



GLOBAL REPORT

**PEAK Urban:
Unleashing
sustainable cities
of the future**



PEAKUrban

GLOBAL REPORT

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This report introduces the approach and findings of PEAK Urban, an innovative collaboration between research institutions in China, Colombia, India, South Africa and the United Kingdom, addressing the future of cities globally.

Foreword

Image credits: Pexels

There is widespread recognition of the importance of cities for global sustainability. The urban arena is where most people will live and where economic, social and environmental sustainability needs to be realised. The urban arena is also where multiple systems of food, energy, water, sanitation, mobility, public health, dwelling and working interface with each other. This is why we, along with many others, characterise cities as “systems of systems”.

There is also growing acknowledgement that these systems of systems demand a new transdisciplinary urban science that can work practically and quickly to address both the challenges of future cities globally and the fashion in which they are realised at multiple geographical scales from collaborations that link nations and cities across the planet down to the smallest scale of the neighbourhood.

But such urban science needs to recognise the particularities of place and time, the legacies of history in shaping the social and economic formations of the present day, and the power of geographies to mediate both the path dependencies of city systems and the propensities of city futures. It also needs to recognise that the sustainability sciences are not straightforwardly commensurable with each other in the ways their logics work, the calculus through which they measure *value* and their interface with the contested *values* that shape social and institutional responses to sustainability challenges. Public health systems measure lives saved. Climate science may be valued for lives saved in generations yet to come or yet to arrive in the city. Economic prosperity prioritises the ability to sustain a living in the here and now.

New, transdisciplinary urban thinking

Recognising this, PEAK Urban designed a programme of transdisciplinary and translational interventions that moved between research and practice, linked critical distance and

embedded scholarship. In their transdisciplinary design, these interventions worked across different traditions of science and knowledge production, recognising that complex systems engender “wicked” problems that may demand bespoke solutions. In their translational practice, they tried to combine a sensibility that draws *analytically* on how the city works, *normatively* on how we think the city should be organised, and *operationally* on a sense of how we might best intervene in shaping urban futures. In varied urban locations, they tested transdisciplinary and translational ways of working and ways of thinking.

We characterise our sense of recognising the links and distinctions between the *analytical*, the *normative* and the *operational* as an **urban disposition**, a way of thinking about complex urban problems that is both practical and scientifically evidenced. This disposition shaped what we describe in this report as a PEAK Urban approach to urban futures. In the report, we work with the general consensus that cities become the key sites for the challenges humanity faces. And so while our work recognises the power of new urban sciences, we stress that the roots of scientific claims need to be evidenced in a fashion that acknowledges both the constitutive normative implications of social formations globally, and the instrumental need to recognise the appropriate operational space, from city acupuncture to national regulation and global cooperation, in which challenges need to be addressed.

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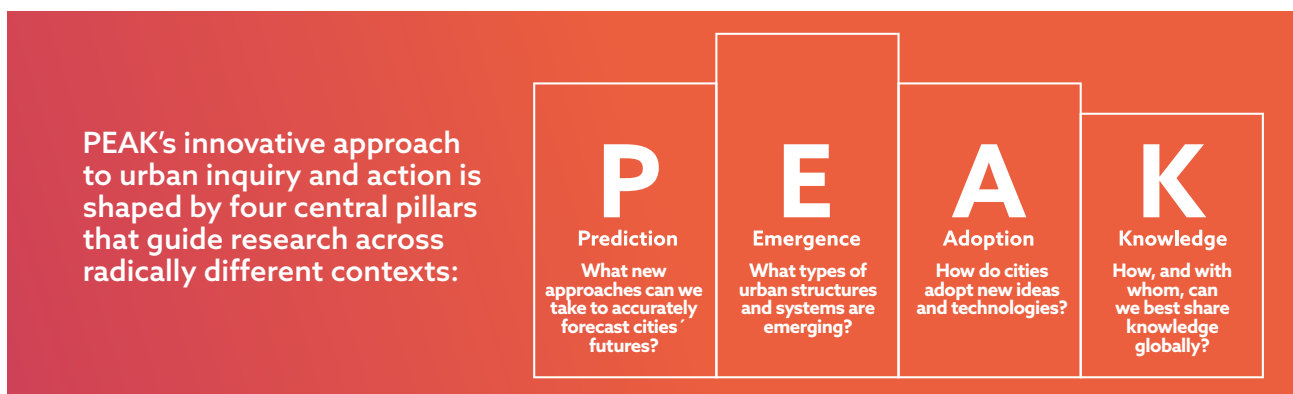
Executive Summary

Image credits: Pexels

How we build cities will determine humanity's future. The UN estimates that 68 per cent of the world's population will live in cities by 2050.¹ The unprecedented scale, form and pace of 21st-century urbanisation means the need to create cities that are sustainable, inclusive and liveable for all their people has never been greater. PEAK Urban's approach to urban enquiry and action offers a powerful way forward.

A new lens: Seeing and creating sustainable cities

The PEAK Urban approach enables diverse stakeholders to understand individual cities in unprecedented ways and develop new tools to inform optimum policymaking for sustainable, inclusive urban development worldwide. To improve cities' capacity to address contemporary urban challenges and development dilemmas, urban policymakers and practitioners will need to understand how cities work as a whole. This means addressing specific problems in relation to other aspects of the city, rather than from within a departmental or disciplinary silo.



Together, these pillars inform the PEAK disposition (how we think about cities) and the PEAK approach (what we do to improve them). Over a five-year period, we ran more than 40 research projects through our hubs in China, Colombia, India, South Africa and Oxford, each harnessing the four constituent elements of PEAK in different combinations as the context required. The projects we developed were not determined by a central programme, but were designed to respond to the PEAK Urban disposition, in a process both recurrent and iterative. The PEAK Urban approach emerged from our enquiry and practice and fed back into it.

This enhanced research practice yielded valuable new insights, with impact at city level, but applicable beyond their context to address national and global challenges and inform urban debate. Our insights provide evidence in usable form for policymakers and practitioners, demonstrating PEAK's value as a lens through which to understand cities and shape their functional, equitable futures.²

¹ UN Department of Economic and Social Affairs (UN DESA), 2018 Revision of World Urbanization Prospects, <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>;

² PEAK Urban impact case studies. <https://www.peak-urban.org/peak-impacts>

Maximising our impact

The PEAK programme was designed to achieve maximum effectiveness via **three pathways to impact**. Together, these allow us to promote policy innovations that can address the global challenges of urbanisation and the nuances of each individual city:

- **Conceptual advancement results pathway:** PEAK’s real-world impact is underpinned by high-quality academic insights.
- **Research into use pathway:** We share PEAK’s research findings with key stakeholders who make the policy, practice and investment decisions for urban development.
- **New ways of working pathway:** Researchers and urban actors collaborate effectively, overcoming professional and disciplinary silos in a challenge-led global network.

By autumn 2022, PEAK Urban had generated over 400 research publications (with more to be published in 2023 and 2024), 344 workshops, conferences and engagements with city stakeholders, 24 collaborations and partnerships, and 32 further research grants. The report outlines key lessons from our five-year programme, before showing how PEAK is helping shape the global urban agenda in the 2020s and beyond.

The PEAK Urban approach emerged from our research design, but was tested in practice and fed back into it, in a process both recurrent and iterative for sustainable urban development.



PEAK Research: Adding new insight to urban enquiry

PEAK Urban brings together five high-profile urban research institutions in a pioneering partnership to generate unprecedented urban insights: the African Centre for Cities at the University of Cape Town, EAFIT University, the Indian Institute for Human Settlements, the University of Oxford and Peking University.

Across urban themes spanning sustainability, migration, governance, economic growth, and health and wellbeing, the PEAK lens reveals novel perspectives that can guide impactful interventions, including policymaking, placemaking and investments – as the cross-section of PEAK research shows.

1. Creating Sustainable Cities

Through projects spanning urban planning, cross-sectoral energy and climate responses, and sustainable service delivery, PEAK research provides strong support for a “system of systems” approach to sustainable urban development. By understanding how new characteristics emerge from the interaction of systems in cities, and integrating ecological, economic, institutional and political responses, policymakers can optimise sustainability in an overarching urban system.

2. Nurturing Economic Growth

PEAK’s insights into how cities emerge highlight the significance of contextual variations in areas including strengthening the urban workforce, financing urban economic growth, and mapping formal and informal economic activity to support city-specific growth policies. The PEAK approach highlights the need for tailored policies and governance to manage economic growth and tackle inequality.

3. Governance for Sustainability

Rapid urbanisation highlights the need for new multi-scale governance approaches that accommodate the uncertainty and unpredictability of the ways in which cities emerge, rather than imposing rigid, top-down regulations. Whether considering upgrading and consolidating urban and land-use planning, or translating global policy to city scale, including lessons from Covid-19, PEAK’s integrated approach helps planners see cities in real time, at a finer scale and from fresh angles – including citizens’ perspectives – informing more impactful policymaking.

4. Harnessing Urban Migration

Understanding people’s movement choices is crucial for policy both responding to and shaping the emergence of urban areas. The PEAK approach informed multidisciplinary collaborations to explore migrant motivation and integration,

and the informal city as an enduring and valid urban form. Using publicly available data and new analytical techniques, and engaging deeply with communities and urban actors, PEAK teams investigated varied aspects of where and how people move and live.

5. Promoting Health and Wellbeing

Improving urban health requires interventions that exceed the mandate of health departments alone. The PEAK approach expands the urban health lens by considering a range of urgent factors and co-producing knowledge across diverse stakeholders, including communities, to refine urban policies for improved health. Our research includes the central role of urban form in city-dwellers’ health, understanding urban drivers and perceptions of disease, and the need to embrace informality to support people’s health.

Optimising impact: Lessons from PEAK for development research

Achieving sustainable cities requires a step change in urban actors’ capacity to anticipate and plan for future challenges and opportunities. Our research shows how the PEAK approach can yield critical new insights to help achieve the shifts needed, and offers valuable learning to inform overall design and expectations in future research-for-development programmes. Key insights include the need for dedicated capacity-building resources to enhance research capabilities; a multi-disciplinary approach that delivers more than the sum of its parts; collaboration with stakeholders to yield richer research insights, and an understanding of policy engagement as integral to high-impact research.

Driving urban change, global to local: PEAK in action

PEAK’s deep engagement with ongoing global, regional and city policy processes is reflected not just through partnerships in research design and implementation, but in joint participation in events that shape the policy agenda and governance systems at all levels. This collaborative dialogue facilitates global learning and knowledge integration to inform policies that can successfully create sustainable urban futures.

At international level, we are collaborating with diverse allies and engaging with policy experts within governance systems worldwide around a new narrative of sustainable city development. We participated widely in high-level global events, from the UN Sustainable Development Goal (SDG) reviews, to COP 26, and are driving high-level international debate to support ongoing progress towards the SDGs and embed the PEAK approach in future urban enquiry and action – including via the G7 and the G20, and the World Health Organisation.

PEAK is already providing bespoke solutions at national and city levels, from informing China's 14th Five-Year Plan to working closely with Colombian public utility company EPM to accurately predict water need from urban growth forecasts. In addition, our massive open online course (MOOC), **Shaping Urban Futures**, available on Coursera and the SDG Academy, provides a free global showcase of the PEAK Urban approach. Launched in September 2022, the course had attracted more than 1500 participants in its first few months, and is strengthening stakeholders' capacity to develop sustainable cities in diverse contexts worldwide.

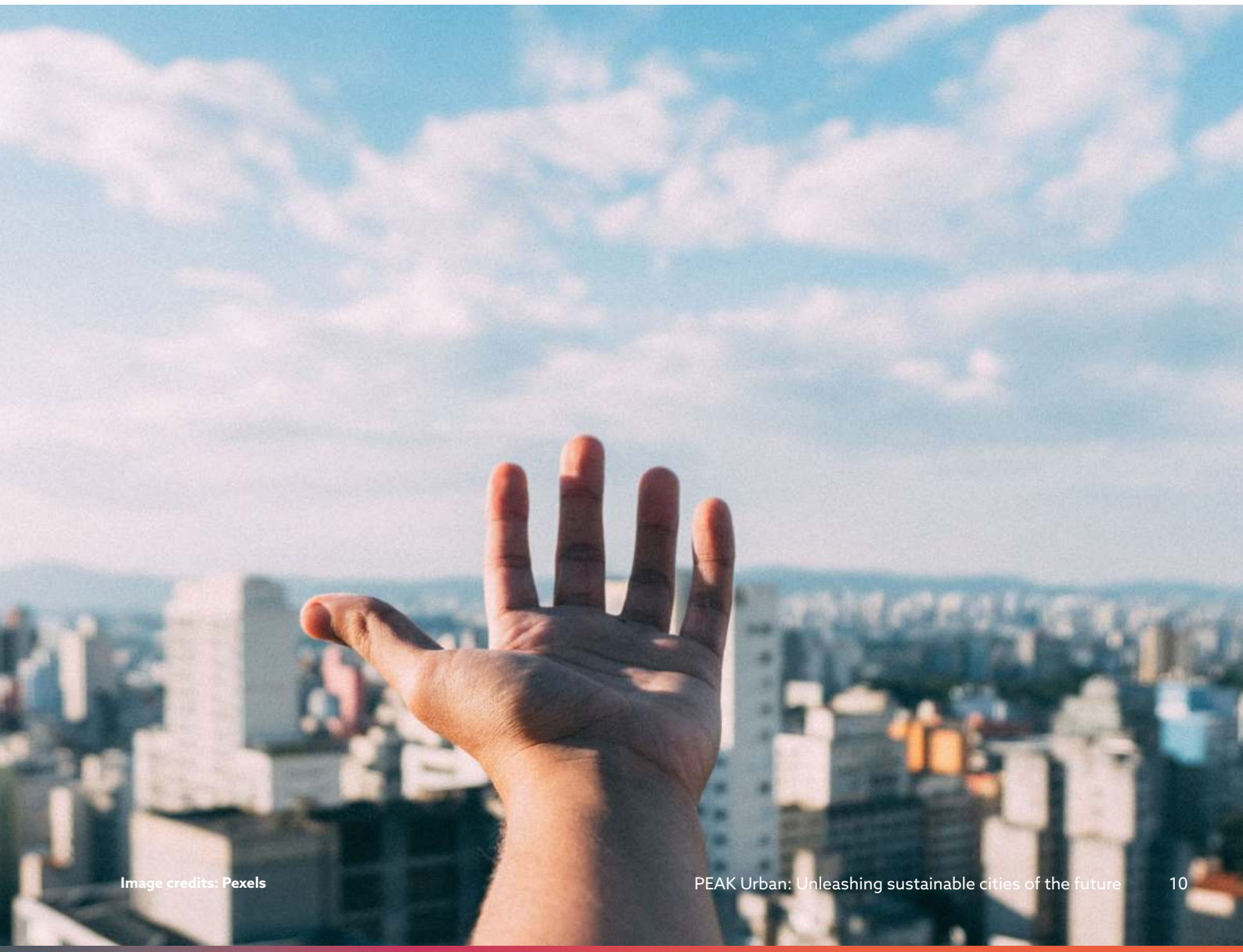
Sustainable urban development: A new narrative

Amid the rapid speed and deep uncertainties of urbanisation, PEAK offers an important new approach, generating new data and guiding prediction, interpreting emergence, informing adoption of solutions, and sharing knowledge. It delivers specific insights enabling policymakers to transform urban sustainability worldwide over the next

decade, responding to the realities of cities as they emerge, rather than trying to mould them into forms that ignore the underlying drivers of urbanisation.

The PEAK Urban approach shows that by working with the widest range of stakeholders across all sectors, linking local to global, building knowledge and integrating city systems, it is possible to optimise the bridge between research and practice. Urban planners, other officials and civil society can all draw on well-designed research to identify innovative solutions which address multiple SDG targets simultaneously.

PEAK both identifies the appropriate operational space in the city to intervene and shows the need for stakeholders to collaborate and shape a global urban agenda that addresses pressing 21st-century social and environmental challenges.



Report Overview

Image credits: Pexels

This report profiles the PEAK disposition (how we think about cities) and the PEAK approach (what we do to improve them).

It includes highlights from our pool of over 40 research projects. By autumn 2022, Peak Urban had generated over 400 research publications (with more to be published in 2023 and 2024), 344 workshops, conferences and engagements with city stakeholders, 24 collaborations and partnerships, and 32 further research grants.

The report outlines key lessons from our five-year programme, before showing how PEAK is helping shape the global urban agenda in the 2020s and beyond. It contains the following six sections:

I. A new lens: Seeing and creating sustainable cities (p.12)

PEAK Urban's innovative approach to urban inquiry and action, enabling diverse stakeholders to understand individual cities in unprecedented ways and optimise policy for sustainable, inclusive urban development, based on four key pillars:

Prediction – What new approaches can we take to accurately forecast cities' futures?

Emergence – What types of urban structures and systems are emerging?

Adoption – How do cities adopt new ideas and technologies?

Knowledge – How, and with whom, can we best share knowledge globally?

II. PEAK Research: Adding new insight to urban enquiry (p.18)

Across urban themes spanning sustainability, economic growth, governance, migration, and health and wellbeing, the PEAK lens reveals novel perspectives that can guide impactful interventions, including policymaking, placemaking and investments – as this cross-section of findings from PEAK's partnership of world-renowned urban research institutions shows.

III. Optimising impact: Lessons from PEAK for development research (p.43)

The PEAK programme yielded critical insights to inform future research-for-development programmes and boost

urban actors' capacity to deliver sustainable cities. This section highlights the value of dedicated capacity-building resources, a multi-disciplinary approach, collaboration with stakeholders, and policy engagement as integral to high-impact research.

IV. Driving urban change, global to local: PEAK in action (p.49)

This section profiles our collaborations and participation at international, national and city levels, promoting a new narrative of sustainable urban development and providing bespoke solutions. It also introduces our MOOC (massive open online course), **Shaping Urban Futures**, offering a free global showcase of the PEAK Urban approach, to build stakeholders' capacity worldwide.

V. Sustainable urban development: A new narrative (p.57)

To conclude, the report summarises how the PEAK approach enables urban actors to unleash tools to predict urban trends, understand how city systems emerge and interact, and design evidence-based interventions in individual urban contexts. It helps decision-makers identify the appropriate operational space in the city to intervene, and stresses the need for stakeholders to work together to set a global urban agenda that addresses 21st-century social and environmental challenges.

VI. Resources (p.61)

Links to the PEAK Urban project hubs, giving more detail on the research and outputs of the projects profiled in this report, and the many others in the PEAK programme.



A new lens: Seeing and creating sustainable cities

A new way of seeing and shaping cities is essential to our future. The PEAK Urban approach enables diverse stakeholders to understand individual cities in unprecedented ways and develop new tools to inform optimum policymaking for sustainable, inclusive urban development worldwide.

Section Overview

How we develop cities will determine humanity's future. Cities are growing in new forms, at unprecedented scale and pace, and in new contexts, mostly in the global South. This demands new ways of understanding them. PEAK Urban provides a powerful approach to urban enquiry and action, enabling stakeholders to understand individual cities and develop tools that inform optimum policymaking for sustainable urban development worldwide.

To improve cities' capacity to address contemporary challenges, urban policymakers and practitioners need to understand how cities work as a whole, viewing each as a system of interlinked systems and addressing specific problems in relation to other aspects, rather than from within a professional or disciplinary silo.

PEAK Urban's approach centres around four central pillars that guide research across radically different contexts:

- **Prediction** – What can we now forecast about cities?
- **Emergence** – What types of urban structures and systems are emerging?
- **Adoption** – How do cities adopt new ideas and technologies?
- **Knowledge** – How can we create and share knowledge globally and locally?

The PEAK approach has shaped over 40 innovative research projects during our five-year programme, exploring five key urban themes: city governance; health and wellbeing; sustainable cities; economic growth, and migration. The approach is designed for ongoing use by researchers, policymakers, practitioners and funders seeking to shape sustainable, inclusive cities of the future.

Our Theory of Change outlines three clear pathways to impact:

- **Conceptual advancement results pathway:** High-quality academic insights underpin real-world impact.
- **Research into use pathway:** Research findings are shared with key stakeholders who make urban policy, practice and investment decisions.
- **New ways of working pathway:** Researchers and urban actors collaborate effectively, taking a panoramic perspective and addressing urban issues in a challenge-led way.

