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## Cross-national Urban Structure in the Era of Global Cities: The US-Mexico Transfrontier Metropolis

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**Summary.** The growth of cities along international boundaries is symptomatic of the gradual integration of border territory into the economic circuitry of the world system. Border urbanisation represents an important regional dimension to the emerging dialogue on global cities. This article examines the US-Mexico transfrontier metropolis, a container of accelerating US-Mexico, First World-Third World integration, manifest within the physical space of a city. The transnational structure of this border metropolis is examined on two levels: social interaction (commuter workers), and economic connectivity (assembly plants).

### Introduction

By the late twentieth century it has become evident that cities cannot be understood solely as products of national culture; the city is profoundly entangled in the world system. Modern technology has transformed our notions of territory, space and nation. From labour migration to banking and corporate practice, social and economic forces operate increasingly at the transnational scale. The nature of the city in such a global context is changing. We have entered an era where transnational processes shape cities. Scholars have long recognised this to be the case for the planet's largest metropolitan centres (Hall, 1966), the global control centres of the world economy, anchored by hierarchies of corporate power and through the internationalisation of capital (Friedmann and Wolff, 1982; Ross and Trachte, 1983;

Friedmann, 1986). But now, as this paper asserts, transnational forces have an impact on more than just the largest metropolitan centres; increasingly they can be seen to shape regional systems of cities such as those along the US-Mexico border.

During the 1980s a dramatic paradigmatic shift occurred in urban studies, as scholars began to recognise that many urban processes, ranging from economic base to design, are inextricably tied to extra-national economic, political and social forces (King, 1990). Studies have focused not only on the city as a centre of global corporate power, but also on the increasing global influence of national governments, and hence of their largest cities (Thrift, 1986; King, 1990). Equally, there has been an outpouring of interest in identifying the way in which cities serve as

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repositories for changing conditions of global labour supply and demand, through a 'new international division of labour' (Sassen Koob, 1988). Attention has turned, as well, toward the global ecological impacts of cities, or what one observer calls "the global responsibility of an industrial city" (Arras, 1989).

Scholars have also become interested in the regional dimensions of the 'global city' phenomenon (Henderson and Castells, 1987). For example, emerging transnational linkages in foreign investment, real estate speculation and international labour migration link cities and nations of the Pacific Rim region (Smith, 1989). The importance of global corporate strategies regarding manufacturing has been documented in research on export processing zones in Hong Kong (Henderson, 1989), or along the US-Mexico border (Fernandez Kelly, 1983; Sklair, 1989). Many scholars of global cities or "mega-cities" (Dogan and Kasarda, 1988a) find it significant that the movement of population toward large cities is occurring mainly in Third World nations: demographic projections for the world's largest cities show that by the year 2010, nearly three-quarters of the 511 cities with populations exceeding 1m will be located in the Third World (Dogan and Kasarda, 1988b). Third World under-development and urbanisation can be linked directly to the larger social and economic processes of the world economy (Timberlake, 1985).

One important regional phenomenon in the era of global cities is the movement of population, industry and capital to international boundary regions, and the subsequent evolution of transnational urbanised areas along some national borders. While many of the world's international boundary zones still remain sparsely populated, in some places—notably Western Europe and the US-Mexico border region—rapid boundary urbanisation has occurred in the second half of the twentieth century (Hansen, 1986; Herzog, 1990). The emergence of urban centres along international

boundaries reflects a pattern of gradual integration of border territory into the financial and economic circuitry of the global political-economic system. Where once boundaries were seen as marginal spaces in a world that was largely organised around centrist nation-states, the late twentieth century has seen the old system fade away: in the new global territorial order, boundary regions may become centres of production and urban life. Thus, a new form of city has evolved: the international border—or transfrontier—metropolis.

In both Western Europe and US-Mexico border regions, medium-scale (above 100 000 population) and large-scale (above 1m population) cities have grown along the international boundary. Typically, the transfrontier metropolis has evolved as two separate urban settlements on either side of an international border. But gradually these settlements have become integrated into functionally unified spaces, suggesting why the term 'transfrontier metropolis' may be the most appropriate way to describe urbanised border areas in the next century. In the transfrontier metropolis there is socio-economic and cultural exchange between settlements on either side of the border. More importantly, some cultural elements, such as language and architecture, are not only exchanged, but permanently transferred across the border.

