

Transport and Regional Development in Argentina: Structural Deficiencies and Patterns of Network Evolution

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Abstract

Structural deficiencies in the evolution of Argentina's transport network have played an important role in the creation and perpetuation of regional inequalities. In this paper, the relationship between transport network evolution and regional development is examined from the Inca period to the present, with a specific focus on Northwest Argentina. The paper argues that deficiencies in transport development have exacerbated the economic and social bifurcation of Argentina into an advanced coastal zone and an underdeveloped interior. The geo-historical analysis also suggests a general pattern of transport network evolution that may be widely applicable in Latin America.

Keywords: *Transport, regions, development, Northwest Argentina.*

INTRODUCTION

Since the 1950s, extraordinarily rapid and revolutionary advances in the infrastructure necessary to facilitate socioeconomic interaction have focused attention on the significance of transport in regional development. Improvements in accessibility and mobility have altered fundamentally the relative location of people and places and restructured the pattern of human-environment interaction, which itself is an important basis for social change. Transport also has been critical in the diffusion and acceptance of ideas and innovations (Leinbach and Chia 1989). Indeed, it is difficult to overestimate the importance of transport in the dynamics of regional development. Transport acts as a catalyst for interactions over space and through time among individuals and communities, and between them and the physical and cultural environment. The reciprocal relationship between transport, space, and time forms the basis for the widely accepted proposition that transport is a fundamental component of regional development (Voight 1984; Dugonjic 1989).

Myriad factors are involved in the complex relationship between transport and regional development. Both regions and transport systems are dynamic. Their genesis, growth and change are fully explicable only in the context of geographical and historical processes. Geohistorical analyses of transport development in Latin America, however, are few and far between. Yet transport has played a critical role in the evolution of Latin America's economies, societies, cultures, and urban hierarchies.

Failure to examine this role more fully has meant that contemporary approaches to addressing transport-related issues have continued to repeat past mistakes. This occurs because we possess more information about current problems than about the geohistorical processes that produced them. As a result, remedies are devised that treat the symptoms of a problem, not the root causes.

Argentina's recent embrace of democracy and free market economic policies has focused attention on the country's transport system. Attempts to strengthen trade links with surrounding countries have exposed severe weaknesses in the national transport network and highlighted the excessive dominance of the network by Buenos Aires, the national capital and primary metropolis. Attention also has focused on the socioeconomic plight of Argentina's poor northern provinces, long subordinated to Buenos Aires and poorly served by inter and intraregional transport facilities (GEICOS 1988; *Economist* 1992; Keeling 1992).

The objective of this paper is to shed light on the origins and consequences of transport network deficiencies in Argentina, with a specific focus on the Northwest region. An analysis of transport development from the Inca period to the present reveals four important elements: (1) dominant interregional trunk lines developed that focused on primary cities; (2) networks became bifurcated into coastal and interior components; (3) post-independence networks became isolated from the those of other countries; and (4) modern networks became characterized [end p. 25] by a lack of intra-regional and local connections. The analysis suggests that the root cause of Argentina's contemporary transport crisis lies, in part, in the historical inertia embedded in the spatial and temporal approaches to transport development. Argentina's geohistorical experience also suggests a general pattern of transport network evolution that may be more widely applicable in Latin America.

THE INCA PERIOD

An examination of Argentina's transport system revealed formal patterns of network evolution that date to the Inca period. The Inca empire flourished at its height for barely a century. Yet within this short time frame, the Inca built a road network of astounding proportions and laid the foundations for the spatial, temporal, and cultural patterns that would characterize northwest Argentina for centuries to come. Inca political organization of territory in the Northwest helped to define the region's

spatial limits. In turn, the boundaries of the Northwest and the influence of the Inca were determined by the extent of the road network. Inca roads drew the entire region north of the Uspallata Pass between Santiago and Ranchillos into the empire's expanding sphere of influence (Figure 1), and the roads facilitated the various economic, military, religious, and administrative processes at work in the empire. The Inca used to the roads to transform the Northwest, to define the region geographically, and to serve as an omnipresent symbol of Inca rule (Hyslop 1984).