Our emphasis on generating knowledge and understanding multifaceted urban drivers underpins effective policy design, replacing rigid, top-down planning philosophies with flexible guidance and participatory coordination, to accommodate the unpredictability of urban development and maximise efficiency.

I. A new lens: Seeing and creating sustainable cities

How we build cities will determine humanity's future. Since 2007, for the first time in history, more people have lived in urban habitats than rural locations. The UN estimates that 68 per cent of the world's population will live in cities by 2050.³ The unprecedented scale, form and pace of 21st-century urbanisation means the need to create cities that are sustainable, inclusive and liveable for all their people has never been greater. This demands new ways of understanding cities. PEAK Urban's approach to urban enquiry and action offers a powerful way forward.

In 2015, cities' central role in a sustainable future was recognised in the Sustainable Development Goals (SDGs). Goal 11 specifies the need to "Make cities and human settlements inclusive, safe, resilient and sustainable", and cities have a cross-cutting role in delivering most of the other goals. But the nature and drivers of urbanisation are changing fast, with new urban forms emerging as a result. Since the SDGs were set, Covid-19 has caused devastation, with greatest impact in cities, and climate change has accelerated, fuelling urban migration. Cities are developing in new ways, with informality as an enduring feature, and in new contexts, mostly in the global South. Yet most urban

research historically reflects priorities typical of cities in the global North, "seeing" like a northern city and reflecting national urban priorities of states in the global North.

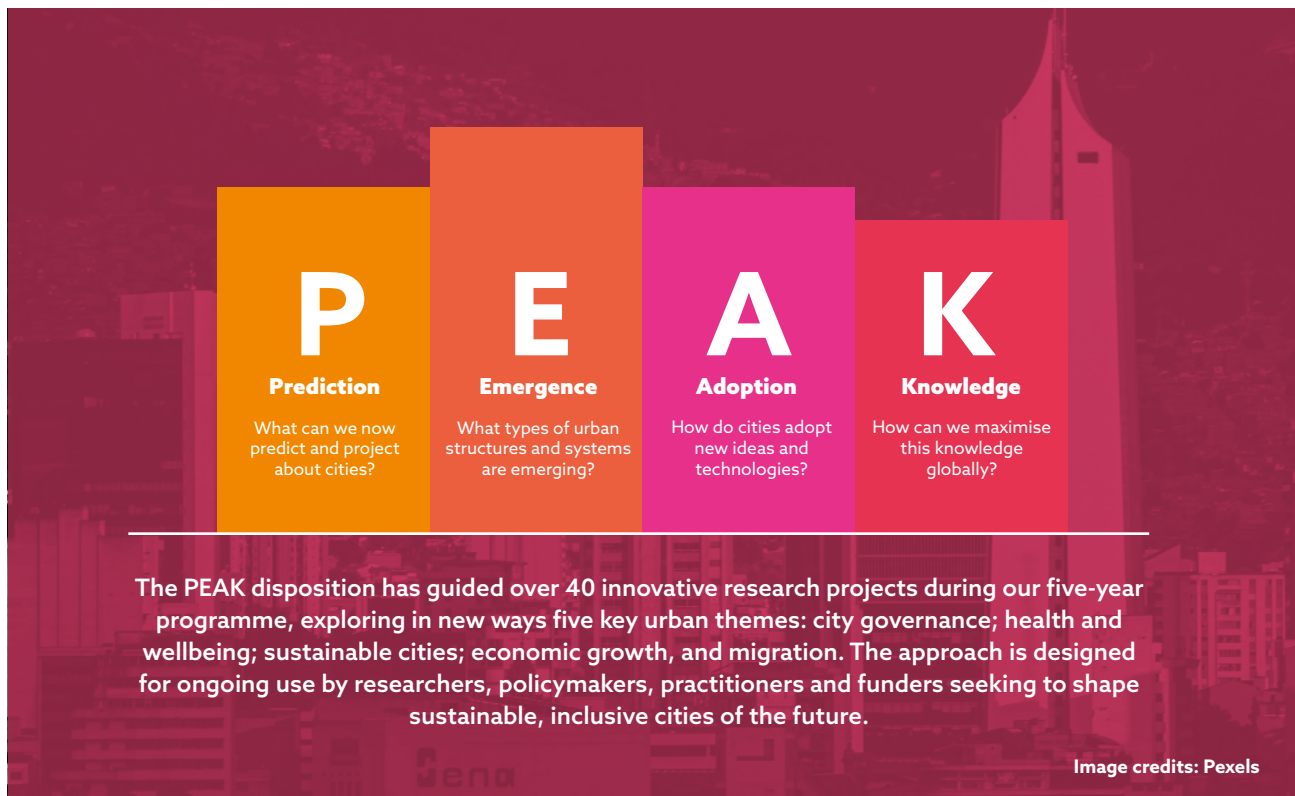
A new approach to seeing and shaping cities is essential to our future. In a highly interconnected world, we need global participation in a joint effort from the north and the south to achieve the change required. To help make the world's new urban areas sustainable and inclusive, policymakers and practitioners need locally relevant, transdisciplinary evidence.

PEAK Urban provides an approach for understanding individual cities, and for generating new insights and tools to inform optimum practice and policymaking for sustainable urban development worldwide.

PEAK Urban: Seeing like a city

To improve cities' capacity to address contemporary urban challenges and development dilemmas, urban policymakers and practitioners will need to understand how cities work as a whole. This means addressing specific problems in relation to other aspects of the city, rather than from within a departmental or disciplinary silo.

PEAK Urban's collaborators bring complementary contributions to the project, united around four central pillars that guide research across radically different contexts.



The graphic features four vertical bars of increasing height from left to right, each representing a pillar of the PEAK Urban approach. The bars are colored orange, red-orange, magenta, and red. Each bar contains a large white letter (P, E, A, K), a bolded title, and a descriptive question. The background is a dark red cityscape at night.

P	E	A	K
Prediction	Emergence	Adoption	Knowledge
What can we now predict and project about cities?	What types of urban structures and systems are emerging?	How do cities adopt new ideas and technologies?	How can we maximise this knowledge globally?

The PEAK disposition has guided over 40 innovative research projects during our five-year programme, exploring in new ways five key urban themes: city governance; health and wellbeing; sustainable cities; economic growth, and migration. The approach is designed for ongoing use by researchers, policymakers, practitioners and funders seeking to shape sustainable, inclusive cities of the future.

Image credits: Pexels

³ UN Department of Economic and Social Affairs (UN DESA), 2018 Revision of World Urbanization Prospects, <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>

The PEAK Urban Approach

An innovative approach to urban inquiry and action guided the research that informs this report. It defined a way of asking questions, employing methods for research, gathering and analysing data and reflecting or acting on the implications of findings. Organised into the acronym PEAK – **P**rediction, **E**mergence, **A**doption and **K**nowledge – and underpinned by principles that apply to all urban contexts globally, the approach is useful in guiding urban interventions, including policymaking, placemaking and investments.⁴ The research considered the four constituent elements of PEAK together, leveraging each as required. This report demonstrates how use of these elements supports urban inquiry and intervention.

P – Prediction and projection

PEAK emphasises interdisciplinary inquiry into city futures, based on urban sciences that use new sources of urban data, providing unprecedented – often real-time – information on urban dwellers’ activities. This includes tracking telecoms data, satellite imagery and street photography; personal and environmental statistics from mobile apps and fixed sensors, and social networks via online platforms. However, the increasing pace of urban change limits the accuracy of longer-term predictions from new data and methods. Predicting urban futures also requires other forms of understanding the city, including institutional analysis and ethnography.

E – Emergence

Cities are constantly evolving and building on what already exists. They are never finished. The concept of emergence rests on the understanding that city systems are rarely in equilibrium. The urban health system, for example, is made up of components including individuals, collective actions, technologies, markets and infrastructure. As the system and its parts change, interactions with other city systems result in “newness” emerging. In particular, technological changes within systems can reconfigure city economic and social life. Even minor changes at the interface of different systems can generate major changes in the complex system of the whole city.

A – Adoption

Histories and geographies matter in understanding how city systems work and evolve, shaping the ideas and technologies a city adopts. Complex systems display characteristics of “lock in” and “path dependency”, with the city’s past and its geography shaping but not determining its future. As a result, knowledge and technologies are taken up, valued and captured differently by cities. Residents may use and be affected by technologies in ways different from other cities or neighbourhoods. The future city is shaped by the needs of both present and future generations.

K – Knowledge

Different approaches to understanding, and alternative models of scientific knowledge, are rooted in diverse moral values and valuation scales, which can at times be competing, contested and not directly comparable. For example, the values informing an economist’s analysis of developing housing in a forested area may clash with those of an environmentalist. These values influence how the city is understood from alternative vantage points. However, different perspectives – including those of urban actors such as elected officials, appointed professionals or community groups – have merit. Through dialogue between these perspectives, policymakers can avoid sub-optimal interventions that affect parts of the city, rather than the city as a whole. Urban futures are shaped by balancing often competing elements, and power structures affect how loudly different voices are heard. This demands an ability to see the city from different perspectives, to recognise structures of power and influence, and to mediate, evaluate and understand such trade-offs.

⁴ Keith M., O’Clery N., Parnell S. & Revi A. The Future of the Future City? The New Urban Sciences and a PEAK Urban Interdisciplinary Disposition. Oxford, UK. 2020. https://www.peak-urban.org/sites/default/files/2021-11/brief_future_city-final.pdf.

Clear pathways to maximum impact

The PEAK programme was designed to achieve maximum effectiveness in strengthening cities for the 21st Century and beyond. Our Theory of Change outlines **three clear pathways to impact**:

1. Conceptual advancement results pathway

PEAK's real-world impact is underpinned by high-quality academic insights. Our innovative, relevant research contributes to conceptual advancement via peer-reviewed academic publications, tools and datasets. We are also an authoritative voice in scholarly urban debates. Our academic results form an essential component of our policy and ways-of-working impact pathways.

2. Research into use pathway

We share, adapt and translate PEAK research findings with key stakeholders and non-specialist audiences who make the policy, practice and investment decisions needed to strengthen cities' capacities to address 21st-century development challenges. Throughout the programme, we have engaged relevant stakeholders meaningfully in PEAK research, bringing together a wide variety of context-specific stakeholders for discussion and collective work. This enables our ground-breaking academic findings to influence decision-making processes in policies, practice and investments at city, national and global levels.

3. New ways of working pathway

Under PEAK's inclusive approach, researchers and key urban actors worked effectively together, overcoming geographical, professional and disciplinary silos. We have built the "first generation" of new-approach thinkers – an international cohort of researchers with enhanced ability and networks to work across disciplines on key urban themes. Together they form a global network of people who have developed the ability to "see like a city", taking a panoramic perspective on urban futures. This network addresses urban issues in a collaborative, challenge-led way, unencumbered by functional or disciplinary boundaries.

Together, these pathways allow us to promote policy innovations that can address the global challenges of urbanisation and the nuances of each individual city. We support policymakers and practitioners in understanding the complexity of different urban spaces in new ways, and to formulate more effective solutions to emerging challenges including climate change, the speed of urbanisation and informal urban systems. Our approach makes visible the city as a system of interlinked systems that influence one another and interact to create new, often unexpected urban forms. This enables urban leaders and practitioners to draw on new insights on the ground and derive key principles that can integrate systems and inform bespoke city-specific interventions, as well as regional and global solutions.

Our emphasis on generating knowledge and understanding multifaceted urban drivers underpins effective urban policy design, replacing city planning philosophies of rigid regulation and top-down control with flexible guidance and participatory coordination aimed at maximising efficiency – approaches that successfully accommodate the uncertainty and unpredictability of urban development.

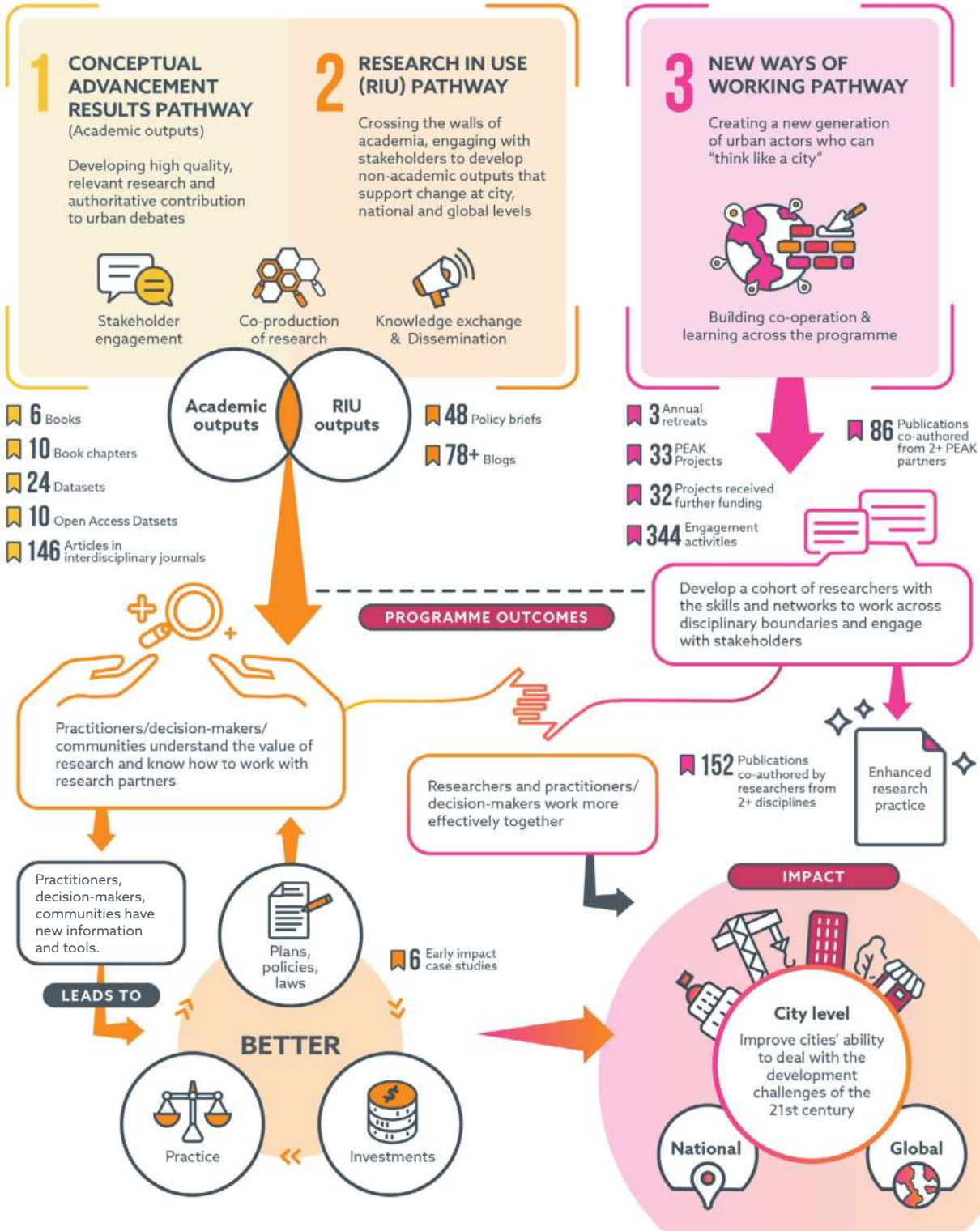


SDG 11 "Make cities and human settlements inclusive, safe, resilient and sustainable."



THEORY OF CHANGE

Three Impact Pathways





PEAK research: Adding new insight to urban enquiry

II. PEAK research: Adding new insight to urban enquiry

PEAK’s comprehensive approach shapes urban inquiry and action in new, effective ways. By combining expertise and experience from different actors, sectors and levels in comprehensive, innovative and inclusive action, the PEAK approach gives urban practitioners and policymakers access to new types of insight. Across urban themes spanning sustainability, migration, governance, economic growth, and health and wellbeing, the PEAK lens reveals novel perspectives that can guide impactful interventions, including policymaking, placemaking and investments – as the cross-section of PEAK research in this section shows.

Drawn from a rich, diverse bank of projects globally, these examples demonstrate how urban stakeholders can use PEAK to gain insight and leverage when seeking to understand cities and shape them as sustainable, inclusive places to live. The research spanned eight cities,

concentrated largely in the global South where PEAK partners are based – Beijing, Bengaluru, Cape Town and Medellín. Throughout, the PEAK disposition defined new ways of asking questions, employing methods for inquiry, gathering and analysing data, and reflecting or acting on the implications of findings. It allowed us to frame new perspectives on existing urban themes and challenges, taking current categories of research forward in pioneering directions.

The research draws on local teams’ expertise, with projects identified at local level to address salient issues facing cities in PEAK countries or regions. Each project considered the PEAK Urban approach, harnessing its four constituent elements in different combinations as the context required. This enhanced research practice yielded valuable new insights, with impact at city level, but applicable beyond their context to address global challenges and inform urban debate. These insights provide evidence in usable form for policymakers and practitioners, demonstrating PEAK’s value as a lens through which to understand cities and shape their functional, equitable futures.⁵

The PEAK Urban global partnership

PEAK Urban brings together five world-renowned urban research institutions in a pioneering partnership. Together, we have collaborated across continents and disciplines, combining knowledge and perspectives in unprecedented ways to generate new urban insights:



African Centre for Cities

Established in 2008 and based at the University of Cape Town, the African Centre for Cities (ACC) is one of the leading knowledge centres conducting meaningful research on how to understand, recast and address pressing urban crises, particularly on the African continent.



EAFIT University

Based in Colombia’s second city, Medellín, EAFIT University inspires current generations to embark on a life project that maximises their potential. The university’s RISE group is a highly multi-disciplinary team that uses open data and a wide range of quantitative methods to generate urban solutions for cities in developing countries.



Indian Institute for Human Settlements

The Indian Institute for Human Settlements (IIHS) is a national education institution based in Bengaluru, committed to the equitable, sustainable and efficient transformation of Indian settlements.



University of Oxford

The University of Oxford is a world-leading centre of learning, teaching and research and the oldest university in the English-speaking world.



Peking University

Peking University in Beijing is one of China’s largest and most prestigious research universities and a member of the C9 League, the Chinese equivalent of the Ivy League.

PEAK Research: The full picture

PEAK Urban includes over 40 research projects and had generated almost 400 publications by autumn 2022, with more to follow. This report presents only a cross-section of PEAK’s output and the way our approach has informed new urban insights. To see the full scope of PEAK research, or to dig deep into a particular project, visit our [rich online repository](#) of journal articles, policy and research briefings, impact case studies and blogs, shaped by – and feeding into – PEAK’s innovative approach to urban futures.

⁵ PEAK Urban impact case studies. <https://www.peak-urban.org/peak-impacts>

1. Creating sustainable cities

Image credits: Adobe Stock

Chapter Overview

Using a “system of systems” perspective that highlights the interdependence between urban systems, PEAK research in Colombia and China found that a denser city is more walkable and associated with lower mortality rates – but only up to a certain point. To promote health, policymakers should create neighbourhoods of controlled density.

Findings from open data analysis – from street networks or night-time light imagery, to crime or traffic accidents – can shape effective policy interventions, such as land-use planning to raise productivity; use of public resources to address crime, or measures to reduce disaster risk or boost public transport use.

For urban sustainability, stakeholders should seek and value multiple actors’ perspectives. In China, research showed the need for cross-sectoral approaches throughout the supply chain to reduce greenhouse gas emissions, and in India, the effects of urban access to energy on both climate change and development.

PEAK research in Africa reveals how people adopt informal solutions – from occupying buildings to running popular transport services – to meet their needs. Policies should view informal urban systems as legitimate, lasting elements of functioning cities, so they can support self-provision of services.

To help authorities and companies improve urban service delivery, researchers in India and Colombia developed methods to downscale ward-level data on water use, and to predict water need from satellite-based urban growth forecasts, while analysis in South Africa exposed gaps in service delivery due to constraints on cities’ mandates and budgets – enabling policymakers to close the gaps.