If global cities are an outcome of late twentieth century changes in the political, economic and territorial order, then the transfrontier metropolis is a distinct subcategory of the larger phenomenon. Transfrontier urban zones are specialised regions created by transnational economic and social forces. The US-Mexico transfrontier metropolis is a by-product of First World-Third World economic integration, expressed within the physical space of a city. While US-Mexico border cities are not large enough in scale to fit Friedmann's definition of world cities, they do possess two of the properties considered crucial: first, a growing concentration of international capital; and second, large volumes of

international migrant workers. The increasing concentration of international capital in urbanised border areas is mainly a result of transnational corporate investments in export processing zone infrastructure (Grunwald and Flamm, 1985; Sklair, 1989), but can also be traced to escalating volumes of cross-border commerce, both legal and illegal. Border zones have, for some time, been the destination of large numbers of migrant workers, both domestic and international. In Western Europe, more than 250 000 workers cross the border every day to work in the more developed nations (Ricq, 1981). Along the US-Mexico border, some 160 000 Mexican workers commute to jobs in the US (Aramburo, 1988); more significantly, vast numbers of Mexican workers have long utilised the border zone as a jumping-off point into the US, or as a home base for return by deportation, medical emergency or other hardship (Martinez, 1977). The 'buffer function' of the US-Mexico border zone partially explains the phenomenal urban growth patterns of the last four decades. Yet the US-Mexico border has been more than simply a passageway for Mexican migrants to the US; it has also become a medium for economic exchange between the two nations, as capital, industry and service activities have begun to concentrate there.

This paper examines the new US-Mexico transfrontier metropolis as a specialised regional product of the era of global cities. The transfrontier metropolis owes its formation to the changing role of international boundaries, and this occupies the discussion in the first section of the paper. The remainder of the essay examines two transnational dimensions of the US-Mexico boundary metropolis: the social circuitry of border commuter workers, and the spatial-economic ties of assembly plant infrastructure. The selection of these examples of cross-border circuitry is deliberate, as they reflect the two most important transnational forces responsible for border zone urbanisation.

### International Boundaries and Urban Space

One important global territorial change that has emerged in the second half of the twentieth century has been the transformation of international boundaries. In the nineteenth century, most modern nation-state boundaries were created through diplomatic negotiation and international law. The sovereignty of nation-states was considered a sacred right of nationhood, and was to be guarded jealously. Sovereignty represented the highest order of political evolution. Nations proudly fortified and guarded their land borders. Boundaries, as one scholar would come to say, were like the epidermis of plants or animals—a protective shield against unwanted incursions, yet permeable to beneficial inputs (Ratzel, 1897).

In the first half of the twentieth century, scholars viewed boundary space mainly as an ideal location for military fortifications and other defensive facilities (Boggs, 1940; Spykman, 1942). But in the decades following the Second World War, economic, technological and political changes led to the "demise of the shelter function" of boundaries (Gottman, 1973). The most important change was the development of new military technologies, such as air power and rocketry, which shifted the scale of military confrontation between nation-states from one that was land-based to one that was air- and sea-based. Other developments included satellite communications, air and rapid transportation technology, transnational banking and trade, and international labour migration.

Such developments made the world more compact. From 1950 to 1980, the expanding importance of the world economy severely eclipsed the significance of nation-states as the primary economic units of the world system. Increasingly, production, markets and banking and credit systems functioned on a transnational scale. For international border regions, a significant shift in the world economy occurred, whereby labour costs, not trans-

port costs, became the overriding concern in industrial location decisions (Storper and Walker, 1983). A new global pattern of industrial investment was to unfold, with the creation of 'export processing zones' in Third World countries (Grunwald and Flamm, 1985; Sklair, 1989).

The changing significance of international boundaries must, therefore, be understood as part of a larger process of change in the world system, but, more importantly, as a specific kind of territorial result of that global spatial reorganisation. The late twentieth century marked the beginning of a new era in the use of territory located along national boundaries. Boundaries would no longer be mere passage zones between nation-states. The era of land-based war had passed, and in the most stable parts of the world nations could now develop the full potential of border territories.

Western Europe was the first world region where these changes manifested themselves. Because ethnic cultures had long occupied territories on either side of the man-made political boundaries, as the Second World War faded into the background in the decades of the 1950s and 1960s, frontier towns began to grow, and people returned to utilise resources in the border regions. By 1980, there were sizeable urban agglomerations along the Swiss, French, German, Belgian, Dutch and Italian borders. Some of the largest cities included the Basel, Switzerland, agglomeration, which encompassed nearly 1m residents spread over Swiss, French and German borders; the Maastricht-Aachen-Liege triangle of over 800 000 residents along the Netherlands-Germany-Belgium border; Lille, France (population 935 000), on the border with Belgium; and Geneva, Switzerland (335 000 population), on the Swiss-French border (Mayne, 1986; Munro, 1988). These towns not only housed large populations—there was a growing movement in Western Europe to formalise programmes of transfrontier co-operation to generate greater levels of

economic development in the frontier region, and to mutually manage transport infrastructure, pollution control, toxic waste regulation and other regional policy matters (Hansen, 1983). There was considerable transfrontier interaction in these urbanised border zones, particularly in the areas of transborder labour exchange (Ricq, 1981), transport development, environmental co-operation, industrialisation and trade (Briner, 1986; Hansen, 1986).

