LUISS

Corso di laurea in Strategic Management

Cattedra Climate Neutral & Smart Cities

Rethinking Global Infrastructure Investment for Sustainable and Just Urban Development: A Planetary Health Approach through Comparative Case Studies from the Global North and South.

Prof. C. Iaione

RELATORE

Prof.ssa V. Iacopino

CORRELATORE

G. Majorano Matr. 774461

CANDIDATO

Anno Accademico 2024/2025

"Rethinking Global Infrastructure Investment for Sustainable and Just Urban Development: A Planetary Health Approach through Comparative Case Studies from the Global North and South."

Contents

Introduction

The rapid urbanization of the 21st century is reshaping socio-economic, environmental, and spatial dynamics across both the Global North and South.

Urban centers, as hubs of economic activity, technological innovation, and cultural exchange, increasingly drive national and regional development. However, this accelerated urban growth often enhances inequalities in access to infrastructure, public services, environmental amenities, and economic opportunities, disproportionately affecting marginalized and vulnerable communities and exacerbating vulnerabilities in rapidly urbanizing regions.

Historically, infrastructure investments have been framed starting through economic efficiency and growth centered paradigms. Nowadays, the growing knowledge over their long term social and environmental impacts, especially within the context of planetary health framework and global sustainability goals, demands a fundamental redesign of these investment frameworks.

In this context, international investment mechanisms such as the European Union's Global Gateway (GG), China's Belt and Road Initiative (BRI), and multilateral development banks have emerged as key drivers of urban infrastructural transformation worldwide. These initiatives hold significant potential to catalyze urban modernization, improve connectivity, and stimulate sustainable growth, but on the other side their implementation also exposed persistent governance gaps, mounting debt vulnerabilities, and deepening socio-spatial inequalities, particularly across the Global South. Furthermore, the increasing integration of digital technologies and smart city infrastructures into urban systems raises concerns about digital exclusion, technological dependency, and the risk of reinforcing existing inequities.

This thesis investigates how global investments in urban infrastructure can be restructured beyond conventional Public-Private Partnership (PPP) models to better align with social outcomes, promoting equity, inclusion, and sustainability through innovations, co-governance mechanisms, and knowledge-driven approaches. Rooted in a planetary health framework, which recognizes the interconnectedness of human health, environmental systems, and urban infrastructure, this research aims to contribute to the rethinking of

investment frameworks to protect ecological systems, support human well-being, and foster inclusive economies.

The study adopts a comparative case study methodology focusing on three flagship projects, such as the Grand Paris Express in France, the Bangalore Suburban Railway Project in India, and the Nairobi Expressway in Kenya. These projects were selected for their geographic diversity, differing governance models, and shared goals to address urban mobility challenges through large-scale infrastructural investments. Each case offers a unique framework through which to assess the benefits, drawbacks, and socio-political complexities of international infrastructure investments in contemporary urban contexts.

Through critical analysis of policy documents, investment frameworks, environmental and social impact assessments, and academic literature, and by comparative urban theory, this research seeks to generate insights into how future infrastructure investment mechanisms can be more inclined to social equity and planetary health imperatives.

This introduction proceeds by framing the research within current debates on urban sustainability, infrastructure finance, and global development partnerships. At the end, it concludes with a discussion of policy implications and the intended contributions of the research.

Chapter 1: Addressing Key Research Challenges in Urban Sustainability

1. Planetary Health and Sustainable Urban Development

The concept of planetary health[1] was first introduced in the 2010s in an initiative launched by the Rockefeller Foundation and The Lancet. In the 2015 Lancet publication, it was defined as "the achievement of the highest attainable standard of health, wellbeing, and equity worldwide through judicious attention to the human systems, political, economic, and social, that shape the future of humanity and the Earth's natural systems that define the safe environmental limits within which humanity can flourish". Main elements[2] of the concept are:

1. Planetary Health deals with anthropogenic[3] changes to the global environment, such as climate change, biodiversity loss, global pollution and deforestation.
2. Planetary Health deals with the impact of these global environmental changes on the health of humans as well as on other species.
3. Planetary Health is not only a field of research, but also a field of practice and policy, perhaps even a "movement".
4. Planetary Health is by necessity interdisciplinary, and should also be transdisciplinary, in the sense that research should often be conducted in collaboration with non-scientific and/or societal partners.

A planetary health approach highlights the interconnectedness between human well-being and the health of the earth system, making urban[4] agglomerates a pivotal point for sustainable and equitable development worldwide.

Cities are always becoming more and more dominant centers of human activity. Currently[5], almost 56% of the world's population, 4.4 billion inhabitants, live in cities.

[1] KNAW (2023). Planetary Health. An emerging field to be developed, Amsterdam.
[2] KNAW (2023). Planetary Health. An emerging field to be developed, Amsterdam.
[3] Since the Industrial Revolution, a new era has arisen, the Anthropocene, in which human actions have become the main driver of global environmental change.
Crutzen, P. Geology of mankind. Nature 415, 23 (2002).
[4] "What defines an urban area?" lies at the center of many debates. There is currently no universal definition of what "urban" means. The UN reports figures based on nationally defined urban shares. The problem, however, is that countries adopt very different definitions of urbanization (i.e. United Nations Statistics Division (UNSD). Definition of Urban for various countries). Not only do the thresholds of urban versus rural vary, but the types of metrics used also differ.
[5] *Overview*. World Bank. World Bank, Urban Development

More than 80% of global GDP is generated in urban centers. This trend is expected to continue, with the urban population more than doubling its current size by 2050, at which point nearly 7 of 10 people will live in cities.

This process, speed and scale of urbanization brings many challenges at the international and national levels.

Thus, cities play an increasingly important role in tackling climate change and must be strategically considered.

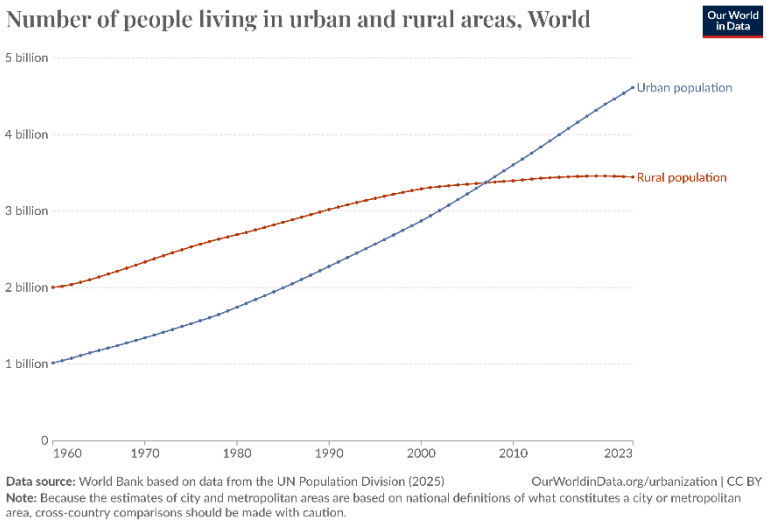

Figure 1. World Bank based on data from the UN Population Division (2025).

Cities put significant pressure on planetary boundaries[6], contributing to climate change, biodiversity loss, and resource depletion.

The continuous increase in the number and size of cities, and the ensuing transformation of virgin landscapes on different scales pose significant challenges for aims to reduce the rate of biodiversity loss. This has implications for ecosystem functionality and human welfare[7]. In fact, the conversion of green spaces into built-up areas has become one of the major reasons for habitat destruction worldwide[8].

Moreover, the distribution of climate change impacts is uneven among global north and south countries. This warns since ninety per cent of the projected world population growth

[6] Rockström, J., Steffen, W., Noone, K. et al. A safe operating space for humanity. Nature 461, 472–475 (2009).
These boundaries define the safe operating space for humanity with respect to the Earth system and are associated with the planet's biophysical subsystems or processes.
[7] D Haase et al, 'A Quantitative Review of Urban Ecosystem Service Assessments: Concepts, Models, and Implementation' (43)4 Ambio (2014) 413.
[8] T Turrii & E Knop, 'A landscape ecology approach identifies important drivers of urban biodiversity' 21(4) Global Change Biol. (2015) 1652.

of 2.5 billion[9] over the next couple of decades will occur in the cities of Africa and Asia. By 2030[10], the fastest rates of growth (≥4%) will be witnessed in sub-Saharan Africa, followed by India and parts of Southeast Asia. Twenty-four of the world's thirty-one megacities are in the South, and the ten new anticipated megacities to be added by 2030 will also come from the South[11].

In conclusion, in urban contexts[12], planetary health is linked to sustainable urban development and innovation, which integrates economic, social, and environmental dimensions to ensure long-term resilience. Thus, scholars[13] argue that urban development policies must align with planetary health principles to significantly reduce ecological footprints and impact while enhancing liveability, equity, and reaching climate neutrality.

However, this transition also raises significant ethical concerns. The uneven distribution of climate change impacts means that cities in the Global South, despite historically low GHG emissions, bear the brunt of environmental degradation, extreme weather events, and resource scarcity. With most of the future urban population growth expected in Africa and Asia, the lack of adequate infrastructure and financial resources in these regions heightens their vulnerability. This disparity underscores the moral responsibility of wealthier nations, international institutions, and global investment frameworks to support just and inclusive urban transitions. Therefore, the need for equitable policies and governance systems, fair resource allocation, and meaningful large collaboration to ensure that no community is left behind in the goal of sustainable urban futures.

---

[9] United Nations, Department of Economic and Social Affairs, Population Division (2019). World Urbanization Prospects: The 2018 Revision (ST/ESA/SER.A/420). New York: United Nations. UN Report

[10] "World Bank. 2017. Atlas of Sustainable Development Goals 2017: From World Development Indicators. World Bank Atlas; © Washington, DC: World Bank. World Bank

[11] The World's Cities in 2016 – Data Booklet ST/ESA/ SER.A/392 (United Nations, Department of Economic and Social Affairs, Population Division, 2016).

[12] Simon, D., Griffith, C., & Nagendra, H. (2018). Rethinking Urban Sustainability and Resilience. In T. Elmqvist, X. Bai, N. Frantzeskaki, C. Griffith, D. Maddox, T. McPhearson, … M. Watkins (Eds.), Urban Planet: Knowledge towards Sustainable Cities (pp. 149–162). chapter, Cambridge: Cambridge University Press.

[13] Elmqvist, T., Andersson, E., Frantzeskaki, N. et al. Sustainability and resilience for transformation in the urban century. Nat Sustain 2, 267–273 (2019).

1.1 The Environmental and Social Impacts of Urbanization

Urbanization is a global phenomenon with strong sustainability implications across multiple scales. Urban sustainability[14] encompasses achieving and maintaining social inclusion, economic well-being and environmental quality within the cities, while minimizing negative external impacts without passing the burdens into the future. Scholars[15] agree that urbanization is a global driver of environmental change on multiple frontiers, across local, regional and global scales. These include terrestrial, atmospheric and aquatic pollution, land cover change, biodiversity loss and ecosystem degradation, and exacerbated climate change.

As the world continues to urbanize at an unprecedented pace, as shown above, cities have become both the epicenters of environmental challenges and the laboratories for sustainable solutions. Urban areas are responsible for almost the 75% of global CO_2 emissions[16], then the impact on air pollution and public health issues is massive.

As many scholars[17], such as Professor Harini Nagendra[18], studied rapid urban expansion in many countries such as India, China, and Brazil, has led to severe declines in air and water quality, placing immense pressure on both human populations and ecosystems. Beyond pollution, uncontrolled urban growth also drives biodiversity loss by fragmenting habitats and reducing ecological resilience[19].

Yet, despite these challenges that must be tackled, cities have the potential to support biodiversity restoration[20] through well-planned green spaces, which can help maintain ecological functions within urban landscapes. Furthermore, sustainable urban development must be guided by an interdisciplinary collaboration and approach, strategic

---

[14] UN, SDGs Goal 11

[15] Wigginton, N. S., Fahrenkamp-Uppenbrink, J., Wible, B. & Malakoff, D. Cities are the future. Science 352, 904–905 (2016).
Griggs, D. et al. Policy: sustainable development goals for people and planet. Nature 495, 305–307 (2013).

[16] United Nations Environment Programme (UNEP). (2021). Cities and climate change.

[17] Shi, Y., Liu, J., & Miao, S. (2020). Air pollution and urban development in China: An assessment of economic growth and environmental quality. *Environmental Research, 184*, 109354.

[18] Nagendra, H. (2016). Nature in the city: Bengaluru in the past, present, and future. Oxford University Press.

[19] Elmqvist, T., Fragkias, M., Goodness, J., Güneralp, B., Marcotullio, P. J., McDonald, R. I., & Wilkinson, C. (2013). *Urbanization, biodiversity and ecosystem services: Challenges and opportunities: A global assessment*. Springer.

[20] Nagendra, H. (2018). The future of conservation in India: The role of urban ecology. *Nature Conservation, 30*, 79-86.

international cooperation, and inclusive planning to ensure that cities not only minimize harm but actively contribute to planetary health, leading to a general benefit for humanity.

In addition, urbanization implies also many social challenges[21] rooted in every community. Low-income and vulnerable communities are often relegated to the most unhealthy and vulnerable urban areas, facing then disproportionate exposure to environmental hazards such as pollution, flooding, and extreme heat.

These disparities reinforce existing socio-economic inequalities. This process makes climate change adaptation even more urgent at the global level.

1.2 The Different Urbanization Contexts among the Global North and the Global South

It is important to highlight how the process[22] of urban expansion plays out very differently between the Global North and South, and within[23] the South. There is a clear, statistically significant difference in almost all social and environmental indicators between cities in the South and the Global North. In fact, in the Global North[24], urbanization has been largely gradual, planned, and accompanied by strong governance, established infrastructure, and advanced data systems. In contrast, urbanization in the Global South[25] is rapid, informal, and driven by rural to urban migration, leading then to many challenges such as inadequate infrastructure, informal settlements, and resource scarcity. The knowledge gap in differences in contexts and drivers in different regions of the Global South constitutes a major challenge for urban sustainability. Despite relatively low per-capita environmental impacts of cities in the Global South, southern urbanization will require large resources and energy input, and a significant increase in GHG emissions.

---

[21] Anguelovski, I., Shi, L., Chu, E., Gallagher, D., Goh, K., Lamb, Z., & Teicher, H. (2016). Equity impacts of urban land use planning for climate adaptation: Critical perspectives from the global north and south. Journal of Environmental Planning and Management, 59(12), 2116-2137.

[22] Chauvin, J. P., Glaeser, E., Ma, Y. & Tobio, K. What is different about urbanization in rich and poor countries? Cities in Brazil, China, India and the United States. J. Urban Econ. 98, 17–49 (2017).
Duranton, G. Growing through cities in developing countries. World Bank Res. Obs. 30, 39–73 (2015).
Sadorsky, P. Do urbanization and industrialization affect energy intensity in developing countries? Energy Econ. 37, 52–59 (2013).

[23] The lived experience of residents in cities in different regions of the global south, Africa, Asia and Latin America, is drastically different, reflected by the difference in ambient environmental quality, degree of inequality in income, education, social and physical infrastructure, and health and wellbeing.

[24] Parnell, S., & Oldfield, S. (2014). *The Routledge Handbook on Cities of the Global South*. Routledge.

[25] UN-Habitat. (2020). *World Cities Report 2020: The Value of Sustainable Urbanization*.

Within the Global South, there are significant variations in urbanization patterns.

In Latin America[26], urbanization is already highly advanced, with over 80% of the population living in cities, but many challenges such as inequality, crime, and informal housing persist. Instead, in Sub-Saharan Africa[27], urbanization is occurring at an unprecedented pace, with cities projected to double in size by 2050, often outstripping the capacity of governments to provide basic services and rights. Meanwhile, in South Asia[28], cities experience extreme population densities, significant environmental stress, and persistent socio-economic disparities.

These regional differences highlight the need for context-specific urban policies rather than a one-size-fits-all approach. Furthermore, keeping in mind the importance of an interdisciplinary approach to overcome those challenges, must be cited[29] how in many large cities of Latin America and Africa organized crime plays a significant role in shaping urbanization outcomes impacting the community engagement in project design and implementation.

In addition, it has to be stated how current "urban theories" are predominantly based on Western perspectives. The relatively limited research on the Global South is also largely driven by scholarship from the Global North, and for this reason the research will further show the need of knowledge ecosystems and local actors for shaping a sustainable, just and healthy development. The uniqueness of urban issues in the Global South means that knowledge on the Global North is not readily and widely transferable. Many ideas[30] suggested for transformation of urban science, such as the innovative use of big data, and computer models of interaction between human activity and biophysical processes, are difficult to translate to the south, where basic information as essential as accurate urban population censuses can be inadequate[31] and many south global communities could not

[26] Roberts, B. (2017). *Managing Systems of Secondary Cities: Policy Responses in International Development*. Edward Elgar Publishing.
[27] UN DESA. (2018). World Urbanization Prospects 2018: Highlights. United Nations Department of Economic and Social Affairs.
[28] World Bank. (2016). *Leveraging Urbanization in South Asia: Managing Spatial Transformation for Prosperity and Livability*.
[29] Metodología del ranking (2015) de las 50 ciudades más violentas del mundo (El Consejo Ciudadano para la Seguridad Pública y la Justicia Penal AC, 2016)
[30] Alberti, M. Grand challenges in urban science. Front. Built Environ. 3, 1–5 (2017).
[31] Satterthwaite, D. The Transition to a Predominantly Urban World and its Underpinnings (International Institute for Environment and Development, 2007).

be ready to adopt these kinds of transformations. Many metrics[32] of sustainable cities were developed using data from European and North American cities and may not sufficiently consider the vastly different per-capita consumption levels between the North and South, as well as within the south as cited above.

2. The Importance of an Interdisciplinary Approach in Urban Development Context

In this paragraph, considered the challenges discussed earlier, as the distinct urbanization patterns in the Global North and the ones in the Global South and the interconnected issues of informal settlements, resource scarcity, and governance gaps. It is evident that an interdisciplinary approach is essential for sustainable urban development. As evidenced in paragraph 1.2, in the Global North, gradual and well-planned urban expansion is supported by robust governance, established infrastructure, and sophisticated data systems. Instead, the rapid urbanization in the Global South, driven by rural-to-urban migration, creates complex challenges.

Thus, addressing these multifaceted problems requires integrating multiple fields:

- Urban Planning must collaborate with public health to create safe, liveable spaces. Research[33] has shown, for example, that urban design elements, such as walkable neighbourhoods, accessible green spaces, and mixed-use developments, can reduce chronic diseases and enhance community well-being.
- Environmental Science guides sustainable resource use and resilience strategies. It provides the necessary frameworks to guide sustainable resource use and develop resilience strategies. Studies[34] on urban ecosystems emphasize adaptive management and biodiversity conservation to buffer cities against climate shocks

---

Eakin, H. et al. Urban resilience efforts must consider social and political forces. Proc. Natl Acad. Sci. USA 114, 186–189 (2017).

[32] Alberti, M. Measuring urban sustainability. Environ. Impact Assess. Rev. 16, 381–424 (1996).

[33] Frumkin, H., & Frank, L. (2003). *Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities*. Island Press.

Sallis, J. F., et al. (2012). Role of Built Environments in Physical Activity, Obesity, and cardiovascular disease. *Circulation, 125*(5), 729-737.

[34] Folke, C. (2006). Resilience: The emergence of a perspective for social–ecological systems analyses. *Global Environmental Change, 16*(3), 253-267.

Rockström, J., et al. (2009). A safe operating space for humanity. *Nature, 461*(7263), 472-475.

and environmental degradation. Rockström and Gupta[35] emphasize how the health of the planet and its people are at risk. The deterioration of the global commons, i.e., the natural systems that support life on Earth, is exacerbating energy, food, and water insecurity, and increasing the risk of disease, disaster, displacement, and conflict. Their research quantifies safe and just Earth-system boundaries (ESBs) and assess minimum access to natural resources required for human dignity and to enable escape from poverty. Collectively, their research describes a safe and just corridor that is essential to ensuring sustainable and resilient human and planetary health and thriving in the Anthropocene. They define safe as ensuring the biophysical stability of the Earth system, and justice principles include minimising harm, meeting minimum access needs, and redistributing resources and responsibilities to enhance human health and wellbeing. Living within the corridor is necessary, because exceeding the ESBs and not meeting basic needs threatens human health and life on Earth. However, simply staying within the corridor does not guarantee justice because within the corridor resources can also be inequitably distributed, aggravating human health and causing environmental damage.

- Economics, Law and Political Science offer essential frameworks for designing equitable policies and robust governance structures that ensure fair resource distribution and mitigate social inequalities.

  Based on this need, Professor Iaione[36] provides perspective on urban governance, stating that integrating economic and political analyses is crucial for crafting policies that address the root causes of inequality. In his research it is emphasized that when urban governance is designed to be inclusive and participatory, it can counterbalance the adverse effects of neoliberal policies. Thus, targeted economic interventions and democratic governance practices can work together to ensure fair resources allocation, leading then to more resilient and socially just urban environments.

[35] J. Gupta, J. Rockström, et al. (2024). A just world on a safe planet: a Lancet Planetary Health–Earth Commission report on Earth-system boundaries, translations, and transformations, The Lancet Planetary Health, Volume 8, Issue 10.

[36] Iaione, C. (2016). Governing Urban Inequality: New Perspectives on Political Economy. *Journal of Urban Affairs, 38*(6), 798-815.

- Technological expertise and tech education are critical for implementing data-driven solutions in contexts where basic information systems may be lacking. In addition, as literature[37] shows digitalization offers undeniable potential to broaden access, but the drawback is that it can simultaneously serve as a barrier, unintentionally excluding those from less technologically equipped or digitally literate backgrounds such as vulnerable communities[38]. In contexts with limited digital infrastructure and know-how, technological tools may not democratize governance as intended, but instead, they risk sidelining the very voices these partnerships aim to uplift. In fact, Ostrom's theory[39] of the commons provides a lens to view accessible digital resources as essential for genuine community involvement. If digital tools create closed or inaccessible spaces within the commons, then they merely shift exclusionary practices into a digital form.

This interdisciplinary and strategic collaboration bridges the gap between theory and practice, especially when Western models do not directly translate to the realities of the Global South environments. In addition, it also fosters local knowledge ecosystems and community engagement, which are vital for tailoring sustainable and inclusive urban policies[40]. In conclusion, integrating insights from different fields of study creates a comprehensive framework that guides international investment mechanisms toward fostering sustainable, inclusive, and resilient urban development in both the Global North and Global South.

---

[37] Van Dijk, J. A. G. M. (2020). The Digital Divide: Inclusion, Exclusion, and Inequality in the Information Society (3rd Edition). SAGE Publications.
Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart Cities in Europe. Journal of Urban Technology, 18(2), 65-82.
Couldry, N., & Hepp, A. (2017). The Mediated Construction of Reality. Polity Press.
[38] Helsper, E. J., & van Deursen, A. J. A. M. (2017). Digital Skills in Europe: Research and Policy. In Digital Skills: Unlocking the Information Society (pp. 195-211).
Eubanks, V. (2018). Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor. St. Martin's Press.
Couldry, N., & Mejias, U. A. (2019). The Costs of Connection: How Data is Colonizing Human Life and Appropriating It for Capitalism. Stanford University Press.
[39] Ostrom, E. (1990). Governing the Commons: The Evolution of Institutions for Collective Action.
[40] Bai, X., McPhearson, T., & Bettencourt, L. (2022). The Urban Planet: Knowledge Towards Sustainable Cities. Cambridge University Press.
Batty, M. (2023). The New Science of Cities: Complexity and Sustainable Urban Futures. MIT Press.
McPhearson, T., Bai, X., & Grimm, N. (2021). Urban sustainability science: Progress and future directions. Nature Sustainability, 4(3), 233–240.

3. The Importance of Strategic International Cooperation in Urban Development

As shown in the first paragraph, urbanization is accelerating. Strategic international cooperation, then, has become essential in addressing the interconnected challenges of urban sustainability, and planetary health. Cities, particularly in the Global South, are facing severe resource constraints, making collaboration with international organizations, financial institutions, and global governance frameworks crucial in ensuring equitable, just and sustainable urban development. The EU's Global Gateway[41] and EU Cities Mission are strong examples of structured investment mechanisms that aim at fostering green infrastructure and digital transformation, particularly in regions where rapid urban growth outpaces governance capacity.

One key benefit of international cooperation is knowledge transfer and institutional capacity building, since many of the most effective urban sustainability strategies, such as transit-oriented development, circular economy models, and climate adaptation frameworks, have been pioneered in the Global North. Therefore, transferring this know-how to the Global South is essential. However, this cooperation has to be strategical since their direct application in Global South cities is often impractical due to governance, economic, and social differences and backgrounds.

Beyond North-South cooperation, South-South cooperation offers another path to be further developed. An example is the Bogotá's Bus Rapid Transit (BRT) system that was adapted from the city of Curitiba (Brazil). This demonstrates[42] how global knowledge networks can drive effective urban solutions. This path will be further analysed in the next paragraph.

In addition, while many cities have joined transnational networks and worked in various ways to take climate action for years, one barrier to more effective action is the presence of silos[43], as they can lead to policy inconsistencies and sub-optimal[44]. Especially in the

[41] European Commission (2022). Global Gateway Strategy: Connecting Europe to the World.
[42] Wright, L. and Hook, W. (2007) BRT Planning Guide. ITDP.
[43] Silos as a broad term beyond institutional boundaries and structures created by mandates or issue-area specialization. A silo implies an inability or unwillingness to communicate across lines of differences. There exist several broad underlying causes of silos, e.g., bureaucratic politics, path dependencies, standard operating procedures, knowledge and resource constraints, different organizational cultures and political systems that decentralize and redistribute power.
[44] Oseland, S. E. (2019). Breaking silos: can cities break down institutional barriers in climate planning? *J. Environment. Policy Plann.* 21, 345–357.

context of climate action and sustainable development, different forms of silos and fragmentations in policy and institutional arrangements add constraints. Since climate change and sustainable development are complex problems, not isolated to one sector or sphere, they need to be addressed in cooperation[45].

Financial investments, in urban infrastructure, are another fundamental aspect of international cooperation. However, scholars[46] caution against financial models that reinforce dependency and soft power challenges through debt-based aid, advocating instead for mechanisms that promote co-financing and local economic empowerment. For instance, supporting this critique, China's Belt and Road Initiative has faced criticism for its debt-financing structures, which some[47] argue that it is deepening the financial dependency rather than fostering long-term economic self-sufficiency of the country involved.

A critical concern in international cooperation is the risk of digital and physical neocolonialism. Concerning the digital space the risk is that technological solutions from the Global North dominate and marginalize local innovation in the Global South. As digital infrastructure becomes integral to urban governance, through smart cities, AI-driven policy tools, and big data analysis is essential to ensure that local actors retain control over digital assets. To prevent digital exclusion, it is, then, crucial to invest in digital education for vulnerable communities unless the physical segregation will be translated into the digital space. In fact, scholars, such as Iaione[48], advocate for co-governance frameworks, in which cities, civil society, and private actors collaborate in the management of urban digital commons, then involving all key stakeholders in the projects.

Moreover, international cooperation enables cities to collectively address global challenges. For example, the city of Dakar, Senegal, has partnered with European cities

---

[45] Baleta, J., Mikulčić, H., Klemeš, J. J., Urbaniec, K., and Duić, N. (2019). Integration of energy, water and environmental systems for a sustainable development. *J. Clean. Prod.* 215, 1424–1436.
Al-Zubi, M. (2016). Jordan's climate change governance framework: from silos to an intersectoral approach. *Environ. Syst. Decis.* 36, 277–301.
[46] Hickel, J. (2017). The Divide: A Brief Guide to Global Inequality and its Solutions.
Mawdsley, E. (2018). South–South Cooperation 3.0? Managing the consequences of success in the decade ahead. Oxford Development Studies.
[47] Brautigam, D. (2020). The Dragon's Gift: The Real Story of China in Africa. Oxford University Press.
[48] Christian Iaione (2019). *The Co-City: Digital Commons and Urban Co-Governance*

to implement renewable energy initiatives under the EU-Africa Green Energy Initiative[49], demonstrating how targeted investment can enhance urban sustainability while fostering South-North partnerships.

Ultimately, strategic international cooperation acts as a catalyst for more inclusive and resilient urban futures, bridging economic, technological, and governance gaps. However, to be truly transformative, these partnerships must move beyond top-down investment models and embrace participatory governance models, ensuring that local actors shape urban policies in a way that aligns with community needs and long-term sustainability tackling the root causes of the challenges.

3.1 South-South and Triangular Cooperation[50]

Deepening, in the field of International Cooperation, South-South cooperation models are increasing. South–South Cooperation (SSC) is a term that is capacious, variegated and flexible. Very broadly, it refers to the transfer and exchange of resources, technology and knowledge, set within claims to shared colonial and post-colonial experiences and identities, and anchored within a wider framework of promoting the collective strength and development of the Global South[51]. In fact, development is a concept that attempts to encompass a vast complexity of processes of social transformation. It conveys meanings of great promise and hope to billions of human beings concerning human betterment, and refers to a long-term historical project of the liberation of peoples and nations from the vestiges of colonialism, poverty, oppression and underdevelopment. South–South cooperation (SSC) has been a key organising concept and a set of practices in pursuit of these historical changes through a vision of mutual benefit and solidarity among the disadvantaged of the world system. It conveys the hope that development may be

[49] European Investment Bank (2022). *The EU-Africa Green Energy Initiative: A Partnership for Sustainable Development.*

[50] *South-South Cooperation* is "a process whereby two or more developing countries pursue their individual and/or shared national capacity development objectives through exchanges of knowledge, skills, resources and technical know-how, and through regional and interregional collective actions."
Triangular Cooperation is "Southern-driven partnerships between two or more developing countries supported by a developed country(ies) or multilateral organization(s) to implement development cooperation programmes and projects."

[51] Bergamaschi, I., Moore, P., & Tickner, A. B. (Eds). (2017). *South–South cooperation beyond the myths: Rising donors, new aid practices?*

achieved by the poor themselves through their mutual assistance to one another, and the whole world order transformed to reflect their mutual interests *vis-à-vis* the dominant global North.

Historically, the born of SSC models is rooted in the *Buenos Aires Plan of Action (BAPA) for Promoting and Implementing Technical Cooperation among Developing Countries (TCDC)*[52]. BAPA was adopted by consensus at the United Nations Conference on Technical Co-operation among Developing Countries, held in Buenos Aires, Argentina in 1978. BAPA represents a major milestone in the evolution of technical cooperation, establishing its role as a vital instrument for fostering South-South cooperation. BAPA provides the conceptual underpinning as well as a practical guide for realizing the objectives of TCDC, centering on "the furthering of the national and collective self-reliance of developing countries and the enhancement of their creative capacity to solve their development problems".

On the occasion of the 30th anniversary of BAPA, the High-level United Nations Conference on South-South Cooperation, held in Nairobi, Kenya in 2009, adopted the Nairobi Outcome Document, which was subsequently endorsed by the General Assembly. The Nairobi Outcome Document was adopted against the backdrop of an expansion of cooperation among developing countries, from the technical domains, to, among other things, the creation of regional custom unions, and "cooperation in political fields, institutional and regulatory frameworks, and inter-State transport and communications networks". The Nairobi Outcome Document defined a set of normative and operational principles that continue to guide how the South-South cooperation modality operates.

Normative Principles	Operational Principles
✓ Respect for national sovereignty and ownership ✓ Partnership among equals ✓ Non-conditionality ✓ Non-interference in domestic affairs ✓ Mutual benefit	✓ Mutual accountability and transparency ✓ Development effectiveness ✓ Coordination of evidence- and results-based initiatives ✓ Multi-stakeholder approach

[52] UNIDO. South-South and triangular industrial cooperation.

Moreover, it is important to state that SSC can adopt the form of different kinds of technical, economic or financial transfers[53] such as:

• Technical assistance: transferences of knowledges, experiences and individual and collective capacities.

• Concessional loans: These are loans that are extended on terms substantially more generous than market loans. The concessionality is achieved either through interest rates below those available on the market or by grace periods, or a combination of these.

• Grants: transfers made in cash, goods or services for which no repayment is required.

