PEAK Urban

The application of granular economic data for improved planning and decision-making in Indian cities

Author: Herry Gulabani, Viola Lewis, Shriya Anand

Indian Institute for Human Settlements

Introduction

To plan effectively for sustainable, inclusive cities, policymakers and planners need granular data on urban economies as outlined in our companion policy brief [i]. To address this need, our research has compiled such a dataset for the Indian city of Bangalore, covering formal and informal firms across different kinds of economic activities at a high level of spatial granularity. We constructed this dataset using India's Economic Census, and by filling in the known gaps using a spatial, rule-based merge with the Karnataka Common Business Register.

In this brief, we present applications of this newly constructed dataset for understanding Bangalore's urban economy, and make a case for how this can play an important role to support better economic and urban planning for Indian cities.

Key Insights

1. Bangalore has a very diverse economy, consisting of low-tech manufacturing, high-tech manufacturing and knowledge-intensive services.

2. The different economic activities important for Bangalore's economy display different spatial clustering patterns, connected to the historical evolution of the city's economic growth across locations and the infrastructure required for these activities.

3. While Bangalore's planning and policymaking has focused heavily on the IT industry since the 1990s, this data presents locations of other dense and vibrant clusters of firms which are major contributors to the city's economy and employment.

4. The Economic Census offers potential for understanding the urban economy, due to its granular nature and the diverse information available. Planners and policymakers can leverage this granular data to build comprehensive economic strategies for Indian cities and make better investment decisions for promoting local economic development.

i PEAK Urban. The need for real-time and granular data to study the urban economy. Research brief. 2022. "**https://www.peak-urban.org/sites/default/files/2022-07/the_need_for_real_time_and_granular_data_to_study_the_urban_economy.pdf**"

What hangs in the balance?

In its May 2022 report, NITI Aayog, the nodal Government of India agency responsible for promoting economic development, proposed developing comprehensive economic plans for Indian cities to "harness the economic potential of all cities, large and small, including the Tier 2 and 3 [1]cities, to take on the mantle in the future". The economies of Indian cities are very diverse, with a large majority of employment concentrated in small and informal firms. This means that in order to realise the country's urban economic potential, policymakers need timely, granular data which enables comprehensive profiling of urban reality on the ground.

Cities across the world use economic data to understand and identify target areas for investment – for example, transportation or economic infrastructure in Sao Paulo; targeted investment funds such as London's Regeneration Fund and Growing Places Fund, or improving poor neighbourhoods' access to better economic opportunities in Johannesburg. India's Economic Census has the potential to close this data gap for Indian cities, due to its granular nature and diverse information on enterprises' features, including sector, size, ownership and operations.

In this brief, we present three applications of the dataset we constructed using the Economic Census (EC 2013) and the Common Business Register (CBR 2013) for Karnataka, which we refer to as the Comprehensive Economic Dataset (CED). We make the case for how the dataset offers a better understanding of the city's economy and how decision-makers could use this understanding for economic planning and to devise targeted investment strategies in the Indian context.

Applications of granular urban economic data

• Mapping Bangalore's economic geography

Based on the CED, this section shows how economic data at a high level of spatial granularity can be used to map the geography of employment in Bangalore.

The location map in Figure 1 shows manufacturing as concentrated in the west of the city, and knowledge-intensive services such as information technology (IT) and professional and financial services in the east. Many of these industrial cluster locations are influenced by historic policy decisions. For instance, Peenya, an industrial area in north-west Bangalore planned and developed by the state of Karnataka in the 1970s, is still one of the largest industrial hubs in the state. The IT corridor has expanded into south-east Bangalore, partly due to the government setting up Electronics City in 1976, and later the Information Technology Park Limited in Whitefield in East Bangalore (Heitzman, 2004; Nair, 2005). Electronics City was an industrial estate that housed the country's first technology park to attract export-oriented units. Leveraging the locations of these

1 The census of India classifies urban areas based on population. Tier 1 cities are cities with more than 100,000 population, Tier 2 cities have a population of 50,000 to 99,999 and Tier 3 cities have population between 20,000 to 49,999.

investments, the city planning authority later started actively promoting the establishment of high-tech industries here, along the Outer Ring Road (Bangalore Development Authority, 2007).