These changes were recognised by social scientists. Before the Second World War, border research had either emphasised the unstable nature of boundary zones, or looked at cases of boundary redrawing. Boundary studies focused mainly on military and national security questions or analysed power relations between nation-states (Spykman, 1942; Minghi, 1963; Prescott, 1965). Researchers wrote about the obstructive qualities of boundaries (Boggs, 1940), particularly with regard to economic activities such as marketing (Losch, 1954; Christaller, 1966).

But after the Second World War, boundary research quickly responded to the changing social functions of borders (Minghi, 1963, p. 413). Boundaries became more stable, and the inclusion of border territory in the daily social and economic circuitry of national life could be contemplated. European scholars were among the first to recognise this. They envisioned a more integrated system of nation-states, where political borders would become more permeable, allowing for exchanges of workers, consumers, products and capital (Anderson, 1982). Luhman perhaps echoed the emerging popular view when he wrote: "Territorial borders are quite meaningless for science, and economic interdependence crosses political borders not occasionally, but as a general rule" (Luhman, 1982, p. 242).

#### **The Transfrontier Metropolis on the US-Mexico Border**

While Western European boundaries offer

one example of the changing use of territorial space along international boundaries, the US-Mexico border region provides a setting in which similar processes are evident. During the period 1950-80, this region experienced profound demographic change. Following two decades of sustained urban expansion, by the 1970s seven US metropolitan areas along the border had achieved growth rates ranging from three to five times the national rate of 11 per cent; in Mexico, border city populations grew at 10-year rates of between 67 and 96 per cent, far exceeding the national average for Mexico of 37 per cent (Hansen, 1984, pp. 140-141). This growth pattern continued in the 1980s, though at a more moderate pace. By 1990, three of Mexico's 10 largest cities were located on the northern border with the US.

US-Mexico border urbanisation is highlighted by the polarities between the First and Third World cultures that meet there. The differences in levels of economic development are obviously enormous. Equally, cultural contrasts and a history of borderlands conflict (Fernandez, 1977) make the boundary corridor a potentially explosive international zone. Obviously, the philosophy of European integration that led to the formation of the European Economic Community still does not have a counterpart in North America.

As in Western Europe, a pattern of evolving social and economic interdependence on either side of the US-Mexico border made possible the formation of the late twentieth century transfrontier metropolis. The boundary region's transformation was a logical outcome of earlier conditions. For more than a century, a steady migration stream fed the population of northern Mexican border cities. Mexican immigrants established permanent communities north of the border. The interconnections between these two social worlds make up a unique regional "social system" (Alvarez, 1984). This system has fused family structures, culture, social interaction and factors of production over

time and across the boundary. One of its most important by-products has been the bi-cultural, transfrontier metropolises that have evolved along the border.

The growth of paired urban centres, or 'twin cities', at the US-Mexico border is an outcome of the century-old social system that evolved in the borderlands. The cross-border interconnection between pairs of settlements was recognised early in the evolutionary history of the modern border zone (McWilliams, 1968). A number of studies of border cities have alluded to the importance of transborder social and economic processes in the creation of transfrontier urban structures. Price's study of Tijuana (Price, 1973) spoke of 'international symbiosis', or the interdependence of two or more cultural systems. Similar arguments have been made in studies of Ciudad Juarez (Martinez, 1978), El Paso (Garcia, 1981) and Tijuana (Piner, 1985). But scholars have grappled with the meaning of symbiotic relations between border city complexes such as Brownsville-Matamoros (Gilderleeve, 1978), Laredo-Nuevo Laredo (Sloan and West, 1976, 1977), El Paso-Ciudad Juarez (D'Antonio and Form, 1965; McConville, 1965) and San Diego-Tijuana (Duemling, 1981; Herzog, 1985, 1990), mainly because relations between a US and Mexican city are complicated by socio-economic inequality and cultural differences.

