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Infrastructure-led development and the peri-urban question: Furthering crossover comparisons

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Abstract

Contemporary development policy portrays enhanced connectivity as the key to fostering economic growth in lagging regions. This global policy consensus and consequent infrastructure scramble have resulted in a proliferation of new urban spaces. These are dispersed, fragmentary and often unrecognised as urban by projects and plans centred on large-scale connective infrastructures to integrate remote regions into circuits of capital. Whilst our understanding of infrastructure-led development is informed by critical engagements with planetary urbanisation, global infrastructure and logistics, this position paper seeks to reconcile political economy analyses with situated studies closer to lived forms of heterogeneous precariousness in emerging urban worlds. Addressing recent debates that frame these bodies of scholarship as antagonistic, we emphasise the supplementarity of perspectives from within and beyond urban studies. This pluralism can be practised through comparisons that will (i) trace the geo-economic relationality of mega-infrastructures, which conditions directly and indirectly their planning, financing, construction and management, and (simultaneously or independently) (ii) examine difference in the diverse experiences of and responses to emergent infrastructural urbanisms of precarity. The article shows that genetic and generative comparisons can inform a research agenda on (peri-)urban precariousness, engaging policies with unmistakable global moorings but complex multi-scalar politics, diverging outcomes and situated resistances and appropriations.

Keywords

comparative urbanism, East Africa, geographies of precarity, Latin America, planetary urbanisation

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摘要

当代发展政策将加强连通性描述为促进落后地区经济增长的关键。这种全球政策共识和随之而来的基础设施争夺导致了新城市空间的激增。这些城市空间是分散的、支离破碎的，并且往往不被以大规模连通性基础设施为中心的项目和计划（旨在将偏远地区整合到资本回路中）认可为城市。虽然我们对以基础设施为主导的发展的理解是通过对行星城市化、全球基础设施和物流的批判性研究得出的，但本立场文件旨在将政治经济学分析与更接近新兴城市世界中异质不稳定性的生活形式的情境化研究相协调。针对最近将这些学术研究相互对立起来的观点，我们强调分别来自城市研究内部和外部的观点的互补性。这种多元化可以通过比较来实践，这些比较将 (i) 追踪大型基础设施的地缘经济关系性，这种关系性直接或间接地影响它们的规划、融资、建设和管理，以及（同时或独立地）(ii) 考察对新兴基础设施城市化所带来的不稳定性的体验和反应的差异性。本文表明，遗传和生成比较可以为（周边）城市不稳定性的研究议程提供启示，考虑具有明确的全球普遍性、复杂的多标量政治、不同的结果以及情境化阻力和应用的各种政策。

关键词

比较城市化、东非、不稳定性地理、拉丁美洲、行星城市化

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Introduction

Novel spatialities and widespread territorial transformation characterise contemporary urbanisation. Initial concern with explosive megacity growth now extends to megaregional transformations. In this article, we call for renewed attention to conceptualising peri-urban development, an extensive phenomenon that needs to include the formation of sparse settlements along development corridors and the emergence of remote new towns even beyond. We posit that these emerging urban spatialities are linked to the unprecedented enrolment of frontier economies into global value chains as precarious and unacknowledged forms of urbanisation proliferate with the economic restructuring of peripheral regions that infrastructure connectivity engenders. Drawing from analysis on connectivity, turbulent logistics operations and global infrastructure (Chua et al., 2018; Easterling, 2014; Hildyard, 2016; Wiig and Silver, 2019), this conceptualisation of the peri-urban aligns with theoretical efforts regarding planetary urbanisation beyond city–hinterland boundaries (Brenner and Katsikis, 2016; Brenner and Schmid, 2014, 2015), and promotes a cross-scalar analysis that links the shifting shape of capital investment to lived experiences of precarity in encounters with infrastructure across (peri-) urban spaces (Arboleda, 2020; Zoomers et al., 2017).

The article proposes the use of comparative tactics to probe causal links between geographically extended connectivity planning and uneven and fragmentary peri-urban development. In so doing, it contributes to global urban studies theoretically and methodologically. It extends, and urbanises, previous work on infrastructure-led development (ILD from here on), a development strategy and investment regime that has consolidated since the 2008 global recession (Schindler and Kanai, 2021), whilst showing how comparative tactics help us to better understand ILD's implications for urbanisation processes across geographical contexts. The regime is driven by a global

yet unstable growth coalition, which comprises the World Bank and the G20, and powerful nation-states such as the United States and China. Its members both collaborate and compete to mobilise finance, build, manage and control infrastructure projects in a variety of low- and middle-income countries (Schindler and Kanai, 2021). This increasingly entails channelling patient institutional capital (e.g. pension funds and sovereign wealth funds) into large-scale infrastructure whose purpose is purportedly developmental (Bigger and Webber, 2021; Gabor, 2020).

ILD matters for global urban studies. Whereas the role of large-scale infrastructure investments in sustaining economic growth is debatable, a range of speculative processes and territorial transformations unfold in consequence to 'this infrastructure scramble' (Kanai and Schindler, 2019). Economic planners justify greenfield megaprojects with connectivity promises for select sectors and assumptions of territorial trickledown. Their goals are narrow: facilitating logistics and powering strategic activities for the seamless coupling of domestic firms and offshored foreign investments with global value chains – often involving resource extraction and agro-food processing. Real estate speculation occurs from assumptions that territorial transformation will augment land value (Gillespie, 2020; Goodfellow, 2020). Therefore, ILD practices constitute a denial of urbanism. They assume inherent benefits to connectivity whilst ignoring emergent forms of precarity in near-and-far peripheries – which include but are not limited to insecure livelihoods, poor housing, inexistence of facilities and exposure to widespread environmental degradation (Arboleda, 2020; Kanai, 2014; Kanai and Schindler, 2019). In sum, we argue that ILD is part of, and can illuminate understanding of, extensive, uneven and fragmentary global urbanisation.

