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Peri-urban Promises of Connectivity: Linking project-led polycentrism to the infrastructure scramble

This paper offers an interpretive framework linking polycentric urban expansion in emerging/frontier economies to the global extension of infrastructure networks. Drawing from scholarship on state restructuring, we theorize an infrastructure scramble whereby numerous state actors and agencies make massive investments in infrastructure connectivity to secure effective integration to transnational value chains as economic and geopolitical competition intensify. This has manifold territorial implications, and matters for debates on planetary urbanization. Novel urbanization processes include the proliferation of peri-urban nodes. Built in cheaply-available land, these respond to (or anticipate economic gains from) enhanced connective infrastructure. In contrast to city-regional exemplars, project-led polycentrism does not arise from territorially-decentralized governance arrangements, and may deepen peri-urban exclusion. The paper includes an experimental comparison of two peri-urban nodal projects: the Iranduba University City, located in a riparian rainforest of the Brazilian Amazon 17 miles from bustling Manaus, and the Bagamoyo Port and Special Economic Zone, located 35 miles north of the congested port of Dar es Salaam, Tanzania's expansive capital. Our findings suggest that: i) techno-entrepreneurial capacity requirements underpin the centralist scalar politics governing the development of peri-urban nodes; as ii) state-led projects rely on ambitious physical planning, with masterplans evincing elite, globalization-oriented objectives that neglect local needs and trigger displacement; and iii) even failing projects spearhead varying trajectories of territorial transformation in erstwhile-stagnant peri-urban peripheries. Concluding, we call for further research on multiple drivers and modalities of polycentrism in the global South, and the infrastructure scramble's broad implications for hyper-connected and bypassed territories.

Introduction

The 21st century has witnessed rapid urbanization in much of the global South. The analysis of these transformations has focused on unprecedented demographic pressures aggravating employment, housing and basic infrastructure deficits. The uncertainties of life in underserved peri-urban peripheries is also thoroughly discussed. Yet, less attention has been paid to the networked connectivity and territorial complexity that characterize expansive urban regions, even if an emergent literature draws attention to large-scale projects in peri-urban areas and the escalation of land values that accompanies fast-paced urbanization. Research on urban polycentricity remains largely focused on the global North (and growing discussions regarding East Asia), with a tendency to highlight city-regional exemplars that are the most territorially consolidated and economically dominant. Aligning ourselves with the call for more explicit Southern perspectives in urban global research, in this paper we argue for a diversity of frameworks to examine and compare polycentric transformations across the entire world of cities. In heretofore less-connected locations, investments in infrastructure networks are meant to induce the development of externally-oriented connectivity nodes as proponents hope to capitalize on infrastructure enhancements. These projects are superimposed on an inherited landscape of local infrastructure deficits and vastly unmet social needs in precarious peri-urban areas.

The paper introduces the concept of ‘infrastructure scramble’ to take stock of the planetary proliferation of cross-border infrastructure networks being built in the context of multipolar, competitive capitalist globalization. Whereas the process has been more thoroughly studied at higher territorial scales, this paper addresses implications for formerly-less-interconnected urban regions in emerging and frontier economies. Thus, this form of

polycentrism is one component of broader processes of territorial reconfiguration pursued in the global South. These support the objective of enhancing economic competitiveness through functional integration to transnational value chains. As a cross-scalar analytic, the infrastructure scramble speaks to ongoing debates surrounding state restructuring and planetary urbanization. For the former, we are witnessing the widespread reengagement of national governments in regional and territorial planning. This occurs in sync with the promotion of investments in networked infrastructures by supranational regional blocs, multi-lateral agencies and a panoply of corporate actors and transnational capital. For the latter, by drawing attention to the redesign of vast territories, the infrastructure scramble advances the discussion on ever more extensive urbanisation processes resulting in uneven and complex (rather than homogenous) urban configurations. We emphasize that these formations encompass peri-urban areas and corridors with diverging degrees of (dis)connectivity and access to infrastructure and services.

Project-led polycentrism in expanding urban regions with enhanced or promised connectivity entails more than some initiatives being located outside of the consolidated city core. It is paramount to recognize that the development of nodal enclaves in satellite cities, secondary cores and green fields triggers broader territorial transformations. This fact needs to be considered for peri-urban planning: the pursuit of strategic global connectivity may cause state-led initiatives to eschew locally integrative development programmes, if interventions and investments focus solely on high-value enclaves and specialized connectivity-capture functions. While state actors are motivated by the promise of enhanced connectivity and economic gains from networked infrastructures, the results may do little to redress inherited peri-urban peripherality and infrastructure deficits: in fact, they may exacerbate uneven geographical development and socio-spatial fragmentation, and also introduce new displacement pressures on

vulnerable populations. Finally, nodal masterplans may induce broader processes of peri-urban transformation, some with a speculative effect on land appreciation and others possibly spreading the benefits of peri-urban development. Therefore, a comprehensive analysis of project-led polycentricity cannot be limited to the critique of exclusionary masterplans as they exist on paper. It requires a grounded examination of territorial trajectories extending beyond project sites and over time.

The paper is informed by empirical examination of two initiatives in remote, seemingly unrelated locations: a riverfront site in the riparian rainforest of Iranduba, 15 miles southeast of Manaus, Brazil, and the Bagamoyo District's historic port city on the Tanzanian coast, located 35 miles north of Dar es Salaam. While the initial *genetic* comparisons of the projects' origins and comparable chains of causality across explanatory scales allowed us to conceptualize the infrastructure scramble as an explanatory heuristic, we conducted additional *generative* comparisons to probe the consequences of connectivity-oriented, project-led polycentricism. The paper has five sections and a conclusion. First, we introduce the infrastructure scramble concept, review its relation to state restructuring/rescaling and planetary urbanization debates, and explain how it helps us frame the emergence of peripheral forms of polycentricity, which differ from processes of city-regional formation studied in the global North.