PEAK research repeatedly highlights the interdependence between urban systems and their governance, providing strong support for a “system of systems” approach to sustainable urban development. By integrating ecological, economic, institutional and political systems, policymakers can optimise sustainability in an overarching urban system.

To understand how new characteristics emerge from the interaction of systems in cities, PEAK researchers worked with diverse stakeholders to investigate aspects of urban form, showing how one distinct area of urban policy – for example, planning – can impact others, such as health, the environment, transport and productivity.

Their findings demonstrate that combining knowledge across diverse disciplines, and understanding how cities adopt new approaches, leads to novel insights on which to base predictions and effective urban policy in low-resource contexts. They also reveal the future of cities in the global South as a hybrid of formal and informal, requiring policies that view informality as a valid city form, and embrace it constructively, for sustainable, inclusive urban development.⁶

Planning cities

Urban planning for health

Health promotion is not the sole preserve of health departments. Urban planners can also contribute to population health and wellbeing through interventions in the built environment. PEAK research in Colombia analysed health data, open geospatial datasets and satellite imagery, to understand the health effects that emerge from urban density. They found that a denser city is a healthier city – to a degree. A larger population, shorter blocks, and more junctions and amenities make cities more walkable and are associated with lower mortality rates. But densities beyond a certain point for each for these factors – 60,000 residents and 200 junctions per square kilometre – were associated with higher mortality, probably due to congestion and poor living conditions. The PEAK disposition also led researchers to explore the environmental and health benefits of green space, with key policy implications. They found that access to nature can promote physical health and reduce stress and depression, but that poorer residents often lack access to such amenities.⁷

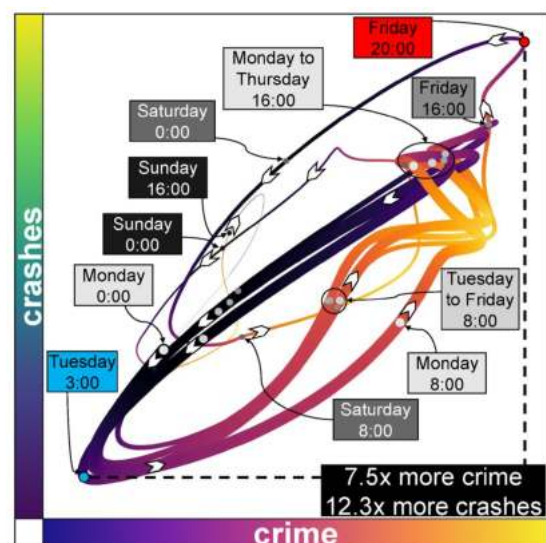
Visit the PEAK project hub:

[- Urban form and its impact on sustainable development](#)

Leveraging data for safe, productive cities

Researchers in Colombia also developed new indicators and applied them to open access data on street networks and night-time light imagery, to test economic productivity.⁸ Although density is widely considered to boost productivity, they found that a non-compact city can still be highly productive, via policy interventions such as well-connected street networks; safe, efficient transport and effective land-use planning. In Mexico City, PEAK research used open-access data to predict patterns of crime and traffic accidents – both influenced at neighbourhood level by the location of local amenities and businesses. This allows the authorities to deploy public resources such as the emergency services more effectively.⁹

Figure 1: Predicted patterns of crime and road accidents in Mexico City, based on open-access data



Source: Prieto Curiel, R., Patino, J.E., Duque, J.C., O’Clerly, N. The heartbeat of the city.

Energy and pollution control

Cross-sectoral responses to control pollution

In China, PEAK’s knowledge-sharing lens showed the need for cross-sectoral responses at every stage of the supply chain to reduce greenhouse gas emissions, enabling stakeholders to seek and value the perspectives of the multiple actors in urban issues. Most energy-use and emissions in Chinese manufacturing¹⁰ occur along the supply chain, rather than at the final stage of production. Higher water use along supply chains is also linked to

⁶ Weinmann A. Personal Communication. 9 February 2022.

⁷ Patiño, J. E. (2020, March). Analyzing Long-Term Availability of Urban Green Space by Socioeconomic Status in Medellín, Colombia, Using Open Data and Tools. In 2020 IEEE Latin American GRSS & ISPRS Remote Sensing Conference (LAGIRS) (pp. 87-92). IEEE.

Hong, A., Martinez, L., Patino, J. E., Duque, J. C., & Rahimi, K. (2021) Neighbourhood green space and health disparities in the global South: Evidence from Cali, Colombia. *Health and Place*.

Patino, J. E., Hong, A., Duque, J. C., Rahimi, K., Zapata, S., & Lopera, V. M. (2021). Built environment and mortality risk from cardiovascular disease and diabetes in Medellín, Colombia: An ecological study. *Landscape and Urban Planning*, 213, 104126.

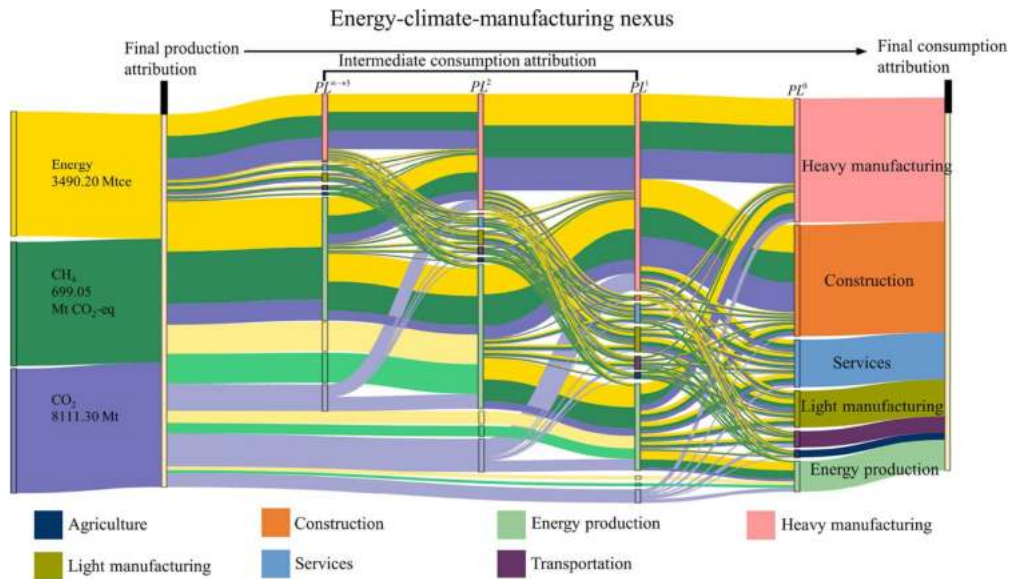
⁸ Duque, J. C., Lozano-Gracia, N., Patino, J. E., & Restrepo, P. (2019). Urban form and productivity: What shapes are Latin-American cities? *Environment and Planning B: Urban Analytics and City Science*, 2399808321999309.

⁹ Prieto Curiel, R., Patino, J. E., Duque, J. C., & O’Clerly, N. (2021). The heartbeat of the city. *PloS one*, 16(2), e0246714.

¹⁰ Zhang, B., Zhang, Y., Wu, X., Guan, C., and Qiao, H. How the manufacturing economy impacts China’s energy-related GHG emissions: Insights from structural path analysis. *Science of The Total Environment*. 2020, 743, 140769. 10.1016/j.scitotenv.2020.140769.

higher emissions.¹¹ Policymakers from the manufacturing, water and climate sectors can reduce emissions by jointly incorporating climate tools throughout supply chains.

Figure 2. Energy consumption in Chinese manufacturing at different stages of the supply chain



Source: Zhang, B., Zhang, Y., Wu, X., Guan, C., Qiao, H. How the manufacturing economy impacts China’s energy-related GHG emissions: Insights from structural path analysis.

Understanding energy as an interlinked system

By viewing energy as a system closely interlinked with climate change and development, policymakers can understand how new interfaces between systems influence the “metabolism” of the city. Researchers in India explored how urban access to energy affects both climate change and development, but found that most energy-related data on India is purely quantitative and at an aggregated scale, so is rarely applicable to cities or regions.¹² This highlights that cities should gather high-quality data at local scale, suggesting ways this might be achieved, to inform energy policies that promote equitable development and optimum climate outcomes.

By viewing energy as a system closely interlinked with climate change and development, policymakers can understand how new interfaces between systems influence the “metabolism” of the city.

Sustainable service delivery

Embracing informality as a legitimate city form

PEAK research in Africa shows how people adopt informal solutions to meet their housing and transport needs. In Cote d’Ivoire’s capital, Abidjan, private motorised rickshaw services in informal neighbourhoods provide an important last-mile service connecting passengers with onward transport networks – despite being banned by the authorities as unregulated.

South Africa’s chronic housing shortage has similarly led people to find their own solutions, leading to occupations of vacant or underutilised land and buildings. Examining informal occupations in Cape Town, PEAK researchers highlighted communities’ and authorities’ competing interests.¹³ The state can at times see occupiers as “bad citizens” disregarding the rule of law, while occupiers believe they are realising their constitutional right to adequate housing and basic services.

These findings highlight the need for policies to view informal urban systems as legitimate, important and lasting elements of functioning cities, so they can support rather than persecute self-provision of some services. Measures could include creative models of fixed-term tenure or licensing, decentralising service provision, or co-designing

¹¹ Zhang, Y., Guan, C., Chen, B., Zeng, L., and Zhang, B. Tracking embodied water uses and GHG emissions along Chinese supply chains. *Journal of Cleaner Production*. 2021, 288, 125590. 10.1016/j.jclepro.2020.125590.

¹²Balakrishnan, K. Towards more equitable and sustainable urban water systems in India: The role of granular data. PEAK Urban policy briefing. 2022. <https://www.peak-urban.org/publications/towards-more-equitable-and-sustainable-urban-water-systems-india-role-granular-data>

informal infrastructure with users or residents.



Credit: Barry Christianson

Occupiers in vacant buildings such as Cape Town’s Cissie Gool House believe they are realising their constitutional right to adequate housing

Visit the PEAK project hubs:

- [Analysing human settlements transformation in Cape Town](#)
- [Everyday mobilities in African transport systems](#)

Addressing unequal access to services

In India, PEAK research monitored neighbourhood groundwater use in Bengaluru, as a basis for tackling inequalities in water use in India’s major cities. Facing a lack of neighbourhood water-use data, our team used population, satellite, infrastructure and land-use data, developing a method to statistically downscale ward-level data on water usage. This allowed them to analyse socio-economic inequalities in water use across Bengaluru, and highlighted the value of capturing data on neighbourhood usage, to inform policies for sustainable, equitable access to water.

Closing the gaps: Africa’s decentralised service delivery

Researchers in South Africa used the PEAK approach to better understand urban service delivery, revealing it as involving a constant state of “fractured” fiscal authority. A city’s capacity for service delivery results from many different actors and infrastructural arrangements, which might lack direct lines of communication or collaboration.^{14,15} City governments are increasingly positioned as key actors in global and local development programmes, but in reality, they face significant limits to their control in these processes. Constraints on their mandates and budgets often require them rely on other levels of government, the private

sector and communities. A mayor, for instance, might be aware of a city’s need to respond to climate change through reducing pollution or offsetting its likely impacts, but the city administration may have no control over policies or spending relating to industries or the transport sector within the city boundaries, even though these contribute to emissions or are vulnerable to extreme weather events. Understanding these “fractures” can help policymakers create the necessary structures and lines of communication to alleviate financial constraints and close gaps in service delivery.



Image credits: Pexels

¹³ Ngwenya N. & Cirolia L.R. Conflicts Between and Within: The ‘Conflicting Rationalities’ of Informal Occupation in South Africa. Planning Theory & Practice. 2020. DOI: 10.1080/14649357.2020.1808237

¹⁴ Cirolia L.R. Fractured fiscal authority and fragmented infrastructures: Financing sustainable urban development in Sub-Saharan Africa. Habitat International. 2020. 104: 102233.

¹⁵ Cirolia L.R. & Robbins G. Transfers, taxes and tariffs: fiscal instruments and urban statecraft in Cape Town, South Africa. Area Development and Policy. 2021. DOI: 10.1080/23792949.2021.1921599.

2. Nurturing economic growth

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Chapter Overview

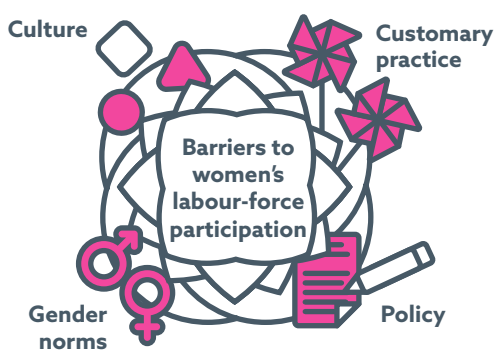
- PEAK emphasises the need for tailored policies and governance to manage economic growth. To understand the capacity of the labour pool to shape economic dynamism and new forms of employment and industrial expansion, we developed an innovative, accurate modelling approach for the probability of a country developing a particular new capability. We also developed nuanced modelling to identify the size of the local labour pool available to emerging new sectors and industries.
- Using new data and analysis techniques, our researchers in Colombia identified the gap in formal employment levels for women and men, and the slow predicted increase in formal-sector employment. We also used machine learning to predict the spatial distribution of employment for 14 test cities worldwide, producing high-resolution estimates where such information does not exist. This makes evidence-based planning possible in many cities for the first time.
- To boost productivity and employment, policy must address interactions between emerging socio-economic systems. Our researchers used data on employment and land-use to locate shifting patterns of industry and informality in India, and developed machine learning approaches to detect the location of commercial firms from street imagery in Colombia, enabling targeted policy support.
- PEAK's focus on how cities emerge highlights the need for context-specific policies to manage urban growth. In less developed areas of China, policy to increase rates of employment creation should aim to increase the scale of the local economy. In more developed regions, policies promoting manufacturing specialisation and service sector diversification will increase employment creation.
- Our research documenting the experiences of South Africa's City Support Programme identified the essential role of city governance in promoting economic development. Beyond providing reliable basic services and infrastructure, city authorities should adopt governance models that promote innovation in urban economies to drive economic development, research and knowledge building.

PEAK's insights into how cities emerge highlight the significance of contextual variations, not only between different-sized cities, but between newly industrialised and more developed regions. This emphasises the need for tailored policies and governance to manage economic growth and tackle inequality. Working with a wide range of stakeholders, we used new data sources and analytical tools to investigate issues around employment and inequality through a multi-disciplinary lens, and identify policy approaches for sustainable, equitable economic growth.

Strengthening the urban workforce

Understanding the labour pool to shape industrial growth

We developed more nuanced modelling to identify the size of the local labour pool available to an industry. Many current models see regional and urban industrial dynamics as a branching process, portraying industries as nodes, and skills overlap as edges. These models typically deploy a local or "nearest neighbour" approach to capture the size of the local labour pool available to an industry in related sectors, neglecting factors such as the presence of industry communities. In contrast, we suggest that node communities naturally delineate the size of the skilled labour force available to an industry and, by exploiting multi-scale community detection, uncover the optimal scale at which labour pooling operates.¹⁶ We used this approach to investigate the impact of knowledge spillovers from multinational firms entering new industries,¹⁷ and deployed a related methodology to show that international research collaboration is increasingly segregated along regional lines.¹⁸



Raising employment levels

Using new data and analysis techniques, our researchers in Colombia identified the gap between formal employment levels for both women and men, and the slow increase in formal-sector employment overall. Analysis of data from 23 Colombian cities from 2008-2016 found that while women's formal employment had increased, it was still lower than men's.¹⁹ Predictions for 62 Colombian cities showed that the share of the working population in formal employment will increase by between 13 and 32 per cent – insufficient to achieve the goal of full and decent work for all by 2030.²⁰ The findings indicate the need for policy at local, national and international levels to promote higher-paid, more secure formal-sector employment – including specific measures to support women's labour-force participation.

Mapping urban economic activity to support growth

New planning tools to increase productivity

To boost productivity and ensure this translates into decent employment, policymakers need to understand and address the multiple interactions between emerging socio-economic systems. Using new data sources and analysis techniques in Colombia, our researchers explored the relationship between factors such as how far people are prepared to commute to work,²¹ the potential productivity increases of less developed regions²² and the extent of informal economic activity in the city.²³ Understanding these relationships can help planners predict a range of issues, from future rises in formal employment, to which regions have capacity to develop more complex goods. Building on new, low-cost techniques to gather evidence, planners in resource-constrained settings can develop multi-level partnerships and collaborations to adopt innovative solutions for their contexts. These could include identifying the infrastructure, knowledge, investment and resources needed to develop optimal economic geographies, and reduce regional inequality.

One country, different urban pathways

PEAK's focus on how cities emerge highlights the significance of contextual variations, including between

¹⁶ O'Clery, N., & Kinsella, S. (2022). Modular structure in labour networks reveals skill basins. *Research Policy*, 51(5), 104486.

¹⁷ Landman, M., Ojanperä, S., Kinsella, S., & O'Clery, N. (2022). The role of relatedness and strategic linkages between domestic and MNE sectors in regional branching and resilience. *Journal of Technology Transfer*.

¹⁸ Fitzgerald, J., Ojanperä, S., & O'Clery, N. (2021). Is academia becoming more localised? The growth of regional knowledge networks within international research collaboration. *Applied Network Science*, 6(1), 1-27.

¹⁹ Lora E. Empleo femenino en las ciudades colombianas: un método de descripción estadística. *Desarrollo y Sociedad* [Internet]. Jan 1 2020. 2020(84):131-79. http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0120-35842020000100131&lng=en&nrm=iso&tlng=es

²⁰ Lora E. Forecasting formal employment in cities. *Revista de Economía del Rosario*. 2021;24(1):1-38.

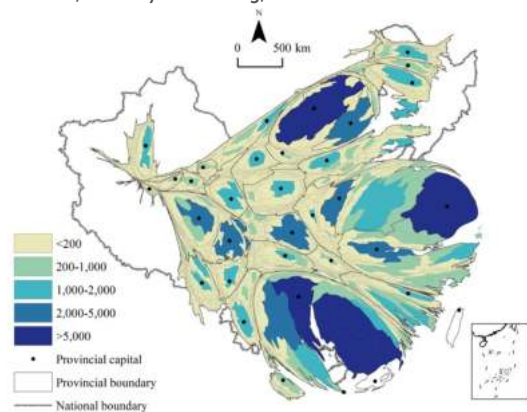
²¹ O'Clery N., Curiel R.P., Lora E. Commuting times and the mobilisation of skills in emergent cities. *Applied Network Science*. 2019 Dec 1;4(1).

²² Restrepo D.E., Duque J.C., Church R. Optimal region design to foster industrial diversification. *Regional Studies*. 2021;

²³ Straulino D, Saldarriaga JC, Gómez JA, Duque JC, O'Clery N. Uncovering commercial activity in informal cities. 2021 Apr 9; Available from: <http://arxiv.org/abs/2104.04545>.

regions and different sizes of city. This emphasises the need for bespoke policies to manage urban growth. Economic Development Zones (EDZs) in coastal regions already enable greater manufacturing specialisation and allow companies to benefit from tailored infrastructure and larger markets, with a positive effect on employment rates.²⁴ City size has a similar positive effect on employment growth, with larger cities' consumption markets promoting job creation. This effect is most pronounced in China's less developed western regions, where fewer large cities means economic and administrative power are concentrated in each, increasing the effect of city size on the rate of job creation. In coastal cities of similar size, with equal economic weight but no administrative power, the effect of their size on job creation rates is less pronounced. Policymakers in different regions should therefore adopt tailored approaches to increasing the rate of local employment creation. In less developed areas, policy should aim to increase the scale of the local economy and promote urbanisation. In larger cities, administrative centres and coastal regions, policies promoting manufacturing specialisation and service sector diversification will increase rates of employment creation.