The article's application of novel comparative strategies to the urban spatialities of planetary connectivity highlights the need to engage diverse manifestations in a situated way. To be clear, ILD does not constitute a plug-in interpretive theory with global purchase on emerging peri-urban conditions, to be applied everywhere equally. Thus we draw from the methodological innovation and analytical pluralism of Robinson's (2016a, 2016b) urban comparativism. We align with the aim of shaping 'a more global urban studies' (Robinson and Roy, 2016: 181) whilst calling for attention to the peri-urban question. Analysis of ILD requires a comparativism which can grapple with novel modes of connectivity across different territorialisations, engaging peri-urban worlds in making and instigating the production of new concepts through innovative comparisons. For peri-urban research that avoids both perspectival fragmentation and the erasure of difference, we recommend use of Robinson's (2016a, 2016b) two distinct yet reconcilable sets of comparative tactics: the genetic and generative. Genetic tracing identifies power-filled geo-economic conditioners in the production of connectivity-centric territorial re-design. Generative comparisons can produce new insights by analytically bringing together heterogeneous social encounters with infrastructure amidst peri-urban precarity. We identify a broad range of reactions from endurance to resistance and social re-appropriation. This comparative perspective, therefore, helps to identify causal links between ILD plans and (its unacknowledged) urbanisation processes and to insist on the diverse range of operational landscapes and peri-urban conditions that result.

The article comprises five sections. The first section establishes how the new urban comparativism can engage ILD as a global (peri-)urban process. The second section reviews the ILD framework and its growing

role in shaping development policy and practice. The third section demonstrates how to put genetic tracing to work. It outlines the geo-economic entanglements of infrastructure investments, allowing us to get closer to characterising the nature of ILD as a vector of global urbanisation. Specifically, we make a distinction between conditioning frameworks designed to render places legible to global investors, and the imposition of project-specific conditionalities whose establishment is a prerequisite for particular projects. The fourth section develops an account of peri-urban worlds of infrastructural precarity, which are the differentiated territorialisations of ILD. We propose that further research could proceed by composing comparisons across cases where these (peri-) urbanisms of infrastructural precarity are lived through endurance or met with resistance and struggle. The article concludes with reflections on the challenges of launching ILD-related urban concepts with comparative purchase. Responding to this challenge will foster peri-urban research and support a more global urban studies.

A more global peri-urban studies

This section explains how analytical strategies from the new comparative urbanism can help avoid turning ILD into a universalising theory of peri-urbanisation fraught with concepts without difference (Robinson, 2016a: 19). It positions this article within the debate on the place of geopolitical economy within a theoretically diverse global urban studies and explains our aim of bridging approaches focused on relationality and those concerned with difference. The comparative tactics and cases that we will present in the rest of the article allow this analytical perspective to be taken forward, which we see as essential for bringing analysis of ILD into urban and regional research.

The drive for a more global urban studies calls for: (i) broader locational repertoires (Kanai et al., 2018; Robinson, 2002), which could support (ii) novel conceptualisations (Roy, 2009), and spur (iii) decolonial knowledge production (Lawhon and Truelove, 2020; Leitner and Sheppard, 2016). Crossover work has begun to address (im)mobilities across transnational development corridors (Enns, 2018; Kanai and da Silva Oliveira, 2014), metabolic rifts and community disruptions resulting from remote extractive activities linked to urban consumption (Arboleda and Banoub, 2018; Lamb et al., 2019). Yet, more permeability beyond the scalar and thematic insularity that still dominates urban studies is required (Angelo and Wachsmuth, 2015; Zeiderman, 2018).

Critical urban theory has struggled for decades to articulate an integrated critique on both the sources of relationality which draw different urban contexts into conversation, and the ways in which difference matters analytically (Brenner et al., 2011; Scott and Storper, 2015). Brenner and Schmid's (2015) ambition of integrating the field by launching a planetary epistemology of the urban faced renewed scepticism regarding political economy's place in transdisciplinary urban collaboration (see Angelo and Goh, 2021). Expressing misgivings, Derickson (2015: 648) calls for 'messier interventions', drawing on critical epistemes to 'create linkages between places that hold promise for productive solidarities towards undecided and undecidable urban futures'. Oswin (2020) opposes incorporation to narratives about capitalism as 'subsidiary context', and 'a surface-depth model of social relations [that] misses a great deal about the realities of lives lived on the margins' (Oswin, 2018: 544). Jazeel (2011) doubts cosmopolitan theories' promise to engage difference in non-assimilatory terms.

Without minimising the points of contention, we suggest that divergent approaches could indeed converge around certain common concerns. Those concerned with geo-economic relationality should indeed continue investigating how infrastructural arrangements engulf their locations of concern and implicate them in pan-urban processes and patterns (Peck, 2015) – it is connections, then, that constitute the urban across geographical spaces and state scales (Brenner, 2019). Nevertheless, researchers should also be aware that phenomena they study in the urban South are always already co-constituted with these processes, and while encountered as pre-existing materiality, cannot be reduced to either structure or context (Schindler, 2017).

