METROSOLUTIONS

Looking at innovation for
the metropolises of tomorrow

METROPOLISES ON THE 2030 HORIZON

Background Papers for the
International Congress on
Metropolitan Solutions

17-18OCT**2022**

AMB

M👁SO

Introduction

Ernest Maragall i Mira

Vice-president of the AMB Area for International Relations and Cooperation

The Montreal Declaration on Metropolitan Areas (2015), spearheaded by UN-Habitat, contributed to sustainable urban development by promoting metropolitan cooperation. The Declaration firmly and rigorously describes all the transformations required to build cities that are supportive, inclusive and respectful of biodiversity and natural, cultural and landscape heritage. Many of its messages integrate the demands expressed by networks such as Metropolis and United Cities and Local Governments (UCLG), among them the right to the city, metropolitan governance, fair financing and recognising diversity.

A year later (2016), Quito hosted Habitat III, which culminated in the New Urban Agenda, endorsed by the UN General Assembly at the end of that same year. Metropolitan areas are the ideal political, social, economic and environmental targets for the challenges posed by the New Urban Agenda. Their institutional, moral and ethical mandate was adopted by the metropolitan areas. Thus, in 2018, the Barcelona Metropolitan Area held the international congress 'Post-Habitat III: The challenges of the metropolis beyond Habitat III. A contribution to the New Urban Agenda', one of the many initiatives that metropolitan areas sought to pursue in order to move into action.

At the World Urban Forum held in Abu Dhabi in 2020, a joint strategy was defined with UN-Habitat, leading to the Memorandum of Understanding signed between this United Nations agency and the Barcelona Metropolitan Area.

With the MetroSolutions international congress, which we will be holding in Cornellà, we need to go further. We have identified the challenges that we, as metropolitan areas, face. Now solutions are needed. This is why we have asked five experts in urban policy thought and development to centre the need for a response to complex and changing questions and uncertain scenarios in a metropolitan perspective. The COVID-19 pandemic has changed the vision of the city in relation to the metropolis, as have conflicts we thought were distant and unrelated to our well-being, but which are now also in Europe, reminding us that every war brings unaffordable costs in different areas: humanitarian, social, economic and environmental. The health crisis, the impact of war, social inequalities and the climate emergency are symptoms alerting us to new priorities we need to keep in mind, such as food sovereignty and energy sovereignty.

Only through innovation will we be able to tackle the needs of citizens and the great metropolitan challenges. Questions and needs must be identified and solutions sought, and it is up to us to take responsibility and respond to them. Metropolitan solutions must enable us to achieve the goals set promptly and appropriately. Without delay. These are policies or programmes that are: (1) connected to metropolitan policy and

plans; (2) multidimensional (social, economic and community scale); (3) multi-actor, because they bring together the range of actors in the territory (public, private and non-profit); (4) multi-level (not only on a metropolitan scale); (5) innovative, (6) inspired by and a response to the challenges of global development agendas; while they also: (7) contribute to urban construction; (8) combine types of action that result in adding to infrastructures and programmes and can be assessed for the whole population and in all territories (they are inclusive for people and for cities); (9) are built, ideally, with the participation of citizens and key actors; and (10) are adaptable and transferable to other metropolises.

This is not the first time, and certainly not the last, that the great metropolitan family that meets in different spaces for coordination and cooperation (such as Metropolis, MedCités, UCLG and European Metropolitan Authorities) has organised and come together to share concerns and define joint strategies and metropolitan policies that bring us closer to the objectives set out on global agendas.

That is why we hope the MetroSolutions international congress will be the beginning of a new, more ambitious horizon, where metropolitan areas are capable of building the necessary understandings to become political actors at the service of citizens, providing all the ambition necessary to achieve the goals of the New Urban Agenda.

There are only a few years left before 2030, the date set for a rigorous, demanding and unpostponable review of our decisions and the public policies we have prioritised to make the world economically fairer, socially more equal and environmentally sustainable.

The MetroSolutions Congress

Clelia Colombo

Head of the AMB Foresight and Strategy Service

In the second decade of the 21st century, the world's metropolises and cities are immersed in a time of uncertainty and change, which means rethinking the challenges they face. The new geopolitical, economic, social and health scenario that has opened up highlights once again the importance of resilience and adaptation by cities and metropolises in crisis, conflict and post-conflict situations, requiring proposals for innovative solutions to meet citizens' needs.

In this context, the Barcelona Metropolitan Area (AMB) is organising the international congress **MetroSolutions: innovative visions for the metropolises of the future**, with the aim of presenting and debating **innovative metropolitan solutions** for the major metropolitan challenges faced today by metropolises worldwide.

The content is structured in **three main areas: metropolitan governance, inclusive and fair metropolises and resilient and innovative metropolises**, focusing on metropolitan solutions for: governance, legitimacy, management and good metropolis governance; solutions for social, gender and diversity-based equality and inclusion; green and blue solutions; and resilience and innovation-related solutions. The articles in this publication aim to introduce and focus on the main topics and issues in each field.

Generating debate and knowledge around metropolitan solutions to specific challenges faced by cities and metropolises around the world, which can be shared and adapted to other metropolises and realities, must help drive progress towards the metropolises of the future, ones that are **democratic, well-governed, equal, resilient and innovative**.

City science and urban design shaping the successful fractal metropolis

Innovative and resilient metropolises: main challenges, metropolitan evolution, future scenarios and possible European and international policies and solutions

Ramon Gras

Researcher in City Science at Harvard University

1. INTRODUCTION

Urban planners and designers of the 21st century face a formidable task: they must advance the science of cities to offer viable, solvent solutions to the challenges posed by technological progress as well as increased population density in metropolitan areas, derived from an unprecedented demographic explosion worldwide. Today, 60 per cent of the world's population and over 70 per cent of GDP is concentrated in cities; these figures are expected to reach 70 and 85 per cent, respectively, by 2050. Cities account for more than 60 per cent of global energy consumption, 70 per cent of greenhouse gas emissions, and a similar proportion of the waste generated on a global scale. At the same time, cities around the world present greater income inequality and per capita crime rates than rural areas with low population density. One of the pressing challenges faced by cities today is how to implement sustainable production cycles that contribute to the prosperity of all their residents without distinction, guaranteeing universal access to quality urban services and addressing the climate and environmental issues that loom in the future. It is in cities, therefore, where the greatest battles will be fought in the struggle to achieve the innovative and resilient nature aspired to in the United Nations Sustainable Development Goals (SDGs), and it is cities that offer us the greatest hope of meeting these goals.

> **Cities account for more than 60 % of global energy consumption, 70 % of greenhouse gas emissions**

Nevertheless, city leaders the world over, in developing countries in particular, are capitalising on the greatest urban growth yet experienced, having entered the 21st century armed with antiquated urban analytics and tools. Prevailing urban growth patterns in cities like São Paulo, Bogotá, Lagos, Delhi, Cairo, Mexico City and Karachi, among others, have largely been inherited from the worst urban planning practices of the 20th century: organic or random urban typology models that use resources inefficiently, thus undermining social interactivity; the abusive centrality of cars in transport systems; dispersed business activities, obstructing the development of individual and collective know-how and the creation of opportunities; excessive suburbanisation, which leads to social fragmentation; the unequal distribution of city services in different districts;

> **Deficient urban development patterns have been applied without critical consideration**

architectural barriers, which exacerbate social fracture and detract from public safety; and lack of green spaces and places for social interaction. In short, deficient urban development patterns have been applied without critical consideration, further complicating our efforts to approach the standards of quality established in the SDGs.

2. INNOVATIVE AND RESILIENT URBAN DEVELOPMENT

Since the late 20th century, the increasingly chaotic acceleration of the urbanisation process around the world has exacerbated urban problems such as overcrowding in substandard housing; a sharp increase in peak hour traffic and average commuting time; limited opportunities for stable, decent, well-remunerated employment; a widening income gap; the gradual disappearance of local businesses and everyday social interactions; the appearance of "food deserts" in large urban areas; energy and water inefficiency; and social isolation and loneliness due to urban atomisation.

After the initial surge provided by the founders of modern urban planning in the 19th century, the science of cities languished for more than a hundred years until the dawn of the 21st century. Despite the emergence of various aesthetic trends in urbanism and architecture, such as the movement associated with the International Congresses of Modern Architecture (1928–1959), these contributions did not always constitute actual progress in city science, nor did they further our understanding of urban phenomena and how these affect people's quality of life. This hiatus progressively hampered the ability of urban planners to adequately rise to the challenges of their time.

> " The science of cities languished for more than a hundred years until the dawn of the 21st century "

3. URBAN CHALLENGES FACING THE METROPOLITAN AREAS OF OUR TIME

Innovative cities: how to develop a successful knowledge economy able to create distributed prosperity and inclusive growth

Metropolitan areas face the urgent need to shape their innovation strategies by emphasising their unique areas of global comparative advantage. Over the next three decades, the middle classes of countries such as China and India are expected to triple in size. This will represent a dramatic shift in power and trade relations on the geopolitical plane. Similarly, emerging technologies based on artificial intelligence, robotics and process automation are threatening to destroy at least a third of jobs in the Western world as we understand them today. The West in general, and Europe in particular, is showing clear signs of exhaustion and of having lost both its flair for innovation and its leadership in developing new solutions that generate virtuous economic circles to benefit the majority of its citizens.

Recent research into the study of economic development and urban phenomena has applied insights of economic complexity to provide a reliable methodology with which to define industry comparative advantage at the national scale. This strand of research applies network theory to study the linkages between knowledge-producing agents in an economy (Hidalgo & Hausmann, 2009). Such methodology enables a systematic understanding of collective know-how advancement and knowledge diffusion at the national scale, as well as the identification of smart specialisation and diversification strategies.

Until recently, the literature presented two major limitations. On the one hand, the focus was primarily on international trade for physical goods, thus lacking the analysis of high value-added intangible services; and on the other, the national level of aggregation allowed only a shallow grasp of geospatial dynamics, hence precluding a detailed understanding of territorial dynamics and the non-linear benefits of the geographic aggregation of knowledge-intensive activities. Economic complexity models would therefore fall short of identifying sub-national and city-level collective know-how dynamics, and illustrating urban development recommendations at regional and local levels (Hausmann *et al.*, 2014).

City science research conducted at Harvard University began to systematically breach that gap in the urban innovation literature, seeking to understand the links between good practices in urban design and the main factors, features and underlying dynamics of successful cities. By combining city science techniques with insights from economic complexity, we can devise a higher resolution methodology with which to measure, evaluate and better understand innovation systems at the urban scale. Geospatial analysis of innovation and knowledge-intensive activities within urban environments will enable deeper understanding of the dynamics of the non-linear benefits of strategic geographic aggregation of knowledge-intensive activities, leading to the identification of the key ingredients and dynamics facilitating economic growth and stable employment creation. This in turn will boost regional growth and more equally distributed prosperity, by means of providing urban development decision-making recommendations to increase urban economic performance.

Resilient cities: economic development challenges at the urban scale
Metropolitan areas need to develop economic development and smart specialisation strategies to strengthen their industry-specific value chains and raise their global competitiveness. In an influential body of academic research, Bettencourt *et al.* (2009) studied the universal relation between scale and urban phenomena, and particularly the remarkable similarity between cities and living creatures. Simple, universally applicable laws link the size of mammals to fundamental biological functions such as metabolism and energy consumption. This implies that, regardless of size, all mammals are a scaled manifestation of a single, idealised mammal. Could this also be true for human cities and agglomerations? By analysing a host of urban phenomena such as infrastructure, crime, pollution, wealth creation and innovation, Bettencourt *et al.* (2009) was able to show that this is in fact the case. The research finds that universally applicable power laws across different geographies and economic dimensions translate the size of a city as measured by population and other measures to the urban phenomena listed above.

> **Metropolitan areas need to develop economic development and smart specialisation strategies to strengthen their industry-specific value chains and raise their global competitiveness**

These laws can be classified as linear, superlinear or sublinear, are determined by the exponent of the power law, and have interesting implications. Urban infrastructure networks tend to manifest an exponent below one, suggesting economies of scale in the use of transportation and communication networks. Social interactions, which culminate in innovation and wealth creation, show a power law coefficient greater

than one, implying increasing returns to scale in human interaction. This effect can be so powerful that it creates jumps in innovation with cycles shorter than a human lifespan, in contrast with biological phenomena, where large innovation jumps occur sporadically and on timelines longer than many lifespans of a living organism.

City design and urban performance: urban development challenges

As early as the 1950s, urban activist Jane Jacobs (1993) began to denounce the fact that post-war urbanism had prioritised cars over pedestrians in public spaces, as well as the loss of vitality in historic city centres, which deteriorated significantly in the second half of the century. Professor Robert Putnam described the collapse of association and community life as a result of the detrimental effects of over-suburbanisation and the social atomisation it caused. Brazilian architect and urban planner Jaime Lerner denounced the abusive nature of overambitious urban renewal projects, arguing that strategic urban transformation initiatives on a smaller scale could bring about significant systemic changes in the medium and long term.

For his part, mobility expert Robert Cervero pointed out the negative consequences of low-density suburban growth and proposed several initiatives to align compact urban development with mobility systems that prioritised public transport, reducing commuting time and transport costs and promoting greater social interaction. The architect and urban planner Jan Gehl (2010) underscored the decline of public spaces and the marginalisation of pedestrians, which led to a lack of public safety, higher crime rates, the loss of a flourishing local business community and the
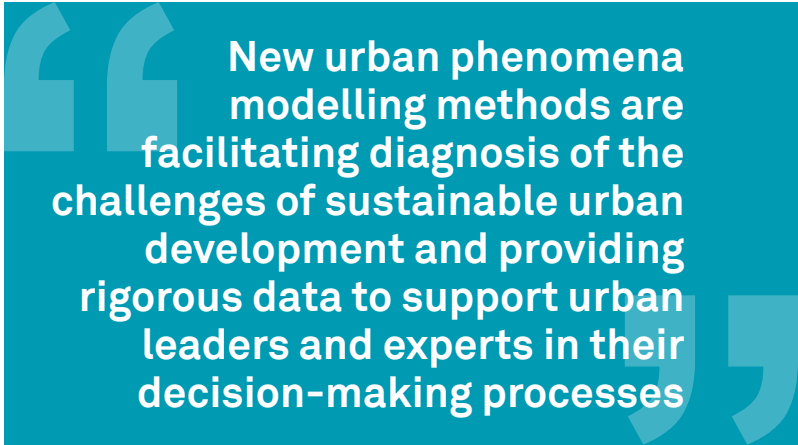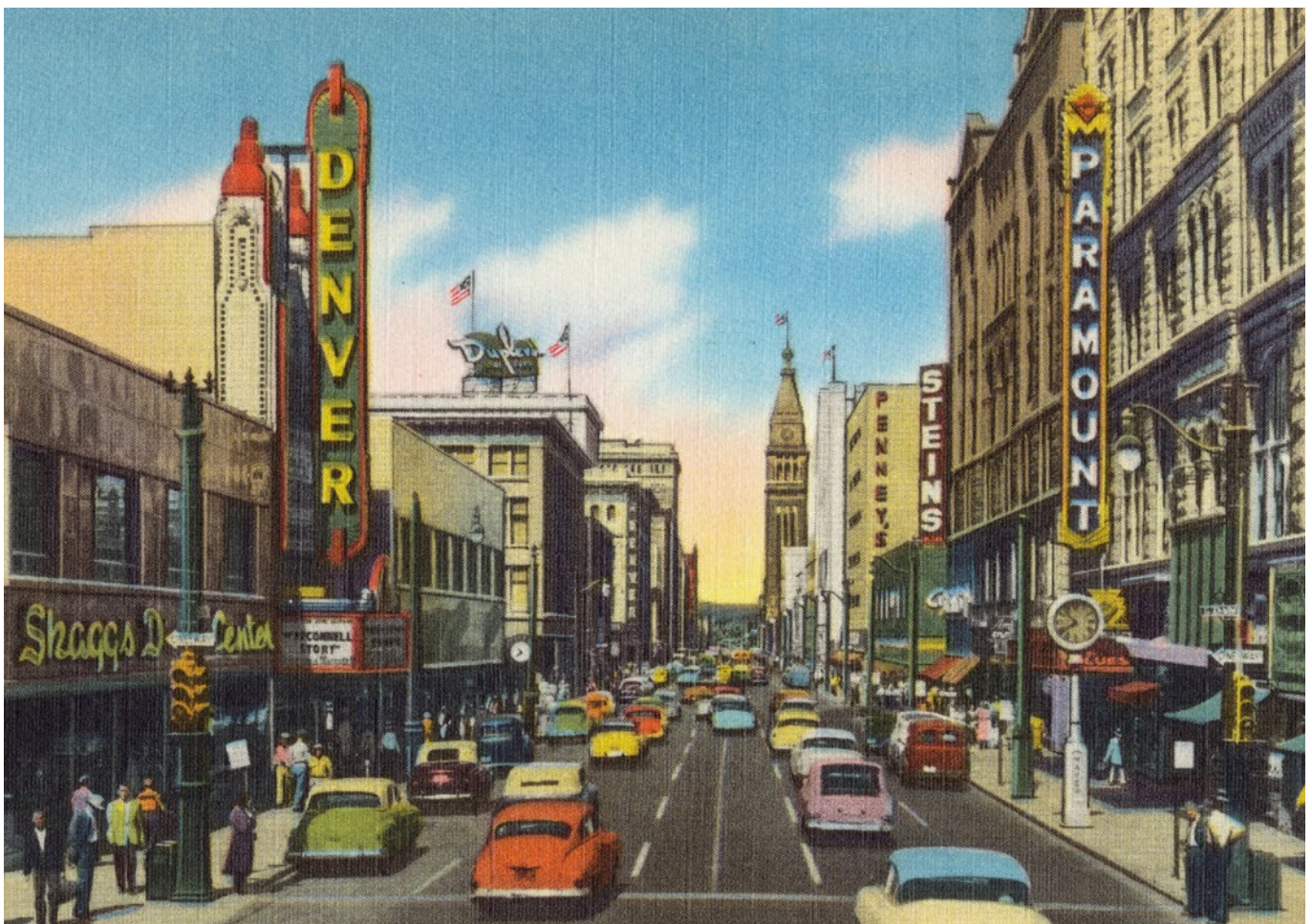
dehumanisation of the public space. In a similar vein, urban designer Jeff Speck defined the negative consequences of the excessive geographical dispersal of urban activities and proposed recovering dense urban centres to revitalise the social life of cities around the world.