Figure 3. Differing growth rates in areas of China used for settlement, industry and mining, 1996-2006



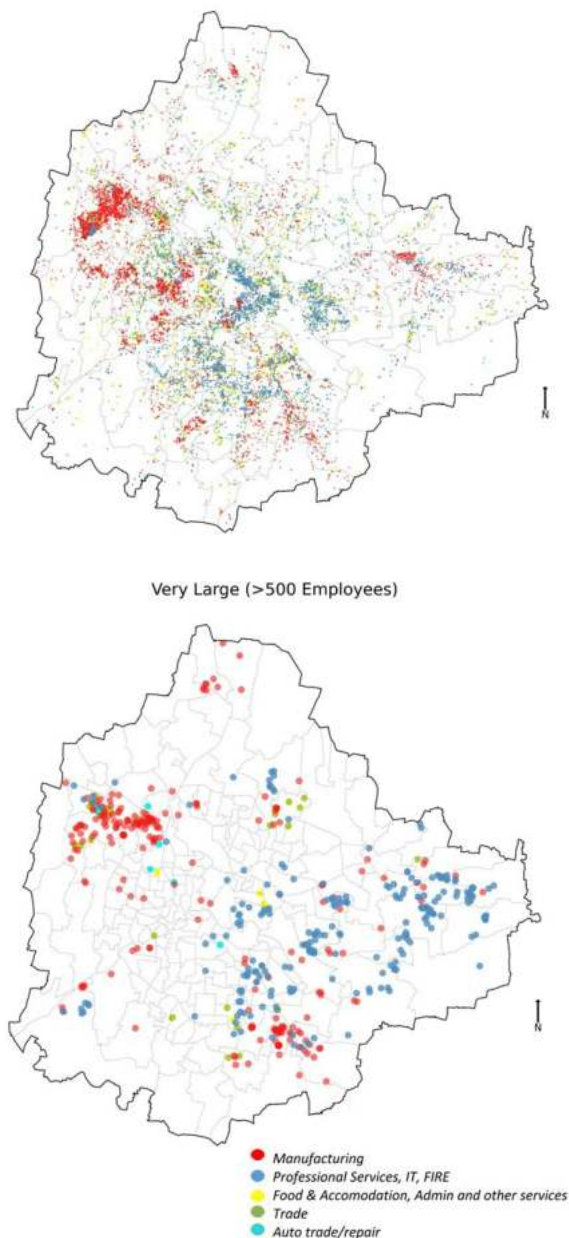
Source: Liu, T., Shi, Q.J., Wang, Y., Yang, Y. Urban-rural development and occupation of cultivated land in China: trends, geography, and drivers.

City-level mapping of industry and informality

Much of the world's research on industrial transformation – especially in the global South – takes place at the national scale, yet much less has been done to understand how these changes occur in cities, and their impacts on urban economies. To profile Bengaluru's industrial transformation, our researchers used data on employment and land-use changes to locate shifting patterns of industry and informality within the city. We also mapped the spatial distribution of informal business, such as the extensive garment industry. Exploring informal industrial neighbourhoods, the research delineated new patterns of informal industry inside core city spaces, illustrating

how urban cores are constantly in flux. A key challenge in such research is the availability of urban economic data to inform policy and investment decisions. To carry out spatial mapping of economic activity in Bengaluru, our team reviewed a range of economic data sources, including the Annual Survey of Industries and the economic and population censuses. Together, these datasets map the economy, particularly the informal economy, at a hyper-local scale – an approach that allows new insight into the geography of work in cities of the global South.

Figure 4. Spatial mapping of firms in Bengaluru, by sector and size 11 to 100 Employees



Source: Urban Informatics Lab, IIHS. For more details, see policy brief: [The need for real time and granular data to study the urban economy.](#)

²⁴ Huang, D., He, H., and Liu, T. The Spatial Distribution and Influencing Factors of Employment Multipliers in China's Expanding Cities. Applied Sciences, 2021, 11(3), 1016. 10.3390/app11031016. Beijing Normal University, Peking University

Machine learning for high-resolution prediction of urban employment

For most cities in developing countries, little is known about the granular spatial organisation of economic activity, despite its key importance to policy and urban planning. In response, working with the World Bank, we adapted an algorithm based on machine learning to predict the spatial distribution of employment using input data from open-access sources such as Open Street Map and Google Earth Engine.²⁵ For 14 test cities, from Buenos Aires to Dakar, the algorithm predicted economic activity with extremely high accuracy. Using open data, the approach can produce high-resolution estimates of the distribution of urban employment for cities where such information does not exist, making evidence-based planning possible in many cities for the first time.

Visit the PEAK project hub:
[- Measuring urban economics](#)

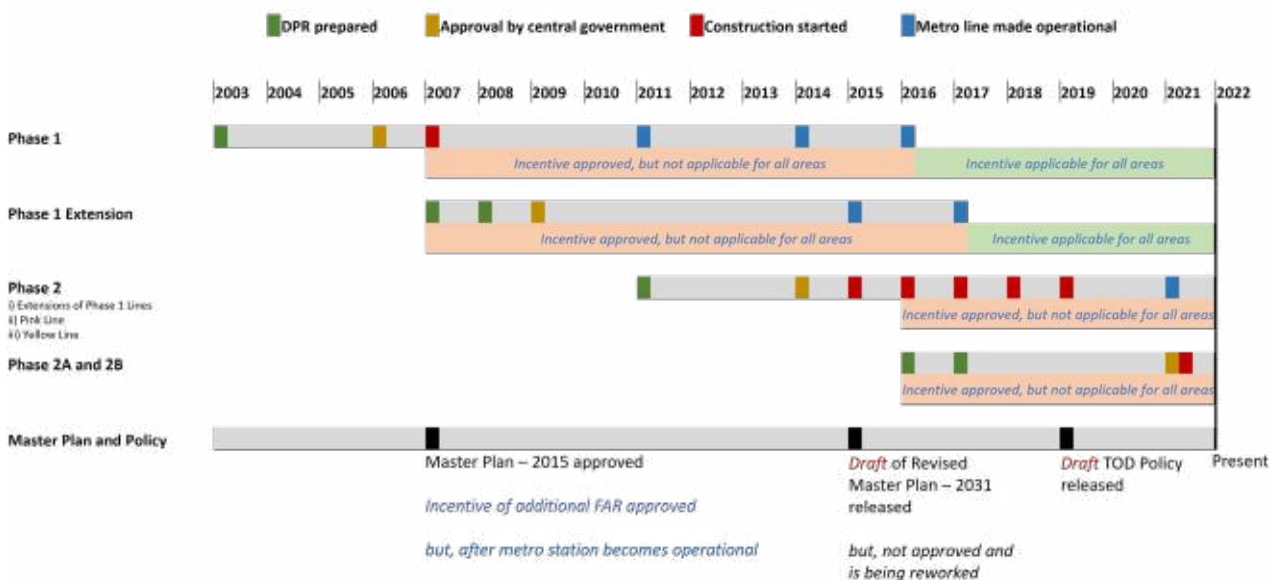
Financing urban economic growth

Identifying the need to reform land-value capture

Land-based financing is gaining importance in Indian housing and infrastructure projects, with land-value capture becoming a significant component of project feasibility. But in many Indian cities, there is a delay of 4-10 years between the announcement of a new infrastructure project and its implementation. This is due to complex land records, displacement and rehabilitation processes, the time required to give planning documents public notice, and negotiations between multiple urban governance bodies (see Figure 8). Private developers typically act quickly in this intervening period to launch new projects in areas adjoining proposed infrastructure corridors, with speculative prices premised on the planned infrastructure. Private land-value capture therefore often occurs long before public land-value capture becomes possible via notified plans and approved instruments. This results in inequitable urban development, limiting the potential for inclusive planning and public reinvestment of accruals. Policymakers should implement reforms to enable public land-value capture and inclusive planning that incorporates social and non-financialised uses of urban land – such as greenspaces and affordable housing – alongside financialised uses, such as high-end housing and commercial property.

Visit the PEAK project hub:
[- Metropolitan development and and-based financing](#)

Figure 5. Timeline for development of the Bengaluru metro and associated plans



Source: Compiled from the website [The Metro Rail Guy](#), Bangalore Metro Rail Corporation Limited (BMRCL) website and newspaper archives
Note: Within a phase, each metro line can have separate DPRs and can tender different construction agencies. Some phases therefore have multiple years marked for DPR preparation and the start of construction. As sections of metro lines are made operational sequentially, each phase can also contain several years in which the metro line became operational.

²⁵ Barzin S., Avner P., Rentschler J. and O’Clery, N. 2022. Where Are All the Jobs? A Machine Learning Approach for High Resolution Urban Employment Prediction in Developing Countries. Policy Research Working Paper; 9979. World Bank, Washington, DC. <https://openknowledge.worldbank.org/handle/10986/37195> License: CC BY 3.0 IGO.

Improved targeting for social protection measures to tackle inequality

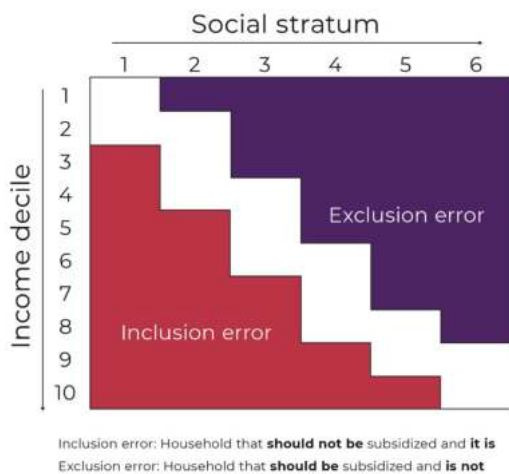
Colombia’s current social classification system for allocating utility subsidies is based only on a property’s external appearance and location, meaning subsidies are often inappropriately awarded.²⁶ Errors are compounded as the system is used to calculate other benefits, such as for health and education. Our researchers developed an alternative multi-dimensional model which uses big data manipulation techniques to analyse a range of administrative databases now available to government, such as taxes, health records and educational enrolment. This enables policymakers to better identify those on the lowest income over time, and target subsidies more effectively.²⁷ Research simulations based on a multi-dimensional index showed significant improvements in identifying those who should receive utility subsidies in Bogota compared with Colombia’s current approach, especially for water and sewage. Our researchers engaged with government planners, resulting in a commitment in the legally binding National Development Plan to review the model for calculating subsidies and develop a more progressive system.²⁸

Cities face competing demands and must balance divergent needs, such as green policies at household level and fiscal management at city level.

The power of governance in strong urban economies

Our researchers documenting the experiences of South Africa’s national City Support Programme (CSP) identified the value of city-specific governance reforms in many aspects of urban life. These include the essential but often overlooked role of city governance in promoting economic development. Beyond providing reliable basic services and infrastructure, we found that city governments have a critical and creative role to play in driving economic development, research and knowledge building. City authorities need to adopt governance models that promote innovation and experimentation in urban economies to drive growth and job creation. Local authority roles and functions should vary based on city context and municipal capability. Drawing on the CSP’s experimental Partnering for Growth programme, our team also emphasised the potential economic impact of collaboration in cities, through providing the right actors with tools and knowledge, building relationships, and finding new ways to achieve goals together. The process can initially be time-intensive, but can enhance project implementation at relatively low cost. The CSP’s experience emphasises the importance of listening and learning, and adjusting urban economic strategy accordingly – in this case, from an emphasis largely on technical support to one including partnership and collaboration. The next step is identifying how to institutionalise these lessons within the intergovernmental system.

Figure 6. Errors of exclusion and inclusion for Colombia’s household classification system for social subsidies



Source: The stratification system to funding utilities in Colombia and its limits to contribute to the reduction of inequality

²⁶ Quiñones M, Martínez LM, Duque JC, Mejía O. A targeting policy for tackling inequality in the developing world: Lessons learned from the system of cross-subsidies to fund utilities in Colombia. *Cities*. 2021 Sep 1;116; Building an Equitable Society in Colombia [Internet]. Washington, DC; 2021 [cited 2022 Jan 31]. Available from: <https://openknowledge.worldbank.org/handle/10986/36535>.

²⁷ Quiñones M, Martínez LM, Duque JC, Mejía O. A targeting policy for tackling inequality in the developing world: Lessons learned from the system of cross-subsidies to fund utilities in Colombia. *Cities*. 2021 Sep 1;116.

²⁸ Plan Nacional de Desarrollo 2018-2022 “Pacto por Colombia, pacto por la equidad” [Internet]. [cited 2022 Mar 12]. <https://colaboracion.dnp.gov.co/CDT/Prensa/Resumen-PND2018-2022-final.pdf>

3. Governance for sustainability

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Chapter Overview

- PEAK's predictive lens strengthens governance by developing more reliable city growth models. In China, researchers developed a system to define city growth boundaries that balance urban density with demand for agricultural land, and showed the value of integrating land-use, urban and other planning systems to better manage urban sprawl.
- City planning and governance often operate across hierarchical scales, hindering effective development. In India, city governments have the legal right to participate in urban planning, yet PEAK researchers found that central rather than local urban bodies manage project development in the Chennai-Bengaluru Industrial Corridor. The findings indicate ways to recognise the geographical scale or operational space most appropriate for interventions, and build institutional capacities at local and national levels.
- Urban authorities are key to implementing international policies at city level. PEAK researchers examined adoption of measures to realise the Sustainable Development Goals (SDGs) in Bengaluru, Medellín and Cape Town. Successful localising of the goals requires awareness-raising and advocacy with a wide range of local stakeholders, to align strategic city-level aims and investment with the goals.
- Research into how Bengaluru, Medellín and Cape Town responded successfully to Covid-19 drew three key lessons that can inform improved SDG delivery. Cities should enable multi-level governance and collaboration; strengthen the science-policy interface, and promote citizen and society engagement.
- Analysis of South Africa's Cities Support Programme emphasises the importance of national urban strategies as an overarching umbrella for governance reform, but these should eschew a "one-size-fits-all" approach in favour of allowing cities to tailor policies to their own particular contexts.

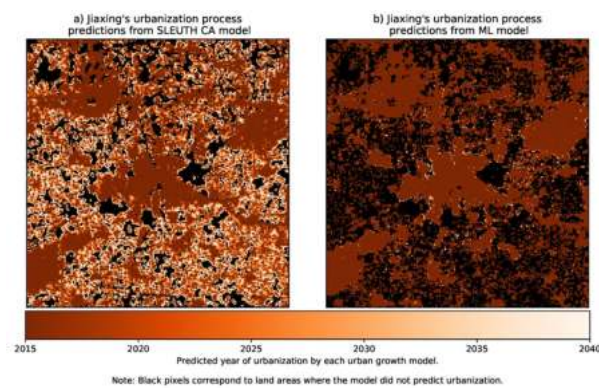
Rapid urbanisation highlights the need for new governance approaches that accommodate the uncertainty and unpredictability of the ways in which cities emerge, rather than imposing rigid, top-down regulations. PEAK’s integrated approach includes innovative forms of prediction, with new technologies, data forms and methods of analysis creating tools that simultaneously model several urban systems – such as transport, employment and land. Urban practitioners and policymakers gain the knowledge to see cities in real time, at a finer scale and from fresh angles – including citizens’ perspectives – informing more impactful policymaking.

Upgrading and integrating urban and land-use planning

Finetuning urban growth predictions

PEAK’s predictive lens strengthens governance by developing more reliable city growth models. Existing models give differing predictions for where and when land will become urban.²⁹ For the Chinese cities of Jiaxing and Lishui, data-driven computer modelling predicts different urban expansion from a model using rules to encode human intuition. The PEAK approach enables new combinations of different models to improve the accuracy of predictions. By integrating analysis where the models indicate the same results occurring at the same time, planners can better predict urban expansion. This helps policymakers develop infrastructure requiring long lead times, welfare facilities and commercial clusters.

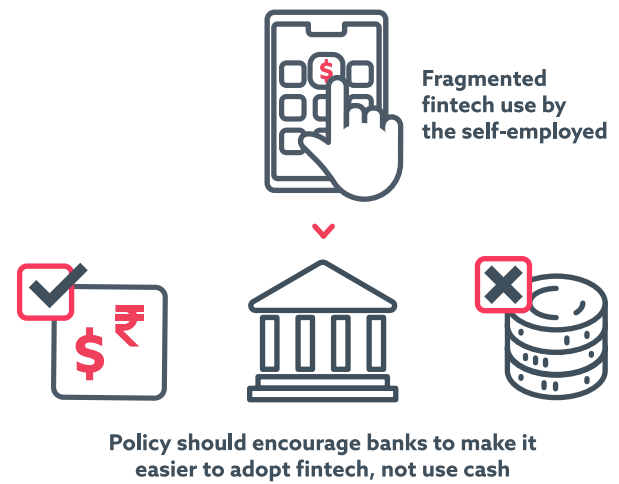
Figure 7. Different existing models give different predictions for urban expansion. PEAK researchers combine these to derive more accurate predictions



Source: Gómez, J. A., Guan, C., Tripathy, P., Duque, J. C., Passos, S., Keith, M., Liu, J. Analyzing the Spatiotemporal Uncertainty in Urbanization Predictions.

Setting realistic boundaries

China also needs stronger methods for delimiting city growth boundaries, to maximise urban density while protecting arable land. Existing approaches are subjective, defined by local government intentions, land markets and planners’ personal experiences. Officials usually delineate land by its physical suitability for development, ignoring local demand for construction land. Using PEAK’s predictive lens, our researchers developed a system to draw urban growth boundaries for Shenyang, using computer modelling to calculate future demand for urban and rural land use, and combining this with information on village property rights.³⁰ The system defines land suitable for future development into urban areas, giving policymakers urban growth boundaries that balance with demand for agricultural land.



Governing informal transport systems through cash-free payments

Focusing on autorickshaw drivers and other self-employed people in Bengaluru, our researchers in India studied the emergence and gradual adoption of financial technologies in highly informal cities. We found glaring inequalities in fintech use, with access to digital payment systems remaining fragmented, and cash use still highly prevalent.³¹ Drivers face challenges in adapting to digital finance and payments, including the cost and inconvenience of having to withdraw money; payment delays when work is mediated by platform aggregators such as Uber, and difficulty managing household spending using digital payments. Those who do use fintech, producing financial data for lenders, can expose their negative borrowing performance, which keeps

²⁹ Gómez, J. A., Guan, C., Tripathy, P., Duque, J. C., Passos, S., Keith, M., Liu, J. Analyzing the Spatiotemporal Uncertainty in Urbanization Predictions. Remote Sensing. 2021, 13(3), 512. 10.3390/rs13030512.

Universidad Icesi, New York University Shanghai, India Institute for Human Settlements, EAFIT University, University of Oxford, Shanghai Academy of Landscape Architecture Science and Planning

³⁰ Huang, D., Huang, J., and Liu, T. Delimiting urban growth boundaries using the CLUE-S model with village administrative boundaries. Land Use Policy. 2019, 82, 422-435. 10.1016/j.landusepol. 2018.12.028.Beijing Normal University, Peking University

³¹ Lucy Baker, Dheeraj Joshi and Tim Schwanen. Digital payment systems and financial inclusion for auto-rickshaw transport operator-drivers in India. PEAK Urban research brief. April 2021. https://www.peak-urban.org/sites/default/files/2021-04/peak_brief_digital_financial_inclusion_rickshaw.pdf

the costs of borrowing prohibitively high. We identified the need for financial market regulation to help govern the transport sector by reducing the cost of loans and improving lending terms. Policies should also promote digital payment, encouraging financial institutions to develop products that compete with the flexibility of cash, and to enable easy access to money via more ATMs and cashback facilities. Unions and civil society groups can assist drivers by helping them develop skills and knowledge relating to digital payments and credit scores.

Integrating industrial and urban planning: New approaches to planning better cities

Recognising the interface between plans and economic development (through emergent patterns) and working with key stakeholders on the ground (through knowledge exchange) we leveraged the 'E' and 'K' aspects of the PEAK

approach in India to generate new methods of planning industrial patterns for better cities. While formal industry has been moving outside cities to allow greater economic investment, informal industry has become embedded in particular city locations. We examined industrial patterns in Bengaluru, to inform provision of important infrastructural services - most crucially, housing - to workers critical to the labour process. Numerous decision-makers occupy different roles in Bengaluru's hierarchical planning process, often at odds with each other. Governing bodies at municipal, state and regional levels all appropriate land for different uses while making decisions on infrastructure provision. As land has become a signifier and driver of growth, the jurisdictions of each entity become more complex. This indicates that to improve the structural conditions of industry, cities need a coordinated approach between multiple decision-making authorities.