Difference needs to be considered constitutive of the global political economy of urbanisation, not just a source of variation. Hart (2018: 389) explains that '[w]hat are typically seen as bounded "units of analysis" are often more usefully understood as vantage points from which to try to begin to grasp the coming together and interconnections of what (at least initially) appear as key processes'. Understanding the peri-urban as a coming together of interconnections in geo-historically situated locations is essential for critiquing its problematic conceptualisation as a spatial abstraction buffering the city and for avoiding form-based dichotomies with the countryside (Brenner and Schmid, 2014). Roy's (2016) deconstructive approach to post-colonial critique mobilises concepts of absence and undecidability to extricate what discourse mutes, identify what cannot be charted with certainty and contribute to an infrastructural analytic of the peri-urban. Even when connectivity schemes do not highlight or even mention urbanisation, infrastructural provision sets up a(n often-tacit) diachronic axis for the emergence, transformation and differentiation of urban spatialities over time. Yet, peri-urban promises of development commonly fail to materialise in accordance with normative assumptions and an image of the (Western) good city. This article addresses the question, then, what kind of (peri-) urbanisation results from ILD?

Difference, as understood in Henri Lefebvre's dialectic between space and power, helps identify practices with revolutionary potential. Differential space constitutes a politicised appropriation whereby the economic abstractions of exchange value are forced to give way to use value and concrete needs of those inhabiting the space (Leary-Ohwin, 2016). Buckley and Strauss (2016: 627) search for differential space in the 'everyday' and the 'residual', indexing 'that which in no way [could be] explained fully or adequately through capitalocentric epistemologies'. This can help avoid the 'partial practice' of single epistemological frameworks (Buckley and Strauss, 2016: 630–631) and aligns with Southern theory's call for knowledge decolonisation (Santos, 2014), which leads us to Jazeel's (2018: 409) preference for supplementing overly forced syntheses across different historical lineages and affinities. As a reflective practice, supplementing can potentially reveal urban studies' blind spots (Jazeel, 2018: 416). In summary, to understand how the peri-urban becomes instantiated through infrastructures with a connectivity bias, we need to transgress arbitrary boundaries around multiple divides and dialogue more openly with 'other' fields of knowledge (see also Pieterse et al., 2018; Watson, 2016). Teasing out the emergence of infrastructure-inflected urban and regional geographies requires crossing over thorny debates in urban and development studies. Integrating (geo-)political economy's contribution with epistemologically pluralistic critical agendas within and beyond urban studies is a tall order. In fact, there is much to gain by further cross-fertilisation between urban studies and critical development research, and we call for

a broader range of perspectives to inform understandings of the territorial instantiations of ILD.

To grapple with the relationality and differentiation of ILD as urbanisation process, we have turned to a new comparative repertoire which includes both 'genetic' and 'generative' tactics (Robinson, 2016a). Genetic comparisons address the genesis of phenomena and chains of causality. The tracing method helps to analyse flows, circulations and mobilities. We utilise this approach to analyse the geo-economic entanglements of infrastructure projects and the extra-local governing of networked infrastructures. We analyse both project-specific conditionalities and the broader conditioning frameworks built into ILD. Generative comparisons, which are composed of heterogeneous cases but with a clear analytical purpose, make visible the divergent pathways that repeated instances of evolving phenomena may take. We show how bespoke comparisons can be applied to repeated instances of ILD with divergent expressions of lived precarity. If infrastructure may be conditioned, directly and indirectly, by a connectivity bias that produces comparable forms of precarity across various regions and settlement typologies, comparability should not be mistaken for homogeneity. Social reactions mediate geo-economic forces' social reactions, and may take complex forms ranging from endurance to resistance and appropriation. Together these produce diverging conditions of urbanisation. This requires situated analysis and we conclude by showing how ILD could benefit from comparison as a means to develop insights across the diversity of urban experiences – learning from elsewhere. This both improves understanding of the processes involved and expands the scope of (peri-)urban experiences considered, further highlighting the value of comparative urbanism as a methodological support for global urban studies.

Urbanising infrastructure-led development

This section introduces ILD's propositions. It develops a critique of policies providing economic justification for channelling investment into infrastructure networks. We argue that ILD is animated by discourses of territorial trickle-down that can render urbanisation invisible.

ILD targets low- and middle-income countries responding to ongoing pressures to reignite growth after the 2008 global recession. For Justin Yifu Lin, former Chief Economist (2008–2012) at the World Bank (WB), multiplier effects of infrastructure upgrades in emerging economies have the potential to propel worldwide recovery. Lin has argued for a global infrastructure initiative reminiscent of the Marshall Plan to foster demand for advanced sectors in OECD countries and address bottlenecks hindering industrial upgrading and investment (Lin and Doemeland, 2012). Critics have pointed to the financial extraction and speculation that occurs when infrastructure financialisation in the global South seeks to secure income streams for private investors (Goodfellow, 2020; Hildyard, 2016). Yet, in collaboration with global governance institutions such as the G20 and the OECD, the WB continues to support 'infrastructure for development'. This takes place in concert with an attempt to cement infrastructure's status as an asset class to facilitate investment (Laboul and Schwartz, 2018).