Mapping the economy at such a granular scale can help policymakers evaluate the impact of historic policies and infrastructure investments to inform future decisions on planning for economic growth.

Further, this mapping helps planners identify various economic clusters that contribute to the city's development, especially clusters of small-scale industries. These small-scale industrial clusters are important contributors to the city's employment and economy, but are not as visible in planning processes as large-scale IT industries, which have been a major focus of the state's economic policy and local planning decisions.

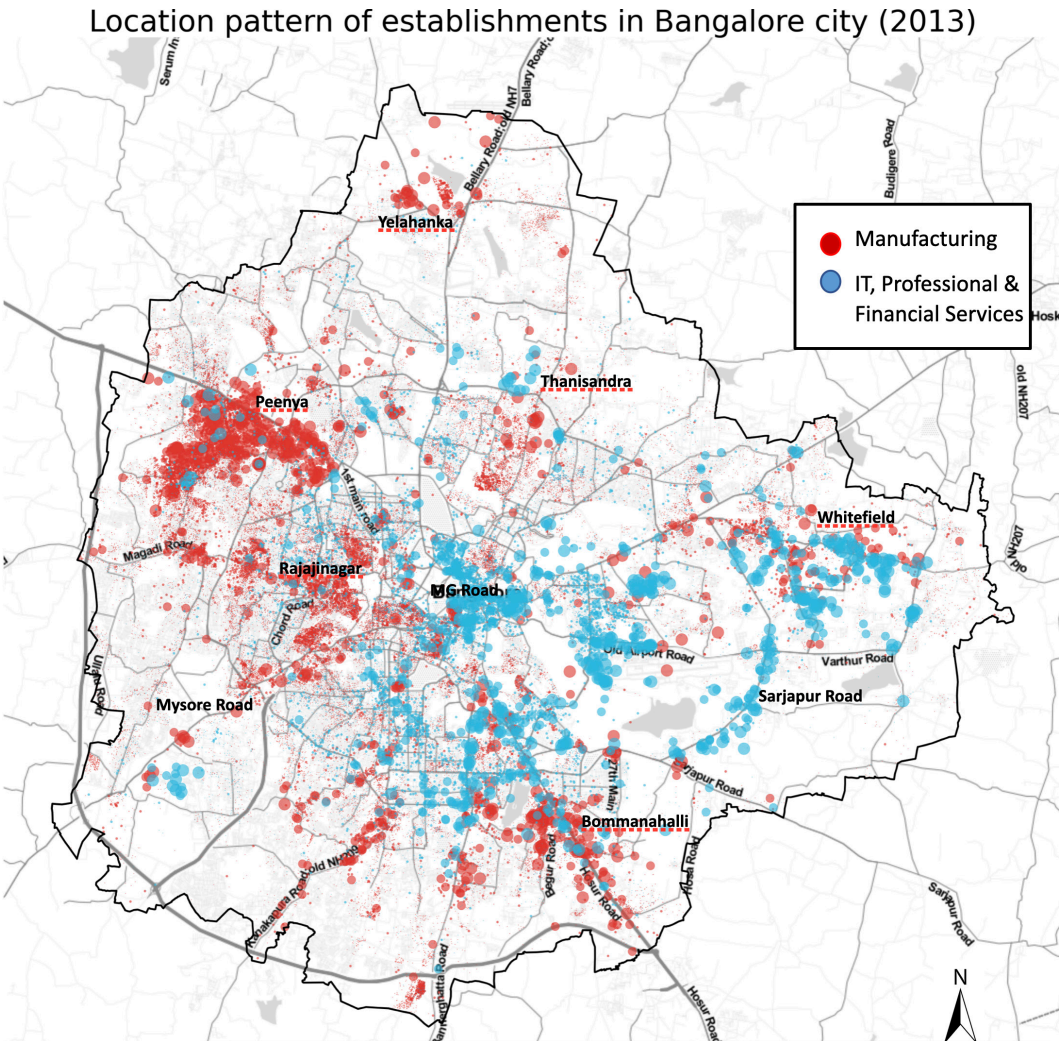


Figure 1: Location of Bangalore's manufacturing and knowledge-intensive services (IT, professional and financial services). The map was created using random uniform location of establishments within enumeration blocks. Bubble size is proportional to number of employees in the enterprise.