Figure 8. Decision-makers and stakeholders in Bengaluru's city government

AGENCY	BBMP	BDA	BMRD	BWSSB	BESCO	BSCL	BMRL	BMTC	KSRTC	KRDC	KUIDFC	DULT	KSRB	KIADB	KSIIDC	KUM	KSSIDC	IR	C-PSUs
JURISDICTION	ML	UDA	MA	MA	MA	MA	MA	MA	SW	SW	SW	SW	SW	SW	SW	SW	SW	N	N
Water, Drainage, and Sewerage				Green															
Electricity					Green														
Road Transport								Green				Grey							
Rail transport								Green											Green
Road Infrastructure	Green	Blue	Blue			Blue			Green	Blue		Grey							
Development Control	Grey	Green	Blue							Blue									
Slum Clearance and Rehabilitation	Blue												Green						
Industrial Development														Green	Blue	Grey	Blue		Grey
Tax Collection	Green																		
Urban finance	Grey	Green	Blue																

ABBREVIATIONS (Alphabetical) /LEGEND			
BBMP	Bruhat Bengaluru Mahanagara Palike	C-PSUs	Central Government Public Sector Units
BDA	Bengaluru Development Authority	DULT	Directorate of Urban Land Transport
BESCO	Bengaluru Electricity Supply Company	IR	Indian Railways
BMRL	Bengaluru Metro Rail Corporation Limited	KIADB	Karnataka Industrial Areas Development Board
BMRDA	Bengaluru Metropolitan Regional Development Agency	KRDCL	Karnataka Road Development Corporation Limited
BMTC	Bengaluru Metropolitan Transport Corporation	KSIIDC	Karnataka Industrial Infrastructure Development Corporation
BSCL	Bengaluru Smart City Limited	KSRB	Karnataka Slum Rehabilitation Board
BWSSB	Bengaluru Water Supply and Sewerage Board	KSRTC	Karnataka State Road Transportation Corporation
KSSIDC	Karnataka Small Scale Industries Development Corporation	UDA	Urban Development Area
KUIDFC	Karnataka Urban Infrastructure Development and Finance Corporation	Green	Primary responsibility rests with this agency
KUM	Karnataka Udyog Mitra	Blue	Some responsibilities overlap with this agency
MA	Metropolitan Area	Grey	Some co-ordination required with this agency
ML	Municipal Limits	Orange	This agency functions only at city-scale/metropolitan-scale
N	National	Yellow	This agency functions at city, and state scales
N	National	Light Yellow	This agency functions at city, state, and national scales.
SW	State-Wide		

Source: Compiled by IIHS Team

Translating global policy to city scale

Goal 11 of the UN Sustainable Development Goals (SDGs) recognises cities' central role in a sustainable global future. While national governments are the coordinating and decision-making authorities for implementing international policies, urban authorities are key to realising them at city level. To explore how global policies are translated at city level, PEAK researchers examined adoption of measures to realise the SDGs in Bengaluru and Medellín, as well as Cape Town.³² The PEAK focus on adoption highlighted the need for policymakers and governance officials to consider whether and how international policy directives are taken up by municipal governments, which may not be aware of what is required, or fiscally empowered to deliver it.

In Cape Town, for example, our research examined the complexities of localising international agreements, the need to work across levels of government, the limitations of pre-existing data, the importance of improved reporting systems, and the need to work collectively with other cities. It found that successful localising of the SDGs requires awareness-raising and advocacy with a wide range of local governance officials and other key stakeholders, to align strategic city-level aims and investment to the SDGs. The goals' cross-cutting nature requires increased cross-sectoral, intra-departmental collaboration – echoing PEAK's emphasis on the co-production of new knowledge by a range of stakeholders. Officials also need to align city monitoring and evaluation systems to SDG indicators, reporting on progress internally, as well as participating in official SDG local reviews.

Visit the PEAK project hub:
[- Assessing SDG localisation in Cape Town](#)

Researchers also analysed how the three cities responded to the Covid-19 pandemic,³³ and drew three key lessons from these responses to improve SDG delivery:

- Enable multi-level governance: Pandemic responses showed actors with different political views can work together during crises to deliver the multi-level governance and collaboration central to achieving the cross-cutting SDGs. To advance the goals, cities should

build on the sense of urgency and the mechanisms and partnerships the pandemic created.

- Strengthen the science-policy interface: scientific policy inputs and evidence-based governance systems are widely acknowledged as central to global sustainability. Despite challenges such as ethical data use, cities must build on the science and data platforms and collaborations developed during the Covid-19 emergency.
- Promote citizen and society engagement: The pandemic showed how citizens and different actors in society can come together in efforts to address crises – while also highlighting the importance of continuity and institutional knowledge.



Image credit: Gina Ziervogel

PEAK researchers identified key lessons from the Covid-19 pandemic response that can help improve SDG delivery

Bespoke city responses to global crises and goals

Medellín has been hailed as a regional pioneer for its pandemic response, acting rapidly to introduce measures to slow the spread of the disease and protect low-income residents from its impact. The city realised early on that it had to ensure the poorest people, many of whom are informal workers relying on daily wages, had access to food and cash to enable them to stay at home and limit the spread of infection. The authorities also worked with local universities and technical experts to help monitor and predict cases, and make crucial decisions about economic support, protecting the supply chain and distributing goods across the city.

³² Mejia-Dugand, S., & Pizano-Castillo, M. (2020). Touching down in cities: territorial planning instruments as vehicles for the implementation of SDG strategies in cities of the global South. *Sustainability*, 12(17), 6778.

Mejia-Dugand, S., Croese, S., & Reddy, S. A. (2020). SDG implementation at the local level: lessons from responses to the coronavirus crisis in three cities in the Global South. *Frontiers in Sustainable Cities*, 2(57).

³³ Martínez, L., Valencia, I., Trofimoff, V., Vidal, N., Robles, E., Duque, J. C., Sarmiento, O. L. & Tuiran, A. (2021). Quality of life, health, and government perception during COVID-19 times: Data from Colombia. *Data in Brief*, 37, 107268.

Curiel, R. P., & Ramírez, H. G. (2021). Vaccination strategies against COVID-19 and the diffusion of anti-vaccination views. *Scientific Reports*, 11(1), 1-13.

Heroy, S., Loaiza, I., Pentland, A., & O'Clery, N. (2021). COVID-19 policy analysis: labour structure dictates lockdown mobility behaviour. *Journal of the Royal Society Interface*, 18(176), 20201035.



Strengthening capacity for strategic urban governance reform

To deliver sustainable, inclusive urban cities, South Africa needs to transform its largely fragmented, sprawling and often exclusive urban areas into more compact, integrated institutional forms. In response, the country’s National Treasury set up the Cities Support Programme (CSP) in 2011 as an inter-governmental unit, working across departments to strengthen cities’ governance capacity, support fiscal and policy reform, and catalyse spatial transformation. The CSP offers a national strategic umbrella for urban reform, yet is explicitly responsive to a city’s particular experiences and context, eschewing a “one-size-fits-all” approach to urban reform.

To harness the lessons learned through this innovative framework, our researchers collaborated with the programme to document its experiences and develop new knowledge on urban cross-sectoral governance, capturing examples of innovation across sectors and scales of governance.^{36,37} Our results document how people tasked with governing cities exchange knowledge and adopt solutions to promote effective governance, and we identify opportunities to strengthen the reform process. This knowledge informs the crucial urban science of prediction. The findings emphasise the importance of national urban programmes as an overarching umbrella for governance reform, but with scope for cities to tailor policies to their own particular contexts. They also demonstrate the far-reaching scope of the PEAK approach, which enabled researchers to explore multiple aspects of urban life through a city governance lens – for example, how the CSP experience informs policies for urban economic growth.

However, despite this success, long-term global goals such as the SDGs are not yet being effectively operationalised at city level. Medellin has made great efforts to use planning instruments to improve performance in areas such as utility coverage, violence and public space, and has defined indicators to contribute to national SDG reporting. But by using municipal planning instruments, such as master plans and local development plans, and involving citizens in diagnosis and formulation, stakeholders can create more effective urban policy and ensure local plans link directly to long-term goals and monitoring efforts.³⁴ This will improve required national-level reporting against SDG targets, capture progress towards the SDGs, and help international bodies identify local sustainability initiatives that merit support. Our researchers in Colombia developed guidance for policymakers on the localisation of SDGs, building on existing city planning systems and focusing on diagnosing challenges and formulating strategies to tackle them. Leveraging the ‘A’ in the PEAK, Medellin Planning Department has used the research and recommended planning process.³⁵

Visit the PEAK project hub:
[- National urban reform in South Africa](#)

Visit the PEAK project hubs:
[- Transitional cities in the global South and their contribution to SDG implementation: Governance and power relations in Medellín](#)
[- Economic challenges of Latin American cities within the framework of the SDG: A disruptive vision on how to tackle them](#)

³⁴ Mejía-Dugand S, Pizano-Castillo M. Touching down in cities: Territorial planning instruments as vehicles for the implementation of SDG strategies in cities of the global south. Sustainability (Switzerland). 2020 Sep 1;12(17).

³⁵ Mejía-Dugand S, Pizano-Castillo M. Touching down in cities: Territorial planning instruments as vehicles for the implementation of SDG strategies in cities of the global south. Sustainability (Switzerland). 2020 Sep 1;12(17).

³⁶ Duminy J. & Parnell S. Supporting City Futures: The Cities Support Programme and the Urban Challenge in South Africa. Cape Town: African Centre for Cities. 2020.

³⁷ Duminy J. & Parnell S. The Shifting Interface of Public Health and Urban Policy in South Africa. Journal of Planning History. 2022; 21(1): 86–102.

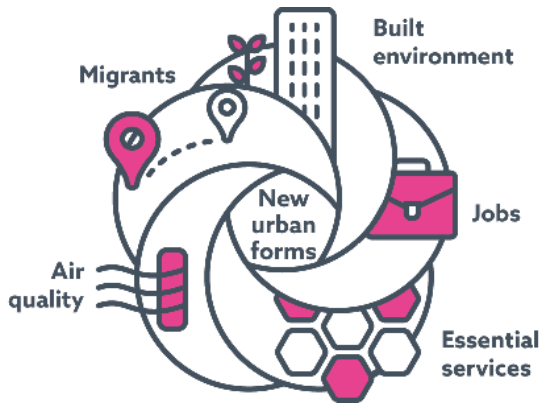
4. Harnessing urban migration

Image credits: Adobe Stock

Chapter Overview

- To help policymakers respond to and shape the emergence of urban areas, researchers in Colombia constructed a model of city-to-city migration, predicting individuals' movement, while research in China showed urban development is now driven by "amenity migration" and cultural and environmental factors, rather than solely economic opportunities – insights vital for evidence-based decision-making, service provision and policymaking.
- Research in Colombia shows that to support migrant integration, cities must provide housing locations that allow day-to-day interaction with host societies. In Beijing, migrants' willingness to stay depends less on economic opportunities than access to medical services. Those with a better education, strong social support and a more central location are more likely to stay – insights that can inform urban policies to retain migrants. Research with African migrants in Delhi showed the need for interventions that also address links between legal and social precarity.
- Climate migration has most often been addressed at the scale of the nation state. PEAK Urban research demonstrated the increasing significance of understanding the city scale and the diverse speeds at which climate migration will occur. In Delhi, we found that climate migration could only be understood through the interfaces of systems of squatter dwelling and informal employment – insights key to making cities more equal, sustainable and resilient.
- Research into informal occupations in Cape Town confirmed that the future of cities in the global South is a hybrid of formal and informal. Policies should embrace informality constructively, as legitimate, through creative models of tenure or permit granting, decentralising service provision, or co-designing informal infrastructure with users. In Colombia, PEAK research documented communities' key role in successful municipal improvements to informal settlements.

Understanding people’s movement choices is crucial for policy both responding to and shaping the emergence of urban areas. The PEAK disposition led researchers to create multidisciplinary collaborations, use publicly available data and new analysis techniques, and to engage deeply with communities and urban actors to investigate many aspects of where and how people move and live.



Migrants’ changing motivations

Beyond economic drivers

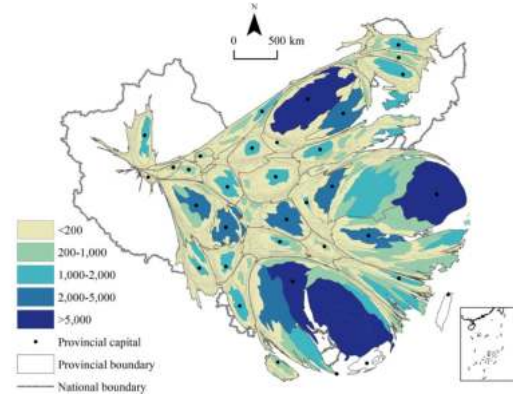
Chinese migrants no longer care solely about economic opportunities in deciding where to move. The country’s urban development has now reached a stage where the “amenity migration” common in more developed countries is shaping where people choose to live. Urban-urban migrants tend to choose destinations in the same province and dialect area, where many people share their educational background.³⁸ This generates competition between cities seeking to attract a skilled workforce. Policies to develop higher education and vocational training and improve existing residents’ educational background could help attract more skilled migrants. Environmental factors are also significant, with air quality a determinant of Chinese migration since 2005.³⁹

Successful urban planning understands migration as a continuous process, with onward migrants tending to choose a new destination geographically close to their origins and previous destinations.⁴⁰ Migrants often want to return to their home province, but fear limited employment opportunities. Provinces facing dramatic outwards migration could attract return migrants through job-creation policies.

Visit the PEAK project hub:

[- Internal migration and urbanisation in China](#)

Figure 9. Total number of in-migrants in prefectures of China, 2010



Source: Shi, Q., Liu, T. Glimpsing China’s future urbanization from the geography of a floating population.

Understanding migration at the city scale

To better understand the critical characteristics of internal migration, including the propensity to keep moving and return to previous locations, PEAK researchers in Colombia constructed a model of city-to-city migration, predicting individuals’ movement using the frequency of distinct labour-market data sequences or signatures.⁴¹ A novel feature is the model’s ability to account for partial information on an individual’s lifetime migrations. Fitting the model to longitudinal data on 3.3 million workers in Colombia, including 1.4 million migrants, we compared signature frequency based on migration and return rates for men and women, and distinct age and income groups. The results show that most people do not move in general, and nearly three out of four times that a person moves at least twice, they return to a previous city. A small group, particularly young and male, migrate frequently. In contrast, women and older people are less likely to move and more likely to return if they do. At a city level, people from small secondary towns are more likely to leave and not return than people from large metropolitan areas. Such insights are vital for evidence-based urban planning.

Visit the PEAK project hub:

[- The past, present, and future of urban footprint growth of Latin American cities](#)

³⁸ Zhuo Y.X., Liu T., Gu W.Y. How multi-proximity affects destination choice in urban-urban migration: An analysis based on nested logit model. *Scientia Geographica Sinica*. 2021. 41(07):1210-1218. Peking University, Pingshan Center for Urban Planning and Natural Resources of Shenzhen

³⁹ Cao G.Z., Liu J.J., Liu T. Examining the role of air quality in shaping the landscape of China’s internal migration: Phase characteristics, push and pull effects. *Geographical Research*. 2021. 40(1): 199-212. Peking University

⁴⁰ Liu T., Zhuo Y.X. and Wang J.J. How multi-proximity affects destination choice in onward migration: A nested logit model. *Acta Geographica Sinica*. 2020. 75(12): 2716-2729. Peking University, Renmin University of China

⁴¹ Curiel R.P., Domínguez M.Q., Lora E. and O’Clery N. Mobility between Colombian cities is predominantly repeat and return migration. *Computers, Environment and Urban Systems*. June 2022. Vol. 94. 101774. <https://www.peak-urban.org/publications/mobility-between-colombian-cities-predominantly-repeat-and-return-migration>.

Dismantling barriers to IDP integration

Following long-term internal conflict, Colombia hosts one of the world's largest populations of internally displaced people (IDPs). At a time when migration was amplified by the governance crisis in neighbouring Venezuela, we explored how policies might effectively address the challenges of new arrivals in cities. Much research suggests that integrating migrants into host societies reduces their vulnerability, while benefitting host communities. However, such research mostly addresses integration from a purely economic perspective, failing to consider adequate housing solutions – yet housing plays a vital role, especially given that IDPs come from different socio-cultural and spatial contexts. Much official housing for migrants comprises high-rise blocks in peripheral areas of the city. This destroys the social and spatial ecosystems that underpin resilience in displaced communities. To promote adequate socio-spatial integration of IDPs, cities must provide housing locations that allow day-to-day interaction with host societies. Approaches such as redensifying urban areas where use of space has deteriorated would enable the authorities to provide housing solutions to both existing and newly arrived populations. Policies require a multi-stakeholder approach, including humanitarian actors, civil society and the private sector, to integrate displaced communities effectively.⁴²

Helping people put down roots

Urban policies should consider not just how to attract people, but how to retain them. A Chinese migrant stays at a destination for five years on average, and is very likely to move to another in the third or fourth year. This movement is particularly pronounced among those who move within their province or work in manufacturing. In China's megacities, the environment, housing costs and amenities are now crucial to retain migrants.⁴³ In Beijing, migrants' willingness to stay depends less on economic opportunities than access to medical services. Those with better education and skills, and strong social support in the city, are also more likely to stay, although integration levels decrease the further migrants live from the city centre.⁴⁴ To improve social integration, urban policy should provide extra support to people with less education, those who migrate alone and those living in the suburbs.

Visit the PEAK project hubs:

- [Urban housing and land use in China](#)
- [Mega-city region and metropolitan area development](#)

The informal city as enduring and valid

Profiling informal cities as a basis for sustainability

Understanding how formal and informal sectors operate, and how they interact, is crucial to plan inclusive and sustainable future cities. In Delhi, numerous migrants come from climate-sensitive areas of India, escaping flooding and droughts to build new homes in marginal spaces such as those bordering city drains, where it is illegal and unhealthy to live. Many earn a living picking through the city's waste to find plastics to sell for recycling, generating an informal economy that interacts with the formal economy and the state, which regulates use of plastics. By recording migrants' accounts of their experiences, observing their everyday interactions with the state, and reviewing key policy documents on climate change, drains and plastics, our researchers in Delhi documented contemporary urban dynamics. As well as profiling the impacts of climate migration, this understanding of how informal settlements are inhabited and managed is key to making them more equal, sustainable and resilient, and provides a lens to indicate whether and how the SDGs might be achieved.

Policy and participation for inclusive cities

Many settlements in urban Latin America have emerged informally – often housing migrants and refugees on marginal land. Despite local authorities' attempts to upgrade such settlements, most fall short of ensuring decent homes and services for residents. In Medellín, PEAK research documented the key role communities can play in successful improvements to informal settlements. In the city's Juan Bobo community, public-sector agencies built trust with local people through dialogue that enabled an inclusive and effective upgrade.⁴⁵ Together, they made decisions that responded to community needs – even where this seemed to contradict established practice. The project's success shows the need for city authorities, supported by national governments and international agencies, to work with communities to improve existing settlements in response to people's needs – leveraging the knowledge-exchange pillar of PEAK – rather than relying on top-down development plans.

⁴² Briefing paper resulting from panel discussion "How can we more successfully support the integration of internally displaced persons in Colombia?" 24 September 2021. hosted by Dr. Edwar Calderón, PEAK Urban researcher at EAFIT University. <http://www.peak-urban.org/publications/gentrification-geographies-conflict>; <http://www.peak-urban.org/publications/sociospatial-integration-internally-displaced-people-idps-within-host-society>.

⁴³ Guo Y., Zhong H., Feng C. Research on Influencing Factors and Changes of Floating Population's Willingness to Stay: A Case Study of Chaoyang District, Beijing. *Urban Development Studies*. 2020. 27(12): 54-61; Liu T., Peng R.X., Cao G.Z. Duration of residence at destination among China's internal migrants: Group differences and spatial variations. *Human Geography*. 2021. 36(03):37-46. Peking University (for both papers)

⁴⁴ Liu T, Wei C C, Tong D. (2020) Human capital, social support and social assimilation of floating population: A case study of Beijing. *Population and Development*. 26(2): 11-22. Peking University, Shenzhen Graduate School

⁴⁵ Calderon E, Eslava A, Mejia-Dugand S. Informalidad en Medellín bajo los lentes de la gobernanza. *Territorios*. 2020 May 4;(43).