In the aftermath of the 2008 financial crisis, therefore, global policy elites rediscovered the potential of global infrastructure both as an asset class and as the key to returning to post-crisis growth (Schindler and Kanai, 2021). This resulted in a step change in the rate of investment in connective infrastructures and at least two differentiated (and increasingly opposed) approaches to ILD. Quantitative easing and low interest

rates in the US allowed countries to finance ambitious megaprojects. Meanwhile, the economic downturn led to decreased demand for Chinese manufactured goods, so in response Beijing launched a domestic infrastructure development programme designed to absorb excess capacity. After building a nationwide high-speed rail network and many white elephants, China became saturated with infrastructure (Tooze, 2018: 248; Yu and Mitchell, 2019). Beijing was forced to choose between restructuring China's domestic economy and redirecting excess capacity to new markets, and policy makers chose the latter. In 2013, Xi Jinping inaugurated the Belt and Road Initiative (BRI), an ambitious plan to foster globe-spanning Sino-centric connectivity that provides partner countries with one-stop-shop infrastructure solutions (i.e. finance, construction and insurance) (Liu, 2019). In response, the US scaled up financial assistance for global infrastructure construction (Schindler, 2018), and despite Trump's unilateralist instincts the US has veered towards multilateralism in its infrastructure development programme. For example, the so-called Blue Dot Network includes the US, Japan and Australia and seeks to compete with, or at least provide an alternative to, the BRI (Rajah, 2020). In this era of hard-nosed realpolitik, a win-win narrative of global influence and growth through enhancing connectivity replaces altruistic rhetoric surrounding development aid. Geopolitical tensions are consequently mixed with geo-economic interests.

Many investment-recipient countries have government units that manage infrastructure megaprojects (Dodson, 2017), often as part of revived regional planning schemes (Schindler et al., 2018). These prioritise external connectivity over endogenous development at multiple scales. Supra-national alliances such as the earlier Initiative for the Integration of Regional Infrastructure in South America (IIRSA) were created to coordinate investments (Kanai, 2016), while countries have incorporated spatial planning into their industrial policy (Kanai and Schindler, 2019).

With the extension of transport, energy and telecommunications networks, erstwhile peripheral and backward regions acquire opportunities for specialisation in the spatial division of labour, which comes at a cost. Resource frontiers evince connectivity's unintended and/or unacknowledged territorial consequences (Arboleda, 2020; Kanai and da Silva Oliveira, 2014). Yet ILD responds with 'strategic ignorance' regarding its impacts on peri-urban growth and urban change (Zeiderman, 2018: 1119). The scale of contemporary agri-business necessitates landgrabs whereby the state-led expansion of monocultural agro-industrial landscapes has devastating socio-environmental consequences (Clements and Fernandes, 2013; Li, 2018). In South-east Asia, mega-plantations stretch endlessly into and across the horizon to meet global demand for palm oil (Kenney-Lazar and Ishikawa, 2019). Similarly, vast South American soya fields connect functionally to distant urban processing and logistics centres, in what constitutes 'agro-industrial urbanism' (Gordillo, 2019; Oliveira and Hecht, 2016). While this induces light industrial processing in some contexts, it has not fostered comprehensive economic upgrading. Evidence suggests that even if logistics infrastructure has improved, the 'global factory' is comprised of a limited number of firms agglomerated in a small number of countries (Baldwin, 2016; Buckley, 2009). These key nodes are integrated across space, with capital-intensive logistics infrastructure that is increasingly enhanced by artificial intelligence, computer science, biotechnology, robotics and geospatial information systems (Arboleda, 2020).

Certainly, the contemporary developmental imperative demands integration: frontiers of extraction – particularly mega-plantations

and planetary mines – must be connected with key production nodes in global value chains and consumer markets. Thus, cross-border infrastructure networks integrate an urban fabric extending metropolitan influences and footprints virtually to the entire planet (Brenner and Schmid, 2015; Soja and Kanai, 2007; Weiss et al., 2018). But connectivity-centric territorial re-design also functions as a vector of urban precarity. Complex logistics operations apply extractive logics to both territories and labour (Mezzadra and Neilson, 2019). Rather than accentuate local particularisms in pursuit of comparative advantage, places are forced to conform to global standards (Danyluk, 2019) and macro-spatial masterplans (Kanai, 2016). Brenner (2019: 379) argues that the new spatial matrix of uneven development, with its selective infrastructural connections and bypasses, produces 'exclusions, deprivations, disruptions, vulnerabilities and dispossessions for large population segments' in hinterland regions instead of trickle-down prosperity. For Brenner (2019), this confers new analytical and political urgency to the question of the hinterland's transformation into operational landscapes within the urban fabric (see also Brenner and Katsikis, 2016; Brenner and Schmid, 2014). The rest of the article shows how this critique can be developed further through a comparative analysis that both traces the power relations of the geo-economic articulations conditioning territorial change and highlights situated experiences of precarity, as endurance and creative resistance.

Tracing ILD's geo-economic entanglements: Comparing conditioners

Genetic tracing is not new to global urban studies. The approach has been used to identify the origins of models, policies, practices and materials of urban development coming together in specific locations (Guggenheim and Söderström, 2009; Hart, 2002; McCann and Ward, 2011). Likewise, we can trace the genesis and transformative travels of connective infrastructures to better understand ILD's heterogeneous logics and practices, which are far from monolithic. Whilst the ILD regime tends to lead to the re-design of diverse geographies into monocultural economies, simultaneously broadcasting metropolitan footprints and extending urban forms, various discourses, plans and projects territorialise differently in diverse peripheral regions, which highlights the need for situated analysis comparing the influences and impacts of different schemes.

Identifying the various origins and implications of connectivity narratives can inform the critical search for alternative forms of infrastructure planning whereby regional articulations and cooperative inter-local relations could be fostered (Massey, 2007; Quispe et al., 2013). We need more empirically informed studies of how ensuring connectivity and sustaining high volumes of unimpeded circulation often take primacy over addressing local needs, livelihood concerns and the diversification of the economic base according to place-specific potentials. Furthermore, genetic tracing can illuminate how the imperative to produce legibility for strategic resources and projects within global circuits of financing and to conform to state-of-the-art international logistics often results in violent processes, which erase local particularities of people and place by either design or default (Cowen, 2014; Wilson and Bayón, 2017).

