the form of joint action among local firms, and even less evidence to suggest that the cluster benefits from the support of public agencies capable of mediating relations between the companies that comprise it. We have argued that the arrival of new buyers in Torreon has resulted in upgrading, both at the industry and at the firm level. But, the absence of an institutional environment that would help further diffuse the benefits of Torreon's export boom beyond the first tier of full-package firms means that there are limits to this process of upgrading, and they may have already been reached.

Recent events in Torreon indicate that links to the global economy can produce disruption as well as growth. A slowdown in the US economy has had a dampening effect on the export boom in Torreon at the end of 2000, and the effects have continued through the first half of 2001. Conversations with industry representatives in May 2001 revealed that 8,000 apparel jobs have been lost since October 2000, and production is down 20% as compared with the same period last year. A commodity chains approach would lead us to expect that job losses and plant closings will be concentrated among the small subcontractors located at the bottom tiers of the chain. Furthermore, we would expect that companies possessing the

additional capabilities associated with full-package production are less negatively affected than the assembly-oriented *maquilas*. Evidence from Torreon confirms that the companies that have suffered most to date are smaller, locally owned subcontractors. The negative implications of the slowdown could spread beyond this group of firms, however, and the absence of institutional support mechanisms in Torreon means that the adjustment to a sustained economic downturn will be harder to manage given the heavy reliance on the US market as the source of export growth.

Both the commodity chains and industrial districts approaches address the issue of development, conceived largely as a process of industrial upgrading, and both can be used to draw policy implications about the best way to achieve local development and upgrading goals. The literature on clusters has shown that under a particular set of conditions, it is possible to use industrial policy and local institutions to promote the creation of industrial districts as a "high road" to development. In many developing countries, however, these conditions are not present. This is likely to be even more true in an era marked by the increasing (if contested) hegemony of the World Trade Organization and institutions such as the International Monetary Fund, which privilege the adoption of neoliberal programs that promote open trade and discourage industrial policy. It is in this environment, characterized by hyercompetition between industrializing countries pursuing export-led growth strategies, that the specter of competitive devaluations and immiserizing growth haunts poorer countries' dreams of development (Kaplinsky, 1999).

Given that the governments of industrializing countries have limited power to "get the institutions right," the question becomes how firms can use their participation in global commodity chains to pursue developmental goals. In the case of Torreon, foreign buyers have provided local firms with a full-package link to the US market that gives them better upgrading prospects. In the context of Mexico's export-oriented growth strategy, figuring out how local firms can improve their position within global industries is a preeminent topic for producers and policymakers alike.

NOTES

1. More generally, there has been considerable research contributing to our understanding of the lean production model and its critique. See, for example, Harrison (1994), Boyer (1998) and Freyssenet (1998).

2. The need to adopt a more flexible approach to industrial districts was already recognized in Pyke and Sengenberger (1992). See, for example, Zeitlin's concluding chapter, which calls for "a 'thin,' 'open' model capable of generating a variety of empirically observable forms" (Zeitlin, 1992, p. 285).

3. The word "*maquiladora*" is used to refer to any factory in Mexico, owned by international or local capital, that has a permit from the Mexican government to import and export products under a special tariff and income tax regime. The term often evokes images typical of the first generation of *maquiladoras*—very large plants along the northern border owned by multinational companies. But, there is tremendous diversity within the *maquila* sector, ranging from giant, wholly-owned subsidiaries of multination corporations to small firms that export only a portion of their production under the *maquila* regime to supplement sales on the domestic market.

4. While this growth in the *maquila* sector is impressive, official statistics actually understate export-oriented apparel production and employment in Mexico since they reflect only those establishments that have registered as *maquiladoras* with the Mexican government. Traditionally, registering as a *maquila* provided a number of incentives, the most important being the ability to import duty-free foreign-made inputs. But, NAFTA changed the rules of the game for this kind of crossborder production sharing by introducing free trade between the three signatory countries. Materials can flow freely between Canada, the United States, and Mexico without duties as long as they meet the North American rules of origin established by NAFTA. Consequently, companies with crossborder production networks that are using North American inputs no longer have as strong of an incentive to register Mexican assembly plants as *maquilas*.

5. In the United States the analog of the *maquila* regime is the 807 program, so-named for the clause of US trade law that describes the status of goods assembled in export-processing factories like Mexico's *maquilas*. The relevant clause was later changed to 9802, so this type of production sharing is often referred to as 807/9802.

6. Martha A. Martínez, a graduate student in the Sociology Department at Duke University, collaborated on the first phase of our fieldwork in Torreon.

7. Major textile and apparel corporations headquartered in the Piedmont region of North Carolina include: Burlington Industries, Cone Mills Corporation, Sara Lee (which owns Hanes and several other well-known apparel brands), and VF Corporation (which manufactures and markets several lines of jeans, including Lee and Wrangler).

8. Although traditionally retailers have sold garments made by apparel companies, most retailers now have their own store brands called private labels. Examples of private label jeans include JC Penney's Arizona brand and Sears' Canyon River Blues line.