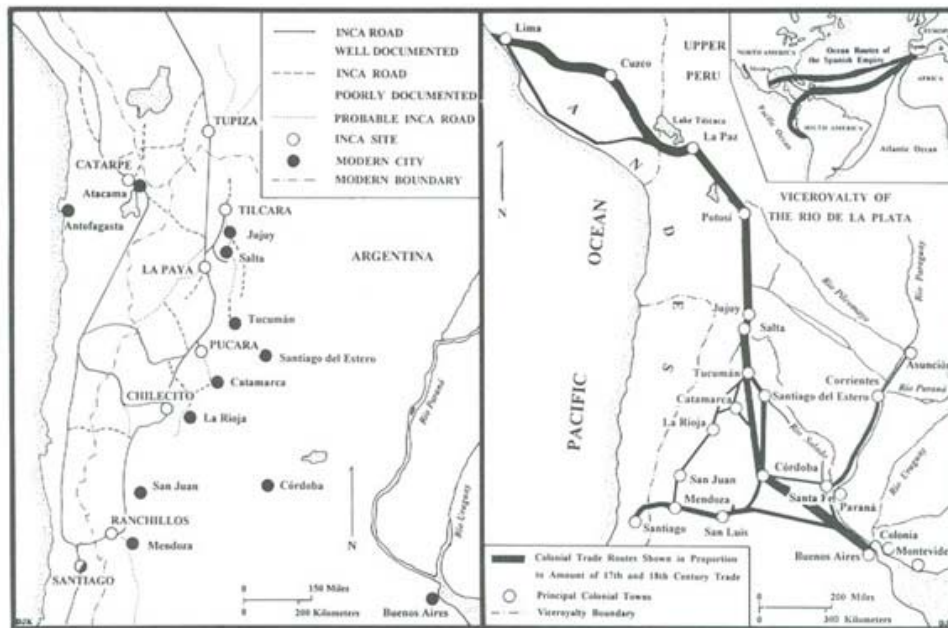


Figure 1. The Inca road network in Northwest Argentina. Source: After Levillier (1942) and Hyslop (1984).

Figure 2. Argentina's colonial transport network. Source: After Scobie (1971).

The Inca roads also created new space-time relationships between the indigenous groups of the Northwest and the Inca capital. Although the road network extended over a large area, it remained internally focused. Traffic flowed predominantly along major trunk lines to and from Cuzco, with little traffic occurring outside the ambit of Cuzco's control (Glave 1988). Moreover, the labor-tribute system of the Inca set the stage for the tributary institutions of the colonial era. These institutions promoted the emergence of a simple agropastoral system that impeded the development of the Northwest's [end p. 26] economy. The colonial economy grew around a forced labor system imposed on the region's indigenous peoples, with political power exercised by Lima, and socioeconomic power exerted by the silver mines of Potosí.

THE COLONIAL PERIOD

Preliminary explorations of northwest Argentina by the Spanish began in 1535. By 1600, the basic form and function of the colonial settlement pattern and transport network had been stabilized. Although the transport network built on pre-existing Inca lines of communication, by the early 1600s the Northwest's well-engineered and maintained Inca roads had given way to roads and paths that were little more than ruts in the ground (Glave 1988). During the Inca period, rather than follow easy gradients to avoid topographical obstacles, human foot traffic followed direct routes and often passed through extremely rugged terrain. The introduction of horses and mules by the Spanish required greater concern for the region's topography, and the use of wheeled vehicles necessitated longer routes with more gentle gradients.

Traffic on the network also underwent drastic restructuring. In contrast to the internally oriented movement of the Inca period, colonial traffic focused outward on the port cities and Spain. Silver and other precious metals flowed out of the region toward Europe, and people, goods, and information flowed inward toward the new settlements. A triangular road system developed that was shaped by, and helped to shape, trade between the growing towns. Four major routes linked the Northwest to Upper Peru via Jujuy, the Northwest to the fledgling port of Buenos Aires, Mendoza to Buenos Aires, and the Northwest to Mendoza via the eastern Andean slopes (Figure 2).