What infrastructures should be built and for whom? Genetic tracing shows how these questions are answered by those with the power to shape infrastructure networks. Decisions are commonly made extra-locally, often at supra-national scales. In fact, ILD itself can be understood as a set of aligned conditioners. But the process is variegated

and comparative analysis illuminates causal relations. Whilst stark conditionalities are often built into bilateral loans and agreements, diffuse conditioning takes place through strategic intelligence, coordination and frameworks generated by multilateral agencies and global policy.

Conditionalities have changed dramatically since the early days of neoliberal hegemony. Structural adjustment programmes typically amounted to a comprehensive 'rolling back' of developmental states whose activity supposedly hindered growth by distorting markets (Killick, 1995; Leys, 1996), and novel mechanisms to support market integration were subsequently 'rolled out' (Peck and Tickell, 2002). Initial emphasis on 'getting prices right' in this way gave way to the creation of institutions to foster economic growth in the 1990s (see Rodrik, 2006) as development economists began to adopt 'good governance' institutional frameworks (Acemoglu et al., 2005). But after the 2008 economic crisis, lacklustre developmental outcomes were more likely to be explained by infrastructural rather than institutional deficits (Schindler and Kanai, 2021). Thus, conditioning is now often articulated in relation to infrastructural investment and demands on connectivity upgrades.

The imperative to mobilise private capital for the expansion of infrastructure networks is at the core of policy coordination globally. Genetic tracing can be applied to compare how different institutions pursue this goal through systemic conditioning. The G20 and the World Bank provide salient examples requiring further inquiry. The G20 created the Global Infrastructure Hub (GiH) in 2014, seeking to standardise infrastructure investment and project delivery and to render the entire process more legible to risk-averse investors. Its Project Pipeline, for example, divides project delivery into eight discrete stages, such as 'start of project feasibility/business case' and 'government approval'. Investors can view projects at each respective stage. Through the Global Infrastructure Connectivity Alliance, the G20 coordinated a joint declaration by multilateral investment banks in support of infrastructure investment (Dodson, 2017: 88–89), and identified trade and transport corridors for development across six continents (Wiig and Silver, 2019: 915). Recently, the GiH launched the 'InfraChallenge', 'an innovation competition aiming to accelerate the global infrastructure industry' (G20, 2020a, 2020b). These efforts facilitate investment but also serve to condition countries by requiring certain levels of conformity with the procedures for securing investment in ways that call for further comparative studies.

Since the early 1990s, the WB has engaged in a calculative exercise on the comparative performance of states, producing rankings and numeric expert knowledge on aspects of governance in ways that (de)politicise policy decisions under the guise of good governance (Erkkilä and Piironen, 2014). The Logistics Performance Index (LPI), published since 2007, includes a survey on the quality of transportation infrastructure, thus evaluating the connectivity endowments of particular places (Hildyard, 2016), and conditioning investment decisions and policies in emerging economies (Aguiar, 2017). For example, the LPI's methodology surveys logistics professionals and assigns value to the quality of port infrastructure based on the perceptions of international freight forwarders (Arvis et al., 2016: 7). By such 'naming and shaming' through rankings and performance monitoring, the LPI prioritises external connectivity in investment decisions over place-based endowments. Intra-regional integration is absent or remains a mere afterthought and comparisons of different infrastructure

investment plans can tease out when and how this is pursued within the larger connectivity imperative.

Free trade, financing and cooperation agreements condition decisions on connectivity infrastructure more directly through contractual obligations. These conditionalities have a history of leaving public policy few options but to advance neoliberal goals, including public sector contractors, privatisation of services and infrastructure provisions and deregulation in the name of free trade (Grinspun and Kreklewich, 1994). Currently, a growing number of free trade and cooperation agreements condition countries to invest scant public resources in connectivity networks and/or relinquish control to private and foreign actors. The notion that trade competitiveness depends on the quality of infrastructure is influential, particularly regarding port efficiency (Kanai and Kutz, 2013; Nordås and Piermartini, 2004). Conditionalities vary greatly depending on donor and partner countries, begging further comparisons.

The global competition between China and the US in the infrastructure sector matters (Schindler et al., 2021). When compared with the US, China imposes few general conditionalities on recipients of loans for infrastructure (the main exception is that countries cannot promote 'splitism' by recognising Taiwan). Instead, conditions are narrow and project-specific, such as the use of Chinese construction firms and incorporation of technology standards, and projects contribute to an overall objective of strengthening Sino-centric global production networks (see Hung, 2015). China's approach is to provide hard infrastructure that conditions countries in ways that reorient economic activity towards East Asia (Mayer and Zhang, 2021).