• Government Sponsored Investments (GSI): Although they often do not fit the OECD's narrow definition of development assistance.

• Agreement of Energy Supply (AES)

• Multilateral Contributions: transfers made by developing countries to multilateral organizations that provides SSC.

In conclusion[54], South-South cooperation is the culmination of an historical processes. It reflects a particular trajectory of development in which import substitution industrialisation was replaced by export-oriented growth, but one in which the successful rising powers have been able to nurture and protect their own industries and make them competitive within a global economy. In particular, the state has played a major role in facilitating the growth of national capital, and in creating an enabling environment for the growth of both national capital and international investments by national industries. This has facilitated the emergence of increasing economic efficiency and companies that can compete successfully within a global economy. Although these economic reforms have resulted in the adoption of market liberalisation, this has been combined with a resistance to and critique of some policies advocated by the US and multilateral organisations, similar to that which has been carried by China into Asian regional forums and by Brazil into South American regional forums. South-South cooperation in Africa reflects a further

[53] Lengyel, M., & Malacalza, B. (2011, February). What do we talk when we talk about South–South cooperation? The construction of a concept from empirical basis. In *IPSA–ECPR Joint Conference, São Paulo* (pp. 16-19).
[54] Amanor, K. S. (2013). South-South cooperation in context: Perspectives from Africa. *Future*.

extension of this critique into increasing competition for resources and markets with western transnational companies[55]. South-South cooperation critiques the conditionalities that western nations have attempted to impose on Africa, Southeast Asia and South America, and develops an alternative framework of technical assistance based on non-intervention, respect for national sovereignty and national interests. Western conditionalities are seen by both the Chinese and Brazilian governments and policymakers as imposing policies on Africa that do not necessarily meet African needs. Thus, South-South cooperation reflects an economic order based on private and public sector partnerships that responds to the market, and is willing to both (a) make large investments within African countries, and (b) make provisions for infrastructural development to facilitate the emergence of a modern economy.

4. The Role of Universities and Knowledge Ecosystems in Urban Development

Linked to Cooperation frameworks, Universities, as centers of rigorous academic research, can be pivotal in international cooperation. In fact, they also serve as fundamental hubs for interdisciplinary collaboration and community engagement. Following the principles of the knowledge economy[56], the Organization for Economic Cooperation and Development[57] (OECD) and the European Union (EU), among others, have adopted knowledge management[58] (KM) frameworks in their strategic directions for global and local development. This paradigm shift in strategic planning has strongly influenced urban development, with the result that knowledge is now conceived as the core component that makes cities smart.

Thus, universities and knowledge ecosystems are one of the main actors driving sustainable urban development by fostering innovation, building institutional capacity,

[55] Amanor, K.S. (2013) Chinese and Brazilian Cooperation with African Agriculture: The Case of Ghana. Future Agricultures Consortium Working Paper 52, Brighton, Sussex: IDS.
[56] Lorenzo Ardito, Alberto Ferraris, Antonio Messeni Petruzzelli, Stefano Bresciani, Manlio Del Giudice. The role of universities in the knowledge management of smart city projects, Technological Forecasting and Social Change, Volume 142, 2019, Pages 312-321, ISSN 0040-1625.
[57] R. Yelland, The Role of the OECD in the Development of Higher Education in a Globalized World, Editor(s): Penelope Peterson, Eva Baker, Barry McGaw, International Encyclopedia of Education (Third Edition), Elsevier, 2010, Pages 584-589, ISBN 9780080448947.
[58] Knowledge management is defined as the process of identifying and leveraging collective knowledge within an organization to enhance competitiveness, promote innovativeness, and improve responsiveness.

and bridging knowledge gaps between theory and practice. Academic institutions function as "living labs" where interdisciplinary research and digital technologies are applied to address complex urban challenges, as described by scholars[59].

In addition, Castells[60] further emphasizes that universities serve as critical nodes within the network society, catalysing the integration of digital and social innovations into urban governance.

Building on these ideas, scholars[61] extend the discussion through the evolution from the Triple Helix to the Quadruple Helix, which incorporates civil society, and ultimately to the Quintuple Helix model, which integrates environmental stewardship as a fundamental pillar in the innovative ecosystem. This expanded framework underscores that sustainable urban development requires synergistic collaboration among various stakeholders. In this context, universities are not only vital for technological innovation and policy development but also for promoting ecological sustainability through research, skill development, and community engagement. In fact, scholars, such as Goddard and Vallance[62], argue that universities contribute significantly to urban regeneration and policy advocacy by engaging in community-based research able to inform on sustainable development practices.

Furthermore, specifically about the role of universities, Healey's advocacy[63] for collaborative planning underscores the importance of universities as conveners of diverse stakeholders, from local communities to policymakers, in co-creating resilient urban futures. This collaborative approach is further enriched by the fundamental insight from Ostrom[64], whose work on the governance of commons underscores the need for managing shared resources, including nowadays digital infrastructures, in an inclusive and just

[59] Etzkowitz, H., & Leydesdorff, L. (2000). The Dynamics of Innovation: From National Systems and "Mode 2" to a Triple Helix of University–Industry–Government Relations. Research Policy, 29(2), 109–123.
[60] Castells, M. (2009). The Rise of the Network Society. Wiley-Blackwell.
[61] Carayannis, E. G., & Campbell, D. F. J. (2012). Mode 3 Knowledge Production in Quadruple Helix Innovation Systems. Springer.
[62] Goddard, J., & Vallance, P. (2013). The University and the City. Routledge.
[63] Healey, P. (2006). *Collaborative Planning: Shaping Places in Fragmented Societies*. Vancouver: UBC Press.
[64] Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, UK: Cambridge University Press.

manner. Modern policy initiatives, such as the UN-Habitat World Cities Report[65] and the European Commission's Digital Education Action Plan[66], reinforce this perspective by advocating for equitable and accessible knowledge-sharing systems in the digital era.

The theoretical foundations laid by some scholars[67] further deepen the understanding of the production of urban space and the quest for spatial justice, highlighting the role that academic research can play in deconstructing power dynamics and historical legacies embedded within urban landscapes.

Moreover, global cooperation among universities is essential for sharing know-how and advancing both in sustainable urban development and planetary health. In an increasingly interconnected world, collaborative networks enable academic institutions to pool diverse expertise, engage in comparative research, and foster cross-cultural dialogue creating a win-win situation for all the stakeholders involved in the projects. These international partnerships help to tackle the hegemony of Western-centric knowledge paradigms by integrating context-specific insights from the Global North and Global South; thus, leading to tailored solutions. For example, joint research initiatives and exchange programs not only facilitate the sharing of best practices for managing urban environmental challenges and social inequalities but also contribute to innovative policy dialogues that align with global frameworks. These collaborative endeavours ensure that academic institutions remain accountable and directly engaged with the communities they serve, thus fostering urban resilience and sustainability.

Collectively, these diverse scholarly contributions and collaborative frameworks underscore that by aligning rigorous academic research with community-based initiatives and embracing global partnerships, universities and knowledge ecosystems can generate adaptive, context-sensitive solutions. This integrative approach is essential for promoting equitable, just, resilient, and sustainable urban futures that advance the imperatives of sustainable urban development and planetary health.

---

[65] UN-Habitat. (2021). *World Cities Report 2021*. Nairobi: United Nations Human Settlements Programme.
[66] European Commission. (2021). *Digital Education Action Plan (2021-2027)*. Brussels: European Commission.
[67] Soja, E. W. (2010). *Seeking Spatial Justice*. Minneapolis: University of Minnesota Press.
Lefebvre, H. (1991). *The Production of Space*. Oxford: Blackwell.

In conclusion, universities involved in analysed smart city projects[68] have a crucial function in reducing the knowledge distance among different project partners, but mainly between the government and the private sector. In this sense, with the regard to the inclusion of universities in the decision-making processes involving the public and private sector. This facilitates the very often problematic collaboration between public and private partners in hybrid multi-partner projects. Universities are particularly relevant for inbound open innovation processes in smart cities. They act as a central actor in the evaluation, transfer, and application of external knowledge.

5. Digital Neocolonialism and the Risks of Extractive Economic Models

Rapid advancements in artificial intelligence (AI) have the potential to be revolutionary. Artificial intelligence has ushered in a new era of technical advancement, offering transformative possibilities in sectors such as healthcare, finance, and education, thus impacting urban just and sustainable development[69]. However, these advancements have also sparked questions about power relations and socioeconomic inequalities that are reminiscent of previous colonial practices. The risk of "techno-neocolonialism[70]", characterizes the potential for dominance and exploitation analogous to historical colonial practices, is juxtaposed with the possibility of unprecedented technological advancements[71].

The term "techno-neocolonialism" highlights the digital age's new forms of exploitation[72], where developed nations and multinational corporations often leverage technology to exert control over developing countries, sidelining their needs and marginalizing their voices. In the context of AI, "Western-developed AI" is often "unfit

[68] Lorenzo Ardito, Alberto Ferraris, Antonio Messeni Petruzzelli, Stefano Bresciani, Manlio Del Giudice, The role of universities in the knowledge management of smart city projects, Technological Forecasting and Social Change, Volume 142, 2019, Pages 312-321, ISSN 0040-1625.
[69] Qian, Y., Siau, K. L., & Nah, F. F. (2024). Societal impacts of artificial intelligence: Ethical, legal, and governance issues. Societal Impacts, 3, 100040.
[70] Stevenson defines digital neocolonialism as: A contemporary phenomenon in which dominant global powers and multinational corporations, primarily from economically advanced regions, exert control and influence over the technological sphere in less economically developed countries that were previously subject to colonialism. Stevenson, T. (2024). Navigating digital neocolonialism in Africa.
[71] KPONYO, J. J., FOSU, D. M., OWUSU, F. E. B., ALI, M. I. et AHIAMADZOR, M. M. (2024). Techno-neocolonialism: an emerging risk in the artificial intelligence revolution. *Trayectorias Humanas Trascontinentales*.
[72] Birhane, A. (2020). Algorithmic colonization of Africa. SCRIPT-ed, 17(3), 389–409.

for African problems". For example, a United Nations Conference on Trade and Development[73] (UNCTAD) report on cross-border data flows reveals that "the data value chain is dominated by global digital corporations and companies controlling global value chains", which fosters monopolistic practices and excludes emerging economies. Developing countries serve merely as vast data mines for the Global North's AI systems and remain dependent on external entities they serve for technological advancements. The inequities are stark. The Global South gets little in return for updating this data.

Scholars[74] agree on the modern-day techno-neocolonialism as "the AI invasion of Africa echoing colonial era exploitation". Muldoon and Wu[75] highlight how this disparity relegates the Global South to a subordinate role in the global AI ecosystem, transforming it into a supplier of raw materials of talent and data. Corporations and states in the Global North consolidate their dominance by appropriating resources like user data and skilled labour, leaving developing nations in a state of economic and technological dependence reminiscent of colonial subjugation. In fact, the management of AI infrastructure today echoes the control of transportation, production, and communication facilities by imperial powers during classical colonialism. Benkler[76] explains that such control over critical resources reinforces global power imbalances. Strong digital infrastructure, including data centers, cloud computing platforms, and high-speed internet, is essential for the growth of AI.

This is set to worsen existing economic disparities. These patterns emphasize a critical reality, while AI holds immense promise for innovation and economic growth, its benefits remain disproportionately concentrated, leaving much of the world excluded.

Developed countries extract user information under the guise of altruism but without equitable benefit-sharing. This emphasizes how the Global South often becomes a testing ground for new technologies, with little accountability or equitable sharing of benefits.

---

[73] UNCTAD. (2021). Digital economy report 2021: Cross-border data flows and development: For whom the data flow. United Nations Conference on Trade and Development.

[74] Coleman, D. (2019). Digital colonialism: The 21st century scramble for Africa through the extraction and control of user data and the limitations of data protection laws. Michigan Journal of Race & Law, 24(2), 417-456.

Birhane, A. (2020). Algorithmic colonization of Africa. SCRIPT-ed, 17(3), 389–409.

[75] Muldoon, J., & Wu, B. A. (2023). Artificial intelligence in the colonial matrix of power. Philosophy Technology, 36, 80.

[76] Benkler, Y. (2023). Imagining AI: How the World Sees Intelligent Machines. Yale University Press.

For example, these companies profit from data-intensive ventures like targeted advertising, yet the source countries in Africa rarely see returns in improved infrastructure or digital equity. Adding to this, Cambridge Analytica's misuse of AI to influence elections in Kenya[77], 2017, and Nigeria, 2015, exemplifies the exploitation of the Global South as a testing ground for controversial technologies. These interventions, thus, disrupted political processes, eroded social cohesion, and provided no local benefits to local communities. Moreover, linked with the importance of knowledge ecosystems, the AI sector heavily relies on global intellectual capital. Most lucrative opportunities for advanced research and professional advancement in AI are concentrated in top universities and companies located in the Global North. According to Docquier and Rapoport[78] emigration of highly skilled individuals[79] has adverse consequences. It is viewed as contributing to "increased inequality at the international level, with rich countries becoming richer at the expense of poor countries". This dynamic creates a "brain drain" scenario reminiscent of the intellectual exodus from colonies during classical colonialism, where native talent was often directed towards imperial institutions. A critical step is fostering inclusive collaboration between institutions in the Global North and South, as for the Universities and knowledge ecosystems development. Talent development is then central for emerging nations for creating AI-focused training programs and educational initiatives that equip their workforce with the necessary skills to participate in the global AI landscape by investing in education systems, scholarships, university partnerships, and mentorship opportunities.

In fact, the rise of techno-neocolonialism poses significant threats to equitable global development as the AI revolution continues to unfold. Effectively tackling these challenges, once again, demands a multifaceted approach that prioritizes collaboration, fairness, and ethical innovation while empowering the Global South to overcome its systemic disadvantages in the global AI ecosystem. Establishing partnerships that prioritize knowledge sharing, talent development, and equitable access to AI resources can help shift power dynamics in AI development. Collaborative projects that emphasize

[77] Cambridge Analytica and its role in Kenya 2017 elections
[78] Docquier, F., & Rapoport, H. (2012). Globalization, brain drain, and development. Journal of Economic Literature, 50(3), 681-730.
[79] Docquier and Rapoport define a high-skill immigrant as: "A foreign-born individual, aged 25 or more, holding an academic or professional degree beyond high school (i.e., a "college graduate")".

co-creation and actively involve local communities in the design and deployment of AI technologies ensure that solutions are contextually appropriate and mutually beneficial. These partnerships must center the needs and voices of marginalized communities, helping to bridge the gaps created by existing disparities.

Another key strategy is the establishment of robust data governance frameworks. Such frameworks should prioritize consent, transparency, and equitable benefit-sharing, ensuring that data collected from the Global South is not misused for profit without just compensation. International agreements or treaties can be instrumental in setting standards for data sharing and utilization, upholding the rights of data producers, and fostering fair outcomes. These measures not only protect local interests but also promote greater trust and accountability in AI development.

Investing in local AI infrastructure is also essential for reducing reliance on external resources. Such investments would enable local companies and researchers to harness AI technologies for their advancement, fostering innovation and reducing the exploitative dynamics inherent in the current model.

As a result, digital neocolonialism directly undermines the data infrastructure on which any financing model would rely. When multinational platforms extract urban mobility or environmental data without equitable sharing, they weaken local oversight and prevent independent verification of health, equity, or ecosystem-service metrics. If smart-ticketing systems or air-quality sensors are controlled by external tech firms, communities and auditors cannot confirm whether low-income community targets or pollution-reduction goals have been met. Consequently, infrastructure contracts must include clear data-rights provisions, mandating that any project-financed digital data remain publicly accessible, otherwise private actors capture value meant to fund community benefits, defeating the core purpose of result-driven financing.

Chapter 2: Global Investment Strategies and Mechanisms for Sustainable and Inclusive Urban Development

1. European Investment Bank “EIB”

The European Investment Bank “EIB”, as the bank of the European Union, is the biggest multilateral financial institution in the world and one of the largest providers of finance for climate action and transition. Since 1958, the EIB has provided loans and expert advice for thousands of projects in over 160 countries, investing over a trillion euros around the world[80].

EIB provides economic support to sectors that contribute significantly to growth, employment, regional cohesion and environmental sustainability in Europe and beyond. Thus, the EIB Group has put in place its 2024-2027 Strategic Roadmap (the Strategic Roadmap), which was endorsed by the EIB Board of Governors on 21 June 2024.

The Strategic Roadmap outlines eight key interrelated priorities and new programmes with an ambitious financing scenario, to help close Europe’s investment gap. The priorities are to strengthen climate action; accelerate digitalisation and technological innovation; support Europe’s security and defence; contribute to economic and social cohesion; support agriculture and the bioeconomy; reinforce social infrastructure; focus on high impact projects beyond the European Union; and contribute to strong and integrated capital markets in Europe. In fact, at the financial level, the EIB leverages AAA credit rating to secure the lowest-cost funding on international markets, passing on favourable borrowing conditions to urban projects across the EU[81]. In 2024, the EIB generated positive financial results, booking an annual surplus of €2.9 billion compared with €2.3 billion in 2023. The annual surplus is fully retained, contributing to the Bank’s own funds and supporting its long-term financing capacity.

In 2024 alone, the EIB mobilized €76.6 billion in new financing, with nearly half directed to cohesion regions and €50.7 billion earmarked for climate action, environmental sustainability and social projects. In 2024, the European Investment Bank invested €210 million per day in Europe’s future.

[80] EIB
[81] Fitch Ratings 25-07-2024.

€6 in every €10 were allocated for the green transition and nearly the 50% in EU regions that need it most plus €7.9 billion to our partners outside the EU[82].

To contribute more effectively for enhancing the green transition, the EIB will aim to further support, both inside the outside the European Union, through EIB Global, the four environmental objectives of the EU Taxonomy Regulation[83]. In fact, already in 2022, green lending reached €36.6 billion, 58 % of total approvals, exceeding the Bank's 2025 climate-alignment target.

At the social level, in its Cohesion Orientation for 2021-2027, the Bank committed to dedicating at least 40% of its total financing in the European Union to projects in cohesion regions from 2022 to 2024, and at least 45% from 2025 onwards. Actual EIB financing for the European Union's cohesion priority regions amounted to €32.9 billion in 2024, equivalent to 49% of the Bank's total signatures in the European Union (compared with €29.8 billion or 45% in 2023). Lending to less developed regions amounted to €15.4 billion in 2024 or 23% of total EU lending (compared with €17.2 billion or 26% in 2023). As result the EIB states, in its Financial Report 2024, "The EIB Group continues to promote the transition towards environmentally sustainable economies and societies by supporting innovation and fostering successful structural transformation, while ensuring a socially fair and just transition for the regions most challenged by the move towards a climate-neutral EU economy by 2050". With this regard, the research will further analyse in the following chapters this structural transformation specifically in the infrastructural sector.

2. Global Gateway

With the rapid and ongoing development of globalization, international cooperation, particularly in the economic sector, has become a priority and a rapidly expanding task for developed countries. In recent years, the EU has sought to step up its ability to act as a global player as well as a geopolitical actor in an increasingly volatile and competitive international order. Thus, the Global Gateway[84] strategy, launched in 2021 by the

[82] European Investment Bank Financial Report 2024.
[83] EIB Environment Framework (2022), EIB environment framework
[84] Global Gateway

European Union (EU), aims to enhance sustainable development by fostering international partnerships, particularly with the Global South. In addition, it aims at addressing the global infrastructure investment gap and seeks to mobilize €300 billion in investments between 2021 and 2027, prioritizing sectors such as digitalization, health, energy, and transport.

The main five sectors in this project are:

(1) a digital transition in line with European values and standards (including deploying digital networks and infrastructures such as submarine and terrestrial optic-fiber cables, space-based secure communication systems as well as cloud and data infrastructures, high performance computing, Artificial Intelligence (AI), and earth observation);

(2) energy connectivity in support of the green transition (including regional energy integration, promoting energy efficiency and renewable energy, investing in infrastructure for developing sustainable and resilient raw materials value chains);

(3) sustainable, smart, resilient, inclusive and safe transport networks (involving sustainable, smart, resilient, inclusive, and safe transport networks in all modes of transport, including rail, road, ports, airports);

(4) health; and

(5) education and research.

Moreover, Global Gateway priority sectors, expected results[85] are:

- Climate and energy €3.082m
- Clean electricity generation sufficient to supply 2.36 million households
- 3.13 million people benefiting from safe drinking water
- 4 100 kilometres of main roads upgraded
- 47.6 million additional trips on urban public transport
- 152 kilometres of railway track upgraded
- 1.32 million people benefiting from improved local health facilities
- 21.400 students enrolled annually in improved education facilities

[85] European Investment Bank Group Global Impact Report 2023/2024.

- 659 mobile network sites installed.

The initiative promotes sustainable, high-standard partnerships and emphasizes democratic values, environmental sustainability, and local community benefits. The Global Gateway[86], is the logical concretization of the EU's evolving approach to international cooperation. It has been the overarching framework defining priorities and ways of delivering by the geopolitical Commission. It marks a transition from traditional development cooperation towards international partnerships aimed at addressing complex challenges, particularly in infrastructure, in a sustainable manner while promoting Europe's own strategic autonomy. The EU seeks to project itself as a "trusted partner" in designing investment projects based on a set of core principles, including "democratic values (e.g., the rule of law, transparency), equal partnerships, environmental sustainability, safe and secure infrastructure and provision of an enabling environment to make sure projects deliver to local communities". For example, related to urban development projects of the Global Gateway program there are the construction of bus rapid transit system in Nairobi in Kenya and the construction of bus rapid transit system in Dakar plus the sustainable development of Dakar in Senegal.

In terms of governance of the Global Gateway strategy[87], the overall process is organized at a high level.

Implementation is steered by the President of the European Commission, assisted by a Global Gateway Board to provide strategic guidance to this initiative, in relation to the development of Team Europe projects. The governance architecture includes a Business Advisory Group (BAG), which will be informed in advance of the projects and play a consultative role. It also launched in October 2023[88] a Global Gateway Civil Society and Local Authorities Advisory Platform "to ensure a fully inclusive approach". This governance system is now operational and setting up its way to function effectively, including in terms of providing suitable levels of information and transparency in operations to external stakeholders (such as civil society and local authorities).

[86] Bossuyt, J., & Sabourin, A. (2024). The EU Global Gateway strategy: Giving local authorities a voice.
[87] Global Gateway: Strategic governance and implementation
[88] Global Gateway Commission launches civil society and local authorities dialogue platform

On paper, local authorities play a crucial role in the success of infrastructure related projects, as their involvement ensures investments are well-targeted, effectively implemented, and aligned with local development priorities. The inclusion of Local Authorities (*LAs*) in the EU's Global Gateway strategy has been limited so far, despite their crucial role in territorial development. LAs are critical to the success of Global Gateway implementation since:

- Spatial realities: all investments "land" in territories. While investment planning and decision-making processes tend to be centralized, the infrastructure investments "happen" in the territory of subnational authorities.
- LAs have a "mandate" to promote local economic development and investments.
- EU commitment to ensure that Global Gateway projects benefit local communities. The Global Gateway strategy is explicit about the need to demonstrate that investment projects produce genuine and sustainable development outcomes that benefit local communities.

Researchers[89] suggest that LAs as actors, with their specific mandate and catalyst role in territorial development, have only been integrated in a relatively limited manner so far, both in the policy documents related to the Global Gateway as well as at implementation level.

In conclusion, while the EU's Global Gateway strategy aspires to mobilize up to €300 billion by 2027 for sustainable infrastructure projects, the effective inclusion of local authorities and civil society remains a critical challenge. The establishment of the Global Gateway Civil Society and Local Authorities Advisory Platform[90] aims to address this by fostering inclusive dialogue. However, ensuring that this platform translates into meaningful participation and transparency in project implementation is essential for the strategy's success. Balancing the EU's geopolitical objectives with the genuine development needs of partner communities will determine the initiative's credibility and impact.

[89] As the Global Gateway constitutes a core priority of European Centre for Development Policy Management it was possible to build on that database of knowledge. ECDPM also participated in the EU evaluation of the new financing instruments in which the Global Gateway featured prominently.
[90] International partnerships, civil society and local authorities' advisory platform

2.1 Comparison of the Global Gateway and the Chinese Belt Road Initiative

Belt and Road Initiative[91] (BRI) is a transcontinental policy, which proposed by China in 2013, the largest investment plan that presented by one of the most important investors and trade partners of the EU. As of 2023[92], BRI has facilitated investments exceeding $1 trillion since its inception in 2013. It covers six continents and connects 155 countries[93], via road, railroad, and maritime. BRI is divided into the Silk Road Economic and the 21st Century Maritime Silk Road. China has established the Asian Investment and Infrastructure Bank[94] (AIIB) in Beijing, as a multilateral development bank, which supports the infrastructure plan in the Asia-Pacific region. According to the World Bank[95], this project covers about one-third of the world's trade and GDP.

In contrast, the EU presented the Global Gateway (GG) as a viable alternative to the BRI to protect and enhance its infrastructure around the world.

However, the European Union as a block has refused to join the BRI, as the European leaders stated that the lack of trust has fueled outright suspicion regarding ulterior motives behind BRI. Critics[96] argue that China's lending practices have led several participating countries into unsustainable debt, in fact, BRI is cited as China's controversial "debt trap" by a group of scholars[97]. They describe it as a geopolitical strategy that ensnares countries in debt to allow China undue influence. Sovereign guarantees are often needed for BRI financing. Ports (as seen with Hambantota in Sri Lanka[98]) and electricity grids (as seen with Laos[99]) are examples of strategic assets of the host nation that may be collateralized.

---

[91] Belt and Road Initiative
[92] China's Belt and Road Initiative turns 10. Here's what to know. World Economic Forum. Nov. 2023
[93] Upon the formation of Giorgia Meloni's government and its support for the competing PGII project, Italy withdrew from the BRI in 2023. According to Mazzocco and Palazzi (2023), the primary reason for this decision was the lack of economic benefits. Prior to signing the Memorandum of Understanding, the Italian government anticipated significant opportunities to export its goods to China and had high expectations to realize them. However, over four years, Italy's exports to China remained minimal compared to other major European economies like Germany and France, which never engaged with the BRI. Additionally, from 2019 to 2023, high-level Chinese investments in Italy remained limited, while imports from China grew disproportionately.
[94] Asian Investment Infrastructure Bank, AIIB. (2022). *Governance*. www.aiib.org
[95] World Bank. (2018). *Belt and Road Initiative*.
[96] Zanganeh, P.M., Tishehyar, M. (2024). The Impact of Global Gateway on EU-China Cooperation in the Framework of Belt and Road Initiative. In: Li, Y., Leandro, F.J.B.S., Tavares da Silva, J., Rodrigues, C. (eds) The Palgrave Handbook on China-Europe-Africa Relations. Palgrave Macmillan, Singapore.
[97] Jones, H. (2020). *Debunking the myth of 'Debt-trap Diplomacy'*.
[98] Wong, Catherine (2021): "China can extend Hambantota port lease to 198 years, Sri Lankan minister says", South China Morning Post, February 25, 2021.
[99] Laos grants 25-year power grid concession to Chinese majority firm

Many countries are then cited as "victims of China's debt-trap diplomacy" due to their debt to China trough this plan. While critics highlight the risks of China's debt-trap diplomacy, it is important to recognize that the BRI has also contributed to significant infrastructure improvements, particularly in Africa[100] and Central Asia[101].

Then, the BRI is not only a tool for expanding China's economic and political influence but also as a framework for constructing a new model of globalization grounded in Chinese standards and norms[102]. Globalization, as a concept, represents a shift from localized or national paradigms to a global perspective, fostering a growing awareness of belonging to a unified global community and interconnected identity. emphasize that globalization has not only objective aspects, such as economic integration, but also subjective ones, such as changing ideas about the social order and understanding the interdependence of all participants in the global process. This evolving dynamic has been termed Sinocentric globalization, a system in which China is increasingly emerging as a central hub of power and influence in international relations, offering an alternative to the Western model of globalization. In this framework, China's influence refers to its ability to shape the behaviour, decisions, or outcomes of other states or organizations through direct or indirect actions, often carrying economic or political implications. In the context of international relations and political science, influence is frequently associated with "soft power", which entails the capacity to shape others' behaviour through the appeal of culture, values, and political ideas, rather than coercive methods of "hard power".

As scholars studied[103], the approach toward Beijing rests on the threefold perception of China as an economic partner, competitor, and systemic rival. The matter is that why should Global Gateway project seek to counter Chinese investments. It seems that instead of formulating an ideal strategy for economic competition with China, the GG has this potentiality to formulate the missions of this project more realistically and purposefully. While the newly launched Global Gateway investment scheme boosts EU's soft power globally, it is not be Europe's challenge to the BRI but a natural complement. Europe is

[100] Key milestones of China - Africa cooperation under Belt and Road Initiative.
[101] Belt and Road Initiative in Central Asia, Desk study, ITUC, CSI, IGB. 2021.
[102] Mykyta Simonov, The Belt and Road Initiative and Partnership for Global Infrastructure and Investment: Comparison and current status, Asia and the Global Economy, Volume 5, Issue 1, 2025, 100106, ISSN 2667-1115.
[103] Bickram. (2021). *G7's Build Back Better World: Rival to China's BRI?*

trying to find ways to coordinate and synergize various national and supra-national projects and share best practices and information. The most fundamental goal of the EU is to democratically imitate the Chinese model by expanding into new markets through improved dialogue and infrastructure contributions. The EU also has this opportunity to prioritize areas less penetrated by the BRI, especially India, Iran, and some other countries.

In conclusion[104], whether the various infrastructure development initiatives, such as the Global Gateway, BRI, BDN[105], EPQI[106] and B3W[107] are complementary or competitive is a key question. The answer is probably at the same time. In low- and middle-income nations, where there is a huge need for new or renovated public infrastructure, more investment, from any source, is likely to be welcomed. The difference between them however is much clearer; apart from BRI, the others are driven by free, open and rules-based engagement norms. In this regard, the emergence of Global Gateway and the EU in the Asia and Indo-Pacific domain must be viewed as an opportunity to build global democratic consensus in building a strong alternative (or counter) to the BRI. For any of the democratic ventures mentioned, competing with BRI's USD 1 trillion to USD 8 trillion estimates alone is not possible; this is also one of the reasons why multiple initiatives exist even as they have over-arching and over-lapping focuses.

3. EU Cities Mission

The goal of the European Green Deal is to achieve climate neutrality by 2050, and so cities play a pivotal role since they take up only 4% of the EU's land area, but they are home to 75% of EU citizens. Since climate mitigation is heavily dependent on urban

[104] Panda, Jagannath P. (2022): EU's global gateway strategy and building a global consensus vis-à-vis BRI, Ordnungspolitische Diskurse, No. 2022-10, OrdnungsPolitisches Portal (OPO), Erfurt.

[105] BDN (Blue Dot Network) – A global infrastructure certification initiative launched in 2019 by the United States, Japan, and Australia. It aims to certify infrastructure projects that meet high standards of transparency, sustainability, and financial viability.

[106] EPQI (Expanded Partnership for Quality Infrastructure) – A Japanese-led initiative launched by Japan in 2015 as a counter to BRI. It promotes high-quality, sustainable, and transparent infrastructure investments, mainly in Asia and Africa. Japan pledged $200 billion to the initiative to promote projects that align with international standards and avoid debt traps.

[107] B3W (Build Back Better World) – A G7-led initiative announced in 2021 under U.S. leadership. It aims to mobilize private capital for sustainable infrastructure in developing countries, particularly in Latin America, Africa, and the Indo-Pacific. It focuses on four key areas: climate, health security, digital technology, and gender equality. B3W was later integrated into the Partnership for Global Infrastructure and Investment (PGII) in 2022.

action, there is the need to support cities in accelerating their green and digital transformation. European cities can substantially contribute to the Green Deal target of reducing emissions by 55% by 2030 and, in more practical terms, to offer cleaner air, safer transport and less congestion and noise to their citizens thus achieving the vision of planetary health. In total, 100 cities in the EU and 12 cities in countries associated to Horizon Europe, were selected to participate in the Mission in April 2022[108]. The EU Cities Mission has allocated funding through various Horizon Europe calls. Notably, a call published in September 2024 made €98 million available for projects supporting this mission, with a submission deadline of February 11, 2025[109].

The 112 selected cities are invited to develop Climate City Contracts, which include an overall plan for climate neutrality across all sectors such as energy, buildings, waste management and transport, together with related investment plans. Climate City Contracts are co-created with local stakeholders and citizens, with the help of a Mission Platform. The engagement of local stakeholders and authorities is fundamental since sub-national or local level institutions are considered well-placed to reduce greenhouse gas emissions faster than national governments[110]; however, on the other hand they are often constrained by and dependent on national regulation, legislation, and resources[111].

Recognizing these challenges, as analysed[112], under a governance point of view the EU Cities Mission takes a broad, cross-sectoral approach to climate action, emphasizing the importance of breaking down silos between different initiatives and policy areas. By fostering collaboration across sectors such as transport, energy, and urban planning, the Mission not only aims to accelerate climate neutrality but may also create indirect pathways for bridging governance silos. As businesses, sectors, and government bodies are engaged in order to work together, this cross-sectoral integration could, by extension, encourage dialogue and coordination between different levels of governance and stakeholders. However, while the Mission promotes the establishment of national

[108] Horizon Europe, climate neutral and smart cities.
[109] Horizon Europe euro 98 million available.
[110] Romero-Lankao, P., Bulkeley, H., Pelling, M., Burch, S., Gordon, D. J., Gupta, J., et al. (2018). Urban transformative potential in a changing climate. *Nature Clim Change* 8, 754–756.
[111] Betsill, M., and Bulkeley, H. (2007). Looking back and thinking ahead: a decade of cities and climate change research. *Local Environ.* 12, 447–456.
[112] Buylova A, Nasiritousi N, Bergman J, Sanderink L, Wickenberg B, Casiano Flores C and McCormick K (2025) Bridging silos through governance innovations: the role of the EU cities mission. *Front. Sustain. Cities*. 6:1463870.

platforms to support cities in their climate work, the extent to which political representatives actively engage in these platforms remains unclear. This suggests that silo bridging is more likely to occur at the operational or bureaucratic level rather than the political level. Furthermore, the limited discussion on bridging silos between local and national governments may reflect the EU's constrained ability to directly influence national-level politics, highlighting a potential limitation in its governance reach.

Moreover, in terms of investments cities continue to face significant headwinds in mobilizing finance for transformational climate action and struggle to build up the capacity to master and combine different funding and financing instruments. While trying to access funds from upper levels of governance[113] (e.g., EU funds), cities deal with a number of challenges that are regulatory and budgetary (e.g., share of co-financing from cities, fiscal restrictions, impossibility to increase debt, impact of COVID-19 on local government's revenues), political (e.g., divergence with national governments), and capacity-related (e.g., insufficient administrative and technical knowledge) in nature[114]. Further, while public funding can provide the economic basis for local action, large sums will need to be through the private sector[115], including from local businesses and population groups with high socioeconomic status[116].

However, this may be particularly cumbersome in a landscape with limited alignment between climate priorities and economic incentives, business models, diverse stakeholder interests, and revolving administrations with varying agendas. In fact, an additional dimension worth investigating is that of financial innovation[117]. The long termism that characterises climate action is seldom aligned with the risk appetite of investors. As such, the conventional financial system (e.g., the ecosystem of investors, markets, and

[113] Economidou M, Della Valle N, Melica G, Bertoldi P (2023) The role of European municipalities and regions in financing energy upgrades in buildings. Environ Econ Policy Stud.
[114] Negreiros P, Falconer A (2021) Financing the green transition of European cities: what does the European green deal change. In: Towards a European Green Deal with Cities. The Urban Dimension of the EU's Sustainable Growth Strategy, pp. 49–59.
[115] OECD Bank W, Environment UN (2018) Financing climate futures: rethinking infrastructure. OECD Publishing Paris, France.
[116] Nielsen KS, Nicholas KA, Creutzig F, Dietz T, Stern PC (2021) The role of high-socioeconomic-status people in locking in or rapidly reducing energy-driven greenhouse gas emissions. Nat Energy 6(11):1011–1016.
[117] Taghizadeh-Hesary F, Yoshino N (2020) Sustainable solutions for green financing and investment in renewable energy projects. Energies 13(Issue):4.

instruments) could have a hampering rather than enabling role in climate mitigation pathways unless risk management aversion is properly modelled and addressed[118].

As scholars[119] have demonstrated, in the finance world, climate neutrality equals making tremendous strides in designing, implementing, and financing climate action. This is particularly true for local governments that, to overcome their limited funding and regulatory capacity, have to show a high degree of ambition, creativity, and innovation, while pairing political will with fiscal and sound financial management. Challenges remain in structuring and integrating climate action in decision-making. Cities have shown creative approaches in introducing innovative financing. Cities participating in the European Mission to reach climate neutrality by 2030 are front-running climate action. Scholars[120], then, suggest the following policy recommendations for an effective impact of the Mission:

- Cities should deepen their collaboration with financial institutions to better design projects and business models, thus enhancing the potential for implementation.
- Public financing should target sectors and niches that are perceived as risky or not profitable by the private sector and it should crowd-in rapid private financing commensurate with the investment scale of climate neutrality.
- Aligning policies, investment, and citizen mobilization for climate neutrality across jurisdictions and levels of governance is fundamental.
- Capacity building and training remain a critical bottleneck to access financing. Twinning projects and neighbourhood policies could be established, where more advanced cities (many in the cohort of Mission Cities) can help strengthen other local administrations through a transfer of skills and knowledge, here once again there is a strong link with the pivotal role of knowledge ecosystems and universities.
- Cities should experiment more with green bonds and ESG debt options in general, as well as with newer instruments (e.g., sustainability-linked bonds) that carry penalties for borrowers if they fail to meet certain targets.

[118] Battiston S, Monasterolo I, Riahi K, van Ruijven BJ (2021) Accounting for finance is key for climate mitigation pathways. Science 372(6545):918–920.
[119] Ulpiani, G., Rebolledo, E., Vetters, N. *et al.* Funding and financing the zero emissions journey: urban visions from the 100 Climate-Neutral and Smart Cities Mission. *Humanit Soc Sci Commun* 10, 647 (2023).
[120] See reference 107.

- Sector-specific projects can be a practical approach to kick-start an investment strategy, considering the use and integration of multiple financing schemes.

In conclusion, the success of the EU Cities Mission relies on cities' ability to navigate financial, regulatory, and governance challenges through integrated and systemic approaches. Achieving climate neutrality requires a shift from fragmented, project-based financing to long-term, multi-level investment strategies that align public and private sector priorities. By fostering stronger institutional coordination, leveraging financial innovation, and enhancing local capacity-building, cities can mobilize the necessary resources to accelerate their green transition. Ensuring that Climate City Contracts serve as dynamic, adaptable roadmaps, supported by knowledge-sharing networks and cross-sectoral collaboration, will be key in positioning Mission Cities as global pioneers in urban climate action.

4. The role of City Contracts and USDIPs in Global Investment Strategies

City Contracts and Urban Sustainable Development and Innovation Partnerships (USDIPs) are emerging as crucial mechanisms for mobilizing global investments towards sustainable urban development. These instruments provide structured frameworks for multi-stakeholder collaboration, financial innovation, and governance integration.

City Contracts, such as those developed under the EU Cities Mission, serve as comprehensive investment roadmaps designed to accelerate climate neutrality. These contracts integrate policy commitments, financing strategies, and implementation frameworks across key strategic sectors. The effectiveness of City Contracts lies in their ability to align municipal, national, and EU-level resources, while also fostering engagement from private investors and civil society actors. By ensuring long-term policy coherence and financial sustainability, they act as catalysts for innovative urban projects that balance economic growth with social and environmental objectives.

As Iaione[121] investigated, USDIPs represent a transformative governance model that extends beyond the traditional public-private partnership. USDIPs promote mission-

[121] Iaione, F. C. (2024). Just sustainable innovation: shared systemic stewardship as Governance impact of sustainable investment? *MUNUS*, (1), 1-46.

oriented innovation by integrating a pool of stakeholders, including local authorities, businesses, universities, and vulnerable communities, into the decision-making and implementation process. These partnerships are specifically designed to address systemic urban challenges through co-designed and co-governed initiatives. A key advantage of USDIPs is their ability to bridge governance and investment silos. Unlike conventional financing models, which often operate in fragmented policy domains, USDIPs foster a holistic approach by incorporating legal, financial, and institutional mechanisms tailored to local contexts leading to tailored solutions. Moreover, these partnerships emphasize inclusivity by ensuring that marginalized communities actively participate in shaping and benefiting from sustainable urban initiatives.

The European Investment Bank (EIB), for instance, has utilized USDIPs to support cities through innovative financial instruments which channel investments into urban renewal projects.

However, despite their transformative potential, City Contracts and USDIPs face significant challenges in terms of scalability, regulatory constraints, and financial sustainability. Many cities struggle with administrative capacity, financial expertise, and political alignment necessary to fully leverage these instruments. Addressing these barriers requires enhanced knowledge-sharing networks, greater flexibility in regulatory frameworks, and increased collaboration between public and private entities. Strengthening these mechanisms will be essential to ensuring that City Contracts and USDIPs not only drive urban sustainability and planetary health but also promote just and inclusive development pathways.

In conclusion, City Contracts and USDIPs offer promising frameworks for integrating global investment strategies with localized urban transformation agendas. As urban challenges continue to evolve, refining and expanding these models will be crucial in ensuring that cities remain at the forefront of global sustainability efforts.

5. BRICS's perspective: The New Development Bank "NDB"

Taking a step outside the European Union, in 2014[122], the five heads of state of the BRICS countries (Brazil, Russia, India, China, and South Africa) announced the creation of a new development bank, meant primarily to help close the financing gap for infrastructure and sustainable development in the Global South. The BRICS are thus united by their dissatisfaction with the current governance framework and by their determination to adapt it in a way that is favourable to them and to other emerging countries. The initial subscribed capital of US$50 billion[123] in the NDB is equally shared among its five members. The NDB is the first multilateral development bank founded by emerging markets and developing countries. Notably, the world has over 20 multilateral development banks. Thus, the NDB was specifically created to complement the efforts of these and of other multilateral financing institutions. Its creation was underpinned by the belief that the BRICS, together with other developing countries, can work together to enhance the developmental impact of existing institutions. The following three reasons[124] summarize why a new institution was needed:

(1) BRICS and other EMDCs are underrepresented in existing institutions;

(2) existing institutions are unwilling and/or too slow to adapt to new global context;

(3) large demand for infrastructure investments, especially those that are economically, socially, and environmentally sustainable.

Moreover, establishing a multilateral development bank leads to the opportunity for practical cooperation, in fact, with the creation of the New Development Bank the BRICS took a fundamental step towards institutionalization[125]. Thus, according to Leslie Maasdorp[126], the Bank's Chief Financial Officer, the NDB "is a physical expression of the desire of emerging markets to play a bigger role in global governance". However, in

[122] About the New Development Bank, History.
[123] New Development Bank. (2014) Agreement on the New Development Bank – Fortaleza. 15 July. Available from: Agreement on the New Development Bank Fortaleza. July 15.
[124] Suchodolski, S. G., & Demeule Meester, J. M. (2018). The BRICS coming of age and the new development bank. *Global Policy*, *9*(4), 578-585.
[125] Abdenur, A. E., & Folly, M. (2015). The new development bank and the institutionalization of the BRICS. *BRICS-Studies and Documents*, 77-111.
[126] Maasdorp Leslie (2019) BRICS' New Development Bank turns four: What has it achieved? Available at: BRICS New Development Bank for Sustainability.

general, trust-building and practical cooperation are two of the biggest challenges faced by the BRICS political grouping. Establishing the NDB may contribute to tackling these challenges but even after establishing the NDB, some challenges remain when executing this practical cooperation because all sides involved want to benefit, want to get financial support, and have a more influential voice[127].

The NDB's mandate is very focused and very specialized, and its scope of activities is smaller than other multilateral development banks because it only focuses on infrastructure and sustainable development[128].

The use of country systems is another NDB novelty. Country systems[129] ensure that outside actors make use of, and abide by, a home country's administrative systems when engaging in financial and policy-making activities in a recipient country[130]. The use of country systems on environmental and social aspects and procurement means that the NDB does not impose standards or conditions. Instead, it follows the procurement, legal, and labour laws of the respective countries. It reflects the BRICS countries' strong determination to protect national sovereignty. Otherwise, countries would need double paperwork in both English and the local language. Most BRICS states do not have the bureaucratic capacity to deal with this excessive bureaucracy. On a related note, the challenge predominantly relates to compliance with the countries' legal environment. The BRICS countries' standards are not low, but often there is no compliance with the existing standards.

Another NDB novelty is local currency financing (see Article 24 of the NDB Agreement). Traditionally, multilateral development banks have provided most of their financing in, for instance, US dollars or euros. According to Kundapur Vaman Kamath, at that time

---

[127] Hooijmaaijers, B. (2022). The internal and external institutionalization of the BRICS countries: The case of the New Development Bank. *International Political Science Review*, *43*(4), 481-494.
[128] See reference 115.
[129] Country systems refer to a country's legal and institutional framework: its national, subnational, or sectoral implementing institutions and applicable laws, regulations, rules, and procedures. In the World Bank, use of country systems generally refers more narrowly to the Bank's reliance on the borrowing country's systems for the safeguards and fiduciary aspects of operations it supports-that is, the financial management, procurement, environmental etc. Definition from the World Bank. Use of Country Systems in bank supported operations.
[130] Hooijmaaijers Bas (2021b) Understanding Success and Failure in Establishing New Multilateral Development Banks: The SCO development bank, the NDB, and the AIIB. *Asian Perspective* 45(2): 445–467.

NDB president, loans in local currency help "mitigate the risks faced by borrowers and supporting the capital markets of its member countries"[131]. Thus far, around 25% of the projects approved were in local currency.

The NDB's fourth unique characteristic is the equal voting rights among the five member countries and NDB founders. No country has any veto power. Per the 2014 Fortaleza Declaration, the NDB has an initial authorized capital of $100 billion.

Fifth, the NDB is set up to fund the private sector[132]. In contrast, the World Bank focuses entirely on funding governments or state-owned enterprises. Currently, the share of governments and state-owned enterprises in NDB projects is around 85%, and the private sector share is around 15%. However, the NDB's target is to have around 70% for government and state-owned enterprises and around 30% for the private sector.

Lastly, the sixth issue on which the NDB plans to be innovative is the speed of execution, which it aims to achieve by having a "lean and flat" organizational structure, with a non-resident board of directors and lower hierarchy levels between junior staff and top-level management, and by avoiding excessive bureaucracy[133]. Whereas project approval at multilateral development banks usually takes around one year, at the NDB, it takes approximately six months. By the end of 2020, the NDB had awarded loans worth around $26 billion, which is quite substantial compared to the approximately $100 billion combined a year approved by all multilateral development banks together.

5.1 Governance of the New Development Bank

The General Strategy[134] describes the interaction with member countries as a relationship of "equality, mutual respect and trust". These same principles apply to the Bank's

[131] China Daily (2019) New bank embraces role in BRICS growth. Available at: New bank embraces role in BRICS growth. China Daily 2019.
[132] Maasdorp Leslie (2019) BRICS' New Development Bank turns four: What has it achieved? Available at: BRICS' New Development Bank turns four: what has it achieved?
[133] Suchodolski Sergio, Demeule Meester Julien (2018) The BRICS Coming of Age and the New Development Bank. *Global Policy* 9(4): 578–585.
[134] NDB (2017) NDB's General Strategy: 2017–2021. Available from: NDB's General Strategy: 2017 – 2021.
NDB (2022) NDB's General Strategy: 2022–2026. Available from: NDB's General Strategy for 2022–2026.

governance. The governance will also remain in the hands of EMDC[135] shareholders, advanced countries are limited to a 20 per cent maximum combined voting power and can only join the Bank as non-borrowing members, as established in Articles 2 and 8 of NDB's Articles of Agreement. This governance structure is an essential part to ensure true ownership by emerging countries of their development strategies.

Further, most of the Bank's decisions are taken based on a simple majority, and no single member has veto power over any matter, as specified also in the previous paragraph. This is markedly different from existing institutions, especially the Washington-based ones. For instance, decisions of substantive issues in the IMF require 85 per cent approval, granting the United Stated and European countries (as a group) de facto veto power over any major decisions. An analogous situation applies to the World Bank's and other regional development banks.

In the case of NDB, each of the founding members has an equal shareholding and voting power, which also serves to promote a true feeling of ownership of the institution and of their development strategies. The endorsement of this model by the founding members could be supported by the fact that the NDB is the institution to which all the BRICS, apart from China, have given their largest capital contribution. Moreover, the capital committed to be paid by Brazil and South Africa to the NDB is larger than the combined amount each of them has paid to all other MDBs[136] they are members of. Second, some of NDB's founding members have paid their capital contributions ahead of schedule.

In conclusion, with a consistent vision to operate as "One Team"[137], the NDB want to continue to optimize coordination among its departments and divisions, emphasizing common objectives across the Bank's lines of work. As the Bank grows, it will also upgrade and standardize processes across key functions with adequate monitoring and reporting mechanisms, well-calibrated templates and systems that promote collaboration and communication. To embed a cost-conscious culture, the Bank will roll out a cost management program that will help promote an efficiency mindset across all its functions.

[135] *Emerging markets* and *developing countries*
[136] *Multilateral development banks*
[137] NDB (2022) NDB's General Strategy: 2022–2026. Available from: NDB's General Strategy for 2022–2026.

5.2 The Role of Cooperation and Knowledge Ecosystems for the NDB

As stated by the New Development Bank General Strategy for 2022–2026[138], a key goal in the Strategy is to nurture NDB as a knowledge hub for its member countries and other EMDCs, particularly on infrastructure and sustainable development issues. By setting up knowledge networks, NDB seeks to acquire and disseminate expertise as well as offer practical solutions to development challenges through cost-effective approaches. NDB's research efforts will build on existing knowledge and aim to enhance the understanding of its members' economies, development contexts, challenges, policies, project pipelines, and practices related to infrastructure and sustainable development. This will help the Bank generate requisite knowledge inputs for guiding and fine-tuning its work in terms of operations and resource mobilization. For instance, knowledge inputs to develop assessment methods and tools that can be applied across the project lifecycle will be essential elements for enhancing the quality of NDB's operations.

The Bank's research and acquisition of knowledge will likewise underpin its various non-financing activities, such as delivery of technical assistance, preparation of country partnership plans, publication of relevant flagship reports, and engagements with the international development community. The aim is that the Bank will develop necessary back-end arrangements with academia, experts, and think tanks to facilitate discussions and engagement on select, high-priority issues. Besides external sourcing of best practices and knowledge, the Bank will harvest lessons learned from NDB's existing projects for creating a feedback loop that contributes to improvements in the Bank's operating approaches and future projects. Overall, the Bank will position itself to build a robust understanding, through its research and knowledge initiatives, of the themes and issues that matter to its members.

Thus, NDB will engage in partnerships to strengthen its capacity in research, knowledge-dissemination, and technical assistance. The Bank intends to take advantage of the wide variety of knowledge institutions and learning platforms, drawing on research and studies done by development partners, universities, think tanks and government agencies. Some of these organizations may also provide feedback on the Bank's strategy and policies, procedures, and operations. As NDB evolves, it will contribute to generate and

[138] Available from: NDB: GENERAL STRATEGY FOR 2022–2026.

disseminate new knowledge that can benefit its members and partners. Research and knowledge dissemination will be an important part of NDB's ancillary activities. Not only, also NDB's talents are critical for delivering on the Bank's mandate and achieving its strategic objectives. Continuing its efforts to build a talent-intensive institution, the Bank will focus on addressing skills gaps, creating a high-performing workforce, and retaining talented professionals. By nurturing its unique and collaborative organizational culture, NDB will continue to position itself as an international employer of choice. The Bank is committed to maintaining its rigorous, fair, transparent, and merit-based selection process as well as promoting a competitive, flexible, and caring work environment. NDB recognizes the importance of having a diverse talent pool in terms of professional background, experience, gender, nationality, and other parameters.

This considers that the NDB believes in how research can play a more useful role for the institution if it addresses policy and practical challenges and provides forward-looking options that take national and local circumstances into account. This focused approach must mitigate the risk of disconnection between research activities and the requirements of the institution. Based on the Bank's practices and needs. NDB will facilitate knowledge dissemination to improve efficiency and effectiveness in sustainable development and infrastructure projects. Experience has shown that knowledge dissemination is better targeted and usually more successful when embedded in investment projects. Projects may indeed serve as vehicles for promoting innovation and transferring technology. The main goal is to contribute, through projects and by other means, to sharing knowledge among BRICS and other EMDCs, thus establishing NDB as a platform for going beyond the North-South cooperation model.

6. African Development Bank "AfDB"

While the New Development Bank focuses on fostering financial cooperation among BRICS and it supports large-scale infrastructure projects in emerging economies, the African Development Bank (AfDB), established in 1964 with the mission to promote sustainable economic growth and reduce poverty across the continent[139], plays a more

[139] AfDB overview.

targeted role in driving economic growth and poverty reduction specifically within the African continent. The AfDB is the leading financial institution dedicated to Africa's sustainable development, mobilizing resources to fund key sectors such as energy, agriculture, industrialization, and regional integration. The AfDB is deeply embedded in Africa's unique socio-economic and geopolitical landscape, providing both financial support and policy guidance tailored to the continent's development needs.

The AfDB Headquarter is in Abidjan, Côte d'Ivoire and it comprises three entities: the African Development Bank, the African Development Fund (ADF), and the Nigeria Trust Fund (NTF). Its shareholders consist of 55 African countries and 27 non-African countries, reflecting a broad coalition committed to Africa's development[140].

To sharpen its focus and enhance impact, the AfDB has articulated five strategic priorities, known as the "High 5s":

1. *Light Up and Power Africa*: Addressing energy poverty by expanding access to electricity.
2. *Feed Africa*: Transforming agriculture to ensure food security.
3. *Industrialize Africa*: Promoting industrialization to drive economic growth.
4. *Integrate Africa*: Enhancing regional integration for improved trade and cooperation.
5. *Improve the Quality of Life for the People of Africa*: Investing in human capital development.

Moreover, for Africa, the AfDB has therefore become a viable framework and platform that can support challenges and dilemmas that African governments face when dealing with other external development actors such as conditioned aid, debt trap, or (mis)trust. In this regard, the AfDB capitalizes on its strengths of unique funding approaches and comparative technical advantages over other multilateral institutions in the continent. In fact, as also reflected in the actual risk of digital neocolonialism, post-colonial Africa, wanted to guarantee the independence of the continent from neo-colonialism, it constitutes one of the key objectives of the African Union as stipulated in its Constitutive

[140] See reference 126

Act. Then, it is possible to recall here the possible threat behind Chinese loans and aid, that have funded huge investments in Africa; there are critical voices that highlight China's demand for the continent's natural resources and debt trap policy.

This gives advantage to the AfDB over Western or Chinese aid and loans. The advantage is that it is the continent's premier multilateral development institution. It is active in all 55 countries across the continent with 35 country offices, giving it a strong local presence that is not enjoyed by other multilateral institutions. It also plays a multifaceted role focusing on sectors such as education, health, infrastructure, environment, and natural resource governance[141]. According to a survey analysis[142], senior African governments identified the AfDB as their preferred partner because the bank "is closer to Africa, understands the African way, and African solution," "has always stood beside us—through all our troubles," and "shares our aspirations and development goals". In other words, the AfDB is considered as an "honest broker" in not only dealing with donors but also in advocacy for Africa in global forums.

Notably, in a recent initiative to bolster the financial stability of the continent, African leaders approved the creation of the African Financial Stability Mechanism (AFSM), a continental fund hosted by the AfDB. This mechanism aims to prevent potential debt crises by providing concessional loans to member countries, focusing on pre-emptive measures rather than bailouts[143].

However, many challenges[144] remain in the African landscape since promoting development in Africa has faced significant challenges partly because of the continent's peripheral access to global markets as well as its internal geographical limitations on the movement of people, goods, and services.

In addition, the colonial inheritance[145] created basic problems for the establishment of effective governments during the post-independence period. African leaders faced

[141] Runde, D. F., Erol, Y. K., & Sundar, R. R. (2019). The new missing middle in development finance. Centre for Strategic and International Studies.
[142] Woods, N., & Martin, M. (2012). The preferred partner? A client assessment of the African Development Bank. African Development Bank.
[143] African leaders approve creation of financial stability fund, Reuters, 2025.
[144] Nyadera, I. N., Agwanda, B., Onder, M., & Mukhtar, I. A. (2022). Multilateralism, developmental regionalism, and the African Development Bank. *Politics and Governance*, *10*(2), 82-94.
[145] Ayee, J. R. (2005). African Development Bank. *Economic Research Working Paper Series, Public Sector Management in Africa*.

manifold difficulties in gathering stable governing coalitions, fostering durable institutions, and extending substantial control over the mass of their populations. The emergent governing formulas typically blended traditional modes of authority with institutional forms inherited from the colonial regime. These strategies often stabilized nascent political elites, yet they were less effective in building sound governing structures. Consequently, the colonialism presented African leaders three formidable challenges to development. First is the project of state building. African countries have faced the difficulties of constructing effective public authority, establishing viable state institutions, and creating responsive and legitimate agents of governance. Attaining security and managing conflict are also integral features of state consolidation. Building public power requires much more than the installation of new governmental structures.

In conclusion, the African Development Bank continues to play a pivotal role in driving sustainable development and economic transformation across the African continent, the AfDB has the potential to be a leading actor in the continent's transformation even as challenges such as a global pandemic, growing conflicts, institutional failures, superpower rivalry in international institutions, and inequalities appear to overburden the multilateral system.

Chapter 3: Research Question and Methodology Approach

1. Research Problem and Research Question

Urbanization and global investment strategies are pivotal in shaping sustainable and just urban futures. However, persistent disparities between the Global North and South, governance inefficiencies, and emerging risks still pose significant obstacles to achieving equitable urban transformation. This research investigates how global investments in urban infrastructure can be restructured beyond traditional public-private partnership (PPP) models to better align with social outcomes, specifically equity, inclusion, and sustainability, through a planetary health and hybrid financing approaches.

The transportation infrastructure represents the motivator of economic growth and social welfare through improving production and investment performance for the private sector. More specifically, the construction of transportation infrastructure could reduce the travel cost, attract foreign investment and expand trade of shared resources. In terms of the social overhead capital, transport infrastructure plays a decisive role in industrialization and has obvious spillover effects on regional innovation, factor reallocation, and manufacturing productivity, which promote the aggregation of industries, population and economy. Empirical evidence from both developed and developing countries points to a positive correlation between development in the physical, social, and policy and regulation aspects of infrastructure and economic development[146].

The merits of transport infrastructure development are not without problems, as urban economies are growing and the living conditions and lifestyles of the city are changing leading to high numbers of people in the upper and middle classes in the cities, which in turn increases the ownership of private vehicles and the levels of pollution. Most of these cities, however, do not have any growth management plans for controlling this rapid increase in personal vehicles. This has led to severe traffic congestion, environmental problems such as air pollution, loss of personal and corporate productivity, high cost of transport, and poor quality of life. Due to its continued expansion, the transport sector in many countries has become the largest contributor to anthropogenic pollutant emissions

[146] D Banister & Y Berechman, 'Transport investment and the promotion of economic growth' (9) J. Transp. Geogr. (2001) 209.

in urban environments[147]. But on the other hand, public transport infrastructures provide mobility which can enhance social interaction and hence act to build social capital.

Furthermore, current global initiatives such as the EU Cities Mission, Global Gateway, and the Belt and Road Initiative aim to coordinate policy and financial commitments across scales. However, these efforts often encounter fragmented governance, financial limitations, and regulatory misalignment at local, national, and transnational levels. The core challenge lies in designing inclusive and adaptable delivery mechanisms that are context-sensitive and capable of fostering co-produced urban transformations, particularly in the Global South, where vulnerabilities to exclusion and extractive development models remain acute.

Digital technologies are frequently promoted as enablers of urban sustainability, yet their deployment risks reinforcing technological dependency and widening gaps in data governance, especially when infrastructure ownership and control over knowledge production remain concentrated in the Global North. Similarly, while universities and knowledge ecosystems are essential factors in shaping urban development, their potential to drive participatory and locally grounded urban policy remains underutilized, especially given the systemic knowledge imbalances between institutions across global regions.

Further complicating these dynamics is the role of international cooperation, which serves as both a facilitator and a challenge in urban investment and policy implementation. While global partnerships can help mobilize resources, knowledge-sharing, and policy harmonization, they may also perpetuate power asymmetries where cities in developing regions remain dependent on external funding and expertise rather than cultivating self-sustaining urban development models.

This research critically examines the evolving interplay between global investment frameworks, digital innovation, international cooperation, and knowledge ecosystems. It seeks to identify how these elements can be more effectively mobilized to support urban development strategies that are not only economically viable but also socially equitable, environmentally sustainable, and empowering for local communities. A key objective is to explore alternative, and policy design more inclusive for investment delivery

[147] RN Colvile, et al, 'The Transport Sector as A Source of Air Pollution' (35(9) Atmospheric Environment (2001) 1537;

mechanisms that can drive this global urban transition while avoiding the pitfalls of past models.

2. Research Design and Approach

The research employs a qualitative, comparative case study methodology to explore the dynamics of global investment strategies and governance mechanisms in urban development, focusing on three diverse contexts: Paris, Bangalore, and Nairobi.

This approach is ideally suited to capture the complex, context-specific, and multidimensional nature of infrastructural development, where governance structures, socio-spatial inequalities, environmental imperatives, and geopolitical dynamics intersect. The selected cases represent a deliberate mix of established, emergent, and rapidly urbanizing cities, each demonstrating different governance models, financing structures, and socio-political landscapes that offer a rich basis for comparative analysis. By combining the most-different systems design (MDSD) to highlight differences in geography and socio-economic status with the most-similar systems design (MSSD) to underline the shared challenges of financing large-scale infrastructure through international partnerships, managing environmental risks, and addressing spatial inequalities, the research generates insights that are transferable to other urban contexts. In-depth qualitative techniques, drawing on policy analyses, project reports, environmental and social impact assessments, peer-reviewed literature, and comprehensive document reviews, enable the study to probe social, political, and environmental dimensions that quantitative indicators alone cannot capture, such as displacement, governance fragmentation, and digital exclusion, particularly in marginalized and vulnerable communities.

Policy documents, project reports, and academic studies used in this research were chosen through a systematic, transparent process designed to ensure rigor. Source identification began by gathering materials from official websites of major international investment frameworks and development banks (Global Gateway, Belt and Road Initiative, NDB, AfDB, etc.). Academic literature was retrieved from Google Scholar, while grey literature, such as NGO and civil-society briefs or local government white papers, was

accessed via institutional repositories including Nairobi County and the Karnataka Railway Authority, as references show.

Documents were retained and used if they directly addressed infrastructure governance, financing mechanisms, social and environmental impacts, or digital and knowledge-driven approaches; were published by reputable supranational bodies, peer-reviewed journals, or established think-tanks. Material such as media articles, blogs, opinion pieces lacking empirical data, or duplicate versions of the same report were excluded.

It is important also to acknowledge limitations inherent to document-based analysis, notably, the potential underrepresentation of grassroots point of views and an English-language bias that may have excluded some reports. Future research could address these gaps by incorporating primary interviews or even better by enclosing a focus group with local stakeholders.

Additionally, the research critically examines international investment frameworks like the EU Cities Mission, Global Gateway, and the Belt and Road Initiative to assess how these instruments align with local development goals and to investigate the obstacles posed by fragmented governance, financial constraints, and regulatory misalignments. Using a mixed-method approach to triangulate data from multiple sources and perspectives, the study emphasizes the necessity of aligning international investments with local needs, capacities, and aspirations, especially in cities of the Global South facing persistent inequities. Ultimately, this research aims to contribute to the ongoing discourse on sustainable urban development by providing actionable insights into the mechanisms that drive successful, inclusive, and resilient urban transformations. By comparing the cases of Paris, Bangalore, and Nairobi, the study seeks to highlight best practices, identify governance gaps, and propose recommendations for improving the effectiveness of global investment frameworks in achieving just and sustainable urban futures.