In the second section, we justify our experimental comparison (a combination of genetic and generative approaches) and present our case studies. Shifting focus to Iranduba and Bagamoyo, the third section demonstrates that both projects reveal an upward politics of scale that (re)centralizes territorial power around the techno-entrepreneurial capacities to harness the potential benefits of enhanced connectivity, and sidelines local governments with limited competencies. The fourth section discusses the physical planning emphasis of both projects, and

draws attention to the exclusionary nature of their masterplans, which resemble ‘fantasy projects’ engaged in previous studies. The fifth section details the factors that have delayed both projects and may compromise their full implementation, and then broadens the scope of analysis to the dynamics impacting the areas that surround project sites. In the conclusion, we discuss the two peri-urban development trajectories; use cross-scalar dynamics to explain the emergence and specificities of project-led polycentrism in the global South; and call for further research on the manifold territorial implications of the infrastructure scramble.

The Infrastructure Scramble: An urban perspective on infrastructure networks

Contemporary urbanization is a globally-articulated process. Urban regions across the world are growing rapidly if unevenly in population, area and economic capacity; infrastructure networks support higher levels of intra-urban functional integration and inter-urban interconnectivity; and the impacts of city-originated effects are ever more perceptible on territories beyond the urban region and even very remote areas (Soja and Kanai 2007). This section introduces the concept of the infrastructure scramble to advance the perspective of urbanization as an articulated yet uneven process, and foreground material transformations that are mediated by asymmetric and complex power relations. In other words, the infrastructure scramble provides a conceptual link between urbanization and the economic and geopolitical multipolarity of globalized capitalism. Our specific aim is to highlight the strategic role that infrastructure networks play in the expansion and (re)structuring of urban regions, and the strengthening of select connectivity nodes, while the meaning of urbanization is rendered increasingly complex and bypassed territories with low levels of connectivity are peripheralized. Finally, we highlight the specificities of emergent polycentricity in the global South while providing an integrative theoretical framework of pan-urban pressures and dynamics – the enhanced connectivity of the

infrastructure scramble and its economic promise, that is applicable even to less salient city-regions.

Therefore, the infrastructure scramble ‘urbanizes’ connectivity networks beyond the economic instrumentality of corporate logistics. In the rest of this section, we develop the concept further by:

a) showing how infrastructure firms up functional territorial articulations within and between urban regions, and across an increasingly blurry urban-rural continuum, which has implications for planetary urbanization;

b) incorporating infrastructure to discussions of state rescaling/restructuring central to contemporary urban and regional governance, and the ways by which retooled state institutions have come to embrace globalist territorial planning;

c) devising a Southern litmus test for global urbanization concepts that may be limited in their applicability to the global North (such as certain takes on city-regionalism);

and d) providing a multi-scalar explanatory framework to explain the proliferation of project-led polycentrism in the diverse urban regions of the global South that are exhibiting common responses to enhanced or promised infrastructure connectivity.

An infrastructural bypass of the urban/non-urban binary

The ‘urban age’ paradigm points to the unprecedented scale of contemporary urbanization by drawing attention to the rural-to-urban demographic transition and the dramatic area expansion of cities. Overall, the paradigm places ‘endless cities’ of diffuse (yet still traceable) boundaries in the foreground of the globalization era (Burdett and Sudjic 2007). Schmid and Brenner (2014: 743) point out that this is a ‘chaotic conception’ of how cities grow, not a processual theory of contemporary urbanization. Indeed, the urban age concept is descriptive and does not

explain the drivers of the generalized urbanization. Furthermore, Schmid and Brenner (ibid.) find that the paradigm focuses excessively on cities. Imagining the urban narrowly as cities, or morphologically-coherent territorial units, they argue, obscures our view of the “*de facto* sociospatial fluidity and relentless dynamism of the urban phenomenon under modern capitalism.”

The alternative perspective of planetary urbanization, which Brenner and Schmid (2015, also Brenner, 2013) promote, provides a thorough and dialectically-articulated explanation of urbanization, which they argue is structured through agglomerative, extensive and differentiating processes. Yet, subsequent critiques (see e.g. Walker, 2015; Derickson, 2015; Schindler, 2017; Kanai, 2014a) suggest that a consensus is yet to be reached on how to critically research urbanization as a generalized and globally integrated phenomenon. For this paper’s purposes, it must be noted that challenges remain in linking contemporary urbanization to broader processes of territorial transformation without relying on the deeply rooted urban-rural binary (Angelo, 2016). Our proposed framework of the infrastructure scramble engages explicitly with the explanatory power of infrastructural materiality, and affords detailed analyses of how urbanisation is articulated and differentiated in various operative landscapes. By tracing what Arboleda (2015:96) calls “the projection of material infrastructures” we offer an analytic to make sense of the assemblage of large-scale, transnationally-oriented territorial systems (Easterling, 2014; McFarlane and Rutherford, 2008; Offner and Pumain, 1996). Similarly, Graham and Marvin (2001) showed how the architectures of infrastructure produce differential space and ‘splinter’ cities, and analysis needs to be scaled up and applied to the planetary proliferation of infrastructure space.