Different conditioners coincide in shaping specific geographies and overlay over time in ways that complicate tracing their influences. The case of Colombia exemplifies this. Having signed more than 40 development agreements and written them into law over the past two decades (as reported in Hylton and Tauss, 2016: 253), the country has also recently embarked on aggressive investments in connective infrastructure, particularly under former president Juan Manuel Santos (2010–2018), who envisioned this as one of the 'locomotives of progress' (Diaz et al., 2021). Critiquing development gone awry in the fertile Cauca Valley, Escobar (2019: 193) explains the territorial implications of these layers of investment. A vast monocultural assemblage of sugar cane mega-plantations has been expanding for decades, sustained by irrigation, chemicals and precarious labour. This is functionally integrated with the industrial, financial and service infrastructure of metropolitan Cali and other intermediate cities. An expansive network of roads 'concretes in' this defuturing (future-destroying) project, which Escobar (2019) denounces, calling for opposition and contestation. Yet, the valley and its port city of Buenaventura continue to receive major investments in interconnectivity, a trend accelerated since the free trade agreement with the US in the mid-2000s. Despite major deficits in social infrastructure, 'bottleneck' arguments on impediments to reaping liberalisation's benefits still legitimise connectivity upgrades (Zeiderman, 2018). Hence, to understand the processes of urbanisation associated with ILD, such distinctive territorialisations need to be considered, as the mode of development leaves little room for alternatives and creates violences of its own.

Precarious peri-urbanities: Endurance, resistance, appropriation

ILD's conditioning of territorial standardisation through differentiated mechanisms and diverging outcomes is only part of the story. Peri-urban transformations also hinge

on how social reactions mediate the precarity that connectivity regimes produce. Following Butler's (2009: ii) definition of precarity as '[a] politically induced condition in which certain populations suffer from failing social and economic networks of support', we suggest a generative crossover between city-based studies of precarity and critical development research engaging infrastructural marginality beyond city boundaries. We propose composing innovative comparisons across case differences to specify links between multidimensional precarity and multifarious situated responses – for example, by bringing together more and less-'urban' cases from different regional contexts.

Connectivity-oriented infrastructure expansion results in (peri-)urban geographies fraught with precarity. This is obscured by ILD's globalist discourse of economic development foregrounding trade expansion, logistics and local coupling with global value chains (Arboleda, 2020; Kanai and Schindler, 2019). This points to the need for a more systematic engagement with geographies of precarity beyond the city locations (Waite, 2009). Labour conditions vary widely and scholars have identified new modes of surplus value extraction beyond shop floors and formal-sector waged labourers (Gago, 2017; Strauss, 2018). Precarity also implicates access to housing (Muñoz, 2018) and forms of endangerment (Zeiderman, 2016a) including exposure to toxic hazards (Auyero and Swistun, 2009; Chan, 2019); natural and human-factor disasters – devastating floods and fires (Endo, 2014; Goh, 2019; Zeiderman, 2016b); and underserviced basic needs – water supply and sanitation (Desai et al., 2015). It is essential to recognise that these are not limited to consolidated cities but also extend to rapidly expanding peri-urban areas where limited and unequal access to public institutions such as hospitals and schools exacerbates precarity (Gordillo, 2019).

The re-engineering of space can result in 'infrastructure violence' across the urban–rural spectrum. It creates strategic enclaves with select functions disembedded from their surroundings. On the opposite, places that are left behind economically are also subjected to symbolic and material marginalisation, abjection and ultimately infrastructure dis-connection (Rodgers and O'Neill, 2012). Rodgers (2012) draws attention to metropolitan Managua, Nicaragua, where the construction of multilane roadways has dissected historically disadvantaged neighbourhoods and subjected residents to a continuum of violence ranging from the physical (violent evictions and expulsions) to the socio-psychological. Just as infrastructural violence can be prosecuted by carving through a place, it is also enacted by bypassing places. Focusing on Indonesia's mega-plantations, Li (2018) points out that road investments centre on plantation facilities whilst circumventing older established towns, violently peripheralising independent farm producers and decoupling them from markets in larger towns and cities. Overall, material infrastructures work alongside legal and administrative provisions to consolidate predatory plantations as the preeminent model of agrarian territorial development.

Generative comparisons across the heterogeneous peri-urban spectrum can foster productive crossovers between global urban studies and critical development research whilst also putting global infrastructure in a historically comparative context. Infrastructure simultaneously embodies and symbolises development promises across geographical and historical differences. In the mid-20th century, the heyday of developmentalism, the integration of backward regions into the 'national space economy'

constituted international planning best practice and signalled national progress. Spatial planning strategies included master-planned growth poles, river-basin territorial integration and hydroelectric dams powering entire regional production systems (Friedmann and Weaver, 1979). The transformation of territory through spatial planning was coupled with the 'improvement' of populations through social engineering. Under contemporary ILD, cross-border corridors, intermodal trans-shipment complexes and post-Panamax ports are the spatial signifiers of connectivity promises. These mobilise aesthetic and discursive resources for the affective enrolment of communities into projects and territory: they index technical mastery and still invoke patriotic pride (Li, 2018). But territorial development schemes depart remarkably from 20th-century predecessors in the near absence of concern they exhibit for the social reproduction of a productive labour force (see Dye et al., 2021), which warrants further comparison in future research. For example, many projects have been stripped of the social engineering components that were inextricably linked to territorial transformation in the 20th century – in the case of new towns on resource frontiers, which responded to a territorial imperative, urban spaces were designed to incubate an industrious working class (Wakeman, 2016). Instead of producing or improving populations through social engineering in the likeness of developmentalist predecessors, ILD projects assume that people will respond entrepreneurially to opportunities supposedly afforded by infrastructure. In this sense, they are embedded with neoliberal assumptions surrounding the logic of competition (Davies, 2017) and call for examinations of their consequences that compare them with projects based on other past and present models.