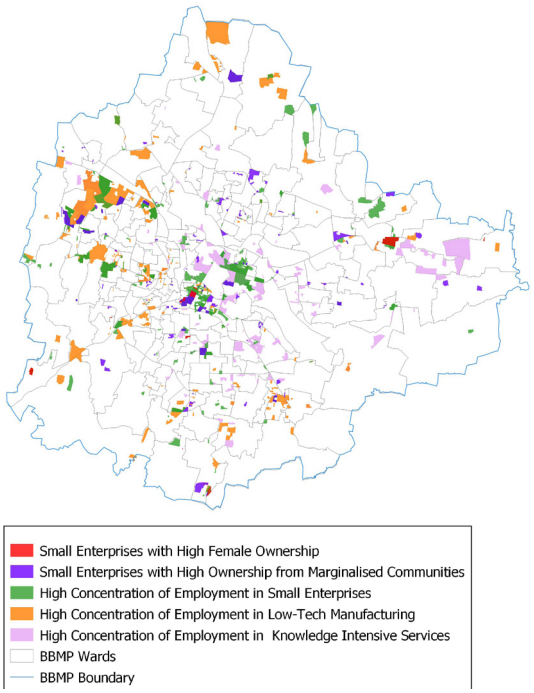
Data Source: Comprehensive Economic Dataset, IIHS 2022

• Inclusive economic planning

Planning in Indian cities has been limited to the regulation of land use and building bylaws (Idiculla, 2021). However, there has been a growing need to integrate key sectors, such as economy, transportation and social development. While there have been macro-level efforts to integrate these sectors into urban plans, the plans still do not reflect the diversity of Indian urban fabric, which has unique requirements in terms of development and infrastructure. Sustainable economic development is dependent on economic diversity, to avoid over-dependence on individual sectors (WTO, 2019). As such, it becomes important to account for these intra-city variations and build local area plans which address the heterogeneity of urban neighbourhoods and promote sustainable economic development.

Padarayanapura neighbourhood in central Bangalore has a very high population density, low-socio-economic status and a high concentration of small-scale household-based manufacturing units.

Hongasandra neighbourhood in South Bangalore was peri-urban before the city's IT-led expansion towards the south-east. Many large-scale manufacturing industries previously located in the neighbourhood have moved out, to be replaced by high-end real estate developments, due to the area's proximity to the IT corridor.



Economic diversity of neighbourhoods in Bangalore
Source: Comprehensive Economic Dataset, 2022

When mapped at the enumeration block level, the CED helps policymakers gain insights into the local economy and build strategic interventions to promote local economic development. This could support planners as they make decisions on commercial or industrial infrastructure investment across the city. It could also help them plan and zone for residential areas, as the nature of residential demand may vary depending on proximity to particular kinds of economy. For example, areas with knowledge-intensive services might have requirements including grade A and grade B buildings,[2] IT parks and commercial or recreational centres, while a low-tech manufacturing cluster would require more focus on grade C buildings or warehouses with affordable rents, rental housing and social infrastructure such as migration centres or primary healthcare centres.

Indian cities have very diverse economies, not only in terms of economic activity but also in terms of enterprise size, ownership and operating patterns. Many small-scale industries have much higher dependencies than larger industries in terms of locational choices and local economic linkages (Benjamin, 2004). They therefore incur higher economic costs due to displacement. These small-scale industries are major contributors to local employment, making it important to promote them as major drivers of the local economy. Social diversity and economic inclusion are also important factors for sustainable economic development (Shariff, 2020). The Economic Census captures information on enterprises in terms of size, demographic ownership (by gender and caste) and location (residential or commercial sites), which together offer better understanding of the location and characteristics of all enterprises. These indicators allow planners to identify economic areas with high vulnerability to displacement, and which need special protection in the planning process, in order to preserve urban economic diversity.

2 Office spaces are classified into Grade A, B and C based on location, rent, building amenities, system standards, etc. Grade A building is generally a new development located in prime locations, equipped with best in class facilities and demand the highest market rents in the area. Comparatively, Grade B buildings are slightly older with average market rents and Grade C buildings have lower than market rents and don't focus as much on amenities.