Other fields are already mapping out the contemporary spatial reach of infrastructure in increasing detail. In his ‘connectography,’ Khanna (2016) highlights how infrastructure articulates global network civilizations: “[each] road, bridge, tunnel, railway, and pipeline rewrites the functional code of the countries it crosses [...]” (p. 198). Infrastructure networks do not only afford planetwide inter-urban connectivity, but also articulate extensive corridors of territorial development across a continuum of urban-rural conditions that is rendered increasingly complex (Zoomers et al., 2017; p. 249). Therefore, we must apply caution when qualifying infrastructurally-mediated territorial conditions and move beyond the limitations of the urban/non-urban binary. There is a proliferation of connectivity conditions laying geographically outside the morphologically-consolidated urban zone, sometimes very distant from the city, but spread along vectors of infrastructure provision. These places and their inhabitants may not fully benefit from urban centrality (economic development, access to services, comprehensive infrastructure support). Yet they are still impacted by the spatial effects of urban extension that are counterpart to increased agglomeration in cities, receiving various surpluses such as increased traffic, waste and pollutants, and are subject to new forms of dispossession and violence. Finally, an analysis of infrastructure predicated on its material presence/absence and effects can be unbundled from the multidimensional (and implicitly normative) category of ‘the urban’ in order to advance research on unbounded urbanisation that does not assume an all-pervasive and homogenous territorial transformation. We could avoid the urban/non-urban undecidability dilemma that, Roy (2016) argues, is prevalent around cities of the global South, and redefine the meaning of peripherality from remoteness to relative position within uneven network designs and connectivity access (Kanai and Silva Oliveira, 2014).

The regulatory role of the state and geopolitical dimensions of infrastructural integration

The politics of scale literature shows that globalization has not led to the demise of the nation-state, rather regulatory functions have been subjected to intense recalibration in a process of state restructuring or rescaling (Swyngedouw, 2005, 1997; Brenner, 2001a; Smith, 2002, Bayirbağ, 2010). Furthermore, cross-scalar dynamics imbricate urban governance into broader forms of economic and ecological regulation (Jessop and Sum, 1997; Hodson and Marvin, 2007). The infrastructure scramble, we argue, is intrinsically linked to the restructuring of the state: while the expansion of networked infrastructures has been largely designed, financed and operated by and for transnational capital, it has also been planned and approved by governmental structures constituted at multiple scales – including regional councils, public works projects, national foreign affairs ministries, multi-lateral agreements and other ad-hoc supra-national entities. The repositioning of the state in infrastructure development goes beyond the privatisation and deregulation of national infrastructure systems (Bakker, 2013). Building on Peck and Tickell's (2002) landmark analysis of state restructuring processes in the neoliberal era, we argue that the production of infrastructurally-mediated global connectivity and the territorial configurations that results from such network designs are a constitutive part of state actions being *rolled out* to firm up global market integration. This process is far from linear. Economic and geopolitical competition shape varying territorial trajectories. Socio-political contestation punctuates context-specific trajectories, which are also path-dependent on previous waves of market liberalization and globalist institution-building. Yet, a rediscovery of regional planning by national governments is occurring in connection to the infrastructure scramble, and there is an emergent generation of comprehensive national urban policy frameworks that combine state-led development strategies focused on infrastructure provision with the erstwhile

neoliberal objective of attracting foreign direct investment (Schindler et al., forthcoming). The imperative to connect disparate territories is driven by both the difficulties of integrating with production networks (Ballard, 2016), and by the tremendous amount of surplus capital available for global infrastructure projects (Torrance, 2009; Dodson, 2017). The increasing importance of new, competing sources of capital, expertise and influence – particularly evident in China’s involvement in infrastructure projects in Africa (Poplak, 2016; Hung, 2008) – highlight the geopolitical nature of urban and territorial planning (Rokem and Boano, 2018). If there is a (re)new(ed) scramble (Carmody, 2016), it is not limited to the rush to seize rural land and natural resources but is also tied to the production and control of urban space, and its integration to functional territories that are articulated by infrastructure networks.

Validity for the global South: the litmus test of comparative urbanism

A number of scholars attuned to the specificities of cities in the global South call for a wider range of urban contexts to contribute to global accounts of contemporary urbanisation (Parnell, Pieterse and Watson, 2009; Robinson, 2002; McFarlane, 2008). We add that this applies to discussions of urban polycentrism and its embeddedness in planetary infrastructure networks. Harrison and Hoyler (2015: 2) question arguments that megaregions have replaced megacities as “globalization’s new urban form,” predicated on territorial articulation and transnational network consolidations which have resulted in “trans-metropolitan landscapes comprising networked urban centres and their surrounding areas.” Much of the research on megaregions is concerned with the global North, and this might seem justified considering the most conspicuous nodes of megaregional development are located in North America, Europe and East Asia. For example, Khanna (2016: 198,4-5) maps the global economy as dense, complex meshes across extensive urban constellations in the global North and East (with much

less dense southward extensions). Furthermore, these North(/East)-South macro-regional divisions can be found in early critical mappings of the uneven global distribution of capitalist cores and peripheries – see French economist François Chesnais’ early 1990s world map (Holmes, 2006: 21). Nevertheless, several studies also document the emergence of megaregional formations in the global South (including in Africa’s ‘new urban corridors’ and in South Asia and South America) with differing regional articulations and trans-territorial network connectivities that are underpinned by large-scale infrastructure investments (Hancock, 2009; Tolosa, 2005; UN-Habitat, 2010; Tavengwa and Newhouse, 2017). If these ‘developing’ megaregions suggest new geographies of theory (Roy, 2009), they also must be included in broad, explanatory frameworks of global scope (Peck, 2015). The concept of the infrastructure scramble, with its cross-scalar implications for the emergent Southern polycentricity of increasingly interconnected urban regions, provides a way of including these diverse geographies.

Producing Peri-urban Connectivity Nodes: A cross-scalar explanation

The infrastructure scramble is expressed through localized territorial reconfiguration. Referencing cross-border roadways, energy and telecommunication systems under construction in South America, Kanai (2016, p. 161) defines this process as a territorial redesign of “a vast array of ... spatial formations [being] (re)shaped to prioritize access to global markets above other spatial planning considerations” through state investments in networked infrastructures. The term ‘design’ implies a purposeful spatial arrangement, as in Schindler’s (2015) concept of the territorial moment, whereby emerging forms of territory-based governance are reshaping cities and regions in the global South.