The disappearance of social engineering and developmental agendas from territorial schemes is compounded by processes of land-grabbing and *depeasantizaton* (see Zoomers et al., 2017). There is a sizeable population that remains permanently outside of the formal labour market (Li, 2010; Sanyal, 2007), whose members oscillate precariously between 'cities of peasants' and 'forests of urbanites' (Castriota and Tonucci, 2018). In the 20th century, planners would have sought to mould this mass of undifferentiated former peasants into a population commensurate with the emergent territory (e.g. miners for mining towns, industrial labourers for special economic zones and so on). However, the formal economy simply cannot absorb these former peasants en masse, and hence it makes little sense for the spatial planners of connectivity infrastructures to (re-)produce a population of labourers destined to remain idle and keep moving. Thus, connective infrastructures and cities of logistics are constructed by what Samaddar (2019: 112) refers to as 'transit labour', that is, 'invisible, dispensable, but ready to hand'. Given its disposability, no effort is made to facilitate its reproduction, which poses a challenge for comparative studies to think through multi-sited and mobile strategies to accompany these precarious workers in their journeys through infrastructural space (Kanai and da Silva Oliveira, 2014).

Comparisons can focus on the concern for the socio-ecological consequences of connectivity that ILD displays. Escobar (2016) points out that the drive to produce an expanded and monolithic order of infrastructuralised geographies (the One-World world of global capitalism, in his words) threatens to obliterate a multiplicity of relational worlds of difference. With the never-ending expansion of the 'resource frontier', threats extend to remote socio-ecosystems such as forest-worlds and mangrove-worlds. These have long been inhabited by diverse populations dependent on their life-enabling materialities but are now rapidly disappearing (see also Diaz et al., 2021; Gordillo,

2019). Future generative comparisons could further elucidate how peri-urban practices and conditioned materialities interact differently in each of these singular life-worlds.

The varied ways that ILD throws people into novel urbanisation processes call for comparative examinations. Willing engagement may take place in the 'real-estatisation of domestic capital' where local investors seek to anticipate the next large-scale megaproject (Goodfellow, 2020: 265–266). However, as we have indicated, the expansion of global entanglements often engenders urbanisms of precarity, which necessitate an acceptance of indeterminacy and rhythms of endurance (Simone, 2018). This may mean that bodies stand in for brick and mortar in dense but underserved informal neighbourhoods where they do the work of grey infrastructure (Simone, 2004a). People may also find a niche as connective infrastructures, facilitating or hindering movement of people and things across expansive urban and peri-urban worlds. The conceptual boundary between endurance and resistance can be blurry as the latter is effected both through collective and individual multifarious actions (Scott, 1985).

In barely habitable spaces at the interstices of infrastructure materialities, inhabitants manage competing pressures to crowd into dense areas (Bayat, 2000), but also extend the scope of their operations to the edges of extended urbanisation (Simone, 2019). In either case, people struggle to situate themselves in strategic relation to chokepoints where they can access – sometimes surreptitiously – resources that serve as the basis of social reproduction (Desai et al., 2015; Schindler, 2017). Indeed, Mercer (2020) showed that in Dar es Salaam and other cities in Sub-Saharan Africa, property ownership is not only a financial investment but it offers the prospect of middle-class membership.

Even when drawn violently into urbanisation processes, people are not entirely stripped of agency, and can influence the terms of engagement with dynamic surroundings (Simone, 2004b). Those resisting in place, particularly women, can be subjected to new forms of confinement and precarisation, particularly when ILD is implemented in conflict-torn or pacified peripheries. Yet, against threats of gender-based and sexual violence, and an overt environment of everyday fear in infrastructuralised landscapes of extraction, Ojeda (2016) points out that community networks have formed for food production, in defence of water and towards political mobilisation. This indicates that social re-appropriation of built environments and differential space may not be limited to consolidated cities, and calls for further peri-urban cross-examination.

The Chinese-built highway that links Nairobi and Addis Ababa illustrates multiple dynamics at play in peri-urban development. Isiolo is clustered around a single road with heavy traffic resulting from the highway upgrade. It features all the trappings of a frontier boomtown – a market bustling with itinerant traders, overburdened waste management facilities and a rapidly expanding built environment comprised primarily of concrete. Much of the sand that is mixed with cement to fuel the growth of Isiolo is mined in Archer's Post, an even smaller frontier outpost approximately 35 km north, where weary heavily armed police guard against cattle rustlers who make use of the highway to execute daring raids on local herders. Thus, the highway introduces circumstances falling largely beyond local control but it also offers licit and illicit opportunities for inhabitants of this frontier milieu to insert themselves into transport-oriented urbanising circuits – as police, market traders, cattle rustlers, shepherds and sand

miners. For those who manage to fashion livelihoods and a modicum of security out of this frontier sociality spawned along the urbanising highway, it is worth reproducing. A comparative example can be found in the dynamics at work on the recently refurbished road leading north from Dar es Salaam to Bagamoyo, a coastal satellite city to the north. It constitutes an urban sinew lined with small shops that cater to inter-city traffic in the urban explosion that has accompanied the road upgrade. Shops sell construction materials – cement, metal door frames and corrugated steel sheets, timber and readymade doors – used to thicken the urban corridor. Thus, emergent urban spaces function as both waypoints and destinations.

Local institutions and (trans-)national legal systems may collide, generating vibrant politics in geographies reshaped by enhanced connectivity infrastructures. The capitalist cornerstone of private property may encounter other value systems that recognise claims advanced on the basis of morality (Chatterjee, 2004). For example, the transnational Lamu Port–South Sudan–Ethiopia Transport (LAPSSET) Corridor in East Africa was jeopardised by a series of protests. One group of protestors did not object to the project in general, but they mobilised to demand that well-paying jobs go to locals (Ahmed, 2018). Another group, however, opposed the project tout court, citing its threats to 'multidimensional traditional knowledge systems that they claim have been transmitted culturally through generations over centuries' (Chome, 2020: 320). Such struggles are not particular to LAPSSET; comparative examples can be found in various world regions. For example, a remarkable confluence of struggles has erupted in Buenaventura, Colombia's largest port on the Pacific. There is much to learn from the diverse social actors in and around the city. They have identified how the 'model of development' renders them invisible, as the first step to contest it.