The new transfrontier metropolis has a unique spatial and economic structure. Two traditional settlements have gradually fused into a transnational settlement space that is functionally unified by common daily activity systems (work, shopping, school, social trips), shared natural resources and environmental features (air, water, flora, fauna, etc.) and product and labour markets that overlap the political boundary. While cities retain the elements of their nationally derived ecological structure in terms of density, social geography, road configurations and physical design, they also display increasing patterns of

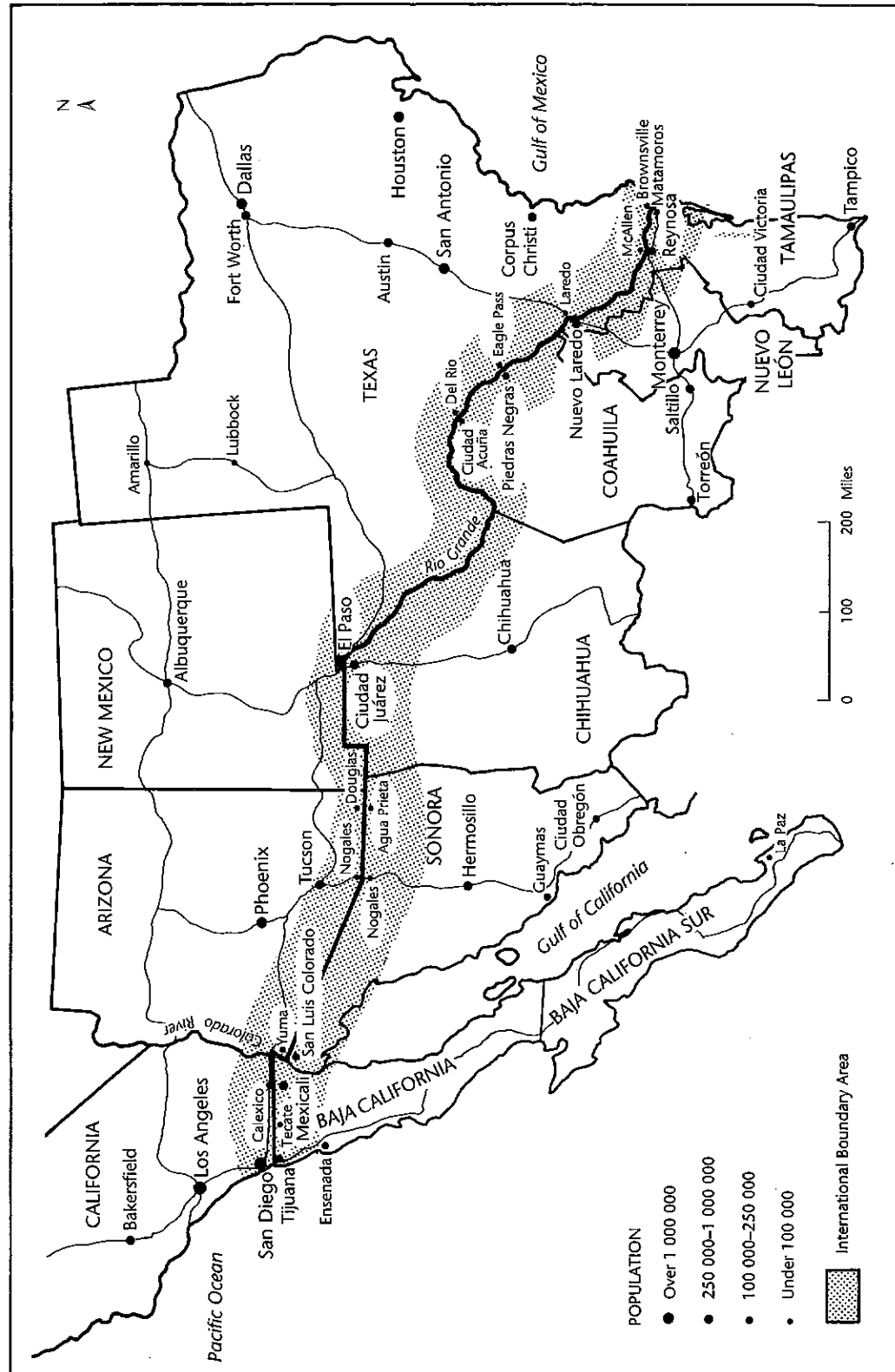


Figure 1. The US-Mexico border region.

connectivity across the border. For example, networks of activity systems integrate settlements on either side of the border. These include: legal and illegal daily labour migration from residential origins in Mexico to employment locations on the US side of the border; Mexican shopping trips to US commercial sites; US shopping trips to Mexican commercial locations; US consumer trips to Mexican entertainment, tourist and other service locations; social, family and other recreational trips north and south of the border; and Mexican children attending school north of the border. These activity systems form part of a human spatial organisation that transcends the political boundary.