Furthermore, the drive to exploit connectivity through state-led projects spearheads urban polycentricity. These projects are not only sited in the consolidated city: enclave initiatives provocatively labelled as ‘city centre’ are also being developed in formerly peripheral neighbourhoods (Kanai and Kutz, 2013), as well as miles away from the urban core. Murray (2016) warns of the deleterious consequences of masterplanned enclaves – rich in transnational connectivity but decoupled from their peri-urban contexts – in which widespread infrastructure deficits and social impoverishment are the norm. Some of the sites under construction have been discussed in literature on greenfield development (Kennedy and Sood, 2016; Murray, 2016; Schindler, 2015) with recent studies discussing the emergence of new cities, satellite nodes, masterplanned communities and suburban business districts in India, South East Asia, the Persian Gulf, East and Southern Africa and South Korea (Datta and Shaban, 2017; Goodfellow, 2017; Kleibert and Kippers, 2016; Shin, Park and Sonn, 2015; Percival and Waley, 2012). The speculative involvement of state actors in urban land markets is well documented (see Shatkin, 2016; 2017; Goldman, 2011; Hsing, 2010) and the notion of ‘bypass urbanism’ (Shatkin, 2008; Sawyer and Schmid, 2015; Schmid et al., 2018) provides a theoretical framework, but the infrastructure scramble concept further frames and elucidates the complex cross-scalar relations driving the emergence of polycentric urban forms.

The Connectivity Promise on Peri-Urban Grounds: Arriving in Iranduba and Bagamoyo

The remainder of the paper compares urbanization trajectories in two very different peri-urban locations: Iranduba and Bagamoyo, respectively located in the Manaus and Dar es Salaam urban regions that are distant from each other but exhibit comparable genetic links to the infrastructure scramble. In both, national and state government plans for transnational infrastructure networks

are being rolled out in collaboration with supranational and multilateral agencies and transnational capital, and producing significant territorial-reconfiguration effects.

Broadening the comparative range of global urban research necessitates new methodological approaches. Tilly's (1984: 82) definition of 'universalizing' comparisons that sought "to establish that every instance of a given phenomenon follows essentially the same rule," was useful in earlier global cities research on "analogous patterns of economic, political and spatial restructuring" Brenner (2001b: 137). Yet, given the heterogeneous conditions of our two sites, Robinson's (2016) contemporary approach to experimental comparisons of "repeated instances" is more appropriate. The paper thus far has presented the 'genetic' component of this comparative approach, which we traced to the infrastructure scramble, what follows is a 'generative' exercise that revises concepts intended to capture emerging dynamics of polycentrism and the roles of state actors and institutions guided by the connectivity promise.

Approaching Manaus and Dar es Salaam comparatively and relationally

At more than 7.5 million sq. km, the Amazon Basin is the world's largest drainage basin, also covered by the world's largest rainforest. The Amazon has undergone major transformations since the late twentieth century. In the Brazilian portion (62% of the basin), development is no longer tied solely to the expansion of the resource frontier even if deforestation continues apace. Rapid urbanization and the global revalorization of nature (for example in the form of payment for ecosystem services and internationally-tradable carbon credits) are behind the emergence of new processes of multi-scalar regional restructuring. Exogenously-oriented models increasingly prevail over local development goals, which has led to the proliferation of territorial conflicts (Becker, 2005, 2004). Moreover, the region is no longer seen as peripheral and remote. Since the 1990s, following the partial rollback of

Brazilian protectionism and rollout of transnationally-oriented infrastructure development plans, the Amazon has become a strategic platform from which Brazil pursues continental integration and increased competitive access to world markets. In fact, several development corridors now crisscross the basin, supported by cross-border infrastructure networks that integrate erstwhile independently-functioning national grids (Théry, 2005). These networks had been planned for decades, but their implementation accelerated after Brazil led the multilateral adoption of the *Initiative for the Integration of the Regional Infrastructure of South America* (IIRSA) in 2000. IIRSA has promoted major road building and the construction of energy and communication grids. Regional planners continue to prioritize the consolidation of transnational logistics corridors (misleadingly called 'axes of integration and development') through the provision and/or upgrading of infrastructure (Kanai, 2016).

Manaus, the sole metropolis within the region's vast rainforest areas, has grown rapidly as the Amazon transformed, even if planners have failed to resolve long-standing structural constraints. To this day Manaus remains the most isolated of all Brazilian metropolises but major federal investments have been put in place to enhance connectivity, such as the international airport upgrade carried out for the 2014 FIFA World Cup. Furthermore, the city lies strategically at the intersection between two of IIRSA's planned corridors: an east-west, river-based corridor providing bi-oceanic linkage, and an even more controversial north-south, roadway-based corridor that would cut through the tropical rainforest (Wilson and Bayón, 2016; Fearnside and de Alencastro Graça, 2006). In terms of economic specialization, eco-entrepreneurial interests have sought to transform Manaus into a green global city of sorts (the capital of the Amazon Rainforest) specializing in high value-added environmental services tradable on world markets. Yet, the urban economic base is still largely dependent on a model

of subsidized manufacturing that has underpinned growth since the creation of the “free zone” in the 1960s (Kanai, 2014a, 2014b; Browder and Godfrey, 1997). Contradictions abound. By the early 2000s, Manaus had one of the most overheated urban real estate markets in Brazil, even though most residents did not have access to basic amenities or quality housing. Meanwhile, policy and economic elites sought to produce more industrial space, while simultaneously creating real-estate value, and capitalizing on “green economy” opportunities, such as globally-tradable REDD carbon credits, payments for ecosystem services and biotechnologies. This multi-pronged strategy of metropolitan expansion was enshrined in the 2007 Manaus Metropolitan Region (MMR) framework, and particularly the costly bridge between Manaus and Iranduba, which opened in 2011 to steer urban development towards the southern river bank (Sousa, 2011). The “university city” planned for Iranduba represented a further attempt to spearhead development on this erstwhile peripheral peri-urban region 16 miles from Manaus. The project would produce a node of globalization-oriented urban activity and high-value land uses in a greenfield site in which few traditional residents lived in riverine squalor.