Although several authors throughout the 20th century made valuable qualitative contributions that facilitated the definition of good criteria for citizen-friendly urban development, it was not until the beginning of the present century that a fresh batch of urban designers and researchers shed new light on the challenges faced by cities in the age of globalisation, automation, robotics and artificial intelligence.

4. GLOBAL URBAN DEVELOPMENT TRENDS: RISKS AND OPPORTUNITIES

Understanding urban planning as both an art and a science allows us to build on the vision of the founders of modern urbanism, chief among them Ildefons Cerdà (1867) and Louis Durand (1840), and modernise a method of analysis and design that is making great strides in recent decades. Ever since the team led by Professor Geoffrey West at the Santa Fe Institute in New Mexico breathed new life into the science of cities, the discipline of urban planning has recovered and increased its vigour. Today, new urban phenomena modelling methods are facilitating diagnosis of the challenges of sustainable urban development and providing rigorous data to support urban leaders and experts in their decision-making processes. By reconciling the cumulative legacy of urban planners, architects, civil engineers and other professionals over the last century with new methods for analysing urban phenomena as a complex system – in other words, relying on complexity science – as well as automated learning, network theory and artificial intelligence, we are able to identify structural patterns and best practices in the field of urban design and devise viable solutions to the pressing urban challenges we currently face.

> **New urban phenomena modelling methods are facilitating diagnosis of the challenges of sustainable urban development and providing rigorous data to support urban leaders and experts in their decision-making processes**

Urban development: scaling trends

Among other findings, West's team showed that the scale of human settlements structurally affects the nature of human interaction. As a human settlement grows over time, we observe three types of alterations in per citizen or per capita indicators:

1. Sublinear growth (<1): benefits are associated with cost reduction and economies of scale, which promote more efficient infrastructure investments and improve the per capita social impact of new builds.
2. Linear growth (=1): proportional growth on the log-log plot, so that the ratio of population to number of houses remains essentially constant.
3. Superlinear growth (>1): growth in the form of multiplying benefits derived from greater social interaction and more complex human and technological networks, providing a tremendous boost to the knowledge economy.

Every time a city doubles its population, the scale factor induces structural changes as a result of the multiplying, superlinear benefits of strategic aggregation.

Thus, the structural effects of doubling the population of an urban settlement tend to produce a per capita increase of:

– +15% in average wealth per capita indicators,
– +15% in average per capita knowledge economy indicators,
– +10–20% in patents per capita,
– +12–18% in average per capita social interaction indicators,
– +12–20% in the speed of human interactions,
– +12–20% in supply chain efficiency,
– +12–20% in average business diversity and jobs per capita indicators,
– +12–20% in productivity per capita.

Similarly, quantitative population growth also affects economies of scale, which allow cities to benefit from positive sublinear growth. The larger and denser the city, the greater the per capita efficiency of investments in urban, transport, energy and water infrastructures tends to be:

– 15% reduction in capital expenditures (CAPEX) and operating expenses (OPEX) per capita (Bettencourt *et al.*, 2010).

Urban development: agglomeration trends

Why do industries agglomerate? How much of this agglomeration is explained by local advantages, and how much is a result of endogenous intra-industry spillover? Ellison and Glaeser (2009) tackle this fundamental question by disaggregating the effect of economic agglomeration between natural advantages and intra-industry spillover in a sample of four-digit manufacturing industries in the United States. By studying the determinants of agglomeration based on cost of inputs (electricity, gas, coal and agricultural products), cost of labour inputs (relative wage differences), relative price of skill, transportation costs and unobserved spillover, they find that the explanatory power of natural advantages is limited, explaining only 20% of observed agglomeration. The implication is that agglomeration effects are an important force driving the geographic distribution of economic activity. As the authors note, this effect is particularly extreme in manufacturing industries, and in the automobile manufacturing sector in particular.

Previous studies by Bettencourt *et al.* (2010) and, later, Barabási (2017) show that the scale of cities has a superlinear or sublinear impact on social measures such as patents, crime, and sustainability. The purpose of the present paper is to quantify the superlinear effects of the geographic aggregation of knowledge-intensive activities within innovation districts and provide quantitative measures of the multiplying effects and the derived economic surplus in terms of knowledge advancement, wealth, and employment creation for the surrounding communities. The novel framework used in this paper will allow readers to understand these relationships by modelling knowledge-intensive activities from a network theory perspective.
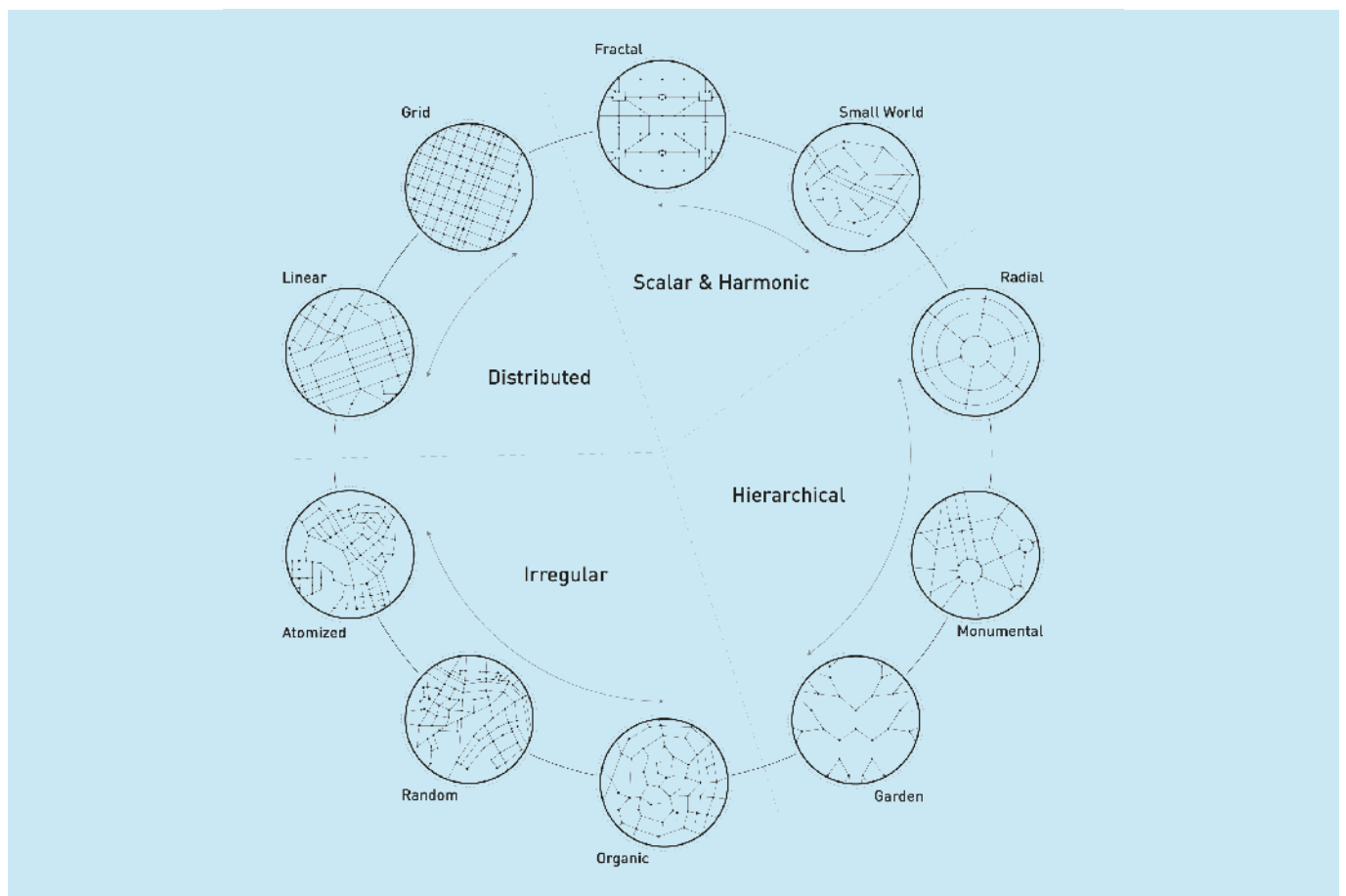
Urban development: city design trends

City form typologies can be described based on their three-dimensional form characteristics, as a unifying framework to understand the long-term impact of city design criteria on urban performance. At a fundamental and abstracted level, cities are combinations of street networks, blocks of buildings, and the humans that populate and use the former two groups of urban spaces. While all developed cities can be defined in such a way as to be considered similar or topologically invariant, it is clear that the urban form of cities – in terms of the nuances of their street networks, buildings and infrastructure – varies greatly. These variations, produced through differing historical approaches to urban design, master planning, development and redevelopment, enable the categorisation of developed cities into a set of explicit city typologies such as small world, radial, linear, reticular or grid, organic, atomised, garden city or fractal city. When considering the connection between urban form and the performance of cities, city typologies and their respective urban characteristics provide a theoretical framework with which to scrutinise associated and potentially induced human behaviours and performance outcomes. More significantly, the introduction of categorical divisions with which to understand cities produces a set of theoretical guidelines conducive to the application of network theory analysis.

Economic development trends

First, the network science-fuelled study of economic complexity and collective know-how attempts to model the relation between the stock of knowledge in a region and economic outcomes (Hidalgo & Hausmann, 2009). Our work incorporates these intuitions but places the scope of analysis at the city and district levels and incorporates higher-quality data such as firm-level data.
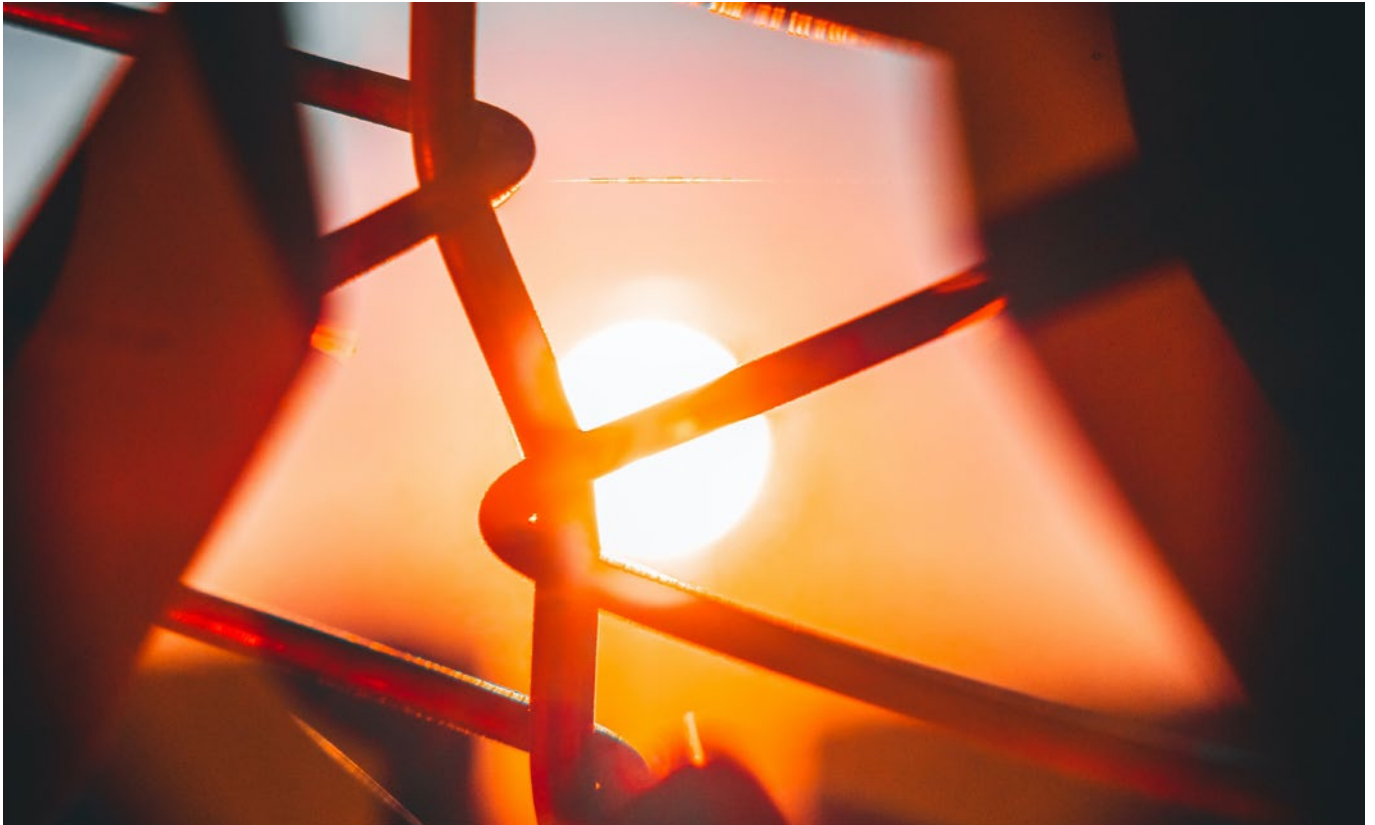
Second, there is the study of power laws in urban scenarios, as proposed by Bettencourt *et al.* (2010), which examines the universal relation between scale and urban phenomena by using graphical descriptions of sublinear or superlinear effects with larger and larger scales of aggregation. We contribute to this literature by focusing the analysis on innovation districts in urban settings. Third is the study of agglomeration economies by Ellison and Glaeser (2009). This strand of the literature attempts to disentangle the effect of local comparative advantage and endogenous spillover to explain the geographic distribution of economic activity. The literature finds that intra-industry externalities play an important role, and that the explanatory power of local natural advantages is limited. We build upon these findings to concentrate on the powerful externalities driven by innovative activities in urban settings.

Finally, a city-level, evidence-based approach to increase urban performance, developed by Kent Larson and Andres Sevtsuk, serves as a source of inspiration to bridge the gap between economic geography, economic complexity studies and urban design (Ekmekci *et al.*, 2016). Economic complexity as a measure of collective know-how and the study of how people collaborate to add value to the economy dates back to the writings of Adam Smith (1776), who studied the division of labour. People and firms specialise in different activities, increasing economic efficiency and the impact of the interactions between them. Hidalgo and Hausmann (2009) applied this insight at a national scale to study the relation between the human and physical capital resources in a given country and the type of goods that they export. Basing their work on the study of scale-free networks by Barabási (2016), they modelled the structure of an economy as a bipartite network in which countries are connected to the products they export and showed that it is possible to quantify the complexity of a

country's economy by characterising the structure of this network. Furthermore, this measure of complexity is correlated with a country's level of income, and deviations from this relationship are predictive of true growth (Barabási, 2017), suggesting that countries tend to converge to the level of income dictated by the complexity of their productive structures. The level of complexity is modelled as the combination of capabilities available in a given country or, more broadly, as a measure of collective know-how.

This body of work triggered further research, including Hartmann *et al.* (2017), which expanded the scope of analysis of economic complexity to study the implications for institutional design and income distribution. Similarly, Youn *et al.* (2016) studied how the diversity of economic activities is dependent on city size. The limitation of this approach as usually applied is that it lacks the level of detail necessary for implementation at the urban scale. In addition, it is mainly tailored to the analysis of export data, which tend to lack measures of service industries. Our goal is to contribute in these two dimensions, by focusing the analysis of collective know-how at the urban scale, making use of firm-level data to also incorporate the production of services. In addition, we believe that a less indirect and more precise approach to measuring collective know-how is through the output of the innovation process, as measured by patents and innovation-related metrics.

Knowledge economy trends: innovation districts as catalysts for activating local talent
A novel urban and economic strategy that aims to boost the knowledge economy and develop innovative cities is to create, for each metropolitan area, a network of innovation districts, all strategically situated to liberate *collective know-how* potential. An innovation district is a specific urban environment, based on combining urban renewal with a geographic concentration of innovation activities, where individual talent and organisations work in knowledge-intensive industries to solve complex problems. Innovation districts activate the dormant capabilities of a community and generate exponential benefits for surrounding neighbourhoods and regions. When analysing this phenomenon, we can build upon these insights to carry the question of agglomeration of manufacturing industries to a more general understanding of innovation activities. How much of the agglomeration in innovation activities can be explained by local comparative advantage, and how much is an endogenous spillover effect that can be replicated in different regions? This is a fundamental question since, as we will show below, the spillover effects of innovative activities appear to be large.

> " A novel urban and economic strategy that aims to boost the knowledge economy and develop innovative cities is to create, for each metropolitan area, a network of innovation districts "

The comparison between innovation intensity (log-normal), innovation performance (Pareto/power law), and innovation impact (gamma) depicts the increasingly nonlinear, amplifying effects of clustering knowledge-intensive activities. On average, innovation districts present a 2.8 times higher concentration of knowledge-intensive activities per employee, thus producing an innovation output 4 times greater per employee in terms of patents, new products, new services, new processes and R&D; 16 times more creation and availability of knowledge-intensive employment

opportunities; and business revenue 25 times greater per resident. These results reveal that innovation districts systematically benefit from structural, nonlinear innovation patterns as a result of geographic aggregation of knowledge-intensive activities within urban environments. Representative examples of successful innovation districts include Kendall Square in Cambridge (Massachusetts), Silicon Alley in New York City, 22@ in Barcelona, the Grand Canal Innovation District in Dublin, and the Pittsburgh Innovation District.

5. POLICY STRATEGIES: CITY SCIENCE INFORMING URBAN AND ECONOMIC DEVELOPMENT STRATEGIES

Cities can strategically benefit from recent advances in the city science research area. By combining city science techniques with traditional urban design methodologies, city leaders can harmonise art and science in urban development, informing their urban design and economic development strategy with evidence to assist the development of innovative and resilient cities.

With the aim of developing innovative and resilient cities, urban and economic development at the metropolitan scale can be better informed by harmonising three main strategies:

- **Urban Design Vision:** A **Fractal Metropolis Strategy** to increase the quality of life of citizens and provide universal access to services, while capitalising on the exponential benefits of the geographic concentration of knowledge-intensive activities.
- **Economic Development Vision: Evidence-based Smart Specialisation** to activate the dormant capabilities of the collective know-how, by strengthening industry-specific value chains and informing product diversification and sophistication strategies
- **Innovation Strategy:** A **Network of Innovation Districts** to liberate the potential of local talent, through the geographical clustering of knowledge-intensive activities and the linking of research to knowledge transfer and production at scale.

