

# “HARD” INFRASTRUCTURE AND REGIONAL CONNECTIVITY IN LATIN AMERICA AND THE CARIBBEAN: DEVELOPMENTS IN THE REGION’S LAND-LOCKED ECONOMIES

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*Despite the substantial reduction in tariffs over the past few decades, the competitiveness of the Latin American and Caribbean region (LAC) has suffered due to a history of underinvestment in hard infrastructure. This paper specifically focuses on transport infrastructure, utilising statistics from the World Bank's most recent Logistics Performance Indicator (LPI 2010) and the World Economic Forum's Global Competitiveness Report (2009) to identify the infrastructural gap in the LAC region. Bolivia and Paraguay are flagged as particular areas of concern, with the quality of transport infrastructure significantly below the global and LAC average, particularly with regard to road and air infrastructure. Whilst efforts are being made to improve the situation (such as the upgrading of Encarnación trading hub in Paraguay), enhanced regional connectivity will require not just more substantive infrastructure spend than at present, but also the assignation of funds to ensure the maintenance of existing infrastructure.*

## INTRODUCTION

In 1994, Gert Rosenthal (then Executive Secretary of ECLAC) highlighted the critical role that infrastructure could play in the developmental process, acknowledging that: “every enterprise, no matter how efficient it may be, will see its competitive potential affected if communication with its clients and suppliers fails, if road, customs and port conditions and management add avoidable costs, and if the bureaucratic proceedings of banks and public services excessively delay foreign trade procedures”. Rosenthal's observation coincided with a renewed emphasis on integration in the Latin American and Caribbean (LAC) region. In Central America the Protocol of Guatemala (1993) heralded a new phase of integration for the isthmus' common market (Central American Common Market - CACM), and the following year Mexico joined with the US and Canada to create a trilateral trade bloc (North American Free Trade Agreement - NAFTA)

while the integrationist impulse in the Southern cone (South American Common Market - MERCOSUR) was reinforced with the signing of the Treaty of Ouro Preto.<sup>1</sup> That same year, December's Miami Summit also saw the genesis of a project that would subsequently metamorphose into proposals for a Free Trade Area of the Americas (FTAA).

A *sine qua non* of such integrationist schemes is the expansion of intra-regional trade. However, such expansion is critically dependent on the development of transport infrastructure -specifically its connectivity with the rest of the trading bloc- and associated trade-enhancing/facilitating measures. Yet, while tariffs across the region have tumbled from 40% or more

<sup>1</sup> In the Caribbean major change occurred in the decade after, as CARICOM evolved into the Caribbean Single Market and Economy (CSME) in 2006, an agglomeration of twelve regional nations.

in the 1980s to around 10% in 2008, intra-regional trade in LAC -where just 13% of total merchandise exports were directed to the region in 2007- lags sharply behind the levels recorded in other regional trading blocs (25% in ASEAN, 74% in the EU), a failing Guerrero *et al.* (2009, p. 4) ascribe to “their inability to cope with a globalisation process that is inherently transport-intensive and where supply chains are now being organised on a global scale”.

This inferior level of regional connectivity directs attention towards the sub-standard condition of the transport infrastructure<sup>2</sup> across LAC and highlights the need for investment. One reason for this infrastructural deficit can be traced to the austere neo-liberal fiscal policies introduced across much of the region following the debt crisis of the early 1980s, with public infrastructural investment tumbling from 3% of GDP in 1988 to just 1.6% of GDP a decade later (Mia *et al.*, 2007, p. 4). A deteriorating infrastructure base fed through into higher per unit transport costs and an accompanying reduction in LAC competitiveness in global markets (Calderón *et al.* 2003). The region spends almost double what the US does to import its goods, leading Moreira *et al.* (2008, p. 13) to propose that trade volumes and diversification would benefit immensely if transport costs were put “at the centre of the region’s trade agenda”. Thus, while the neo-liberal agenda successfully removed the tariff elephant from the regional living room, it was replaced by a new transportation elephant.