Dar es Salaam has particularly benefited from Tanzania’s infrastructure scramble, enshrined in the 2010 *Integrated Industrial Development Strategy 2025* (IIDS). The IIDS departs radically from the developmentalist approach adopted by Tanzania and other sub-Saharan African countries post-independence (Coulson, 2013; Szermai and Laperre, 2001) and has been shaped by more recent restructuring interventions, which have led the Tanzanian government to value infrastructure development and reposition the port city transnationally. Under the colonial division of labour, the country produced basic, low-cost agricultural commodities. After independence, the Tanzanian government reoriented the economy towards the self-sufficient production of intermediate goods and basic consumer products, through a

formal development strategy involving state-led import-substitution industrialization, formalised in the 1969 and 1974 five-year plans, focusing on “basic industries.” The plans proved vulnerable to the successive oil crises of the 1970s, and by the mid-1980s the resulting economic malaise showed no signs of abating (Kim, 1986). International financial institutions encouraged Tanzania to liberalize its economy and pursue a more export-oriented development strategy. The shift from a planned socialist economy to a free market capitalist one was gradual (James, 2001), but the Tanzanian government was committed to economic liberalization. As a result, many of Tanzania’s core industries found themselves struggling to compete with Asian imports.

After more than a decade of rolling back socialist-era policies in an effort to “get the prices right”, the Ministry of Industries and Trade (MIT) rolled out the Sustainable Industries Development Policy (1996-2020) (SIDP) in an attempt to “get the institutions right” (see Rodrick, 2007). The SIDP sought to expand the country’s industrial base from basic industries to export-oriented, capital-intensive industries, with “the private sector as the principle vehicle in carrying out direct investments in industry” (MIT, 1996: Sec 3.2). The SIDP also sought to encourage investment by “making enabling amendments in all major policies” (MIT, 1996: Sec. 3.2). The first phase was initially planned for five years (1996-2001), but, in 2010, the renamed Ministry of Industry, Trade and Marketing (MITM) lamented that their targets had not been met, due to poor infrastructure support and other factors. The IIDS was designed to enhance the SIDP by providing an infrastructure development strategy informed by fundamental changes in the “economic environment surrounding Tanzania and Africa” (MITM 2010: 10). The architects of the IIDS now seek to achieve the SIDP’s market-oriented goals through territorial redesign. Dar es Salaam is the strategy’s lynchpin: the IIDS centripetally orients far-flung areas towards

the capital. Four growth corridors have been demarcated, two of which converge at Dar es Salaam, and the plan calls for improvements in transportation infrastructure and the development of industrial hubs with regional division of labour. Most significantly, the IIDS recommends transforming Bagamoyo into an integrated port and industrial hub to expand the urban region's overall connectivity and productive capacity.

A Politics of Scale that (Re-)centralizes Planning Power

This section will focus on questions of governance, power and control over the projects' aims. Although both projects seek to create a satellite city or secondary node away from the main urban core, neither of them originated as bottom-up initiatives by locally situated "growth machines" (Molotch 1976). The two initiatives may present entrepreneurial land-value capture opportunities for some local state actors and/or business interests involved in land speculation and real estate development (see Shatkin 2016; 2017; Goldman 2011), but they were launched by higher levels of government. Thus, both cases are diverge from the integrative dynamics identified in the global North whereby inter-jurisdictional competition (to create metropolitan nodes in local municipalities) and collaboration (to successfully harness the benefits of globalization) drive polycentric development (Kloostermann and Musterd, 2001; Bontje and Burdak, 2005). These cases problematize the notion that globalization brings about political and economic autonomy to city-regions able to collectively develop localized territorial competitiveness (Scott, 2008). Indeed, both initiatives were carried out by special agencies controlled by higher levels of government with little or no input from local jurisdictions, and they invoked broad-based state or national development objectives. Furthermore, they required complex negotiations with multiple external actors with specialized governmental capacities and techno-entrepreneurial expertise. Therefore, although these projects accelerate

polycentrism, they (re)centralize planning power. They do not signal a democratization of city-regional decision-making: in fact, in Iranduba in particular, ad-hoc planning agencies and instruments were created to bypass pre-existing local competencies on land use and urban growth.

These *upwards* politics of scale (see Swyngedouw 1997) are guided by the projects' *outwards* politics towards the networked integration of profitable territories. Each project's overarching aim is to exploit the newly acquired (or expected) connectivity of an urban region, and this requires ambitious masterplans with international appeal. Even when local actors exhibit entrepreneurial receptivity to the projects, these activities are believed to exceed their technical competencies. Upscaling therefore empowers central state actors, while excluding local government and civil society (Swyngedouw, 2005).

Iranduba was recently a rural district servicing Manaus with fresh produce and construction materials, and home to a handful of cottage industries. It now boasts a real estate boom fuelled by sprawling, suburban subdivisions and illegal encroachments on environmentally protected areas. The Amazonas state government triggered this process by building the Manaus-Iranduba Bridge which provides a direct link with central Manaus. The creation of the MMR, with its governing board (which has representatives from local governments, but remains primarily subject to the governor's office) was the second step in a planning process to facilitate the development of industrial space and produce residential real estate value, while protecting rainforest and local landscape assets (Kanai, 2014b). The state government also designated a 100-sq. km (20 km riverside and 5 km of inland rainforests) zone of 'special interest' for metropolitan growth, incorporating a detailed land-use zoning scheme

designed to combine environmental amenities with high-value tourism and residential land uses (Kanai, 2014a).