9. Schmitz and Knorringa (1999, p. 20) reported a similar finding from their interviews with global footwear buyers, who seemed more willing to assist their suppliers in acquiring the skills needed to "translate designs into technical specifications" than with helping them develop new and innovative designs. Our analysis points to the same conclusion that these authors reached: buyer–supplier relationships can help developing country manufacturers upgrade their production activities, but they rarely offer manufacturers the opportunity to develop skills, such as design and marketing capabilities, that would elevate them from the status of supplier to potential competitor. Schmitz (2000) concludes that foreign buyers may assist local firms in *process* and *product* upgrading, but they do not encourage *functional* upgrading that involves moving into new stages of the value chain.

10. The owners of Libra and Grupo Impeccable are brothers, and cousins of the two brothers that own Sieta Leguas and Grupo Denim. The families that own Kentucky Lajat and OMJC are also related by marriage. A full discussion of the family networks that crisscross the Torreon apparel cluster is beyond the scope of this paper, but will be explored in future analyses.

11. The US$ exchange rate in Mexico increased from 8.7 pesos in 1998 to 9.5 pesos in 2000.

12. Wages in the apparel industry, and in the maquiladoras more generally, vary dramatically across Mexico. In Guanajuato, where growth in the *maquila* sector was dramatic under then-governor, now president, Vicente Fox, average weekly salaries ranged from 300 to 450 pesos (US$ 31.60 to US$ 47.40) in July 2000 (Martínez, 2000). In addition to abundant coverage in the Mexican press, the country's booming maquiladora program has been the subject of several recent articles in US newspapers. Examples include Thompson (2001), Dillon (2001) and Jordan (2000).

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APPENDIX A. STRATEGIC INTERVIEWS

Strategic interviews were carried out with corporate managers and other knowledgeable informants in the textile and apparel sector in the United States and Mexico in order to understand the diverse factors contributing to the restructuring of the North American apparel industry in the 1990s. These interviews include a mix of standard and open-ended questions, and thus they depart from traditional survey instruments that only ask a pre-determined set of closed questions and seek fixed responses. For our fieldwork in Torreon, we used a semi-structured protocol that listed key questions to insure that critical issues were addressed with esach respondent. Respondents were asked to provide a historical description of their firm (e.g., In what year was it founded? Did it serve the national market, and if so through what channels and with what products?), as well as a current profile (number of employees, number of customers,

production volume, main clients, main suppliers). Our interviews typically lasted an average of two hours in length, and included questions regarding:

—The kind of link (direct or indirect, and if indirect, through what kind of intermediary) connecting the exporting firm to foreign markets;

—the type of production networks characterizing the firm and its relationship with clients and suppliers (e.g., *maquila* versus full-package relationships);

—the existence and nature of vertical and/or horizontal relationships with local firms and the role of local institutions, such as industry associations, in promoting the cluster;

—how the Torreon region and the experiences of local firms have changed since both Mexico's initial trade liberalization of the mid-1980s and the implementation of NAFTA; and

—a set of issues addressing industrial and human relations (average wage, turnover rate, training procedures, union presence in the plant), as well as characteristics of the workforce (age, gender, marital status, previous work experience, educational background).

APPENDIX B. INTERVIEWS IN TORREON, 1998 AND 2000

In cases of multiple interviews per firm, the number is indicated in parentheses (see Table 4).

Table 4. *Interviews in Torreon 1998 and 2000*

Firms[a]	Ownership	1998		2000	
Original Mexican Jean Company (OMJC)	Joint venture	X	(3)	X	(4)
Maquilas Pami	US subsidiary	X	(2)	X	(2)
Wrangler	US subsidiary	X		X	
Kentucky-Lajat[b]	Joint venture (1998); Mexican (2000)	X		X	
Libra	Mexican	X		X	
Siete Leguas	Mexican	X		X	
Grupo Denim	Mexican			X	(2)
Grupo Impecable	Mexican			X	
Pafer Huichita	Mexican			X	
Red Kap International	US subsidiary			X	
Parras Cone[c]	Joint venture	X			
Creaciones Lobo	Mexican	X			
Dustin	Mexican	X			
Fabricas de Ropa Manjai	Mexican	X			
Viesca 2000	Mexican	X			
Total number of firm interviews		14		15	
Other interviews					
Camara Nacional de la Industria del Vestido (CNIV) (Laguna branch)[d]		X		X	
Secretaría de Comercio y Fomento Industrial (SECOFI)[e]		X		X	
Fomento Económico de Laguna de Coahuila (FOMEC)[f]		X		X	

[a] Additional information regarding the first ten firms is provided in Table 3.

[b] In July 1998, Kentucky–Lajat was a US–Mexican joint venture that produced denim fabric as well as apparel. In December 1998, Kentucky–Lajat sold its denim mill to Parras, a Mexican textile firm. Then in July 1999, the Mexican Lajat Group bought out its US partner, Kentucky Apparel, and later that year expanded its operations to include apparel design as well as production in Mexico.

[c] Produces denim fabric only.

[d] The local branch of the national apparel industry association.

[e] The local office of the federal ministry of commerce and industrial promotion.

[f] A local development company in the Laguna region.