The evolving regional transport network influenced relationships between Northwest settlements, cities outside the region, and Europe. The Spanish crown, however, dictated the official supply route to and from Potosí. Concerns about the dangers of a long and difficult transshipment of bullion and goods through the deserted interior between the Northwest and the Atlantic, the long trans-Atlantic voyage, and the increasing power of merchants and government officials in Lima and the Caribbean all help

to explain what today seems to be a geographically illogical supply route via Lima, Guayaquil, Panama, and the Caribbean ports. Agricultural producers in the Northwest came to resent the Seville-Lima merchant monopoly on trade and the exorbitant prices charged for commodities in Potosí (Rodríguez 1956). Before long, a healthy and profitable contraband traffic in high-demand goods developed along the "back-door" route between the Atlantic coast, particularly Buenos Aires, and Potosí via the Northwest.

Transport in Argentina during the 17th and 18th centuries continued almost exclusively along the triangular network developed during the late 1500s. Increased conflict with indigenous groups and a lack of intraregional and local trade restricted development of new routes and ensured that the Northwest remained tied firmly to Upper Peru. Intraregional and local trade could not provide the same profit that could be earned from direct participation in the international and interregional economy. Moreover, following the 1776 establishment of the Viceroyalty of Río de la Plata, the dominant processes influencing interior development began to emanate from Buenos Aires and not from Potosí.¹ Economic expansion in the new Viceroyalty, along with rapid population growth in the coastal regions, forced dramatic changes in the flow patterns of people, goods, and information. The Lima-Buenos Aires trunk line still dominated the interior, but traffic flow changed from a focus on Potosí to a concentration on the Atlantic port. This occurred because the Spanish Crown legalized the role of Buenos Aires as a trading port and regional entrepot. Although *comercio libre* was intended to encourage direct trade with Spain, in reality inter-American and British commerce came to dominate the city's economy.

Political, economic, and geographic changes in Argentina between 1776 and 1886 proved crucial to the Northwest's subsequent development during the railroad era. The 1810 revolution, for example, transformed the political and geographic environment that shaped the Northwest's society and economy (Brown 1979). Lines of development pursued by the Pampa provinces ran contrary to the needs and interests of the Northwest. Independence separated the Northwest from areas with which it formed an integral part. The natural resources and geographic position of the Northwest argued for preservation of political and economic unity with contiguous areas. Yet the territories that were economically and culturally complementary to the Northwest remained outside the new Argentine Confederation after independence. Not only was the Northwest exposed to devastating competition from foreign and Pampas industries, the region also lost the markets in which European competition was least effective—northern Chile, Bolivia, and Peru. Political emancipation and unrestricted commerce with Europe, as well as the development of commercial farming and ranching on the Pampas, contributed to the decline of important Northwest manufacturing, the annihilation of trans-Bolivian commerce, and the contraction of intraregional and local trade (Rock 1985). Thus, the late colonial-early independence era can be characterized as a period of regional disintegration and restructuring. The transport network remained static, with few intraregional or local improvements, and with space-time relationships little changed from the early colonial era, and the cultural patterns formed during the Inca period and developed during the colonial era became embedded in the economic and political structures of the Northwest.

THE RAILROAD ERA

Between 1876 and 1948, the Pampas became the social, political, and economic powerhouse of Argentina. More than any other technological advance in the nineteenth century, railroads epitomized the crusade to incorporate European ideologies into Argentine development. Enthusiasm for the ability of railroads to expand frontiers, civilize populations, transform economies, and unite countries ran rampant (Alberdi 1960). Politicians, especially, were convinced that elimination of provincial isolation and insularity would promote national unification, which in turn would propel the economy of the country forward (De Clerq 1973). Yet during the railroad era, the Northwest became increasingly peripheral to the growing power of the Pampas, as railroad construction focused on the port cities and began to tie the Pampas more closely to the world economy (Figure 3). Buenos Aires and surrounding provinces became closer perceptually and practically to London and Paris than to the Northwest (Scobie 1971). Thus, although the railroad had reached all of the Northwest capitals by the early 1900s, most northwestern settlements remained isolated, connected by poor or non-existent roads and terminally slow overland travel to the railheads.



Figure 3. Argentina's railroad network, 1948.