City authorities need to work with communities to improve existing settlements in response to people’s needs, rather than relying on top-down development plans.

However, examining informal occupations of land or buildings in Cape Town, PEAK researchers confirmed that communities and the authorities can have competing interests and intentions over housing shortages.⁴⁶ The state can see occupiers as disregarding the rule of law, and can think they should “wait their turn” for subsidised housing. Conversely, occupiers believe they are holding the government to account over their constitutional right to adequate housing, through a profoundly political and democratic act. These competing approaches complicate city officials’ decision-making over issues such as whether to evict occupiers or compensate owners. Yet they also help highlight that informal urban systems are here to stay for the longer term, and should therefore be viewed as legitimate elements of functioning cities. The government’s inability to meet housing needs means informal “self-provision” will find ways to outstrip formal provision. To address shortages in housing and other services, policymakers must acknowledge this and create systems that support rather than persecute medium- and long-term self-provision.



Image credit: Barry Christianson

People who informally occupy vacant buildings believe they are realising their constitutional right to adequate housing and basic services

Towards inclusive urban futures: African migrants in Delhi

The PEAK research team in India documented ways in which African migrants in Delhi, particularly those with precarious legal status, experienced and laid claims to the city. Through fieldwork in two distinct neighbourhoods, the project examined racial issues, gender and the barriers of law and bureaucracy for racialised migrants. The prevalence of anti-black racism in urban India has resulted in violence and discrimination against African people, highlighting how racialised migrants – even those with legal status – experience insecurity, violence, unstable access to housing and dependency on intermediaries such as private brokers. Although India hosts among the world’s largest immigrant population, its migration framework remains a colonial legacy difficult for migrants to navigate. Our research showed the need for interventions that acknowledge the links between legal and socio-cultural precarity impacting migrants, to foster an inclusive urban future.

Visit the PEAK project hub:

[- African migrants in India: urban space and claim-making in Delhi](#)

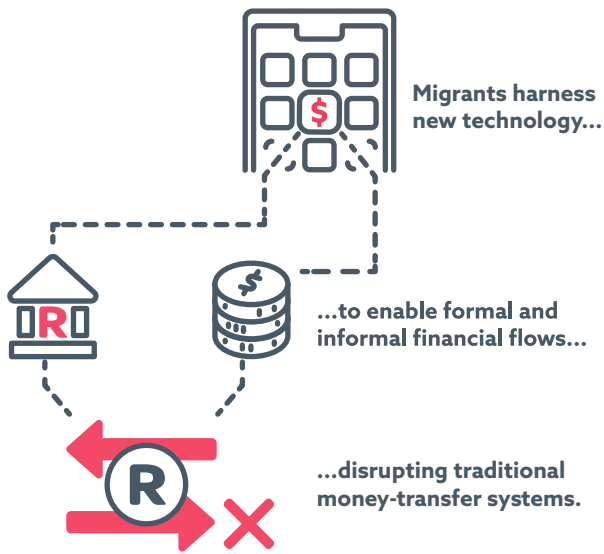
Embracing informality in hybrid cities

Urban informality is here for the longer term, and needs to be seen as a valid part of the city form. Viewing settlements or systems as “informal” suggests the need to improve and formalise them, along a linear development route on which the ideal modern city has eradicated informality. While there is need to improve the built environment and services to communities, the reality is that the future of cities in the global South is a hybrid of formal and informal.

PEAK’s approach to understanding such emergence in cities can help urban stakeholders to reframe their view of informality and encourage processes that embrace it constructively. These could include creative models of tenure or permit provision, decentralising service provision, or co-designing informal infrastructure with users or residents.

Explore [PEAK’s research on informality in partnership with the Oxford Martin School](#).

⁴⁶ Ngwenya N. & Cirolia LR. Conflicts Between and Within: The ‘Conflicting Rationalities’ of Informal Occupation in South Africa. Planning Theory & Practice. 2020. DOI: 10.1080/14649357.2020.1808237



Remittances shaping the urban economy

Remittances shared by migrants are central to development, raising questions about how to make remittance systems cheaper for users, while managing the regulatory and

financial risks for states and companies. Examining remittance service providers to Cape Town’s Congolese community, PEAK researchers found that the legacy systems, which have cornered the market for transnational money transfer for decades, are being disrupted in several ways, including by informal providers (such as logistics companies), tech companies, and retail outlets, shaping the way the city emerges. The research also found that – in contrast to linear and binary understandings – remittances move in a circular way, with a blurred overlap between formal and informal money flows. Digital technologies, such as cell phones and platforms, are central to remittance infrastructures, with communities constantly harnessing new technologies to address their needs,⁴⁷ and migrants’ movements defining remittance networks’ shape and reach. City planners also need to understand how demand for remittance services affects the physical city – for example, many remittance services use the infrastructure of supermarkets. These factors suggest that financing for sustainable urban development could maximise effectiveness by building on existing financial systems which reflect cities’ governance and physical configurations on the ground.⁴⁸



⁴⁷ Liza Rose Cirolia RL, Hall S. & Nyamnjoh H. Remittance micro-worlds and migrant infrastructure: Circulations, disruptions, and the movement of money. *Trans Inst Br Geogr.* 2021; 00:1-14.

⁴⁸ Cirolia, LR. 2020. Fractured fiscal authority and fragmented infrastructures: Financing sustainable urban development in Sub-Saharan Africa. *Habitat International.* 104, 102233

5. Promoting health and wellbeing

Image credits: Pexels

Chapter Overview

- Promoting urban health requires interventions beyond the mandate of health departments alone. Urban green space, for example, has significant effects on health, but residents in poorer neighbourhoods derive fewer health benefits from green spaces. Planners and health officials should coordinate policies to promote access to quality urban green space and tackle underlying health disparities across socio-economic strata.
- Inclusive policy processes can help address the impacts of urban disease. In Cape Town, internationally driven HIV programmes often overlook core community requirements. This threatens the relationship between donor aid and communities. To ensure long-term viability, donors should base programmes on participatory design, so they meet local needs.
- Measures to upgrade informal settlements often focus on service delivery and infrastructure, yet wellbeing is strongly influenced by how people interact with the built environment through factors such as noise, overcrowding and safety. To optimise urban health, policymakers should bring together stakeholders, including communities, in collaborative decision-making about the urban environment.
- Rapid changes in population movement typical in developing countries meant Covid-19 spread faster and further in China than the SARS virus in 2002. The Chinese cities first affected by Covid-19 were megacities connected with the epicentre, Wuhan, more for business and tourism than migration, indicating infectious disease control measures should focus initially on business travellers and tourists.
- Factors affecting urban life expectancy including the economy, the environment and public services, vary by degrees between cities, meaning policymakers should prioritise different measures in different cities to raise life expectancy. This, in turn, requires targeted policies to prevent and manage mental and physical health conditions among the elderly.

Addressing the many factors influencing urban health requires interventions that exceed the mandate of health departments alone. City governments care for their people by creating the conditions for health in multiple ways – through healthcare, childcare, public safety, community and economic development, transport and green spaces. The immediate link between health and the urban built environment is clear – particularly in informal settlements, where poor health can entrench socio-economic inequalities. The PEAK disposition allowed our researchers to expand the urban health lens by considering a range of urgent factors, stressing the importance of collaborative partnerships, including with communities, and co-producing knowledge across diverse stakeholders to refine urban policies for improved health.⁴⁹

Urban form: Central to city-dwellers' health

Environmental impacts on health

Urban green space and biodiversity can promote healthy behaviours, increase wellbeing and reduce socio-economic health disparities. Yet most evidence for these links comes from high-income countries, with little from low- and middle-income countries. Our research in Medellín addresses this gap. Beyond exploring city density for walkability and health, the PEAK approach also led our team to examine the health benefits of green space and biodiversity. We found that urban green space and land use affect people's levels of physical activity, with significant effects on physical and mental health.⁵⁰ There are also associations between floral biodiversity and health.⁵¹ However, the lower a neighbourhood's socio-economic status, the fewer health benefits its residents derive from green spaces. These findings can inform policy to optimise people's physical and mental health in cities across the global South. Urban planners and health officials should coordinate policies to promote equitable, inclusive access to quality urban green space, and tackle underlying health disparities, in all socio-economic strata – with careful coordination to ensure greening does not inflate property prices and displace low-income households.

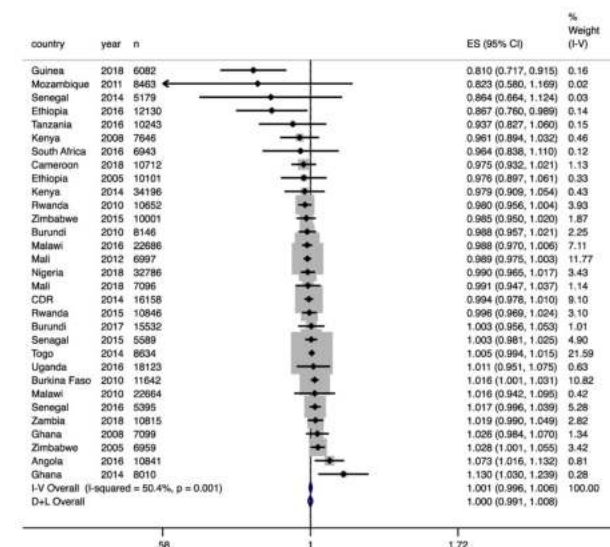
Our research in South Africa also emphasised the importance of people's interactions with the built environment for urban health.^{52,53} Measures to upgrade informal settlements often focus on service delivery and infrastructure, yet wellbeing is strongly influenced

by how people interact with their domestic and external environments through psycho-social factors such as noise, overcrowding, personal safety and access to nature. To optimise urban health, policymakers should look beyond services and infrastructure, bringing together a wide array of stakeholders – including communities – in collaborative decision-making.^{54,55}

Improving health requires understanding risks from air pollution. PEAK researchers analysed health and air pollution data from 21 countries in Sub-Saharan Africa for possible correlations between ambient air pollution and coughs or acute lower respiratory infection in children under five. Although they found no overall correlation, there were significant correlations between pollution and cough in several countries, highlighting the urgent need for further investigation into the concentration, distribution and toxicity of ambient air pollution across Africa, and its impact on young lungs.⁵⁶ This is especially important as Africa's rapid urbanisation suggests air pollution will be a key environmental health risk.

Visit the PEAK project hub:
[- Linking the environment and risk of respiratory infection in children in Sub-Saharan Africa](#)

Figure 10. Associations between prior-month concentration of particulate matter (PM2.5) and prevalence of cough in the previous two weeks in children under five in Sub-Saharan Africa



Source: Cai, Y.S., Gibson, H., Ramakrishnan, R., Mamouei, M., Rahimi, K. Ambient Air Pollution and Respiratory Health in Sub-Saharan African Children: A Cross-Sectional Analysis.

⁴⁹ Obando, F. and Keith, M. Cities can care for people and enable them to care for others, making urban health possible. Issue-Based Contribution to the sixth Global Report on Local Democracy and Decentralization (GOLD VI), Working Paper Series #16. April 2022. https://gold.uclg.org/sites/default/files/16_cities_can_care_for_people_and_enable_them_to_care_for_others_making_urban_health_possible_by_francisco_obando_and_michael_keith_peak_urban_programme_school_of_anthropology_university_of_oxford.pdf

⁵⁰ Hong, A., Martinez, L., Patino, J., Duque, J. and Rahimi, K. Neighbourhood green space and health disparities in the global South: Evidence from Cali, Colombia. *Health & Place*, Volume 72. 2021.

⁵¹ Houlden, V., Jani, A. and Hong, A. Is biodiversity of greenspace important for human health and wellbeing? A bibliometric analysis and systematic literature review. *Urban Forestry & Urban Greening*, Volume 66. 2021. URL

⁵² Weimann A. Kabane N. Jooste T. Hawkrigde A. Smit W. & Oni T. Health through human settlements: Investigating policymakers' perceptions of human settlement action for population health improvement in urban South Africa. *Habitat International*. 2020; 103: 102203.

⁵³ Weimann A. & Oni T. A Systematised Review of the Health Impact of Urban Informal Settlements and Implications for Upgrading Interventions in South Africa, a Rapidly Urbanising Middle-Income Country. *International Journal of Environmental Research and Public Health*. 2019; 16: 3608.

⁵⁴ Weimann A. Kabane N. Jooste T. Hawkrigde A. Smit W. & Oni T. Health through human settlements: Investigating policymakers' perceptions of human settlement action for population health improvement in urban South Africa. *Habitat International*. 2020; 103: 102203.

⁵⁵ Weimann A. & Oni T. A Systematised Review of the Health Impact of Urban Informal Settlements and Implications for Upgrading Interventions in South Africa, a Rapidly Urbanising Middle-Income Country. *International Journal of Environmental Research and Public Health*. 2019; 16: 3608.

⁵⁶ Cai YS, Gibson H, Ramakrishnan R, Mamouei M, & Rahimi K. Ambient Air Pollution and Respiratory Health in Sub-Saharan African Children: A Cross-Sectional Analysis. *Int. J. Environ. Res. Public Health*. 2021; 18: 9729.

Understanding drivers and perceptions of disease

Lessons from Covid for disease control

Rapid changes in population movement typical in developing countries meant Covid-19 spread differently in China from the SARS virus in 2002.⁵⁷ Migration is now a nationwide phenomenon, enabling Covid-19 to spread nationally and then globally. Migrants take a wider range of jobs, and their movements within cities are greater and less predictable. This meant ordinary cities were hit harder than expected by the pandemic. Increased tourism and business travel also enabled Covid-19 to spread faster and further than SARS. The Chinese cities first affected by Covid-19 were megacities connected with the epicentre, Wuhan, more for business and tourism than migration.⁵⁸ Policymakers should therefore focus infectious disease control measures initially on business travellers and tourists, who are far more mobile than migrants.

Policymakers should focus infectious disease control measures initially on business travellers and tourists, who are far more mobile than migrants.

Informal systems for health and nutrition

Socio-economic and cultural contexts shape people's conceptions of illness and health. In a low-income neighbourhood of Bengaluru, our researchers explored how chronic illness is defined by people in the informal workforce, and at what point people abandoned improvised treatment and sought medical care. We found that people seek care for chronic illnesses at different stages, based on their socio-economic backgrounds and precarity, indicating the need for a health system in Indian cities to treat and care for people suffering non-episodic, non-communicable illnesses.

Informality plays a central role in African cities' food systems, which combine formal and informal markets, and non-market-based sources, such as own-production and food transfers. People draw their nutrition – critical to health – from a complex network of sources, including supermarkets, informal markets, small shops, self-production (such as vegetable-growing), sharing or borrowing food, food remittances, community kitchens and food aid. This spectrum implies policymakers and planners should accept formality and informality in the food system as a continuum, rather than a dichotomy for which the only solution is to formalise the informal.⁵⁹



Targeted policies boost life expectancy

Factors affecting urban life expectancy include the economy, the environment and public services – to varying degrees between cities.⁶⁰ In less developed western China, for example, urban life expectancy is mainly affected by economic development. In more developed northern and southern regions, public services are key, while in highly developed eastern China, environmental factors are most significant. Policymakers should therefore prioritise different measures in different regions to raise urban life expectancy. This, in turn, requires policies to prevent and manage mental and physical health conditions among the elderly, which can achieve greatest impact by targeting groups most affected, including women and people with lower incomes or living alone.^{61,62,63}

Visit the PEAK project hub:

- Population healthcare research based on big data

⁵⁷ Shi et al., 2020 Shi, Q., Dorling, D., Cao, G., and Liu, T. Changes in population movement make COVID-19 spread differently from SARS. *Social Science and Medicine*. 2020, 255, 113036. 10.1016/j.socscimed.2020.113036. University of Oxford, Peking University

⁵⁸ Shi and Liu, 2020 Shi, Q., and Liu, T. Glimpsing China's future urbanization from the geography of a floating population. *Environment and Planning A: Economy and Space*. 2019, 51(4), 817-819. 10.1177/0308518X19834572. University of Oxford, Peking University

⁵⁹ Smit W. The food environment and health in African cities: Analysing the linkages and exploring possibilities for improving health and wellbeing. In Keith M. & de Souza Santos AA. (Eds.), *Urban transformations and public health in the emergent city* (pp. 123-146). Manchester University Press. Manchester. 2020.

⁶⁰ Huang, D., Yang, S., and Liu, T. (2020). Life Expectancy in Chinese Cities: Spatially Varied Role of Socioeconomic Development, Population Structure, and Natural Conditions. *International Journal of Environmental Research and Public Health*, 17(18), 6597. 10.3390/ijerph17186597.

Beijing Normal University, Peking University; Liu, T., Yang, S., Peng, R., and Huang, D. A Geographically Weighted Regression Model for Health Improvement: Insights from the Extension of Life Expectancy in China. *Applied Sciences*. 2021, 11(5), 2022. 10.3390/app11052022. Peking University, Beijing Normal University

⁶¹ Wang Z., Liu B., Guo Z., Yang H. Disability of the elderly in China: a meta-analysis. *Chinese Journal of Gerontology*. 2020. 40(08):1671-1674. Peking University, Georgia Institute of Technology.

⁶² Wang Z, Yu H, Tang J, Yang H. Cognitive impairment rate of the elderly in China: a meta-analysis. *Chinese Journal of Evidence-based Medicine*, 2020, 20(11):1295-1300. Peking University

⁶³ Wang, Z., Yang, H., Guo, Z., Liu, B., and Geng, S. Socio-demographic characteristics and co-occurrence of depressive symptoms with chronic diseases among older adults in China: the China longitudinal ageing social survey. *BMC Psychiatry*, 2019, 19(1), 310. 10.1186/s12888-019-2305-2; Wang, Z., Yang, H., Zheng, P., Liu, B., Guo, Z., Geng, S.,... Hong, S. Life negative events and depressive symptoms: the China longitudinal ageing social survey. *BMC Public Health*, 2020, 20(1). 10.1186/s12889-020-09119-0. Peking University

Community inclusion to identify needs

Inclusive policy processes can help address the impacts of urban disease. In Cape Town, male same-sex communities experience high levels of HIV infection, violence and discrimination, especially in informal and low-income areas. Yet internationally driven HIV programmes often promote prevention and treatment, while overlooking core community needs, such as strategies to build resilience, tackle inequality and develop skills.⁶⁴ This risks fracturing the relationship between donor aid and male same-sex groups, potentially depriving the community of vital funding and support. To ensure long-term viability, donors should base programmes on participatory design, so they meet community needs.⁶⁵



Visit the PEAK project hub:
[- Health and sexuality in Cape Town](#)

⁶⁴Hassan N.R. and Tucker A. "We have to create our own community": Addressing HIV/AIDS among Men who have Sex with Men (MSM) in the Neupolis' Transactions of the institute of British geographers. 2021; 46: 598-611

⁶⁵Tucker A. What can homonationalism tell us about sexuality in South Africa?: Exploring the relationships between biopolitics, necropolitics, sexual exceptionalism and homonormativity. Journal of Gender Studies. 2020; 29(1): 88-101.



Optimising impact: Lessons from PEAK for development research

Section Overview

- The PEAK approach fosters a culture that expects and supports multidisciplinary working and engagement with external stakeholders at all stages of the research process – a disposition that bridges research and practice.

- Dedicated managerial and academic time and funding enhance research capabilities and ensure impact. PEAK academic leads supported early-career researchers from the global South and North alike. We started working groups that crossed disciplines; funded workshops, publications and spin-off projects, and built understanding of policy engagement as an essential research component.

- A multi-disciplinary approach delivers more than the sum of its parts, generating new combinations of knowledge and research methods that produce valuable findings for urban sustainability. Our teams drew on an inter-disciplinary, international network of academics, practitioners and policymakers, who leveraged synergies between findings in different fields.

- Collaborating with non-academic urban stakeholders yields richer insights. Our external collaborations spanned international organisations, development banks, city and regional governments, businesses, communities and urban practitioners, ensuring PEAK research was rooted in urban experience on the ground, and our findings are practical, appropriate and useable.