The state government has played a contradictory role. They attempted to restrain the illegal land occupations that lead to deforestation, but provided infrastructure incentives for development pressures along the subdivision where construction is legal: by, for example, continuing to increase roadway capacity westward from the bridge. Furthermore, through the Iranduba University City (IUC) project, the state is directly taking part in greenfield development of an ambitious, speculative nature – using the Amazonas State University as a proxy. The IUC was designed to promote advanced scientific research, international collaborations in the fields of earth sciences and eco-technologies, and state-wide higher education through increased facilities, dormitories for students from remote areas and satellite education, and to diminish congestion in central Manaus where the current university is located (Bowater, 2014; Severiano, 2012). Its university and ancillary urban facilities are expected to have a major impact on Iranduba. Yet there was no local input into the IUC master plan, which was drafted by a consortium of architectural, planning and engineering firms based in Manaus and São Paulo. We will discuss the plan in more detail in the following sections.

The Bagamoyo port was constructed in response to longstanding concerns about Dar es Salaam’s fixed and limited capacity, particularly since it is the main Indian Ocean outlet for Tanzania, Malawi, Zambia, Burundi, Rwanda, the Democratic Republic of Congo and Uganda. The Tanzanian Ports Authority (TPA) therefore recommended the development of a greenfield port in Bagamoyo (TPA, 2009). A year later, the Ministry of Industry, Trade and Marketing (MITM) expanded the scope of the plan to include a special adjacent economic zone “to make Bagamoyo the industrial and logistic hub of the Region” [sic] (IIDS: 15). National development

strategy has therefore transformed Bagamoyo into an industrial and logistics satellite of Dar es Salaam “in similar manner of Tokyo and Yokohama ports or Osaka and Kobe ports in Japan” (IIDS: 37). To steer territorial redesign and produce a polycentric metropolitan region, these national institutions have retained control of development of the port and of the adjacent SEZ. Although the region lacks a coherent planning framework, significant efforts are underway to address infrastructure and housing deficits. The *Dar es Salaam Metropolitan Development Project* (DMDP) has received approval for a US \$300 m. World Bank loan to improve basic infrastructure services, urban mobility and flooding prevention in low income neighbourhoods in three peri-urban areas, one of which extends north of the city along the coast through the Kinondoni Municipality and this will improve the feeder roads that straddle the trunk road to Bagamoyo. However, coordination between these interventions and the satellite-node plan has been patchy and the historical town of Bagamoyo does not have leverage here either, even though its localized real estate and land markets have been affected by speculative growth.

Masterplanning as a Global(ist) Technique of Rule

The two projects are envisioned in ambitious masterplans with a globalist logic. First used under colonial rule as “the instrument of power for controlling and disciplining the occupation of land” (King, 2015: 32), masterplans have a long, problematic history. They continued to be popular in the post-colonial and developmentalist eras, despite critiques of their exclusionary character and the recommendations of multi-lateral organizations that the emphasis shift to more comprehensive and flexible instruments – such as the city development plan (Harris, 2014; Dupont, 2011; Irazábal, 2004; Holston, 1989). Yet, globalist competition and the pressures to create what Sanchez (2010) calls distinctive city merchandises for a world market exacerbate the effects of rigid zoning schemes, resulting in anti-poor outcomes (such as the

displacement of formal employment and housing); increase socio-spatial inequalities; and do little to secure environmental sustainability (UN Habitat, 2016: 121-140; Watson, 2009a, 2009b).

Both masterplans exhibit the problems of ‘fantasy planning’ (Watson 2014), in their attempts to distinguish themselves within a crowded world market of ‘model cities’ (Sánchez 2003) seeking outside investors. This often involves insulating aspirational ‘city doubles’ (Murray 2015: 92) from their ‘failed’ environs, instead of rehabilitating “physical landscapes already in place.” Both initiatives are also vulnerable to the shortcomings that Carmody and Owusu (2016:69) argue riddle “utopian dystopias [...] [that] are unlikely to generate substantial economic benefits in the form of job creation, linkage, multiplier and accelerator effects.” The two peri-urban nodes may also exacerbate uneven development and fragmentation, producing exclusionary microspatialities in their expected uses (and user profiles) and “deepen[ing] the structural violence experienced by the majority of the population” (Carmody and Owusu, 2016: 70).

In 2012, the Amazonas State University and the state governor unveiled the masterplan for Iranduba University City (IUC) with an impressive scale model, audio-visual materials and a glossy hardcover book (TLC, 2012). These materials show a total area of 1,330 hectares, with an almost 2-mile riverbank perimeter extending a further 2.3 miles into the flood plain.¹ Strikingly, university facilities represent only 10% of the total area (140 has) and are located on the perimeter’s southern edge, like a *cordon sanitaire* between the development and the rest of Iranduba. The plans for the other sectors are mainly globalist, with some focus on ecological and regional themes. They include an Earth Campus dedicated to international life sciences research and a Technology Centre. While well-defined programmes for these institutions have

yet to be published, the riverfront has already been dedicated to entertainment and tourism-oriented uses as well as (presumably high-end) housing (as in the premium waterfront areas of Manaus, whose *Barra da Ponta Negra* is one of the most expensive addresses in Brazil). The few architectural designs which have been unveiled, such as the university chancellor's office building, invoke a high-tech modernist style adapted to tropical conditions, with large glass surfaces, steel columns and concrete platforms. This architecture has more in common with structures in Miami or Dubai than with Iranduba's urban areas – let alone with the precarious huts removed from the area at the beginning of the project.

According to the environmental impact assessment, the IUC will serve a permanent population of over 86,000 – more than doubling Iranduba's total 2010 population (SEINFRA-AM, 2012). Nevertheless, the local district (*município*) government did not have significant input in the masterplan and no other substantial participatory mechanisms were in place for local constituencies. District authorities also failed to assume leadership in the planning of the areas surrounding IUC – which are beginning to show anticipatory impacts due to speculative real-estate subdivisions. Instead, public officials have been mired in scandals over the drafting of land transactions and overpriced contracts for the provision of urban services, scandals which have led to high-level arrests (Brazil, 2015). There have also been land grabs, evictions, displacements and even violence against land-rights activists for impacted local people, a traditional population with irregular land tenure, socio-economic vulnerabilities and little knowledge of planning processes (Ojeda, 2015). While the future benefits of the IUC for Iranduba residents remain unclear, many have already been negatively impacted by the project.