Regional development in the Northwest during the railroad era failed to materialize. Visionary nineteenth-century dreams of the power of railroads, telegraph lines, and highways to civilize the interior, transform its economy, and bring region-wide social and political integration never were translated fully into reality. Railroads did not facilitate widespread advancement in either a geographical or social sense, nor did they build the institutional means whereby the local population could increase its production and income. As a result the regional economy became bifurcated. Railroads complemented elite dominance of land by favoring large producers and reinforcing the geographic isolation of the Northwest's rural economy. The landowner's world of cities, industry, import, and export relied on a backward, exploited rural population and thrived, whereas the local means of production [end p.28] remained small, technologically deprived, and poor. Northwest elites appropriated the profits of commercial agriculture stimulated by the railroad, but offered the community little in return. Yet railroads were but one factor, albeit an important one, at work in the Northwest's development. The conversion of the potential provided by the railroads depended to a great degree on the response by local forces to the new technology. Heralded as the Northwest's economic salvation, railroads could not negate the culturally embedded influences of a regressive social system, unjust land tenure, exploitive labor conditions, political corruption, usurious credit practices, and technological underdevelopment

The railroad development pattern helped to create a dendritic market system which encouraged socioeconomic polarization and an overreliance on export trade. The port cities of Buenos Aires, Rosario, and Bahia Blanca functioned as export-import points and centers of consumption. The Northwest provincial capitals, connected to the port cities by railroad, acted as collection points for exportable primary production and as distribution points for imported consumer goods. Absent the development stimuli of intraregional and local transport, a territorially dispersed hierarchy of market centers in the Northwest failed to evolve. The local settlements came to depend on the provincial capitals for both transport and a whole range of other social and economic facilities. Yet, the provincial capitals could offer only a geographically and socially limited range of goods, services, employment opportunities, and technological change. Continued rural isolation and the sugar monocrop that dominated the Northwest economy further restricted the growth of urban centers. The sugar industry relied heavily on seasonal labor, which caused acute social polarization throughout the region. Thus, seventy years after railroads arrived in the Northwest, and despite the economic development they facilitated, the majority of the region's population remained poor and isolated. Most Northwest residents lived a life almost one hundred years removed from the Pampas, with inequalities evident across a broad spectrum of regional society.

Federal government development priorities for the Northwest during the railroad era were to reach the provincial capitals, capture their industries, and bind the region irrevocably to the fortunes of Buenos Aires. The development of a transport network focused on the Pampas ultimately helped to restrict widespread social, political, and economic growth in the Northwest. By failing to take advantage of the socioeconomic interaction transport would have permitted with Bolivia, Chile, Paraguay and adjoining provinces, Argentina's government stymied any possible integrated or independent economic system from emerging in the Northwest and alienated many of the region's residents. The Northwest was condemned to future decades of a substandard quality of life with minimal access to the opportunities that could have set the region on a course parallel to the Pampas.

THE CONTEMPORARY PERIOD

Argentina's development priorities since 1948 have been driven by two major factors: the implementation of federal regional planning strategies between the 1950s and the 1980s that attempted to deconcentrate industrial and manufacturing activities, and the management of the transport sector, first through nationalization of the railroads and airlines, and recently through privatization policies. After nationalizing the railroads in 1948, the Argentine government made little headway in improving the country's transport system. In 1950, barely 8,000 of Argentina's 61,000 km of roads had any kind of surfacing, and most of this could be found in the Pampas. By 1955, total highway kilometers actually had declined. Many roads in the Northwest still were little more than the dirt tracks they had been centuries earlier. The fledgling airline network focused primarily on Buenos Aires and the provincial capitals, with few intraprovincial connections. The railroads suffered from poor track maintenance and ageing equipment. Moreover, the existence of three different gauges with costly interchange from one to another placed the railroads at a disadvantage vis-a-vis road transport. As the railroad system continued to deteriorate, abysmal service, featherbedding, and derailments became the norm. By 1960, annual railroad losses of about \$280 million comprised nearly 80 percent of the entire federal government deficit (*Review of the River Plate* 1961).