• Mapping employment nodes for transport infrastructure

Transportation is a key component of urban economic development. Efficient transport networks connecting employment clusters are important for improving local productivity (Bloomberg, 2021). However, most large Indian cities face major problems related to traffic congestion, with municipal bodies struggling to sustain the investments required to upgrade transport infrastructure. While there has been a recent push for investments to upgrade public transport infrastructure through many central and state government policies (National Urban Transport Policy, 2014; Metro Rail Policy, 2017; National Transit Oriented Development policy, 2017), with the help of international funding agencies, economic growth is a crucial element of these investments. Transport infrastructure investments are made with a view to leveraging the revenue increase generated from the resultant economic growth as a way of funding these infrastructure improvements. Therefore, in order for public transportation to succeed, it becomes imperative to connect areas with high economic density, providing high passenger numbers and bringing maximum numbers of people into the system. With newer infrastructure investments being more focused on Value Capture Finances to make better returns, it becomes even more important to understand the economy when carrying out economic feasibility studies for future developments, to ensure the type of development matches local economic needs.

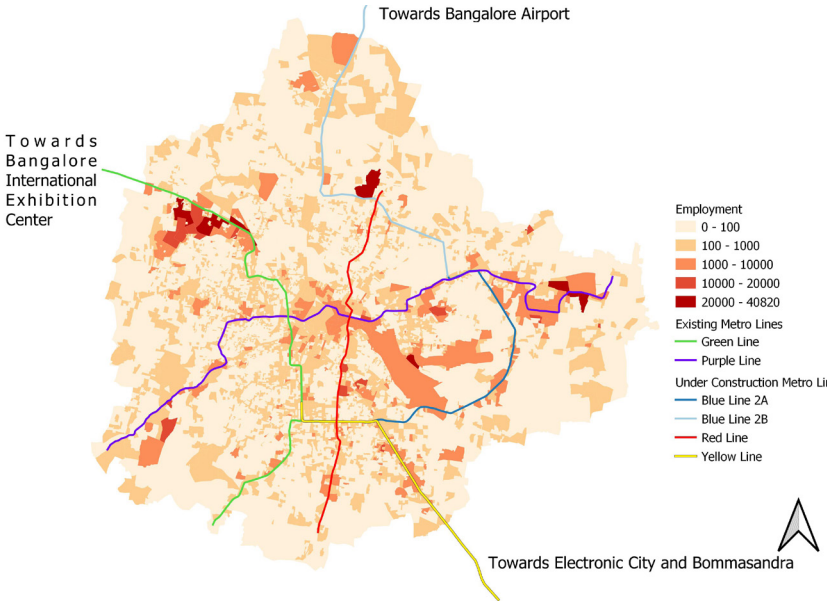


Figure 2. Employment and Metro Infrastructure Bangalore
Source: Comprehensive Economic Dataset. 2022; metro lines accessed from: https://github.com/geohacker/namma-metro. retrieved 17 March, 2020

Decision-makers need access to granular data which can help guide these decisions. The economic census allows us to generate this data at the smallest spatial unit and map areas with high concentrations of employment, including the type of employment. As Figure 2 shows, Bangalore has multiple high-density employment nodes which are being connected by existing and upcoming metro lines. However, the success of mega-infrastructure projects such as the metro system depends not only on single-point connections to employment clusters, but also on access from the station to proximate areas of employment. Understanding the spread of local employment clusters also helps with building investment strategies for improving local transport infrastructure and connectivity with the larger, city-level transport system. With the recent push for transit-oriented development in Indian cities, along with transportation infrastructure projects, understanding the local economy becomes crucial to creating appropriate strategies for economic development.

Conclusion and recommendations

Indian cities are highly diverse and require better understanding of local heterogeneity to support economic growth, development and inclusion. The Economic Census offers the potential to study the urban economy and leverage data for better decision-making. Planners and policymakers can use this information to create strategies and investment decisions which promote local economic development, instead of creating macro-level plans which only promote a certain type of economic growth.

This brief highlights different ways in which planners could deploy granular economic data to improve decision-making around infrastructure investments, addressing economic inclusion, supporting economic diversity, and meeting the transport needs of a diverse set of workers.