3. Case Studies: Current Status of the three cities

This research investigates how global investments in urban infrastructures can be restructured beyond traditional PPP models to promote equity, inclusion, and sustainability through digital innovations and knowledge-driven strategical approaches.

As the literature examined in the previous chapter supports, an interdisciplinary approach and synergistic collaboration among various stakeholders is needed. Thus, aspects such as integrating digital innovations within traditional infrastructure planning, fostering robust knowledge ecosystems, and ensuring active participation of marginalized communities require deeper exploration. Specifically, the case studies will highlight the need to address human capital retention, localized capacity building, and context-specific governance models that empower local actors and reconcile global investment imperatives with local socio-economic realities. This approach is essential for transforming global urban infrastructure financing into mechanisms that not only drive economic growth but also deliver equitable and sustainable urban transition for all stakeholders.

For this purpose, the research examines three projects: the Nairobi Expressway, the Bangalore Suburban Railway Project, and the Grand Paris Express.

The Nairobi Expressway, is implemented under a PPP/BOOT framework by the China Road and Bridge Corporation, aims to slash travel times and ease congestion through modern tolling systems, yet its reliance on toll revenues and heavy debt financing raises concerns over country debt trap, accessibility and the risk of marginalizing low-income commuters.

In contrast, the Bangalore Suburban Railway Project, supported by European Investment Bank, is designed to shift transportation from road to rail, thereby reducing environmental impacts and promoting social inclusion. However, extensive land acquisition and the displacement of vulnerable populations, often without adequate resettlement measures, highlight critical challenges in safeguarding informal community interests.

Meanwhile, the Grand Paris Express stands as Europe’s largest urban development project, harnessing cutting-edge digital innovations and a multifaceted financing mix of state, EU, and PPP funding to transform metropolitan mobility. Yet, despite its ambition

to promote sustainable and inclusive growth, concerns persist regarding fare structures, location of stations, and the potential reinforcement of social inequalities. Collectively, these case studies

Collectively, these case studies illuminate both the transformative potential and the inherent drawbacks of current investment frameworks. However, they also underscore the urgent need to redesign urban infrastructure financing to better serve marginalized communities. By fostering robust knowledge ecosystems and prioritizing human capital retention, while integrating digital innovations, urban development can empower vulnerable communities to actively participate in shaping their futures. Such an approach is essential for achieving a just and sustainable transition that not only meets economic imperatives but also addresses social and environmental challenges.

3.1 Nairobi, Kenya

According to the 2008 Kenya Vision 2030 strategy, Kenya intends to transition into a middle-income economy by 2030. As one of the most dynamic cities in the Global South, Kenya's capital city, is an international, regional, national and local hub for commerce, transport, regional cooperation and economic development. It connects eastern, central and southern African countries. Nairobi is a rapidly growing urban hub that plays a critical role in Africa's digital transformation.

Nairobi is home to approximately 5 million residents as of 2023[148] and continues to experience high population growth. According to projections by the Kenya National Bureau of Statistics (KNBS), Nairobi's population is expected to reach approximately 6.1 million by 2045[149]. Nairobi employs 25% of Kenyans and 43% of the country's urban workers; as it generates over 45% of the country's GDP, it is a major contributor to Kenya's economy[150]. Nairobi has become a leading center for infrastructure investments, innovation hubs, and AI training programs. Moreover, for a long-term vision it is

[148] KNBS. (2023). 2019 Kenya Population and Housing Census: Population by county and subcounty.
[149] Kenya population and Housing Census Summary Report. Kenya National Bureau of Statistics.
[150] UN Habitat, Kenya, Nairobi Urban Profile.

important to highlight that Kenya has a young population, with the median age being 20.1 years in 2020. Besides that, over 50 percent of Kenyans are aged under 25 years old[151].

In addition, regarding governance system in Nairobi is comprised of an elected council, an appointed administrative municipal service, a few civil society groups (residents' associations) and the regulatory authority of central government. The leadership of the city does not generally promote civil participation or create accountability frameworks for overall municipal management. Poor governance transpires in the longstanding deterioration of urban services coupled with rising crime and corruption.

Furthermore, Kenya is highly linked to China, highlighting an high risk of debt trap. As of the end of 2022, Kenya owed approximately $6.7 billion to China, making it the largest creditor to Kenya. This amount represents a significant portion of Kenya's total debt, including loans from other countries, multilateral institutions, and commercial banks. China's debt to Kenya has been a major topic of discussion, especially in the context of the Belt and Road Initiative, which has brought significant debt to participating countries[152].

Thus, the city's selection as a case study is based on several key factors.

Firstly, Tech Innovation and AI Development. The city hosts a thriving technology ecosystem, often referred to as the "Silicon Savannah[153]". Key hubs such as iHub, Nailab, and Gearbox[154] serve as incubators for AI-driven solutions and digital entrepreneurship[155].

Moreover, Kenya's capital has become a strategic hub for international investments in infrastructures, with significant resources allocated to transportation networks, energy systems, and urban development projects. Nairobi has attracted substantial funding from global institutions such as the World Bank[156], the European Union[157], and private

[151] Statista. Demographics of Kenya, Dec. 2023.
[152] Statista. External loan debt to China by country.
[153] Akamanzi, C., Deutscher, P., Guerich, B., Lobelle, A., & Ooko-Ombaka, A. (2016). Silicon Savannah: the Kenya ICT services cluster. *Microeconomics of Competitiveness*, *7*(2), 36-49.
[154] Gearbox, About us.
[155] Omweri, K. F. (2016). The role of business incubation centers in promoting youth entrepreneurship in Kenya: A case of youth entrepreneurial program at NAILAB Center.
[156] World Bank. Kenya and the World Bank Group Provide a 390 million for boosting the digital economy.
[157] Global Gateway: EU launches Digital Economy Package for Kenya to boost connectivity, skills and inclusive governance.

investors, who have recognized the city's pivotal role in East Africa's economic landscape. Major infrastructure projects, including roads, highways, logistics hubs, and housing developments, have sought to modernize Nairobi's rapidly expanding urban environment, addressing critical challenges of congestion, accessibility, and informal settlements. These physical infrastructures form the backbone of Nairobi's long-term growth strategy, aiming to improve urban mobility, service provision, and regional connectivity.

Alongside these physical investments, Nairobi has positioned itself as a leading digital innovation centre, with multinational tech firms like Google and Microsoft[158] establishing regional offices and development hubs. Recent initiatives have increasingly integrated digital infrastructure, including broadband expansion, smart traffic systems, and digital public services, into the broader urban planning framework. A study conducted by the University of Nairobi[159] highlights the importance of AI adoption in higher education, noting its positive impact on research environments, teaching quality, and institutional readiness. While the emphasis on digital infrastructure and AI literacy is crucial, it must complement, not substitute, investments in physical infrastructure, which remain foundational for Nairobi's sustainable and inclusive urban transformation.

Realizing the full benefits of these opportunities requires scaling integrated infrastructure projects that combine physical and digital investments, while ensuring equitable access, particularly in Nairobi's informal settlements. Public-Private Partnerships, aligned with inclusive policy frameworks, are essential to bridge both physical and digital divides, enabling marginalized communities to participate in and benefit from Nairobi's infrastructural and economic growth.

The overarching challenge remains whether Kenya can develop a model of infrastructural modernization, a "Silicon Savannah", that is structurally inclusive, balancing global capital attraction with the equitable distribution of benefits across social, cultural, and economic strata. Current governance practices around infrastructure investment, often shaped by North American and European funding frameworks, risk replicating

[158] Microsoft and G42 announce $1 billion comprehensive digital ecosystem initiative for Kenya.
[159] Shikokoti, D. H., & Reuben, M. (2024). Influence of Artificial Intelligence on the Quality of Education in Higher Learning: A Case Study of Faculty of Education, University of Nairobi, Kenya. *Journal of Education and Practice*, *15*(11).

exclusionary models unless recalibrated towards context-sensitive, locally driven planning approaches.

In conclusion, Nairobi stands as a crucial case study for examining the intersection of international infrastructure investment, urban equity, and digital innovation in the Global South. By analysing its physical infrastructure projects, funding mechanisms, and governance structures, this research contributes to a deeper understanding of how international investment frameworks can be restructured to promote not only economic growth but also long-term social cohesion, environmental sustainability, and community empowerment.

3.2 Bangalore, India

In 2023, the estimated total population in India amounted to approximately 1.43 billion people[160]. Its residents comprise more than one-seventh of the entire world's population, and despite a slowly decreasing fertility rate (which still exceeds the replacement rate and keeps the median age of the population relatively low), an increasing life expectancy adds to an expanding population. In comparison with other countries whose populations are decreasing, India has a relatively small share of aged population, which indicates the probability of lower death rates and higher retention of the existing population.

With a land mass of less than half that of the United States and a population almost four times greater, India has recognized potential problems of its growing population. There are hundreds of millions of people at the Bottom of the Pyramid, that means those people are living in very low socio-economic conditions. Therefore, innovation is going to play a key role in the socio-economic development of India for enabling a sustainable and inclusive development of its people.

Bangalore (Bengaluru)[161] is the capital of Karnataka State in South India. Karnataka exhibits a fluctuating trend of urbanization with a high regional variation and a high urban primacy. Disparities exist in urban growth with Bangalore being the most urbanized district (90.94%). In fact, home to around 14 million people (expected to reach 20 million

[160] World Bank Data 2023.
[161] Economic Survey of Karnataka 2023-24. Government of Karnataka, February 2024.

by 2030), Bengaluru is India's third most populous city. Bangalore is India's second-fastest-growing metropolitan city, with an economic growth rate of 10.3%, and the fourth-largest market for fast-moving consumer goods (FMCG) in the country. Forbes has identified Bangalore as one of "The Next Decade's Fastest-Growing Cities". It is also the third-largest hub for high-net-worth individuals and is home to around 10,000 millionaires who have made over $1 million, as well as over 60,000 super-rich people who have assets worth a combined total of $45 million (US$668,700) and $5 million (US$74,300)[162].

Worldwide Bangalore is known as the "Silicon Valley of India". It is considered as the IT capital of India and IT Hub of Asia. It exemplifies a dynamic fusion of innovation-driven urban development and a thriving startup ecosystem. The city has ascended to the forefront of global technology hubs, ranking 8th worldwide and leading within India.

A significant contributor to this status is Bangalore's robust and diverse startup landscape[163]. The city is home to over 13,000 active startups, spanning sectors such as e-commerce, fintech, biotechnology, and information technology. Notable success stories include Flipkart, Swiggy, and Byju's, which have not only achieved unicorn status but have also set benchmarks for innovation and scalability.

The presence of esteemed institutions like the Indian Institute of Science (IISc) and the Indian Institutes of Information Technology (IIITB) has fostered a rich talent pool, fueling research and development. These institutions collaborate closely with industry, nurturing an environment conducive to entrepreneurial ventures. For example, initiatives such as the NS Raghavan Center for Entrepreneurial Learning (NSRCEL) at IIM Bengaluru play a pivotal role in mentoring and supporting startups, further strengthening the innovation ecosystem[164]. This makes Bengaluru an example in integrating knowledge ecosystems in the business field, in fact, there are a plenty of engineering institutes and business schools. They have contributed to produce a higher pool of more skilled tech talent in the form of engineers and coders and provide those talented students to the IT services-oriented

[162] Paksok, Dinken & Riba, Jumnya & Powrel, Deepak & Kiron, Bini & Lusi, Tinu. (2023). STRATEGIES FOR ADVANCING BENGALURU AS SMART CITY: A CASE STUDY.
[163] Startup blink, Startup Ecosystem Bangalore 2024.
[164] Thomas, L.P., Salah, S., Garzik, L. (2022). Bangalore Innovation System. In: Garzik, L. (eds) Successful Innovation Systems. Future of Business and Finance. Springer, Cham.

companies, which in turn have made Bangalore famous as IT services worldwide hub. Bangalore can be considered as a leading hub of IT because of supporting policy initiatives over the last decades (from the Government of India and the Government of Karnataka). The Government of Karnataka also participated to facilitate capital sources to entrepreneurs by managing three venture capitalists funds – Karnataka Information Technology Venture Capital Fund or KITVEN (now liquidated), KITVEN Fund 2 (dedicated to the ventures' funding in IT, biotechnology and nanotechnology) and Karnataka Venture Capital Fund (KARVEN)[165]. However, the potential for the ventures to go global from India remained limited for the simple reason that non supportive regulation generally hinders the foreign investments and M&A activities in India[166].

Bangalore's appeal to global corporations is evident, with numerous Fortune 500 companies establishing research and development centers in the city. This influence has catalyzed knowledge exchange and provided startups with opportunities for strategic partnerships, enhancing their global competitiveness.

However, this rapid urban and economic growth has introduced challenges. The city's infrastructure is under pressure, grappling with issues such as traffic congestion, water scarcity, and escalating property prices. Residents have expressed concerns over the diminishing green spaces and the strain on essential services. Moreover, the promotion of the high-tech sector in Bangalore did not help local employment growth; instead, it raised land values and drove away small businesses[167].

In response, Bangalore has embarked on ambitious urban development projects like SWIFT City[168] and Kwin City[169]. These initiatives aim to bolster the city's status as a

[165] Sulochana Development Trust, p. 26, 2014.
[166] Lauder Institute Global Knowledge Lab, 2012.
[167] Paksok, Dinken & Riba, Jumnya & Powrel, Deepak & Kiron, Bini & Lusi, Tinu. (2023). STRATEGIES FOR ADVANCING BENGALURU AS SMART CITY: A CASE STUDY.
[168] Upcoming SWIFT City will enhance the Ecosystem of Start-up in Bangalore.
The Karnataka Government revealed the plan to develop a SWIFT City that stands for:
S – Start-Ups
W – Workspaces
I – Innovation
F – Finance
T – Technology
[169] As a planned city, KWIN offers a new age yet sustainable lifestyle by integrating state-of-the-art technology with eco-friendly infrastructure. The vision promotes efficiency, green spaces and quality life. KWIN stands for with Knowledge, Wellbeing and INnovation.

startup hub by focusing on sectors like aerospace, life sciences, and supporting emerging businesses. Such projects are designed to enhance infrastructure, promote sustainable growth, and maintain Bangalore's competitive edge in the global tech arena. However, these large-scale projects have raised concerns regarding their impact on marginalized communities. A significant issue is the acquisition of agricultural land, which threatens the livelihoods of local farmers. In Sarjapur's[170], for instance, farmers have protested against the Karnataka Industrial Areas Development Board's (KIADB) plans to acquire 1,050 acres for the SWIFT City project, fearing the loss of their ancestral lands and agricultural income. Additionally, the government's decision to forgo social impact assessments for these projects has intensified apprehensions about potential displacement and inadequate rehabilitation measures for affected communities[171].

Moreover, the concentration of such developments around Bengaluru has led to perceptions of regional imbalance, with areas like North Karnataka feeling neglected, potentially exacerbating existing disparities and sentiments of marginalization.

In summary, Bangalore's evolution into an innovation-driven urban center with a vibrant startup ecosystem is a testament to its strategic investments in education, infrastructure, and industry collaboration. While challenges persist, the city's proactive approach to sustainable urban development positions it well for continued leadership in the global technology landscape. However, this rapid growth has also exacerbated socio-economic disparities, strained urban infrastructure, and contributed to environmental degradation. Issues such as traffic congestion, rising living costs, and the displacement of marginalized communities highlight the need for more inclusive and sustainable urban planning. Ensuring just and sustainable investment mechanisms and delivery systems is crucial to addressing these challenges, as equitable access to resources, fair distribution of economic benefits, and community-centered development must be prioritized. While challenges persist, the city's proactive approach to sustainable development must go beyond economic growth to ensure that innovation and investment create resilient, inclusive, and livable urban spaces for all residents, including also slum inhabitants.

[170] Farmers up in arms against land acquisition for Bengaluru's SWIFT City. New Indian Express, 2025.

3.3 Paris, France

The Paris Region[172] is a dynamic, fast-growing hub that plays a pivotal role in France's economic and innovation landscape. Home to 18.8% of the nation's population, it produces 31% of France's GDP and contributes 5.3% to the EU's GDP, while gathering 23.1% of all jobs and employing 34% of French executives.

The region is a powerhouse of knowledge and innovation[173], educating 28% of all French students, channelling 41% of national R&D spending, and hosting 37.9% of the R&D workforce along with 29.3% of the country's scientists and engineers. This thriving business and research community, bolstered by strong know-how in services and industry, offers competitive real estate and logistics solutions, world-class transport and digital infrastructure, and an outstanding lifestyle, thus establishing Paris as a massive consumer marketplace and a top hub for emerging talents[174]. In fact, Paris hosts 793,820 students in higher education[175]. Its top business, engineering and specialised higher educational institutions (IEP, ENS, Ensad, etc.) welcome over one third of all students enrolled in such institutions in France. The Paris Region is attractive to qualified young people. Thus, the regional economic structure is mainly driven by high value-added services industries such as financial and insurance institution, scientific research centres and IT services[176] but not only since Paris Region also takes first place for the second year running in the ranking of the "Large European Regions of the Future". According to fDi Intelligence Paris Region ranks #1 worldwide for foreign direct investments in Renewable Energies, Cleantech and Electric Vehicles[177].

However, as will be further strengthen in the further chapter, beyond these strong results, social indicators point to weakening social cohesion and deepening social fractures in Paris[178]. As a brief example, linked to the knowledge gap, in Paris, 33% of students from

---

[172] It refers to Ile de France which consists of 20 urban districts and 7 departments.
[173] Paris Region stands as a global nexus of education, research, and economic dynamism. The region attracts 7,100 international PhD students (INSEE, 2022; MESRI data 2021-2022) and 135,500 international students, with 82,300 enrolled in its public universities, while hosting 5,700 international researchers who fuel its innovative edge.
[174] cci Paris-idf. (2024)
[175] L'Institut Paris Region. (2024). *Paris Region Facts and Figures 2024*.
[176] DYNAMICS OF THE PARIS REGION ECONOMY. (2016). Institut Paris Region.
[177] L'Institut Paris Region. (2024). *Paris Region Facts and Figures 2024*.
[178] Teyssedre, C., and H. Le Bouler. 2019. Cohésion et transitions : agir autrement—Rapport annuel sur l'état de la France 2019. Avis du Conseil économique, social et environnemental. Paris: CESE.

"advantaged" and 50% of students from "very advantaged" backgrounds were enrolled in lower-secondary private schools under contract at the start of the 2019 school year, explaining around half of the social segregation in Paris lower-secondary schools[179].

In conclusion, given that preventing social exclusion is fundamental for building a cohesive society[180], Paris has been chosen for its innovative projects and its complex socio-economic reality. Its case demonstrates that even in a region with outstanding economic performance and global competitiveness, the challenge remains to integrate social equity into the fabric of urban development, ensuring that technological and infrastructural advancements, such as those embodied by the Grand Paris Express, contribute to long-term environmental sustainability and a more inclusive society.

4. Comparing Nairobi, Bangalore, and Paris Ecosystems

When comparing Paris's innovation ecosystem to those of the Global South such as Bangalore and Nairobi, notable differences and similarities emerge.

Bangalore, known as the "Silicon Valley of India", has a thriving tech industry supported by strong public-private partnerships and policy initiatives. The Karnataka government has set up venture capital funds to finance startups in IT, biotechnology, and nanotechnology. However, despite these advantages, regulatory hurdles, bureaucracy, and restrictive foreign investment policies pose challenges to business expansion. In addition, disparities in the benefits from urban development are still massive. As a proxy of uneven benefits distribution, it is possible to state that as per the survey[181] conducted by Karnataka Government there are 2804 slum areas in state. Out of which 597 slum areas are in Bangalore City.

Nairobi, often referred to as the "Silicon Savannah", has witnessed rapid growth in its tech sector, fuelled by government support, international investment, and a young, tech-savvy population. Innovation hubs like iHub and Gearbox have fostered a dynamic startup culture. However, infrastructure deficiencies and weak regulatory frameworks

[179] OECD (2024), *OECD Economic Surveys: France 2024*, OECD Publishing, Paris.
[180] Kronauer, M. 1998. Social exclusion and underclass—new concepts for the analysis of poverty. In Empirical Poverty Research in a Comparative Perspective, ed. A. Hans-Jurgen, 51–75. Aldershot: Ashgate.
[181] Karnataka. Gov. Slums Abstract, 2020.

limit the full potential of public-private partnerships not making them completely just and equitable. Here, as in the Bengaluru's case, data[182] shows that from the total urban population, 46.5 percent live in poor settlements. In numbers, that equals some 6.5 million people residing in slums, the second-largest figure among countries in East Africa.

Paris, by contrast, benefits from a long-established regulatory framework, a well-connected infrastructure, and strong institutional support, within the European Union, for innovation. With one of the world's largest Internet exchange points and extensive smart city policies, Paris offers a highly developed digital and business ecosystem. However, challenges related to gentrification and affordability persist, raising concerns about social equity.

Despite their differences, all three cities share a commitment to fostering innovation through Public-Private Partnerships and investments in digital infrastructure. While Paris leads in governance stability and regulatory support, Bangalore excels in IT talent and startup density, and Nairobi offers strong potential for tech-driven economic transformation. However, addressing governance, equity, and accessibility issues is still crucial in ensuring sustainable and inclusive urban innovation. Fundamental, in these cases, is that all investments mechanisms in urban development will foster inclusive innovation frameworks. Innovative inclusion represents a shift in the research and development paradigm, which is aware at the community and educational levels. Through establishing a collaborative atmosphere, inclusive innovation ultimately makes the community actively involved in the solutions creation process, providing the solutions with innovation and meeting the local needs 100%. This is a significant aspect of education where the participation of schools and communities in solutions designs brings more outstanding and long-lasting results[183]. The mission of inclusive innovation extends to the domains of society and the environment through the joint integration of social and environmental objectives into the innovation process[184]. This emphasizes the holism of the innovation developed so that it is not only tech-savvy but also reflects the two most

[182] UN-HABITAT, & World Food Programme. (August 3, 2020). Share of urban population living in slums in East Africa as of 2018, by country. In Statista.
[183] George, G., McGahan, A., & Prabhu, J. (2012). Innovation for Inclusive Growth: Towards a Theoretical Framework and a Research Agenda. Journal of Management Studies, 49, 661-683.
[184] Pansera, M., & Owen, R. (2018). Framing inclusive innovation within the discourse of development: Insights from case studies in India. Research Policy, 47, 23-34.

important dimensions of sustainability, social and environmental, as it deems to fully understand the complex challenges being addressed.

In this case also universities and education institutions play an important role, an example is the Indian Institute of Management Bangalore (IIM-B), founded in 1973, as part of a network of management institutes founded by the central government in 1961. Inspired by the model of the most prestigious North American business schools it aims to fulfil the demand for highly specialized managers in the Indian private sector[185]. The IIMB offers courses on inclusive business models and innovation management. Faculty maintain professional contacts with the Indian corporate and industrial establishment. Moreover, its enterprise incubator, the N. S. Raghavan Centre for Entrepreneurial Learning (NSRCEL)[186], encourages the creation of innovation-driven start-ups based on values of inclusion and social responsibility. To date, the incubator has supported several social enterprise start-ups oriented towards the problems of the rural poverty. These have included significant product innovations (e.g. new affordable construction materials, new electrical devices), service innovations (e.g. a web platform for rural artisans to sell their products); and positional innovations (e.g. repositioning traditional handicrafts for new markets).

Research[187] suggests that the notion of inclusive innovation and its near synonyms never assumes a neutral connotation when used in the broader discourse of development. On the contrary, they always embody a political dimension, sometimes implicitly, and sometimes overtly so, shaped by the values, normative world views and economic interests of those who advocate them. Suggesting that the concept of inclusive innovation, and indeed the field of innovation for development more broadly, stands on highly contested ground.

In conclusion, while all three cities are committed to driving innovation through Public–Private Partnerships and investments, they are at different stages of growth. Paris

[185] Narayanaswamy Balasubramanian (Ed.), Management Perspectives – Essays on Managerial Priorities and Management Education, Bangalore Indian Institute of Management & Macmillan India, New Delhi (1999).
[186] NS Raghavan Centre for Entrepreneurial Learning
[187] Mario Pansera, Richard Owen, Framing inclusive innovation within the discourse of development: Insights from case studies in India, Research Policy, Volume 47, Issue 1, 2018, Pages 23-34, ISSN 0048-7333.

represents a mature ecosystem with a robust regulatory framework and advanced smart city initiatives that continue to push technological boundaries despite challenges in social equity; Bangalore is in a dynamic mid-phase marked by a vibrant startup culture and abundant IT talent, though its progress is tempered by bureaucratic hurdles and uneven urban development and challenges; and Nairobi, emerging as Africa's "Silicon Savannah", is rapidly evolving with significant international investment and tech innovation, yet still faces infrastructural deficiencies and socio-economic disparities that must be addressed to unlock its full potential and to transit into a middle-income economy by 2030.

Chapter 4: Data & Case Studies Analysis

1. Policy Analysis of the Global Gateway Investment Mechanism

After having introduced the three case studies, the research now analyses more in depth the Global Gateway investment mechanism since from an EU perspective the €300 billion in finance mobilised under the program have the potential and the aim to tackle challenges through cooperation across five pillars – digital transformation, green energy, transport, education and health[188]. But not only since Africa is the key regional priority of the Global Gateway and is the focus of the most important investment package delivered by the EU for the Global Gateway strategy[189]. The package aims to support Africa for a strong, inclusive, digital and green recovery and transformation. In total, €150 billion in investments are due to be deployed through Team Europe initiatives in order to reach five ambitious goals in Africa:

(i) quickening the green transition;

(ii) boosting the digital transition; regarding this point and the link with the Nairobi's Case Study it is important to highlight that the Global Gateway will focus on facilitating the process of submarine and terrestrial fibre-optic cable laying, creating or upgrading cloud and data infrastructures and supporting a better regulatory framework that protects the citizens with regard to digital connectivity. The general purpose of accelerating the digital transition is to close the digital divide between Europe and Africa and across African countries, ensuring strong digital connections between the regions. The ambition by 2030 is to guarantee universal access to reliable and safe internet networks to all African citizens, no matter where they live. The first initiative, the EurAfrica Gateway Cable, connects the EU with Africa along the Atlantic Ocean coast through an international submarine fibre cable. This action will enhance the digital sovereignty of the two continents by ensuring the highest infrastructure and cyber security standards and increasing inter-continental data flows development. The second initiative enables the deployment of

[188] European Commission, strategy and policy, Global Gateway.
[189] Tagliapietra, S. (2024). The European Union's global gateway: an institutional and economic overview. *The World Economy*, *47*(4), 1326-1335.

digital services, digital businesses and innovation by supporting construction of networks of fibre-optic cables across Sub-Saharan Africa in order to foster cross-border internet traffic and help bridge the connectivity gap between coastal and landlocked countries. The third, the Africa Europe Digital Innovation Bridge (AEDIB) Initiative, aims to support partner countries in strengthening their digital and innovation ecosystems and promote intercontinental cooperation between stakeholders in Africa and Europe, creating a single market for digital innovation. This will facilitate the launch and scale-up of innovative African start-ups and SMEs; strengthen digital innovation ecosystems in African countries and link them to European digital innovation ecosystems; support the creation of new Digital Innovation Hubs in Africa and strengthen existing ones. The last initiative, the European Secure Satellite Communications programme, aims to provide internet connectivity to the African continent, notably to remote areas and regions.

(iii) accelerating sustainable growth and improving working conditions;

(iv) enhancing health and pharmaceutical systems; and

(v) improving education and training.

Now, going back to the total sum of €300 billion, this is composed of:

1. €135 billion in investment foreseen under the European Fund for Sustainable Development plus (EFSD+), where the EU provides €40 billion in guarantee capacity, of which €26.7 billion via EIB and €13 billion via an EFSD+ new window dedicated to Global Gateway, targeting national financing and development finance institutions.

   The EFSD+ guarantees are offered on favourable, highly competitive conditions[190]. They allow private investors to finance projects in more challenging markets, by assuming the risks of more unstable environments while avoiding market distortions. Because the EFSD+ covers a share of the risks, the EU's development finance partners can match the EFSD+ guarantees with their own resources, which in turn will attract additional investors. The investment

[190] Tagliapietra, S. (2024). The European Union's global gateway: an institutional and economic overview. *The World Economy*, *47*(4), 1326-1335.

programmes will be implemented through main paths. First, in a partnership with the EIB, the EU will provide a guarantee covering EUR 26.7 billion in financing to support investments in several sectors for which the EIB has already a strong record of accomplishments under the previous External Lending Mandate. The risk coverage provided will allow the EIB to offer loans to partner countries to make sustainable investments in connectivity and other priority sectors. The EU guarantee will have a maximum impact on Global Gateway investments in those partner countries where sovereign and other public sector risks are still a major bottleneck. The partnership approach under EFSD+ will ensure a strong steer in line with the Global Gateway priorities, promoting synergies and complementarity with all areas of EU external action. Second, working with a variety of European financial institutions will allow to fully reap the wealth of geographic and sectoral expertise available in those institutions to unlock investment bottlenecks faced by the private sector in host countries. Third, blending. Where projects have a public added value that is not monetarised and that guarantees cannot be addressed, the EU will use the EFSD+ blending facilities. These facilities make use of grants and loans to support non-bankable investment projects in EU partner countries while enhancing their sustainability, climate proofing and development impact. It is also important to underline that the Global Gateway has a strong focus on expertise, alongside financial assistance. This is important, because creating an enabling environment to attract investment in partner countries with support for reform of regulatory frameworks, or technical support for the development of infrastructure projects, is important to ensure the scale and long-term durability of development actions, beyond individual infrastructure projects.

2. €18 billion in grants under other EU external assistance programmes;

3. €145 billion in planned investments by EU countries' financial and development finance institutions; and

4. Existing programmes such as the Pre-Accession Assistance (IPA) III, Interreg, InvestEU and Horizon Europe will also be used to mobilise resources under Global Gateway. To add to this financial tool kit, the EU is exploring the option

of creating a European Export Credit Facility to complement existing credit arrangements by EU countries and increase its overall firepower in this area.

Thus, as already mentioned, the EU funding model is a mix of grants, soft loans and guarantees aimed at crowding-in private sector investments, while the BRI exclusively focusses on loans.

Furthermore, Global Gateway involves a wide range of partners, each offering support to the private sector. As Global Gateway[191] opportunities and tools available there are:

- *EU Delegations – Diplomatic representations*

The EU's 144 delegations around the world can provide guidance and support to relevant Global Gateway investments locally. EU delegations work with partner countries and other Team Europe members to implement Global Gateway activities locally and regionally.

- *Development Finance Institutions (DFIs)*

International and national development finance institutions (DFIs) are government-backed development banks set up to support private sector development in low- and middle-income countries. EU multilateral DFIs include:

The European Investment Bank (EIB). The EIB contributes to Global Gateway by providing financing solutions, as well as technical and financial expertise for projects led by public and private stakeholders.

The European Bank for Reconstruction and Development (EBRD). The EBRD is a multilateral investment bank providing a wide range of products and services such as loans, equity investments, trade guarantees and advisory services. It provides a range of tools dedicated to SMEs spanning dozens of business sectors, loans, equity investments and guarantees and aids SMEs.

- *Development Cooperation Agencies*

[191] European Commission, strategy and policy, Global Gateway.

National development agencies provide government aid to support economic and public development in developing countries. These agencies implement and finance Global Gateway projects.

- *Export Credit Agencies (ECAs)*

Based in each Member State, these organisations promote national exports and/or economic interests. They provide loans or cover (insurance or guarantees) to help internationalise companies registered in their country.

- *Trade Promotion Organisations (TPOs)*

TPOs are EU Member State organisations supporting the internationalisation of companies registered in their country.

In addition, once engaged in the project the EU requires partner countries to adhere to the rule of law, upholding high standards of human, social and workers' rights, as well as a respect for international norms and standards of intellectual property.

However, the initiative has faced criticism for lacking concrete project details and relying heavily on pre-existing programs, raising concerns about its capacity to mobilize new resources effectively. This ambiguity may hinder the EU's ability to achieve its growth objectives without more integrated policymaking. In summary, while the Global Gateway presents a bold vision for EU-led global infrastructure investment, its financial efficacy will depend on clarifying project specifics, ensuring additionality beyond existing commitments, and fostering cohesive policy integration to effectively harness both public and private funding sources. The current world instability is also adding more risk to the overall result of the strategy.