That is not to say that hard infrastructure spend has been wholly ignored across the region in recent years. High rates of economic growth at the start of the last decade were translated into increased expenditures in transportation infrastructures so as to ameliorate the effects of past under-investment in a number of countries.<sup>3</sup> Panama, for example, is in the process of investing to widen its Canal (US\$5,250 million), Brazil is extending the airport at Campinas (US\$1,400 million) and increasing the number of lanes in the Belo Horizonte to São Paulo highway (US\$1,300 million), while Colombia has invited tenders for the construction of the

*Ruta del Sol*. In total, between 2009 and 2010, over US\$45,026 million worth of investment was destined for large (>US\$240 million) transportation projects across the region (own calculations from Thompson, 2010). Regional connectivity has also been emphasized, particularly in the context of integrationist schemes, since the Millennium. The *Plan Puebla Panamá/ Mesoamerican Integration and Development Project* (dating from 2001), a US\$8 billion development plan, was primarily oriented towards improving transportation links from southern Mexico through to Colombia. In South America, the Initiative for the Integration of the Regional Infrastructure in South America (IIRSA), a US\$74,500 million project encompassing 510 projects across 12 countries, also promotes regional physical integration with a strong transportation focus.<sup>4</sup> Nevertheless, if regional integration is to proceed apace, enhanced connectivity is of paramount importance -and this paper is intended to contribute to the investigation of, and debate upon, “hard” (and specifically transport) infrastructure across the region.

This paper is organised as follows. The second section provides an overview of the links between growth, infrastructural development and trade expansion, highlighting the magnitude of the infrastructural “gap” facing the region. The third section interrogates existing indices and data-sets to pinpoint the two LAC countries currently most deficient in “hard” infrastructural terms, while the fourth section identifies factors hampering infrastructural investment in these two land-locked economies. A fifth section concludes.

## INFRASTRUCTURE, TRADE FACILITATION AND LOGISTICS COSTS: A REVIEW OF THE LITERATURE

Infrastructure can enhance growth, even if the precise spill over relationship has been problematic to establish (Sutherland *et al.*, 2009, p. 13). Hulten *et al.* (2006), for example, find that infrastructure growth (specifically roads and electricity-generating capacity) over the years 1972 to 1992 accounted for almost half the growth of the productivity residual in India’s formal manufacturing sector, while Démerger (2001) has shown that provincial differentials in

<sup>2</sup> “Hard” infrastructure in the parlance of Portugal-Pérez and Wilson (2010).

<sup>3</sup> However, González *et al.* (2007, p. 29) point out that the region would need to invest between 3% and 6% of GDP on infrastructure (as opposed to the 2% to 3% at present) if it wished to match the investments being made in the Asian region.

<sup>4</sup> Guerrero *et al.* (2009, p. 32) calculates that transportation accounted for 59.3% of investment and 69% of the projects in the IIRSA portfolio.

Chinese growth performance from 1985 to 1998 was significantly related to geographic location and infrastructure differences (in this case transport infrastructure and telecommunications facilities). With regards to infrastructure development and the level of income, Easterly and Servén (2003) suggest the infrastructure gap could account for as much as one-third of the income gap between LAC and East Asia.

A further branch of the literature examines the impact of infrastructure on export performance and trade growth. Krugman's early work on foreign trade (Krugman, 1980; Helpman and Krugman, 1985) embraced transportation within a transactions costs/services "iceberg technology" framework that envisaged freighted goods values "melting" as they were transferred to the final consumer. The greater the melt down (transactions costs as a proportion of final consumer price), the more circumscribed international trade was likely to be. Gravity models are one empirical application of this, the greater the distance between trading nations commonly being used as a *de facto* proxy for transport cost charges (Jansen and Nordhås, 2007, p. 4). Limão and Venables (2001), for example, found US shipping costs rose by around 8% per shipment for each additional thousand miles travelled, this rising to 50% in the case of landlocked countries. Solf *et al.* (2010) notes that the current time taken to complete procedures for imports and exports in LAC (which takes an average of 20.9 and 18.6 days for imports and exports, respectively) far exceeds the OECD average (of 10.5 and 11 days). A study by Moreira *et al.* (2008), calculated that LAC *transport costs* could be slashed by as much as 20% if national ports were able to match the efficiency of their US counterparts (achieving US tariff and competitiveness levels would cut transport costs by a further 13%).

*Trade facilitation reform* was analysed by Soloaga *et al.* (2006), who applied the four dimensional -port efficiency, customs environment, regulatory environment, and business e-commerce use- framework first applied by Wilson, Mann and Otsuki (2003), to develop a gravity model simulation of **Mexican** trade reform. Their findings suggested that unilateral reforms in this area could see Mexican exports growing by 22% and imports by 11%, while research by Portugal-Pérez and Wilson (2010) found **Bolivian** exports would increase by 49.1% and **Venezuelan** exports by 26.1% if these two countries could respectively improve their infrastructural quality and business environment to half the level of **Chile** (the best LAC performer).

Moreover, as such logistical costs<sup>5</sup> ascend to as much as 32% (case of Peru -with slightly lower proportions for Argentina [27%], Brazil [26%], Mexico [20%] and Chile [18%]) of total product value, markedly higher than the OECD average (9%), such costs present a much more significant impediment to regional trade growth than tariff barriers (González *et al.*, 2007, p. 9). As a consequence, a growing research literature has thus focused on examining the links between improved connectivity and hard infrastructure (and how these in turn help to enhance LAC trade), a literature to which this paper now adds.

### "HARD" INFRASTRUCTURE IN LAC: A COMPARATIVE SURVEY

There is a strong positive correlation, as one might expect, between infrastructure and GDP *per capita* in LAC. Infrastructural data<sup>6</sup> from the World Bank's most recent Logistics Performance Indicator (LPI 2010), a subjective bi-annual assessment by logistics professionals of the qualitative and quantitative challenges to improved logistical support to trade in the region,<sup>7</sup> confirms this relationship (*Figure 1*).

Infrastructure quality is scored on a one (very low/poor quality) to five (very high quality) basis. As can be seen, Brazil has better than expected infrastructure given its level of GDP -a somewhat unexpected outcome given the logistical difficulties posed by the Amazon and its tributaries to internal road and rail transport, and one that merits further examination perhaps. Conversely, Uruguay and Venezuela underperform in infrastructural terms relative to national income. While,

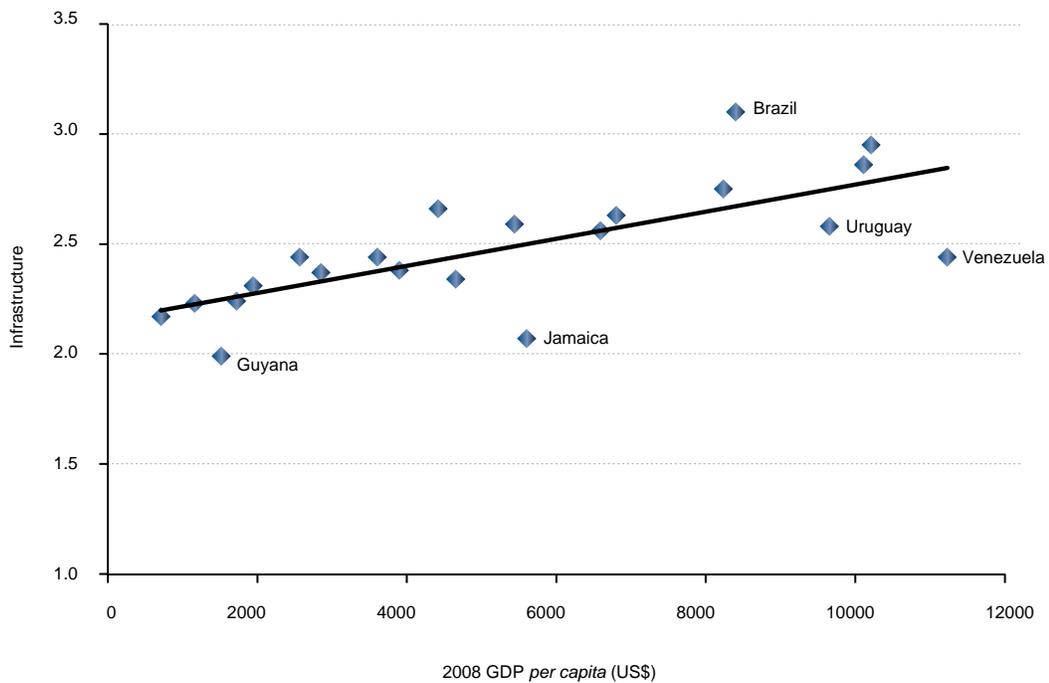
<sup>5</sup> The authors acknowledge there is no one accepted definition of logistics costs, and in their research conflate transaction (transport and trade processes-permits etc.), financial (inventory and storage), and non-financial (insurance) costs. The same is true of trade facilitation -Portugal-Pérez and Wilson (2010, p. 6) notes that it can be "widely defined as any policy measure aimed at diminishing trade costs", while Milner *et al.* (2008, p. 4) note the term can be used in a narrow or broad, unilateral or multilateral sense.

<sup>6</sup> On average, infrastructure scores are one of the weakest components of the LPI rating for each LAC country (just behind border procedures), as appears to be the trend for different regions across the world.

<sup>7</sup> Factors assessed include infrastructure (ports, airports, roads, rail, warehousing and ICT provision), supply chain reliability, border procedures and time, and the logistical services (competences of freight forwarders, service sector regulation among others).

**Figure 1**

**LPI - INFRASTRUCTURE INDICATOR IN LAC**



Source: Infrastructure indicator is taken from the LPI (2010), GDP per capita is sourced from the World Bank International Trade and Transport Department.

arguably, causality could be bi-directional -higher income countries have potentially more funds to spend upon improving infrastructure, while strengthened infrastructure can have beneficial impacts upon a country's economy- a simple Granger causality test on LAC data reveals that improved infrastructure impacts upon growth and not *vice-versa* (reinforcing the LPI 2010 observation that a good logistical performance can add 1% to economic growth rates, 2% to trade growth rates).

An alternative measure of infrastructure -and infrastructural deficiency- in the LAC region is available from the *Global Competitiveness Report* published by the 2009 World Economic Forum (Schwab *et al.*, 2009) using data from an Executive Opinion Survey undertaken across 133 countries. The Report breaks infrastructural quality down into four constituent components; road, rail, port and air transport, and measures quality on a score of 1-7 -where 1 is extremely underdeveloped and 7 is viewed as extensive

and efficient by international standards. Railroad infrastructure is viewed as particularly poor in LAC, scores ranging from 1 to 2.5 (average 1.55), well below the global average of 3.17 (which in turn is the lowest in comparison to other transport infrastructures). This tallies with LPI 2010 findings, where all respondents in the ten LAC countries reporting on this indicator categorised railroad infrastructure quality as varying from "low" to "very low".

The gap between the world and LAC average for air transport infrastructure is the smallest (0.24 compared to 1.55 for railroad infrastructure), implying that the region is fairly advanced in this area, although air transportation facilities in Paraguay (2.4), Argentina (3.4), Bolivia (3.5), Venezuela (3.5), Guyana (3.6) and Uruguay (3.7) score poorly. Port infrastructure is variable -with facilities in Panama, Chile, Jamaica, Honduras and Uruguay rated as better than the global average (score 4.2) while port installations in Venezuela, ranked by Executives sampled as particularly poor, score

barely half this value. The road infrastructure in the majority (15) of LAC countries also lie below the world average (3.9) most notably in Paraguay, Bolivia, Costa Rica, Ecuador, Colombia and Brazil, although road quality scores in Chile (5.8) and El Salvador (5.3) were markedly higher. This shortcoming is somewhat critical, given the correlation between roads and productivity growth identified by Hulten *et al.* (2006), as we have noted earlier in this paper.

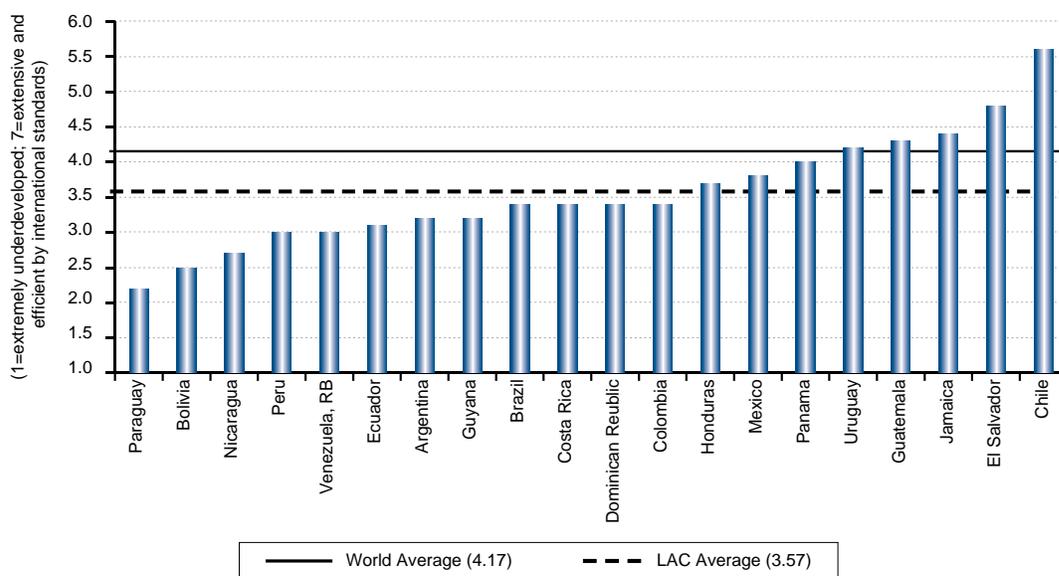
While Chile, El Salvador and (to a lesser extent) Jamaica and Guatemala exceed the global average in aggregate terms, in general infrastructural quality in LAC is lagging in comparison to the rest of the world (Figure 2). Nowhere is this more so than in the region's two landlocked economies -Paraguay and Bolivia. Paraguay, for instance, not only scores the lowest in the region for the quality of its air transport infrastructure, but is also equally deficient in terms of road quality and rail infrastructure. Hence the following section of the paper identifies the factors presently inhibiting transport connectivities in Bolivia and Paraguay.

### FACTORS HAMPERING TRANSPORT SYSTEMS DEVELOPMENT IN BOLIVIA AND PARAGUAY

While topography, most notably in Bolivia, presents particular problems in infrastructural terms, a number of further factors have militated against the emergence of an efficient transport system in the two countries. **First, past levels (and the nature of past) infrastructural investment** in the two countries. In Paraguay, recognition that past investment levels had failed to close the infrastructural gap, bequeathing the country a network that is "inadequate in relation to the size of the country", prompted the 2008-2013 *Plan Estratégico Económico y Social* (PEES) to pledge to increase the network of paved and improved roads to 6,000 km (from 4,600 km) and 6,600 km (from 3,600 km) respectively, and to double the road maintenance programme to 51,000 km by 2013 (Equipo Económico Nacional, 2008, p. 96). Insufficient historic attention had also been paid to road safety issues, causing the 2008-2013 National Road Safety Plan (Ministerio de Obras Públicas y Comunicaciones, 2008, p. 48) to

Figure 2

### QUALITY OF OVERALL INFRASTRUCTURE IN LAC



Source: World Economic Forum (WEF), *Executive Opinion Survey* (2009).

request US\$15.9 million be set aside for improving roads from a safety perspective. While Bolivia directed almost 40% of public investment into the transport sector over the period 2000-2008 -more than US\$2,650 million- this has been insufficient to redress years of prior underinvestment in the road network dating back to the introduction of the structural adjustment programme in August 1985. Moreover, the strategy emphasized new construction over maintenance -just US\$0.3 million annually being assigned to maintain the existing network over this period (Suárez, 2009, p. 32).

*Second*, and perhaps most importantly, both countries have **weak institutional frameworks** that hampers strategic investment in the transport sphere. In the case of Bolivia, while legislation exists to regulate different transportation modes,<sup>8</sup> and other legislation has implications for the sector (such as the 1994 Capitalization Law), there is presently no unifying General Transport Law that clearly defines the precise remit of the different institutions operating within the sector, and ensures coherence between the objectives of the National Development Plan and sectoral planning targets (Suárez, 2009, p. 39). A similar scenario prevails in Paraguay where the PEES emphasizes not only the necessity to modernise and restructure the Ministry of Public Works and Communications, but also update the National Transport Policy by developing a Transport Master Plan (*Plan Maestro de Transporte*) that identifies existing bottlenecks and establishes transport priorities (Equipo Económico Nacional, 2008, p. 39). As a consequence, there is a real danger than investments are undertaken in an uncoordinated and fragmented manner.

A *third* (and somewhat connected) factor, relates to the **role of private investment** in resolving the infrastructural deficit. In Bolivia, recognition of this infrastructural shortfall led to the 1994 Capitalisation Law being deployed to transfer both the national rail company (*Empresa Nacional de Ferrocarriles* - ENFE) and airline operator (*Lloyd Aéreo Boliviano* - LAB) from state into private hands. This was reinforced by

Law 1874 (*Ley de Concesiones de Obras Públicas de Transporte*) of June 1998 which placed the responsibility for financing, constructing and administering new roads, airports, rail and port facilities in private (national and/or international) hands. Unfortunately, the expected investment/refurbishment failed to take place. Suárez (2009, p. 28) notes that no private transport concessions have been granted to date under Law 1874. While ENFE was subsequently split by its Chilean purchasers (*Cruz Blanca*) into separate Western and Eastern nodes -the former, sold in 2000 to the US Company Genesse Wyoming, has largely fallen into disuse. In response, in early 2010 President Morales revealed plans to renationalise the network (Business Monitor, 2010). In a similar vein, greater competition within the civil aviation sector allied to declining air passenger and cargo traffic numbers, caused LAB to suspend all its operations in 2008. While Paraguay has more recently developed a private investor/concessions scheme, offering 30 year road maintenance concessions over its main road arteries (*Rutas 1, 2, and 6*) to private investors, the scheme has encountered strong opposition from public-sector trade unions, and is currently stalled (Business Latin America, 2009). Private involvement -at least to date then- has not been a panacea to the infrastructural problems of LAC's two land-locked economies.

In addition, there are a number of **location-specific factors** that deter infrastructural investment until the underlying constraint is removed. The failure of Paraguay's main international airport at *Silvio Pettrossi* (Asunción), for example, to meet minimum international standards militates against private and state investment in facilities there until these shortcomings have been addressed. Rail network unification between the Puno-Guaqui (Peru) and the El Alto-Guaqui (Bolivia) railroads needs to reconcile the different rail gauges of the respective systems, while falling water levels in the Paraguay river are more problematic to resolve -and have prompted consideration of new port construction to the south of Asunción (see highlighted projects in *Table 1* and *Table 2*).

**While the respective governments have elaborated/commenced a series of national projects intended to improve domestic transportation infrastructure, these are supplemented by a growing number of bi-national investment projects** -reflecting recognition of the role that wider regional connectivity can play in enhancing

<sup>8</sup> Civil aviation is regulated by Law 2902 of October 2004, road cargo traffic by Law 1769 of March 1997, and passenger traffic by Law 1874 of June 1998, while Law 3507 of October 2006 created the *Administradora Boliviana de Carreteras* entity within the Public Works, Services, and Housing Ministry, for example.

**Table 1**

**NATIONAL, BI-NATIONAL AND TRI-NATIONAL TRANSPORTATION PROJECTS COMPLETED, BEING EXECUTED OR PENDING IN BOLIVIA**

Scope	Type	Location	Nature of Project	Value (US\$ millions)
<b>National</b>				
	Road	Potosí-Tarija	361 km road paving	163.2
		Santa Cruz-Argentina	Road widening	105.75
		Puerto Suárez-Mutún	Road paving	18.8
		Hito Br94-Uyuni	474 km road paving	29.0
		Cucho Ingenio-Villazón	291 km road paving	252
		Pailón-Puerto Suárez	594.4 km road paving	416
		Concepción-Brazil	474 km road paving	260
		Puente Banegas	Bridge construction	40
		Los Troncos-Okinawa	Road paving	Pending
		Santa Cruz-Cochabamba	30 km Road Rehabilitation	120
		Oruro-Pisiga	232 km road paving	54.5
		La Guardia-El Churo	265 km road rehabilitation	35
		Puente de la Amistad	Bridge construction	3
		Desaguadero-Yucumo	433 km road paving	550
		Cobija-Riberalta	439 km road paving	80
		Yucumo-Trinidad	Road paving	200
		Cobija-Extrema	74 km road paving	29
	River	Madre de Dios	Improve river navigability	Pending
		Beni	Improve river navigability	Pending
		Ichilo-Mamoré	Improve river navigability	Pending
	Rail	Aiquile-Santa Cruz	388 km rail link	700
	Rail/Port	Motacucito-Mutún-port	Enhance cargo transport	202.85
<b>Bi-National</b>				
(Argentina)	Road	Puente Yasma	Unify road network	23
(Argentina)		Puente La Quiaca	Bridge restoration	15
(Brazil)		Puente Rio Mamoré	Bridge construction	150
(Chile)		Ollagüe-Abaroa	Improve border transit	1.6
(Paraguay)		Infante Rivarola-Oruro	Improve border transit	1.7
(Brazil)		Puerto Suárez-Corumbá	Improve border transit	2
(Brazil)		San Matías-Cáceres	Improve border transit	2
(Chile)		Pisiga-Colchane	Improve border transit	10
(Peru)		Desaguadero	Improve border transit	7.5
(Peru)		Bolivia-Extrema	Improve border transit	2

➔ Table 1

**NATIONAL, BI-NATIONAL AND TRI-NATIONAL TRANSPORTATION PROJECTS COMPLETED, BEING EXECUTED OR PENDING IN BOLIVIA**

Scope	Type	Location	Nature of Project	Value (US\$ millions)
<b>Bi-National</b>				
(Brazil)		Epitaciolândia-Cobija	Improve border transit	Pending
(Brazil)	River	Paraguay	River navigability study	1.5
(Peru)	Rail	Puno-Guaqui	Unify railroad systems	198
<b>Tri-National</b>				
(Braz/Para)	River	Paraguay	Maintain river navigability	4.3
(Braz/Para)	River	Paraguay	Water level prediction	Pending

Note: Red = being executed, Blue = funding being solicited, Green = completed, Black = not yet initiated.

Source: IIRSA.

**Table 2**

**NATIONAL, BI-NATIONAL AND TRI-NATIONAL TRANSPORTATION PROJECTS EXECUTED, OR CURRENTLY PENDING IN PARAGUAY**

Scope	Type	Location	Nature of Project	Value (US\$ millions)
<b>National</b>				
	Road	Rutas 2 and 7	Maint. concession to private sector	136
		Caazapá-Coronel Bogado	140 km road paving	180
		Ruta 6	Maint. concession to private sector	136
		Pozo Hondo	Improved border transit	1.5
		Pozo Hondo-Neuland	288 km road paving	144
		San Estanislao-Pto. Rosario	Road rehabilitation/widening	33.5
		Santa Rosa-Pto. Antequera	69 km road paving	27
		Concepción-Vallemí	Road paving	90
		Troncal II	57 km road paving	25.65
		Villeta-Alberdi	70 km road paving	35
		Encarnación	Access road improvement	26
		River Paraná access roads	320 km road paving	142
		Carmelo Peralta-Loma Plata	Road paving	140
		Ruta 9 - Transchaco	Various roadworks	170
		Pozo Colorado- Concepción	Road Rehabilitation	32
		Concepción-P. J. Caballero	Road Rehabilitation	12.5
		Bella Vista-Puente R. Apa	80 km road paving	Pending
	Airport	Mariscal Estigarribia	Cargo and logistics centre	30

➔ Table 2

### NATIONAL, BI-NATIONAL AND TRI-NATIONAL TRANSPORTATION PROJECTS EXECUTED, OR CURRENTLY PENDING IN PARAGUAY

Scope	Type	Location	Nature of Project	Value (US\$ millions)
<b>National</b>				
		Asunción	Modernisation	Pending
		P. J. Caballero	Extend airport	2.5
		Guaraní	Extend airport	50
		<b>Encarnación</b>	<b>Construct new airport</b>	<b>25</b>
	Rail	Asunción-Ciudad del Este	Railroad paving	297.5
		Ciudad del Este-Pilar	Railroad paving	438.6
		Depto. de Itapúa	150 km railroad rehabilitation	90
	Port	Asunción	Port relocation	25
		Villeta	Inc. Traffic due to port relocation	30
		Paraguay	New river port to be constructed	120
		<b>Encarnación</b>	<b>Container port construction</b>	<b>18</b>
		Puerto Indio	Extend port facilities	1.2
		Salto de Guairá	Rehabilitate port facilities	0.8
		Asunción	Impact study on port facilities	Pending
		Kaarendy	Container port on Paraná	9.9
	River	Paraguay	Improve river navigability	40
<b>Bi-National</b>				
Argentina	Road	Nodo Clorinda-Asunción	Improve road crossings	100
Brazil		<b>Puente Presidente Franco</b>	<b>Bridge construction</b>	<b>80</b>
Argentina		Puente Neembucú	Bridge construction	60
Argentina		P. Posadas-Encarnación	Restore existing bridge	52.26
Argentina		Puente P. Franco-Iguazú	New bridge	75
Brazil		Carmelo P.-P. Murtinho	Improve border transit	Pending
Bolivia		<b>Infante Rivarola-Oruro</b>	<b>Improve border transit</b>	<b>1.7</b>
Brazil		Carmelo P.-P. Murtinho	Improve border transit	0.15
Brazil	Rail	Cascavel-Foz do Iguazú	Construction of rail bridge	70
Brazil	River	Itaipú	Transfer containers past dam	Pending
Brazil		<b>Itaipú Reservoir</b>	<b>Imp. navigability on reservoir</b>	<b>Pending</b>
Argentina		<b>Paraguay/Paraná</b>	<b>Improved navigability</b>	<b>?</b>
Argentina		Corpus Christi HEP plant	Sluices to help river traffic pass	Pending
Argentina		Upper Paraná	Improve navigability	Pending
<b>Tri-National (besides those noted in Table 1 above)</b>				
(Arg/Uru)	Rail	Asunción-Montevideo	380 km railroad reconstruction	150

Note: **Red** = being executed, **Blue** = funding being solicited, **Green** = completed, **Black** = not yet initiated.

Source: IIRSA.

trade and consolidating integration in the LAC region (Table 1 and Table 2). Bolivia, in particular, views participation in regional initiatives as a “win-win” scenario, allowing the country to exploit its strategic position in the centre of the continent to facilitate the transcontinental movement of commerce.<sup>9</sup>

**A final factor inhibiting the enhancement of transport connectivities is the project gestation period.** New infrastructure can rarely be installed overnight, and an extended process of; project identification/elaboration, the completion of the requisite technical, economic and environmental studies, the obtention of funding, contract preparation and the subsequent appointment of contractors, all serve to defer execution of the project. This is apparent in the Tables above. In the case of Paraguay, of the 49 projects identified in Table 2, just 11 have advanced beyond the drawing board (of these the most notable are those relating to the upgrading of Encarnación from a local to an important border trading hub, equipped with new port and air transport facilities and accompanying road infrastructure development). Bolivia fares somewhat better: 17 of the 37 projects identified in Table 1 being implemented to date, including the paving of over 2,000 kilometres of road.

## CONCLUSION

It is clear that historic underinvestment in hard infrastructure unintentionally introduced a new “elephant into the living room” at precisely the time trade liberalisation removed the tariff elephant from the LAC house. Ejecting this new elephant is no easy task, and (a belated) acknowledgement of the local infrastructural deficit now underpins much of the regional integration literature. Guerrero *et al.* (2009, p. 38), for example, lament that “the region’s infrastructure network in general and transport infrastructure in particular have suffered chronic underinvestment”, with Moreira *et al.* (2008, p. 13) stating unequivocally that “... putting transport costs at the centre of the region’s trade agenda will produce

great gains in volumes and diversification of trade”. The infrastructural gap -and the associated [elevated] cost of transportation- is particularly acute for landlocked countries as Guerrero *et al.* (2009, p. 37) surmise, and Section Three of this paper shows.

In response, national initiatives have emerged (Table 1 and Table 2) -often focussing upon the development of internal trade corridors (Pailón-Puerto Suárez in Bolivia) and the formation of domestic trade hubs (Encarnación in Paraguay), initiatives which are increasingly intent on co-opting the private sector into service delivery via maintenance/concession schemes. These are supplemented by regional initiatives -the *Plan Puebla Panamá*/Mesoamerican Integration and Development Project in Central America, and both *Fondo para la Convergencia Estructural del MERCOSUR* (FOCEM) and IIRSA in South America- signalling that connectivity of markets should not be constrained by national, historically defined, borders. While these national and regional initiatives are to be welcomed, improved regional connectivity -and hence enhanced trade- for the region’s land-locked countries remains critically dependent upon addressing the factors (identified in Section four) as hampering increased infrastructural spend.

**Most importantly, attention needs to be directed towards strengthening the institutional and regulatory framework governing the sector in both countries.** In the case of Bolivia this will require the delineation and approbation of an overarching General Transportation Law that clearly defines the jurisdiction of different stakeholders concerning road, rail, river AND air transportation, details the rights and responsibilities of the different user and supplier groups, ensures legislative coherence across the different transport branches, and embraces long-term planning horizons. In Paraguay the need is more for a strategic planning tool -a Master Transport Plan which can identify and prioritise projects across the sector, highlighting in the process the precise role that state, local government, and the private sector can play in bringing the project to fruition. While, as we have noted (Section four), renewed economic growth has led to a concomitant increase in state infrastructural spend, it is clear that supplementary private investment is needed to help close the infrastructure gap in both countries. However, private involvement in infrastructure provision to date in both Bolivia and Paraguay has been limited, a factor in part attributable to the prevailing institutional frameworks, and in part to the less than successful

<sup>9</sup> To this end, a paper published by the government’s Economic and Social Policy Analysis Unit in December 2009 (Suárez, 2009), identified five “integration” corridors around which transport investments would be concentrated (these include the creation of an East-West bi-oceanic corridor project -approved by Bolivia, Brazil and Chile in 2009).

past private forays in the field. While the institutional reconfiguration proposed above will go some way to providing a more congenial environment for private investment in the sector, it is unlikely to be sufficient in itself -and *further research is required to identify how best to bring the private sector "on board" in each country.*

Further, while **project gestation times** will always prevent an immediate fixing of any transportation deficit, it seems the principal bottleneck in the current project identification-elaboration- execution cycle lies in obtaining the investment financing necessary (Moreira *et al.*, 2008, p. 13, and [Table 1](#) and [Table 2](#)) particularly in Paraguay. In this sense, the reunion in Chile in 2009 of Finance Ministers from across the region to discuss strategies to promote physical infrastructure and reduce intra-regional trade costs (IDB/ECLAC/World Bank, 2010) is to be welcomed.

**One final connectivity caveat too is in order.** González *et al.* (2007, p. 29) caution that it is not simply a case of funding physical investment (as was perhaps the case in the past), but also ensuring sufficient funds are assigned to the *maintenance of the constructed facilities* (ports, roads etc.). Suárez (2009, p. 32), for example, informs that just US\$300,000 was assigned annually to cover all transport maintenance needs in Bolivia during most of the last decade. Hence there is a very real need to balance the sectoral investment budget between rehabilitating and renovating EXISTING transport infrastructure, and financing NEW infrastructure projects. If not, there is a very real likelihood that increased infrastructure spend will not remove the transportation elephant from the LAC living room -but merely transform said incumbent into a "white elephant". ☹ ☹

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