There is also a transboundary natural ecosystem, a simple outcome of overlapping physiogeographic phenomena: air sheds, hydrological systems and land formations. Both the transboundary flow of water and air, and the bilateral arrangement of land uses, impose a unifying effect on these settlements. Air and water pollution, as well as water supply management, are planning issues that affect both sides of the boundary, and need to be resolved mutually (Mumme, 1980; Bath, 1982; Bath and Applegate, 1982). The transborder environmental consequences of assembly plant location at the border have become a growing concern (Sanchez, 1989).

Functional linkages between US and Mexican border cities emerge as an outgrowth of economic interdependence, and are strengthened through environmental, social, cultural and historic ties. These linkages, simply put, involve an overlapping across the political boundary of the built environments of twin cities, and an evolving interconnection of infrastructure on either side of the border. As urbanisation continues, there is a greater tendency for freeways, sewer systems, mass transit projects, industrial developments and other man-made facilities to become integrated (Herzog, 1990). In recent studies of interdependence between US and Mexican

settlements along the border, many scholars recognise that this integration is growing stronger (Hansen, 1981; Herzog, 1985). The international boundary has indeed become a highly permeable membrane between two linked settlements (House, 1982). Economic and social interaction are inevitable in a region where border cities share resources and cultural ties. Below, two important examples of cross-boundary connectivity in the new transfrontier metropolis are reviewed: social circuitry, as measured by the commuter worker phenomenon, and economic circuitry, illustrated by industrial development linkages across the border.

### **Transboundary Urban Social Circuitry: The Commuter Worker Phenomenon**

The international border commuter represents one layer in the social structure of the new transfrontier metropolis. Border commuters are a hybrid form of migrant worker. One must acknowledge that the social circuitry of the transborder metropolis is partially derived from the larger context of international immigration. Theories of international migration, be they neoclassical economic or neo-Marxian in origin, have tended to view immigration as the transfer of labour power within an acultural, placeless context. Yet, migrants move across real geographic settings; along borders they are a distinct part of bi-cultural urban social formation.

Unlike international migrants, border commuters—workers who travel each day from a place of residence in Mexico to a place of work in the US—do not leave their country of origin, with or without their families, to live and work in a foreign country. They travel to work each day much like other intra-urban commuters, yet their journey to work involves the crossing of an international boundary line. This distinguishes them from national urban commuters.

The Mexican commuter worker was essentially born in the period following the

1924 Immigration Act in the US. The early quota system organised in 1924 established that the number of immigrants from a given country permitted to enter the US in any year could only be equivalent to 3 per cent of the total number of foreigners resident in the US from that country in 1910. The law had an immediate impact on legal immigration into the US. Total legal immigration decreased from 707 000 in 1924 to only 294 000 a year later (Calavita, 1981, p. 363).

The quotas created by these laws did not apply to immigrants from the Western hemisphere; thus, Mexican, Canadian or other alien immigrants entering from Mexico or Canada could cross the border into the US, by obtaining a visa which classified them as 'temporary visitors'. This created an enormous loophole by which foreign workers from quota-bound countries could enter the US for employment (LaBrucherie, 1969). In 1927, under pressure from the American Federation of Labor, the US Bureau of Immigration (now the Immigration and Naturalization Service (INS)) passed general order 86, which redefined temporary visitors, so that quota-country aliens who entered daily as border crossers would be subject, at their first entry, to quota limitations applicable to their native countries. Once those quotas were filled, no more temporary visitors could cross the border. This order did not affect non-quota countries like Mexico and Canada, but it did institutionalise the creation of a class of 'commuter workers' who had no intention of living in the US, but were granted the same legal status as alien immigrants residing in the US (LaBrucherie, 1969, p. 1753). This order was challenged, but unanimously upheld by the Supreme Court in 1929. The 1929 case established that commuter workers would be defined legally as immigrants who had been granted permanent residence in the US. Each time they crossed the border to work in the US, the immigrants were considered to be "returning from a temporary visit abroad". Since the commuter

workers did not actually live in the US, under existing law they might lose their immigration privileges if no domicile was established, but the rules for commuters reinterpreted the intent of the law, and allowed that the commuters' jobs in the US could be a substitute for domicile (LaBrucherie, 1969, p. 1754).

During the 1930s, restrictions were placed on the entry of Mexican workers into the US because of the depressed US economy. But the infrastructure that had created the commuter worker phenomenon remained. Indeed, the *bracero* programme, established in the 1940s to bring Mexican labour into the US to work in food production and other labour-poor sectors created by the Second World War, resurrected the cross-border legal flows of Mexican labour. Many of the *bracero* workers of the 1940s and 1950s became part of the expanding population that chose to remain in cities along the US-Mexico border.