- Policy engagement is integral to high-impact research. Our awareness of policy dialogues – and frequent participation – informed the design and implementation of our research. PEAK's emphasis on influencing policy enabled researchers to help transform policymakers' understanding of the role of evidence in decision-making, and equip them with new tools, multi-disciplinary approaches and networks to inform future policy.

III. Optimising impact: Lessons from PEAK for development research

Achieving sustainable cities requires a step change in urban actors’ capacity to anticipate and plan for future challenges and opportunities. Our research shows how the PEAK approach can yield critical new insights to help achieve the shifts needed.

PEAK’s Theory of Change highlights “New ways of working” as a key pathway to generating these advances. Recognising established approaches to viewing the city and development planning as inadequate, the PEAK framework fosters a culture that expects and supports multidisciplinary working and engagement with external stakeholders at all stages of the research process. We identify this as less a “recipe” for interventions and more as a disposition that bridges research and practice. A PEAK Urban disposition interrogates, in specific contexts, how we combine a sensibility that draws *analytically* on how the city works, *normatively* on how we think the city should be organised and *operationally* on a sense of how we might best intervene in shaping our urban futures.

By developing a cohort of researchers with increased ability to work across disciplines and engage with policy processes, PEAK has helped ensure urban actors and researchers work effectively together to uncover insights and influence policies that can help create the sustainable cities of the future. This collaboration will foster new generations of leaders able to draw on different perspectives and backgrounds to address the greatest urban challenges of the 21st Century. It also offers valuable learning to inform future research-for-development programmes.

Dedicate resources to enhance research capabilities

From the outset, PEAK created an innovative research culture, driven by a new cohort of researchers able to work on urban issues across disciplines, with enhanced ability and networks.⁶⁶ Academic leads supported early-career researchers from global South and North alike, encouraging them to think beyond their usual discipline and to collaborate with all available tools and actors to address urban challenges. As a result, researchers worked across disciplinary silos throughout the programme, from project design to publishing in academic and non-academic outlets and engaging with external stakeholders. Many PEAK

early-career researchers have progressed to significant positions in academic and public life – a cost-effective way to strengthen urban research and policy to manage future challenges. Several key factors underpinned our successful support for researchers:

- **Shaping ground-breaking research projects**

We required all research projects to be interdisciplinary, challenge-led and impact focused, and to relate to one or more dimensions of the PEAK approach. Academics from different institutions carried out interdisciplinary peer reviews of a wide range of proposals. We initially selected 38 projects, identified locally to address context-specific challenges, harnessing existing research, relationships and academic expertise at all levels.



PEAK Urban retreat, Bangalore

- **Supporting collaborative research**

Researchers received one-to-one mentoring from senior academics, covering project design and implementation, external relationships and collaboration, and career development. Our teams also benefitted from mentoring and peer-to-peer learning across international institutions at three annual retreats, and ongoing dialogues via thematic working groups and work-in-progress meetings. These enabled us to share emerging findings, gain interdisciplinary insights and hone skills in explaining research to new audiences. We started working groups that crossed disciplines, and provided countries with seedcorn funding for workshops, publications and spin-off projects. We also planned for internships in different partner institutions for all early-career researchers, although this programme was curtailed by the Covid pandemic.

- **Building skills for policy impact**

PEAK’s understanding of policy engagement as an essential research component inspired our teams to engage with non-academic stakeholders, particularly global institutions. Academic leads ran policy engagement workshops, helping researchers

⁶⁶ Developing New Ways of Working. PEAK Urban impact case study. June 2022. https://www.peak-urban.org/sites/default/files/2022-06/developing_new_ways_of_working_peak_impact_case_studies_0.pdf

understand impact, identify potential contacts and make research compelling. We used impact planning templates and offered communications training to help our teams shape key messages for non-academic audiences.

Our approach shows the importance of future programmes such as PEAK allocating dedicated managerial and academic time and funding to capacity-building activities. Funding for translation of outputs and at meetings also boosts collaboration between researchers with differing first languages.

“We brainstormed the problem with researchers with very different expertise, which helped us to think creatively, break down boundaries and develop innovative solutions in a very short time”.

Jairo Alejandro Gomez Escobar,
Research Team Leader, Colombia

Multi-disciplinary research delivers more than the sum of its parts

PEAK’s multi-disciplinary approach created new synergies, combinations of knowledge and generated research methods that produced valuable findings for urban sustainability. The strength of this approach is reflected in the number of papers our researchers co-authored across disciplines and institutions. **By autumn 2022, Peak Urban had generated over 400 research publications (with more to be published 2023 and 2024), 344 workshops, conferences and engagements with city stakeholders, 24 collaborations and partnerships, and 32 further research grants.**

Our Colombia team, for example, drew on an inter-disciplinary network of academics, practitioners and policymakers, who leveraged synergies between findings on public health, the built environment, green space and

climate change. Their exchanges provided more effective solutions to urban problems than siloed approaches, offering important lessons for other countries on urban improvement and renovation.

“In Colombia, researchers normally work only in their specific area,” says Jairo Alejandro Gomez Escobar, who led a PEAK research team modelling future demand for utilities. “We brainstormed the problem we wanted to address with researchers with very different expertise, which helped us to think creatively, break down boundaries, and develop innovative solutions in a very short time.” Contacts across the PEAK global team have further extended the team’s perspectives. The group went on to collaborate with PEAK colleagues in China and India, extending their research network and learning from new contexts and approaches.

Collaborating with stakeholders yields richer research insights

By developing research and policy recommendations in collaboration with non-academic urban stakeholders, we ensured PEAK research was rooted in urban experience on the ground, and our findings are practical, appropriate and useable. External collaborations spanned international organisations, development banks, city and regional governments, businesses, communities and urban practitioners, co-creating knowledge and inspiring joint action towards sustainable cities.

In Cape Town, for example, our researchers held 12 monthly multi-stakeholder seminars,⁶⁷ allowing a wide range of actors from city, provincial and national government, the private sector, NGOs, urban planning and different academic disciplines to exchange and develop new ideas on aspects of localising the Sustainable Development Goals (SDGs). These included local financing for the goals, citizen-centric approaches to achieving them, and the need to improve data for monitoring and reporting. The seminars brought together around 150 participants from diverse backgrounds, who co-produced knowledge that helped align Cape Town’s Resilience Strategy with the SDGs, built strong new connections to strengthen progress, and fed into the global community of practice on SDG localisation.

We also engaged and collaborated with urban dwellers – particularly marginalised and low-income groups – to share their views with policymakers, promoting more equitable urban policy. In Colombia’s Itagüí municipality, our team convened a group of 40 low-income women to co-create our research with people most affected by local issues.⁶⁸ We also engaged with representatives from national, municipal and local government, ensuring that

⁶⁷ Croese S. Talking SDG implementation in Cape Town. PEAK Urban blog. June 2019. <https://www.peak-urban.org/blog/talking-sdg-implementation-cape-town>

⁶⁸ PEAK Urban. Communities, accessibility, and healthy living in itagüí. Project overview. <https://www.peak-urban.org/project/communities-accessibility-and-healthy-living-itagui>

decision-makers were part of the conversation from the start. The resulting policy brief summarised the women’s views on issues including transport and healthcare.⁶⁹ As a result, the authorities adopted recommendations into the 2020 municipal development plan and strengthened the relationship between communities and powerholders, enhancing capacity for future sustainable development.

Visit the PEAK project hub:

- [Communities, accessibility and healthy living in Itagüí](#)

Working with the World Bank, our researchers in Colombia also explored urban productivity, through research spanning economics, planning and geography. We highlighted ways that countries should strengthen metropolitan authorities to help increase productivity.⁷⁰ These findings are now being used in World Bank dialogues with national and local governments in Latin America about job creation and economic development.

Policy engagement is integral to high-impact research

PEAK’s emphasis on influencing policy enabled our researchers to help transform policymakers’ understanding of the role of evidence in decision-making, and equip them with new tools, multi-disciplinary approaches and networks to inform future policy. Our awareness of policy dialogues – and frequent participation – informed the design and implementation of our research projects. In many cases we answered important urban questions collectively, lending our expertise, methods and tools to address pressing local issues. All PEAK projects identified key stakeholders from the start, positioning our researchers as trusted collaborators, often invited to support subsequent planning processes. This cooperative process has already demonstrated impacts which promote more inclusive and equitable development.



Image credits: Unsplash

⁶⁹ Orjuela J.P., Giraldo D. and Morales, N. Comments to the draft document of the Development Plan: Itagüí, city of opportunities 2020-2023. PEAK Urban policy briefing. 2022. https://www.peak-urban.org/sites/default/files/2022-03/peak_-_comentarios_al_borrador_de_las_bases_del_plan_de_desarrollo_-_itagui_ciudad_de_oportunidades_2020_-_2023_final.pdf

⁷⁰ Duque JC., Lozano-Gracia N., Patino JE., Restrepo P. Urban form and productivity: What shapes are Latin-American cities?: <https://doi.org/10.1177/2399808321999309> [Internet]. 2021 Mar 8 [cited 2022 Feb 6];49(1):131-50. Available from: <https://journals.sagepub.com/doi/10.1177/2399808321999309>

Research-based policies to upgrade Beijing's fringe

In many Chinese cities, rapid urban expansion has created "urban fringes" which often encompass rural areas, but lack the employment opportunities, services and transport links of older city neighbourhoods. Although integrated urban-rural development has been a national policy since 2003, competing land-use plans at different levels of government fail to ensure adequate housing, productive agriculture or thriving industry in fringe areas such as Chaoyang. The largest of Beijing's six "Urban Districts", Chaoyang is a former rural area that has become increasingly developed in recent decades. Government policies have resulted in industrial growth, but the challenge of achieving people-centred urban development – including housing, employment, infrastructure and public services – remains.

Seeing new approaches to rural integration

In response, when Chaoyang's authorities began developing the district's 14th Five-Year Plan (2021-2025), they sought academic and technical expertise to help them create new approaches to urbanisation. When they invited tenders for this work, PEAK colleagues at Peking University recognised that our research into urban villages could offer significant insights. Awarded the contract in 2019, PEAK researchers were tasked with reviewing progress against the previous five-year plan, identifying opportunities and challenges ahead, and making recommendations to promote integrated urban-rural development.

The PEAK approach was ideally suited to Chaoyang's context. As a multi-dimensional goal, urban-rural integration draws on understanding of both traditional and emerging systems of governance and development. It also requires knowledge, approaches and technologies from different disciplines, such as ethnography, urban science and technological innovation. Our team carried out surveys, focus groups and discussions with stakeholders including local authorities, village governance committees and residents. They also used detailed data analysis to inform a range of proposals, submitted in 2021, to boost rural development, modernise industry and agriculture, and ensure social protection and services for rural residents.

These proposals included strengthening finance for rural infrastructure by raising funds from international and private investors; developing the digital economy and high-end tech industries; improving environmental protection through measures such as reduced air pollution; modernising agriculture, and integrating rural dwellers into the urban social security system.

Translating research into life-changing policies

In dialogue with Chaoyang's authorities, the PEAK team transformed the initial recommendations into 17 practical and measurable indicators in the district's new Urban-Rural Integration Five-Year Plan. At a symposium in March 2021, the Director of Chaoyang District Rural Affairs Committee, Lijuan Chen, highlighted the importance of PEAK's research in shaping the plan, emphasising its new approaches and clear framing – including costings – of what could be realistically achieved.

If fully implemented, the plan will help evolve the governance of urban fringe areas, promoting modern industrial and agricultural development, improving incomes and services, and delivering significant benefits for low-income communities. It is projected to help improve the lives of 80,000 farmers, increase rural residents' income by 30 per cent, support 1.5 million migrant residents and improve the environment by 2025 – allowing all Chaoyang's residents to share the benefits of development.

IV

**Driving urban change,
global to local:
PEAK in action**

Section Overview

At an international level, we are collaborating with multi-stakeholder allies to engage policy experts from governance systems worldwide around a new narrative of sustainable urban development. We participated widely in key global events such as COP26, and hosted two high-level, two-day international meetings in 2022 to support progress towards the SDGs and embed the PEAK approach. This work is ongoing, with more high-level events planned to disseminate findings and influence policy.

PEAK is already providing bespoke solutions at national and city levels, from cutting-edge analysis of migration trends to inform China's 14th Five-Year Plan, to recommendations to India's XV Finance Commission to shape policy on national-state financial relations. In Colombia, we worked closely with public utility company EPM to develop a model which predicts water need from urban growth forecasts, helping ensure new infrastructure meets future demand.

Shaping Urban Futures, PEAK's massive open online course (MOOC) provides a free global showcase of the PEAK Urban approach to an international multi-stakeholder audience. The course includes 36 films and 30 contributors, and is supported by webinars, to strengthen stakeholders' capacity to develop sustainable cities in diverse contexts worldwide.

IV. Driving urban change, global to local: PEAK in action

PEAK’s deep engagement with ongoing global, regional and city policy processes is reflected not just through partnerships in research design and implementation, but in joint participation in events that shape the policy agenda and governance systems at all levels. This collaborative dialogue facilitates global learning and knowledge integration to inform policies that can successfully create sustainable urban futures.

Helping shape the global agenda

At international level, we are working with urban stakeholders to reinvigorate the momentum behind inclusion of a dedicated goal on cities in the 2015 Sustainable Development Goals (SDGs). World events, including Covid-19, have since limited space for urban concerns on the global agenda – despite cities’ critical role in equitable, sustainable development. Yet urban development which embraces city-specific complexity is a powerful component of highly interdependent, complex global development.

- In response, we are collaborating with urban stakeholders to galvanise political interest in the global agenda for cities, positioning cities as key international decision-making spaces. With our allies, we are engaging with policy experts within governance systems worldwide around a new narrative of sustainable city development, built on recent understanding of urban complexity and systems. Together, we are participating widely in high-level global events, motivating the international community to embrace cities’ key role in international efforts to tackle issues such as inequality and climate change. Highlights from many examples include:
- **UN Sustainable Development Goal reviews, 2019**
In collaboration with UK Research and Innovation, and the Global Challenges Research Fund (GCRF), PEAK Urban convened a workshop in New York immediately before the first review of SDG 11, on sustainable cities. Bringing together key researchers across GCRF-funded projects, the workshop linked with US-based stakeholders and researchers engaged in the SDG review process, to share insights and identify the most

effective ways to feed into the reviews and consider progress towards SDG 11 in particular.⁷¹



Michael Keith speaking at UN Habitat 2020

- **World Urban Forum, 2020**

At the 10th World Urban Forum in Abu Dhabi, we hosted a networking event, collaborating with UN-Habitat and Chengdu City Government and focusing on “Interdisciplinary dialogues on economic opportunities and shared prosperity driven by technological innovations”. This provided stakeholders and experts with discussion space on recent technological changes, such as digitisation, robotics and artificial intelligence, that are often seen as reducing job opportunities, especially for vulnerable low-income workers, and generated a major publication edited by PEAK Urban and published by UN-Habitat.⁷² The dialogue addressed ways in which new technologies can trigger business opportunities, job creation and economic growth, including through smart wealth distribution to reduce inequalities; stronger urban governance, and public-private partnership models tailored to address new urban challenges.

⁷¹ UN SDG Summit, 2019. Summary, Political Declaration, Statements and Report. <https://sustainabledevelopment.un.org/sdgsummit>

⁷² UN-Habitat. Future Cities, New Economy, and Shared City Prosperity Driven by Technological Innovations. 2020

- **Innovate4Cities, 2021**

At Innovate4Cities,⁷³ a virtual global event organised by UN-Habitat and the Global Covenant of Mayors for Climate and Energy, we led a panel discussion on climate-resilient urban development, followed by group discussions around the PEAK disposition by participants from the public sector, academia and civil society organisations. Drawing on our research approaches and experiences, panellists explored how global climate change will be both accelerated and mitigated through city systems. Discussions underlined the importance of understanding complex urban environments before designing effective, bespoke policy responses to reduce the impacts of climate change. This requires systematic research into how cities can develop the governance, financial and social structures needed to manage urban transition in varying contexts across the world. Participants emphasised the strategic need for global participation, including funders channelling research grants to scale capacity in the global South.



Juan Pablo Orjuela, speaking at the Resilience Hub, COP 26

- **COP 26 (2021): Harnessing PEAK to tackle the climate crisis**

Embracing the links between issues such as informality, health, climate justice, equity and equality, we joined events throughout COP26, positioning the PEAK disposition as a critical starting point for action on the climate emergency.⁷⁴ Alongside partners including Google, Arup, the Climate Chance Association, UK Research and Innovation, the Oxford Martin School and the World Resources Institute (WRI), we presented numerous examples from our research, highlighting how individual contexts impact the ways cities can address their futures in relation to the climate crisis.



Michael Keith speaking at the World Resources Institute, COP 26

During COP's inaugural Cities Day, at a high-level event hosted by WRI on the critical role of equity in cities as the bedrock for transformative climate action, we presented key PEAK findings in a panel discussion, and how our approaches can be scaled up for global impact in increasing equity. We also hosted an online event, Understanding Systems and Tools for Change in Cities, launching a framework for change based on the PEAK approach and WRI research into inequalities in urban service delivery. The session emphasised our call for stakeholders to fund city-focused research and knowledge exchange activities in low-and middle-income countries, to increase equitable, sustainable urban service provision.



Francisco Obando, with Mayor of Itagüí in Columbia, speaking at COP 26

Critically, we brought community voices to Cities Day at the COP, leading an event offering policymakers and investors ways to enhance urban resilience by listening to local people during infrastructure design and adaptation. Researchers, partners, practitioners and communities from PEAK regional hubs explored aspects of the PEAK approach calling for use of technology and big data methods alongside community inclusion, to deliver infrastructure initiatives for resilient cities. Presenters showed how tools such as Google's Environmental Insights Explorer and PEAK's big data innovations in Colombia enable prediction; how solutions to

⁷³ Innovate4Cities 2021. UN-Habitat and the Global Covenant of mayors for Climate and Energy. <https://www.innovate4cities.org/>

⁷⁴ COP26 Resilience Hub Synthesis Report, Key messages and future directions. 2021. <https://www.resilienceshift.org/wp-content/uploads/2021/12/COP26-RH-Synthesis-Report1.pdf>. 22-23.

Indonesia’s housing shortage emerge when informal urban settlers are supported to maintain and upgrade self-built housing, and how Ugandan authorities partnered with non-profits, community groups and small businesses to adopt innovations to improve sanitation. A women’s group that co-produces research with PEAK in Medellín, Colombia, described helping shape the municipal plan, while the local mayor explained how the community’s knowledge enabled the municipality to overcome challenges in delivering infrastructure that enhances resilience.



Dimú, Women’s group, Itagüí

- **Advancing the Global Urban Agenda: 2022 and beyond**

In 2022, we hosted a high-level, two-day international event in Oxford to support ongoing progress towards the SDGs and embed the PEAK approach in future urban enquiry and action. Participants included senior members of leading universities worldwide and international bodies, including the OECD, UN-Habitat, the World Health Organisation and the Inter-Governmental Panel on Climate Change, and sustainability experts. Together, we assessed activities and capabilities in specific organisations and sectors, mapping urban initiatives and capabilities at the global scale, and identifying priorities for the next three years, on the pathway to the 2030 SDG deadline. We identified strategic entry points to advance the global urban agenda, such as initiating a G7/G20 pact on sustainable urbanisation.⁷⁵ We also defined funding needs and opportunities, and ways to strengthen the global urban agenda and engage the global South more directly in future urban processes. A set of recommendations from the workshop was published in Nature Sustainability.⁷⁶



PEAK Urban at Advancing the Global Urban Agenda, Oxford

Driving localised change

As well as helping drive global dialogue on sustainable urban futures, PEAK is already providing bespoke solutions at national and city levels.

Informing national urban strategy in India and China

In China, the state Academy of Macroeconomic Research asked Peking University to provide a cutting-edge analysis of migration trends to help shape the country’s 14th Five-Year Plan for National Economic and Social Development (2021-2025). In a widely acclaimed report, our research team at Peking University drew on PEAK findings on what motivates urban-urban migrants’ choice of destination to highlight emerging patterns and mechanisms of migration.⁷⁷ Based on PEAK’s contribution to the five-year plan, the team has since been advising China’s National Development and Reform Commission on migration policies.