Between the 1950s and the 1970s, Argentine development strategists experimented with programs designed to develop river basins, to target problem regions, to colonize and settle [end p. 29] frontier regions, and to create and promote regional growth poles (Ackerman 1972; Morris 1981). Several plans focused on the possibilities for import-substitution industrialization in the Northwest based on the region's natural resources (República Argentina 1965, 1971). Yet the strategies set out in the plans had no empirical foundation, provided no guidelines for transforming the intraregional and local economy, and presented no plans to address deficiencies in the Northwest's transport network. Growth poles were designated in both Tucumán and the Salta-Güemes-Jujuy-San Pedro area, but successes were minimal. Aside from additional paved roads and improvements in the interregional bus network, the Northwest continued to suffer from intraregional and local transport deficiencies which hindered the ability of either the growth poles or the region to transmit benefits to the hinterland. A study of development processes in the Northwest by a group representing the Northwest provinces criticized the federal government's growth pole strategies (NOA General 1975). The group found that transport improvements during the 1960s and 1970s had served only to strengthen Buenos Aires' hold over the Northwest's economy and to draw the region closer to the capital. At the same time, the Northwest had become increasingly isolated from areas such as the Northeast and Bolivia, with which it was trying to develop socioeconomic ties.

Table 1. Traffic flows by transport mode, 1970-1990.

In Millions of Passenger-Kilometers					
Mode	1970	1975	1980	1985	1990 ^a
Air	988	2,402	3,649	3,670	3,420
Cars/ Trucks	22,877	26,622	34,081	35,069	38,290
Omnibus	16,233	18,636	19,550	18,807	19,200
Railroad	4,737	6,890	4,177	4,943	4,581
Total	44,835	54,550	61,457	62,489	65,491

In Millions of Ton-Kilometers					
Mode	1970	1975	1980	1985	1990 ^a
Air	17	25	29	40	48
Water	29,858	20,396	24,580	16,415	17,180
Highway	46,296	49,915	60,290	60,404	66,909
Pipeline	9,844	16,812	22,635	26,662	23,887
Railroad	13,640	10,659	9,804	9,833	7,639
Total	99,655	97,807	117,338	113,354	115,663

Source: República Argentina (1991).
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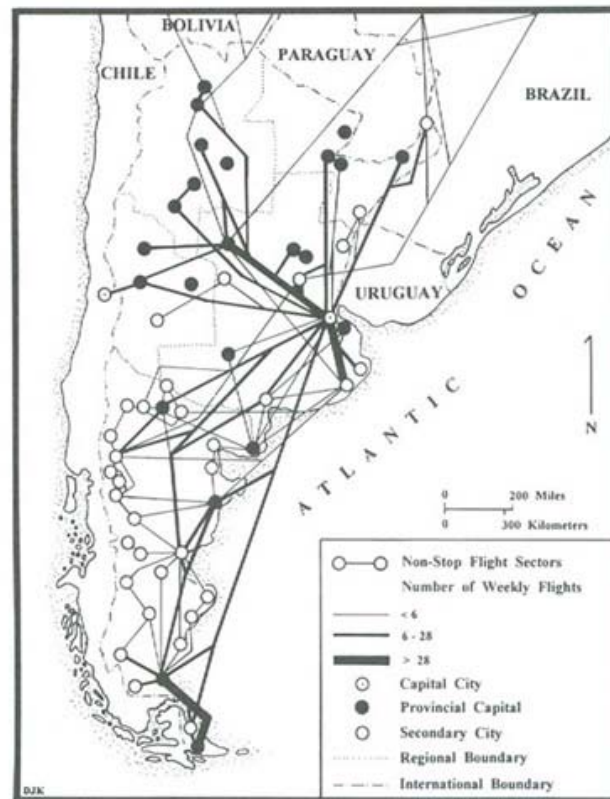


Figure 4. Argentina's domestic airline network, January 1993. Source: Official Airline Guide (1992).

Few significant changes in the Northwest's transport network have occurred in recent decades. Most of the paved road network was not completed until 1976, and several gaps still exist, especially in border areas and along east-west routes. The paved roads in existence are a far cry from the levels of quality and quantity needed to sustain regional development in rural areas. Many of the roads are narrow, only single-lane, and in extremely poor condition. Moreover, increased truck traffic, caused in part by

deterioration in railroad services, has accelerated the region's road maintenance problems. The railroad network has remained much as it was in 1948, with some lines abandoned and others without regular traffic. Both freight and passenger services have continued to lose substantial market share to the roads and airlines (Table 1). The growing airline network has followed the same communication pathways as the railroad. From its humble beginnings in the 1950s, the airline network (Figure 4) became essentially dendritic, with most flights originating and terminating in Buenos Aires and connecting provincial capitals [end p.30] and more important urban centers to the federal capital. Few interprovincial routes have been developed, and connections between the Northwest, Northeast, Cuyo, and Patagonian regions continue to be negligible; transfers in Buenos Aires are usually required. The inter-city bus network has become the most important means of inter- and intraprovincial passenger and small package movement; however, many of the patterns evident at the national level have been duplicated at the provincial level, with buses originating and terminating in provincial capitals. Few intraregional links exist between secondary and tertiary centers. Moreover, traffic flow in Argentina continues to show a distinct bias toward the Pampas and Buenos Aires (Figure 5), with transport links from the Northwest to Bolivia, Brazil, Chile, Paraguay, and Peru tenuous and erratic.

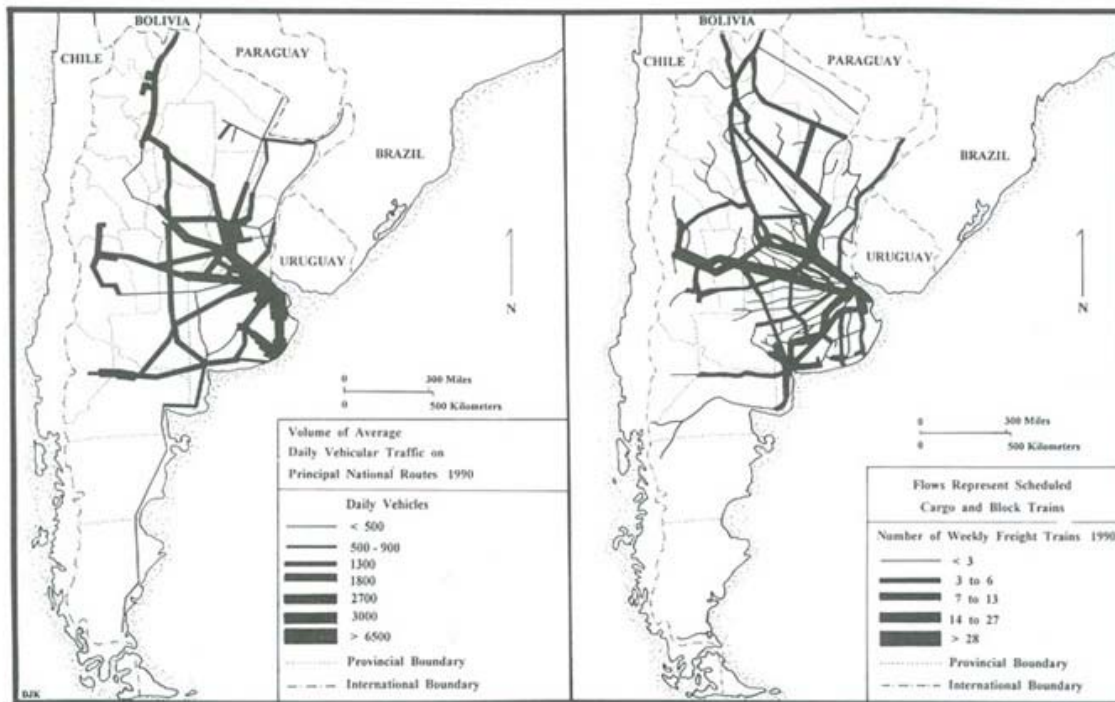


Figure 5. Argentina's road and rail traffic flow patterns, 1980. Source: República Argentina (1991).

This geohistorical analysis of Argentina's transport network evolution has shown that four critical and overlapping factors have worked to the disadvantage of regional development in the Northwest. First, transport policies failed to bring about a shift away from a pre-colonial and colonial transport network that favored interregional linkages along a single trunk line focused on Buenos Aires. Second, transport priorities during the railroad era encouraged the development of a network more concerned with moving export products to port than with fostering regional development. Third, Argentina's transport network failed to provide for intraregional and local connections that would foster interior regional development. Finally, transport policies failed to develop international and provincial links between the Northwest and adjacent regions with which the Northwest could have developed productive relationships. Thus, although many aspects of Argentina's transport and regional development policies achieved some measure of success in the short-term, over the long-term Argentina has become a bifurcated state, with marked differences in development between interior and coastal regions (República Argentina 1984, 1985). In particular, the concentration of political power and socioeconomic infrastructure in the Pampas and Buenos Aires areas estranged the interior regions and [end p. 31] contributed to the creation and perpetuation of strong regional inequalities. In addition, the focus of Argentina's dendritic transport network on the federal capital had a deleterious effect on interior development. It contributed to a deterioration in intraregional and local accessibility, and it promoted national economic and social disequilibrium (Roccatagliata 1986).