After the Second World War, the Immigration and Nationality Act of 1952 continued the policy of regarding Mexican commuters as returning immigrants. Various court cases in the 1960s tested the legality of Mexican commuters' immigration status. In one, the 1963 Texas State American Federation of Labor-Congress of Industrial Organizations v. Kennedy, the INS re-examined the legal question of whether commuters needed to establish a residence in the US, and decided that they did not— "lawful admission for permanent residence" was a status gained by having been accorded the "privilege" of residing in the US. Whether that privilege was realised did not matter, concluded the INS. In general, the INS continues to operate under this philosophy today. The main legal restriction on commuter workers is that they are not permitted to cross into the US as strike-breakers. They also must not be out of work for more than six months, although this rule is rarely enforced (North, 1970).

In the 1960s, a new quota system was



conceived, in which the quantity of aliens permitted into the US was calculated on the basis of skills, class and education. In 1965, the US Congress attached an amendment to the Immigration and Nationality Act of 1952. The new amendment imposed a ceiling on immigration from the Western hemisphere of 120 000. This went into effect on 1 July 1968. At about the same time, there were forces in the US seeking to eliminate the Mexican commuter workers' status. Organised labour and certain Mexican American groups wanted tighter border controls. An amendment to the 1965 Immigration Act that would only allow commuter workers to enter the US every six months upon certification of a need for their labour was defeated. In 1968, the Select Commission on Western Hemisphere Immigration recommended the termination of the commuter status of Green Card holders, and the creation of a new form of border crossing authorisation for non-citizens residing outside the US. These recommendations were never acted upon, despite the fact that several studies suggested that border commuters may reduce wages on the US side of the border, and create unemployment for US labourers (Jones, 1969; North, 1970). This has led observers to believe that US policy serves the interests of employers, while skirting the letter of the law (Greene, 1972).

The commuter worker continues to be a vital part of the transborder social system, and recent social science research reports corroborate this (Acuna Gonzalez, 1988). In the nine largest metropolitan areas along the US-Mexico border, according to one estimate (Aramburo, 1987, 1988), nearly 160 000 Mexican workers from the largest Mexican border cities commute to jobs on the US side of the border each day (see Table 1). It would not be unrealistic to speculate that another 100 000 Mexicans commute illegally to jobs in the US, meaning that every day about 250 000 Mexicans participate in an 'international journey to work' within the US-Mexico transfrontier metropolis. There do not seem to be any

indications that either the US or Mexican governments will do anything to diminish these flows. The most recent US immigration legislation, the 1986 Immigration Reform and Control Act (IRCA) took no steps to impede the border commuter worker phenomenon (US House of Representatives, Committee on the Judiciary, 1986). In fact, it may have increased the flow of border crossers by creating two new legal forms of border workers: Special Agricultural Workers (SAW) and Replenishment Agricultural Workers (RAW). The SAW programme offered legal immigrant status to any alien who could establish that he worked in agriculture in the US for more than 90 days between May 1985 and May 1986. Over 500 000 Mexican workers may have qualified. The RAW programme will import Mexican citizens annually to work for 3 years in agriculture; they can then apply for permanent resident status (Calavita, 1989, p. 163). While these programmes are theoretically available to all foreigners, they will primarily affect Mexican nationals (North and Portz, 1988).

#### **Transnational Economic Circuitry: Assembly Plants and US-Mexico Border Urban Space**

A second important dimension of the new US-Mexico transfrontier metropolis is that settlements on either side of the international boundary are joined increasingly in a variety of transborder economic ventures. In general, economic growth has been the main catalyst for the rapid urbanisation of the boundary region. Among the important new economic activities sprouting in the US-Mexico border region, perhaps the most significant has been the emergence of the *maquiladora*, or assembly plant industry, part of the worldwide phenomenon of 'global factories' or co-production relationships between multi-national corporations and cheap labour regions of the world.

The appearance of assembly plant operations along the US-Mexico border can be

**Table 1.** Estimated number of Mexicans commuting to work in the US, by municipality, 1970 and 1980

Mexican municipality	Number of Mexican commuters	
	1970	1980
Tijuana	11 697	28 351
Mexicali	8 979	27 968
San Luis Colorado	3 616	12 340
Nogales	1 388	5 140
Ciudad Juarez	13 493	50 454
Piedras Negras	2 089	11 211
Nuevo Laredo	3 456	10 553
Reynosa	1 249	4 496
Matamoros	2 430	8 570
Total	48 209	159 083

Source: Aramburo (1988).

traced to the early 1960s, which saw the beginning of a global transformation in the organisation of production. Changing technologies in manufacturing led to the reorganisation of the production process into various stages. Industrial entrepreneurs saw the strategic value of isolating the labour-intensive operations within the overall manufacturing process (Grunwald and Flamm, 1985). This approach became even more important as new high technology industries began to dominate the world production system. For example, the electronics industry that emerged during this era could be divided into five stages: research and development, component production, assembly, final products and distribution (Clement and Jenner, 1987). Corporations realised that the assembly phase of production was labour-intensive, and that it might be possible to lower production costs by seeking out cheap labour locations in foreign countries.

Thus, a wave of investment by multinational industries began in the early 1960s, mainly from the US, in 'offshore' production facilities in Puerto Rico, Korea, Taiwan, the Philippines and Singapore. Despite the uncertainties associated with

political instability in some of these nations, US firms believed that cheap labour sources might keep them competitive with the rest of the world in certain product markets (House, 1982). Two US Tariff Code provisions—806.30 and 807.00—were established through the Tariff Classification Act of 1962 to allow for the duty-free entry of North American components assembled outside US boundaries. US firms would only pay tariffs on the 'value added' to their assembled product.

In 1965, recognising that US firms were relocating labour-intensive operations overseas, the Mexican government established the Border Industrialization Programme (BIP), a policy initiative aimed at attracting US assembly plant operations to Mexico. The Mexican law allowed duty-free import of all necessary machinery, equipment and raw materials, as well as components needed to engage in 'offshore' production. All products had to be exported from Mexico, and 90 per cent of the labour force had to be Mexican nationals. There were also provisions concerning minimum wages and conditions of work. Thus began the *maquiladora* programme, the title derived from the Spanish term *maquila* which traditionally referred to the portion of flour retained by the miller as payment for grinding a client's grain (House, 1982, p. 216).

Between 1969 and 1983, the *maquiladora* programme began to dominate the overseas location decisions of US firms. Whereas, in the early 1960s, Hong Kong attracted five times as many offshore facilities as Mexico, and Taiwan about the same number, by 1983 Mexico exported more than 20 times the 'value added' in duty-free components than Hong Kong, and more than twice as much as its nearest competitor, Malaysia. By the early 1980s the assembly plant programme was earning about US\$500m in annual foreign exchange for Mexico (Grunwald and Flamm, 1985, p. 143).

Of the nearly 1500 foreign assembly plants built in Mexico since the mid-1960s,

nearly 90 per cent are located along the northern border adjacent to the US. Clearly, the border location is valued by US interests. Here, they are able to take advantage of Mexico's cheap labour costs, but are also strategically situated within easy reach of US highways, airports and banking and communication facilities. The interest in locating near the border can be linked to early use of the term 'twin plants' to describe the co-production system that was envisioned for assembly plants in the border zone. The idea was that a capital-intensive facility would locate north of the border, while its counterpart, a labour-intensive plant, would locate in the Mexican border city. Thus, a symbiotic relationship was envisioned for *maquiladora* complexes locating along the border. The US plant would produce the inputs to be assembled across the border in Mexico. The finished products would then be shipped back to the US side where distribution would take place. It was assumed that both countries would benefit from this process, and that there would be a natural transborder economic exchange process that would strengthen the border economy. Another attraction of the border location would be that assembly plant executives could work in Mexico, but reside in the US (House, 1982; Clement and Jenner, 1987).

We can postulate that there is a direct relationship between the arrival of thousands of *maquiladoras* and the formation of the transfrontier metropolis. Assembly plants generate long-term linkages that become embedded in transfrontier urban space. It has been shown, for example, that in one Mexican border city there is a relationship between foreign investment in industrial development and changing residential ecological structure (Christopher, 1983).

It is possible to describe the linkages created by the assembly plant industry in a typical transfrontier metropolis. One excellent example is found in the case of the Tijuana-San Diego region, the largest US-Mexico transfrontier metropolis. In

Tijuana, *maquiladoras* have become one of the centrepieces of the economy over the last two decades. By 1985, the twin plant programme accounted for nearly 200 factories and 25 697 jobs (Clement and Jenner, 1987). The manufacturing sector employed slightly more than one-third of the city's total labour force; most of this employment was in assembly work.

The assembly plant infrastructure in Tijuana displays transnational linkages to both San Diego and southern California more generally. As Table 2 shows, nearly three-quarters of all assembly plants in Tijuana were territorially connected with a companion facility either in San Diego (43.1 per cent of all plants) or in southern California (31.4 per cent). The distinction between parent plants and staging plants reflects the size and importance of the *maquila* linkage across the border. Parent plants, of course, suggest a larger scale of operations on the US side, perhaps even the headquarters or main operating centre of the assembly plant in Tijuana. Staging plants involve more modest operations that include management, distribution and information processing. Instead of forming direct subsidiary companies in Mexico, some US firms sometimes either subcontract to Mexican firms to carry out the assembly work, or form temporary arrangements called 'shelter plans' in which Mexican companies perform assembly work until US firms are ready to establish their own subsidiary. Mexican subcontractor firms tend to link up with staging plants on the US side of the border.

The co-production linkages in the Tijuana-southern California region can also be disaggregated by product, as Table 3 illustrates. Here we see that the *maquiladoras* that produce electronic goods or other industrial commodities, such as furniture, lamps, medical supplies and sports equipment, are linked with US firms in San Diego. Assembly plants in the electronics and apparel categories are linked with US firms in Los Angeles.

There is further evidence of transna-

**Table 2.** Location of US-based staging plants and parent plants for *maquiladoras* in Tijuana

	San Diego	Southern California	Rest of California	Rest of US	Foreign
Staging plant/ distribution office	30	2	—	—	—
Parent plant	58	62	11	38	3
Total	88	64	11	38	3
Percentage	43.1	31.4	5.4	18.6	1.5

Source: Mexico Communications (1986).

**Table 3.** Tijuana: *maquiladora* attributes by location of parent firms

	San Diego	Southern California	Rest of California	Rest of US	Foreign
Total firms	88	64	11	38	3
Product categories <sup>a</sup>					
Electronic	22	18	3	11	2
Other manufacturing	27	10	3	11	—
Apparel	4	23	—	1	—
Wood/cork	9	6	1	1	—
Other metal	13	5	—	2	—
Machinery	2	—	—	2	1
Food	1	—	2	1	—
Leather/shoes	2	1	1	—	—

<sup>a</sup> Not all firms reported product categories.

Source: Mexico Communications (1986).

tional connectivity in the assembly plant location and production process. Plant locations on the northern Mexican border normally lead to the location of special facilities on the US side, to service the Mexican assembly plants. In one example—the State of California—these kinds of facilities created 1274 jobs and US\$11.5m in lease rent expenditures in one year—1985 (Clement and Jenner, 1987, p. 71). In addition some *maquiladora* workers choose to live north of the border, and spend their income in the US. In fact, in the 1970s, it was estimated that 60–75 per cent of all wages earned along the border were spent in the US (Bustamante, 1975). Many *maquiladora* operating expenses occur north of the border—including supplies, services and hosting business visitors. In California, this figure

reached between US\$35m and US\$50m in 1985 (Clement and Jenner, 1987).

Despite the positive financial impacts *maquiladoras* impose on both sides of the border, there is concern about their long-term viability as a source of income. For one, *maquiladoras* have not really diversified economically—they are still dominated by electronics, apparel and small manufacturing. There are severe inequalities in the structure of production and management (Hiereaux, 1986). Large producers control too much of the overall employment generated. Women are the principal workers and are often exploited (Fernandez Kelly, 1983). There are few backward linkages to inputs coming from within Mexico, or forward linkages to markets in Mexico (Grunwald and Flamm, 1985; Sklair, 1989).

### Conclusion

The US-Mexico transfrontier metropolis has emerged as an important regional example of transnational urban growth, where global forces—immigration and transnational manufacturing—generate a common circuitry that allows urban structure to transcend international boundaries. It should be noted that the process of transfrontier urbanisation along the US-Mexico border has not been tension-free. For example, north of the border, urban interest groups have protested about the impact of Mexican workers on job opportunities for US citizens; Mexican residents worry about increasing ownership of property and business enterprises by US interests. The biggest source of tension is derived ultimately from the vast differences in levels of economic development between the US and Mexico. Communities on both sides of the border also blame their neighbours for allowing noxious elements (polluted air, sewage or disease) to spill across the border.

The implications of transfrontier urbanisation must now be confronted by scholars of urban planning and policy. Already there is concern along the heavily urbanised portions of the US-Mexico border zone over the problems of air pollution, toxic waste dumping, sewage and water contamination, traffic congestion and lack of services. Because problems spill across international borders, the authority to solve them is administratively transferred from local to national government. City planning in the US-Mexico transfrontier metropolis becomes a matter of foreign policy.

The elevation of city planning problems to the arena of foreign policy is a by-product of the era of global cities. This transfer of city planning authority out of the hands of local governments to federal agencies represents an emerging trend for urban scholars to unravel. On the US-Mexico border, when local planning problems are transferred onto the agenda of bilateral relations, they enter a much more

complex decision-making environment. Neither the US nor Mexico wishes to slow down the economic or social forces—production and migration—that feed border urban growth. Thus, the border circuitry described in this article is likely to stay, and it is obvious that border cities will continue to grow. Less obvious are the transnational planning solutions needed to manage that growth.

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