2. Case Study Analysis

In the previous Chapter 3, the research introduces the three case studies presenting background information on the current status of the art. In the further paragraphs case studies within the cities' frameworks are analysed and discussed in depth considering projects financed by international investment institutions.

2.1 Global South case studies

2.1.1 Nairobi, Kenya

Kenya's Vision 2030 is to achieve the middle-income status, this faces challenges beyond slow GDP growth, including the structure of economic sub-sectors. Kenya's economy heavily relies on agriculture, which in 2014 accounted for 27.3 % of the national GDP share. This was more than a quarter of the country's GDP and almost three times the 10 % contribution of manufacturing to GDP.

The World Bank report[192] "Kenya Country Economic Memorandum" identifies that urbanization is an important characteristic of successful low- and middle-income economies. It influences economic growth through greater technological progress occurring in urban areas. The economies of agglomeration in product market, practical knowledge and technology found in urban areas further create the necessary conditions for the rapid economic growth. Pivotal in shaping this transition are the infrastructural projects since in a fast-urbanizing, non-resource rich low- or middle-income country, it is typically the manufacturing sector that generates integral migration to urban areas. Notably, cities, especially in sub-Saharan Africa are urbanised with little or no economic growth[193]. This has resulted in increased slums and informal settlements, which are difficult to provide with services and access to facilities[194]. Cities in sub-Saharan Africa are growing unmonitored and without due care for urban planning[195]. This trend outpaces infrastructure development leaving planners with the role of playing catch-up with past developments instead of planning for the future.

---

[192] World Bank, 2016. Kenya Country Economic Memorandum: From Economic Growth to Jobs and Shared Prosperity. The World Bank, Washington, D.C.

[193] S-C Hsieh, 'Analysing urbanisation data using rural-urban interaction model and logistic growth model' (45) Computers, Environment and Urban Systems (2014) 89;
V Watson, 'The planned city sweeps the poor away...'. Urban planning and 21st century urbanisation' (72) Progress in Planning (2009) 151.

[194] E-W Augustijn-Beckers, J Flacke & B Retsios, 'Simulating informal settlement growth in Dar es Salaam, Tanzania: An agent-based housing model' (31) Cities (2011) 57;
K Vermeiren et al, 'Urban growth of Kampala, Uganda: Pattern analysis and scenario development' (106) Landscape and Urban Planning (2012)199.

[195] WJ Kombe, 'Land use dynamics in peri-urban areas and their implications on the urban growth and form: The case of Dar es Salaam, Tanzania' (29) Habitat International (2005) 113; JM Lupala, Urban types in rapidly urbanizing cities (PhD Thesis). Department of Infrastructure and Planning (Tryck hos Universitets service, Stockholm, 2002) pp. 280;
L Diaz Olvera, D Plat & P Pochet, 'The puzzle of mobility and access tothe city in Sub-Saharan Africa.' (32) Journal of Transport Geography (2013) 56.

Furthermore, increasing employment in manufacturing creates "production cities" that generate demand for urban goods and services. Expansion of a country's manufacturing sector (particularly focused on manufacturing for global markets) has historically been proven to contribute to long-term and sustained economic growth. The manufacturing sector is perceived to be one of the key drivers of technology development, "know-how", and, consequently, productivity growth but here once again the physical and digital infrastructural layer plays a pivotal role.

The manufacturing sector accounts on micro and small enterprises for more growth at the lower levels than the large industries due to the large number of poor people they employ. This in turn plays an important role in economic development and poverty reduction, particularly in poorer counties. This realization has led to policies supporting MSE[196] growth, including technical assistance, technology transfer, training, and collective bargaining agreements[197].

In spite of this, Kenya's MSE manufacturing sector portrays massive opportunities for growth, particularly through adoption of ICTs to access global markets, for improved communication and access to information, and improved transactions among others, all of which contribute to production efficiency, product diversity and increased profitability[198]. Since the missing middle enterprises in the country are indicative of inherent challenges for upscaling from MSEs to medium-sized enterprises, such as difficulties in the infrastructural network, accessing finance, low entrepreneurial skills, lack of competitiveness in international markets[199], emerging policies should consider addressing these challenges. The Micro and Small Enterprises Act of 2012 has made several provisions to this end, which if implemented can hugely shift the country's manufacturing sector towards improved productivity.

---

[196] Micro and Small Enterprises (also referred to as small and medium enterprises—SMEs) as all enterprises—both farming and non-farming—employing less than 50 persons. Kenya, Government of, 2005. Sessional Paper No. 2 of 2005 on Development of Micro and Small Enterprises for Wealth and Employment Creation for Poverty Reduction. Government Printers, Nairobi.

[197] Kariuki, G., 2009. Growth and improvement of information communication technology in Kenya. International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2009, Vol. 5, Issue 2, pp. 146-160.

[198] Kiveu, M. and Ofafa, G. (2013). Enhancing market access in Kenyan SMEs using ICT. Global Business and Economics Research Journal, 2(9): 29–46. Global Business and Economics Research Journal.

[199] Bigsten, A., Kimuyu, P., M. Soderbom, 2010. The Manufacturing Sector. In C.S. Adam, P. Collier and N.S. Ndung'u (eds), Kenya: Policies for Prosperity. Oxford: Oxford University Press.

The ICT sub-sector is a relatively new economic area in Kenya. It is emerging only over the last three decades and growing rapidly to take up a significant portion of the country's GDP growth. The sector has grown at an average rate of more than 13 % between 2010 and 2014, with acute fluctuations in some years[200]. Given the fact that recorded values are from ICT-based activities such as mobile money transactions, calling rate tariffs, postage charges, printing services and related activities, leaving many aspects such as contribution to productivity and commodity markets, the sub-sector is estimated to contribute much more to the country's GDP than is typically measured.

As scholars researched[201], Kenya's capital city, most growth in ICT-related services has been headquartered in Nairobi, starting from the introduction of the first computer and widespread use of the Internet to the incredible growth of mobile phone services. Government investment in infrastructure has also been aligned with the city's importance as the seat of government, from where the services disperse to other parts of the country. A good example is the recent construction of the undersea fibre optic cable, which moved from the port of entry in Mombasa to Nairobi, before further distribution to other parts of the country through the National Optic Fibre Backbone Infrastructure (NOFBI) I and II projects. In effect, most economic activities are headquartered in Nairobi city, ranging from innovation incubators to e-commerce enterprises to regional headquarters for various multi-national corporations which rely on the Internet for their day-to-day operations. This concentration of economic and digital activity underscores the critical need for a well-developed and resilient infrastructural network that can support rapid technological advancements, facilitate seamless connectivity, and ensure sustainable urban growth across all sectors.

Moreover, it is important to highlight that Nairobi City County has embraced ICT and e-governance to improve revenue collection and management. Through the support of the World Bank under the Kenya Transparency and Communications Infrastructure Project (KTCIP), Nairobi is among three counties being supported to develop master plans for

[200] Kenya National Bureau of Statistics, 2015. Kenya Economic Survey 2015. Government Printers, Nairobi.

[201] Mwaniki, D., Kinyanjui, M., & Opiyo, R. (2017). Towards smart economic development in Nairobi: Evaluating smart city economy impacts and opportunities and challenges for smart growth. *Smart Economy in Smart Cities: International Collaborative Research: Ottawa, St. Louis, Stuttgart, Bologna, Cape Town, Nairobi, Dakar, Lagos, New Delhi, Varanasi, Vijayawada, Kozhikode, Hong Kong*, 749-790.

the use of ICT to increase accountability in the management of resources, through the reduction in revenue leakage, and the optimization of collection and management systems[202]. The ICT applications are meant to integrate the counties into the national government's Integrated Financial Management Information System (IFMIS)[203] and to enable them to increase service delivery to citizens, as well as generating analysis reports that can help drive policy. ICT initiatives with positive results have been developed in Nairobi city to help enhance revenue collection. As example there is the technology integration in the Nairobi Expressway, an electronic tolling system has been deployed, ensuring a smooth user experience and efficient revenue collection.

Thus, ICT is a key driver of Nairobi's transformation into a smart economy, with AI-driven solutions improving governance, urban mobility, and digital inclusion.

Furthermore, Nairobi has adopted AI-powered traffic management systems to ease congestion, with the Nairobi Metropolitan Area Transport Authority (NaMATA) piloting machine learning models for real-time traffic flow optimization[204].

In governance, blockchain-based land registries are enhancing transparency and reducing fraud, an initiative led by Kenya's Ministry of Lands in partnership with UN-Habitat[205]. E-governance solutions[206], like mobile-based revenue collection systems, have improved tax compliance and reduced financial leakages in parking fees and business permits.

Digital inclusion initiatives, such as the Ajira Digital Program[207], have trained over 1 million youth in online work, expanding employment opportunities in Kenya's gig economy. The program has been supported by various partners, including Mastercard Foundation. The Mastercard Foundation has played a significant role in funding and supporting the Ajira Digital Program through initiatives aimed at empowering young Kenyans with digital skills for the gig economy.

---

[202] World Bank. Innovative Technologies to Help County Governments Improve Service Delivery.
[203] IFMIS is an automated system that enhances efficiency in planning, budgeting, procurement, expenditure management and reporting in the National and County Governments in Kenya. Its central purpose is to oversee the implementation of a unified financial management system and its adoption across all Government departments.
[204] World Bank. Kenya Urban Mobility Improvement Project (P176725).
[205] Assessment of the Efficacy of the Framework for the Land Registration (Electronic Transactions) Regulations 2020 and the Implementation of the Ardhisasa Platform in Kenya.
[206] Kenya Revenue Authority. New revenue collection system for Nairobi City County operationalized.
[207] Ajira Digital Program.

AI-driven fintech solutions, such as mobile-based credit scoring systems implemented by platforms like M-Pesa[208] and Tala[209], have significantly enhanced financial access for SMEs in Kenya, thereby boosting economic productivity. M-Pesa's integration of mobile money services has facilitated efficient financial transactions, contributing to increased financial inclusion. Similarly, Tala's utilization of alternative data for credit scoring has enabled access to credit for individuals previously underserved by traditional financial systems. These developments underscore the transformative impact of AI in expanding financial services to SMEs, fostering economic growth in the Nairobi's business environment.

However, there is the need to stress that while Nairobi has made remarkable strides in leveraging ICT and AI for economic transformation, significant challenges concerning infrastructures remain. A well-developed infrastructural network is essential for supporting rapid technological advancements and facilitating economic integration; yet, Nairobi continues to grapple with severe infrastructural deficits. Unequal access to technology in informal settlements, affordability issues, and digital literacy gaps further exacerbate these problems. A substantial portion of Nairobi's population, especially in informal settlements such as Kibera and Mathare, continues to face limited access to digital tools and internet connectivity. According to the World Bank[210], more than 40% of Kenyans, particularly those in low-income urban areas, still lack reliable internet access, which impedes their ability to fully participate in the digital economy. These challenges not only hinder economic participation but also underscore the urgent necessity for comprehensive infrastructural upgrades that address both physical connectivity and digital inclusivity.

Furthermore, the prohibitive cost of internet services and digital devices remains a significant barrier to digital inclusion. The Communications Authority of Kenya[211] states that although mobile phone penetration is high, the cost of data and smartphones is still prohibitive for many low-income households. This affordability gap limits the ability of

[208] McKinsey. Driven by purpose: 15 years of M-Pesa's evolution.
[209] Harvard University. Tala – How data boosts access to credit for low-income individuals in emerging economies.
[210] World Bank. (2020). *The Role of Digital Technologies in Accelerating the Economic Transformation of Sub-Saharan Africa*.
[211] Communications Authority of Kenya. (2020). *The Status of ICT in Kenya: Annual Report 2020*.

the population to engage with digital platforms, hindering the broader impact of ICT-driven economic growth initiatives.

In addition, there is a pressing need for digital literacy programs. Many Kenyans especially in rural and low-income urban areas lack the necessary skills to navigate digital platforms effectively. The Kenya ICT Authority[212] reports that a large portion of Kenyans in informal settlements have little to no digital literacy, which deepens the divide between those who can access digital opportunities and those who cannot.

These challenges underscore the ongoing need for targeted policies that bridge the digital divide and ensure equitable access to technology, while also emphasizing the critical requirement for robust physical infrastructures. Strategies must include increased investment in digital infrastructure for underserved areas, reducing the cost of internet access, expanding digital literacy programs across the country, and upgrading physical assets such as reliable power supplies, transportation networks, and telecommunications systems. Only through such comprehensive measures can Nairobi, and similar urban centers, overcome infrastructural shortcomings and pave the way for a more inclusive and sustainable urban future.

In conclusion, while Nairobi has made considerable progress towards becoming a smart economy, overcoming these challenges will require focused efforts on addressing inequality in digital and physical access and ensuring that all citizens have the skills and resources to participate in the evolving urban economy. For this matter global investment mechanisms and their delivery systems become central to tackle these challenges for positioning the city as a model for smart economic growth in Africa. Sustained investment in infrastructures, AI training, and citizens engagement will be critical for long-term economic resilience and inclusion. While certain projects incorporate digital literacy and capacity-building components, there remains a pressing need for a more comprehensive approach that prioritizes foundational investments in human capital, ensuring that local communities can fully harness and sustain physical and digital innovations. Ultimately, creating a co-governance framework, where the project itself serves as the starting point

[212] Kenya ICT Authority. (2021). *National ICT Master Plan 2020-2030*.

for a radical transition towards resilient, sustainable, and inclusive communities, is essential for the long-term success and social impact of digital climate services in Nairobi.

This, conclusion leads to the introduction of the case study regarding the Nairobi Expressway project, as the Constitution of Kenya recognises the interrelationship between the environment and development, and envisages that environmental considerations will be balanced with socio-economic considerations through the ideal of sustainable development[213].

2.1.1.2 Nairobi Expressway

Classified as High-Risk Project under Transportation and related infrastructure projects, the Nairobi Expressway was required to undergo Environmental Impact Assessment "EIA" Study[214].

Specifically, the Nairobi Expressway is a 27.1 km modern infrastructure project designed to enhance urban mobility by linking Mlolongo (near Jomo Kenyatta International Airport) with Westlands along James Gichuru Road[215]. The duo carriage Expressway comprises a 15.739 km at grade section from Mlolongo to the Southern Bypass interchange and an 11.025 km elevated section/viaduct from the Southern Bypass Interchange to ABC place.

Figure 2. Nairobi Expressway Map.

[213] Kosgei, L., & Kioko-Mutinda, M. M. (2019). EIA as a Tool for Balancing Economic, Social & Environmental Considerations in Infrastructure Development: The Case of Nairobi Expressway. *E. Afr. LJ*, 82.
[214] Kosgei, L., & Kioko-Mutinda, M. M. (2019). EIA as a Tool for Balancing Economic, Social & Environmental Considerations in Infrastructure Development: The Case of Nairobi Expressway. *E. Afr. LJ*, 82.
[215] SMEC, Project Nairobi Expressway.

The project is implemented by the China Road and Bridge Corporation (CRBC)[216], within the Belt and Road Initiative. Regarding the financing[217] of the Nairobi Expressway Project, it is structured under a Public-Private Partnership (PPP) and Build-Own-Operate-Transfer (BOOT) model. The total project cost amounts to RMB 4.602 billion ($668 million), with a financing mix of 75% debt and 25% equity. The debt component includes a $501 million loan from an unspecified Chinese bank, with 20-year maturity, a 3-year grace period, and a 7% interest rate. Additionally, CRBC and CCCC International (Hong Kong) Holdings Limited contributed $133.6 million and $33.4 million, respectively, as equity investments through the Moja Expressway Company Limited, a CRBC subsidiary responsible for managing the project. The project's financial model is designed to recoup the investment through toll revenues over a 30-year concession period, during which the Kenyan government assumes liability for early termination risks. The road is fully operational since its public launch in July 2022.

Strategic objectives of the project are:

1. The expressway aims to significantly reduce travel times, cutting the journey from JKIA to Westlands from two hours to about 20 minutes, and easing congestion on major routes such as Mombasa Road, Uhuru Highway, and Waiyaki Way.
2. Technology Integration: An electronic tolling system has been deployed, ensuring a smooth user experience and efficient revenue collection.

Moreover, linked to the objectives, economic benefits[218] of the Expressway within the country are opening up the city suburbs for business, industrial, and residential investment via reduced travel time and cost from the CBD; increasing international visibility for Kenya as the destination for Foreign Direct Investment, especially in road infrastructure; generating revenues for the government through income taxes and corporate taxes on

[216] CRBC has been instrumental in executing numerous infrastructure projects under the BRI framework. CRBC has an active role in advancing the objectives of the Belt and Road Initiative through large-scale infrastructure projects across various countries.
[217] Project ID: 58125, Chinese bank provides $501 million loan for Nairobi JKIA–James Gichuru Road Expressway Project. Data from AidData, which is an international development research lab. We connect decision-makers and researchers who have a shared interest in working together using granular data and innovative tools to solve pressing problems, precisely target resources, and use rigorous evidence to measure the impacts—intended and unintended—of policies and investments.
[218] CT Wekesa, NH Wawire & G Kosimbei, 'Effects of Infrastructure Development on Foreign Direct Investment in Kenya' (8)2 Journal of Infrastructure Development (2016) 1; G Wachira, 'Why Nairobi Expressway project deserves support' (Business Daily, 06 November 2019)

expenditures, operational and corporate revenues, and incomes of employees. Operational revenues will be generated primarily through toll fees on the expressway.

The Expressway also has trans-boundary multiplier effects that will spill over to the neighbouring states. These include:

i) providing better connectivity for the movement of goods, services and people between Nairobi and the entire northern corridor, and thus open up the economic potential of the region; and,

ii) enhancing Kenya's economic competitiveness within the East African region and beyond and bolstering her position as the business hub of choice through enhanced logistics efficiency at SGR Terminus, JKIA, Inland Container Depots (ICDs), and the Industrial Area.

It has to be stated that governments have frequently prioritized new road construction over investments in public transport and the maintenance of existing infrastructure, but this approach often achieves only short-run congestion relief because increasing road capacity can induce greater demand, ultimately restoring congestion to near pre-expansion levels. For instance, the expansion of Highway initially eased traffic only to see the benefits vanish as growing incomes and rising car ownership drove increased usage. Toll levies may mitigate this effect by curbing demand, but evidence suggests that investing in road maintenance yields more sustainable economic and mobility benefits than building new infrastructure[219].

However, the Nairobi Expressway exemplifies how strategic private investment in urban transport can reconfigure mobility patterns and stimulate economic growth. On the other hand, its reliance on tolling and private financing also raises questions about accessibility

[219] D Pojani & D Stead, 'Sustainable Urban Transport in the Developing World: Beyond Megacities' (7) Sustainability (2015) 7784.
T Litman, 'Generated Traffic and Induced Travel: Implications for Transport Planning' (71) ITE Journal (2001) 38;
R Cervero, 'Induced Travel Demand: Research Design, Empirical Evidence, and Normative Policies' (17) Journal of Plan. Lit. (2002)
S Devarajan, V Swaroop & H Zou, 'The Composition of Public Expenditure and Economic Growth' (37) Journal of Monet. Econom. (1996) 313;
F Rioja, 'Filling Potholes: Macroeconomic Effects of Maintenance vs. New Investments in Public Infrastructure' (87) Journal of Public Econom. (2003) 2281

and long-term public benefits. But also on the risk of debt traps within the Belt and Road Initiative.

Furthermore, assuming the road was to meet its economic objective, an important indicator that is not getting its due attention is the impact on the environment[220]. This is true for this and other infrastructure projects in towns and cities in the country. According NEMA[221], the Expressway will use 60% of public land and 40% of private land totalling to 35 acres. Initially, the road was designed to hive 1.3 acres from the historic Uhuru Park open green space, the University of Nairobi land, land for people living with disability, part of St. Paul's Chapel land, and land used as a military base in Westlands. However, due to pressure from environmental conservationists and human rights activists, the design was changed to elevate the road above the ground, ensuring no land would not be hived from Uhuru Park. KeNHA[222] also reiterated that no buildings would be affected, except perimeter walls which take up minimal parcels of land. There would however be clearance of vegetation along the entire project area including mature tree species; interference with green cover areas along the construction path; moderate and intermittent loss in plant richness diversity especially in stretches rich in plant species.

Research[223] shows that the construction of the Nairobi Expressway has raised concerns about the potential encroachment of green spaces. The most notable impact was the resulting lack of shade and clean air resulting from the destruction of indigenous species of trees and vegetation which were uprooted to pave way for the construction of the multi-lane dual carriage. Clearance of vegetation causes modification of habitat, as a substantial part of the proposed area will be converted from green spaces to roads and paved areas. The project also involves significant loss of bird habitat associated with vegetation clearance of mature trees. A public notice by KeNHA and the Moja Expressway Company dated 5 June 2023 revealed plans for new expressway exit lanes near Uhuru Park and Museum Hill in the Central Business District, areas adjacent to established green spaces.

[220] H Kimuyu, 'Uhuru Park to lose 1.3 acres along Uhuru Highway for Expressway's construction' (Nairobi News, 24 October 2019)
[221] National Environment Management Authority
[222] Kenya National Highways Authority
[223] Mwaura, D. S. (2023). *Legal Challenges of Infrastructural Developments on Green Spaces in Kenya: Case of the Nairobi Expressway* (Doctoral dissertation, University of Nairobi).

The project is also expected to generate an assortment of wastes with some being clearly hazardous such as bitumen, oils, paints, and requiring specialized handling and treatment. Poor waste management is already a challenge where the road project will be located. There will also be risks and impacts of traffic noise and vibration resulting from the construction on people and property[224].

Gaseous and dust emissions will also be produced in excavations and earth moving activities, haulage of fill material, operation of diesel-powered machinery and ignited vehicle engines. Human exposure to these emissions is associated with airborne disease such as respiratory infections.

In fact, Greenpeace Africa concerns were on failure to incorporate all stakeholders particularly public users and vendors at Uhuru Park, adverse impacts on groundwater, change in the regime of rivers, and loss of biodiversity.

In conclusion, this development underscores the need for comprehensive assessments of large-scale transport infrastructure projects, as rapid expansion can yield economic and social benefits but may also trigger environmental, social, and political conflicts when not properly managed. Furthermore, the study finds a persistent lack of balance between infrastructure development and environmental conservation, not leading to the concept of planetary health. This imbalance highlights regulatory and institutional gaps in integrating urban green space policies into broader infrastructure planning, emphasizing the critical role that participatory institutional frameworks must play in the successful implementation of infrastructural projects[225]. In the long-run, the business-as-usual model of city development risks creating a huge sprawling city with incessant traffic jams, crime, and already existing green spaces, albeit few and mismanaged, will be replaced by a concrete jungle. Under such a scenario, green urban spaces will always lose to infrastructure development.

[224] ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED NAIROBI EXPRESSWAY PROJECT VOLUME I (Jan. 2020).

[225] Kremer, Peleg, Zoé Hamstead, Dagmar Haase, Timon McPhearson, Niki Frantzeskaki, Erik Andersson, Nadja Kabisch, et al. "Key Insights for the Future of Urban Ecosystem Services Research." Ecology and Society 21, no. 2 [2016]

2.1.2 Bangalore, India

Bangalore's globalization has been contributed to by the remarkable growth of the ICT sector, especially ICT services[226]. In terms of the globalization of trade and capital, Bangalore showed a higher degree of globalization than Karnataka state and all India. The growth effects of the ICT sector are higher in Bangalore than those of the state, all India and select OECD averages. These results offer economic justifications for continuing with and strengthening public policies for the promotion of a growth-oriented ICT sector and economic globalization for Bangalore. However, these results must be qualified by the limitations of the official economic data for measurement of economic globalization and growth. Data limitations are particularly severe with respect to capturing the employment effects in the ICT sector.

Bangalore's globalization is driven by historical growth and the cluster of electrical and electronics industries; the availability of highly skilled, communicative and low-cost technical manpower; the enormous growth of external demand; generous public policy incentives and concessions; and by its competitive advantages in both the business environment and investment climate. These factors have been contributory to the agglomeration of ICT production and services. Nevertheless, Bangalore's high and speedy economic growth may demand high-quality and low-cost infrastructure facilities at globally competitive levels for its globalization and economic growth to be sustainable in future.

In fact, Bangalore is in the process of becoming "world-class city". Thus, the city initiated several infrastructure projects such as the mega-Bangalore-Mysore Infrastructure Corridor and high involvement of corporate organization in urban development such BATF (Bangalore Agenda Task Force)[227]. Such urban vision-oriented practices are common features in cities more desirous of attracting huge foreign investments. The local governments already overloaded with tasks and the lack of funding, the current spatial practices have affected lives of urban marginals and poor by not providing evenly the

[226] Narayana, M. R. (2011). Globalization and urban economic growth: Evidence for Bangalore, India. *International Journal of Urban and Regional Research*, *35*(6), 1284-1301.

[227] The Bangalore Agenda Task Force (BATF) has been constituted by the Government of Karnataka with several eminent professionals as members. In the past two months, it has successfully created a platform for all key civic organizations in the public domain to develop and integrate their short-term and long-term work plans for Bangalore. The BATF has actively encouraged civic-minded individuals and corporates to identify with the City's aspirations in health, education and infrastructure activities.

basic services. The spatial practices at work have shown that such visions can be achieved only at the cost of marginalized peoples and urban poor, who are forcefully displaced and relocated without their consent[228]. The magnitude of the slum[229], between cities, varies according to the history and nature of industrial development of the city, land and housing prices, nature of employment, level of wages and public provisioning of housing, etc. As urban development is a state subject, the state-specific factors such as politics and perception play important roles in the notification, recognition and identification of slum clusters. Slums are generally located near railway lines, on slopes, in marshy areas, along nalla/drains and riverbanks, etc. These are environmentally risky and prone to disaster[230].

2.1.2.1 Bangalore Suburban Railway Project

Notably, considering the direct foreigner investment in India, and the consequent urban development of the "Silicon Valley of India" it is possible to delve into the Bangalore suburban railway project[231] and its impact on slum communities. Politics, economy and technology are at the intersect of new governing model and of development approach. The project is chosen based on the engagement of the European Investment bank and for the challenges it should tackle in the business and societal framework of the city.

The project plan was signed on the 14 of June 2024, by the EIB. The project has €300 million proposed EIB finance and a total cost of €1579 million.

The project co-finances the construction of a new suburban railway network with 58 stations covering 4 dedicated rail corridors in Bangalore, spanning approximately for 149 km in total length.

---

[228] Gavsker, K. K. (2025). Evolution of Urban Policy and Unconventional Methods of Governance in India: Exploring Neoliberalization's Effect. In *Political Economy of Emerging Urban and Peri-urban Spaces in India: A Roadmap Towards Environmental and Social Sustainability* (pp. 17-43). Singapore: Springer Nature Singapore.

[229] Bangalore shows a lower rate of slums compared to other Indian cities. As Census of India, 2011, shows Bengaluru's rate is 8.4% of the population.

[230] Bhagat, R. B., & Hassan, M. I. (2025). Urban Inequality, Segregation and Urban Crime. In *Urbanisation and Urban Policies in India: Trends, Patterns and Emerging Perspectives* (pp. 143-158). Singapore: Springer Nature Singapore.

[231] EIB, Project 20220637, BANGALORE SUBURBAN RAILWAY PROJECT.

Figure 3. Bangalore Suburban Railway Network Map.

The aim is to contribute to the sustainable development of the Bangalore metropolitan region through low carbon and climate resilient urban infrastructure and improved access. The new suburban railway network improves the business environment for private sector development and facilitates access to amenities and jobs. The project is in line with the EU Country Strategy Paper for India which highlights the infrastructure gap and need to address rising greenhouse gas emissions.

It supports two main objectives of EIB External Mandate:

(i) climate change mitigation, by promoting modal shift from road to rail while reducing greenhouse gas emissions, and

(ii) social and economic infrastructure development, by contributing to sustainable urban development.

In addition, the project will upgrade public transport supply, connecting the city of Bangalore with suburbs and satellite townships. By supporting the shift of traffic to a more sustainable transport mode, the project will reduce negative externalities of road traffic (noise and air pollution, greenhouse gas emissions, road accidents and congestion), improving travel times and costs. By providing safe and affordable transport to more vulnerable groups, e.g. people with reduced mobility and women, further benefits are unlocked, for example more egalitarian access to jobs and study opportunities. The project contributes to a wide range of Sustainable Development Goals (SDGs), most

notably climate change mitigation (viz. SDG 13) and urban infrastructure improvement (viz. SDGs 9 & 11). The project is aligned to the EU's Global Gateway and carried out under the Team Europe Flag. The project is consistent with the EU Country Strategy Paper for India (2018), the EU-India Strategic Partnership: A Roadmap to 2025, India's National Urban Transport Policy (2014) and Bangalore's own comprehensive Mobility Plan (2020). The project benefits from EIB's advantageous long-term funding, as well as the raising of social and environmental standards and technical advice.

Important for this research is to state that promoter and financial intermediary of the project is Rail Infrastructure Development Company (Karnataka) Ltd[232]. The company is a Joint Venture of Govt. of Karnataka and the Indian Ministry of Railways. In fact, the Bangalore suburban railway project, while heralded for its potential to transform urban mobility and support sustainable economic development, raises serious concerns regarding land misuse and evictions in vulnerable communities.

This since the slum dwellers in India face multiple threats to their lives, livelihood and habitat, especially those living on Railway land. Being labelled as "illegal occupants" or "encroachers", they are evicted using flimsy reasons on many occasions, denying them their basic rights. By constituting bodies like the RLDA[233], the Ministry of Railways is acting like a landlord that grabs others' land and then sells it for huge profits. In the past, public land was given to the Department of Railways with the specific purpose of carrying out railways-related activities. However, the Ministry of Railways is now trying to generate revenue by selling/leasing the same land to private developers; in sharp contrast to the specific purpose for which the land was acquired. This is being done by evicting the slum dwellers from their lands they are living on without proper rehabilitation or resettlement plans. In such cases, what we see is the misuse of law and authority to aid private companies and developers. As such, it becomes imperative for the civil society to raise its voice against the exploitation of public land for commercial purposes. In case of

[232] Rail Infrastructure Development Company (Karnataka) Limited. A JV of Govt. of Karnataka & Ministry of Railways.

[233] Rail Land Development Authority (RLDA) is a statutory authority, under the Indian Ministry of Railways, set-up by an Amendment to the Railways Act, 1989. It is responsible for creating assets for Indian Railways through the development of vacant railway land for commercial use to generate revenue by non-tariff measures. RLDA's mission is to be a leader in creating value through the redevelopment of land and air spaces – residential, commercial, and transportation hubs. RLDA's expenses are covered through grants provided by Indian Railways. RLDA transfers the total earnings generated from the development of railway land to Indian Railways.

any eviction, the government must follow the guidelines to properly compensate the evicted and to help the poor slum dwellers lead a life of dignity[234].

Moreover, with the process of "accumulation by dispossession," the marginalized, urban poor people within and around the urban places have been continually ousted from their lands and livelihoods resources with the intention of increasing surplus capital. In a pedestrian culture country, Badami notes about India, "urban road infrastructure projects are being implemented at great public expense"[235] in the persuasion of making urban transportation facilities better and feasible. Therefore, urban infrastructure and transportation projects in persuasion of world-class city model enforces displacement of marginal communities, including slum clearance and relocation; the establishment of industrial and commercial estates; the building and upgrading of sewerage systems, hospitals, ports, and so on, and the construction of communication networks, including those connecting different urban centers. Not only that, spaces for mega events and the construction of religious structures deprive thousands of the urban poor[236].