According to the 2009 Tanzania Ports Authority Master Plan, commissioned from the Dutch firm Royal Haskoning and several other consultants, the new Bagamoyo port was to be

situated at a cost-effective greenfield location. The new port is also expected to create synergies with the 9,000-hectare Special Economic Zone (SEZ), earmarked by the Export Processing Zone Authority (EPZA) (n.d.) which aims to provide investors “with world class industrial infrastructure; efficient government services as well as lucrative fiscal and non-fiscal incentives.” The project links a “world class Sea Port as a transport logistics hub and gateway for international trade” with an “industrial platform for value addition and manufacturing processes” (EPZA, n.d.). While the plans call for infrastructure to link the port and SEZ, both remain disconnected from the city proper, and are situated on the southern edge of the city on the road to Dar es Salaam.

The SEZ’s masterplan, which the EPZA commissioned from Danish consultants COWI, encompasses five villages with an approximate combined population of 11,600 (COWI, 2013: 12 & 21). It states that “[l]arge tracts of vacant land are available in the area as no significant onsite developments have been undertaken. Thus, Bagamoyo SEZ presents a virgin area, where modern planning concepts can be used to develop the SEZ with contemporary facilities.” Due to its isolated site, “[a]ll necessary infrastructure, roads, power supply, water supply, etc. must be constructed during the transformation of the area” (COWI, 2013: 44). In addition to basic infrastructure and industrial plots, the plan includes “housing intermingled with recreational areas, tourism, institutions including both the Mbegani Fisheries Institute and the Uongozi Institute, as well as conservation, nature and green spaces” (COWI, 2013: 14). Yet these additional components are only scheduled for a later phase predicted to last twenty years. Meanwhile, the plan suggests (and proposes advertising) possible residential settlements west of the planned industrial area (COWI, 2013: 117).

Connectivity Promises Unfulfilled, Peri-Urban Zones Reshaped

At the time of writing, both projects were incomplete and had long passed the deadlines for the conclusion of their initial phases. Delays, budget overruns and forced downscaling plague large-scale projects worldwide (Flyvbjerg et al., 2003). By early 2016, both projects had been temporarily suspended, and, despite governmental reassurances, mounting controversies have cast doubt as to whether the projects will adhere to the original master plans. Several factors may compromise the projects' completion: electoral upsets; negotiations with multiple external investors in Bagamoyo; and a sharp economic downturn and fiscal crisis compounded by mounting social discontent in Iranduba.

Neither project has adequately planned for what infrastructure analysts call the “last mile” problem of connecting end users to networked processes and technologies. Satellite nodes, multiple transportation, telecommunications and energy grids all need to be readapted locally, at major regional cost and with the possible disruption of pass-by areas and producing disproportionate burdens on specific constituencies. This failure of planning is exacerbated in urban regions of the global South where the masterplans are superimposed on infrastructure fragility and multiple contingencies (Muggah, 2015; Gandy, 2006). However, even in their current state and even if they ultimately become *elefantes blancos* (expensive vanity projects), the projects have already transformed their respective areas. Examined through a critical infrastructure prism, they have begun to impact the urban realities of many locally-rooted people (Simone, 2015).

By late 2016, more than two years after the project's initial deadline, completion of the Iranduba University City (IUC) was still uncertain. In addition to on-going opposition within the state university community (França, 2013), media and political scrutiny revealed that even the main university buildings had not yet been completed. Their half-built structures stood at the

end of a paved road extension, which one of our local planning informants critiqued as unnecessarily wide given the bottlenecks to be expected on the AM-070 trunk roadway connecting it with the bridge to Manaus. The state government may increase the bridge's capacity by an additional lane in each direction. However, the state university has reported that it lacks funds to render the IUC functional. The new university president has begun a public consultation campaign to envision the campus's future (Gonçalves and Tapajos, 2016). In addition, amid a recession which has affected the entire urban region, including the Manaus manufacturing base, no investors have materialized to carry out the additional projects that the IUC master plan envisioned to supplement the university facilities.

Nevertheless, land speculation continues apace in Iranduba and lots surrounding the IUC are advertising their 'prime' location. While the masterplan may never fully materialize, the project's impacts already exceed the many expropriated and relocated families and the university constituencies. Researchers have begun to document the multi-dimensional character of Iranduba's transformation and its manifold impacts on land appreciation, sprawl and increased traffic, pollution, accidents and criminality (Sousa, 2015; Oliveira Louzada and Conceição Santos, 2016; Pinheiro, 2011). While Iranduba's rapid urbanization and incorporation into the expansive Manaus metropolitan area are inevitable, how much the IUC will enhance global connectivity remains questionable. The imperatives of increasing land values and producing premium real estate seem to have trumped the lofty goals of transforming Manaus into an economically diversified and sustainable urban region supporting effective conservation and social inclusion in its vast surrounding rainforest areas.

Construction of the first phase of Bagamoyo's SEZ is already underway, but the construction of the port has yet to begin and it has been mired in controversy. Its financial

backers are Chinese and Omani: the construction itself will be undertaken by China Merchant Holdings International Ltd., a state-owned conglomerate specializing in logistics and port construction. The framework agreement for the Bagamoyo port was signed in March 2013, with the official blessing of the Chinese government, symbolised by Xi Jinping's personal attendance. The 2015 election in Tanzania of political outsider John Magufuli led to a string of quixotic announcements about the future of the port, which indicate the lack of governmental consensus on infrastructurally-enabled connectivity. Most significantly, in January 2016, the Minister of Works, Transport and Communications announced that the port project had been suspended indefinitely: "we are currently concentrating on [upgrading] the Dar es Salaam and Mtwara ports [instead]" (Mirondo 2016a). The following day, however, the Government of Tanzania "clarified" the statement, confirming that a Memorandum of Understanding had been signed with the governments of China and Oman, and that together they were "preparing technical and commercial contracts for the implementation of the Port of Bagamoyo" (Mirondo, 2016b).

The extent to which the integrated Bagamoyo port and SEZ project will resemble the masterplanned satellite city is unclear. However, the announcement of a new port and the steady expansion of construction within the SEZ have already impacted Bagamoyo. First, anticipation of the project has augmented land values, and the city has rapidly expanded westward far in advance of public utilities. The newly built areas lack formal water supplies and electricity connections. While some residents have built houses, dug wells and installed solar panels, others have laid the foundations of small houses mainly to stake claim to ownership of their plots. Land is being exchanged and new dwellings are being built to accommodate recent migrants, attracted to Bagamoyo by its growing cash economy. So, in many ways, Bagamoyo

has already become a regional hub. The challenge for policy makers, however, is to extend infrastructure to cover the ‘last mile’ and transform Bagamoyo and Dar es Salaam into an integrated metropolitan region with transnational linkages.

Conclusions

Our experimental comparison of two projects near Manaus and Dar es Salaam began by examining the elite globalist character of nodal developments in peri-urban areas. Both state-led projects were predicated on a connectivity promise, which was linked to infrastructure enhancements, the prospects of upgraded land uses, and the capture of land values. We also showed that this form of project-led polycentrism, in which major investments are made to consolidate satellite or secondary nodes located dozens of miles away from the central city, does not decentralize planning power. This provides grounds to question the scholarship on city-regions that tends to equate polycentric urbanization with horizontal territorial governance, and in particular Scott’s (2008) arguments on the political and economic autonomy that globalization brings about for city-regions.

Our results also speak to peri-urban planning research in the global South: both cases envisioned future cities that had little in common with existing conditions, and the masterplans made scant provision for the integration of nodal developments with their surrounding areas. The Iranduba University City was designed for multiple uses, with strong residential and recreational components, while Bagamoyo was more exclusively focused on industrial land use, but both projects pay lip service to broad-based development. It remains unclear whether broader constituencies will benefit beyond elite users and investors. Displaced residents have not received appropriate compensation, and little provision has been made for other affected constituencies, such as the students and staff from Manaus who would face very long

commutes. Finally, after major public investments, both projects have been significantly delayed and, at the time of writing, their completion as originally planned cannot be guaranteed.

State-led masterplanning is not the only game in town for peri-urban areas. Previous research has emphasized the construction of private cities by large corporations, and the preference for gated community-living among the transnationally-oriented middle and upper classes. Such developments can also be found in Manaus and Dar es Salaam. Relations between state- and market-led drivers of polycentricity merit future research. Yet our focus on state-led projects matters: such investments could promote broader welfare gains, if conducted in more democratically-accountable ways and with more inclusive visions of the benefits of connectivity.

There are multiple entry points to engage the production of connectivity through coordinated infrastructure investments. Brazil, Tanzania and numerous other emerging and frontier economies have witnessed the renewal of regional planning (Schindler et al., 2017). This territorial re-investment of the nation-state is reflected in the United Nations Habitat's New Urban Agenda (NUA), with its call to "reinvigorat[e] long-term and integrated urban and territorial planning and design" (UN-Habitat, 2016: sec 15.iii). The NUA states that (sec. 50):

We commit to encouraging the urban-rural interactions and connectivity by strengthening sustainable transport and mobility, technology and communication networks and infrastructure, underpinned by planning instruments based on an integrated urban and territorial approach in order to maximize the potential of these sectors for enhanced productivity, social, economic, and territorial cohesion, as well as safety and environmental sustainability. This should include connectivity between cities and their surroundings, peri-urban, and rural areas, as well as greater land-sea connections, where appropriate.

Global examples of ambitious state-led programmes of infrastructure provision and (trans)national connectivity include China's Belt and Road initiative, the Indian government's use of industrial corridors, the China-Pakistan Economic Corridor, the Lamu South Sudan-

Ethiopia Transport Corridor, as well as plans for bi-oceanic integration across South and Central America.

In this paper, we proposed the concept of the infrastructure scramble as a means to question the globalist discourse that defines connectivity solely through the aim of cost reductions in corporate logistics. Working comparatively through our case studies allowed us to analyse in more depth how emergent polycentricity in consolidating urban regions links up with other territorial, economic and political processes at multiple scales. Our aim was to demonstrate that even urban studies that are highly localized and focused on specific development projects can and should make more explicit reference to the planetary proliferation of infrastructure networks and the connectivity aims behind them. The re-design of productive territories for global integration has enormous and insufficiently understood implications for urbanization corridors in the global South, including cities and unevenly developed and rapidly transforming peri-urban areas.

Overall, the infrastructure scramble is a heuristic intended to link the planetary expansion of infrastructure space to global dynamics of urbanization. Future research can broaden this paper's initial focus on state and geopolitical dimensions by examining in greater detail the multiple private actors involved in the financing, construction, management and uses of infrastructure networks. There is also much work to be done on the private-public articulations that occur through infrastructure growth coalitions at the global scale; the complex relations between the intended designs of infrastructure networks and actual processes of territorial reconfiguration; and the ways in which the un-/re-bundling of infrastructure leads to forms of geographical bypassing that produce new peripheries within the current model of selective and fragmentary global integration. While several urban regions and select territories

oriented towards world markets are gaining in connectivity, we must not lose sight of the many regions left behind. Interstitial locations in peri-urban areas are not reaping the benefits of nodal connectivity either. By emphasizing the ways in which state intervention and power relations influence the production of such uneven geographies, we could help envision a more just world of infrastructural interconnections in which, one day, the urban/non-urban distinction may be less hierarchical.

1.- A promotional clip is available on YouTube at

https://www.youtube.com/watch?v=kECXkZq_SKw (Last accessed on January, 30, 2018).

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