To deliver comprehensive economic planning, the government needs to push for a temporal and spatial data-led approach which delivers understanding of the urban economy. However, as our earlier research shows,[3] while these datasets offer significant potential, there is need for a more robust data infrastructure, with proper checks and balances, for maintaining data quality and mapping the data. The government therefore needs to release data with granular spatial boundaries, and digitise older records.

Acknowledgements

The authors would like to thank Sudeshna Mitra and Sooraj Raveendran for their valuable feedback on this brief.

References

- Bangalore Development Authority. (2005). Draft Master Plan 2015.

- Benjamin, S. (2004). Urban land transformation for pro-poor economies. Geoforum Volume 35, Issue 2. Pg 177-187.

- Zipper, D. (2021). "It's Time for Economic Developers to Focus on Transportation". Bloomberg. From:

https://www.bloomberg.com/news/articles/2021-07-01/invest-in-transportation-for-economic-growth

- Heitzman, J. (2004). Network City: Planning the Information Society in Bangalore. Oxford University Press.

https://doi.org/10.1016/j.geoforum.2003.08.004.

- Idiculla, M. (2021). Who Plans the Indian city? The anomalies of India's Urban Planning System. The Print.

https://theprint.in/opinion/who-plans-indian-cities-development-authorities-who-still-follow-colonial-masterplans/770913/

- Nair, J. (2005). The Promise of the Metropolis. Oxford University Press, New Delhi.

- NITI Aayyog and Asian Development Bank. (2022). Cities as Engines of Growth.

https://www.niti.gov.in/sites/default/files/2022-05/Mod_CEOG_Executive_Summary_18052022.pdf

- Shariff, A. (2020). Social diversity and economic growth. Frontline.

https://frontline.thehindu.com/cover-story/article30433461.ece

- World Trade Organisation. (2019). Aid for Trade Global Review 2019: "Supporting Economic Diversification and Empowerment".

https://www.wto.org/english/res_e/booksp_e/aid4trade19_chap5_e.pdf

3 PEAK Urban. The need for real-time and granular data to study the urban economy. Research brief. 2022. https://www.peak-urban.org/sites/default/files/2022-07/the_need_for_real_time_and_granular_data_to_study_the_urban_economy.pdf

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.

Contact

In PEAK Urban:
peakurban.director@compas.ox.ac.uk

Published by PEAK Urban

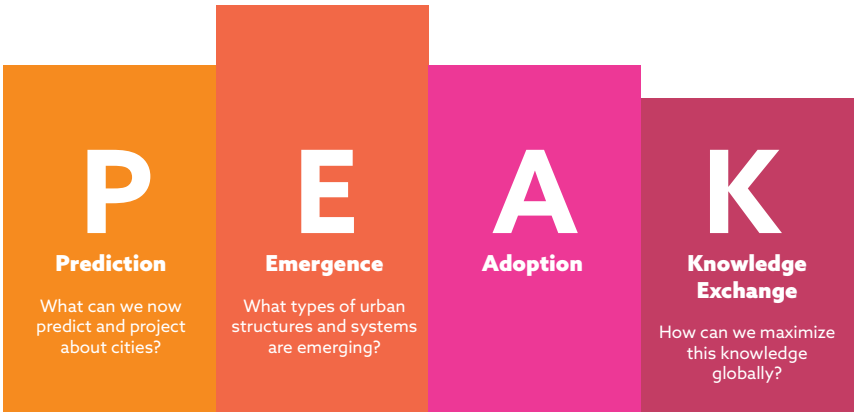
December 2022

PEAK Urban is managed by the Centre on Migration, Policy and Society (COMPAS)

School of Anthropology and Museum Ethnography,
University of Oxford,
8 Banbury Road,
Oxford, OX2 6QS

+44 (0) 1865 274706
@PEAK_Urban
www.peak-urban.org

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.

PEAK Urban is funded by UK Research and Innovation as part of the Global Challenges Research Fund.

UK Research and Innovation

GCRF
Global Challenges Research Fund

PEAK Urban is a partnership between:

University of Oxford

African Centre for Cities

Peking University 1898

Universidad EAFIT

iihs
Indian Institute for Human Settlements