With unusually challenging conditions of underdevelopment and social exclusion, the largely Afro-Colombian city of Buenaventura experienced a surge of armed violence after the arrival of paramilitary groups in the 2000s (Nicholls and Sánchez-Garzoli, 2011). Whilst the Colombian government negotiated free-trade agreements with the US and others, and opened the lucrative harbour for major national and international investments to expand and upgrade facilities, residents were exposed to a racially-driven eviscerating politics. Homes and neighbourhoods were razed, water-based livelihoods robbed and bodies gored (Alves and Ravidran, 2020). Rising from the horror, organisers did not only work within the city but also formed regional coalitions with peri-urban and remote Afro-Colombian communities with ancestral claims and newly gained rights (Oslender, 2019; Zeiderman, 2018). In 2017, a broad-based coalition brought the port city and its logistics to a standstill in the transformative 20-day civic strike. However, many commitments that the coalition obtained from authorities have not yet materialised, social leaders fear assassination and port expansion continues apace. Nevertheless, post-strike Buenaventura witnesses new forms of collective action in defence of communal rights and public spaces, emerging youth and women's leadership and myriad creative repertoires of disruption against extractive appropriations (Jaramillo-Marín et al., 2019). Moreover, the defiant Afro-Colombian movement extends throughout cities and communities of the entire Colombian Pacific, opening to potential for a comparativist Black urbanism.

Concluding remarks

Global capital's operations to enhance connectivity trigger vast spatial restructuring in

the geographies incorporated into transnational economic circuits and circulations. This article argued that as peripheral territories are re-designed, novel urban-and-peri-urban spatialities emerge. ILD justifies major infrastructure investments selectively focusing on (agro-)industries and extractive activities with assumptions surrounding the inherent virtues of connectivity, but this obscures the production of peri-urban precarity.

Global urban studies has fallen short of formulating a comprehensive critique of the emerging spatialities of infrastructural connectivity, possibly because these territorialisations occur at vast distances from more common sites of metropolitan enquiry. We proposed to put comparative analysis to work for redressing the peri-urban blind spot, drawing on both genetic and generative tactics of comparison. Whilst the two tactics can be applied independently from one another, we argued for their combined use as a means to rebalance geo-political economy's focus on relationality and other critical approaches which are more explicitly concerned with difference. On the one hand, we traced the pan-urban geo-economic entanglements of infrastructure investment, notably evident in processes of investment and project-based conditioning. But we presented this alongside multiple examples from Latin America, East Africa and South and South-east Asia.

Our discussion illustrated the value of attending to the different concrete settings variously conditioned to embrace ILD but also generating resistances and spatial appropriations worth learning from. Theoretically, we emphasised that the peri-urban does not indicate an inert spatial relation of variable radius around cities. Rather, we have argued that the peri-urban constitutes a spatio-temporal relation of indeterminate anticipation of changes to come in the built environment, economy and sociality. Thus, selectively provided and hierarchically governed infrastructure networks mediate and condition (peri-)urban transformations through complex rhythms of change. Connectivity is prioritised, but this form of territorial re-design is subject to contestation. Differential infrastructure space may emerge as people seek to re-appropriate precarious peri-urban geographies.

Before concluding, we must address certain challenges and urgencies facing comparativist research on peri-urban connectivity. We are aware that demarcating a zone of common concern where genetic and generative tactics overlap is only a first step towards a less fragmentary global urban studies. Common frameworks will also be required to achieve more productive crossovers between political economy and engagements with difference influential in urban studies. These include but are not limited to post-structuralist concerns with the situatedness of power, decolonising efforts to conceptualise urbanisation trajectories beyond the Eurocentric canon and Lefebvrian understandings of differential space as possibility. One such framework could be developed around Gordillo's (2019: 70) recent provocation that planetary urbanisation (the metropolis, in his words) constitutes 'a non-totalising totality', which escapes our capacity to make sense of it partly because its scale 'is permanently redefined by practices woven locally and regionally'.

Finally, we need to acknowledge that the endeavour of launching comparative concepts from anywhere, as proposed by Robinson (2016a), cannot hinge solely on creative research designs and committed practices of cross-regional reading by individuals. Broadening the global urban studies canon will require that academic publications are not hampered by 'area studies' filtering contributions concerning off-the-map peri-urban locations (see Kanai et al., 2018, on geographical blindspots and regional

segmentations). Openness to learning from difference needs to apply to both the concepts that we construct and the geo-historical realms where we apply them. Long-duration processes should not be neglected. We made reference to stark contrasts between ILD's conditionalities and the structural adjustment of early neoliberalism, also showing how connectivity-oriented projects could be compared to those from the developmentalist era. Yet, whilst efforts to engineer and reproduce populations and sociality have disappeared, comparisons should also consider continuities and legacies from colonial infrastructures in the instances where they matter (Enns and Bersaglio, 2020). Comparativist disposition will also be essential for engaging with cases of peripheral urban development in which connectivity may not play an evident role. We still know little about urban expansion. Urbanisation often fails to conform to models, including ILD. Quite simply, the urban unfolds in the most unexpected places and defies attempts to predict its direction (see Mukhopadhyay et al., 2020).

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