A FIVE-STAGE SEQUENCE OF TRANSPORT NETWORK EVOLUTION

Several well-known models have explored the relationships between transport and development and provided useful generalized viewpoints in the quest to understand the role of transport in regional growth and change (Taaffe et al. 1963; Hoyle 1973;

Rimmer 1977). However, because the models are confined broadly to the era of European colonialism and its immediate aftermath, they have not proved to be particularly useful in explaining transport network evolution in Latin America, especially during the post-independence era. The geohistorical experience of Argentina suggests a pattern of transport network evolution that may be more applicable to Latin America than the models developed in Africa and Southeast Asia (Figure 6).

During stage one of Argentina's transport network evolution, pre-contact networks were defined by the limits of control and interaction of particular culture groups within a region. The networks of major groups such as the Inca generally were internally oriented, with nearly all traffic moving from the periphery to the center. The geographic extent of political or economic relationships determined the level of interaction among nodes on the network. Stage two illustrates the situation in Argentina after European contact. Regional coastal and interior networks emerged that were linked by a single dominant trunk route focused on two central points—the mines of Potosí and the port of Buenos Aires. Links between these two networks strengthened with development of interregional trade routes, the exploitation of mineral and agricultural resources for export, and the creation of new urban settlements. The incorporation of a region into the global economy expanded links to coastal networks and reduced travel time between major cities. Stage three occurred after independence and involved the consolidation and interconnection of networks around primary cities. Argentina became a bifurcated state, with dense networks focusing on primary coastal cities and poor intraregional and local networks dominating the interior. As the coastal network expanded, interior links to adjacent countries and provinces were allowed to deteriorate.

A focus on regional inequalities and a move toward suprastate integration and cooperation encourages the development of interior networks and cross-boundary links. Contemporary Argentina is attempting to achieve stage four via privatization and restructuring strategies. Once stage four has been reached, the international, regional, and local integration of the network can proceed. In stage five, regions rather than primary cities become the focus of network development. The entire sequence is an ongoing, evolutionary process. It should not be viewed as a series of discrete historical points on a linear growth path.

The sequence suggested by Argentina's geohistorical experience is necessarily general in scope. Each state and region in Latin America has experienced variations on the central theme. Nonetheless, a general pattern does emerge that shows many post-independence networks were focused on primary cities, bifurcated into coastal and interior components, and isolated from the networks of other countries. The model could be useful in helping to shed light on transport network evolution in Latin America generally, and in providing a framework for analysis of Latin America's incorporation into the global economy.

CONCLUSION

In Argentina, as elsewhere in Latin America, there remains a desperate need for critical reevaluation of the real constraints to regional development and a new appreciation for the role of transport in loosening those constraints. Regional development must be recognized as symbiotically intertwined with cultural and environmental circumstances, not just with economic conditions. Transport improvements alone, however, cannot solve the problem of regional inequalities. They form just one component of the larger regional development process. Attention also must be paid to the provision of basic needs, the improvement of income levels, the availability of capital for entrepreneurial activities, and the strengthening of regional and local educational, social, and [end p. 32] political institutions. Furthermore, structural deficiencies in contemporary transport networks cannot be understood or addressed adequately without a clear appreciation of the geohistorical processes undergirding these deficiencies. An examination of national and regional transport networks within the framework of the sequence outlined above may help to shed light on the evolution of Latin America's contemporary transport problems.

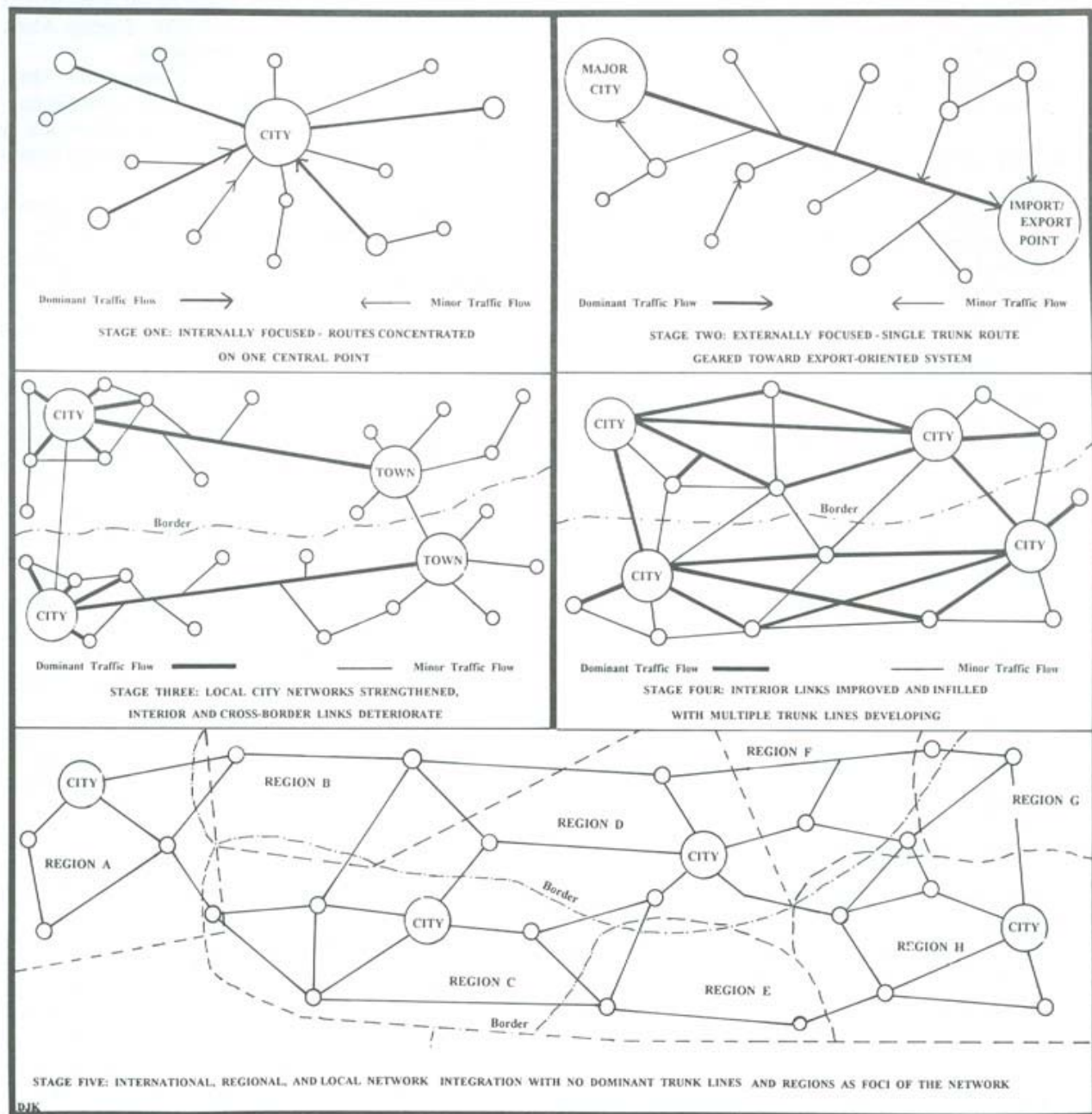


Figure 6. A Five-stage sequence of transport network evolution in Argentina.

NOTE

1. Although Chuquisaca functioned as the official administrative center for Upper Peru, and served as an important agricultural supplier for Potosí, its influence on the Northwest's regional relationships during the colonial era was negligible.

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Resumen

Las deficiencias estructurales de la evolución de la red de transporte argentina desempeñan un papel importante en la creación y la perpetuación de desigualdades regionales. El presente estudio examina la relación entre la evolución de la red de transporte y el desarrollo regional argentino desde la época incaica al presente, con énfasis específico al noroeste del país. El trabajo sostiene que las deficiencias del desarrollo de transporte intensificaron la bifurcación socioeconómica de Argentina, y que esta creó dos zonas: la costa avanzada y el interior subdesarrollado. También, el análisis geohistórico indica un modelo general de la evolución de la red de transporte que se podría aplicar mas extensamente a toda la gran región de América Latina. [end p. 34]