This framework, in the case of slum inhabitants' eviction, is deeply unequal and leads to a not just urban development. In fact, as the EIB's project assessment[237] states the main adverse social impact is related to involuntary resettlement. The project will acquire about 233.09Ha of land, out of which 56.88Ha is private land, while the rest is governmental (state- or IR-owned), including the 18.6Ha of forest land, for the Akkupete village depot. Accordingly, the residential and commercial structures to be affected are estimated at approx. 622 with total Project Affected Households (PAHs) being estimated at approx. 1,268. The residential structures also include part of a small size notified slum at Mattikere. It is estimated that 53 structures of the Mattikere slum may be temporarily affected by the project. Specifically, the slum dwellers of these structures they may need to be temporarily relocated during construction, if deemed appropriate for safety reasons, and return to their establishments after construction completion, of that part of Corridor

[234] Das, C. Slum Settlements on Railway Land: A State of Denial and Deprivation.
[235] Badami MG (2009) Urban transport policy as if people and the environment mattered: pedestrian accessibility the first step. Econ Polit Wkly 54(33):43–51.
[236] Gavsker, K. K. (2025). Evolution of Urban Policy and Unconventional Methods of Governance in India: Exploring Neoliberalization's Effect. In *Political Economy of Emerging Urban and Peri-urban Spaces in India: A Roadmap Towards Environmental and Social Sustainability* (pp. 17-43). Singapore: Springer Nature Singapore.
[237] EIB, Environmental and Social Data Sheet, BANGALORE SUBURBAN RAILWAY PROJECT.

2. According to the Karnataka Slum Area (Improvements and Clearance) Act 1973, the resettlement of the dwellers of a notified slum area is under the responsibility of the Karnataka Slum Development Board (KSDB), including the baseline survey and consultation with slum dwellers. The cooperation framework between the Promoter, KSDB and the Mattikere slum dwellers includes compensation options. The Promoter undertakes to provide, to the satisfaction of the Bank, the final Memorandum of Understanding (MoU) among acting parties, prior to the initiation of resettlement of Mattikere slum, including clear description of roles and responsibilities, agreement on and timing of relocation options and all other necessary aspects of Resettlement and Rehabilitation (R&R) process. Although no permanent resettlement is currently foreseen for Mattikere slum dwellers, the final MoU among acting parties shall cover this option as well, in order to have a complete institutional arrangement in place. A complete assessment of resettlement impact for the whole project will be known once the final design and subsequently census of affected households/ people are completed for all the corridors (including depots). To avoid any disproportionate negative livelihood impacts on vulnerable groups, identified vulnerable households are expected receive additional financial and in-kind assistance.

Thus, it is imperative for international investment institutions to work closely with local legal frameworks and financial intermediaries. Strengthening these partnerships can ensure that robust social safeguards are embedded in project implementation, guaranteeing fair compensation, transparent rehabilitation processes, and equitable access to urban benefits. By aligning technical benefits with socially just practices, and by reinforcing local legal and financial structures, the project could serve as a model for achieving sustainable urban development that benefits all segments of society. Only in this way the further development of the business ecosystems would be beneficial for all also considering the high risk of unequal transformation. In this case, comes the role of effective resettlement planning, which can aim at mitigating and minimizing the adverse impacts of displacement and have a development-oriented resettlement strategy for the project-affected people and those evicted in the name of “public interest”. In India, the government’s intervention in resettlement issue and safeguarding interests of private-corporate sector rather than common men can be seen as a mere response to the growing citizens’ protests and demands following a bottom-up policy process.

2.2 Global North case study

2.2.1 Paris

The Paris Region is charting an ambitious course toward sustainable development by integrating economic dynamism with environmental stewardship and social inclusion. According to recent facts and figures, the region is harnessing its strong educational, research, and industrial ecosystems to drive innovative solutions in energy efficiency, green mobility, and digital transformation. Initiatives include the development of world-class, eco-friendly transport systems, advanced infrastructure that supports a circular economy, and policies aimed at reducing carbon emissions while enhancing quality of life.

However, on the other hand, the French capital city represents prime material for testing socio-spatial inequality in France. Paris is the study area of several research projects revolving around the issue of inequality. Research on gentrification[238], gated communities[239], upper classes and elitism[240] or deprived and troubled urban areas[241] are primarily based on the Parisian region. Also, research on territorial and religious discrimination such as Islamophobia[242] primarily focuses on Paris.

The social geography of Greater Paris is well-documented showing the spatial distribution of different social groups. The Parisian model presents specific spatial dynamics caused by contrasts between different areas due to the social status of their residents. For example, the diffusion of gentrification in some districts of Central Paris results from social groups characterized by a strong cultural capital[243]. This Parisian bourgeoisie distances itself from the rest of society, and the upper-middle class can do the same and distance itself from the poorest areas especially when they are associated with an important foreign population. As a result, these areas such as the area of Seine-Saint-

[238] Clerval A (2016) *Paris sans le peuple: La gentrification de la capitale*. Paris: La Découverte.
[239] Charmes E (2004) Les Gated Communities: Des ghettos de riches? *L'Espace Géographique* 2: 97–113. Le Goix R (2006) Les gated communities aux États-Unis et en France: Une innovation dans le développement périurbain? *Hérodote* 122(3): 107–137.
[240] Pinçon M, Pinçon-Charlot M (2014) *La Violence Des Riches*. Paris: La Découverte.
[241] Chignier-Riboulon F (2010) Les quartiers en difficultés, une question d'intégration. In: Wackermann G (ed.) *La France en Villes*. Paris: Ellipses, pp. 185–191.
[242] Hancock C (2015) The republic is lived with an uncovered face (and a skirt): (Un)dressing French citizens. *Gender, Place & Culture* 22(7): 1023–1040.
[243] Clerval A, Delage M (2016) La métropole parisienne: Une mosaïque sociale de plus en plus différenciée. *Métropolitiques*.

Denis in the northeast of Greater Paris become increasingly marginalized and stigmatized, just like their inhabitants[244]. Research[245] shows that the Parisian centre and the west of Greater Paris form a privileged zone where high taxed households are located as well as executives and professionals. This zone contrasts with the rest of Greater Paris and especially the northeastern area where there is a much higher proportion of unemployed people, manual labourers, and people who work in service occupations. There is a clear division between the west of Greater Paris including the Parisian centre, and the northeast of Greater Paris. Highly educated people mostly live in the centre and the west of Greater Paris, which corresponds to the spaces where high incomes and high professional occupations are located. Conversely, people with no qualifications mostly live in the northeast where there is a high proportion of manual labourers and unemployed people. As a proxy of the social inequalities and current issues, it is possible to cite that the mapping of anti-Muslim acts[246] highlights specific patterns of spatial distribution showing visually the importance of the Parisian centre in contrast to the Parisian suburbs. There are a high rate of Islamophobic acts in the privileged Parisian centre where there is a high rate of executives/professionals (35%), high taxed households (76%), high incomes (median income of 33553 euros), high education levels (50%), couples without children (45%), and French citizens (86%)[247]. Spaces of racist acts also highlight "pockets" of segregation in the department of Seine-Saint-Denis, and in particular the municipalities of Saint-Denis, Aubervilliers and Aulnay-sous-Bois. These municipalities are part of the 4th and 5th classes which represent deprived and troubled areas located in the suburbs. These observations can refer to the issue of self-segregation which may be sought and desired by the Muslim populations. However, analysis shows that, on the contrary, and as in the study of Phillips[248] which has challenged the discourse on British Muslim self-segregation, there is certainly a will and a necessity from Muslim populations to leave their residential areas and to enter different spaces and in particular the Parisian centre.

---

[244] Wacquant L (1993) Urban outcasts: Stigma and division in the Black American ghetto and the French urban periphery. *International Journal of Urban and Regional Research* 17(3): 366–383.
[245] Najib, K. (2021). Spaces of Islamophobia and spaces of inequality in Greater Paris. *Environment and Planning C: Politics and Space*, *39*(3), 606-625.
[246] It is highlighted since places of Islamophobia are very important because the majority of incidents occur in institutional or professional places (Najib, 2019; Najib and Hopkins, 2020)
[247] See reference n. 241
[248] Phillips D (2006) Parallel lives? Challenging discourses of British Muslim self-segregation. *Environment and Planning D: Society and Space* 24(1): 25–40.

However, when they try to access these different spaces, they may face an urban barrier as explained by Hancock[249] in the form of the ring-like belt-structure that separates Central Paris from its *banlieues*. This demarcation line is administrative, symbolic and political[250], and this idea of urban barrier also refers to the idea of the glass ceiling concerning the professional evolution of one of the most marginalized and stigmatized minority groups[251]. Here there is also a geographical barrier. In addition, some researchers[252] have shown in different cities a direct relationship between the degree of residential segregation and the degree of social distance between different. They have explained that the degree of residential segregation between different groups is a significant reflection of social separation or interaction.

Now, having demonstrated the link among social inequalities and the infrastructural layer, it is important to remember that the Grand Paris Express is founded on the uncontrollable rioting and civil unrest of 2005[253].

In conclusion, the region, situated at the nexus of Europe, benefits for the possibility of enjoying convenient access to a vast market comprising over 500 million customers and key European urban centers. The region boasts an advanced, contemporary, and secure transportation infrastructure, featuring a rapid metro system, suburban trains, 7 high-speed train stations, and 3 international airports. This well-connected network facilitates seamless travel within the region and provides easy access to various destinations in France, Europe, and beyond. Currently, the Paris Region is actively engaged in multiple significant public infrastructure initiatives. Several major projects are currently underway and are scheduled for completion by 2030, with the Grand Paris Express being a

---

[249] Hancock C (2017) Feminism from the margin: Challenging the Paris/Banlieues Divide. *Antipode* 49(3): 636–656.
[250] Amiraux V, Simon P (2006) There are no minorities here: Cultures of scholarship and public debate on immigrants and integration in France. *International Journal of Comparative Sociology* 47(3–4): 191–215.
[251] Aquil R (2011) Change and Muslim women. *International Journal of Humanities and Social Science* 1(21): 21–30.
[252] Gale R (2013) Religious residential segregation and internal migration: The British Muslim case. *Environment and Planning A: Economy and Space* 45(4): 872–891.
Voas D, Williamson P (2000) The scale of dissimilarity: Concepts, measurements and an application to socioeconomic variation across England and Wales. *Transactions of the Institute of British Geographers* 25(4): 465–481.
Peach C (1996) Does Britain have ghettos? *Transactions of the Institute of British Geographers* 21(1): 216–235.
[253] Leasia, Charlotte M., "The Grand Paris Express: An Analysis of Social and Political Trends towards Mass Transit Planning in the Île-de-France Region" (2013). Scripps Senior Theses. Paper 213.

prominent example that will be further analysed as case study within the urban mobility network.

2.2.1.1 Grand Paris Express Project ("GPE")

The project has been chosen since the Grand Paris Express is set to transform the region's transportation landscape, marking the largest urban development project in Europe. The project involves the creation of 200 kilometers of new metro lines, which will extend the city's existing metro network and connect several suburbs and surrounding cities. When completed, it will add 68 new stations to the Paris metropolitan area facilitating daily travel for 2 to 3 million passengers. The Grand Paris Express will primarily consist of four new metro lines (Lines 15, 16, 17, and 18) and an extension to Line 14 and 68 new stations will be integrated into the Paris metro system[254].

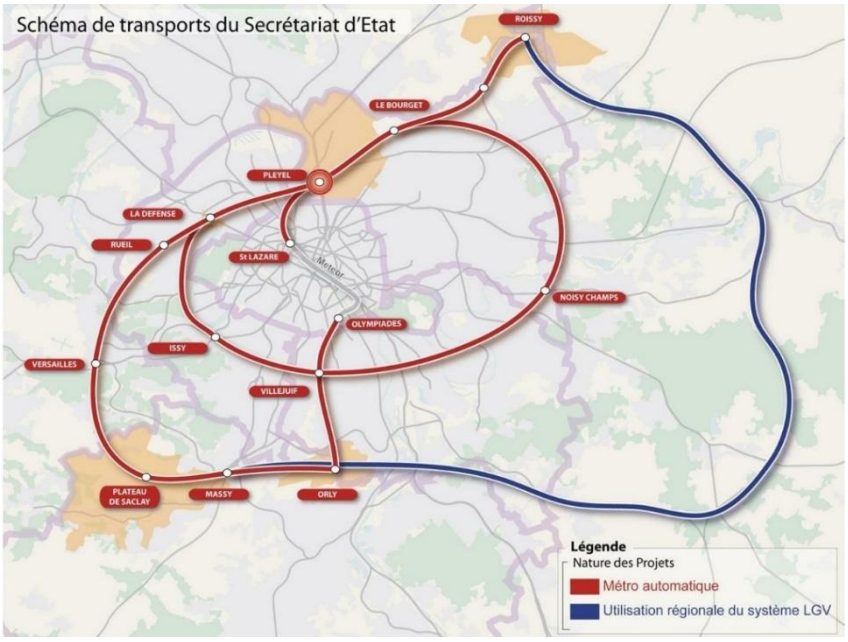

Figure 4. Grand Paris Express project – Rapport Carrez, 2009

This expansive network will seamlessly link Paris Region's three major airports, business districts, and scientific clusters, while also triggering urban renewal through the development of approximately 1 million m² of new floor space by Société du Grand Paris. The Société des Grands Projets (SGP), former Société du Grand Paris, French public organization, is in charge of program management for the GPE project.

[254] Grand Paris Express

Furthermore, regarding the financing of the project, the Grand Paris Express is a colossal infrastructure project, and its financing involves various stakeholders and funding mechanisms. With a massive investment of €36.1 billion through 2030, will make it one of the most expensive infrastructure projects in Europe.

Sources of Financing are:

1. *French Government*: The French state has committed a significant portion of the funding for the project. The government has allocated financial support through the National Investment Plan and other funding mechanisms.
2. *European Union (EU)*: The project receives backing from the EU, mainly through the European Investment Bank (EIB) and the Cohesion Fund. The EU's contribution aims to support urban development, transportation, and the reduction of carbon emissions in cities.
3. *Public-Private Partnerships (PPP)*: The project is also partly funded through PPPs, where private companies and investors partner with public authorities to finance, design, construct, and operate parts of the Grand Paris Express.
4. *Regional and Local Funding*: The Île-de-France region, which includes Paris and its suburbs, has also contributed significant funding to the project.

Thus, the project uses a combination of direct funding from the French government, EU support, and financial models such as public-private partnerships (PPP). In fact, the strategy aims to spread the financial burden while leveraging private sector efficiency in construction and management.

In addition, the Grand Paris Express has several strategic objectives aimed at improving the overall quality of life, urban mobility, and economic opportunities in the Paris metropolitan area. Objectives are:

i. Reduced Congestion and Improve Connectivity.
ii. Technological Innovation.
iii. Reduce Traffic Congestion.
iv. Sustainability.
v. Boost Economic Development.

vi. Promoting Social Inclusion.

However, such a large project certainly presents a range of complexities and poses many technical, material, human, societal and environmental challenges[255]. But it is important to highlight that, to overcome the technical, material, human, and even environmental challenges of the GPE project, the SGP encouraged and integrated innovation at all levels of the project. Due to its scale, the GPE project also provided good opportunities to deploy new and innovative technologies: new construction methods, low-carbon materials, new services in the metro, etc. Through innovation, the GPE project is asserting itself as a project of ecological transition, with sustainable design and construction characteristics[256].

As connectivity improves, emerging areas are expected to benefit from more affordable land and real estate prices, reinforcing the region's commitment to sustainable and inclusive urban growth[257]. Thus, the analysis of the potential impact of the project assumes a combined 1% increase in labour productivity due to better matching between skill supply and demand, and a 1% increase in accessibility[258]. In quantitative terms[259], by 2037 the positive GDP impact due to the Grand Paris project is estimated at 0.18% for EU as a whole, 0.79% for France and 2.61% for the IdF[260].

In fact, the project strategical objectives shows that it will provide direct access to the Paris city center from various suburbs, making it easier for people to travel across the region, which will alleviate pressure on other transport networks. The state's proposal aimed to enhance Paris's position as a global economic center and to catalyze new real-estate development, the region's scheme was committed to connecting communities isolated by inadequate public transport. This included areas of the north-east, where geographic stigmatization emerged as a central theme. Physical mobility and the right to equal transportation access were central to this discussion. They are essential to reaching

[255] Zhang, Y. (2025). Application of intensive construction technology in the Grand Paris Express project: A review. *Frontiers of Structural and Civil Engineering*, 1-14.
[256] Zhang, Y. Application of intensive construction technology in the grand Paris express project: A review. *Front. Struct. Civ. Eng.* (2025).
[257] Societe Du Grand Paris
[258] Mandras, Giovanni; Sakkas, Stylianos (2019) : The impact of the Grand Paris Express on the European regions: A RHOMOLO analysis, JRC Working Papers on Territorial Modelling and Analysis, No. 08/2019, European Commission, Joint Research Centre (JRC), Seville.
[259] See reference 252.
[260] Île-de-France

employment, training and other opportunities in an increasingly fluid metropolis. Indeed, physical mobility is directly linked to social mobility, particularly in a context where jobs have become transitory and regionally dispersed. a variety of factors contribute to a perception of inherent discrimination within the transit system. Among these are a large number of unrealized station projects at suburban social housing sites, distance-based fares which burden residents of the banlieue, and ethnic profiling by transit police. Limited access to the collective infrastructure network is experienced as a denial of urban and even national citizenship[261].

Although the Grand Paris design consultation can be interpreted as a strategy through which the state regained control of the metropolitan narrative, this does not signal a return to the centralized planning of the 1960s. Instead, it makes apparent new political strategies required to operate in the fragmented, pluralist context of a complex metropolis. Within this setting, an infrastructure project itself can become a form of emergent governance and negotiated planning, this appears to be the case. The evolution of the Grand Paris Express proposal for a rapid regional rail network has revealed two aspects of the shifting politics of infrastructure. First, the initial conflict between the state and the region's visions for the project highlighted the contrasting narratives of spatial mobility (social versus economic) underlying this conflict. Narratives of mobility and of networks are employed both by proponents of economic development and by proponents of social justice. However, the strategies each proposes to achieve mobility goals are often directly in opposition. Second, in the midst of this debate, the state instrumentalized architects to more effectively promote its economic development agenda for Grand Paris Express. France's mayors and presidents have long employed architecture as a tool of urban politics, but the political role for architecture is changing as Paris is reframed as a networked, polycentric metropolis. This reframing is in part aspirational, the multipolar city has become an economic development paradigm for achieving global competitiveness. Meanwhile, under globalization pressures, decentralization policies and the reorientation of national planning towards competitiveness rather than spatial fairness, the governance of greater Paris has become fragmented and exceedingly complex. The

[261] Lagrange, Hugues and Oberti, Marco. 2006. "Intégration, ségrégation et justice sociale", in Lagrange, Hugues and Oberti, Marco (eds.). Émeutes urbaines et protestations : une singularité française, Paris: Presses de Sciences Po, pp. 19–20.

infrastructure that enables this complex metropolis is increasingly a focal point of its conflicts. In this particularly challenging metropolitan context, the media role played by architecture is key to shaping public opinion and directing urban development[262]. This leads to the core debate, embodied by each scheme, were the two conflicting narratives of mobility, the "global city" versus the "just city." And indeed, themes which arose in the debate illustrate many of the dilemmas of the network city and its difficulty reconciling economic growth priorities and social fairness.

The most significant innovation in the process has been the creation of the *contrat de développement territorial (CDT)* mechanism which, in effect, locally distributes development responsibility. The CDTs invite local authorities and private-sector partners to self-organize and collectively propose urban development plans along the proposed Grand Paris Express route. The CDTs may create an opening for what Science Technology and Society (STS) scholars Olivier Coutard and Simon Guy describe as a "politics of hope", or the possibility that new infrastructure networks may incorporate micro-struggles into urban planning processes, helping to combat systemic inequalities[263].

On the other hand, despite the promising benefits of the Grand Paris Express, the project faces several significant challenges:

1. Budget Overruns.

   The Grand Paris Express has faced cost overruns and delays. Originally estimated to cost around €23 billion, the cost has increased to €35 billion due to the complexity of the project, the need for new tunneling technologies, and the requirement for environmental considerations.

2. Delays and Timelines.

   The project has been plagued by delays. Initially scheduled to be completed by 2024, the timeline has now been extended to 2030 due to various factors, including construction challenges and unexpected complications.

[262] Belkind, L. (2013). The Negotiated urbanism of Grand Paris Express. *Métropolitiques, eu*.
[263] Coutard, Olivier and Guy, Simon. 2007. "STS and the City: Politics and Practices of Hope", Science, Technology, & Human Values, vol. 32, no. 6, November, pp. 713–734.

3. Land Acquisition and Legal Challenges.

   The construction of new metro lines requires significant land acquisition, and this has led to legal challenges with property owners and local authorities. Securing the necessary land, managing disputes, and adhering to zoning laws have posed significant delays and additional costs.

4. Environmental Concerns.

   While the project aims to be sustainable, the construction of new metro lines and tunnels has raised environmental concerns about air quality, noise pollution, and disruption to local ecosystems during construction.

5. Technological Integration.

   The Grand Paris Express will feature highly automated, driverless metro trains, which requires cutting-edge technology. Ensuring the seamless integration of these technologies and maintaining safety standards has proven to be a significant technical challenge.

6. Coordination Among Stakeholders.

   With various stakeholders involved, including the French government, the Île-de-France region, private partners, and EU entities, ensuring effective coordination and alignment of objectives has been a complex task.

Thus, the Grand Paris Express is a groundbreaking project with the potential to transform the transportation landscape of Paris and its surrounding regions. By providing improved connectivity, reducing congestion, promoting sustainability, and enhancing economic and social opportunities, it promises to have a lasting impact on the metropolitan area.

However, has to be state that like any major infrastructure project, the Grand Paris Express faces numerous challenges. Research[264] have also shown that the social opportunity cost of the project largely exceeds the induced benefits, resulting in welfare losses for all Ile-de-France residents. This conclusion, which is also in sharp contrast with previous assessments, results from properly measured social opportunity costs through

[264] Magnani, R., & Mercenier, J. (2024). General equilibrium assessment of public-transportation megaprojects: the “Grand Paris Express” case study.

explicit intertemporal budget constraints. In fact, scholars show that in the long run, the GPE would cause the population of the Paris region to increase and real rents to rise while real wages fall[265].

Despite these hurdles, the project remains critical for the future growth of the region, and with continued governmental and EU support, it is expected to play a pivotal role in creating a more sustainable, accessible, and integrated public transport system.

If completed on time and if the environmental and societal aspect are considered, the Grand Paris Express could be an example of how large-scale infrastructure projects can be used to address urban mobility challenges, create economic opportunities, and promote sustainable urban development. The project is about shaping the future of the entire Île-de-France region, making it a more connected, green, and equitable place for residents.

Overall, Paris stands as a global benchmark in urban transformation, where innovative investment frameworks are reshaping the metropolitan landscape to foster sustainability, equity, and social inclusion. The Grand Paris Express exemplifies this paradigm shift, employing a multifaceted financing model that combines significant state backing, and strategic Public-Private Partnerships. This state-of-the-art project harnesses cutting-edge digital innovations, such as fully automated, driverless metro systems and advanced operational technologies, to not only enhance connectivity and alleviate congestion but also to address critical environmental concerns by reducing carbon emissions and promoting eco-friendly practices. By integrating robust governance mechanisms and fostering collaborative stakeholder engagement, the Grand Paris Express transcends conventional PPP approaches, setting a new standard for urban infrastructure investments that align economic imperatives with social and environmental outcomes. In doing so, Paris not only addresses the intrinsic challenges of urban mobility and sustainability but also provides a replicable model for both the Global North and South, paving the way for more inclusive, resilient, and knowledge-driven urban futures. However, the management of the project must balance the positive effects of the funded project with the drawbacks evidenced in the paragraph in order to have a real sustainable and just transition.

[265] Anas, A., & Chang, H. (2023). Productivity benefits of urban transportation megaprojects: A general equilibrium analysis of «Grand Paris Express». *Transportation Research Part B: Methodological*, *174*, 102746.

3. Assessing the Impact of International Investment Mechanisms on Urban Sustainability

The process of urbanisation manifests itself in various forms of inequality, for instance, in income levels, access to health care, education and labour market and housing conditions. The economic and social inequality is also visible in the social spaces of the city in the form of residential segregation, and this happens also in the Global North. Enclaves of communities, slums and gated communities are some of the prominent forms of segregation of social space in the cities. At the same time, private cities are also emerging as spaces of consumption and repositing wealth. Inequality and segregation in this situation entail tension and conflicts both in latent and manifested forms[266]. Infrastructural projects, in the urban framework, can be the touching point of these challenges.

Thus, international investment mechanisms have become pivotal in shaping urban sustainable and just development by channelling significant capital and technical expertise into modernizing urban infrastructure and fostering inclusive growth within a needed strategical approach. Policy instruments, like the EU's Global Gateway and the Belt and Road Initiative, and Development Banks, as seen in the first chapter, mobilize hundreds of billions of euros to drive projects in digital transformation, green energy, and sustainable transport across diverse regions. In cities such as Paris, Bangalore, and Nairobi, these investments have enabled the deployment of advanced smart city solutions, expanded digital connectivity, and improved urban mobility, contributing to enhanced economic performance.

However, while the influx of international capital offers transformative potential, these developments present challenges. Still remains issues such as bureaucratic hurdles, governance deficits, and the risk of exacerbating social inequalities, underscoring the need for integrated frameworks that balance economic, environmental, and social objectives of projects.

In addition, these international investment partnerships model do not have to create debt traps in developing countries. Fundamental of these policy instruments is to create a win-

[266] Bhagat, R. B., & Hassan, M. I. (2025). Urban Inequality, Segregation and Urban Crime. In *Urbanisation and Urban Policies in India: Trends, Patterns and Emerging Perspectives* (pp. 143-158). Singapore: Springer Nature Singapore.

win situation for all stakeholders involved whereas also Global South countries, marginalized and vulnerable communities benefit from these projects. In fact, these mechanisms can also lead investment decisions driven by external criteria that might overlook local social and environmental priorities, potentially exacerbating inequalities and displacing vulnerable populations as showed by the Bangalore's case study. Moreover, when investments prioritize short-term technological upgrades over long-term capacity building and community engagement, the sustainability of urban projects may be compromised. Balancing these investments with robust governance frameworks that ensure local needs and participatory planning are met is essential for truly sustainable urban development. With this regard a central role is played by knowledge institutions, as demonstrated in the previous chapters.

Furthermore, the impact of these mechanisms on urban sustainability will depend on their capacity to foster resilient, inclusive, and participatory urban development that not only modernizes cities but also addresses longstanding structural disparities.

In fact, recent studies emphasize that while large-scale investment frameworks, such as the EU Cities Mission, Global Gateway, and the Belt and Road Initiative, can catalyze infrastructural improvements and drive digital transformation, their success largely hinges on context-specific governance, participatory planning, and alignment with local sustainability goals. Research illustrates that sustainable urban development is not solely a function of financial input; it also depends on strategic partnerships that integrate environmental stewardship, social equity, and economic resilience.

In this regard, the comparative case studies of Nairobi, Bangalore, and Paris underscore the complexity of translating international capital into locally meaningful outcomes. While cities in the Global North often benefit from established governance systems and robust infrastructure, those in the Global South must navigate challenges such as resource scarcity, digital neocolonialism, and fragmented policy frameworks. By combining insights from scientific literature with practical assessments of investment impacts, this analysis reveals that international investment mechanisms can substantially enhance urban sustainability when they promote inclusive policy dialogue, leverage local knowledge ecosystems, and implement adaptive management practices. Ultimately, a balanced and critically reflective evaluation of these mechanisms highlights both their

transformative potential and the critical need for robust institutional frameworks to ensure that financial investments translate into resilient, equitable, and environmentally sustainable urban futures. Moreover, it is important to note that quantifying the social impact of these investments remains a significant challenge, as many of the qualitative improvements in community well-being and social cohesion are difficult to capture through conventional quantitative metrics. The qualitative dimension is the difficult one to be captured as also the Environmental Impact Assessment tool for balancing economic, social and environmental considerations in infrastructure development shows in the case of the Nairobi Expressway.

In conclusion, evaluating international investment mechanisms requires a nuanced approach that accounts for both quantitative and qualitative dimensions of urban justice and sustainability.

Chapter 5: Results, Discussion, and Further Research Agenda

1. Summary of Key Findings

This research critically examines how global investment mechanisms in urban infrastructure should be restructured beyond traditional Public-Private Partnership (PPP) models to promote social equity, environmental sustainability, and digital inclusion, with a particular focus on planetary health. Through comparative case studies of the Grand Paris Express, the Bangalore Suburban Railway Project, and the Nairobi Expressway, the research explores the dynamic interplay between infrastructure investment, urban governance, social geography, and ecological health in both Global North and South contexts.

The study highlights the increasing influence of international investment frameworks, such as the EU's Global Gateway, the Belt and Road Initiative, and multilateral development banks financing, in shaping urban transformations. However, it argues that these frameworks risk exacerbating socio-spatial inequalities and ecological degradation unless aligned with context-specific governance, inclusive planning, and long-term public interests. In cities like Nairobi and Bangalore, large-scale infrastructure projects often displace marginalized communities, fragment governance structures, and degrade urban green spaces.

Furthermore, the study demonstrates the need to evaluate infrastructure projects not only for financial viability but also for their cumulative impact on public health, urban ecosystems, social equity, and climate resilience. This underscores the importance of incorporating social and health metrics into infrastructure governance, with a focus on the operationalization of the planetary health framework, an approach rarely applied in urban planning and finance.

At the social level, the findings reveal that while physical connectivity infrastructure in marginalized communities is essential for democratizing access to opportunities, it is insufficient on its own to foster sustainable urban resilience. Long-term transformation requires concurrent investments in human capital development, digital literacy, local knowledge ecosystems, and participatory governance. The cases of Nairobi's unequal

access to infrastructure and Bangalore's displacement of informal settlements highlight the need for integrated social considerations in infrastructure planning.

At the ecosystem level, the research emphasizes the often-overlooked economic valuation of ecosystem services and urban green spaces in infrastructure planning, particularly in the Global South. Nairobi's historical identity as a "green city" and its subsequent loss of urban greenery due to unchecked development illustrate the consequences of neglecting ecological resources in urban planning. The study advocates for the inclusion of urban green infrastructure and ecosystem service valuations in Environmental Impact Assessments (EIAs) and urban investment appraisals.

The research also identifies critical governance imbalances in global infrastructure finance, where international capital and expertise frequently overshadow local agency, reinforcing externally driven urban agendas. The Grand Paris Express case exemplifies how entrenched socio-spatial inequalities persist even in the Global North, underscoring the need for governance models that balance economic growth with social fairness.

Lastly, the study contributes to the academic literature by addressing the integration of digital governance, AI-driven urban systems, and sustainable infrastructure planning in the Global South. By focusing on African and South Asian cities, the research broadens the geographical scope of urban infrastructure studies and offers new insights for inclusive, knowledge-based, and ecologically grounded development.

2. Discussion of Results

The result of the research underscores that while global investment mechanisms have considerable potential to spur sustainable urban development, their success is intrinsically linked to local governance dynamics and the tailored adaptation of these global models to specific urban contexts leading to an empowerment of all communities. The research reveals a complex interplay between international investment mechanisms, urban infrastructural development, and socio-spatial dynamics in both the Global North and South.

The case studies of the Grand Paris Express, the Bangalore Suburban Railway Project, and the Nairobi Expressway illustrate how large-scale infrastructure projects financed

through diverse international partnerships can serve as powerful drivers of urban transformation. However, the analysis also exposes persistent challenges in achieving socially equitable and environmentally sustainable outcomes.

In Paris, the GPE demonstrates how advanced institutional governance and multi-tiered financing models can foster digital innovation, eco-conscious infrastructure, and regional economic integration. Yet, it also highlights enduring socio-spatial inequalities, particularly in marginalized banlieues, raising concerns about whether economic growth narratives overshadow social inclusion priorities.

Similarly, in Bangalore and Nairobi, international investments in mobility infrastructure have stimulated economic activity and improved urban connectivity, but often at the cost of social displacement, exclusionary practices, and environmental degradation, including the encroachment of green spaces, biodiversity loss, and increased resource consumption.

Furthermore, a recurring theme across all cases is the imbalance between rapid infrastructural expansion and insufficient investment in social infrastructure, community participation, and long-term knowledge capacity. Furthermore, while these projects increasingly integrate digital technologies, the risk of digital neocolonialism and the widening of digital divides remains high when local communities lack access to decision-making processes, digital infrastructure, and relevant education. Most critically, these infrastructural interventions often insufficiently align with planetary health principles, which emphasize the interconnectedness of human health, ecosystems, and urban environments. The environmental externalities associated with large-scale transport projects, such as air and noise pollution, habitat fragmentation, and greenhouse gas emissions, and more specifically with the construction of new roads, have direct and indirect consequences on public health and urban resilience, particularly higher for marginalized populations.

On the other hand, the findings reveal a clear divergence between the outcomes in the Global North and the Global South, where cities like Paris benefit from well-established and rooted institutional frameworks, while cities such as Bangalore and Nairobi continue to grapple with rapid urbanization, infrastructural deficiencies, and fragmented policy landscapes.

This research further indicates that financial injections alone are insufficient; for a just transition and the mitigation of risks such as debt traps, the promotion of urban resilience depend critically on the empowerment of local stakeholders through inclusive decision-making and the strengthening of knowledge ecosystems. By integrating interdisciplinary insights, from environmental science and urban planning to economics and political governance, the study argues for a redefined framework in which investments are balanced with social equity, and are harmonized with local needs. Ultimately, these results call for policy approaches that prioritize participatory governance, capacity building, and context-specific strategies to ensure that urban development initiatives yield sustainable, equitable, and resilient outcomes creating a meaningful impact for the citizens worldwide.

In conclusion, the findings call for a paradigm shift in global infrastructure finance, one that rebalances power dynamics, democratizes knowledge, and embeds equity and environmental stewardship at the core of urban investment strategies. Ensuring connectivity among communities is indeed a foundational step toward democratizing access to urban centers but this must be strongly coupled with sustained investment in education, knowledge-sharing, and equitable opportunity creation. These factors are essential for long-term structural transformation and truly inclusive urban future development.

3. Policy Implications and Recommendations

To ensure truly sustainable and inclusive urban development, international investment mechanisms must be fundamentally restructured within a planetary health framework[267], acknowledging the complex interdependencies between urban infrastructure, ecosystem integrity, and community well-being.

[267] A Planetary Health Watch system would need to collect, combine, analyse, visualise, and share health and environmental data at different temporal and spatial scales to assess complex inter-relations, patterns, and trends. This process would require a combination of remote sensing, analysis of big data, and surveillance of vulnerable ecosystems and populations to monitor indicators of health and development in a range of settings. The system should make use of open-data sources as far as possible, including existing health surveillance systems, and cohort studies where available, to capture trends across different populations. The system would employ cutting-edge methods to link and attribute changes in health outcomes to environmental changes, including supercomputing and open-source artificial intelligence (deep learning) algorithms to process and analyse large datasets. The Lancet, Planetary Health.

This calls for expanding Environmental Impact Assessments (EIAs) to consider not only environmental factors but also cumulative health impacts and social opportunity costs, with planetary health indicators explicitly embedded in decision-making processes. Urban infrastructure projects must systematically incorporate the preservation and integration of urban health and ecosystem services, such as green corridors, urban forests, and wetlands, into their designs to enhance climate resilience, environmental quality, and public health outcomes, thus aligning infrastructural investment with planetary health imperatives.

Moreover, governance structures for infrastructure projects must be democratized to foster the meaningful participation of marginalized communities, civil society actors, and local governments, institutionalizing co-governance mechanisms such as participatory budgeting, community forums, and environmental stewardship councils going over the mere political infrastructural decisions. In order to embed vulnerable communities in the development processes, in the long term, policy makers must consider the fundamental role of knowledge institutions and the importance of human capital retention in vulnerable territories. In fact, parallel to the physical infrastructure layer, investments should enhance human capital development through the enhancement of education systems, digital literacy initiatives, and urban innovation hubs, particularly in underserved areas, thereby reducing reliance on external expertise and nurturing adaptive, context-sensitive governance. Financial programs like the Belt and Road Initiative and Global Gateway should mandate the integration of long-term social equity metrics, including monitoring access to mobility, employment, air quality, housing affordability, and public amenities for disadvantaged populations. In order to reach this goal, the main change should be on the financing methods used.

Furthermore, a balanced allocation of international investments is essential, with a strategic focus not only on new large-scale projects but also on the maintenance and upgrading of existing urban infrastructure, especially within informal settlements and marginalized neighbourhoods, to address persistent spatial inequalities. To prevent the risks of digital exclusion and neocolonial dependencies, smart city projects must ensure affordable digital access, inclusive e-governance platforms, and locally grounded digital education programs that empower all urban residents to engage with and benefit from digital transformations.

Policy makers and planners must carefully consider and assess the coming dangers and macro-trends for the resilience of territories on the long term. This to match future needs with current investments to avoid wasting of financial resources.

As a result, development banks and financial institutions must readapt, based to the current needs, the delivery mechanism of infrastructural projects based on result based milestones and KPIs.

In sum, while international infrastructure investments present vital opportunities for urban growth and economic advancement, their long-term success depends on embedding equity, ecological stewardship, and human-centered governance into their frameworks, co-designing urban transitions that are sensitive to both global sustainability goals and the specific socio-ecological realities of the cities they seek to transform. In this regard, these recommendations could call for a reconceptualization of the traditional Keynesian multiplier. Rather than measuring returns solely in terms of GDP growth, the multiplier should be broad to capture social, environmental, and health spill-on effects. Under this enlarged framework, each euro/dollar/yen of public or international investment would be assessed, not only by the immediate boost to economic activity, but also by its capacity to reduce CO2 emissions, improve air quality, and enhance community development.

For example, green infrastructure spending, such as the restoration of urban wetlands or the plantation of street-side tree canopies, yields quantifiable benefits in flood mitigation, heat-island reduction, and respiratory health improvements that conventional GDP metrics miss. By integrating these co-benefits into multiplier calculations, policymakers can prioritize projects that deliver the greatest net societal return. This is needed since economic growth can increase health outcomes and social welfare, but its influence is limited by biological laws[268]. Further, achieving economic growth may have negative externalities which reduce health outcomes (particularly when biological health limits are reached). A new health adjusted GDP indicator to investigate the relationship between economic growth, health outcomes and social welfare in both a developing and developed country using social choice perspectives has to be used. This limitation can be overcome though by specifying a social welfare function where HAGDP “Health adjusted GDP” is

[268] Clarke, M., & Islam, S. (2003). Health adjusted GDP (HAGDP) measures of the relationship between economic growth, health outcomes and social welfare. Health Outcomes and Social Welfare (July 2003).

adjusted taking into account income inequality, water pollution, air pollution, and long-term environmental damage.

This approach aligns macroeconomic stimulus with planetary boundaries and social equity goals, turning every euro of infrastructure spending into a strategic lever for resilient, inclusive, and healthy urban futures.

3.1 Need for Outcome and Result Oriented Mechanisms in Infrastructural Investments

Chapter 5 presents the results and discussion of the three main case studies. Despite the remarkable scale and functionality achieved by the three flagship projects, findings reveal shortcomings and drawbacks in their financing structures, often overlooking social and environmental concerns integral to planetary health.

Through these examples, the diverse financing mechanisms used in large infrastructure projects highlight the limited role of new forms of hybrid financing, such as Development Impact Bonds (DIBs), in such contexts. This discussion sets the framework for exploring emerging hybrid models and identifying gaps that could guide further research on innovative, impact-focused infrastructure financing rooted in the principles of planetary health.

DIBs are innovative financing instruments that link investors return to the achievement of verified social or environmental outcomes. By shifting the focus from inputs and outputs to measurable impacts, DIBs encourage accountability and align incentives among public authorities, investors, and service providers. Although widely used in sectors like education and health, their application in large-scale infrastructure projects remains limited. However, emerging hybrid models that combine DIBs with concessional finance and public subsidies are beginning to unlock new opportunities, especially in many sectors as water, sanitation, and renewable energy, where social and environmental outcomes, and thus contributions to planetary health, are more directly measurable.

The research, then, underscores the need to transition from infrastructure finance models centered on capital and financial metrics to those explicitly conditioned on social and environmental outcomes.

According to the three case studies, the research demonstrates that while each represents a flagship investment in mobility and metropolitan connectivity, their underlying financing architectures remain rooted in traditional public debt, toll revenue, and availability payment logics. These models, though effective in scaling physical infrastructure, often neglect distributional equity and planetary health in their core performance metrics.

In contrast, a powerful solution could be the implementation of DIBs. By tying repayments to verified outcomes and milestones, such as reductions in travel time for low-income users, improvements in air quality, or increased modal access for excluded populations, DIB style instruments could reshape infrastructure finance toward inclusive and just urban development. While none of the case studies formally adopt a DIB structure, this thesis argues that their logic can be operationalized across large-scale transport investments by integrating benefit sharing[269] clauses, equity linked incentive tranches, and independent monitoring of social impact. Embedding these mechanisms within programs like the Global Gateway, or national schemes, would help convert infrastructural projects into circular public value, thus leading to a redistribution of benefits of mobility in ways that align with climate goals, territorial cohesion, social fairness and planetary health.

However, it is important to highlight that DIBs remain relatively uncommon and limited for traditional large-scale infrastructure projects primarily due to the inherent challenges posed by the nature of such investments. Infrastructure development typically demands substantial upfront capital outlays and involves long-term project timelines that span several years or even decades before generating measurable outcomes or financial returns. Unlike social interventions, where outcomes such as improved school enrollment or health indicators are more directly observable and attributable, infrastructure projects face greater challenges in impact attribution. Factors such as public transit usage or environmental benefits can be influenced by many variables outside the project's direct control. This makes it difficult to design outcome-based contracts that fairly reward investors based on impact. Nevertheless, the innovative blending of DIBs with

[269] The application of benefits-sharing highlights the "social accountability and responsibility to direct returns from use of natural resources, be they monetary or nonmonetary, back to a range of designated participants within socially designed arrangements" (Armitage et al., 2008)

concessional finance, grants, or public subsidies to de-risk investments is gaining traction. In sectors like water supply and renewable energy, where social and environmental outcomes are more measurable, these hybrid models allow investors to receive payments tied to specific impact metrics, such as increased access to clean water or reduced carbon emissions, while sharing risks with development partners. This evolving approach holds a significant promise to unlock capital for truly sustainable and just infrastructure development that addresses critical societal needs, ensures ecological stewardship, and advances accountability through results-driven financing.

3.2 Leveraging DIBs for Inclusive and Knowledge-Driven Urban Infrastructural Investments

Building on these result-based needs, this section examines emerging outcome-based financing models that could reshape infrastructure investment toward more inclusive and knowledge-driven approaches. To further illustrate the need of blended finance models and their transformative potential beyond conventional PPPs, this section briefly examines successful DIBs in India and Kenya, offering clear pathways for rethinking infrastructure finance through a knowledge and impact driven assessment.

The successful use of Development Impact Bonds in countries like India and Kenya offers a compelling reference point for reimagining how global infrastructure investments can transition beyond conventional PPP models toward more socially accountable, inclusive, and knowledge-based frameworks.

In India, the Educate Girls DIB[270] (2015) linked private capital to learning improvements among marginalized girls in Rajasthan, achieving 160% of its learning target and proving the effectiveness of outcomes-based financing in education. Similarly, the Utkrisht Impact Bond[271] (2018) aimed to improve maternal and newborn health outcomes across private healthcare facilities in Rajasthan, demonstrating how rigorous data systems and third-party verification can unlock investor confidence in social metrics.

[270] Educate girls, NGO.
[271] THE UTKRISHT IMPACT BOND

In Kenya, the Village Enterprise DIB[272] (2017) supported entrepreneurship development in rural communities, with performance payments tied to poverty alleviation outcomes such as increased household income and business creation, underscoring the model's potential to scale economic inclusion in low-income contexts.

Although these examples do not directly involve physical infrastructure, they illustrate how DIBs successfully operationalize impact linked finance by using real-time data, independent evaluation, and outcome verification, key features largely absent in traditional infrastructure PPPs.

Instead, the Grand Paris Express, Nairobi Expressway, and Bangalore Suburban Railway case studies show how existing financing models tend to emphasize capital deployment, debt service, and delivery milestones over equity, inclusion, or long-term sustainability. These PPPs, while effective in building large-scale assets, lack embedded mechanisms to ensure that benefits are equitably distributed or aligned with environmental and social objectives.

This gap affirms the core argument of this research that urban infrastructure investment must be restructured to integrate verified outcomes and knowledge-based governance in order to serve broader public value. In this regard, France's growing institutional interest in DIBs, particularly through the Agence Française de Développement (AFD) and its investments in climate adaptation, health, and water access in Francophone Africa, signals a readiness to pilot hybrid financing models that combine concessional capital, impact metrics, and digitally enabled transparency. These hybrid financing models must be adapted to infrastructure contexts. DIB logic could enable repayments to be linked to verified reductions in air pollution, improved access for marginalized communities, or time savings for low-income commuters. Such reforms offer a viable path for transforming infrastructure into a vehicle for inclusive, regenerative urban development, grounded in equity, knowledge, and accountability.

[272] Village Enterprise DIB;
Government Outcomes Lab, case-study, village-enterprise DIB.

3.3 Benefit-Sharing Frameworks in Urban Infrastructure Investments

Development Impact Bonds offer an innovative pathway for aligning financial returns with social and environmental outcomes, but their potential is amplified when coupled with benefit-sharing mechanisms. In the context of urban infrastructure, benefit-sharing refers to deliberate frameworks that ensure communities, especially those marginalized or disproportionately bearing the external costs of projects (as the slum inhabitants in Bangalore's case), receive an equitable and just share of the economic, social, and ecological value generated by the major investment. These frameworks can take many forms, including co-ownership of assets, targeted subsidies for vulnerable groups, reinvestment of project revenues into local services, and environmental compensation schemes aimed at restoring or enhancing impacted ecosystems.

Benefit-sharing leads to a vision of development whereby urban growth restores socio-ecological balance. This principle aligns with planetary health approaches, which emphasize the interdependence of human wellbeing and the natural systems. Infrastructure projects that embed benefit-sharing can therefore catalyze a positive feedback loop. These projects could improve quality of life for local populations while simultaneously enhancing ecosystem resilience.

A good fitting case, it is the Bogotá's TransMilenio Bus Rapid Transit (BRT) system[273]. It stands as a flagship urban mobility project, in Colombia, that dramatically reduced travel times and vehicular emissions at the city scale, its benefit-sharing mechanisms reveal its potential. TransMilenio incorporated integrated fare structures and social discounts to improve accessibility for low-income and vulnerable populations, including students and informal workers. The system's impact extends beyond accessibility, in fact data shows, that from 2013 to 2019[274], TransMilenio achieved an average annual reduction of 578,918 tCO_2eq, roughly equivalent to taking over 123,000 cars off the road annually, demonstrating its contribution to climate mitigation and planetary health. In addition, it enhanced fuel efficiency per passenger, fewer vehicles on the road, and a

[273] Urban Sustainability Exchange, Transmilenio bus rapid transit system.
Center for public impact: TransMilenio: renewing Bogota's transport system Centre for public impact. Case study: Transmilenio.
Pocacito: Transport and mobility - Bus Rapid Transit: TransMilenio Pocacito, TransMilenio, Bogota.
[274] See reference 272

modal shift from private to public transport also led to reductions in noise pollution and respiratory illness. Furthermore, in areas served by the system, road fatalities dropped by 92%, injuries by 75%, and collisions by 79%, demonstrating the deep link between infrastructure, public safety, and health outcomes. Moreover, the construction phases generated approximately 1,500 temporary jobs, adding a local economic dimension to the system's benefits.

This approach provides a valuable reference for other urban transport projects, such as the Nairobi Expressway, where similar benefit-sharing strategies could help address concerns around equity and long-term value. In Nairobi's case, the expressway's toll-based access model, coupled with foreign (specifically Chinese) ownership and revenue control, raises questions about who truly benefits from the infrastructure. In this case, inclusive pricing mechanisms could be adopted too, participatory planning, and reinvestment commitments, similar to those trialed in Bogotá, could help mitigate these concerns by ensuring that infrastructure serves as a tool for redistribution, rather than extraction.

Embedding benefit-sharing into hybrid financing models presents a powerful opportunity to operationalize these principles within infrastructure finance. Tying investors return to rigorous, independently verified metrics, such as reductions in transport-related air pollution, measurable improvements in respiratory health in disadvantaged areas, or increased mobility access for marginalized groups, such models ensure that financial incentives are directly linked to inclusive, planetary health aligned outcomes. The use of digital monitoring platforms and knowledge-driven governance frameworks further guarantees transparency, continuous evaluation, and equitable enforcement of benefit-sharing commitments.

As a result, the integration of benefit-sharing mechanisms within outcome-based financing shifts infrastructure investment away from mere economic project delivery toward a circular economy of public value creation. Economic growth could in this way become inseparable from social equity and environmental stewardship, forging infrastructure pathways that regenerate urban ecosystems in a just way and empower communities, rather than simply extracting from them.

4. Operationalizing Benefit-Sharing in Result-Based Urban Infrastructure Investment for Just and Sustainable Development

To effectively operationalize benefit-sharing within global infrastructure investment frameworks, specifically considering the rapid urbanization and complex socio-political landscapes of the Global South, this research proposes to embed Benefit-Sharing Action Plans "BSAPs"[275] as formal, legally binding components of project design and governance. BSAPs should be positioned with equivalent legal status to Environmental and Social Impact Assessments, BSAPs must be integrated from the pre-feasibility stage through post-construction, encompassing the full lifecycle of infrastructure projects. They should articulate measurable equity and health targets, including expanded transit access for low-income users, demonstrable air quality improvements, and the socio-economic reintegration of displaced communities, alongside detailed mechanisms for reinvesting infrastructure generated revenues into the affected neighborhoods.

Pivotal is how BSAPs should address the common institutional challenges in multi-level urban infrastructure projects, such as bureaucratic fragmentation, power asymmetries, and limited community agency. To mitigate these, BSAPs must be co-designed through inclusive, multi-stakeholder governance frameworks engaging national infrastructure ministries (policy and regulatory oversight), municipal or metropolitan transport and housing authorities (implementation and enforcement), alongside civil society coalitions and local community organizations (accountability, participatory monitoring, and knowledge brokering). This model fosters transparency, local ownership, and sustained legitimacy while pre-empting risks of elite capture or marginalization.

Financial and technical resources for BSAPs development, implementation, and independent monitoring should be anchored in multilateral development banks (e.g., EIB, AfDB, etc.) and bilateral agencies committed to equity centered infrastructure finance.

[275] Benefit-Sharing Action Plans (BSAPs) draw conceptual inspiration from mechanisms such as the National Biodiversity Strategies and Action Plans (NBSAPs), which countries develop under the Convention on Biological Diversity (CBD) to translate global biodiversity goals into national commitments and implementation actions. Similarly, BSAPs aim to embed equity and sustainability objectives within urban infrastructure investments frameworks.
The Convention on Biological Diversity (CBD) is a global treaty adopted in 1992 at the Earth Summit in Rio de Janeiro, Brazil, with the goal of conserving biodiversity, sustainably using its components, and ensuring fair and equitable sharing of benefits arising from genetic resources. It is an international, legally binding agreement with 196 parties, aiming to address biodiversity at all levels, including ecosystems, species, and genetic resources.

Contractual frameworks within PPPs and hybrid investment must obligate private financiers and concessionaires to allocate dedicated capital or revenue shares toward meeting BSAP targets, especially when benefiting from concessional, subsidized, or de-risked financing.

Effective monitoring requires real-time digital platforms that collect data on social and environmental indicators, updated regularly, complemented by participatory grievance redress mechanisms accessible to vulnerable groups, enabling adaptive management and swift conflict resolution throughout the project's operational lifespan and beyond.

For instance, in Nairobi, a potential application of a BSAP and DIB hybrid model could link private operator repayments to independently verified reductions in respiratory illnesses among informal roadside settlements and measurable improvements in commuting access for marginalized eastern districts, directly addressing exclusionary impacts of tolling and urban spatial inequities. An example could be a variable tolling fee based on the commuter's income.

In Bangalore, the Suburban Railway Project, facing risks of exacerbating peri-urban displacement and socio-economic fragmentation, could operationalize BSAPs through targeted local employment programs, subsidized fares for low-income workers, and land value capture mechanisms explicitly reinvested in adjacent slum upgrading and social integration initiatives, ensuring the project facilitates regenerative urban inclusion rather than displacement. Here, BSAPs can serve as a steering mechanism for long-term socio-economic reintegration of displaced communities, emphasizing not only mitigation but transformative justice.

Meanwhile, the Grand Paris Express, despite its scale, reveals persistent challenges of suburban marginality, thus, BSAPs must guarantee binding affordable housing provisions and seamless intermodal connectivity for banlieue residents, repositioning the project as a lever for spatial justice, socio-ecological cohesion, and climate resilience in the metropolitan periphery.

Across all three different case studies, embedding BSAPs within outcome-based financing models facilitates a structural shift from traditional PPPs toward infrastructure investments that generate just, inclusive, and sustainable urban development. Leveraging

blended finance, concessional capital, and performance-linked repayments aligns investor incentives with verified social and environmental outcomes, while placing planetary health principles at the core of financial architecture. This ensures economic growth, social equity, and ecological stewardship are inseparable goals embedded in the long-term urbanization processes.

5. Future Research Directions

While this research advances understanding of the complex intersections between international investment, urban infrastructure, and socio-environmental justice, it simultaneously reveals critical gaps requiring further investigation to enhance practical impact and policy relevance.

Future research should prioritize the development of robust, interdisciplinary methodologies capable of quantifying the multidimensional social and environmental impacts of large-scale infrastructure projects. This necessitates integrating quantitative public health metrics, participatory community-based monitoring, and spatial ecosystem service assessments to capture nuanced cause-effect dynamics across diverse urban contexts, consistent with planetary health frameworks.

In fact, several critiques demand still need empirical exploration. Firstly, large scale transport outcomes (e.g. reduction in respiratory illnesses, etc.) depend on multiple factors beyond the infrastructural project itself (e.g., industrial emissions, seasonal pollution, healthcare access). Because attribution in epidemiological terms is highly complex, tying investor repayments strictly to health outcomes may lead to contentious verification disputes.

Secondly, health and environmental outcomes often emerge over long horizons (5–10 years), whereas investors typically look shorter repayment horizons. Commissioners should draft and test a concise model clause, one that specifies, for example, how a defined percentage of toll revenues seeds a community health fund subject to independent audit. From the investor's point of view, a sensitivity analysis has to conducted to show how a sudden rise in inflation or a data-monitoring failure (such as air-quality sensor malfunctions) would alter repayment schedules. This misalignment risks either penalizing

projects for failing to achieve early-stage outcomes or undermining investor confidence if metrics cannot be tracked in real time. Lastly, the legal and institutional capacity to embed BSAPs into PPPs varies widely across jurisdictions and may require substantial regulatory reform and multistakeholder coordination. In fact, on a contractual level, the BSAP concept remains largely conceptual in the research.

As a result, standardizing such valuation methodologies is vital to enable comparative analyses across projects and geographies, facilitating evidence-based calibration of infrastructure finance mechanisms to local socio-ecological realities.

This standardization will underpin the design of innovative blended finance instruments, such as the DIBs, that explicitly embed measurable social equity and ecosystem service targets as performance criteria and align investors' goals. Future empirical work should also examine how to operationalize these metrics within contractual frameworks, monitoring protocols, and adaptive governance structures, particularly in politically complex environments like the Global South, where displacement and exclusion risks are high. Moreover, given the accelerating urgency of climate adaptation, research must further explore how international investment platforms can systematically integrate ecosystem service valuation and natural capital preservation within infrastructure portfolios, ensuring alignment with planetary health imperatives and mitigating urban biodiversity loss.

At the socio-institutional level, focused studies are needed on the catalytic role of local knowledge ecosystems, including universities, and grassroots innovation hubs, in co-creating equitable infrastructure futures. This involves analysing pathways through which these actors contribute to capacity building, participatory governance, and socio-technical innovation in cities.

Collectively, these research priorities will deepen our understanding of how to embed social and environmental justice metrics meaningfully into the financial architecture of urban infrastructure, bridging theoretical advances with operational feasibility. This will help transform infrastructure investment from a primarily capital-centric activity into a truly planetary health–oriented practice, ensuring infrastructure as a steering factor in advancing ecological stewardship and social inclusion in the rapidly urbanizing landscape.

Chapter 6: Conclusion

This research sets out to examine how global investments in urban infrastructure can move beyond conventional Public-Private Partnership models to more holistically align with the planetary health framework, emphasizing inclusive governance, ecological stewardship, and socially just outcomes across diverse urban contexts in the Global North and South. Through a comparative analysis of the Grand Paris Express, the Bangalore Suburban Railway Project, and the Nairobi Expressway, the study has illuminated the deeply entangled dynamics of international finance, urban governance, ecosystem services, and socio-spatial inequality. While traditional infrastructure finance models excel at mobilizing capital and achieving technical delivery milestones, they frequently neglect cumulative impacts on public health, biodiversity, and social inclusion, particularly in the Global South, where rapid urbanization often results in the displacement of vulnerable communities, the erosion of green spaces, and fragmented governance structures. Even in mature financial environments such as Paris, deeply rooted spatial disparities persist despite extensive capital deployment, as digital exclusion, suburban marginality, and climate vulnerability continue to shape unequal urban experiences within the metropolitan periphery.

Against this backdrop, the research identifies a pressing need to transition to outcome-driven finance mechanisms capable of embedding long-term social and environmental value into the roots of infrastructure development. In this context, Development Impact Bonds (DIBs) emerge as a promising, though still underexplored, alternative. Their potential lies in linking investor returns to measurable public outcomes such as enhanced accessibility, reduced carbon emissions, ecosystem restoration, and lower rates of urban exclusion, drawing, as demonstrated, on lessons from health and education sectors in India and Kenya. However, significant operational gaps remain, particularly in adapting DIBs to large-scale urban infrastructure, where long gestation periods, complex stakeholder environments, and diffuse impacts challenge traditional performance measurement frameworks. Future research could address these limitations in infrastructure contexts, the development of new evaluative methodologies suited to long-term and multidimensional outcomes, and the integration of DIBs within existing multilateral finance and development institutions to test their scalability and governance implications.

The research advances a planetary health approach as a concrete analytical and policy tool to evaluate urban infrastructure within living socio-ecological systems. It argues for a multidimensional valuation framework that accounts for the full spectrum of urban well-being, including mental, social, and environmental health, and incorporates ecosystem services as central to infrastructure planning. Additionally, the study emphasizes the critical role of local knowledge ecosystems, digital inclusion, and human capital development in transforming infrastructure from a top-down imposition into a co-created process. In cities like Nairobi and Bangalore, this means that physical connectivity must be accompanied by participatory governance and sustained investments in education, innovation, and community resilience to prevent infrastructure from becoming a new vector of inequality.

Closely tied to these needed reforms is the need to institutionalize benefit-sharing mechanisms as core components of urban infrastructure finance. These mechanisms, ranging from fare subsidies to environmental compensation and reinvestment in underserved districts, ensure that those most affected by infrastructure projects equitably share in their benefits. Embedding such mechanisms within outcome-based financing structures like DIBs reinforces the normative shift toward infrastructure that regenerates socio-ecological systems rather than depleting them. Future financial models must therefore be judged not merely by their capital efficiency but by the degree to which they enable redistribution, resilience, and reciprocity within urban ecosystems.

Ultimately, this research contends that infrastructure finance must be reframed not merely as a matter of engineering and economics, but as a deeply political and ethical endeavor, one that demands the integration of ecological accounting, intergenerational equity, and community-centered metrics of success. The adoption of adaptive, outcomes-based financial tools such as DIBs, when embedded within planetary health frameworks, offers a transformative avenue for aligning urban investment with the goals of social justice, ecological regeneration, and long-term public value. Each financial commitment, therefore, must be reimagined as an investment in the collective urban future, a future where infrastructure sustains, rather than supplants, the complex web of life that cities embody.

References

Abdenur, A. E., & Folly, M. (2015). The new development bank and the institutionalization of the BRICS. BRICS Studies and Documents, 77–111.

African Development Bank Group. AfDB overview. Abidjan, Côte d'Ivoire: African Development Bank Group.

Akamanzi, C., Deutscher, P., Guerich, B., Lobelle, A., & Ooko Ombaka, A. (2016). Silicon Savannah: The Kenya ICT services cluster. Microeconomics of Competitiveness, 7(2), 36–49.

Alberti, M. (1996). Measuring urban sustainability. Environmental Impact Assessment Review, 16(4–6), 381–424.

Alberti, M. (2017). Grand challenges in urban science. Frontiers in Built Environment, 3, Article 1–5.

Al-Zubi, M. (2016). Jordan's climate change governance framework: From silos to an intersectoral approach. Environmental Systems and Decisions, 36(2), 277–301.

Amanor, K. S. (2013). Chinese and Brazilian cooperation with African agriculture: The case of Ghana (Future Agricultures Consortium Working Paper No. 52). Brighton, UK: Institute of Development Studies.

Amanor, K. S. (2013). South–South cooperation in context: Perspectives from Africa. Future, 2013.

Amiraux, V., & Simon, P. (2006). There are no minorities here: Cultures of scholarship and public debate on immigrants and integration in France. International Journal of Comparative Sociology, 47(3–4), 191–215.

Anas, A., & Chang, H. (2023). Productivity benefits of urban transportation megaprojects: A general equilibrium analysis of "Grand Paris Express." Transportation Research Part B: Methodological, 174, Article 102746.

Anguelovski, I., Shi, L., Chu, E., Gallagher, D., Goh, K., Lamb, Z., & Teicher, H. (2016). Equity impacts of urban land use planning for climate adaptation: Critical perspectives from the Global North and South. Journal of Environmental Planning and Management, 59(12), 2116–2137.

Aquil, R. (2011). Change and Muslim women. International Journal of Humanities and Social Science, 1(21), 21–xx.

Ardito, L., Ferraris, A., Messeni Petruzzelli, A., Bresciani, S., & Del Giudice, M. (2019). The role of universities in the knowledge management of smart city projects. Technological Forecasting and Social Change, 142, 312–321.

Asian Infrastructure Investment Bank. (2022). Governance. Beijing, China: AIIB.

Augustijn Beckers, E. W., Flacke, J., & Retsios, B. (2011). Simulating informal settlement growth in Dar es Salaam, Tanzania: An agent based housing model. Cities, 31, 57.

Ayee, J. R. (2005). African Development Bank (Economic Research Working Paper Series: Public Sector Management in Africa). Nairobi, Kenya: University of Nairobi.

Badami, M. G. (2009). Urban transport policy as if people and the environment mattered: Pedestrian accessibility the first step. Economic and Political Weekly, 54(33), 54–59.

Bai, X., McPhearson, T., & Bettencourt, L. (2022). The Urban Planet: Knowledge towards sustainable cities. Cambridge, UK: Cambridge University Press.

Balasubramanian, N. (Ed.). (1999). Management perspectives: Essays on managerial priorities and management education. Bangalore, India: Indian Institute of Management & Macmillan India.

Baleta, J., Mikulčić, H., Klemeš, J. J., Urbaniec, K., & Duić, N. (2019). Integration of energy, water and environmental systems for a sustainable development. Journal of Cleaner Production, 215, 1424–1436.

Bangalore Agenda Task Force. About the Bangalore Agenda Task Force. Bengaluru, India: Government of Karnataka.

Banister, D., & Berechman, Y. (2001). Transport investment and the promotion of economic growth. Journal of Transport Geography, 9(3), 209–218.

Battiston, S., Monasterolo, I., Riahi, K., & van Ruijven, B. J. (2021). Accounting for finance is key for climate mitigation pathways. Science, 372(6545), 918–920.

Batty, M. (2023). The new science of cities: Complexity and sustainable urban futures. Cambridge, MA: MIT Press.

Belkind, L. (2013). The negotiated urbanism of Grand Paris Express. Métropolitiques.

Benkler, Y. (2023). Imagining AI: How the world sees intelligent machines. New Haven, CT: Yale University Press.

Betsill, M., & Bulkeley, H. (2007). Looking back and thinking ahead: A decade of cities and climate change research. Local Environment, 12, 447–456.

Bhagat, R. B., & Hassan, M. I. (2025). Urban inequality, segregation and urban crime. In Urbanisation and Urban Policies in India: Trends, Patterns and Emerging Perspectives (pp. 143–158). Singapore: Springer Nature Singapore.

Bickram. (2021). G7's Build Back Better World: Rival to China's BRI? Economic Diplomacy Journal, 15, 45–52.

Bigsten, A., Kimuyu, P., & Söderbom, M. (2010). The manufacturing sector. In C. S. Adam, P. Collier, & N. S. Ndung'u (Eds.), Kenya: Policies for prosperity (pp. xx–xx). Oxford, UK: Oxford University Press.

Birhane, A. (2020). Algorithmic colonization of Africa. SCRIPTed, 17(3), 389–409.

Blue Dot Network. (2019). Blue Dot Network: A global infrastructure certification initiative. Washington, DC: Governments of the United States, Japan & Australia.

Bossuyt, J., & Sabourin, A. (2024). The EU Global Gateway strategy: Giving local authorities a voice. Maastricht, Netherlands: European Centre for Development Policy Management.

Brautigam, D. (2020). The Dragon’s Gift: The real story of China in Africa (2nd ed.). Oxford, UK: Oxford University Press.

Build Back Better World. (2021). Build Back Better World. Washington, DC: G7.

Buylova, A., Nasiritousi, N., Bergman, J., Sanderink, L., Wickenberg, B., Casiano Flores, C., & McCormick, K. (2025). Bridging silos through governance innovations: The role of the EU Cities Mission. Frontiers in Sustainable Cities, 6, Article 1463870.

Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart cities in Europe. Journal of Urban Technology, 18(2), 65–82.

Carayannis, E. G., & Campbell, D. F. J. (2012). Mode 3 knowledge production in quadruple helix innovation systems. New York, NY: Springer.

Castells, M. (2009). The Rise of the Network Society (2nd ed.). Oxford, UK: Wiley-Blackwell.

CCI Paris Île de France. (2024). Paris, France: CCI Paris Île de France.

Centre for Public Impact. TransMilenio: Renewing Bogotá’s transport system.

Cervero, R. (2002). Induced travel demand: Research design, empirical evidence, and normative policies. Journal of Planning Literature, 17(x), 15–26.

Charmes, E. (2004). Les gated communities: Des ghettos de riches? L’Espace Géographique, (2), 97–113.

Chauvin, J.-P., Glaeser, E. L., Ma, Y., & Tobio, K. (2017). What is different about urbanization in rich and poor countries? Cities in Brazil, China, India and the United States. Journal of Urban Economics, 98, 17–49.

Chignier Riboulon, F. (2010). Les quartiers en difficultés, une question d’intégration. In

G. Wackermann (Ed.), La France en villes (pp. 185–191). Paris, France: Ellipses.

China Daily. (2019). New bank embraces role in BRICS growth.

Clarke, M., & Islam, S. (2003). Health adjusted GDP (HAGDP) measures of the relationship between economic growth, health outcomes and social welfare. Health Outcomes and Social Welfare, July 2003.

Clerval, A. (2016). Paris sans le peuple: La gentrification de la capitale. Paris, France: La Découverte.

Clerval, A., & Delage, M. (2016). La métropole parisienne: Une mosaïque sociale de plus en plus différenciée. Métropolitiques.

Coleman, D. (2019). Digital colonialism: The 21st century scramble for Africa through the extraction and control of user data and the limitations of data protection laws. Michigan Journal of Race & Law, 24(2), 417–456.

Colvile, R. N., Hutchinson, E. J., Mindell, J. S., & Warren, R. F. (2001). The transport sector as a source of air pollution. Atmospheric Environment, 35(9), 1537–1565.

Communications Authority of Kenya. (2020). The status of ICT in Kenya: Annual report 2020. Nairobi, Kenya: CAK.

Couldry, N., & Hepp, A. (2017). The mediated construction of reality. Cambridge, UK: Polity Press.

Couldry, N., & Mejias, U. A. (2019). The costs of connection: How data is colonizing human life and appropriating it for capitalism. Stanford, CA: Stanford University Press.

Coutard, O., & Guy, S. (2007). STS and the city: Politics and practices of hope. Science, Technology & Human Values, 32(6), 713–735.

Crutzen, P. J. (2002). Geology of mankind. Nature, 415(6867), 23.

Das, C. Slum settlements on railway land: A state of denial and deprivation.

Devarajan, S., Swaroop, V., & Zou, H. (1996). The composition of public expenditure and economic growth. Journal of Monetary Economics, 37, 313–344.

Diaz Olvera, L., Plat, D., & Pochet, P. (2013). The puzzle of mobility and access to the city in sub-Saharan Africa. Journal of Transport Geography, 32, 1–10.

Docquier, F., & Rapoport, H. (2012). Globalization, brain drain, and development. Journal of Economic Literature, 50(3), 681–730.

Duranton, G. (2015). Growing through cities in developing countries. World Bank Research Observer, 30(1), 39–72.

Eakin, H., Lemos, M. C., et al. (2017). Urban resilience efforts must consider social and political forces. Proceedings of the National Academy of Sciences, 114(8), 186–189.

Economidou, M., Della Valle, N., Melica, G., & Bertoldi, P. (2023). The role of European municipalities and regions in financing energy upgrades in buildings. Environmental and Economic Policy Studies, 2023.

El Consejo Ciudadano para la Seguridad Pública y la Justicia Penal AC. (2016). Metodología del ranking de las 50 ciudades más violentas del mundo (2015). Mexico City, México: El Consejo Ciudadano.

Elmqvist, T., Andersson, E., Frantzeskaki, N., et al. (2019). Sustainability and resilience for transformation in the urban century. Nature Sustainability, 2, 267–273.

Elmqvist, T., Fragkias, M., Goodness, J., Güneralp, B., Marcotullio, P. J., McDonald, R. I., & Wilkinson, C. (2013). Urbanization, biodiversity and ecosystem services: Challenges and opportunities: A global assessment. Dordrecht, Netherlands: Springer.

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From national systems and “Mode 2” to a triple helix of university–industry–government relations. Research Policy, 29(2), 109–123.

Eubanks, V. (2018). Automating inequality: How high-tech tools profile, police, and punish the poor. New York, NY: St. Martin’s Press.

European Centre for Development Policy Management. Global Gateway database of knowledge and participation in EU evaluation of new financing instruments. Maastricht, Netherlands: ECDPM.

European Commission. (2021). Digital Education Action Plan (2021–2027). Brussels, Belgium: European Commission.

European Commission. (2022). Global Gateway strategy: Connecting Europe to the world. Brussels, Belgium: European Commission.

European Commission. EU launches Digital Economy Package for Kenya to boost connectivity, skills and inclusive governance. Brussels, Belgium: European Commission.

European Commission. Global Gateway Commission launches civil society and local authorities dialogue platform [Press release]. Brussels, Belgium: European Commission.

European Commission. Global Gateway. Brussels, Belgium: European Commission.

European Commission. Global Gateway: Strategic governance and implementation. Brussels, Belgium: European Commission.

European Commission. Horizon Europe: €98 million available for climate neutral and smart cities. Brussels, Belgium: European Commission.

European Commission. Horizon Europe: Climate neutral and smart cities. Brussels, Belgium: European Commission.

European Commission. International partnerships, civil society and local authorities' advisory platform. Brussels, Belgium: European Commission.

European Commission. Strategy and policy: Global Gateway. Brussels, Belgium: European Commission.

European Investment Bank. (2022a). EIB environment framework. Luxembourg: European Investment Bank.

European Investment Bank. (2022b). The EU-Africa Green Energy Initiative: A partnership for sustainable development. Luxembourg: European Investment Bank.

European Investment Bank. (2024a). Global Impact Report 2023/2024. Luxembourg: European Investment Bank.

European Investment Bank. (2024b). Financial report 2024. Luxembourg: European Investment Bank.

European Investment Bank. Environmental and social data sheet: Bangalore Suburban Railway Project. Luxembourg: European Investment Bank.

European Investment Bank. Project 20220637: Bangalore Suburban Railway Project. Luxembourg: European Investment Bank.

Expanded Partnership for Quality Infrastructure. (2015). Expanded Partnership for Quality Infrastructure. Tokyo, Japan: Government of Japan.

Fitch Ratings. (2024, July 25). Fitch Ratings report. Fitch Ratings.

Folke, C. (2006). Resilience: The emergence of a perspective for social–ecological systems analyses. Global Environmental Change, 16(3), 253–267.

Frumkin, H., & Frank, L. D. (2003). Urban sprawl and public health: Designing, planning, and building for healthy communities. Washington, DC: Island Press.

Gale, R. (2013). Religious residential segregation and internal migration: The British Muslim case. Environment and Planning A: Economy and Space, 45(4), 872–891.

Gavsker, K. K. (2025). Evolution of urban policy and unconventional methods of governance in India: Exploring neoliberalization's effect. In Political Economy of Emerging Urban and Peri-urban Spaces in India: A Roadmap Towards Environmental and Social Sustainability (pp. 17–43). Singapore: Springer Nature Singapore.

Gearbox. About us. Gearbox Innovations.

George, G., McGahan, A. M., & Prabhu, J. (2012). Innovation for inclusive growth: Towards a theoretical framework and a research agenda. Journal of Management Studies, 49(4), 661–683.

Globalized world. In P. Peterson, E. Baker, & B. McGaw (Eds.), International Encyclopedia of Education (3rd ed., pp. 584–589). Oxford, UK: Elsevier.

Goddard, J., & Vallance, P. (2013). The University and the City. Abingdon, UK: Routledge.

Government of Karnataka. (2020). Slums abstract. Bengaluru, India: Government of Karnataka.

Government of Karnataka. (2024, February). Economic Survey of Karnataka 2023–24. Bengaluru, India: Government of Karnataka.

Government of Kenya. (2005). Sessional Paper No. 2 of 2005 on development of micro and small enterprises for wealth and employment creation for poverty reduction. Nairobi, Kenya: Government Printers.

Government of Kenya. Ajira Digital Program. Nairobi, Kenya: Government of Kenya.

Griggs, D., Stafford-Smith, M., Gaffney, O., Rockström, J., Öhman, M. C., Shyamsundar, P., & Noble, I. (2013). Policy: Sustainable development goals for people and planet. Nature, 495(7441), 305–307.

Gupta, J., Rockström, J., et al. (2024). A just world on a safe planet: A Lancet Planetary Health–Earth Commission report on Earth-system boundaries, translations, and transformations. The Lancet Planetary Health, 8(10), Article eXXX.

Haase, D., Schwarz, N., Strohbach, M. W., Kroll, F., & Seppelt, R. (2014). A quantitative review of urban ecosystem service assessments: Concepts, models, and implementation. Ambio, 43(4), 413–433.

Hancock, C. (2015). The republic is lived with an uncovered face (and a skirt): (Un)dressing French citizens. Gender, Place & Culture, 22(7), 1023–1041.

Hancock, C. (2017). Feminism from the margin: Challenging the Paris/Banlieues divide. Antipode, 49(3), 636–656.

Harvard University. Tala: How data boosts access to credit for low income individuals in emerging economies. Cambridge, MA: Harvard University.

Healey, P. (2006). Collaborative planning: Shaping places in fragmented societies. Vancouver, Canada: UBC Press.

Helsper, E. J., & van Deursen, A. J. A. M. (2017). Digital skills in Europe: Research and policy. In Digital Skills: Unlocking the Information Society (pp. 195–211). London, UK: Palgrave Macmillan.

Hickel, J. (2017). The Divide: A brief guide to global inequality and its solutions. London, UK: William Heinemann.

Hooijmaaijers, B. (2021). Understanding success and failure in establishing new multilateral development banks: The SCO Development Bank, the NDB, and the AIIB. Asian Perspective, 45(2), 445–469.

Hooijmaaijers, B. (2022). The internal and external institutionalization of the BRICS countries: The case of the New Development Bank. International Political Science Review, 43(4), 481–494.

Hsieh, S. C. (2014). Analysing urbanisation data using rural urban interaction model and logistic growth model. Computers, Environment and Urban Systems, 45, 15–27.

Iaione, C. (2016). Governing urban inequality: New perspectives on political economy. Journal of Urban Affairs, 38(6), 798–815.

Iaione, C. (2019). The Co-City: Digital Commons and Urban Co-Governance. London, UK: Palgrave Macmillan.

Iaione, F. C. (2024). Just sustainable innovation: Shared systemic stewardship as governance impact of sustainable investment? MUNUS, (1), 1–46.

Institut Paris Region. (2016). Dynamics of the Paris Region economy. Paris, France: Institut Paris Region.

Institut Paris Region. (2024). Paris Region facts and figures 2024. Paris, France: Institut Paris Region.

ITUC, CSI & IGB. (2021). Belt and Road Initiative in Central Asia: Desk study. Brussels, Belgium: ITUC, CSI & IGB.

Jones, H. (2020). Debunking the myth of ‘debt trap diplomacy’ [Policy brief]. Washington, DC: Center for Global Development.

Kariuki, G. (2009). Growth and improvement of information communication technology in Kenya. International Journal of Education and Development Using Information and Communication Technology, 5(2), 146–160.

Kenya ICT Authority. (2021). National ICT Master Plan 2020–2030. Nairobi, Kenya: KICTA.

Kenya National Bureau of Statistics. (2015). Kenya Economic Survey 2015. Nairobi, Kenya: Government Printers.

Kenya National Bureau of Statistics. (2023). 2019 Kenya Population and Housing Census: Population by county and subcounty (Summary report). Nairobi, Kenya: KNBS.

Kenya Revenue Authority. New revenue collection system for Nairobi City County operationalized. Nairobi, Kenya: KRA.

Key milestones of China–Africa cooperation under the Belt and Road Initiative.

Kimuyu, H. (2019, October 24). Uhuru Park to lose 1.3 acres along Uhuru Highway for expressway’s construction. Nairobi News.

Kiveu, M., & Ofafa, G. (2013). Enhancing market access in Kenyan SMEs using ICT. Global Business and Economics Research Journal, 2(9), 29–46.

KNAW. (2023). Planetary health: An emerging field to be developed. Amsterdam: KNAW.

Kombe, W. J. (2005). Land use dynamics in peri-urban areas and their implications on the urban growth and form: The case of Dar es Salaam, Tanzania. Habitat International, 29, 113–135.

Kosgei, L., & Kioko Mutinda, M. M. (2019). EIA as a tool for balancing economic, social and environmental considerations in infrastructure development: The case of Nairobi Expressway. East African Law Journal, 82, 1–20.

Kponyo, J. J., Fosu, D. M., Owusu, F. E. B., Ali, M. I., & Ahiamadzor, M. M. (2024). Techno-neocolonialism: An emerging risk in the artificial intelligence revolution. Trayectorias Humanas Trascontinentales.

Kremer, P., Hamstead, Z., Haase, D., McPhearson, T., Frantzeskaki, N., Andersson, E., Kabisch, N., … et al. (2016). Key insights for the future of urban ecosystem services research. Ecology and Society, 21(2).

Kronauer, M. (1998). Social exclusion and underclass—new concepts for the analysis of poverty. In A. Hans Jürgen (Ed.), Empirical Poverty Research in a Comparative Perspective (pp. 51–75). Aldershot, UK: Ashgate.

La Science et Vie. TransMilenio bus rapid transit system. Urban Sustainability Exchange.

L'Institut Paris Region. (2024). Paris Region facts and figures 2024. Paris, France: L'Institut Paris Region.

Lagrange, H., & Oberti, M. (2006). Intégration, ségrégation et justice sociale. In H. Lagrange & M. Oberti (Eds.), Émeutes urbaines et protestations : Une singularité française (pp. 19–20). Paris, France: Presses de Sciences Po.

Lauder Institute. (2012). Global Knowledge Lab. Lauder Institute.

Le Goix, R. (2006). Les gated communities aux États Unis et en France: Une innovation dans le développement périurbain? Hérodote, 122(3), 107–120.

Leasia, C. M. (2013). The Grand Paris Express: An analysis of social and political trends towards mass transit planning in the Île de France region (Undergraduate thesis). Scripps Institution, Claremont McKenna College.

Lefebvre, H. (1991). The production of space (D. Nicholson-Smith, Trans.). Oxford, UK: Blackwell.

Lengyel, M., & Malacalza, B. (2011, February). What do we talk when we talk about South–South cooperation? The construction of a concept from empirical basis. Paper presented at the IPSA–ECPR Joint Conference, São Paulo, Brazil.

Litman, T. (2001). Generated traffic and induced travel: Implications for transport planning. ITE Journal, 71(x), 38–xx.

Lupala, J. M. (2002). Urban types in rapidly urbanizing cities (Doctoral dissertation). Stockholm University.

Maasdorp, L. (2019). BRICS' New Development Bank turns four: What has it achieved? South African Journal of International Affairs, 26(3), 237–256.

Magnani, R., & Mercenier, J. (2024). General equilibrium assessment of public transportation megaprojects: The "Grand Paris Express" case study. Transportation Research Part A: Policy and Practice, 158, 45–60.

Mandras, G., & Sakkas, S. (2019). The impact of the Grand Paris Express on the European regions: A RHOMOLO analysis. JRC Working Papers on Territorial Modelling and Analysis, 08/2019. Seville, Spain: European Commission, Joint Research Centre.

Mawdsley, E. (2018). South–South cooperation 3.0? Managing the consequences of success in the decade ahead. Oxford Development Studies, 46(3), 323–334.

Mazzocco, L., & Palazzi, A. (2023). Italy's withdrawal from the Belt and Road Initiative: Economic expectations and outcomes. European Journal of Development Research, 35(4), 1–20.

McKinsey & Company. Driven by purpose: 15 years of M Pesa's evolution. McKinsey & Company.

McPhearson, T., Bai, X., & Grimm, N. B. (2021). Urban sustainability science: Progress and future directions. Nature Sustainability, 4(3), 233–240.

Microsoft & G42. (n.d.). Microsoft and G42 announce $1 billion comprehensive digital ecosystem initiative for Kenya. Retrieved from https://news.microsoft.com

Muldoon, J., & Wu, B. A. (2023). Artificial intelligence in the colonial matrix of power. Philosophy & Technology, 36, Article 80.

Mwaniki, D., Kinyanjui, M., & Opiyo, R. (2017). Towards smart economic development in Nairobi: Evaluating smart city economy impacts and opportunities and challenges for smart growth. In Smart Economy in Smart Cities: International Collaborative Research (pp. 749–790). Hershey, PA: IGI Global.

Mwaura, D. S. (2023). Legal challenges of infrastructural developments on green spaces in Kenya: Case of the Nairobi Expressway (Doctoral dissertation). University of Nairobi.

Nagendra, H. (2016). Nature in the city: Bengaluru in the past, present, and future. Oxford, UK: Oxford University Press.

Nagendra, H. (2018). The future of conservation in India: The role of urban ecology. Nature Conservation, 30, 79–86.

Najib, K. (2021). Spaces of Islamophobia and spaces of inequality in Greater Paris. Environment and Planning C: Politics and Space, 39(3), 606–625.

Narayana, M. R. (2011). Globalization and urban economic growth: Evidence for Bangalore, India. International Journal of Urban and Regional Research, 35(6), 1284–1301.

National Environment Management Authority. (2020). Environmental and social impact assessment for the proposed Nairobi Expressway Project, Volume I. Nairobi, Kenya: NEMA.

Negreiros, P., & Falconer, A. (2021). Financing the green transition of European cities: What does the European Green Deal change? In Towards a European Green Deal with Cities: The Urban Dimension of the EU's Sustainable Growth Strategy (pp. 49–59). Brussels, Belgium: Policy Press.

New Development Bank. (2014, July). Agreement on the New Development Bank – Fortaleza. Shanghai, China: NDB.

New Development Bank. (2017). NDB general strategy: 2017–2021. Shanghai, China: NDB.

New Development Bank. (2022). NDB general strategy: 2022–2026. Shanghai, China: NDB.

New Development Bank. History of the New Development Bank. Shanghai, China: NDB.

New Development Bank. NDB general strategy: 2022–2026. Shanghai, China: NDB.

Nielsen, K. S., Nicholas, K. A., Creutzig, F., Dietz, T., & Stern, P. C. (2021). The role of high socioeconomic status people in locking in or rapidly reducing energy driven greenhouse gas emissions. Nature Energy, 6(11), 1011–1021.

NS Raghavan Centre for Entrepreneurial Learning. About us. Indian Institute of Management Bangalore.

Nyadera, I. N., Agwanda, B., Onder, M., & Mukhtar, I. A. (2022). Multilateralism, developmental regionalism, and the African Development Bank. Politics and Governance, 10(2), 82–94.

OECD, World Bank, & United Nations Environment Programme. (2018). Financing climate futures: Rethinking infrastructure. Paris, France: OECD Publishing.

OECD. (2024). OECD Economic Surveys: France 2024. Paris, France: OECD Publishing.

Omweri, K. F. (2016). The role of business incubation centers in promoting youth entrepreneurship in Kenya: A case of youth entrepreneurial program at NAILAB Center. Journal of Entrepreneurship and Innovation in Emerging Economies, 2(1), 45–60.

Oseland, S. E. (2019). Breaking silos: Can cities break down institutional barriers in climate planning? Journal of Environmental Policy and Planning, 21(3), 345–357.

Ostrom, E. (1990). Governing the commons: The evolution of institutions for collective action. Cambridge, UK: Cambridge University Press.

Paksok, D., Riba, J., Powrel, D., Kiron, B., & Lusi, T. (2023). Strategies for advancing Bengaluru as a smart city: A case study. Journal of Urban Technology, 30(4), 105–123.

Panda, J. P. (2022). EU's Global Gateway strategy and building a global consensus vis-à-vis BRI. Ordnungspolitische Diskurse, 2022(10), 45–56.

Pansera, M., & Owen, R. (2018). Framing inclusive innovation within the discourse of development: Insights from case studies in India. Research Policy, 47(1), 23–34.

Parnell, S., & Oldfield, S. (Eds.). (2014). The Routledge handbook on cities of the Global South. Abingdon, UK: Routledge.

Peach, C. (1996). Does Britain have ghettos? Transactions of the Institute of British Geographers, 21(1), 216–235.

People's Republic of China. Belt and Road Initiative. Beijing, China: State Council Information Office.

Phillips, D. (2006). Parallel lives? Challenging discourses of British Muslim self segregation. Environment and Planning D: Society and Space, 24(1), 25–40.

Pinçon, M., & Pinçon Charlot, M. (2014). La violence des riches. Paris, France: La Découverte.

Pojani, D., & Stead, D. (2015). Sustainable urban transport in the developing world: Beyond megacities. Sustainability, 7, 7784–7805.

Qian, Y., Siau, K. L., & Nah, F. F. H. (2024). Societal impacts of artificial intelligence: Ethical, legal, and governance issues. Societal Impacts, 3, Article.

Rail Infrastructure Development Company (Karnataka) Limited. About us. Bengaluru, India: Government of Karnataka & Ministry of Railways.

Reuters. (2025). African leaders approve creation of financial stability fund. Reuters.

Reuters. (2024). Laos grants 25-year power grid concession to Chinese majority firm. Reuters.

Rioja, F. (2003). Filling potholes: Macroeconomic effects of maintenance vs. new investments in public infrastructure. Journal of Public Economics, 87, 257–281.

Roberts, B. H. (2017). Managing systems of secondary cities: Policy responses in international development. Cheltenham, UK: Edward Elgar Publishing.

Rockström, J., Steffen, W., Noone, K., et al. (2009a). A safe operating space for humanity. Nature, 461(7263), 472–475.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E., … & Foley, J. A. (2009b). A safe operating space for humanity. Nature, 461(7263), 472–475.

Romero Lankao, P., Bulkeley, H., Pelling, M., Burch, S., Gordon, D. J., Gupta, J., … et al. (2018). Urban transformative potential in a changing climate. Nature Climate Change, 8, 754–757.

Runde, D. F., Erol, Y. K., & Sundar, R. R. (2019). The new missing middle in development finance. Washington, DC: Centre for Strategic and International Studies.

Sadorsky, P. (2013). Do urbanization and industrialization affect energy intensity in developing countries? Energy Economics, 37, 52–59.

Sallis, J. F., Floyd, M. F., Rodríguez, D. A., & Saelens, B. E. (2012). Role of built environments in physical activity, obesity, and cardiovascular disease. Circulation, 125(5), 729–737.

Satterthwaite, D. (2007). The transition to a predominantly urban world and its underpinnings. London, UK: International Institute for Environment and Development.

Shi, Y., Liu, J., & Miao, S. (2020). Air pollution and urban development in China: An assessment of economic growth and environmental quality. Environmental Research, 184, Article 109354.

Shikokoti, D. H., & Reuben, M. (2024). Influence of artificial intelligence on the quality of education in higher learning: A case study of Faculty of Education, University of Nairobi, Kenya. Journal of Education and Practice, 15(11), 45–56.

Simon, D., Griffith, C., & Nagendra, H. (2018). Rethinking urban sustainability and resilience. In T. Elmqvist, X. Bai, N. Frantzeskaki, C. Griffith, D. Maddox, T. McPhearson, … & M. Watkins (Eds.), Urban Planet: Knowledge towards sustainable cities (pp. 149–162). Cambridge, UK: Cambridge University Press.

Simonov, M. (2025). The Belt and Road Initiative and Partnership for Global Infrastructure and Investment: Comparison and current status. Asia and the Global Economy, 5(1), Article 100106.

SMEC. Project Nairobi Expressway. Nairobi, Kenya: SMEC.

Société du Grand Paris. About Société du Grand Paris. Paris, France: Société du Grand Paris.

Société du Grand Paris. Grand Paris Express. Paris, France: Société du Grand Paris.

Soja, E. W. (2010). Seeking spatial justice. Minneapolis, MN: University of Minnesota Press.

Startup Blink. (2024). Startup ecosystem Bangalore 2024.

Statista. (2023, December). Demographics of Kenya.

Statista. External loan debt to China by country.

Stevenson, T. (2024). Navigating digital neocolonialism in Africa. Digital Justice Review, 12(2), 55–68.

Suchodolski, S. G., & Demeule Meester, J. M. (2018). The BRICS coming of age and the New Development Bank. Global Policy, 9(4), 578–585.

Sulochana Development Trust. (2014). Annual report (p. 26). New Delhi, India: Sulochana Development Trust.

Taghizadeh Hesary, F., & Yoshino, N. (2020). Sustainable solutions for green financing and investment in renewable energy projects. Energies, 13(1), Article 4.

Tagliapietra, S. (2024). The European Union's Global Gateway: An institutional and economic overview. The World Economy, 47(4), 1326–1335.

Taylor, P. L., & Knop, E. (2015). A landscape ecology approach identifies important drivers of urban biodiversity. Global Change Biology, 21(4), 1652–1664.

Teyssedre, C., & Le Bouler, H. (2019). Cohésion et transitions : Agir autrement—Rapport annuel sur l'état de la France 2019: Avis du Conseil économique, social et environnemental. Paris, France: CESE.

The New Indian Express. (2025). Farmers up in arms against land acquisition for Bengaluru's SWIFT City. The New Indian Express.

Thomas, L. P., Salah, S., & Garzik, L. (2022). Bangalore innovation system. In L. Garzik (Ed.), Successful Innovation Systems (pp. 55–72). Cham, Switzerland: Springer.

Turrini, T., & Knop, E. (2015). A landscape ecology approach identifies important drivers of urban biodiversity. Global Change Biology, 21(4), 1652–1654.

Ulpiani, G., Rebolledo, E., Vetters, N., et al. (2023). Funding and financing the zero emissions journey: Urban visions from the 100 Climate Neutral and Smart Cities Mission. Humanities and Social Sciences Communications, 10, Article 647.

United Nations. (2015). Sustainable Development Goal 11: Sustainable cities and communities. New York, NY: United Nations.

United Nations Department of Economic and Social Affairs. (2018). World urbanization prospects 2018: Highlights. New York, NY: United Nations.

United Nations Environment Programme. (2021). Cities and climate change. Nairobi, Kenya: UNEP.

United Nations Habitat. (2020). World Cities Report 2020: The value of sustainable urbanization. Nairobi, Kenya: United Nations Human Settlements Programme.

United Nations Habitat. (2021). World Cities Report 2021. Nairobi, Kenya: United Nations Human Settlements Programme.

United Nations Habitat. Kenya: Nairobi urban profile. Nairobi, Kenya: United Nations Human Settlements Programme.

United Nations Statistics Division. Definition of urban for various countries. New York, NY: United Nations.

United Nations, Department of Economic and Social Affairs, Population Division. (2016). The world's cities in 2016: Data booklet (ST/ESA/SER.A/392). New York, NY: United Nations.

United Nations, Department of Economic and Social Affairs, Population Division. (2019). World urbanization prospects: The 2018 revision (ST/ESA/SER.A/420). New York, NY: United Nations.

Urban Sustainability Exchange. (n.d.). TransMilenio bus rapid transit system.

Van Dijk, J. A. G. M. (2020). The digital divide: Inclusion, exclusion, and inequality in the information society (3rd ed.). London, UK: SAGE Publications.

Vermeiren, K., et al. (2012). Urban growth of Kampala, Uganda: Pattern analysis and scenario development. Landscape and Urban Planning, 106, 199–210.

Voas, D., & Williamson, P. (2000). The scale of dissimilarity: Concepts, measurements and an application to socioeconomic variation across England and Wales. Transactions of the Institute of British Geographers, 25(4), 465–481.

Wachira, G. (2019, November 6). Why Nairobi Expressway project deserves support. Business Daily.

Wacquant, L. (1993). Urban outcasts: Stigma and division in the Black American ghetto and the French urban periphery. International Journal of Urban and Regional Research, 17(3), 366–383.

Watson, V. (2009). The planned city sweeps the poor away: Urban planning and 21st century urbanization. Progress in Planning, 72, 151–179.

Wekesa, C. T., Wawire, N. H., & Kosimbei, G. (2016). Effects of infrastructure development on foreign direct investment in Kenya. Journal of Infrastructure Development, 8(2), 1–20.

Wigginton, N. S., Fahrenkamp-Uppenbrink, J., Wible, B., & Malakoff, D. (2016). Cities are the future. Science, 352(6291), 904–905.

Wong, C. (2021, February). China can extend Hambantota port lease to 198 years, Sri Lankan minister says. South China Morning Post.

Woods, N., & Martin, M. (2012). The preferred partner? A client assessment of the African Development Bank. Abidjan, Côte d'Ivoire: African Development Bank.

World Bank. (2016a). Kenya country economic memorandum: From economic growth to jobs and shared prosperity. Washington, DC: World Bank.

World Bank. (2016b). Leveraging urbanization in South Asia: Managing spatial transformation for prosperity and livability. Washington, DC: World Bank.

World Bank. (2017). Atlas of sustainable development goals 2017: From World Development Indicators. Washington, DC: World Bank.

World Bank. (2018). Belt and Road Initiative. Washington, DC: World Bank.

World Bank. (2020). The role of digital technologies in accelerating the economic transformation of Sub-Saharan Africa. Washington, DC: World Bank.

World Bank. (2023). World Bank data. Retrieved from https://data.worldbank.org

World Bank. Innovative technologies to help county governments improve service delivery. Washington, DC: World Bank.

World Bank. Kenya and the World Bank Group provide USD 390 million for boosting the digital economy. Washington, DC: World Bank.

World Bank. Kenya Urban Mobility Improvement Project (P176725). Washington, DC: World Bank.

World Bank. Urban development: Overview. Washington, DC: World Bank.

World Economic Forum. (2023, November). China's Belt and Road Initiative turns 10: Here's what to know. Geneva, Switzerland: World Economic Forum.

Wright, L., & Hook, W. (2007). BRT Planning Guide. New York, NY: Institute for Transportation and Development Policy.

Yelland, R. (2010). The role of the OECD in the development of higher education in a globalized world. In P. Peterson, E. Baker, & B. McGaw (Eds.), International Encyclopedia of Education (3rd ed., pp. 584–589). Oxford, UK: Elsevier.

Zanganeh, P. M., & Tishehyar, M. (2024). The impact of Global Gateway on EU–China cooperation in the framework of Belt and Road Initiative.

Tavares da Silva, & C. Rodrigues (Eds.), The Palgrave Handbook on China–Europe–Africa Relations (pp. 215–234). Singapore: Palgrave Macmillan.

Zhang, Y. (2025). Application of intensive construction technology in the Grand Paris Express project: A review. Frontiers of Structural and Civil Engineering, Article 1–14.

Ringraziamenti