In recent years, a rising number of innovative firms and talented workers are choosing to congregate and co-locate in compact, amenity-rich urban settlements in the cores of central cities, as described in Katz and Wagner (2014). These districts are geographic areas in which leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators and accelerators. They are physically compact, transit accessible and technically wired, and are developed for mixed-use housing, offices and retail.

Knowledge economy strategy: networks of innovation districts

A winning strategy to boost the knowledge economy is to envision, plan, design, develop, build and operate a network of strategically located innovation districts through which to liberate the latent economic forces of the community, unleashing their potential for global competitiveness and contributing to raise the quality of life of citizens.

Bettencourt *et al.* (2008) address power law trends at the scale of the city as a whole. Furthermore, the findings of this study revealed much greater variability in the ranges of empirical power law exponents with respect to the various urban metrics evaluated. This increased variability suggests that, as cities scale and grow, the performance outcomes observed are affected by variations at smaller scales. These variations are no doubt a consequence of the heterogeneity of social and infrastructural networks and structure in different global cities. Narrowing the focus of the study of innovation from city to district level allows us to study in particular the superlinear effects of
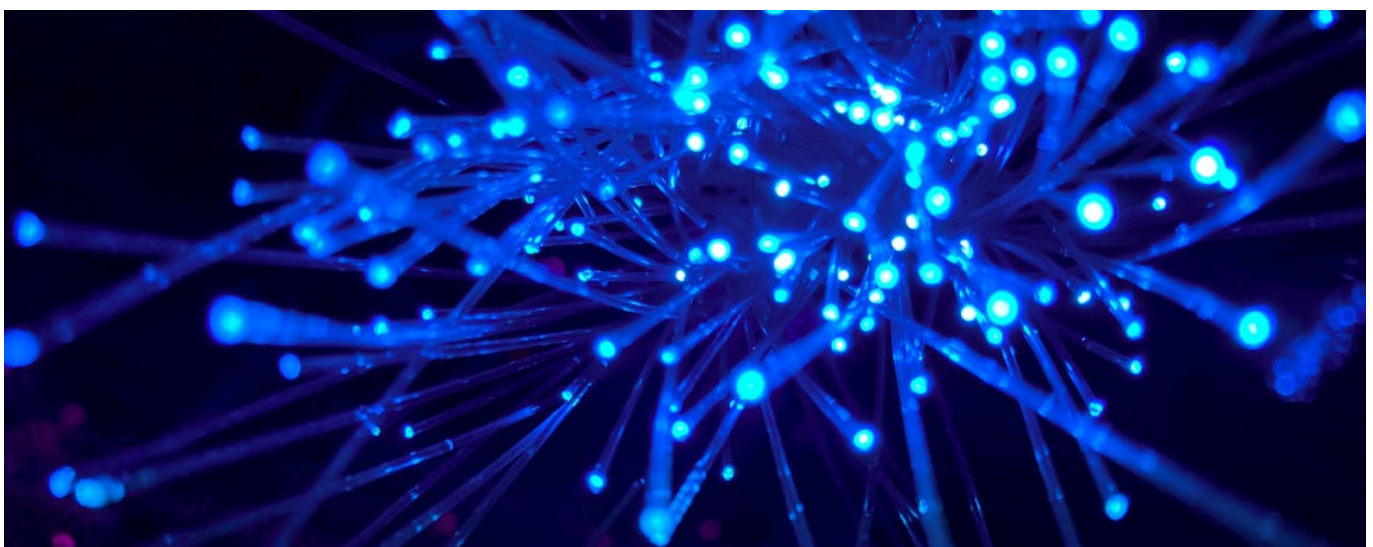
agglomerations of knowledge-intensive activities around innovation districts. We can incorporate these measures of scale into our work to analyse the implications of population density and city size in the context of different urban layouts (Bettencourt et al., 2006; Bettencourt *et al.*, 2007; Arbesman *et al.*, 2009; Ellison and Glaeser, 2009). Global examples of successful knowledge economy systems nurtured within innovation districts include Kendall Square in Cambridge (Massachusetts, USA), Jurong Innovation District (Singapore), Pittsburgh Innovation District (Pennsylvania, USA), and MIND (Milan, Italy), among others.

Economic development and smart specialisation strategy
The intensity of social interactions is a key metric in the evolution of innovation districts. The scaling exponent of urban infrastructure networks with population is usually estimated below one, suggesting economies of scale in the use of buildings, transportation, and communication networks. On the other hand, social interactions, which culminate in innovation and wealth creation, present a scaling exponent greater than one, indicating increasing returns to aggregation through human interaction. The latter effect can be so powerful as to create leaps of innovation with cycles shorter than a typical human lifespan, as against biological phenomena, wherein significant leaps of innovation occur sporadically and in a timeline longer than many lifespans of a living creature.

Previous research has expanded on this topic. Research critical to understanding the social dynamics that align with the scale of a city includes Moretti (2012), which argues that every high-tech job creates a further five jobs in the service economy. Arbesman *et*

al. (2009) provides a theoretical model to demonstrate the superlinear effects of urban innovation. The network model proposed is not tested on empirical data, but could nevertheless serve as a solid basis for future tests with urban innovation empirical patterns. Schläpfer *et al.* (2014) studies the superlinearity of communication networks in urban environments by analysing mobile phone interactions within European cities.

Our contribution to this body of literature is to narrow the focus of the study of innovation from city to district level, studying in particular the superlinear effects of agglomerations of knowledge-intensive activities around innovation districts. This is an area of analysis that deserves a set of data sources and a methodological approach of its own. Within the economic geography literature, a large body of work focuses on agglomeration economics. Successful examples of nurturing a successful smart specialisation strategy include Tallinn (Estonia), Dublin (Ireland), Bangkok (Thailand), Seoul (South Korea), Pittsburgh (Pennsylvania, USA) and Cambridge (Massachusetts, USA).

Urban development strategy: the vision of the fractal metropolis
Recent advances in the field of city science research, composed of affiliates from various Harvard University schools, have identified ten main urban form or design typologies, all of which can be modelled as complex network systems. Each type of city belongs to a family of urban networks, depending on their two-dimensional topology, three-dimensional morphology, level of urban entropy and scale. We subsequently found that the formal properties of a city have an impact on the dynamics of urban systems, which in turn structurally condition urban performance indicators. Therefore, each type of city can be described, both visually and mathematically, by means of networks in constant flux.

Through modelling based on network theory and validated by empirical data, we can measure the performance level of each part of a city or metropolitan area in great detail, in terms of their principal urban systems: talent network, economy and wealth creation, value chains by business sector, mobility efficiency, energy and water systems, etc. Among other things, this modelling allows us to assess the extent to which each of the ten urban design types affects, facilitates or hinders efforts to capitalise on the multiplying benefits of the strategic aggregation of knowledge-intensive activities.

Some representative examples of city types are the small world city (such as the historic quarters of Bruges, Brussels or Tallinn), the radial city (Paris, Milan or Beijing), the grid city (New York, Chicago or Philadelphia), the organic city (São Paulo, Marseille or Manchester), the linear city (Turin, Karlsruhe or Adelaide), the garden city (Arlington, new towns in the UK), the monumental city (St. Petersburg, Washington, Brasilia or Rome), and the fractal city (the Eixample in Barcelona, La Plata or Savannah).

In general, each type has advantages and disadvantages inherent to its structure. However, some urban models possess properties that are qualitatively superior to others. For instance, radial or concentric cities tend to benefit from the advantages of agglomeration in their central hub or core, although these effects decrease dramatically as we move out of the city centre and disappear altogether in most outlying neighbourhoods. Linear cities have the advantage of minimising the time it takes to access the main transport network, but they also have several major limitations in their scalability. Once population density reaches a certain point, the main roads require such a high capacity that they tend to divide the city into several poorly interconnected parts, thereby diminishing the efficiency of the network of social interaction and access to urban services.

Organic cities tend to contain a wide variety of urban settings, increasing the diversity of the urban experience, but they also present a series of inefficiencies in terms of infrastructure costs per resident, making them undesirable as a whole. One such inefficiency is the randomness of the organic urban layout, which renders mobility systems less efficient, increasing average commuting times and costs. Moreover, their irregularity makes it difficult to distribute services evenly. Finally, due to the lack of a more efficient pattern, organic cities tend to have poor accessibility between different neighbourhoods and districts, with higher levels of social and financial inequality. After analysing hundreds of metropolitan areas across the globe, we found that only one of the ten urban design typologies is capable of meeting the standards of quality associated with the SDGs and the "fifteen-minute city" model: the fractal city. The harmonious hierarchy of hubs found in fractal urban layouts tends to facilitate high levels of urban performance in terms of value creation (productive human interaction, creation of wealth and opportunities) and value capture (equitable distribution of urban services across the entire city).

> **Organic cities tend to contain a wide variety of urban settings, increasing the diversity of the urban experience, but they also present a series of inefficiencies**

Fractal cities combine the multiplying, non-linear benefits of the geographical concentration of knowledge-intensive activity with a polycentric layout. Every area of the city is within a twenty-minute walk of all essential services, including education,

healthcare, shops, employment, and recreational and cultural opportunities. This makes the most of the multiplying benefits of the geographical concentration of uses in the city centre, while facilitating a polycentric distribution of second-, third- and fourth-tier hubs around squares and intersections scattered across the length and breadth of the urban fabric. In addition, the decentralised layout of the fractal city ensures that residents in any part of the city have access to basic commercial, cultural, healthcare, educational and other services.

> **Fractal cities combine the multiplying, non-linear benefits of the geographical concentration of knowledge-intensive activity with a polycentric layout**

Based on similar city form features, the ten core urban form design typologies identified that were used to define a set of urban performance KPIs. Research results show that (1) city typologies have a structural effect on urban performance; (2) fractality is a key urban form component when evaluating the relationship between urban form and urban performance KPIs, and the most efficient in terms of material infrastructure; and (3) fractal grids achieve a more egalitarian distribution of amenities than other network types.

In summary, the urban and economic development quality standards that would facilitate distributed prosperity are rarely met by cities and urban areas today, despite being feasible, attainable and desirable. A key take away from our analysis shows the capability of mathematical modelling to help address specific urban environment design challenges by evaluating each component of cities individually and finding common patterns between different city types. This allows us to understand and learn from the diagnostics technique and use it for recommendations in the future. While no city is precisely a single type, it is important to have a tool which can respond to the complexity of real world examples, where cities are made of multiple types blended together. Analysis of this type can therefore further our understanding of how our cities perform and identify the interventions that will best improve the quality of life in each context. Moving forward, a core challenge will be to identify the types of urban design and place-making interventions capable of reinforcing the fractal condition of any given city type, as well as

> **The urban and economic development quality standards that would facilitate distributed prosperity are rarely met by cities and urban areas**

the types of network science analyses (such as geographic clustering, reach and gravity indexes, triadic closure, strength of weak ties, catchment area analyses and between-ness) able to warn of exogenous shocks in the system to raise the overall quality of life. This will boost the potential of cities to increase their ability to serve their citizens by supporting inclusive growth, thus benefiting the broader society.

The great challenge we now face is to determine, for each city and context, the kind of urban layout design interventions, density levels, building form, capacity, heights, smart location and innovation hub design needed to boosting the knowledge economy, geographical distribution of services and mobility model structures should be prioritised to reinforce this fractal condition, consolidate the standards

of quality of the "15-minute city" model and, ultimately, outline strategies that will allow us to achieve a sustainable development pattern. Such goals can be achieved by harmonising a vibrant knowledge economy able to ignite prosperity cycles, with a resilient urban development model, thus increasing the quality of life of citizens.

6. CONCLUSION

In conclusion, the harmonious incorporation of evidence-based city science insights into traditional urban design and economic development strategies can assist urban leaders in developing innovative and resilient metropolitan areas, thus increasing the quality of life of citizens, through a combination of three articulated strategies: (1) an **Urban Design Vision for a Fractal Metropolis Strategy**, aimed at increasing the quality of life of citizens and achieving universal access to services, while capitalising on the exponential benefits of the geographic concentration of knowledge-intensive activities; (2) an **Economic Development Vision**, grounded in an evidence-based **Smart Specialisation Strategy** to activate the dormant capabilities of the collective know-how, by strengthening industry-specific value chains and informing product diversification and sophistication strategies; and (3) a network-theory driven **Innovation Strategy**, based on envisioning, designing, building and nurturing a **Network of Innovation Districts** to liberate the potential of local talent through geographically clustered, knowledge-intensive activities, and the linking of research with knowledge transfer and production at scale.

Bibliographic References

Arbesman, S., Kleinberg, J. M., and Strogatz, S. H. (2009). *Superlinear scaling for innovation in cities*. Physical Review E, 79, 016115.

Barabási, A. L. (2016). *Network Science: The scale free property*. Retrieved from: https://barabasi.com/f/623.pdf

Barabási, A. L. (2017). *The elegant law that governs us all*. Science, 357 (6347), 138.

Bertaud, A. and Malpezzi, S. (2003). *The Spatial Distribution of Population in 48 World Cities: Implications for Economies in Transition.*

Bettencourt, L. M. A., Lobo, J., Helbing, D., Kühnert, C., and West, G. B. (2006). *Growth, Innovation, Scaling and the Pace of Life in Cities.* PNAS, 24 April 2007, 104 (17) 7301-7306;

Bettencourt, L. M. A., Lobo, J., and Strumsky, D. (2007). Invention in the city: increasing returns to scale in metropolitan patenting. Research Policy, Volume 36, Issue 1, 2007, pp. 107-120, ISSN 0048-7333, https://doi.org/10.1016/j.respol.2006.09.026.

Bettencourt, L. M. A., Lobo, J., and West, G. B. (2008). *Why are large cities faster? Universal scaling and self-similarity in urban organization and dynamics*. The European Physical Journal B., 63, pp. 285-293.

Bettencourt, L. M. A., Lobo, J., and West, G. B. (2009). *The self-similarity of human social organization and dynamics in cities*. D. Lane, D. Pumain, S. E. van der Leeuw, and G. West (Eds.), Complexity Perspectives in Innovation and Social Change. Dordrecht: Springer.

Boeing, G. *Urban spatial order: street network orientation, configuration, and entropy.* Appl Netw Sci 4, 67 (2019).

Burke, J. and Gras, R. (2019a). *Hacia una nueva ciencia para entender y diseñar mejor las ciudades*. MIT Technology Review.

https://www.technologyreview.es/s/11355/hacia-una-nueva-ciencia-para-entender-ydisenar-mejor-las-ciudades

Burke, J. and Gras, R. (2019b). The Atlas of Innovation Districts. Recovered from:

Burke, J., Gras Alomà, R., Yu, F., and Kruguer, J. (2021). *Multiplying effects of urban innovation districts. Geospatial analysis framework for evaluating innovation performance within urban environments*. In: Advances in Science, Technology and Innovation (Springer, 2022).

Burke, J., Gras, R., and Yu, F. (year). *Geospatial Analysis Framework for Evaluating Urban Design Typologies in Relation with The 15-minute City.* Journal of Business Research (Elsevier): "Innovation, Management and Governance for Sustainable Cities" (work-in-progress, Elsevier, 2022).

Cerdà, I. (1867). *Teoría general de la urbanización y aplicación de sus principios y doctrinas a la reforma y ensanche de Barcelona*. Madrid: Imprenta Española.

Durand, J. N. L. (1840). *Précis des leçons d'architecture données à l'École Royale Polytechnique (Vol. 2).* Paris: École Polytechnique.

Ekmekci, O., Kalvo, R., and Sevtsuk, A. (2016). Pedestrian accessibility in grid layouts: The role of block, plot and street dimensions. Urban Morphology #20.

Ellison and Glaeser. (2009). The Geographic Concentration of Industry: Does Natural Advantage Explain Agglomeration? Ellison and Glaeser, American Economic Review.

Gehl, J. (2010). *Cities for People*, Island Press.

Helbing, D. *et al.* (2009). *Power laws in urban supply networks, social systems, and dense pedestrian crowds*. In: D. Lane, D. Pumain, S. E. van der Leeuw and G. B. West (Eds.), Complexity perspectives in innovation and social change. Dordrecht: Springer.

Jacobs, J. (1993). *The death and life of great American cities*. Vintage Books.

Kühnert, C., Helbing, D. and West, G. B. (2006). Scaling laws in urban supply networks. Physica A: Statistical Mechanics and its Applications, 363(1), pp. 96-103.

Moreno, Allam, Chabaud, Gall, Pratlong. (2021). "Introducing the 15-minute city: Sustainability, Resilience and Place Identity in Future Post-Pandemic Cities".

Schläpfer, M. *et al.* (2014). The scaling of human interactions with city size. Journal of the Royal Society Interface, 11, 20130789.

United Nations. (2016). The New Urban Agenda. Recovered from: http://habitat3.org/the-new-urban-agenda

Youn, H., Bettencourt, L. M. A., Lobo, J., Strumsky, D., Samaniego, H., and West, G. B. (2016). The systematic structure and predictability of urban business diversity. Journal of the Royal Society Interface, 13 (arXiv:1405.3202v1).

Reinventing the metropolis

Elena Costas

Economist at KSNET (Knowledge Sharing Network)

1. INTRODUCTION

Metropolises last a long time. Often longer than the countries that surround them. Yet they are not without challenges, or threats to their growth and collapse. In an increasingly changing world, where the future involves competition between major metropolises, we ask how to improve their resilience and their ability to reinvent themselves. There is no doubt that the future will be urban, but whether the metropolises we live in today can stand the test of time is less clear. We therefore need to analyse what dynamics and externalities, both positive and negative, are generated in large cities and metropolitan areas, and make us want to live in them. We need to pinpoint what external obstacles they face, such as the recent COVID-19 pandemic, and what internal challenges they themselves generate. Only then will we know how to reinvent our metropolises, ensuring they are sustainable over time.

2. WHY DO WE LIVE IN METROPOLISES?

More than half of the world's population lives in a city, in a process of urbanisation that has grown steadily in recent years (UN World Urbanisation Prospects, 2018). These urban agglomerations offer advantages in production, employment and consumption, leading many people to move to metropolises and large cities (Sánchez-Vidal & Sanchis-Guarner, 2020).

Throughout history, as cities have grown in size and density, they have also become richer. This is, in part, what economists call *agglomeration economies*. These refer to all the forces that mean the larger a city is, the more productive it becomes, as reflected in higher wages (Combes & Gobillon, 2015; Duranton & Puga, 2020). Productivity and wages increase because, firstly, firms that choose to locate near each other share assets and infrastructures, such as roads. Furthermore, since there are more people in one place, it becomes easier to fill vacancies quickly, and the number of potential consumers also increases. And, secondly, having several sectors working together also increases knowledge transfer and innovation (Duranton & Puga, 2004). For example, if measured in patents, at the beginning of the 1980s,

> **Throughout history, as cities have grown in size and density, they have also become richer. This is, in part, what economists call *agglomeration economies***

although metropolitan areas were home to only 30% of the American population, they accumulated 96% of product innovations. Metropolises grow and change, largely because of technological change. Centuries ago, the challenge was to bring water to the city. Today, it is to attract technological innovation hubs. Indeed, for a long time it was assumed that this would change with new information technologies and that, because we could communicate over the Internet, human beings would want to live further and further apart. However, the opposite is the case, and high-innovation cluster cities have sprung up, such as, Silicon Valley in San Francisco.

Agglomeration economies are not the only theory that explains the creation and growth of cities. Clearly, historical transport and trade routes have a major bearing on where today's metropolises are located. Some areas and territories are more conducive to economic activity, either because they have more fertile land or because transport costs are lower (Bakker *et al.*, 2020). Furthermore, as urban centres grow, economies of scale are generated in some economic activities. In other words, the more that is produced, the lower the production costs (Brueckner, 2011).

> **The competitiveness of metropolises is based on the combination of transport, trade and production**

The competitiveness of metropolises is therefore based on the combination of transport, trade and production. Locations with poor accessibility and lack of strategic access to external markets will hardly be able to generate the agglomeration economies necessary to become a metropolis.

As we can see, when cities are more productive they can therefore also offer higher wages. Being more urbanised makes us more productive, but as time goes on, big cities accumulate human capital, i.e. people who are better educated and have better skills who, together, innovate and produce more efficiently. And this drives up wages (Ciccone & Hall, 1996). It is not just your education and experience that makes you more productive, but the skills of all those around you. It has been shown that a person's income increases by more than 7% as the percentage of people in their metropolitan area with higher education increases by 10% (Winters, 2013). Even if we do not receive more education, we will earn more simply because we are surrounded by more educated people.

It is thus paradoxical that the reduction in communication costs, both physical and virtual, has led people to concentrate more in cities, rather than spread out. But what globalisation and technological change have achieved is to increase the return on having skills and abilities. And, at the same time, surrounding ourselves with others increases our capabilities.

Cities are the best way for humans to reduce transaction costs and improve access to markets. These gains generate a number of benefits, or positive externalities, such as having a highly skilled labour market and the learning generated and disseminated from one economic sector to another.

> **Cities are the best way for humans to reduce transaction costs and improve access to markets**

Moreover, this knowledge exchange among people living together is intensified in metropolises that are open to the world, as they not only trade goods from abroad, but also import culture and ideas (Hall, 1985).

Cities and their metropolitan areas largely determine the degree of direct foreign investment and technological progress in a country; in other words, they are the "competitive nexuses" of global capitalism (Muñoz Comet & Fernández-Monge, 2020). As far as globalisation is concerned, cities that have proved capable of connecting with global industries, thereby attracting the smaller corporate centres of global businesses, such as banks or financial companies, have experienced significant growth. These include London, New York and Tokyo, but also Paris, Frankfurt, Zurich and Mexico City.

It is because of this trend that the infrastructures available to these metropolises are becoming increasingly important, in a world where future competitiveness will not be between nations, but between cities. This poses major challenges for their governance, essential to the strategic planning of all their assets, boosting the productivity of metropolises and defining specific agendas, such as environmental or social rights (Gómez-Álvarez *et al.*, 2017).

> **Large cities cannot seek only to maximise their productivity and income. A thriving metropolis requires a well-governed metropolis**

As centres of exchange, metropolises need regulations, whether for trade or to establish common norms among their citizens. Large cities cannot seek only to maximise their productivity and income. A thriving metropolis requires a well-governed metropolis. To be attractive, large cities must offer not only good jobs prospects and good wages, but also safe streets, readily available housing and public goods and services at a minimum acceptable standard. It is necessary to know how to manage the costs of large urban agglomerations, as discussed later. But real metropolises are much more than their buildings, infrastructure and the skylines that define their contours. They are, first and foremost, the people who live in them, work in them and interact with them. Therefore, governing a metropolis means building a large city that considers the needs of the people who live in it, or have to live in it.

3. WHAT MAKES A METROPOLIS SUCCESSFUL?

Although cities grow, and many last longer than the countries to which they belong, many also lose much of their population and wealth after a glorious past. Think, for example, of Detroit or Venice.

If we analyse cities that have been in decline in recent decades, we see that, to a large extent, the cause of this decline has been deindustrialisation and the relocation of production to countries with lower costs. With the automation of industry, the beneficial urban density of Western countries lost much of its comparative advantages. In this sense, large industrial centres such as Seattle and Milan seemed doomed to disappear. But this was not the case.

Metropolises are living entities that are born, grow, sometimes stagnate or die, and sometimes reinvent themselves. But why do some great cities endure while others do not? The answer comes from Edward Glaeser, a Harvard economist and one of the world's leading experts on urban economics, who believes that, beyond good governance and a dynamic economy, cities and metropolises that grow and remain active over time are those that know how to constantly reinvent themselves.

What makes some metropolises capable of reinventing themselves? Seattle is a paradigmatic example, as it has much in common with many cities now forgotten (Glaeser & Ponzetto, 2007). For instance, like Detroit, Seattle began as a key point in a transportation network, and over the course of the 20th century it developed a major manufacturing industry and large engineering industry, in Boeing. When this large company began to reduce its presence in Seattle, the city's decline seemed inexorable. But unlike Detroit with the departure of Ford, or General Motors, Boeing had attracted a profile of highly skilled workers. It also had a strong university network, led by the University of Washington.

Compared to the depression of other industrial cities, Seattle was revived by the skills of its citizens. Its highly skilled population determined the success that many of the city's companies, such as Amazon, Starbucks and Microsoft, enjoyed in later years. If previously it was thought that urban reinvention required industrial diversity and a large number of small and medium-sized companies, rather than a large industrial monopoly, over the last few years we have seen that the key lies in being able to attract and retain human capital (Glaeser & Berry, 2006).

Although much innovation takes place in large cities (Feldman & Audretsch, 1999), innovation alone is not enough to ensure a metropolis will endure over time. Indeed, Detroit was, at the start of the 20th century, one of the most innovative cities in the world, with a large number of automotive entrepreneurs. The existence of an innovative metropolis cannot be guaranteed forever. The closure of a factory, an economic crisis or even a pandemic can mark the beginning of the end for large, successful urban areas. We have seen this in Detroit, Pittsburgh and Liverpool, which have lost much of the weight they had in the last century.

According to Glaeser's thesis, metropolises must generate human capital in order to prosper. This means attracting skilled people and letting them work collaboratively. Boston has managed to reinvent itself several times when on the verge of decline. From a trading port in the 17th century to a biotechnology centre today, having also had a manufacturing industry throughout the 19th century, Boston has always invested in education as a driver for change (Glaeser, 2005).

New York is another example of a city that has based its reinvestment on human capital. It was born as a port city, then became a manufacturing and industrial centre, and is now the capital of global finance. The key? Good management of the innovation economy by attracting and retaining talent as a driver for growth (Ariño & Olayele, 2021). Competing globally to attract talent is not easy, but it is essential in a global system of cities (Montes Gan & Gómez Funes, 2021).

What happens to metropolises is the opposite of Tolstoy's view of families, in which all happy families are alike and every unhappy family is unhappy in its own way. Metropolises that do not persist over time are similar and share many similar traits, such as higher rates of poverty and underused infrastructure. However, each happy metropolis is happy in its own way. We cannot define a single model of successful metropolis. From London to Singapore, the lucky cities look very different. What they have in common is their ability to reinvent themselves. In other words, they have been able to concentrate skills by generating externalities from their human capital.

4. COVID-19

With the arrival of the pandemic, many predicted the end of the metropolis. Remember how office buildings and co-working centres were emptied, and many owners appeared in the media talking about the end of their business. And it was undoubtedly citizens in urban areas, those most accustomed to high population densities, who experienced the most dramatic change in their daily lives from the early 2020s onwards. The density of cities favours the spread of viruses, so COVID-19 was a major threat to the urban world. But infectious diseases have always been commonplace in urban settings, from the great plague of Athens to the cholera pandemic on the streets of London in the 19th century. Yet we often forget that the solution to these problems often comes from the cities themselves and their metropolitan areas.

Metropolises undergo major transformations, which can bring them down and also help them recover, from factory automation to global pandemics (Sassen & Kourtit, 2021). The risk of contagion, lockdown and teleworking have forced metropolises to question their economic, labour and social dynamics, and even to discuss their urban structure (Subirats, 2021).

Teleworking provides flexibility for certain workers, usually the most qualified, who can live away from the centre of large cities. This can mean, for example, lower housing costs, and improved quality of life. But it also brings challenges, such as the need to improve technologies and access to environments far from large cities. It would not be the first pandemic to help expand the infrastructure of metropolitan areas, as happened with the London sanitation system in the 19th century in response to cholera. For cities with a higher cost of living, this also poses an additional challenge for attracting and retaining talent.

During the pandemic, we have seen that in-person activity has significant benefits, such as facilitating promotion and that teleworking especially affects younger workers (Baum-Snow *et al.*, 2022). This is why, even with the advance of teleworking, in the post-COVID-19 era we will probably still want to be surrounded by others so we can share ideas and continue to innovate.

5. THE CHALLENGES OF TODAY'S METROPOLISES

As we have seen, metropolises have significant advantages. Beyond the gains in innovation and employment, population density makes it possible, for example, to reduce transport costs. But we cannot ignore the fact that metropolises also pose major problems for the present and future of the people who live in them, as well as for society as a whole.

Increased density can reduce the environmental impact of population, but metropolises generate a major cost in terms of climate change. According to the United Nations, cities consume 78% of the world's energy and produce more than 60% of greenhouse gas emissions (UN Habitat). Generating more liveable, less polluted spaces is a challenge that all metropolises face, using solutions with varying degrees of innovation and effectiveness.

At the same time, metropolises attract large numbers of people, which can generate negative dynamics, beyond high traffic congestion, such as more crime and inequality. Traditionally, poverty was located in rural settings, but today 40% of the world's poorest countries are more than a third urbanised, with several megacities located in very poor areas. Despite the advantages associated with urban agglomerations, large cities are not exempt from dynamics that can have a negative impact on their inhabitants' living conditions (Muñoz Comet & Fernández-Monge, 2020). Historically, cities have favoured productivity, but they are increasingly struggling to avoid inequalities. This poses a challenge for economic policy, both in terms of population distribution and promoting equal opportunities in metropolises (Castells-Quintana & Royuela, 2021).

For its part, the increase in urban density and wages also implies a rise in housing prices. The demand to live in cities, and especially their centres, drives up the value of living space. The dynamics of metropolises over the last two decades is characterised by a significant rise in house prices in city centres, where it is particularly difficult to add new homes. Global metropolises face housing market-related problems such as land scarcity, gentrification and energy sustainability. Concerns regarding affordable housing are part of everyday public debate in metropolises worldwide.

6. THE ROAD TO REINVENTING THE METROPOLIS

Despite the challenges facing metropolises, from technological change to pandemics, large cities tend to be resilient over time. As we have seen, attracting talent is the mechanism for metropolises to reinvent themselves and adapt to the needs of a changing world, where leadership (political, social, cultural) is increasingly located around the poles of innovation and knowledge. In an increasingly globalised world, it is important to identify the keys to a competitive metropolis, and having highly skilled workers is a clear source of stability.

When thinking about the future of metropolises, we often tend to focus on the physical environment. However, as we have seen, the focus must be on human capital to ensure their sustainability. This means not only attracting talent, but also retaining it, both the talent generated in the cities and metropolitan areas themselves and talent that from comes from outside. Therefore, one of the key elements to improving cities' resilience and capacity to reinvent themselves is the availability of affordable housing so that workers, including entrepreneurs and innovators, can live there.

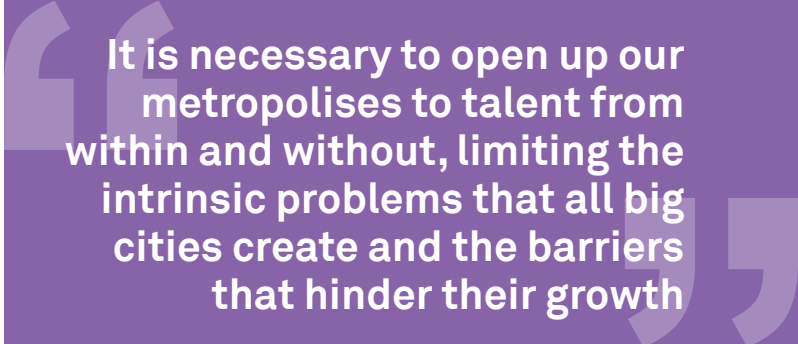> **Housing dynamics are fundamental to the future of metropolises**

Housing dynamics are fundamental to the future of metropolises. Firstly, a metropolis becomes dynamic when it manages to emancipate its young people early, not at the age of 30, as is the case in many southern European countries, while also attracting new foreign talent. Opportunities for emancipation depend on many factors, both social and individual, but nations in which young people are more likely to be able to embark on a life project tend to have employment and housing policies specifically aimed at them. It is therefore a question of seeing young people as a strategic resource for our society, for its future economic growth and for social welfare.

Affordable rental housing is essential to ensuring the future and innovation of cities. High housing costs, which are partly caused by the high productivity of large cities, also limit their growth potential. Indeed, if metropolises do not solve the problem of the lack of affordable housing for young talent, the rise of teleworking in the post-COVID-19 era could bring about a major shift in the current weight of cities. If metropolises are to continue to offer opportunities for all, housing prices must not make cities and their metropolitan areas unaffordable for many to live in.

> **It is necessary to open up our metropolises to talent from within and without, limiting the intrinsic problems that all big cities create and the barriers that hinder their growth**

Therefore it is necessary to open up our metropolises to talent from within and without, limiting the intrinsic problems that all big cities create and the barriers that hinder their growth. This is the only way to reinvent the metropolis, making it sustainable over time and offering everyone the chance to prosper. And to be happy, in our own way.

Bibliography

Ariño. A.; Olayele, F. (2021). "Urban Innovation and Reinvention: The Case of New York". *Información Comercial Española, ICE: Revista de Economía*, no. 920, pp. 29-48.

Bakker, J. D.; Maurer, S.; Pischke, J. S.; Rauch. F. (2020 / in press). "Of Mice and Merchants: Connectedness and the location of economic activity in the Iron Age". *Review of Economics and Statistics*.

Baum-Snow, N.; Glaeser, E. L.; Rosenthal, S. S. (2022). "The Spread and Consequences of COVID-19 for Cities: An Introduction". *Journal of Urban Economics*, no. 127, p. 103428.

Brueckner, J. K. (2011). *Lectures on Urban Economics,* chapter 1. MIT Press.

Castells-Quintana, D.; Royuela, V. (2021). "Ciudades y desigualdad: una mirada a las Áreas Urbanas Funcionales españolas". *Información Comercial Española, ICE: Revista de Economía*, no. 920, pp. 133-148.

Ciccone, A.; Hall, R. (1996). "Productivity and the density of economic activity". *American Economic Review*, no. 86(1).

Combes, P. P.; Gobillon, L. (2015). "The empirics of agglomeration economies". In G. Duranton; J. V. Henderson; W. Strange (Eds.). *Handbook of Regional and Urban Economics*, vol. 5. Amsterdam: North-Holland.

Duranton, G.; Puga, D. (2004), "Micro-foundations of urban agglomeration economies. Handbook of Regional and Urban Economics". In J. V. Henderson; J. F. Thisse (Eds.). *Handbook of Regional and Urban Economics*, edition 1, volume 4, chapter 48, pp. 2063-2117.

—(2020). "The economics of urban density". *National Bureau of Economic Research*, p. w27215.

Feldman, M. P.; Audretsch, D. B. (1999). "Innovation in cities: Science-based diversity, specialization and localized competition". *European Economic Review*, vol. 43, no. 2, pp. 409-429.

Glaeser, E. L. (2005). "Reinventing Boston: 1630-2003". *Journal of Economic Geography*, no. 5(2), pp. 119-153.

Glaeser, E. L.; Berry, C. R. (2006). "Why are smart places getting smarter". *Rappaport Institute/Taubman Center Policy Brief*, no. 2.

Glaeser, E. L.; Ponzetto, G. A. (2007). *Did the death of distance hurt Detroit and help New York?* National Bureau of Economic Research, p. w13710.

Gómez-Álvarez, D.; Rajack, R. M.; López-Moreno, E.; Lanfranchi, G. (Eds.) (2017). *Steering the metropolis: Metropolitan governance for sustainable urban development*. Inter-American Development Bank.

Hall, P. (1985). *Cities and the Wealth of Nations: Principles of Economic Life*. Penguin Random House.

Montes Gan, V.; Gómez Funes, A. (2021). "Ciudades globales y atracción de talento. El espacio físico en el que germina la innovación y el emprendimiento". *Información Comercial Española, ICE: Revista de Economía*, no. 920, pp. 149-166.

Muñoz Comet, J.; Fernández-Monge, F. (2020). "Ciudades, inmigración y desigualdad social". *Panorama Social*, no. 32.

Nacions Unides (2018). *World Urbanisation Prospects: Key Findings*.

Sánchez-Vidal, M.; Sanchis-Guarner, R. (2020). "Las ciudades y su rol en el comercio y los sistemas de transporte". *Panorama Social*, no. 32, pp. 49-64.

Sassen, S.; Kourtit, K. (2021). "A Post-Corona Perspective for Smart Cities: Should I Stay or Should I Go?". *Sustainability*, no. 13(17), p. 9988.

Subirats, J. (2021). "Complejidad, urgencia y dinámicas de gobierno. La gestión de la pandemia del coronavirus". In *Las administraciones ante los riesgos sociales y globales: repensando la Administración*. Instituto Nacional de Administración Pública (INAP), pp. 101-118.

Winters, J. V. (2013). "Human capital externalities and employment differences across metropolitan areas of the USA". *Journal of Economic Geography*, no. 13(5), pp. 799-822.

The government of the metropolis: five dilemmas

Oriol Nel·lo

Professor at the Autonomous University of Barcelona

1. METROPOLITAN GOVERNANCE: EXPRESSION AND COMPENDIUM OF MAJOR SYSTEMIC CHALLENGES

Metropolitan governance today is problematic in the vast majority of urban areas around the world. Since the urbanisation process has moved beyond the boundaries of individual locations to include ever larger territories socially, economically and functionally, the challenge of management and representation in urban areas has become increasingly complex. In the third decade of the 21st century, metropolitan governance has become particularly significant and urgent given the challenges posed by planetary urbanisation, interdependence of global economies, the environmental crisis and increasing inequalities (Nel·lo & Mele, 2016).

The issue of metropolitan governance is therefore intertwined with the major systemic challenges facing contemporary societies (Frase, 2014; Streeck, 2014). Thus, although the issue of metropolitan governance is often presented and perceived as a purely administrative problem or object of partisan struggle, it is in fact a local issue that encompasses crucial issues of general scope. In each urban area, metropolitan governance has to face – explicitly or implicitly – the dilemmas arising from changes in urban morphology, the spread of capitalist relations of production to the entire planet, the consequences of climate change and resource management, the problem of social equality and the need to guarantee citizens' rights and freedoms.

The difficulty of metropolitan governance stems from the size and significance of the issues it has to tackle. Its necessity arises precisely from the possibility of tackling such issues at the local level, in the territories where most of the world's population lives. This is why the challenge of shaping efficient, fair and democratic metropolitan governments is so complex, but, at the same time, so urgent.

When discussing the dilemmas facing metropolitan governance, it might be useful to structure them through a set of oppositions: city/territory, place/network, collapse/sustainability, exclusion/equality, institutional agency/collective action. The following pages will provide a brief analysis of the connections between these dyads and the challenges of metropolitan governance.

> " In the third decade of the 21st century, metropolitan governance has become particularly significant and urgent given the challenges posed by planetary urbanisation, interdependence of global economies, the environmental crisis and increasing inequalities "

2. CITY/TERRITORY

The urbanisation process in contemporary societies was initially characterised by a significant trend toward concentrating the population and activities in the territory (Lefebvre, 1970; Brenner, 2014). In many cases this trend was associated with factors such as demographic transition, industrialisation and the modernisation of agricultural activities. As these phenomena have arisen at different times and in different geographical areas worldwide, so the phases and intensity of population concentration have occurred at different moments in history. Thus, in general terms, it developed first in Europe and North America, followed later on other continents. Whatever the case, it is the trend towards concentration, which prevailed in Western Europe from at least the early 19th century until well into the 20th century, that has led to more than half of the world's population living in high-density settlements. Settlements that in fact occupy a very small part of the planet's surface. In contrast, very large, low-density territories have seen their population and resources drained and have lost relative demographic weight, sometimes also inhabitants in absolute terms.

However, the period of concentration in urbanisation has tended to decline and even regress in many countries, particularly in those where it started at an earlier moment in history. This decline is the result of the gradual spread of urban networks over the territory, due to the development of infrastructures, motorisation of travel, the impact of ICTs and changes in production systems (Soja, 2000; Indovina, 2009). Thus, urban areas today tend to expand over the territory, spreading urbanisation and integrating ever larger spaces. In this context, centres tend to lose weight in the metropolitan area as a whole and concentration has given way to a new phase, characterised by the dispersion of population and activities (Nel·lo, 2021; Nel·lo, 2022).

What we wish to stress here is that the conjunction of these two phases in the urbanisation process in the middle of the last century, which Gunnar Myrdal (1957) termed backwash and spread, respectively, has had the effect of extending the metropolitan networks to encompass or, on many occasions, exceed the totality of the respective regional spaces. In these circumstances, establishing boundaries for metropolitan areas and differentiating between town and country has become an extremely labile issue.

There is a great deal of literature on the delimitation of urban areas, based on different methods and approaches that consider history, morphology, function, economic structure, hierarchy of services and even ways of life (Nel·lo, 1998). However, it is clear that establishing the boundary of a metropolitan area based on thorough scientific criteria is a futile endeavour.

Hence, the first challenge in discussing metropolitan government is the very definition of the territorial scope over which it is to exercise its functions. Technical arguments will undoubtedly be relevant to this demarcation exercise. Ultimately, this will most likely have to be based on normative and therefore political criteria. Delimiting the metropolis for its government basically depends on the city project the government seeks to implement. Thus, the definition of limits to the urban area for governance purposes is today not so much a matter of what the metropolis is, but what it is meant to be. More than a scientific conclusion, it is a political decision. Hence its highly controversial character.

> **The first challenge in discussing metropolitan government is the very definition of the territorial scope over which it is to exercise its functions**
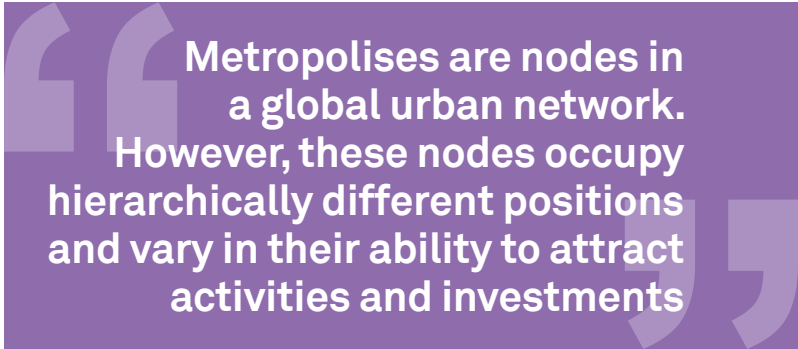
> **Delimiting the metropolis for its government basically depends on the city project the government seeks to implement**

3. PLACE/NETWORK

Metropolitan governance today faces a second source of dilemmas: the opposition between place and network. Indeed, the evolution of the urbanisation process in recent decades has not only led to the spread of urbanisation and urban lifestyles to encompass all regional spaces, but has also involved the integration of each metropolis into national, continental and global urban networks (Wallerstein, 2011; Castells, 2000).

Two factors have contributed most to this integration (Harvey, 1989). Firstly, improvements in communication infrastructures and the widespread use of ICTs have significantly reduced transport costs. Secondly, the lowering of tariffs and unification of markets has led to greater liberalisation in world trade. These two factors combined has led to an unprecedented increase in the mobility of goods, capital, information and, more selectively, people (Urry, 2014). Economic and social dysfunctions in recent years, with the COVID-19 pandemic and the war in Ukraine putting global exchange flows at risk, illustrate the extent to which cities are now dependent on their integration into and functioning of networks (Boira, Nel·lo & Seguí, 2022).

Metropolises are thus nodes in a global urban network. However, these nodes occupy hierarchically different positions and vary in their ability to attract activities and investments. Mainstream economic doctrine suggests that each city must enhance its competitiveness if it is to prevail in this context (Pengfei & Zheng, 2014). The argument is that high factor mobility makes the potential comparative advantage gained by locating activity or investment in one city rather than another more relevant. Cities must therefore adopt strategies to obtain an image and an 'urban offer' – in infrastructure, workforce, facilities and services – that is attractive to capital (Kamiya et al. 2020).

> **Metropolises are nodes in a global urban network. However, these nodes occupy hierarchically different positions and vary in their ability to attract activities and investments**

This conviction has exacerbated inter-territorial competition: the drive of governing sectors in each city to attract activities considered profitable and convenient, while also stopping those that contribute little value or are directly harmful to their image from locating there. As we know, heritage, cultural activity and symbolic elements have also been used alongside the material elements of the 'urban offer' in this endeavour. Indeed, rankings of varying degrees of sophistication have been developed to measure the attractiveness of each city (Kamiya et al. 2020).

However, the competitiveness paradigm has been challenged on several fronts. In particular, it has been pointed out that the struggle for competitiveness has different consequences for different social groups. Thus, if the attractiveness of an urban area is pursued by reducing income from labour or taxes to maintain social services, the increase in competitiveness may lead not to improving, but worsening living conditions for large sectors of the population. In this context, it may be argued that cooperation between metropolises, such as forming alliances against companies seeking to impose tax cuts or socialise their negative externalities, might often be more beneficial for the majority of their populations than competition between them (Urry, 2014; Nel·lo, 2018).

Another consequence of integrating metropolises into global networks has been the diversification of their inhabitants, so that large cities are now a compendium of diverse cultures. For example, 1 in 3 Barcelona residents was born abroad and it is estimated that up to 300 different languages are spoken in the city on a daily basis. This provides metropolises with a vast flow of cultural wealth and attraction. But it also contributes to fears and insecurities among certain sectors of the population. The explosion of xenophobic and nationalist attitudes that many (but not only) European countries are experiencing today is directly related to the difficulties of managing the social consequences of the relationship between places and networks within each metropolis.

Thus, we see how the integration of metropolises into global urban networks can provide major opportunities in terms of cultural wealth and economic efficiency, but also poses significant challenges. In a world governed by supra-local interests that are as difficult to understand as they are to manage, place of residence can be seen as a refuge and source of meaning, but the patrimonialisation of places by those who inhabit them can also give rise to exclusionary and xenophobic attitudes. Such consolidation of urban networks can generate ties of mutual aid and solidarity, but also stimulate fierce competition, whose results are not necessarily positive for either the losing or the winning cities. More than a century ago, Pyotr Kropotkin, in one of his most famous works, stressed the importance of mutual aid in the progress of mankind. The ability of metropolises to facilitate this principle, both internally and in relation to other cities, depends largely on the future of their governance.

> **The integration of metropolises into global urban networks can provide major opportunities in terms of cultural wealth and economic efficiency, but also poses significant challenges**

> **Place of residence can be seen as a refuge and source of meaning, but the patrimonialisation of places by those who inhabit them can also give rise to exclusionary and xenophobic attitudes. Such consolidation of urban networks can generate ties of mutual aid and solidarity, but also stimulate fierce competition**

4. EXCLUSION/EQUALITY

The dynamics of metropolitanisation and integration into global networks are directly related to another major challenge facing urban governance: social inequalities. Indeed, in many of the world's metropolises, internal inequalities tend to increase, despite the global rise in average income per capita and the relative fall in the average incomes of the countries that led industrialisation in the 19th century and so-called emerging economies (Stiglitz, 2012; Piketty, 2013; Milanovic, 2016).

Social inequalities are embodied in the city through residential segregation, i.e. the tendency of social groups to separate from one other in the urban space, based on their ability to choose their place of residence (Maloutas & Fujita, 2012; Secchi, 2013; Oberti & Preteceille, 2016). Essentially, this is the result of a combination of two factors: personal and household income, on the one hand, and land and house prices, on the other. Thus, social groups with less income are confined to living in those parts of the urban area where housing prices are lowest, which are often also those with fewer services, poorer accessibility and poorer quality public space. At the same time, better-off households also tend to separate themselves from the rest of the population to benefit from living among their peers without having to share available services with the rest of the population.

Although its historical origins are much older, residential segregation is a substantial issue in the capitalist urbanisation process which, in recent decades, has arisen in various forms (Van Ham et al. 2021; Nel·lo & Sabatini, 2022). Firstly, it has become a clearly global phenomenon, affecting every major metropolis and city on the planet: from Baltimore to Santiago de Chile, from Shanghai to Budapest. Secondly, separation between social groups is often aggravated by rising social inequalities within each metropolis. It is true that some cities have not followed this general trend, especially those where popular neighbourhoods have become gentrified or affluent populations have entered low or middle income areas, which may have reduced, however temporarily, the physical distance between social groups with different income levels. But available evidence suggests that the more general trend is towards greater separation between social groups. The third new feature in the evolution of segregation

in recent decades is that it has tended toward a distinctly metropolitan scale: it is no longer specific streets or neighbourhoods in each place that bring people of a certain income level together, but rather municipalities and even entire metropolitan hubs or corridors that concentrate residents of similar income levels.

Far from merely reflecting social inequalities, residential segregation often maintains and reproduces them (Nel·lo, 2021). Therefore, any urban policy that aims to reduce inequality, improve the living conditions of the population and increase opportunities for the most vulnerable sectors must address the causes and effects of segregation. Along with fiscal, labour market regulation and educational measures, in progressing towards this objective, policies have been tried in two main areas, in the strictly urban sphere: housing and urban regeneration.

Firstly, housing policies have sought to provide affordable housing, thereby helping the most vulnerable groups access housing on more favourable terms than those offered by the market. Housing policies can indeed undermine one of the pillars of the segregation process by having a substantial impact on housing prices. Secondly, urban regeneration policies have traditionally sought to improve living conditions in the most vulnerable neighbourhoods by rehabilitating the public space, providing facilities and improving the existing housing stock. Both policies have achieved remarkable results, but have sometimes helped increased segregation: housing actions can concentrate affordable supply in specific neighbourhoods of the metropolis; redevelopment initiatives can give rise to gentrification in some areas (Benach & Albet, 2018).

Whatever the merits and shortcomings of these policies, the metropolitan dimension of the problems they seek to address is today a major obstacle to their implementation. Indeed, with metropolitanisation, the problems associated with segregation combine with those arising from administrative fragmentation. As stated above, municipalities with the lowest house prices are often those with the poorest services, which, precisely because of the low quality of buildings and low level of economic activity, also tend to be the areas with the lowest tax base. This often results in the paradox whereby, in each metropolitan area, social sectors most in need of social services end up concentrated in the areas least able to provide them (Checa, Donat & Nel·lo, 2002).

> **Addressing the causes and effects of social inequality and residential segregation requires both structural and specifically urban policies, especially in the field of housing and neighbourhood rehabilitation**

> **Fiscal consolidation and the design of equalising policies on a metropolitan scale is today one of the main needs for metropolitan governments**

Addressing the causes and effects of social inequality and residential segregation requires both structural and specifically urban policies, especially in the field of housing and neighbourhood rehabilitation. However, the metropolitan scale of segregation means addressing the problem using the policies and resources available to each individual municipality is not feasible. Thus, fiscal consolidation and the design of equalising policies on a metropolitan scale is today one of the main needs for metropolitan governments.

5. COLLAPSE/SUSTAINABILITY

The development of contemporary urbanisation is closely linked to the transformation of society's relationship with nature, inherent in the capitalist economic system. Thus, over the last few centuries, human societies have tried to subject environmental systems to the requirements of production and consumption, imposing themselves on the laws that regulate them. Thus, natural resources have been privatised and exploited, to the point of depletion (Klein, 2014). This process has altered the functioning of ecosystems, reduced biodiversity and contributed decisively to current climate change, which threatens to worsen living conditions across vast regions of the world.

The formation and development of the metropolis is a paradigmatic example of the consequences of the utilitarian relationship between society and nature. Urban areas, being heterotrophic systems, must import huge flows of energy, water and resources, while generating waste and emitting greenhouse gases. Thus, according to UN estimates, they are home to more than 50% of the world's population on just 2% of the world's land area; they generate about 80% of the world's wealth, consume about 70% of the world's energy and emit 75% of its CO_2 (Burdett & Sudjic, 2011).

The chief paradox in this situation is that urban areas are particularly vulnerable to resource depletion and the effects of climate change (Musco & Zanchini, 2014). Thus, many cities today are acutely exposed to the risks of rising sea levels, changes in precipitation patterns and recurring catastrophic weather events. Urban areas are

also particularly sensitive to epidemics and energy supply problems, as the recent COVID-19 health crisis and the consequences of the war in Ukraine have made clear. However, urban settlement can also provide major advantages in adapting to climate change and limiting its effects (Camagni & Gibelli 2002). Thus, experts have pointed out that the compactness and high density of settlements are favourable factors for limiting mobility and energy and water consumption per inhabitant. It is also in cities that major scientific innovations have developed: from vaccines to combat infectious diseases, to energy transition technologies. The urbanisation process thus brings with it acute problems yet contains part of the solution to humanity's environmental challenges. It is therefore unequivocally safe to say that the trade-off between collapse and sustainability is another pressing dilemma facing major metropolises today.

Yet no viable and lasting solution to the environmental challenge can be achieved unless it is addressed in conjunction with the other systemic problems associated with urbanisation. Take, for example, the issue of the energy transition, which experts and institutions advocate as a means of addressing the progressive exhaustion of fossil fuels and reducing greenhouse gas emissions (Brown et al., 2015). Clearly, two premises must be met if this proposal is to be fulfilled: firstly, fossil fuels must be abandoned in favour of renewable energies; secondly, production points and consumption must be brought closer together. In urban terms, the corollary should be that cities produce the energy they consume from renewable sources.

The dilemmas associated with the city/territory and exclusion/equality dyads relate closely to the chances of overcoming these environmental challenges. The first reason for this is because implementing systems for the use of renewable energies

(hydro-, wind and solar power) requires huge tracts of land. For instance, supplying the electricity consumption requirements of Catalonia, with its 7.5 million inhabitants, using renewable sources would require a four-fold increase in land to 55,000 ha for energy generation, an area over five times the size of the city of Barcelona (López, 2017). Locating these facilities far from the centre of the metropolitan system is already causing significant territorial inequalities. Firstly, the installation of energy production for domestic self-consumption in the city itself, still very modest, above all benefits better-off social groups, to the extent that, in the city of Barcelona, households in the top income decile are 40 times more likely to have self-consumption installations than those in the poorest decile. There is thus a danger that the energy transition will increase territorial and social inequalities if appropriate measures are not taken (Mejía, López & Checa, 2022).

> **The environmental challenges facing cities are closely interlinked with the question of equality in wealth creation and distribution**

Far from being an isolated problem, the environmental challenges facing cities are closely interlinked with the question of equality in wealth creation and distribution. Large cities need to make far-reaching decisions to cope with them and avoid situations of possible collapse. To do so, they will have to confront powerful interests and significant inertias, as success depends on them gaining overwhelming social support. Thus, territorial and social equality are not just the consequences of environmental policies, but are in fact an essential premise for their viability and success.

> **Territorial and social equality are not just the consequences of environmental policies, but are in fact an essential premise for their viability and success**

6. INSTITUTIONAL AGENCY/COLLECTIVE ACTION

As we have seen, metropolises must face dilemmas arising from changes in settlement morphology, integration into global urban networks, social cohesion and environmental sustainability. These dilemmas find their corollary in political-administrative organisation. In this field, two tendencies are engaged in an unceasing struggle: the need for stable and comprehensive metropolitan governance instruments and the existence of powerful interests that benefit from fragmentation and the lack of political-administrative coordination.

There are a number of reasons for defending the establishment of a system of metropolitan governance, through administrative structures and integrated policy development (Heinelt & Kübler, 2005; Tomàs, 2015; Nel·lo, 2021). The absence of integrated and stable governance instruments hinders efficient management of mobility, service networks and environmental issues. It also hinders land-use and infrastructure planning and management. In social terms, without a degree of fiscal consolidation and unity of purpose at the metropolitan level, it is virtually impossible to tackle the challenges of access to housing, providing facilities and urban regeneration. Finally, administrative fragmentation hinders transparency, accountability and, often,

democratic representativeness in decision-making. Thus, coordinating metropolitan governance, whether through the association of the places in the urban area or by creating an ad hoc metropolitan government, has been seen as the aspiration in establishing and maintaining a degree of order in how the city functions (Indovina, 2017). Yet despite this apparent need, it has proved extremely difficult for metropolitan governments to come into being and thrive in many of the world's urban areas. Apart from the intrinsic complexity of urban reality, the difficulty largely stems from the fact any order that might be established alters pre-existing interests: while it may benefit certain social groups, it jeopardises the status of others.

Firstly, it should be borne in mind that the metropolitan phenomenon is, in historical terms, relatively new. Thus, the spread of urbanisation and urban networks over the territory is, in many cases, superimposed on pre-existing administrative structures, the result of past settlement systems. Adapting inherited historic administrative structures to new urban realities has almost always met with considerable resistance. It should also be borne in mind that administrative fragmentation may favour certain social groups. Therefore, metropolitan fiscal consolidation facilitates equality in urban facilities and services, while hindering free-riding among the privileged. However, the better-off (who, as stated above, tend to group together in the metropolitan space) may benefit from residing in separate municipalities or fiscal units, without the need to share local services and neighbourhoods with more vulnerable social groups. It is not surprising, therefore, that they are reluctant to integrate and strongly defend their autonomy.

Furthermore, administrative fragmentation can also benefit certain economic actors. One consequence of creating global networks is, as indicated above, the asymmetric mobility of capital and labour. While the former enjoys virtually unrestricted freedom of movement, workers often remain anchored in one territory, facing numerous obstacles to settling in others. Hence the growing retaliation from companies facing attempts to maintain labour rights in each country. In this context, local governments in metropolises share, to a large extent, the fate of the workforce. If the best conditions for location are not offered, investors can always choose to move elsewhere. Administrative fragmentation can stimulate this dynamic, so sites in each metropolis end up competing with one other, the community obtains lower returns than it might do with action coordinated on a metropolitan scale.

However, other actors also operate in the metropolis, an expression of the organisation of subaltern social groups. They organise into movements that try, and often succeed, to influence governance (Harvey, 2013; Nel·lo, 2015; Fregolent & Nel·lo, 2021). Thus, in several countries, there have been experiences in recent years whereby local governments have introduced significant innovations in the urban agenda, in areas such as access to housing, neighbourhood rehabilitation, traffic calming, control of water management, energy transition and the democratisation of decision-making processes (Blanco & Gomà, 2016). These experiences, which have been termed 'new municipalism', have sometimes benefited from administrative fragmentation that has allowed citizens' organisations to take over the government in certain places. As they

represent working class sectors, who usually live in the less well served and more poorly resourced zones of each urban area, they often favour promoting instruments of metropolitan governance capable of addressing third-party interests and promoting mechanisms for equality.

This type of local government is also notable for its willingness to form metropolitan alliances to defend common interests. As a result they have fostered agreements between cities to introduce environmental regulations, given the reluctance or refusal of state governments to do so. Alliances have also arisen to challenge the intentions of companies and economic sectors, in particular to defend cities from the potential negative effects of the emerging platform economies (in sectors such as distribution, mobility and tourist rentals). In the current situation of geopolitical tension, alliances between urban governments could even provide a counterpoint for tensions between states in matters such receiving refugees and contributing to conflict mediation.

Finally, a third factor increasingly affects metropolitan governance: the growing importance of collective action based on solidarity and mutual support. Given the market's inability to provide affordable goods and services to a large part of the population, the decline of the welfare state and difficulties in coordinating effective metropolitan governance, new forms of citizen organisation are proliferating in many cities. This phenomenon was particularly visible during the COVID-19 health crisis (Nel·lo, Blanco & Gomà, 2022). In part, these are contentious actions, aimed at asserting

rights over private interests or the state; they are also, partly, experiences that explore and prefigure social relations, forms of production, distribution mechanisms and an innovative and pre-figurative relationship with the environment.

The coordination of metropolitan governance systems is necessary for reasons of functionality, sustainability and equality. However, it faces significant resistance due to the multiple social and economic interests it affects, at both the local and supra-local levels. In this context, actors are emerging in many cities to renew the urban agenda and promote policies that require both metropolitan level fiscal consolidation and management, as well as international cooperation between cities. Citizen action is also gaining considerable strength in many urban areas, capable not only of demanding citizens' rights, but also promoting alternative forms of social organisation and governance. The future of the metropolises depends, to a large extent, on the outcome of this struggle between conflicting interests and aspirations.

"The coordination of metropolitan governance systems is necessary for reasons of functionality, sustainability and equality"

"Actors are emerging in many cities to renew the urban agenda and promote policies that require both metropolitan level fiscal consolidation and management, as well as international cooperation between cities. Citizen action is also gaining considerable strength in many urban areas"

References

Benach, N. & Albet, A. (2018). *Gentrification as a Global Strategy. Neil Smith and Beyond*. New York: Routledge.

Blanco, I. & Gomà, R. (2016). *El municipalisme del bé comú.* Barcelona: Icària.

Burdett, R. & Sudjic, D., eds. (2011). *Living in the Endless City.* London: Phaidon Press.

Boira, J.V.; Nel·lo, O. & Seguí, J.M. (2022). "La gran aturada. La mobilitat a Catalunya, les Illes Balears i el País Valencià durant la crisi sanitària de la COVID-19", in A. Domingo & M. Barceló, *Les mutacions socials de la Covid.* Barcelona: Institut d'Estudis Catalans.

Brenner, N. (2014). *Implosions/Explosions: Towards a Study of Planetary Urbanization*. Berlín: Jovis.

Brown, Lester R. et al. (2015). *The Great Transition. Shifting from Fossil Fuels to Solar and Wind Energy*. New York/London: W. W. Norton & Company.

Camagni, R. & Gibelli, M.C. (2002). *I costi collettivi della città dispersa*. Milano: Alinea.

Castells, Manuel (2000). *The Rise of the Network Society. The Information Age: Economy, Society and Culture*. New York: John Wiley & Sons.

Checa, J.; Donat, C. & Nel·lo, O. (2022). "Segregación residencial y recursos municipales en la región metropolitana de Barcelona", in I. Blanco & R. Gomà, eds. ¿Vidas segregadas? Reconstruir fraternidad. València: Tirant lo Blanch

Frase, P. (2014). *Four Futures. Live After Capitalism*. London, Verso.

Fregolent, L. & Nel·lo, O., eds. (2021). *Social Movements and Public Policies in Southern European Cities*. Cham: Springer

Harvey, D. (1989). *The Condition of Postmodernity. An Enquiry into the Origins of Cultural Change*. Cambridge: Blackwell.

Harvey, D. (2013). *Rebel Cities. From the Right to the City to the Urban Revolution*. New York: Verso.

Heinelt, H. & Kübler, D., dir. (2005). *Metropolitan Governance: Capacity, democracy and the dynamics of place*. London: Routledge.

Indovina, F. (2009). *Dalla città diffusa all'archipelago metropolitano*. Milano: Franco Angeli.

Indovina, F. (2017). *Ordine e disordine nella città contemporanea.* Milano: Franco Angeli.

Kamiya, M. & Pengfei, N. (2020). *Global Urban Competitiveness Report (2019-2020).* Nairobi: UN Habitat.

Klein, N. (2014). *This Changes Everything. Capitalism vs. the Climate*. New York: Simon & Schuster.

Lefebvre, H. (1970). *La révolution urbaine*. Paris: Gallimard.

López, J. (2017). "¿Sostenibilidad a cambio de suelo? La huella territorial de la generación de electricidad". *Ciudad y Territorio. Estudios Territoriales*, vol. XLIX, 194.

Maloutas, T. & Fujita, K., eds. (2012). *Residential Segregation in Comparative Perspective. Making Sense of Contextual Diversity*. London: Ashgate.

Mejía, V.; López, J. & Checa, J. (2022). "¿Hacia una transición energética justa? Consumo energético y segregación residencial en el área metropolitana de Barcelona". *Ciudad y Territorio. Estudios Territoriales.*

Milanovic, B. (2016). *Global inequality: a new approach for the age of globalization*. Cambridge, Massachusetts: Harvard University Press.

Musco, F, & Zanchini, E. (2014). *Il clima cambia le città. Strategie di adattamento e mitigazione nella pianificazione urbanística*. Milano: Franco Angeli.

Myrdal, G. (1957). *Economic theory and under-developed regions*. London: Duckworth.

Nel·lo, O. (1998). "Los confines de la ciudad sin confines. Estructura urbana y límites administrativos en la ciudad difusa", in F. J. Monclús, *La ciudad dispersa*. Barcelona: CCCB.

Nel·lo, O. (2018). "Los cuatro retos de la ciudad europea", *Informe Económico y Financiero ESADE*. Barcelona: ESADE.

Nel·lo, O. (2015). *La ciudad en movimiento. Crisis social y respuesta ciudadana*. Madrid: Díaz & Pons.

Nel·lo, O., ed. (2021). *Efecto barrio. Segregación social y condiciones de vida en las grandes ciudades ibéricas.* València: Tirant lo Blanch.

Nel·lo, O. (2021). "Cinc reptes territorials per a la Catalunya post-covid", in J. Burgueño, ed., *La nova geografia de la Catalunya post-covid*. Barcelona: Societat Catalana de Geografia.

Nel·lo, O. (2021). *La governança metropolitana a Barcelona. Sis reptes i trenta propostes.* Barcelona: Pla Estratègic Metropolità https://barcelonadema-participa.cat/pages/paper-governanza

Nel·lo, O. (2022). "Transformaciones territoriales en España. De la dispersión de la urbanización a la urbanización extendida", in J. A. Rio Fernandes et al. *El mundo visto de las ciudades*. València: Tirant lo Blanch.

Nel·lo, 0. (2022). "Le aree interne della Sardegna. Per una nuova centralità", in A. Cecchini & A. Sanna. Milano: Franco Angeli.

Nel·lo, R. & Mele, R. (2016). *Cities in the 21st Century*. New York: Routledge.

Nel·lo, O.; Gomà, R. & Blanco, I. (2022). *El apoyo mutuo en tiempos de crisis. La solidaridad ciudadana durante la pandemia COVID-19*. Buenos Aires: CLACSO.

Nel·lo, O. & Sabatini, F. (2022). "Segregación residencial y políticas urbanas: convergencias y contrastes entre Barcelona y Santiago de Chile", *Documents d'Anàlisi Geogràfica*, 68/3.

Oberti, M. & Preteceille, E. (2016). *La ségrégation urbaine*. Paris: La Découverte.

Pengfei, N. & Zheng, Q. (2014). *Urban Competitiveness & Innovation*. Cheltenham: Edward Elgar.

Piketty, T. (2013) *Le Capital au XXIe siècle*. Paris: Éditions du Seuil.

Secchi, B. (2013). *La città dei ricchi e la città dei poveri*. Bari: Laterza.

Soja, E. (2000). *Postmetropolis. Critical Studies in Cities and Regions*. Oxford: Blackwell.

Stiglitz, J.E. (2012). *The Price of Inequality: How Today's Divided Society Endangers Our Future*. London: W. W. Norton & Company.

Streeck, W. (2014). "How Will Capitalism End?", *New Left Review*, 87.

Tomàs, M. (2015). *La governança metropolitana a Europa. Models i reptes*. Barcelona: Àrea Metropolitana de Barcelona.

Urry, J. (2014). *Offshoring*. London: Polity Press.

Van Ham M.; Tammaru, T.; Ubarevičienė, R.; Janssen, H. (eds.) (2021). *Urban Socio-Economic Segregation and Income Inequality. A Global Perspective*. Cham: Springer.

Wallerstein, I. (2011). *The modern world-system*. Berkeley: University of California Press.

Inclusive metropolises: strengthening and innovating in metropolitan social policy

Ricard Gomà

Director of the Institute of Regional and Metropolitan Studies of Barcelona

This paper aims to discuss elements for reflection in the space where the **social agenda** and the **metropolitan scale** intersect. It will do so in two blocks and four sections. The first block provides a global view, with two key ideas: the change of epoch calls for innovation in social policy (first section), and the urban epoch calls for a strengthening of the metropolitan dimension of the welfare agenda (second section). The next block explores the reality of the Barcelona metropolis. Firstly, it reviews the principal social dynamics cutting through it in the post-pandemic scenario (third section) and, secondly, proposes a decalogue of social policies to structure a more inclusive city (fourth section).

1. THE CHANGE OF EPOCH: INNOVATING IN SOCIAL POLICY

We live in a time marked by profound crises: the Great Recession, with the enormous social impact caused by austerity; the pandemic, with its effects on the health and living conditions of the most vulnerable people; and the current scenario arising from the Russian invasion of the Ukraine, with clear consequences for geopolitics (military escalation) and economics (galloping inflation). But beyond the crises, the **dynamics of the change of epoch** are active in several dimensions. A cycle of intense, multiple and rapid transformations has been unleashed, demanding a redefinition of the personal pathways and collective horizons that will run through the 21st century. A new era is emerging.

In the territorial and ecological spheres, simultaneous processes of gentrification, urban segregation and population loss are taking shape and socially-caused environmental risks are becoming more acute (climate emergency). In the socio-economic sphere, processes of technological transition are advancing; financialisation and its speculative logics are spreading, aggravating the causal factors of inequality and expressions of vulnerability. In the socio-cultural sphere, a world of everyday complexities (such as multicultural spaces and new gender relations and identities) is emerging and biographical discontinuities and uncertainties (such as global migrations and ages in transition) are appearing. Finally, in the political sphere, factors of belonging are changing; coalitions form around emerging conflict hotspots and new kinds of citizens' energies bloom.

All of this is simultaneously shaping the scenario of daily transformations that cuts through our lives. Ulrich Beck spoke of the "global risk society" as a way for deciphering changes in socio-ecological terms. Zygmunt Bauman constructed the metaphor of the

"liquid society", as far removed from the narrative of post-modernity free of economic conflict as from the nostalgia for a mirage-filled industrial era. Judith Butler and Nancy Fraser discussed the "feminist revolution" and the intersectionality of dominations and hopes. Richard Sennett and Eric Klinenberg see the "ethics of fraternity", of everyday bonds, as the cornerstone of socio-political transitions. These contributions are diverse, but are all expressed in the grammar of epochal change. There is a huge gulf between these transformations and the social-Keynesian logic of the 20th-century welfare regimes. At the same time, recent neoliberal manoeuvres seem to run out of ideas in a context in which the collective is re-emerging as a human need. This is an epoch-making rupture, **a fundamental mismatch between pre-existing agendas and emerging dynamics**.

> **Re-emerging as an epoch-making rupture, a fundamental mismatch between pre-existing agendas and emerging dynamics**

By looking beyond perspectives that tend to trivialise or resist transformations, the dimensions of epochal change can be read as **co-ordinates for the reconstruction of social citizenship**. The current context serves as the scenario in which to explore a profound reorganisation of the social contract, to map ecological and gender contracts for the 21st century. A framework of rights linked to the society emerging from major transitions and its structure of collective risks and hopes; a range of new welfare policies and new ways of producing them. The grammar of a potential social citizenship for the 21st century is written in the dual connection between **equality with differences** and **autonomy with bonds**. Bringing about the construction of equality in a framework of diversity may require, in terms of public policy, at least four major shifts in the old social contract: towards predistribution, beyond classic redistributive logic; towards feminism, beyond dominant gender identities and relations; towards interculturality, beyond traditional concepts of integration; and towards age, beyond adultocratic approaches. Bringing about the construction of autonomy within a context of fraternity may require four new transformations: a shift towards basic income, to guarantee material living conditions and thus real freedom; towards ecosocial transition, to build global climate justice and local sovereignty (in food, water and energy); towards care, as relational commons aimed at addressing everyday vulnerabilities; and towards the urban agenda, to ensure rights in housing, in the neighbourhood and in the city.

> **The grammar of a potential social citizenship for the 21st century is written in the dual connection between equality with differences and autonomy with bonds**

2. THE ERA OF THE METROPOLIS: POSITIONING SOCIAL POLICY

Industrial society developed within the state space, and the times that emerge from the transitions in the change of epoch is forcefully expressed in the networks of cities and metropolises. Today we live in an unprecedented urban/metropolitan era. The UN Habitat III conference (Quito, 2016) noted the **historic double majority indicator**: 54.5% of the world's population live in cities, and the world's 1,934

metropolises are home to 60% of this urban population. If this trend continues, metropolises will be home to 39% of humanity by 2025 (62.5% of urban dwellers). In absolute terms, the dynamic revealed by metropolitan population forecasts is clearly one of growth: from 2.59 billion in 2020 to 3.47 billion by 2035. That would be one billion new metropolitan dwellers in 15 years (1.2 million more per week). These figures express a double structural logic: **a)** an increase in metropolises: from 1,934 in 2020 to 2,363 by 2035 (a new one every two weeks); **(b)** population concentration: from 34 to 51 megacities (more than 10 million inhabitants) and from 51 to 73 above 5 million, by 2035.

But this does not only, or even mainly, express a new demographic reality; the figures reflect much more than this: **a)** 20% of the population live in the world's 500 most dynamic metropolises, yet generate 60% of the planet's GDP; **b)** the financialisation of the global economy has its main anchor in rents from urban real estate; **c)** cities with over 300,000 inhabitants are today responsible for 70% of greenhouse gas emissions, but the most advanced ecological transition strategies are also located in them; **d)** the rate of social inequality, with its resulting segregation, has risen by 20% in the metropolises over the last 20 years, while new networks of community solidarity have also been created. In short, **metropolises construct and reflect the world of the 21st century**, in all its tensions: economic dynamism, urban speculation, climate change, inequality. They are also the place where the logics of collective action (social innovation practices) and the most significant political alternatives develop: the municipalist and metropolitan construction of the right to the city, as a window of democracy in the face of global markets and state borders.

The above figures are even more striking once we turn our attention to Latin America and the European Union.

– In Latin America, the demographic weight of cities increased from 25% to 75% of the population from the early 20th century to the beginning of the 21st century; in the same period, the urban share of total GDP climbed from 20% to 80%. The leap in metropolitan reality is unprecedented: no Latin American city had more than one million inhabitants at the end of the 19th century; today there are more than 60 metropolitan areas with larger populations than this. Of the 34 megacities in the world (those with more than 10 million inhabitants), 6 are in Latin America: Mexico City, São Paulo, Rio de Janeiro, Buenos Aires, Lima and Bogotá, while Santiago de Chile, Guatemala City, Guadalajara and Belo Horizonte exceed 5 million. They are dynamic but globally inefficient metropolitan economies; they create unequal and fractured societies with high levels of informal labour and urbanisation; they undergo processes of widespread urbanisation and have high levels of pollution.

– In shifting the focus to the European Union (EU), the metropolitan grammar changes. The logics of concentration and growth are less dynamic: only the megalopolis of Paris exceeds 10 million inhabitants and the aggregate increase is due to the combined action of global migratory flows and internal displacement of the young population. However, a structural element of enormous interest emerges: the process of the formation of 12 transmetropolitan networks as areas of high relational intensity (economic, socio-cultural, ecological) developed by mature metropolises. Two of these mega-regions are located in Great Britain (London-Birmingham-Manchester-Liverpool and Glasgow-Edinburgh). Six are located in the western and central EU: Amsterdam-Brussels-Cologne, Paris, Frankfurt-Stuttgart, the Berlin area, Prague-Dresden-Leipzig and Vienna-Budapest. And four in Latin-Mediterranean Europe: Rome-Milan-Turin, Barcelona-Lyon, the Madrid region and Lisbon. With regard to EU totals, the 12 metropolitan networks make up 61% of the population, 69% of GDP, 74% of R&D spending and 78% of creative industries.

The above considerations show how a global reality marked by urban/metropolitan hegemony is now consolidated and forcefully expressed in all regions of the planet, although with different features in the European context. This leads to the following questions: Can a metropolitan regime of the 21st century be characterised? To what extent would it be linked to a change of epoch?

The metropolitan regime of the 21st century is expressed in three key dimensions:
a) The *economic dimension*, where value creation shifts towards knowledge, and industrial revival occurs under conditions of automation and artificial intelligence; technologies are widely deployed and digital platforms are inserted into the heart of metropolitan economies, while financial capital is mobilised through urban investment, tending to create real-estate bubbles.
b) The *socio-residential aspect* generates forces in tension: the unprecedented increase in metropolitan social complexity (origins, households, ages) emerges as an opportunity to develop spaces with new diverse and compact morphologies, towards creative environments imbued with logics of recognition; in addition, the social impact of financialisation produces expulsions and functional substitution.
c) In *ecological terms*, rising emissions creates the climate emergency, with metropolises as key agents in global warming; mass car use is the root cause of air pollution, while triggering a process of extensive use of space: between 1996 and 2020, the metropolitan population grew by 25%, but its territory expanded by more than 40%. Metropolises are thus at the heart of the social production of ecological risks.

The metropolises of the 21st century operate at the centre of the cycle of epochal change:

a) In its *configuration*. Digitisation consolidates the network of global metropolises and the emergence of new urban platform jobs within them. Speculative logic turns housing and space into financial assets.

b) In its *impacts*. Residential exclusion, water and energy poverty, the effects of gentrification on communities, vulnerability and residential segregation and informal urbanisation are at the heart of the new structure of social risks.

c) In the *responses*. The way changes in the metropolis and their social impact are configured has activated new forms and processes of socio-political response: from institutions (the municipalist innovation cycle) and from citizens (the social innovation cycle and solidarity networks).

3. BARCELONA AND THE POST-COVID-19 METROPOLITAN SCENARIO: SOCIAL DYNAMICS

Two key ideas emerge from the previous sections. Firstly, the change of epoch generates the coordinates for reconstructing social citizenship, the parameters within which to express the new welfare contract and its innovative policies. Secondly, the urban era has a strong metropolitan bias, an emerging scenario where metropolises are central to the context of major social transitions. Social policy should therefore respond to the combination of the two types of logic: ***innovation*, beyond pre-existing agendas and formulae, and *localisation* in urban and metropolitan settings**, beyond the predominant national-state level. Clearly, the new social policy in the metropolitan sphere must match specific realities, in time and space. We now focus this reflection on the post-COVID-19 period and the space of the metropolis of Barcelona. In broad social terms, the Barcelona metropolis and post-pandemic Barcelona may be characterised in four dimensions:

> "Social policy should therefore respond to the combination of the two types of logic: *innovation*, beyond pre-existing agendas and formulae, and *localisation* in urban and metropolitan settings"

A. Social inequalities. With regard to income, the most powerful impact of the pandemic appears in the form of poverty: the vulnerable population has increased by 20% in the metropolitan area of Barcelona. By distributing poverty by profile one observes highly focussed patterns: a very high impact on the working classes, children and migrants. In terms of labour, the new scenario has widened pre-existing asymmetries. Young people, women and groups in precarious jobs have been hit the hardest. The pandemic has also widened the age gap as an axis of inequality. The impact was greatest among children in at-risk family situations, precarious living conditions and lacking tools for remote education. Many young people live in situations of economic and residential insecurity: exclusionary labour and housing markets. In the metropolis, youth unemployment rates grow unevenly depending on origin, income and neighbourhood: the unemployment rate among young migrants is twice that of locals, while it is three times higher for young people living in low-income neighbourhoods compared to those living in affluent ones. In short, the COVID-19 crisis **has fragmented and further polarised the metropolitan social structure**.

B. Urban segregation. Housing is now at the heart of the risk of social exclusion in the metropolis, most significantly for people living in rental accommodation. The percentage of tenants paying excessive housing costs continues to grow. Closely linked to the spatial distribution of land and property prices, this territorial embodiment of inequality has also gained visibility in the context of the pandemic. In the Barcelona metropolitan area, the pattern of urban vulnerability exhibits three factors: persistence (areas of poverty become chronic), concentration (spatial focus) and complexity (with different configurations between social and residential aspects). For decades, exclusion has been most intensely expressed in the Llobregat and especially the Besòs axes, affecting large trans-municipal areas with a clearly metropolitan logic. Finally, the pandemic has substantially altered certain dynamics in mobility. The lockdown and numerous restrictions led to an unprecedented reduction in transport flows. However, this situation clearly reveals patterns of spatial socio-economic segregation: in affluent areas, teleworking has led to a breakdown in pre-existing patterns of hyper-mobility by private car; in low-income neighbourhoods, employment in essential face-to-face services has sustained much greater use of public transport.

C. Community fragilities (and energies). Ninety percent of the metropolitan population lives in apartment blocks, which affects the conditions of apartments and the dynamics of community relations. Lockdown highlighted daily fractures that cut across the household space: inequalities in the very conditions of habitability, in gender relations linked to care time, in the digital dimension linked to education. In many cases, the pandemic has also meant a rediscovery of the neighbourhood, a strengthening of relationships and community solidarity. But the reality is complex. And experiences of loneliness have also increased; the situation of those people who, despite living in densely populated environments, express an unwanted absence of daily relationships, and are unable to rely on friends or family in case of need. Above all, such loneliness affects the most vulnerable people in terms of health, single-person households and the homes of older people.

For their part, stakeholders in the territory have shown significant potential for agency in dealing with the pandemic and have strengthened the foundations to foster transformation. The responses have been expressed through collective urban action. In the field of citizenship, one should bear in mind a long cycle of growth and diversification of practices connected to the community's protection of rights and coverage of basic needs. These first took the form of urban self-management at the turn of the millennium. They then crystallised shortly afterwards, in response to the Great Recession and in the context of the 15M movement or *indignados* protests, as practices of social innovation. Without this background, it would be difficult to understand the new outburst of collaborative logic in response to the impact of the pandemic. New types of citizens' solidarity initiatives are emerging: mutual support networks and the activation of neighbourhood and community bonds, to cope with the material and relational vulnerabilities exposed by the pandemic.

D. Institutional asymmetries. The distribution of municipal resources reflects pre-existing socio-territorial inequalities; instead of functioning as a rebalancing element, it tends to reproduce and even widen existing imbalances. The average per capita income of the metropolitan municipalities was €1,310 in the period 2013-2017. A high level of disparity can also be seen: the gap between the average incomes of the municipalities at the distribution extremes is 65.5% (€947 compared to €1,567). Among the vulnerable population as a whole, 75% live in municipalities in the first quartile (those with the lowest incomes), and 96% in the 81 municipalities with below-average per capita incomes. The vulnerable population accounts for 12.5% of the total number of inhabitants in the first quartile, while it is only 0.8% in the quartile of above-average income municipalities. At the other pole, 52% of the affluent population lives in municipalities with above-average incomes. This population constitutes only 6.7% of the first quartile, but this rises to 31.6% of inhabitants in the group of municipalities with the highest incomes. Income inequality translates into inequality in spending and investment. Municipalities with the lowest incomes receive an average per capita expenditure of between €974 and €1,073 while per capita public expenditure rises to €1,124 in municipalities containing only middle- and high-income census brackets.

These figures confirm a key point: the metropolitan municipalities where there is a higher concentration of vulnerable neighbourhoods, with the consequent need for social policies, are also those with the lowest fiscal capacity and the lowest public spending. Conversely, in more affluent areas, where social demands are consequently lower, institutional spending capacity is higher. This **inverse relationship between social need and institutional strength** not only reflects socio-residential segregation, but also produces a new axis of territorial inequality. Strictly municipal agendas are important (also in cities with the highest concentrations of vulnerability) and should be strengthened to build more inclusion. But they are already utterly insufficient: **there is a need for supramunicipal redistributive decisions and policies to also build a more cohesive metropolis**.

4. BARCELONA AND THE POST-COVID-19 METROPOLITAN SCENARIO: SOCIAL POLICY

The project of an inclusive Barcelona metropolis can be developed from two interlinked ideas: the *innovative shift* in social policy, to connect with realities emerging from the combination of crisis and change of epoch, and the *metropolitan shift*, in other words, the determining role of the Barcelona Metropolitan Area (AMB) as an institutional subject with the capacity to implement social policy and interact at multiple levels of governance in the welfare state. The social dynamics outlined in the previous section serve as the foundations for this metropolitan shift on a twofold basis:

A) The **scale hypothesis**: social inequality, spatial segregation and community fragility are explained and expressed (to a very large extent) in the metropolitan sphere, operating at a trans-municipal way.

B) The **redistributive hypothesis**: institutional asymmetries between municipalities, in terms of available resources, crystallise in an inversely proportional relationship between spending capacity and social needs. Based on the evidence and arguments here, the inclusive metropolis requires a framework for action which, in the proposal we put forward, is structured into five agendas that form the backbone of a decalogue of innovative social policies in a metropolitan context (see Table 1).

A final note on governance is required before concluding this reflective and propositional discussion. It is true that metropolises, including Barcelona, tend to have a highly fragile institutional architecture, as well as significant limits to their governmental capacities. This is paradoxical. We live in the age of the metropolis, and it is in these metropolises that the dynamics and fractures, challenges and dilemmas of the change of epoch are expressed. However, these same metropolises carry persistent institutional, agenda-setting and democratic weaknesses. Two reasons for this may be mentioned: municipal/regional resistance and the problems of *demos* (the weakness of metropolises as spheres of collective belonging), which pose difficulties of agency and legitimacy. Whatever the case, the implementation of social policy for an inclusive metropolis requires overcoming current governance scenarios. In what direction? Substantial changes, rather than the reproduction of past patterns, are needed. Specifically, in Barcelona, the construction of a strong metropolitan welfare dimension could operate as a window of opportunity for promoting governance of the metropolis: **a)** with **direct democratic elections**; **b)** with **greater capacity for self-government**; and **c) greater cooperation between territory and the citizenry**, strengthening the already existing Metropolitan Social Forum as a space for the co-creation of an inclusion agenda.

Table 1. Inclusive metropolis: five agendas and a decalogue of social policies

1. Agenda for the social economy and quality employment

1. Developing a metropolitan *green deal* that includes policies for the social and solidarity economy (cooperative ecosystems and metropolitan communities), for an inclusive digital transition and the strengthening of science, culture and creativity-intense components.

2. Drawing up a strategy for quality employment with labour rights, which includes the approval of a metropolitan minimum wage, in accordance with the territorial calculation of the cost of living for urban areas.

2. Agenda for equality and the fight against exclusion

3. Structuring socio-educational and universal care networks in the metropolitan area (e.g. pre-school, home care) as a strategy linked to gender equality and demographic change. Extending agreements with the Barcelona Social Emergency and Urgent Care Centre (CUESB) as the seed of a policy of care for vulnerability that will provide the metropolis with a network of inclusion services.

4. As a supplementary income to the citizens' guaranteed income (RGC) and the minimum living wage (IMV), establishing unconditional metropolitan economic support based on a process of harmonising and strengthening municipal emergency aid. Financing the funds for the 0-16 age group on a metropolitan scale, as an instrument for action against severe child poverty.

3. Agenda for housing and urban improvement

5. Implementing a metropolitan neighbourhood plan as a structural policy to address urban vulnerability, with flexible and tailored interventions and neighbourhood and community co-production processes.

6. Implementing the housing agenda with multiple instruments: metropolitan rental operator, generation of affordable housing from existing stock, rule of 30 % subsidised housing on urban land, promotion of cooperative housing in concession of use, rehabilitation based on ecosocial criteria and with rental subsidies.

4. Agenda for strengthening communities

7. Defining a metropolitan framework of support for social innovation practices and solidarity networks to facilitate rescaling, inter-territorial transfer and the strengthening of the community fabric in highly vulnerable neighbourhoods.

8. Defining a framework for citizens' management of facilities, green infrastructure and metropolitan spaces (Collserola, Llobregat delta, agricultural and river areas) that allows the involvement of the socio-community fabric in structuring of the metropolitan territory.

5. Ecosocial transition agenda

9. Developing a metropolitan ecosocial strategy based on climate action, improving green infrastructure, preserving biodiversity and committing to local sovereignty (energy, food and water), guaranteeing the management of natural resources as common goods.

10. Implementing the Metropolitan Urban Mobility Plan with a gender perspective, prioritising policies aimed at a modal shift (active mobility and public transport), territorial cohesion and inclusive pricing.

Authors and books cited:

Bauman, Z. (2000). *Liquid Modernity,* Cambridge: Polity Press.

Beck, U. (1998). *La Sociedad del Riesgo.* Barcelona: Paidós.

Fraser, N.; Butler, J. (2003). *Redistribution or Recognition?* New York: Verso Books.

Hirschman, A. (1991). *Retóricas de la intransigencia*. Mexico: FCE.

Klinenberg, E. (2021). *Palacios del Pueblo*. Madrid: Capitán Swing.

Sennett, R. (2019). *Construir y habitar.* Barcelona: Anagrama.

The challenge of the digital transformation in social services for inclusive and equitable metropolises

Toni Codina i Filbà

Director of iSocial Foundation for innovation in social action

We need to ask why social and technological innovation is so crucial today to meet people's needs and move towards more inclusive and equitable metropolises. The answer lies in the digital era in which we live, where digitisation has changed the way we work, relate to one other, learn and participate in society, both for the population as a whole and the part of the population that requires some kind of social support or care.

Digitisation opens up new opportunities for people's development and well-being, but also generates new risks related to the digital divide, which can aggravate and deepen situations of inequality, social exclusion and mental and emotional distress.

Social services in metropolises are now the focus of this debate, as their contribution to solving this equation will be crucial in the coming years.[1] In March 2021, the European Commission stated in its communication, *2030 Digital Compass: the European way for the Digital Decade*, clearly identified the potential of digital transformation in the field of welfare policy, as well as the strengths and weaknesses to consider when establishing priority actions, with a clear commitment to digital transformation as a key building block for European resilience.[2]

> **Digitisation opens up new opportunities for people's development and well-being, but also generates new risks**

However, social services in cities still have a very long way to go along this path, due to their significant shortcomings, which the COVID-19 health crisis made more visible and evident. While their management and information systems have undergone significant improvements in recent decades, the same cannot be said of the digital transformation in their social intervention and psychosocial accompaniment and support systems for citizens with vulnerabilities. In this area, the social services lag behind public services and much further behind other sectors of society, both public and private, which have profoundly transformed the way they relate to service users to improve their experience and their effectiveness. While countries such as Spain

1. Davide, F.; Gaggioli, A.; Misuraca, G. (2021). ***Perspectives for Digital Social Innovation to Reshape the European Welfare Systems***, 13, Emerging Communication: Studies on New Technologies and Practices in Communication. https://www.iospress.com/catalog/books/perspectives-for-digital-social-innovation-to-reshape-the-european-welfare-systems.

2. European Commission (2021). ***2030 Digital Compass: the European way for the Digital Decade***. https://ec.europa.eu/info/sites/info/files/communication-digital-compass-2030_en.pdf.

are at the forefront of connectivity and digitisation in some areas of public services, such as finance and social security,[3] the same cannot be said of social services, where digital transformation is still very limited. This lag in the social welfare sector in terms of digitisation affects both publicly and privately managed social services: recent studies show that the use of technology in the third sector lags behind the private sector by at least five years.[4]

The digital transformation in social intervention is today both a necessity and an opportunity for social services in metropolises.[5] It is a necessity because it must interact with a digitised citizenry, with all the changes in culture and mentality this implies: immediacy, self-management, simplification, remote communication, asynchrony and use of the cloud, among others.[6] Although the digital divide has a greater impact on people served by social services, in metropolises such as Barcelona, 91 % of low-income households now have an Internet connection and unconnected households are mostly those made up of people aged over 74. Moreover, the effects of the COVID-19 health crisis have had an impact on all social sectors, causing a change in the digital behaviour among almost all social groups.[7] Even in highly vulnerable groups, such as new arrivals and the homeless, most people have smartphones,[8] while in others, such as people with intellectual disabilities, daily use of smartphones has become an indispensable and effective tool for achieving greater personal autonomy.[9]

> **The digital transformation in social intervention is today both a necessity and an opportunity for social services in metropolises**

Another reason why social services must board the digital transformation train is the emergence of new forms of social vulnerability linked to the digitisation of society, which require a response from social services. This is what is known as *e-social work*,[10] a new area of specialisation within social work. These are new areas of social intervention, responding to people affected by situations of cyberbullying, the use of technology as a form of control and gender-based violence, situations of domestic tension due to screen addiction, lack of knowledge of cybersecurity and the risk of falling for digital scams or phishing and stalking by a malicious anonymous person with whom the victim has no personal connection. This requires

3. European Commission (2021). *Digital Economy and Society Index (DESI)*. https://digital-strategy.ec.europa.eu/en/policies/desi.

4. Fundación Telefónica (2022). *Libro blanco de la transformación digital del tercer sector*. https://www.fundaciontelefonica.com/cultura-digital/publicaciones/libro-blanco-de-la-transformacion-digital-del-tercer-sector/751/.

5. Position Paper (2021). *Social work and Digitalisation*. https://www.sozialdigital.eu/.

6. BID (2018). *Servicios Sociales para ciudadanos digitales*. https://publications.iadb.org/es/servicios-sociales-para-ciudadanos-digitales-oportunidades-para-america-latina-y-el-caribe.

7. Ajuntament de Barcelona (2021). *La bretxa digital a la ciutat de Barcelona*. https://ajuntament.barcelona.cat/premsa/2021/01/21/barcelona-presenta-linforme-la-bretxa-digital-a-la-ciutat-de-barcelona/

8. Fundació iSocial (2021). *Projecte NIDUS*. https://isocial.cat/nidus/.

9. Fundació iSocial (2022). *Projecte All by myself*. https://isocial.cat/all-by-myself/.

10. Fundació iSocial (2022). *Els serveis socials davant les noves vulnerabilitats causades per la digitalització: l'e-social work*. https://isocial.cat/els-serveis-socials-davant-les-noves-vulnerabilitats-causades-per-la-digitalitzacio-e-social-work/.

the social work sector to adapt and develop new action protocols to meet these emerging vulnerabilities, increase awareness of the problem and find solutions to the various gaps caused by the rise of digital life. This is especially important for many already vulnerable people served by social services, for whom these new digital vulnerabilities can worsen their situation of exclusion, dependency, isolation or violence.

Yet, at the same time, digital transformation requires increasingly agile and creative solutions for social demands and provides a great opportunity for social services in cities. The digital transformation of social intervention provides a great window of opportunity to advance towards more inclusive and equitable metropolises by improving the quality of care from support services and accompaniment for the most vulnerable citizens or those with support needs who, through digitisation, can obtain a better experience from their interaction with social services. This covers aspects such as:

– Access to information.
– Speed and shorter response times.
– Time convenience through remote or asynchronous 24-hour services.
– Reducing unnecessary travel.
– Overcoming barriers caused by social stigma.
– Simplification of administrative procedures.
– Personalisation of services.
– Intensification of personal accompaniment.

- Strengthening preventive work.
- Mobilisation of community support.
- Making certain services cheaper.

The experience of certain public authorities and social service bodies already applying technology to their intervention and organisation in recent years shows its irrefutable value to improving processes and conditions for all those involved in social services, from beneficiaries to professionals and volunteers.[11] For example, linking processes and tools for large-scale quality information collection and advances in data analysis technologies help provide greater and better knowledge of people and their needs, interests and behaviour. As already applied in other economic sectors, this knowledge facilitates the design of social services focused on different beneficiary profiles. Technology is also facilitating significant improvements in the living conditions of people who need assistance for varying reasons, such as disability and old age. Accessible mobile telecare, 3D printing, a variety of support applications and technological advances in accessibility, among other tools, are enabling the transition from dependency to greater autonomy and empowerment among people with these needs.

Similarly, the digital society is also defining a new model of communication and participation between the social services and beneficiaries. Despite the digital divide, many people in situations of vulnerability have mobile device habits of use that facilitate new ways and means of interacting and communicating and open up the possibility of promoting a new model of more fluid relations with social service professionals with more options for active listening and participation.

Obviously, this is not a risk-free path. As in other sectors of society, the digital transformation of social intervention entails ethical, practical and strategic risks and challenges that the social services sector needs to face and manage, such as:

- The dehumanisation of care.
- Increasing feelings of loneliness.
- The imposition of difficult-to-use or inappropriate digital tools.
- Loss of privacy.
- Cybersecurity data risks.
- The use of algorithms that perpetuate or exacerbate discrimination.

The fears often generated by these risks sometimes act as a brake to progress, even producing technophobic attitudes, which are probably more frequent among professionals in the social services sector than in other fields. Resistance to change, present in all sectors, is accompanied in the social services by other difficulties[12] which, when combined, may explain the delay in this sector in boarding the digital transformation train. Such difficulties and barriers include:

11. European Social Network (2020). *Transforming social services through digitalisation*. https://www.esn-eu.org/sites/default/files/2021-03/Digitalisation.pdf.

12. Montalba, Carmen; Russo, Mayra (2021). *Intervención social␣digital: ¿Hacia qué futuro queremos caminar?* Ed. UVa. https://redib.org/Record/oai_articulo3311330-intervenci%C3%B3n-social-digital-%C2%BFhacia-qu%C3%A9-futuro-queremos-caminar; López-Peláez, Antonio; Marcuello, Chaime (2018). *El trabajo social en la sociedad digital*. Servicios Sociales y Política Social. https://www.serviciossocialesypoliticasocial.com/-34.

– Minimal training and digital empowerment for professional teams.[13]
– Low presence of digital talent and digital profiles in teams.
– Work stress and lack of time for innovation.
– Lack of research and knowledge generation.
– Financial precarity and difficulties in funding innovation.
– Atomisation and complexity of skills.
– Difficulties in providing and contracting technology and digital tools.
– Limitations in scaling existing solutions and managing the changes they entail.
– Lack of adequate infrastructure.
– Little hybridisation and collaborative work with other sectors.

Some of these fears are probably justified, given that things have not always been done well and flawed practice often ends up disproving theories that seemed irrefutable. Some significant requirements to consider to do things better are:

– Person-centred care: as with social intervention, digital tools for social services should also put the beneficiary at their centre. The needs of organisations and social professionals often end up taking precedence over the needs of the citizens targeted by the services.

13. Castillo, Joaquín; Palma, Mariola; Gómez, Luis. **"Abordando el reto de la transformación digital desde el Trabajo Social"**. *Documentos de Trabajo Social*, no. 60 (2020). https://dialnet.unirioja.es/servlet/articulo?codigo=7190580.

- Co-design: right from the start, listening to and involving the users, professionals and social service teams who will have to use the digital solutions. Tools designed in an office are doomed to failure.
- UX and UI: making it easy is very difficult, especially in relation to users with deeper limitations and vulnerabilities than the rest of the population. And this can only be achieved by using expert companies to design the user experience (UX) and user interface (UI) that the digital tools must offer in relation to the user profiles they target.
- *First mobile:* most social service users have smartphones, while not so many households have computers. Moreover, travel must be made easier for social workers, especially in rural contexts. Thus, tools should be designed mainly for use on mobile phones.
- *Data is the new oil:* data provision must be one of the main values of the new digital tools. In a sector such as social services, where structured and real-time data is lacking, tools must be created that allow for improved data collection and management.
- Access and equality: solutions that are simple, affordable and accessible to all should be prioritised. In digitisation, the best is often not the most convenient. Tools that are too complicated and cumbersome end up being displaced by simpler, more intuitive solutions.
- Horizontality: digital tools in social services must help end welfare dependency and the sometimes excessive prominence of social workers or educators, while contributing to empowering users and facilitating a more horizontal relationship between professionals and citizens.

- Change management: the most important aspect of digital transformation is not the introduction of new tools, but the changes it all implies in organisations, teams, working methods and how professionals relate to the people they serve. Properly managing these changes, giving them the attention and effort they require, is the key to success in these processes.
- Taking risks: to innovate is to test, experiment and make mistakes. The social service sector has an aversion to risk-taking that has to be overcome in order to move forward in its digital transformation.
- Opportunities in an environment full of barriers and difficulties, it is necessary to know how to take advantage of glimmers of opportunity to move forward. The COVID-19 health crisis helped speed up processes in the social services that would otherwise have taken many years.
- Copying is free: there are many, many successful experiences in other sectors of society, other countries and other disciplines, which social services can learn from and adopt or adapt solutions at no cost.
- Too much criticism: the atomisation of the social service sector is a barrier to its development and improvement, but can be solved by coming together in clusters, collaborative spaces and collective projects.
- Hybridisation: the social services needs a dose of fresh air and to learn from other more advanced sectors, which will only be achieved by working with them, considering their opinions and involving them in its projects.
- Assessment: "Do-goodism" is another handicap for social services. By assuming everything they do is good for society they have been saved from having to prove it. Assessing and obtaining evidence on whether new digital solutions bring the expected improvements is crucial in moving forward.

Despite the obvious difficulties, major transformations are currently taking place within the social service sector and welfare policy. This is partly because the COVID-19 health crisis has accelerated them. This is the case, for example, with remote social care,[14] as a complementary form of in-person social care. An exceptional practice before COVID-19, and one that generated reticence and heated professional debate in the sector, it is now well on the way to becoming normalised.[15] This is, firstly, because there is greater awareness of the disadvantages of online communication, such as limitations to interaction and potential loss of nuance in video calls, significant difficulties in detecting risk factors, lack of knowledge regarding application data use and consents among some users, and risk of encroaching on the boundaries between personal and professional life, etc. Secondly, the importance of making full use of its benefits has been seen, among them time and travel savings, convenience and flexibility. All this has led a large part of the sector to consider the above-mentioned risks as a challenge worth facing when designing and developing tools (chats, video conferences, notifications, exchange of documentation in the cloud, etc.) that facilitate the co-existence of remote and traditional practice.

Some successful experiences from other countries in this field are also helping break the ice. In the Netherlands, for example, the DigiContact[16] video conferencing remote

14. Fundació iSocial (2022). *Riscs i beneficis de la intervenció social en remot*. https://isocial.cat/riscs-i-beneficis-de-la-intervencio-social-en-remot/.

15. Fundació TIC Salut Social; Generalitat de Catalunya (2021). *Estat de la digitalització de les Àrees Bàsiques de Serveis Socials*. https://dixit.gencat.cat/ca/detalls/Article/estat_digitalitzacio_arees_basiques_serveis_socials.

16. **Digicontact, servei d'atenció social remota i immediata durant les 24 h.** https://isocial.cat/digicontact-servei-datencio-social-remota-i-immediata-durant-les-24h/

accompaniment service facilitates highly intensive, 24-hour support for thousands of people in need of long-term care across the country. In Germany, the IPSO[17] psychosocial support service offers peer-to-peer online support and mental health services in more than 20 languages and today has more than 200,000 beneficiaries. And in San Francisco, in the United States, the CIRCLES[18] online service has become a virtual community that energises thousands of professionally supported therapy and peer support groups, having offered over 100,000 hours of psychosocial support to service users in 2020.

Another relevant field of innovation in social services, though still in the exploratory phase, is artificial intelligence. Analysis of big data and constructing algorithms to process it opens up an enormous field full of possibilities for building more intelligent social service systems.[19] Big data and artificial intelligence are today rapidly becoming a significant support for professionals in a wide range of fields, such as commerce, transport, tourism, journalism, agriculture, industry, health, education, justice, security, banking and the environment. And increasingly in the field of personal services as well, most notably social services. Algorithms help professionals understand and draw conclusions regarding complex problems much more quickly, to then suggest a diagnosis or response, manage teams and organisations better and read reports or histories on a large scale.

It is true that professionals see things that an algorithm cannot see, but it is no less true that an algorithm can find patterns the human eye is unable to perceive. So errors are greatly reduced when professionals and algorithms work together. In detecting breast cancer, for instance, studies show that the best doctor has an error rate of 5-6% when interpreting breast scans, while algorithms that also interpret images have an error rate of 6-7 %. But with the machine and the professional working together, the margin of error is reduced to only 0.5 %.[20]

The main contributions of artificial intelligence to the field of welfare services are summarised in the famous 5Ps, inspired by Leroy Hood:[21] more personalised, more predictive, more proactive, more preventive and more population-based or universal services. And more specifically to the field of social assistance, there is a whole list of possible benefits for social services:

– Greater speed, security, efficiency and objectivity in professional decisions.
– Efficient and quality diagnoses, prescriptions and treatment plans for people.
– Personalisation of interventions, with the option of offering proactive, tailored recommendations.

17. **IPSO, servei internacional de suport psico-social *peer-to-peer***. https://isocial.cat/ipso-servei-internacional-de-suport-psicosocial-peer-to-peer/.

18. **CIRCLES, grups de teràpia psicosocial *online* entre persones que pateixen situacions similars.** https://isocial.cat/circles-grups-de-terapia-psico-social-online-entre-persones-que-pateixen-situacions-similars/.

19. Codina, Toni (2020). **"Per què la intel·ligència artificial transformarà els serveis socials?"**. *Revista de Treball Social*, 219, pp. 85-98. DOI: 10.32061/RTS2020.219.04, https://www.revistarts.com/publicacio/desembre-2020.

20. López de Mántaras, Ramon (2017). **"Diez cosas que la inteligencia artificial puede hacer por ti"**. *El País*, https://elpais.com/elpais/2017/01/24/talento_digital/1485284777_722413.html.

21. Flores, Mauricio; Glusman, Gustavo; Brogaard, Kristin; Price, Nathan D; Hood, Leroy (2013). ***P4 medicine: how systems medicine will transform the healthcare sector and society***. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4204402.

- Professional empowerment and versatility.
- More support for personal autonomy and independent living, and greater residential flexibility and diversity.
- Strengthening preventive policies.
- Strengthening community action for mutual aid, self-organisation and participation.
- Better planning of services and professional teams.
- Greater efficiency and better economic planning.
- Real-time assessment of the social impact of programmes and interventions.

These are advances and improvements that can be very significant for welfare policies and social cohesion in cities. The personalisation, adaptation and anticipation of public services to the needs of citizens are a manifestation of good administration and contribute to public effectiveness and efficiency. These processes also have a positive impact on the legitimacy of public administrations and contribute to improving citizens' trust in and attachment to public authorities. Personalisation and proactive service delivery are now widespread in the private sector, where many companies already engage with their users in a personalised, proactive way. An increasing number of companies are capable of quickly and constantly adapting to changing user needs and personalise services to their preferences based on the analysis of the big data generated by their business. By contrast, only 9% of public services are provided proactively (European Commission, 2020).[22]

---

22. Escola d'Administració Pública de Catalunya (2021). *Guia per a la personalització dels serveis públics a través de la intel·ligència artificial*. Generalitat de Catalunya (Estudis de recerca digital, 19). https://eapc.gencat.cat/ca/publicacions/colleccions/estudis_de_recerca_digitals/19.-guia-per-a-la-personalitzacio-dels-serveis-publics-a-

According to experts,[23] in social services it is a matter of using technology in much the same way as other sectors have done to leverage the improvements that the social service system needs: increasing personalisation of interventions; economic efficiency; organisational integration; collaborative dynamics; preventative impact; social legitimisation; ethical quality; democratic governance and the political universalisation of social services.

Some European cities, such as Barcelona, currently have a well-established roadmap to move in this direction, having developed innovative artificial intelligence tools for municipal social services in recent years, such as the Demands, Problems, Resources (DPR) system. [24] With the 2021-2023 Social Innovation Government Measurement,[25] Barcelona City Council promotes various new technological solutions that will facilitate decisive progress in the digital transformation of the city's social services. Among these, we highlight:

– Tools to improve information for citizens:
  • Online booking of appointments at social service centres.
  • Bots as entry channels to provide information and appointments simply and automatically.

traves-de-la-intelligencia-artificial/index.html.

23. Fantova, Fernando (2020). *Els serveis socials davant la intel·ligència de grans quantitats de dades*. Fundació iSocial, https://isocial.cat/fantova-fernando-els-serveis-socials-davant-la-intelligencia-de-grans-quantitats-de-dades-big-data-barcelona-2020/.

24. Ajuntament de Barcelona (2019). *Intel·ligència col·lectiva als centres de serveis socials*. https://ajuntament.barcelona.cat/mesames/noticia/posem-en-marxa-una-prova-pilot-dintel%C2%B7ligencia-col%C2%B7lectiva-a-tres-centres-de-serveis-socials/.

25. Ajuntament de Barcelona (2021). *Mesura de govern d'innovació social 2021-2023, Transformant la realitat per millorar el benestar dels veïns i veïnes de la ciutat*. https://ajuntament.barcelona.cat/dretssocials/ca/innovacio-social.

– New services to facilitate remote care:
  • New virtual social care offices (OVAS).
  • The citizen's app, to request an appointment, chat with the social worker, and provide information or documents, among other functions.
  • Digital one-stop window (FUD), a single online connection system including video calls.

– Big data-based tools:
  • Social big data: integrated social data system, 360° view of people, interoperability with health and education.
  • Single, interoperable social folder, which in the future can also be viewed by citizens and other municipalities.

– Process automation:
  • Automatic system for granting emergency aid, to be tested with 0-16 age-group funds for households with children and teenagers.

– Tools to strengthen community action:
  • Digital tools at the service of collective care, to energise groups, group care for users and community action with local bodies.

This is a path that other large European metropolises, such as Paris, London, Amsterdam, Berlin, Vienna, Stockholm and Helsinki[26] are similarly following in the field of community social services. And the range of initiatives and possibilities is much wider and more diverse for specialised social services, although beyond the scope of this document, and includes robotics, home automation, immersive technologies, 3D printing and gamification, among others.

Today, the digital transformation of social services in cities is a major challenge in better meeting the needs of citizens and moving towards more inclusive and equitable cities. It will help increase efficiency and efficacy in this area of local public services, improve the experience for people who need to use the services, progress towards their universalisation and provide a greater social impact to benefit current and future generations.

26. European Social Network. *European Social Services Awards*. https://essa-eu.org/.

METROSOLUTIONS

Looking at innovation for
the metropolises of tomorrow

metrosolutions.amb.cat

AMB