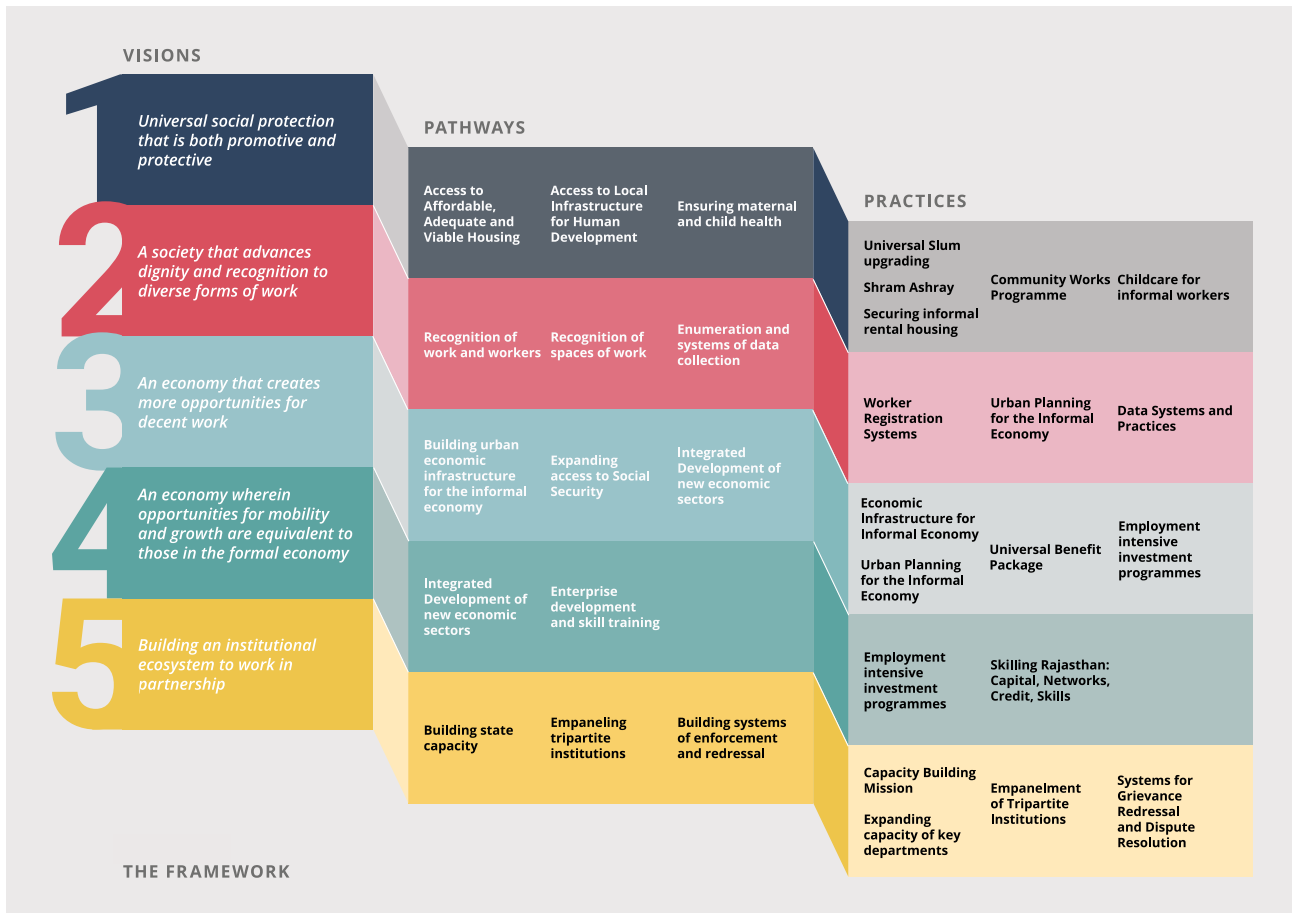


Image credits: Unsplash

⁷⁵ Buchoud N., Keith M., Parnell S. and van der Pütten M. A G7/G20 Pact for Sustainable Urbanisation? Building on the Positive Legacy of Italy’s G20 Presidency. Instituto Affari Internazionali. February 2022. <https://www.iai.it/en/pubblicazioni/g7g20-pact-sustainable-urbanisation>

⁷⁶ Keith M., Birch E., Buchoud N., Cardama M., Cobbett W., Cohen M., Elmqvist T., Espey J., Hajer M., Hartmann G., Matsumoto T., Parnell S., Revi A., Roberts D., Saiz E., Schwanen T., Seto K., Tuts R. and van der Pütten M. A new urban narrative for sustainable development. Nature Sustainability. October 2022. <https://doi.org/10.1038/s41893-022-00979-5>

⁷⁷ Liu, T. (2021). The influence of population distribution on the optimisation strategy of spatial layout of urbanization in China. In G. Gao & B. Liu (Eds.), Study on the Optimization Strategy of Spatial Layout of Urbanization in China (pp. 128-173). Beijing: China Social Sciences Press. <https://www.sklib.cn/booklib/bookPreview?SiteID=122&ID=9319855&fromSubID=316>



Five Vision statements presenting long-term goals IIHS created for the Government of Rajasthan

Indian authorities also asked PEAK researchers to inform national policy, by sharing research with the country's XV Finance Commission, tasked with developing recommendations on national-state financial relations for 2021-2026, and with the unique role of planning India's post-pandemic economic recovery. Our team drew on PEAK insights to recommend innovative strategic measures to promote urbanisation and economic growth at national, state and local levels.⁷⁸ We also addressed the potential of new greenfield cities to support economic recovery. These recommendations will help guide large-scale investment by India's government to reduce regional inequality and drive economic growth.



Image credits: Pexels

⁷⁸ Revi, A., Ray, M., Mitra, S., Anand, S., Sami, N., & Malladi, T. (2020). Report to the XV finance commission on the potential of urbanisation to accelerate Post-COVID economic recovery. Indian Institute for Human Settlements.

Image credits: Adobe Stock

Optimal resource use: Predicting city-level utility demand

PEAK's collaboration with Colombian public utility company EPM shows not only how the PEAK approach promotes sustainable service delivery, but the value of our collaborative, multi-stakeholder ways of working.

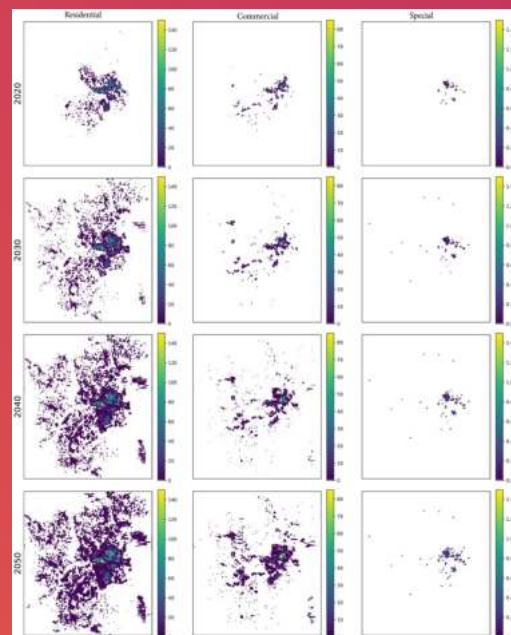
When they joined PEAK in 2018, our researchers in Colombia wanted to develop flexible models to predict urban growth, strengthening cities' capacity to plan for sustainability. They had already developed a ground-breaking model to predict demand for water, combining complex mathematical modelling and detailed historical information about water connections. The model has been used by Colombian utility company EPM to plan infrastructure and services more effectively since 2014, but its information requirements and complex rule-based modelling made it difficult to adapt to different contexts.

In response, drawing on multi-disciplinary expertise, the PEAK team developed "Urban Pixel", a new data-driven model using machine learning to analyse freely available satellite images.⁷⁹ We tested the model in two cities with different growth patterns and characteristics, showing how certain policy decisions – such as setting a target maximum population capacity – can result in more compact, sustainable cities. In 2019, EPM asked us to develop Urban Pixel into a bespoke tool to predict water demand in any context. Our researchers worked closely with experts from EPM over seven months to adapt the model, combining specialist market knowledge with data-driven modelling in a rich collaborative

process. Together we developed "Newton", a model which predicts water need from urban growth forecasts using satellite images, and trained colleagues at EPM to run the software.

"Now it's easy for us to predict future water demand in existing markets or those we want to explore," says Juan Camilo Hurtado, Planning Professional at EPM. "We can download satellite images, feed them into the model and quickly get a detailed report on how an urban area is growing and what this means for water consumption in 20, 30 or 40 years."

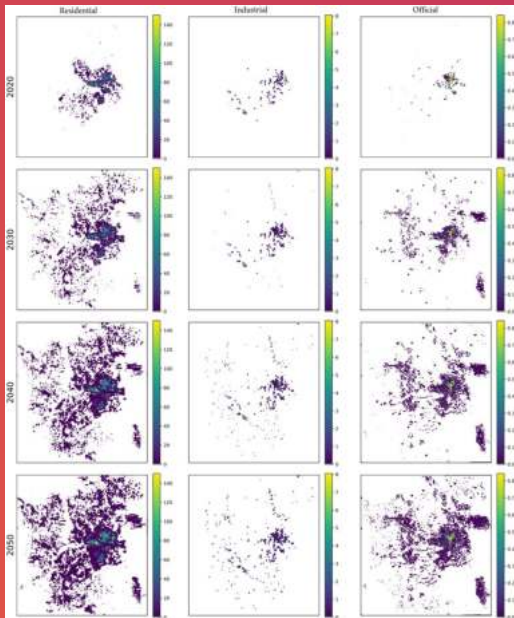
Figure 11. Maps with aqueduct connection predictions from 2020 to 2050 for the residential, commercial, and special users in Rionegro (Antioquia), Colombia



Source: Gómez JA., Patiño JE., Duque JC. [Newton: forecasting water demand with data-driven urban growth modeling](#) Jairo Alejandro Gómez Escobar

⁷⁹ Gómez JA., Patiño JE., Duque JC., Passos S. Spatiotemporal modeling of urban growth using machine

Figure 12. Maps with aqueduct connection predictions from 2020 to 2050 for the residential, industrial, and official users in Rionegro (Antioquia), Colombia.



Source: Gómez JA., Patiño JE., Duque JC. [Newton: forecasting water demand with data-driven urban growth modeling](#) Jairo Alejandro Gómez Escobar

Benefits across stakeholders

EPM is running Newton in urban areas where it already supplies water, to help it better understand how to use the model to improve services and plan future utility provision – including outside Colombia. “The provision of water infrastructure is often based on poor estimates of where and when it might be needed,” says Hurtado. “If people don’t move to an area as quickly as expected, it could be years before facilities are used and generate a return. Newton allows for accurate planning, making sure the infrastructure we build meets future demand. This will enable us to improve the efficiency, value for money and quality of our services – and help us move into new markets with confidence.”

Customers should benefit from lower water tariffs and infrastructure built to meet their needs. EPM also believes the model will reduce environmental damage caused by inappropriate development and assist the urban planners it works with. “Municipal authorities usually base predictions on intuition,” explains Hurtado, “but it’s useful to have a tool to help them plan more precisely. This can help ongoing conversations... What kind of city do they wish to see? What action should they take to achieve this?”

Visit the PEAK project hub:
[- Urban form and its impact on sustainable development](#)

Shaping Urban Futures: PEAK’s open-access online course

Through the [Shaping Urban Futures](#) massive open online course (MOOC), we are providing a free global showcase of the PEAK Urban approach, to bring new ways of seeing cities to a multi-stakeholder audience worldwide. Speaking from and reading across unique places internationally, the MOOC involves 36 films and 30 contributors from across the world. It is structured around the PEAK Urban disposition, to address urban challenges that are analytical in making sense of how cities work, normative in raising ethical dilemmas about how cities should work, and operational in making us think creatively about the best ways to intervene in their practices, shape and form. Shaping Urban Futures was launched in September 2022 on the Coursera MOOC platform, in partnership with the UN Sustainable Solutions Development Network. In the first few months, more than 1500 people had enrolled. We are promoting the course through webinars hosted by each of the five PEAK partners (ACC, EAFIT, IHS, Oxford and PKU) over the following 24 months, to strengthen stakeholders’ capacity to develop sustainable cities in diverse contexts worldwide.



Enrol on coursera



V

Sustainable urban development: A new narrative

Section Overview

- The PEAK Urban approach emerged from diverse global academic practice and feeds back into it, in a recurrent and iterative process, which sees urban contexts as sites for reconsideration of transdisciplinary sustainability sciences.

- By using the PEAK approach, urban actors can unleash a wide range of tools to predict urban trends, understand how city systems interact and emerge, and design evidence-based interventions to promote sustainability in individual urban contexts.

The approach identifies the appropriate operational space in the city to intervene, from urban acupuncture in small neighbourhoods, to city sovereignty or national regulation.

- PEAK's experience also shows the need for urban stakeholders to work together beyond city or national level to set a global urban agenda that helps humanity respond to pressing 21st-century social and environmental challenges.

V. Sustainable urban development: A new narrative

What we describe in this report as the PEAK Urban approach to complex urban problems was co-designed by an alliance of scholars in five countries, who shared an interest in practical engagement in city futures, but whose roots were in different scientific and scholarly traditions. The PEAK Urban approach consequently emerged from our practice and fed back into it. The projects we developed were not determined by a central programme, but were designed to respond to the PEAK Urban disposition, in a process both recurrent and iterative.



In this sense, the PEAK Urban approach argues for the importance of seeing urban contexts as sites for reconsideration of transdisciplinary sustainability sciences. It is not making a case for a particular governance structure in cities. As we have seen throughout this report, the city is a space in which many systems come together and impact on each other – systems of food provision, economic life, mobility and transport; public health and cultural formations; ways of dwelling and working. Multiple governance regimes crisscross urban spaces within and beyond the city boundaries. Their logics shape configurations that vary from one country to another, structured by local debates around variable alignments of governance institutions. But the PEAK Urban approach is not about the governance of cities, or their right to govern themselves. The approach addresses the power of cities – not just city powers, but identifying the appropriate operational space in the city to intervene. This might be in the spirit of urban acupuncture in small neighbourhoods, or at the level of national regulation, as much as at the scale of city sovereignty.

We believe that the urban disposition we root at the heart of our approach recognises both the power of science and the significance of how science lands in place and addresses interfaces between economic, social and environmental systems. In this sense, we believe that our programme of work proffers different ways of thinking about the relationship of research and intervention, theory and practice, science and society. This way of thinking might be extended powerfully to other cities at other times. The PEAK Urban disposition is validated by the evidence of this report and provides promising opportunity for further collaboration globally.

Generating insights to address rapid change

While local and national governments have made great efforts to increase the sustainability of cities in recent years, there are still multiple challenges ahead if we are to meet the SDGs by 2030 and ensure productive, enjoyable lives for all city dwellers. By using the PEAK approach, urban actors including researchers, policymakers, funders and practitioners can unleash a wide range of tools to predict urban trends, understand how city systems interact and emerge, and design evidence-based interventions to promote sustainability in individual urban contexts.

Our research shows that by working with the widest range of stakeholders across all sectors, linking local to global, building knowledge and integrating city systems, it is possible to optimise the bridge between research and practice. Urban planners can draw on well-designed research to identify innovative solutions which address multiple SDG targets simultaneously. Given the rapid speed and deep uncertainties of urban development, we need new ways to gain insight into all aspects of city life, from people's mobility patterns during lockdown, to predicted population growth and service needs, or the future increase in formal employment. PEAK offers an important new approach to generate and curate new data, to navigate this process and guide prediction, understand emergence, inform adoption and share knowledge. Our approach delivers specific insights enabling policymakers to transform urban sustainability worldwide over the next decade, responding to the realities of cities as they emerge, rather than trying to mould them into forms that ignore the underlying drivers of urbanisation.



Placing cities at the forefront of sustainable development

PEAK's experience also shows the need for urban stakeholders to work together beyond city or national level to set a global urban agenda that helps humanity respond to pressing 21st-century social and environmental challenges – including the inequities exposed by Covid-19. Our approach can support the global urban community in placing sustainable city development at the forefront of international governance, allowing us to trace a new narrative of what sustainable urban development really is, and what it offers policymakers.

By directly embracing complexity, PEAK's approach to urban development gives a pertinent, practical approach to implementing a global, highly interdependent and complex sustainable development agenda. By supporting the creation of interconnected networks of knowledge and action, and new tools to optimise urbanisation processes, PEAK can help deliver environmentally, economically and socially sustainable cities, inclusive of all their people and fulfilling their crucial role in achieving the SDGs.

To find out more about PEAK and how our approach can help you:

Email peakurban.director@compas.ox.ac.uk or sign up for our online course, [Shaping Urban Futures](#).

For a wide range of project overviews, journal articles, policy and research briefings, and blog discussions, visit our project pages at www.peak-urban.org.

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Read the related Country Synthesis Reports:

[China](#)

[Colombia](#)

[India](#)

[South Africa](#)

V.I.

Resources

VI. Resources

Visit the PEAK Urban project hubs for more detail on the research and outputs of the projects profiled in this report, and the many others in the PEAK programme:

- [Urban form and its impact on sustainable development](#)
- [Analysing human settlements transformation in Cape Town](#)
- [Everyday mobilities in African transport systems](#)
- [Internal migration and urbanisation in China](#)
- [The past, present, and future of urban footprint growth of Latin American cities](#)
- [Urban housing and land use in China](#)
- [Mega-city region and metropolitan area development](#)
- [Assessing SDG localisation in Cape Town](#)
- [Transitional cities in the global south and their contribution to SDG implementation: governance and power relations in Medellín](#)
- [Economic challenges of Latin American cities within the framework of the SDG: a disruptive vision on how to tackle them](#)
- [Linking the environment and risk of respiratory infection in children in Sub-Saharan Africa](#)
- [Population healthcare research based on big data](#)
- [Health and sexuality in Cape Town](#)
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- [Experiencing state informality: social inequality and spatial relations in urban India](#)
- [Cellular automata urban simulation](#)
- [Developing scalable a method to assess urban greenspace and associated health disparities in the global South](#)
- [Exploring the complex relationship between environment and health using machine learning](#)
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- [Global land enclosures, urban technology and experimental property in Medellin's comunas](#)
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- [Urban informality and resilience: new methods, old questions](#)
- [Spatialising residential neighbourhoods using urban big data](#)
- [Big-data-driven transport planning and governing in the post-colonial smart city](#)
- [Pollution and poverty](#)
- [Climate-related mobilities and the informal city](#)
- [Measuring urban economics](#)
- [Machine learning for informal settlement health](#)
- [Metropolitan development and land-based financing](#)
- Explore [PEAK's research on informality](#) in partnership with the Oxford Martin School.

About us

The PEAK Urban programme aims to aid decision-making on urban futures by:

1. Generating new research grounded in the logic of urban complexity;
2. Fostering the next generation of leaders that draw on different perspectives and backgrounds to address the greatest urban challenges of the 21st century;
3. Growing the capacity of cities to understand and plan their own futures.

In PEAK Urban, cities are recognised as complex, evolving systems that are characterised by their propensity for innovation and change. Big data and mathematical models will be combined with insights from the social sciences and humanities to analyse three key arenas of metropolitan intervention: city morphologies (built forms and infrastructures) and resilience; city flux (mobility and dynamics) and technological change; as well as health and wellbeing.

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Our framework



The PEAK Urban programme uses a framework with four inter-related components to guide its work.

First, the sciences of **Prediction** are employed to understand how cities evolve using data from often unconventional sources.

Second, **Emergence** captures the essence of the outcome from the confluence of dynamics, peoples, interests and tools that characterise cities, which lead to change.

Third, **Adoption** signals to the choices made by states, citizens and companies, given the specificities of their places, their resources and the interplay of urban dynamics, resulting in changing local power and influencing dynamics.

Finally, the **Knowledge** component accounts for the way in which knowledge is exchanged or shared and how it shapes the future of the city.

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Infographics: Research Retold Ltd

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PEAK Urban is a partnership between:

