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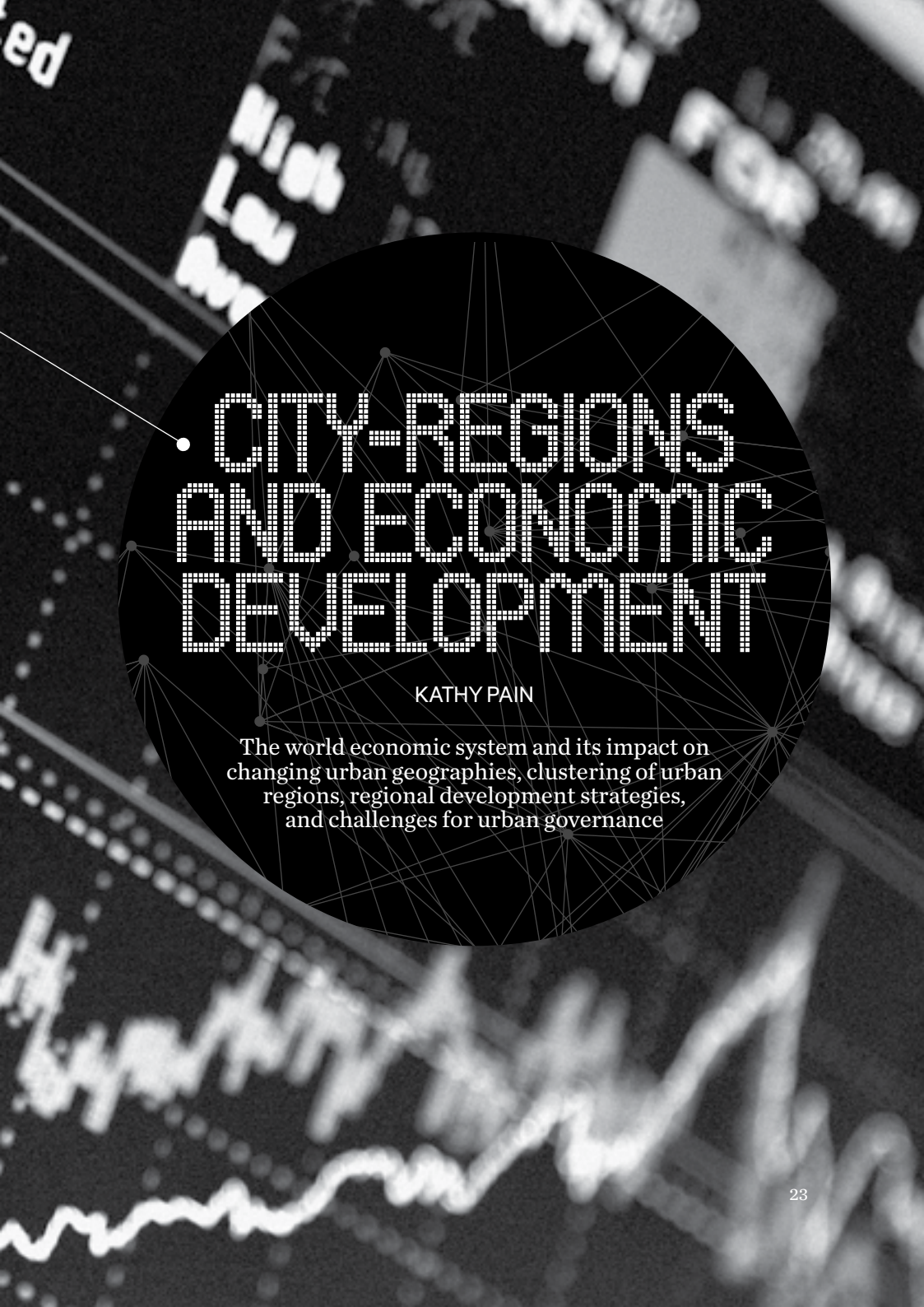


CITY-REGIONS AND ECONOMIC DEVELOPMENT

KATHY PAIN

The world economic system and its impact on changing urban geographies, clustering of urban regions, regional development strategies, and challenges for urban governance

GLOBAL MEGA-CITY REGION
AN EXTENSIVE AND FUNCTIONALLY INTERCONNECTED CLUSTER OF URBAN CENTRES THAT IS DEVELOPING AROUND THE WORLD'S MAJOR CITIES

Cities are widely recognised as the key locations for advanced economic activity in contemporary globalisation but recent evidence suggests that a new type of urban economic formation is emerging at the start of the 21st Century. This has been called a polycentric Global Mega–City Region—an extensive and functionally interconnected cluster of urban centres that is developing around the world's major cities. This phenomenon is arising in a number of distant locations in parallel with a major shift in global economic relations as capital moves from the developed to the less developed world. In short, the macro–economic changes that are occurring as nation states world–wide open up to direct foreign competition and embrace the post–industrial global economy, are also impacting on a local scale around cities that are gateways for the new wave of globalisation.

These unprecedented global and local changes present major challenges for the nation state in two ways. On the one hand, increasing integration and informationalisation of the world economy is challenging the power and authority of states over long–established national jurisdictional territories; on the other hand, the dramatic impacts of global change at a city region scale, seem to require urgent mediation.

IMPORTANTLY, THE DETACHMENT OF ECONOMIC EXCHANGES FROM THE TRADITIONAL NATIONAL SCALE OF GOVERNANCE IS CRUCIALLY LINKED TO CHANGES IN PRODUCTION AND TRADE WHICH ARE INCREASINGLY ASSOCIATED WITH KNOWLEDGE

CHANGING URBAN GEOGRAPHIES OF INTERNATIONAL ECONOMIC EXCHANGE

A large interdisciplinary literature has pointed out the tensions facing nation states in the modern globalisation era. In his seminal 1996 publication *The Rise of the Network Society* Manuel Castells described the changes associated with developments in informational and communications technologies (ICTs) at the end of the twentieth century as constructing a new geography in which informational economy 'flows' would come to dominate the familiar territorial patchwork of 'places'. The increasing ability of economic actors to communicate, conduct knowledge–based transactions and trade products over any distance virtually instantaneously, can be said to have effectively dismantled the traditional world map of national boundaries that has historically marked the jurisdictional scale of states. In his famous 1999 *Reith Lecture*, sociologist Anthony Giddens famously described this coming major reordering of space and loss of control associated with globalisation, as a 'runaway world'.

According to 'globalists', the development of a modern 'world city system' has provided the essential infrastructure for these profound changes transcending national institutional structures, economies and politics. Urban theorists John Friedmann and Saskia Sassen, have shared the view that a single world economic system is overtaking the traditional economic role and powers of nation–states. They have identified the city as the new dominant spatial scale replacing countries as central nodes in the world economy. Friedmann's 1986 'World City' hypothesis cast cities as the major power behind a new spatial organisation of the international division of labour, while for Sassen writing in 1991, 'key structures of the world economy integral to contemporary globalisation' are now located in 'Global Cities'. Appreciating the processes that are transforming the economic relationships between cities worldwide proves critical in understanding the changes also occurring at a city–region scale, and their implications for governance.

As Peter Taylor's empirical *World City Network* research has demonstrated, the organisational networks of firms now able to conduct business on a global scale due to the ICT revolution, have created a world–wide network of global cities. Dominant contemporary world economic functions, 'advanced producer services'—banking, financial and professional services etc—create the connections in this network because service firms are clustered within global cities on a world–wide scale. It is the process of world dispersal and integration of these services (in global city nodes) that has created the new strategic role of global cities that gives them economic independence from nation states.

Importantly, the detachment of economic exchanges from the traditional national scale of governance is crucially linked to changes in production and trade which are increasingly associated with knowledge. Advanced producer service firms produce and trade specialised knowledge that is vested in human capital. This is most apparent in wholesale financial services where fungible trade such as securities and futures is virtual, crossing nation state borders almost invisibly. But production of tangible products is increasingly knowledge–intensive too. Advanced manufacturing and primary production require financing, R&D, innovation, information management, intellectual property, advertising, marketing, supply and value chains, logistics management, etc. Adding value in competitive markets that are increasingly global everywhere, means capitalizing on knowledge. Production of all kinds is thus increasingly linked into a knowledge–based economy that is operating on a global scale. Geographies of commodity chains through various production stages, haulage and distribution, are increasingly highly networked and dependent on advanced knowledge–intensive services that are also traded globally. Transcontinental flows of material and intangible knowledge–based goods, labour and services, all point to the diminishing significance of territorial borders.

The dynamic architecture of the knowledge–based economy therefore marks a transition in spatial relations in which the network connectivity of global cities is ever more crucial, but at the same time, the nodal scale of international exchanges is changing. A new sub–national scale of economic agency, identified by Hall and Pain in their 2006 European POLYNET study, is emerging in key world locations as flows in knowledge–intensive networks, concentrated in global cities, seep out creating a global mega–city region.

ECONOMIC CLUSTERING OF CITY-REGIONS

The City–Region

Christaller's city–region as described in 1933 *Central Place Theory*, focused on local, hierarchical urban–hinterland relations that have now been overtaken by the processes of economic globalisation previously discussed. In common with other early location and systems theories, central place theory was a relatively static model which emphasised core–periphery relationships between cities and their surrounding hinterlands. But as Peter Taylor's work has shown, in modern–day globalisation, a city's development is less linked to its nearby hinterland than to a far–reaching global 'hinterworld'. As explained, cities are now integrated into a world city network of informational flows, knowledge and economic exchange as opposed to the national and regional scales of interaction prioritised in Christaller's pre–globalisation model.

From the early 1970s, there has been recognition that the city–region is also a functional entity that extends across urban administrative areas, but even so research has mainly continued to focus on their internal relations and the demarcation of their boundaries (for example the 'Metropolitan Statistical Area' in the United States and the 'Functional Urban Region' in Europe). With the development of knowledge–dependent forms of commercial production and trade in a world economy, the economic relations of city–regions can clearly no longer be defined in this way. The new reality of a borderless space economy suggests the need to find a new term to describe the intersection of global flows with the city–region scale. The term, the global mega–city region used in the POLYNET study, thus builds on Allen Scott's 2001 notion of the economically developed global city region and that of the mega–city region associated with urban expansion in poor economies of the developing world.

The Mega–City Region

The mega–city region is an extension of the term 'mega–city' which has long been associated in development studies with the mushrooming populations and sprawling cities of the global 'South'. The mega–city region as identified by Peter Hall in South East Asia, is a functionally interconnected space where R&D, high technology and other urban functions have spread across a large multi–cluster region. Well known examples are the Pearl River and Yangtze River Delta regions of China where commercial, business and administrative services centred in Guangzhou and Shanghai respectively, are linked to urban centres across thousands of square kilometres.

Morphologically, the mega–city region is similar to the urban configuration described in 1960 by Jean Gottmann as 'Megalopolis' on the north east coast of the United States but a key distinction between this and the global mega–city region identified by Hall and Pain, is the increased international connectivity of regional economic processes in the latter.

The Global–City Region

It is this international dimension of regional economic exchange incorporated in Scott's global city region concept which is critical in understanding the important differences occurring in contemporary processes of urban transformation. Scott describes global city–regions as having a 'deepening role' in the economy because they are places where globalisation conspicuously 'crystallises out' on the ground. For Scott global city–regions are increasingly the active agents that are shaping the geography of economic globalisation.

Importantly then, the concept encapsulates a new world economic geography in which the global role associated with cities described by Sassen, is conferred on city–regions, hence increasing global network connectivity of dominant nodes—global cities—has the ability to increase the economic vibrancy of city–regions. In the case of the Yangtze River Delta mega–city region, this means that Shanghai's developing global city profile with Chinese economic liberalization, is literally 'opening the door' to knowledge–based regional economic expansion. Similarly, strengthening functional linkages between Guangzhou and global city Hong Kong, are paving the way for regional development in the Pearl River Delta leveraging Hong Kong's very high level of connectivity in the global city network. With the West–East shift of capital to Asia in the new wave of globalisation, the changing role of Chinese mega–city regions as 'deepening points' in the world economy to global mega–city regions, becomes of vital interest.

The Global Mega–City Region

The impetus to closer examination of these processes associated with global city transformation in Hall and Pain's POLYNET research was an earlier 2001–02 study of advanced producer services—the defining function of Sassen's global city—by the GaWC research team in the City of London. The results showed the ongoing importance of agglomeration in the central area of the City but also highlighted the complex functional interdependencies between these densely clustered advanced global services and other towns and cities across a wide area of South East England. The distinctive characteristic of the extended urban formation identified seemed to be its constitution by, and connectivity to, key functions in the global service economy. Hence while London as a global city is regarded as a monocentric spatial form in European spatial policy, the urban processes operating at this expanded global mega–city region scale appeared to be functionally polycentric. This conjecture was the basis for the major European–funded POLYNET investigation that followed.

The Polycentric Urban Region

The concept of the 'polycentric urban region' has its roots in urban literature of the early 20th century which focused on the intra–regional spatial clustering patterns of towns and cities. More recently, Castells has referred to such 'multifunctional, multinuclear spatial structures' as a feature of the 'new spatial logic' of informational flows in globalisation. Similarly Scott has depicted global city–regions as increasingly 'polycentric or multiclustered agglomerations'. But to date, there has been a failure to specify the nature of the functions associated with the multi–clustered economic development around global cities empirically. Furthermore, European policy on regional polycentricity predates recent understanding of the changes affecting city–regions in globalisation hence the relevance of the concept for contemporary city–region development requires urgent clarification.

To date, the concept of polycentrism has been applied normatively rather than analytically in European regional policy in order to achieve specific objectives. These are to boost Europe's economic competitiveness on the global stage and at the same time to promote regional spatial equity, social cohesion and sustainability. Urban polycentricity is seen as supporting all these objectives simultaneously by encouraging economic growth, promoting balanced development and limiting environmentally damaging inter–urban movement and sprawl. But this view is based on an out–moded understanding

of contemporary spatio–economic relations in globalisation which regards regions as simple morphological constructions leading to a policy paradox. On the one hand it is argued that the global role of cities such as London and Paris is vital to Europe's competitiveness and economic sustainability, but on the other hand it is argued that agglomeration, which characterises the global city, is 'monocentric' with negative implications for balanced regional development.

Contemporary understanding of the city as a process representing connectivity in a global network, sheds light on the cause of this policy conundrum—a focus on urban regions as proximate places defined by territorial boundaries in a present–day world that is characterised by inter–city economic linkages and informational flows.

REGIONAL DEVELOPMENT STRATEGIES OF ECONOMIC AGENTS

The POLYNET study therefore set out to fill the analytical gap associated with global city region expansion, examining this phenomenon in the most densely urbanised world region, NorthWest Europe. Involving academics in eight major city–regions—the Randstaad, Netherlands; Rhine–Main and Rhine–Rhur, Germany; Central Belgium; Northern Switzerland; Greater Dublin, Ireland; the Paris Region; and South East England—the research focused on defining this new scale of economic interaction by studying the regions' city network relations. Their development in globalisation, specifically their external connectivity in knowledge–based advanced services, was the important focus for investigation. Crucial in doing this was the application of GaWC quantitative and qualitative methods of world city network analysis at the city–region scale.

An initial study of changes in regional population, employment and commuting patterns from 1981 to 2001 provided basic information on developments in the structure of the regions over a twenty year period of globalisation. The research then focused on in–depth investigation of eight service sectors: finance/banking, insurance, law, accountancy, advertising, consultancy, design and logistics—all knowledge—intensive industries which have a key role in the advanced service economy. They create the very high levels of world city network connectivity studied by GaWC through the everyday practices of their agents that generate knowledge flows and add value in global production and trading. In POLYNET the subjects

of study—firms, their office networks and their people—thus replace cities (places) as the key agents of regional change in globalisation. GaWC methodologies used in global city analysis were adapted to calculate the connectivity of sub–nodal towns and cities in each region to service networks at different geographical scales and shed light on their functional polycentricity.

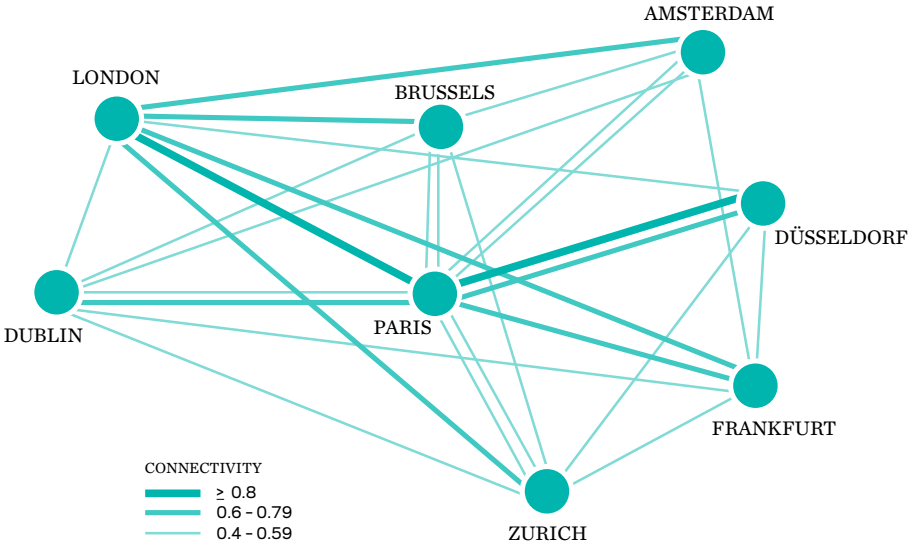
Some firms which have not yet engaged in global strategies, simply have one or a number of local offices in a given region. Others have developed organisational links at a national or European scale, while the largest firms now have offices in important cities in all the major world economic regions. To find out how well connected city–regions are to flows in the world city network it is therefore necessary to study the office networks of their firms operating at intra–regional, national, European and global scales. Information on the size and importance of offices was aggregated for each region to show their connectivity at each of these four service network scales—clearly regions that are most linked to global scale office networks have the highest connectivity to global knowledge flows whereas regions that have a higher representation of smaller local firms are less well integrated in the global service economy. In addition to this large–scale quantitative analysis, a complementary in–depth face–to–face interview survey was conducted with senior service network agents working in the towns and cities of each region. The purpose of this study was to provide qualitative evidence on the interactive working practises that across numerous transactions, projects and interrelationships, constitute the active flows present at each city network scale.

The largest service business networks require a presence in, and generate flows between major world economic regions—USA, Europe/North Africa and Asia—concentrating their international wholesale functions in just three or four global city nodes including London. This being the case, what evidence did the study find of an extension of global city network flows to a city–region scale across North West Europe and to what extent is this scale functionally polycentric? The results, set out in detail in *The Polycentric Metropolis* published in 2006 by Earthscan, allow six main features of the global mega–city region formation process to be specified.

1 The Regional Development Process

THE STUDY REVEALS EUROPEAN CITY–REGION DEVELOPMENT, not as a static spatial pattern but the outcome of a multi–scale process that is interlinking the local regional and global scales of economic globalisation. This is a result of the servicing strategies of internationally networked firms. Interdependencies between cities that are well connected globally (albeit to different degrees) are evident in all eight regions as shown in FIGURE 1 which plots the service interlinkages between the most globally connected nodes of each region. And this is constructing functional linkages across considerable distances within regions as well as between them. Intra–regional functional servicing linkages are necessary to allow knowledge transfer to occur within and between office networks because corporate clients have dispersed locations outside global cities. Together these processes are leading to a form of urban polycentricity that is not evident from the morphological patterns of city–regions which simply reflect their size and distribution, significantly key differences between the city–regions were found to relate to their levels of service connectivity at the four operational scales studied.

FIGURE 1
EUROPEAN SERVICE NETWORK LINKAGES



2 Regional Functional Connectivity

South East England has the most intense and geographically extensive functional connectivity at a global network level. Importantly, this is associated with the development of multi–sector business clusters that service corporate markets from economically vibrant towns and cities outside London. These clusters benefit from their access to global flows and specialisms present in London and, because they are similarly constituted in terms of multi–sector representation, knowledge transfer similar to that taking place in London also occurs locally. Because secondary regional clusters are linked by the service networks located in them, specialised knowledge articulated through London results in globally networked inter–city relationships across a wide area of the South East which can be described as functionally polycentric, Figure 2 shows the largest of these service linkages.

A key distinction between this development process and that of some other cases studied, is that regional and national level networks are more strongly represented in the towns and cities of morphologically polycentric regions. This is evident in the Randstaad Netherlands and most pronounced in Rhine–Ruhr Germany which has a particularly 'flat' distribution of urban places. Figures 3–4 show the increased polycentricity of Rhine–Ruhr that is conferred by regional scale as opposed to global scale service networks compared to South East England. Interestingly, sectoral specialisation between clusters is also a feature of morphologically polycentric regions and this seems important because it is multi–sector clustering characteristic of highly connected global cities, that allows a multiplicity of flows to take place between firms, industries and sectors.

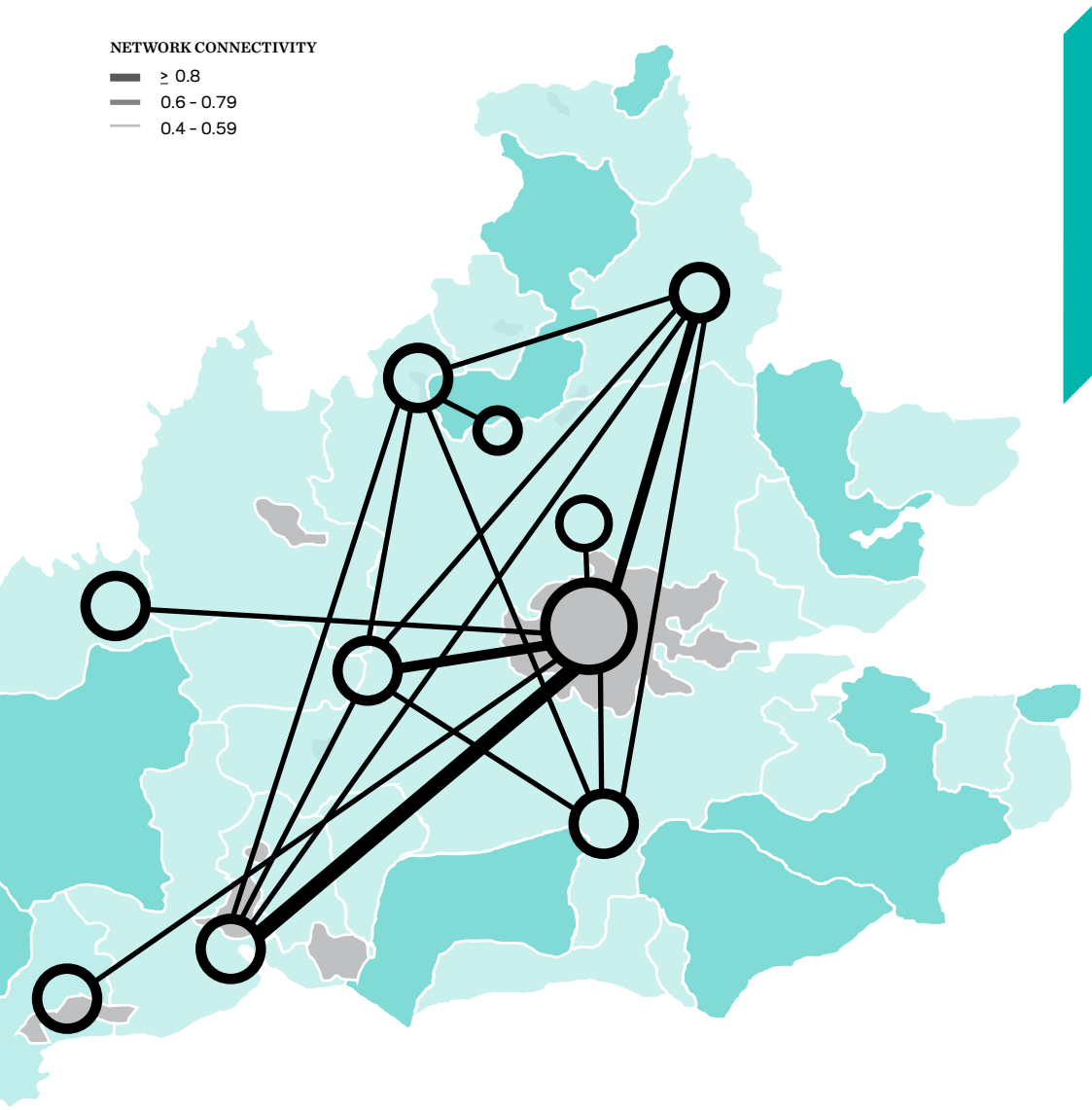


FIGURE 2
SOUTH EAST ENGLAND REGIONAL SCALE CONNECTIVITY

FIGURE 3
RHINE RUHR CONNECTIVITY

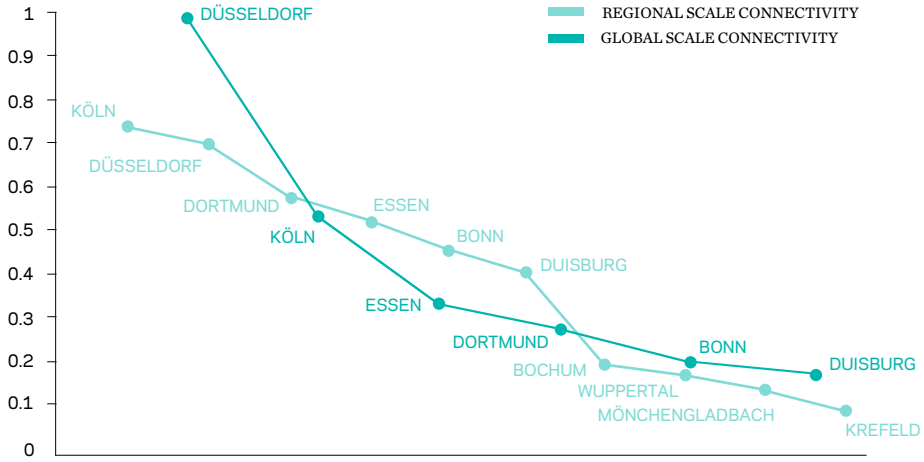
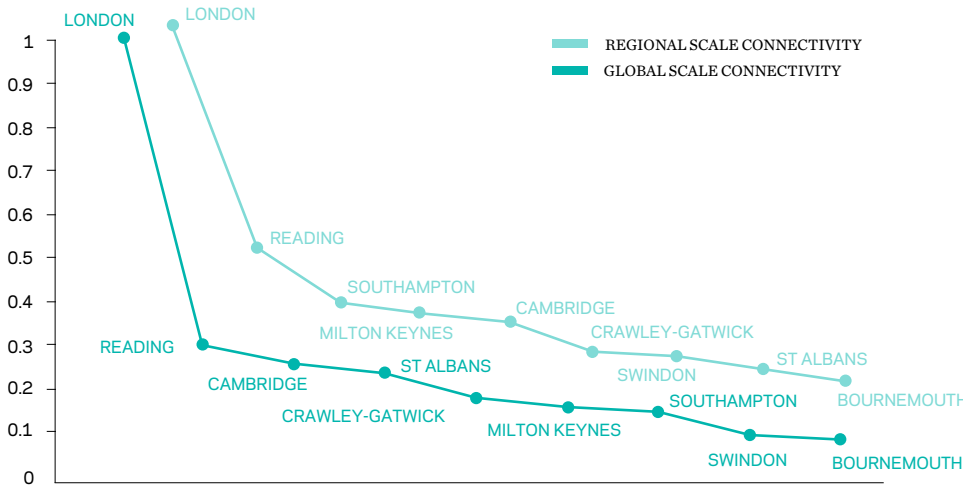


FIGURE 4
SOUTH EAST ENGLAND CONNECTIVITY



3 Global Functional Agglomeration

SURPRISINGLY IN SPITE OF THESE DIFFERENCES, ALL REGIONS were found to have an agglomeration of international and global service network functions in just one city where the most high–skilled and specialised international labour is present and where the highest intensity of interactions and exchanges takes place. Access to skilled labour—the core business asset of firms because knowledge is the source of their competitive advantage—is even more important than proximity to customers and is to be found in these globally networked cities. These reinforcing agglomeration tendencies apply across all sectors for high–value–added, high–complexity and specialised services.

While regional and some national scale service networks cluster together in one of several similar sized cities in morphologically polycentric regions, transnational service networks therefore show the same requirement for proximity in each region. As described, the cities that have this global role are powerfully linked to each other across national borders and they also constitute essential global gateways to the regional and national markets of their country. The sites of global agglomeration in these well–connected cities are densely clustered business and financial districts.

4 Regional Innovation

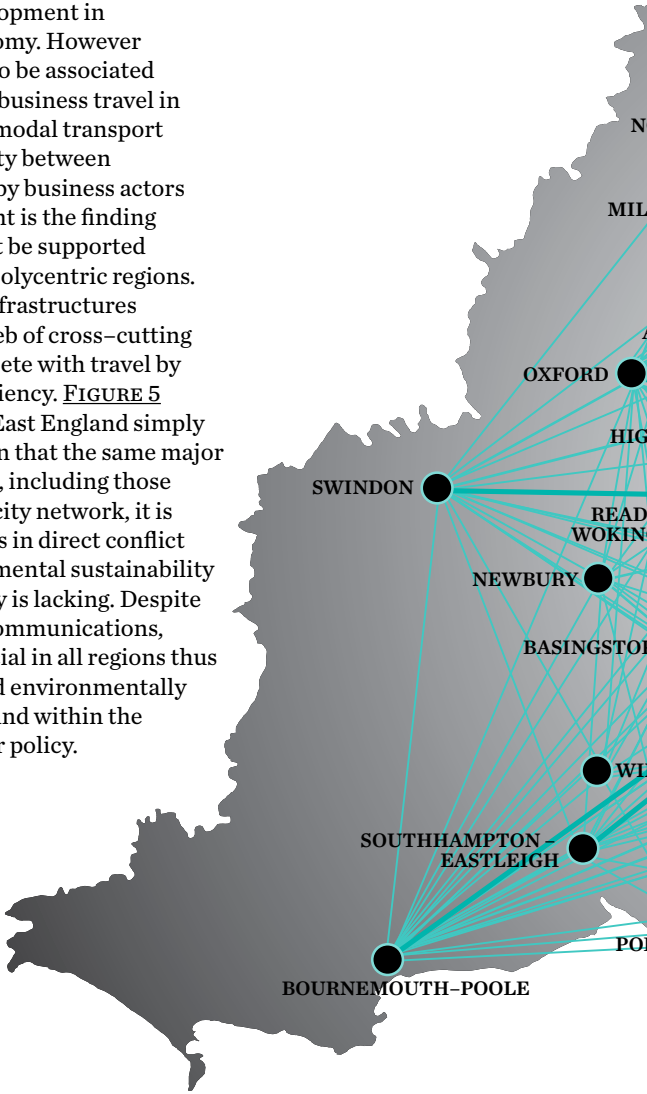
Global innovation mainly occurs in densely clustered city locations because it relies on the exchange of tacit knowledge, trust and cooperation which require very close proximity to establish and maintain relationships. The vital need for face–to–face communications underlies the strong agglomeration forces that are grounded in these global nodes. Tacit knowledge is transferred face–to–face, locally, and used to innovate and create value. Complex interdependencies between firms that arise through multiple interrelationships only possible in high density business clusters, are the channels for this knowledge transfer. Client team–working between firms representing different global specialisms, vertical and horizontal industrial and cross–sector restructuring, consolidation and regrouping through mergers, acquisitions and 'spin–offs', cross–servicing relationships, labour churn and social networking, all provide multifarious opportunities for knowledge flows. A multiplicity of planned and accidental relationships and interactions therefore allow exchanges between global agents representing different world locations to take place in regional global gateway cities. Thus the need for proximity has not faded with increased use of ICTs but has proved an essential component of firms' global abilities. Similarly out–and in–sourcing, off–and on–shoring of back office and digitised functions are all part of a natural cycle that sustains dynamic global service clusters.

5 Regional Polycentricity

Functional polycentricity which refers to multi–scale flows of information and knowledge transfer within and between cities, is thus found to be very different from morphological polycentricity which simply describes a pattern of regional distribution without regard for the external connectivities of cities that are essential to innovation and economic vibrancy. Interviews with senior business actors in each region revealed that morphology provides no indication of a city's service linkages or the intensity and value of knowledge–based interactions and flows between cities. The interview evidence shows that morphological polycentricity is in fact associated with weak intra–regional functional linkages, thus balanced spatial development does not equate to an even distribution of complementary and synergistic economic functions. Paradoxically, given its description as a monocentric spatial formation in European spatial policy, London's depth of global service infrastructure produces the strongest global connectivity and functional polycentricity amongst the regions studied.

6 Polycentricity and Regional Movement

Flows of people within and between these densely populated city–regions and between them and other global cities worldwide, are thus crucial for Europe's development in the knowledge–based global economy. However regional polycentrism was found to be associated with 'criss–cross' commuting and business travel in all eight regions. Although multi–modal transport infrastructures vary in their density between regions, they were found wanting by business actors everywhere. Particularly significant is the finding that business related travel cannot be supported effectively by public transport in polycentric regions. This is because hub–and–spoke infrastructures must be overlaid with a spiders' web of cross–cutting infrastructure which cannot compete with travel by car in terms of time–distance efficiency. Figure 5 illustrates the problem for South East England simply in terms of daily commuting. Given that the same major problem is identified in all regions, including those least well connected to the global city network, it is clear that regional polycentricity is in direct conflict with policy objectives for environmental sustainability even where new economy vibrancy is lacking. Despite intensive business use of virtual communications, face–to–face contact remains crucial in all regions thus improved efficiency, reliability and environmentally sustainable, mobility into, out of, and within the regions should be a key priority for policy.



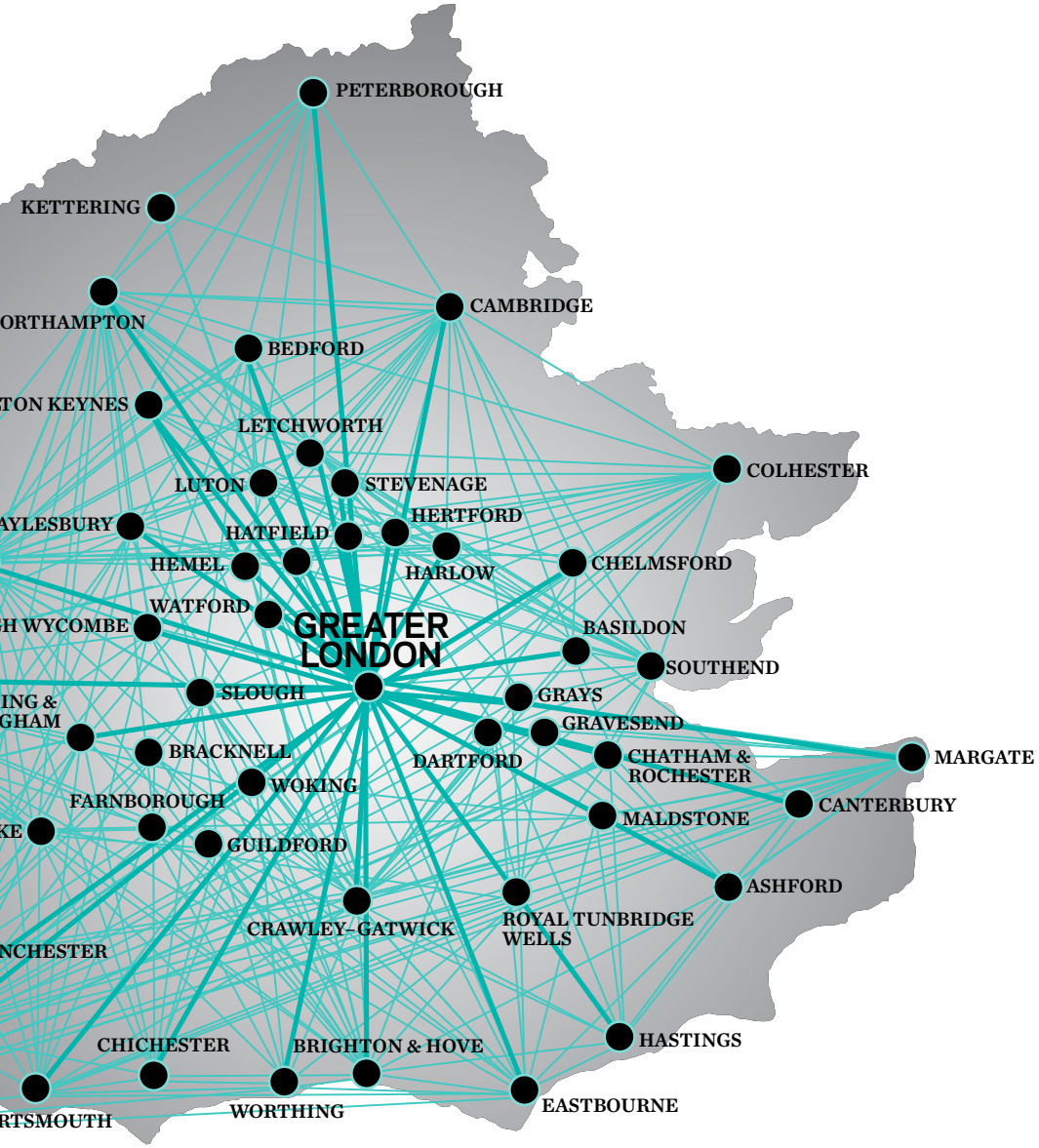


FIGURE 5
SOUTH EAST ENGLAND COMMUTING NETWORKS

CONCLUSION:

ECONOMIC DEVELOPMENT AND GOVERNANCE CHALLENGE

ECONOMIC DEVELOPMENT —DIFFERENT REGIONAL FUNCTIONS AND REGIONAL STRUCTURES

Global network connectivity is clearly increasingly essential to create and sustain economically vibrant cities. The expansion of connectivity from a global city to its surrounding centres to create a functionally complementary city–region is a powerful process associated with economic globalisation. But, as shown from the example of Europe, not all regions presently benefit from this process. Service networks which are regional or national in scope, i.e. unconnected beyond a nation state's boundaries, give rise to regions of proximate cities but they lack knowledge exchanges which generate global mega–city region expansion. Regional and national networks are of course present in global cities too because different network roles and structures can be present in the same place, but it is a city's intense global city connectivity which can spark off vibrant functionally–linked cluster development across a wide proximate space. The out–dated focus of policy in Europe limits understanding of these important differences, hence the need to support dynamic and fluid global mega–city regions has not been addressed.

The European city–regions studied are smaller in extent than those of Australia and each has at least one city which is strongly linked globally, as well as at national and regional levels. A current GaWC study of the UK national system of cities, indicates that South East England's global service network connectivity is extending to envelop major Midland cities so functional complementarities between cities can spawn network linkages across considerable distances, pointing to

the difficulty of attempting to define global mega–city region boundaries. The parallels for Australian cities require detailed consideration but it seems clear from the POLYNET study that understanding the significance of process, function and flows will be extremely important. Australia seems uniquely positioned to benefit from changing world trade patterns and the rise of Asia, especially China, in the new wave of globalisation, hence Australia may be on the brink of major city–region changes.

Recent global financial reporting shows Australia's leverage into the Chinese economy to be higher than that of any other leading developed world nation. And this a reciprocal trading relationship, with China's demand for Australian natural resources and Australia's demand for Chinese manufactured products, benefiting both countries. This two–way trade in commodities and manufactured goods is likely to be especially good for Sydney as Australia's most connected city in global advanced producer services. Traditional vertically integrated manufacturing production in Asia is giving way to a modern global reality which is complementary to the global mega–city region process. Manufacturing has an increasingly open architecture of virtual and material trade links and global supply chains, complementing world city network linkages. As already discussed, tangible trade is increasingly knowledge–intensive, and advanced logistics are an important part of this process, but financing, venture capital, trading, intellectual property, markets in global advertising networks—and a whole raft of other specialised knowledge services, are now also production necessities. They require depth of infrastructure within the world city network which Sydney is able to provide within Australia.

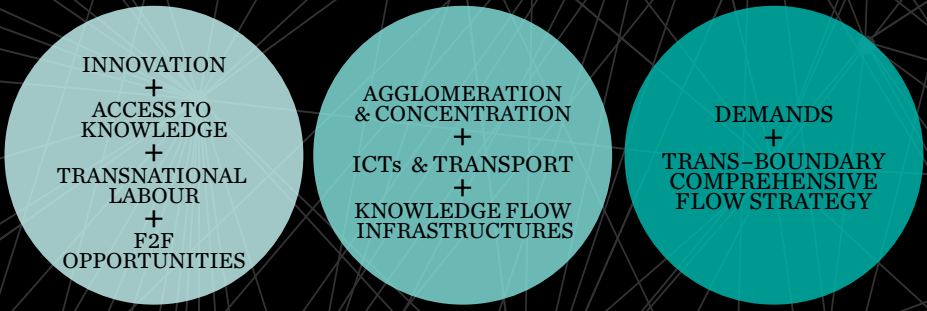
As shown by GaWC 'hinterland' analyses for Australasia, Sydney is Australia's leading global city and is therefore strongly connected to London and New York. But beyond these powerful connections within the established world city network geometry, Sydney is also highly connected to the West Pacific globalisation arena. Here, Hong Kong ranks third for world city network connectivity and now has a key position in the fastest growing national economy, China—Australia's biggest trading partner. Future knowledge–based economic growth will require a concentration of specialised international skills and functions in key global cities like Sydney. The process is people and market–led and cannot easily be produced by design, but the POLYNET research shows that the network flows which make global clusters and mega–city regions require public support through appropriate governance.

THE CHALLENGE FOR GOVERNANCE— POLICY NETWORKS

An important finding from the European case is that in spite of the challenges to their authority associated with globalisation, states retain a vital ongoing influence on the economic development of their territories and this is relevant for global mega–city region development in two ways.

Firstly, state systems of regulation, legislation, taxation, trade policy etc., provide the soft infrastructure which allows and withholds, cross–border flows associated with global networks. Secondly, government intervention is needed to manage the provision of appropriate transportation, buildings and ICT infrastructures and systems. These flow imperatives for the global mega–city region make it a vital focus for policy, yet in North West Europe, policy makers reported that appropriate focused governance and policy instruments are currently absent in all eight countries studied. In all regions there is a mismatch between global mega–city region functional geography and statutory administrative boundaries. The process character of global mega–city region emergence and expansion does not fit easily with hierarchical territorial governance structures but co–ordinated responses to the challenges they present are urgently needed. Even where cross–jurisdictional and cross–sectoral structures already exist, the process of cooperation may still be lacking. This is because reciprocal patterns of communication and exchange require network structures and organisation as used by international knowledge–based businesses. Innovative policy networks that leverage global business leadership and integrated spatial and economic development plans, informed by process and network understanding, would seem to be basic governance requirements. Figure 6 summarises the challenges facing governance for global mega–city region positioning in the new reality of world economic globalisation.

FIGURE 6
CITY–REGION GLOBAL POSITIONING REALITY



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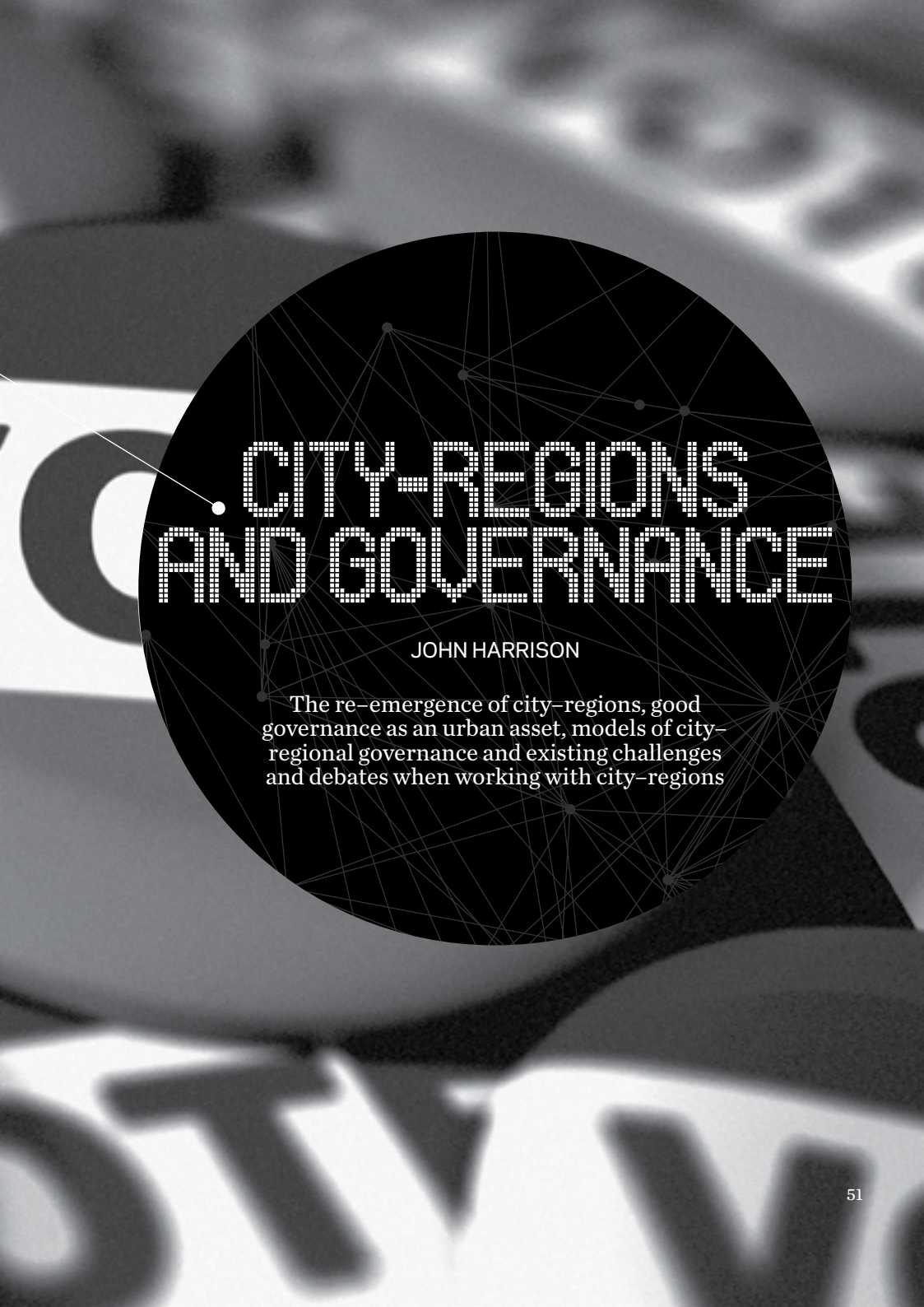


CITY-REGIONS AND GOVERNANCE

JOHN HARRISON

The re–emergence of city–regions, good governance as an urban asset, models of city–regional governance and existing challenges and debates when working with city–regions

CITY-REGIONS HAVE EMERGED AS AN APPARENT CHALLENGER TO THE PRIMACY OF THE NATION-STATE

THE RE-EMERGENCE OF CITY-REGIONS

Until the 1970s, modern nation–states were the site/scale at which economic management was conducted, social welfare delivered, and political subjects were treated as citizens. However, against the backdrop of a protracted economic crisis, the deindustrialisation of core manufacturing regions, and the fiscal crisis of the state has seen the primacy afforded to the nation–state challenged by the emergence of new state spaces. One such challenger has been the city–region.

The city–region concept has been in common usage amongst urbanists, economists, and planners since the 1940s, representing an area (rural hinterland) linked to a core (city) by functional ties. Despite a rich scientific history, the concept has been enjoying something of a revival in recent years. Divorced from views that predicted 'the death of distance' and 'the end to geography', the re–emergence of city–regions has served to highlight the importance of dense nodes of socio–economic activity within a globalised world. In a world where interactions are increasingly described in terms of flows of capital, knowledge, people and services, rather than in terms of organised exchanges, recent research has demonstrated how the dynamics of globalisation has tended to crystallise not only in states but in specific city–regions as well.

In his 2001 book *Global City–Regions*, Allen Scott describes how city–regions are 'beginning to function as the spatial foundations of the new world system'. This is because city–regions are the nodes and hubs of these flows, acting as centres and gateways for global business, culture, and social relations. They are the site from which the flows originate and terminate. In the words of Scott, city–regions 'function as territorial platforms for much of the post–Fordist economy that constitutes the dominant leading edge of contemporary capitalist development, and as important staging posts for the operations of multinational corporations'. Moreover, 'the geographic nature of these networks tends more and more to override purely political

boundaries so that they are increasingly free from regulatory supervision on the part of nation–states'. In these senses, city–regions have emerged as an apparent challenger to the primacy of the nation–state.

Consequently, as city–regions increasingly become the site for economic activity and basic service provision that is independent of the national economic environment, there is a growing volume of research devoted to the interplay between city–region development and governance. This focuses on how city–region elites have to cope with two processes simultaneously —globalisation and regionalisation— and how there are no neatly separated layers of institutions and decision–makers in today's multi–layered and multi–tiered structures of governance. As a consequence, none of them function as a unitary actor. Instead, different groups of actors simultaneously try to exert control over the developments affecting their respective city–regions. Build into this the recognition that city governments have seen their influence wane as the new anchors of regional development—airports, universities, science parks—are increasingly located beyond city lines, and it is clear to see why questions relating to the governance of city–regions have become a topical, but also thorny, issue in recent years.

City–regions are not simply smaller states. Where nation–states were seen to offer stability, the universal logic underpinning diverse city–region formation in different parts of the world is the territorial restlessness inherent in the capitalist system. This means that instead of looking at neatly separated layers of institutions and decision–makers which form a nested hierarchy running from the global to the local—like Russian Matryoshka dolls —we must now recognise the plurality of interdependent actors and polities that comprise city–regions. City–regions are connected to the macro–regions, to their states, and increasingly to one another. Their transnational outreach promotes greater territorial inter–connectivity between cities and city–regions. However, within this global network city–regions are forced to compete against one another for investment and trade. They have to market, sell, and place themselves in a competitive environment where their position in league tables defines their character. These circumstances can no longer be described using the notion of government. Instead we have to develop and make operational the concept of governance on the level of city–regions. Governance is required any time multiple actors come together to accomplish an end. It is the process through which multiple actors make decisions that direct their collective efforts. In city–regions the group of actors is too large to efficiently make all necessary decisions, so a new entity is required to facilitate the process.

URBAN GOVERNANCE AS AN ASSET OF A CITY OR REGION

According to the Institute on Governance one simple definition of governance is 'the art of steering societies and organisations'. Urban governance is therefore about the more strategic aspects of steering, making the big decisions about the direction of city–region development and the roles that actors will fulfil. The ability to make these decisions relies on city–region actors to delegate a large portion of the decision–making responsibility to this entity. However, it is a little more complicated than this. Steering suggests that governance is a straightforward process, akin to a steersman in a boat. But by its very nature, governance is complicated by the fact that it involves multiple actors, not a single helmsman.

These actors are important because they articulate their interests, influence how decisions are made, who the decision–makers are and what decisions are taken. They feed into the decision–making process, but the decision–makers are then accountable to those same actors for the output, and process for producing it. The aim of governance—the taking of decisions and rendering of account—is good governance. Here the desired results are achieved and achieved in the right way.

Just as much as bad governance can be a major barrier for city–regions, good governance can be a key asset for a city–region looking to elevate its position in the national and international competitiveness league tables. There is, however, no universal template for good governance in city–regions. Instead, each city–region must tailor its definition of good governance to suit its needs and values. What is right for one city–region will not be right for another. This goes some way to explaining why city–regions across the world operate through a variety of different governance models.

Before looking at the various city–regional governance models, it is first necessary to highlight a number of key principles which underpin all examples of good governance. According to the United Nations, good governance has nine major characteristics.

ASPECTS OF GOOD GOVERNANCE

1 **PARTICIPATION**
All actors should have a voice in decision-making, either directly or through legitimate intermediate institutions that represent their interests. Such broad participation is built on freedom of association and speech, as well as capacities to participate constructively.

2 **RULE OF LAW**
Legal frameworks should be fair and enforced impartially.

3 **TRANSPARENCY**
Transparency is built on the free flow of information. Processes, institutions and information are directly accessible to those concerned with them, and enough information is provided to understand and monitor them.

4 **RESPONSIVENESS**
Institutions and processes try to serve all stakeholders.

5 **CONSENSUS ORIENTATION**
Good governance mediates differing interests to reach a broad consensus on what is in the best interests of the group, and where possible, on policies and procedures.

6 **EQUITY**
All actors have opportunities to improve or maintain their well-being.

7 **EFFECTIVENESS AND EFFICIENCY**
Processes and institutions produce results that meet needs while making the best use of resources.

8 **ACCOUNTABILITY**
Decision-makers in government, the private sector and civil society organisations are accountable to the public, as well as to institutional stakeholders. This accountability differs depending on the organisations and whether the decision is internal or external to an organisation.

9 **STRATEGIC VISION**
Leaders and public have a broad and long-term perspective on good governance and human development, along with a sense of what is needed for such development. There is also an understanding of the historical, cultural and social complexities in which that perspective is grounded.

This is not a prescriptive model for good governance, rather it is a series of aspirations. Each city–region will be stronger on some aspirations and weaker on others. This depends on their governance model, but moreover, it depends on the negotiations that take place between the multiple actors who have a stake in that city–region. To understand how city–regions develop different governance models despite pursuing the same aspirations, we must recognise that city–regions are a site of contest, tension and conflict. Although many of the actors are the same across city–regions, we must also recognise that their role and, more importantly, their authority will be different in each. One prominent example of this would be the state. An important actor in any city–region, the degree of authority a state has over the city–region can dictate the nature of the governance model and to a large extent its success in meeting the aspirations of good governance. All other actors contribute in however small a way to the prevailing governance model and its success. As a consequence, there is no one model for the governance of city–regions. Rather there are a number of models, any number of which can be found in close proximity to one another.

METROPOLITAN AND REGIONAL GOVERNANCE MODELS

The governance model for a city–region is the outcome of negotiation between the multiple actors who hold a stake in the city–region and its development. A simple way of explaining the different types of governance model is to say that they can range from the 'formal' to 'informal'. An example of a formal governance model would be where a city–region's governing body is made up of directly–elected representatives (including the leader), has tax raising capabilities, autonomy over its financial resources, functional responsibility for service provision, and the capacity to introduce city–regional legislation. This is the model of governance adopted in London and other prominent global cities. A key characteristic of this governance model is that the leader is often more prominent than the body they represent—for example, Ken Livingstone and Boris Johnson (London), Rudy Giuliani and Michael Bloomberg (New York), and Arnold Schwarzenegger (California). The very nature of the media frenzy which surrounds their election to office, and their capacity to change the very nature of the city (for example, the introduction of

the congestion charge in London) ensures that the leader becomes a figurehead under this model of governance. Appropriate for global city–regions where, in political terms, there is legitimacy for such a formal tier of city–regional governance, it is questionable whether this model of governance is practical and/or achievable for other cities.

Compare the US with the UK for instance. While the federal nature of US government sees power divided between central government and the government of each state, the centralised nature of UK politics sees London as the only city currently operating with this formalised model of governance. Here UK city–regions operate through less formal governance structures. Still operating above local authorities, these city–regional governance bodies range from the still quite formal, where group members are all directly elected, to institutions where members are either appointed or indirectly elected. Below this, the most informal model of city–regional governance sees the formation of metropolitan area boards—a voluntary collaboration between local authorities. As well as ranging from the formal to the informal, we can also relate models of city–regional governance ranging from 'strong' to 'weak'. Naturally the most formal models of city–regional governance are the most likely to have statutory status, legislative powers, and additional tax raising powers. So what dictates how formal and strong or informal and weak a city–regions model of governance is?

As intimated earlier in this chapter, the complexity which surrounds models of city–regional governance derives from the interest conflicts of the actors involved and the differences in legitimacy they share. Central to the outcome is the negotiation of interests between the city–region and national government. For when it comes to national governments decentralising authority and resources to city–regions, the interests of the city–regional and national government tend to be at odds. Recent analysis by Andres Rodríguéz–Pose and Nicholas Gill into the devolution process in Brazil, China, India, Mexico, the US and countries of the European Union, concluded that, 'although national governments would prefer, ceteris paribus, to devolve responsibilities (authority) to their regional or state governments with as few accompanying resources as possible, the subnational government would prefer the opposite case'. Going on to suggest that 'the balance between these extremes will depend upon the relative strength, or, in political terms, legitimacy, of the two tiers of government', the authors offer an important insight into why some city–regions emerge with a more formal and stronger model of governance than others.

Simply put, global cities develop the most formal models of urban governance because they have the authority and legitimacy required to put pressure on the central state to devolve the necessary authority and resources, allowing them to have the power to affect change but also requiring more accountability in their governance. When city–regional authority and legitimacy reduces in relation to that of the central state, the weaker and more informal the model of governance will be. Most obvious in countries such as the UK where the asymmetric devolution of state power to city–regions has resulted in the development of a whole range of governance models ranging from the formal to informal, it can also be seen in countries where each city–region has the same model of governance. Albeit in a more conspicuous way, these countries also show a strong degree of asymmetry within what appears to be a symmetrical model of governance. Even within a symmetrical framework those city–regions with the most political power, usually those with the most economic power but often those with the least as well, will have more legitimacy in negotiating with the state for the devolution of power and resources. However, this is not the only tension, for there are a whole series of conflicts that currently surround attempts to develop new models of governance which marry up with the new urban growth pattern.

CONFLICT BETWEEN OUTDATED GOVERNANCE AND THE NEW URBAN GROWTH PATTERN

A DECADE AGO CITY–REGIONS WERE ONLY JUST BECOMING A FOCAL point for academics and policymakers alike. Since then, academic discourses pertaining to a new city–regionalism in economic development and territorial representation have emphasised the capacity of city–regions to bring forth greater democratisation, improved service delivery, and better economic performance. But this new urban growth pattern is presenting a real challenge for those involved in the governance of city–regions. Quite simply, existing governance models are outdated and do not fit the new urban growth pattern of city–regions where the economic footprint extends beyond city lines. The race to put the new city–regionalism into practice has therefore exposed a series of tensions around the issue of governance.

First and most obvious is the current lack of understanding about what exactly a city–region is. Wherever you look in the literature you will find a different definition and set of criteria for distinguishing what is and what is not a city–region. For instance, Allen Scott in his book *Global City–Regions* takes those cities with a population over 1 million as his starting point. With populations ranging from 2 million (Dublin, Helsinki) to 35 million (Tokyo), the OECD concentrates on what it identifies as 78 metro–regions. Others focus solely on polycentric mega city–regions such as South East England, the north–eastern seaboard of the US, and the Pearl River Delta in China. This lack of consistency has led some commentators to identify the city–region as an extremely chaotic concept.

Second and somewhat related, knowledge of issues relating to the economics of city–regions is far more advanced than issues relating to the politics of city–regionalism. Though promoted as key attributes of city–region development, much less is known about the politics of governance and state reterritorialisation, the role of democracy and citizenship in city–regional politics, and issues relating to social reproduction and sustainability across city–regions. These issues have been marginalised by accounts documenting the importance of city–regions for issues relating to exchange, interspatial competition and globalisation. It also serves to reinforce this tension between the new urban growth pattern and the outdated governance models which are often tasked with regulating it. The tension that exists here is between the real economic geography of cities and regions, based on viewing the world as a networked 'space of flows' (i.e. connected cities), and

established patterns of partnership working (i.e. governance), based on the more traditional view of the world as a 'space of places' and made up of territorial and administrative units. City–regions give the closest answer to the former, but existing governance models do not reflect in the same way the regional economic geography and are instead based on territorial patterns of partnership working. To disturb these established partnership–working patterns has a reasonable level of risk attached to it, which is not a reason never to look at change but it is a reason to be cautious of leaping to a new governance model.

Third, there is a tension around whether policy should focus on those areas which exhibit the most potential for economic success or those where the greatest concentration of problems are to be found. In one sense it can be argued that they are one and the same thing. For example, it is widely accepted that while global cities have the greatest potential for economic success they also contain the most deprived communities. Social polarisation is therefore a key feature and one which poses challenges for those involved in the governance of global city–regions.

Relatedly, a fourth tension centres on the inclusion or exclusion of certain city–regions within national city–development programmes. To be included brings a certain degree of legitimacy and authority to those city–regions, while those that are not deemed part of the national city–regional program can become isolated and miss out on the potential benefits of state–assisted city–regional development. This is certainly true in countries such as the United Kingdom where city–region development is both piecemeal and by nature asymmetrical.

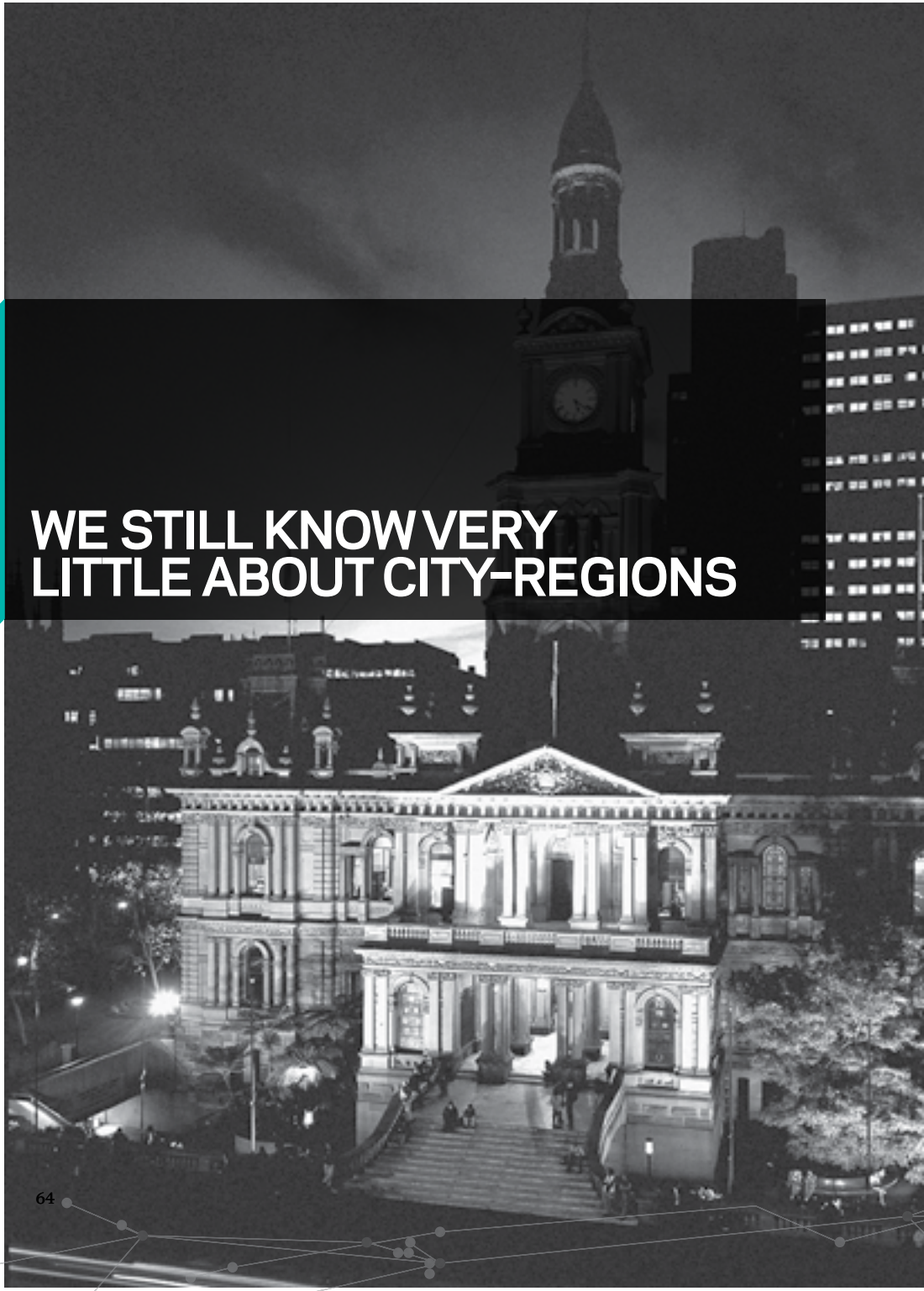
Highlighting once more the tension between city–regions and the central state, a fifth tension revolves around the nature of city–region development as autonomous city–regional action (bottom–up) or centrally orchestrated (top–down). Here city–regions are caught in a dilemma. Much of the literature emphasises how a bottom–up approach is necessary to enable city–regions to have the ability to operate independently from the state. This enables city–regions to have the flexibility to respond to their own specific city–regional needs and preferences, and the ability to implement policy innovations that might be deemed politically sensitive and difficult to pursue at the national level. However, the need to operate independent of the state is often to be balanced against the necessity for city–regions to work closely with the national government to secure their legitimacy, authority and power. With national governments inclined

to be prescriptive in what they require of city–regions in return for the decentralization of authority and power, the development of city–regions is often more top–down than it is bottom–up. Again the relative strength or, in political terms, legitimacy of the two tiers will play a critical role in the outcome of this particular tension.

Sixth, as with any orthodoxy there is a real danger that people get swept up in the furore which surrounds city–regions. In particular, there is a real issue over the causality of many incidents, events and developments taking place in or around cities today. Given the current popularity of city–regions in academic and policy literatures, there is a culture whereby people are all too ready to identify any sign of improvement as being evidence of the new city–regionalism in action. What is routinely overlooked in the rush to highlight the impact of the new city–regionalism is that the city–regional approach may have had little or no bearing on that development. Causality is an important, but often overlooked, concept in debates around city–regions. This is because it is extremely difficult to overcome the counterfactual argument: 'well there is no way of knowing whether it would or would not have happened if we had not introduced these policies?' Having said that, we need to remain vigilant to the fact that it is all too easy to get ahead of ourselves and assume causality, and in so doing jump on the city–regional bandwagon. The simple motto is to learn how to walk before attempting to run.

All of which leads to a seventh tension that the current orthodoxy which surrounds the city–region in academic discourse and political praxis is reminiscent of the orthodoxy achieved by the 'region' in the 1990s and the 'local' in the 1980s. The lack of a consistent definition for what a 'city–region' is, the failure to recognise the critical role of the state and the associated asymmetries of power when accounting for the current focus on city–regions, and the narrow construction around issues which relate to the economic logic for city–regions, are all tensions which characterise the new city–regionalism. But they are also tensions which were present in its predecessor, the new regionalism. And herein lies the warning. Recent research suggests that these tensions manifest themselves as a series of critical points of weakness which served to undermine the theoretical standing of the new regionalism in academic circles, but also went a long way to explaining why political attempts to put the new regionalism into practice did not necessarily bring about the expected results. The question which remains unanswered in relation to city–regions is whether the same critical points of weakness will in the same way

WE STILL KNOW VERY LITTLE ABOUT CITY-REGIONS



undermine attempts to put the new city–regionalism into practice?

The eighth and final tension to highlight is one which underpins many of the points made previous to it. Put bluntly, we still know very little about city–regions. This reflects amongst other things the difficulty which surrounds defining city–regions, but also the noticeable lack of an evidence base. Figures for city–regions are very often aggregates of smaller units of analysis or estimates based on the aggregation or disaggregation of data collected at other scales. So despite ongoing research in academic and policy communities the evidence is just not there in many cases. Understandably this causes tension because without the evidence base there is a natural tendency for much conjecture to become associated with fact. The reality is that at present, the answer to many of the challenging questions which face city–regions and their planners is that we just do not know for sure. Whilst the situation is improving, and significant improvements in recent years have allowed academics and policymakers to make better informed recommendations, there remains a long way to go.

The lack of an evidence base for city–regions is clearly an important starting point for improving our understandings of city–regions. More city–regional data will inevitably allow us to gain a better understanding what is going on it city–regions, but there are other key questions for which it is not sufficient simply to have more data and more evidence. It is to these questions that the final section of the chapter turns.

There are a series of currently topical debates which it is important to acknowledge, but more important to understand, when working with city–regions.

EXISITING DEBATES & PRACTICES

COMPETITIVENESS DISCOURSE

Closely allied to the development of the new regionalism and more recently the new city–regionalism, the work of Michael Porter and colleagues at Harvard Business School has seen 'competition' become the buzzword for policymakers worldwide in the past decade. Originally focused on firm competitiveness, but more recently on city and regional competitiveness, Porter's seminal thesis on competition, and what it means to be competitive, has seen competitiveness elevated to the status of a 'natural law' in the modern capitalist economy. Recent research by Gillian Bristow at the Cardiff School of City and Regional Planning (UK) has illustrated how the concept of regional competitiveness is so ingrained in public policy circles that policies and strategies deemed to be competitiveness enhancing are accepted irrespective of their indirect consequences. But Bristow and others are now suggesting that while policy extolling the language of competitiveness tends to present it as 'an unproblematic term' and as 'an unambiguously beneficial attribute of an economy', much confusion surrounds the actual idea of regional competitiveness because it lacks a 'clear, unequivocal and agreed meaning' in the literature.

Of particular concern is how, despite the concept of regional competitiveness being opened up to suggestions that it is a somewhat chaotic and ill–defined concept based on a narrow conception of how regions compete, prosper and grow, it continues to assume such significance in policy circles.

Given the pre–dominance of the linkage between city–regions and competitiveness, this questioning of the competitiveness discourse raises the important question of the relative strength of claims made by city–regionalists that, in the quicksilver global economy, city–regions are economic territories par excellence. As such, there is a need to consider the causality between city–regions and competitiveness more closely. To understand why, for instance, the economic logic for city–regions has run parallel to and ahead of the political, social, cultural and environmental logic for city–regions there is a need to understand the process by which city and regional competitiveness has become a hegemonic discourse within public policy circles and academic commentaries. In particular we need to discover for which interests (i.e. actors) city–regions are necessary and for whom it is merely contingent, and whether the new city–regionalism legitimates certain courses of political action (e.g. the pursuit of competitiveness) over others (e.g. sustainable development)? But it is not just issues around city–regions and the competitiveness discourse that are shaping current debate on city–regional governance. A second important debate centres on the changing role of the state and its association with the emergence of city–regions.

CHANGING ROLE OF THE STATE

Much of the literature on city–regions and claims of a new city–regionalism have advanced the notion that city–regions have broken free from the regulatory control of their respective nation–state. However, as noted above, recent research has accused these accounts of bending the stick too far in the direction of autonomous city–regions. Giving weight to the argument that the nation–state and the national scale continue to provide the institutional conditions for economic development, critics highlight how the most successful city–regions are also those which are located in the most successful national economies. An example of this can be seen in the recent work of Pauline McGuirk, a researcher at the Centre for Urban and Regional Studies in Newcastle (nsw, Australia). Focusing on the political construction of the Sydney city–region, McGuirk has done much to highlight how the metropolitan scale, which had little strategic presence before, can now be found at the core of Australia's national regime of economic–territorial management. This is despite there having been no formal scalar devolution of state power and no formal metropolitan–scaled government in the Australian political structure. McGuirk's work on Sydney, and research by other academic and political commentators around the world, is highlighting how 'city–regionalisation is an ongoing and multiscalar process without autonomy from the national political economy nor from its territory'. Current debate is therefore centred on the degree to which city–regions are autonomous: are they, as first imagined, increasingly free from the regulatory supervision of the state, or, is the autonomy that city–regions possess only resulted because of state authority and institutional structure, state mediation, and significantly, state legitimation?

THE IMPORTANCE OF PLACE

The third and final debate that I want to highlight here is actually more of a pointer than a debate per se. It emphasises a theme that has been implicit throughout this chapter —place. More so than ever before, place is seen as the critical element in understanding the development of, and governance requirements for, city–regions. Emphasis on the importance of noncodifiable production conventions and inter–firm associations (e.g. trust, loyalty, familiarity) to being competitive has raised the awareness that institutions are notoriously bad travellers. While you can uplift an institution or model of governance from a successful city–region and plant it in a less successful city–region, you cannot transfer the noncodifiable production conventions. All of which makes it extremely difficult for less successful city–regions to mimic the institutional arrangements of more successful city–regions.

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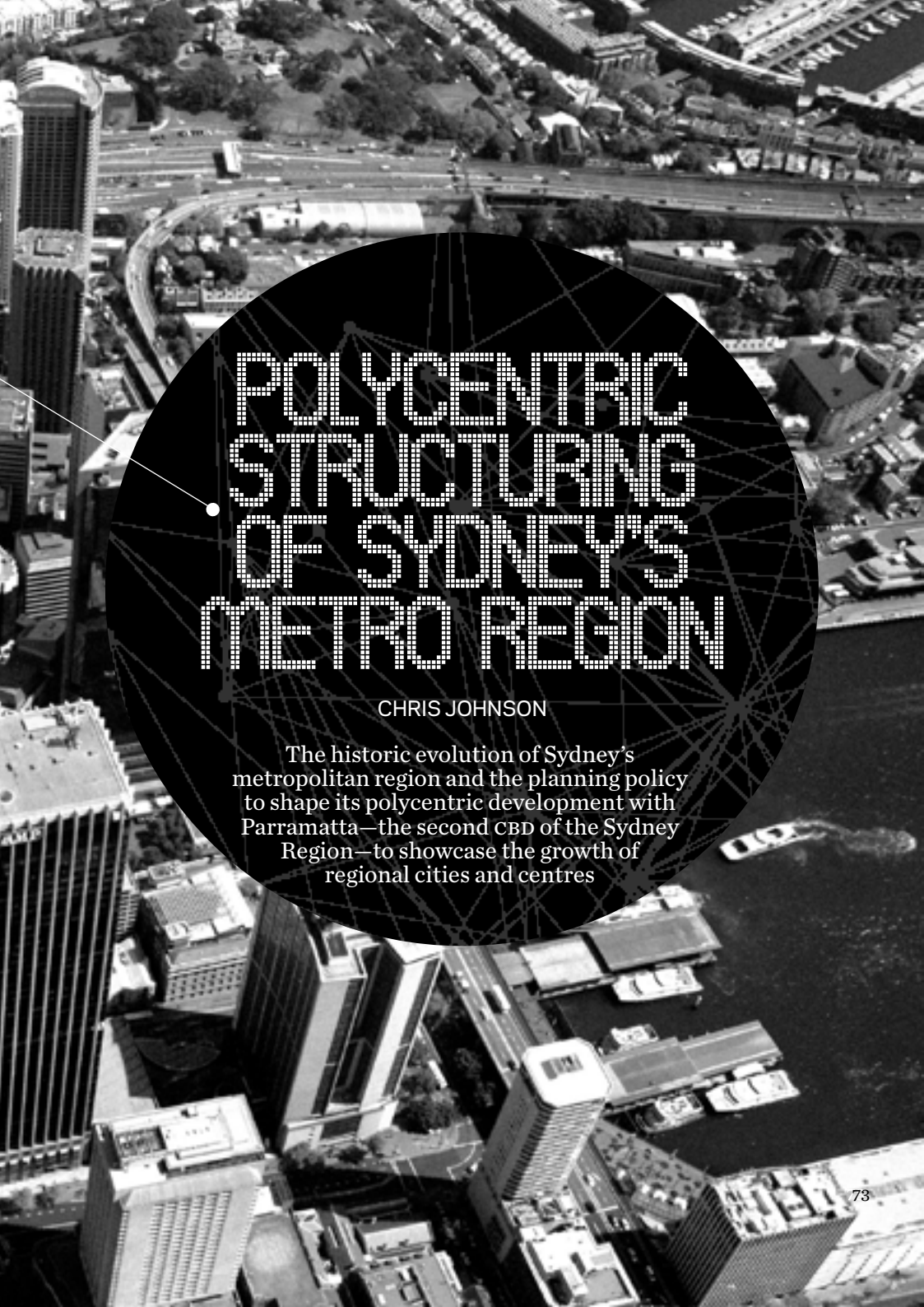


POLYCENTRIC STRUCTURING OF SYDNEY'S METRO REGION

CHRIS JOHNSON

The historic evolution of Sydney's metropolitan region and the planning policy to shape its polycentric development with Parramatta—the second CBD of the Sydney Region—to showcase the growth of regional cities and centres

AS URBAN AREAS SPREAD INTO METROPOLITAN REGIONS, THEY ARE DEVELOPING OMELETTE LIKE STRUCTURES WITH MULTIPLE CENTRES

In the 1960s English architect Cedric Price created significant interest when he related the form of the city to three different ways to cook breakfast eggs. Price began with the hard boiled egg and related this to the ancient city with its walls containing the yellow urban centre and agriculture outside the walls. Unfortunately Price's clear diagram of the city was lost as the urban core became surrounded by sprawling suburbs. The fried egg therefore demonstrated the relatively uninteresting spread of low rise housing around what was becoming an urban centre only for work.

Price had a better model for our cities using the omelette to describe its visual and culinary delights. The omelette mixed up the ingredients of the yolk and the white and added in richness from tomatoes, onions and mushrooms. The omelette kept the integrity of these ingredients by keeping pieces of tomatoes or mushrooms as sub–centres within the finer grain egg mix.

As urban areas spread into metropolitan regions, they are developing an omelette like structure with multiple centres. Sir Peter Hall from the UK has used the word 'polycentric' to describe the new urban form in a recent book *The Polycentric Metropolis —Learning from Mega–City Regions in Europe*. His book examines the phenomenon of urban growth in Holland where the Randstad becomes a series of interconnected centres, the city of Paris with its satellite cities and the south east of England with its city centres surrounding London. Hall examines the extent of email and conference call traffic between the centres to understand how the network of centres works. Of particular interest is the measurement of commuting to determine where people work relative to where they live in these metropolitan regions.

In Sydney's metropolitan region, we witness a polycentric urban process of similar nature.

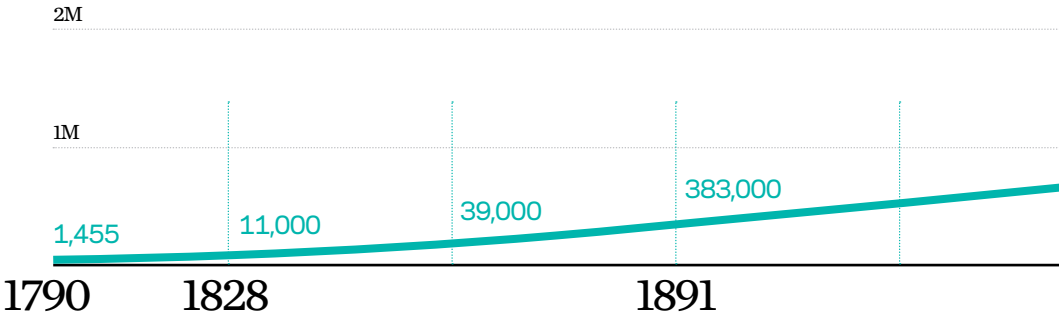
SYDNEY'S URBAN GROWTH

Sydney's development as a city began on 26 January 1788 when the First Fleet arrived in Sydney Harbour and raised the British flag at what is now Circular Quay. By 1790 the township had reached a population of 1,455 mainly composed of convicts transported from Britain. While the settlement grew around Sydney Harbour, a number of settlers moved out of Sydney to develop land for farming. By 1828, 70% of the population of the colony was living outside of Sydney with 10,815 people in the city itself.

A number of river based secondary centres evolved at Parramatta, Liverpool and Penrith but these were seen as quite different towns from Sydney. From 1840 onwards development outside the town centre of Sydney occurred in areas that were later to be described as the suburbs. By 1851 Sydney's population was 42,240 with a further 9,684 people living in the surrounding areas. Significant growth occurred in the 1880's and Sydney's metropolitan population had reached 383,283 by 1891.

By 1917 the metropolitan population had reached 960,000 people mainly based on the southern shores of Sydney Harbour with the growing focus around Parramatta and along the ridge north of the harbour. By 1945 the population reached 1,700,000 with the construction of the Harbour Bridge opening up significant land north of Sydney.

FIGURE 1
Sydney Population Growth



The population reached 3,100,000 by 1975 with new development along the northern beaches and westward towards Parramatta and Liverpool. The road heading to the Blue Mountains through the town of Penrith also developed urban growth in a linear form along the road way. By 2005 the population reached 4.2 million with strong growth along the Penrith corridor and to the south west of Liverpool and further to Campbelltown.

In parallel with the population growth in the Sydney basin was an increase in population along the north to Newcastle and south to Wollongong and beyond. Much of this growth was constrained by natural features including the national park to the south and the escarpment that is formed by the great dividing range of mountains that runs just back from the coast. Further north the Broken Bay area with its steep hills became a natural barrier forcing development northwards to Gosford and Wyong and to the much earlier settlement of Newcastle. The population of the greater metropolitan region stretching from Newcastle in the north and to Wollongong in the south had reached 4.2 million by 2005. With this large number of people a new structure was required to balance the importance of Sydney as the major employment hub.

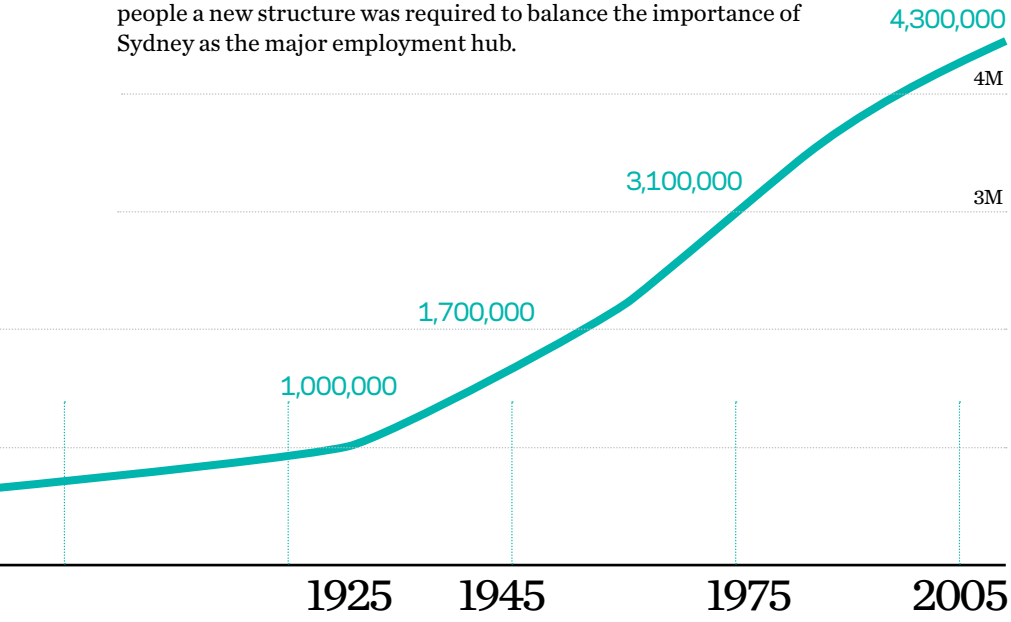
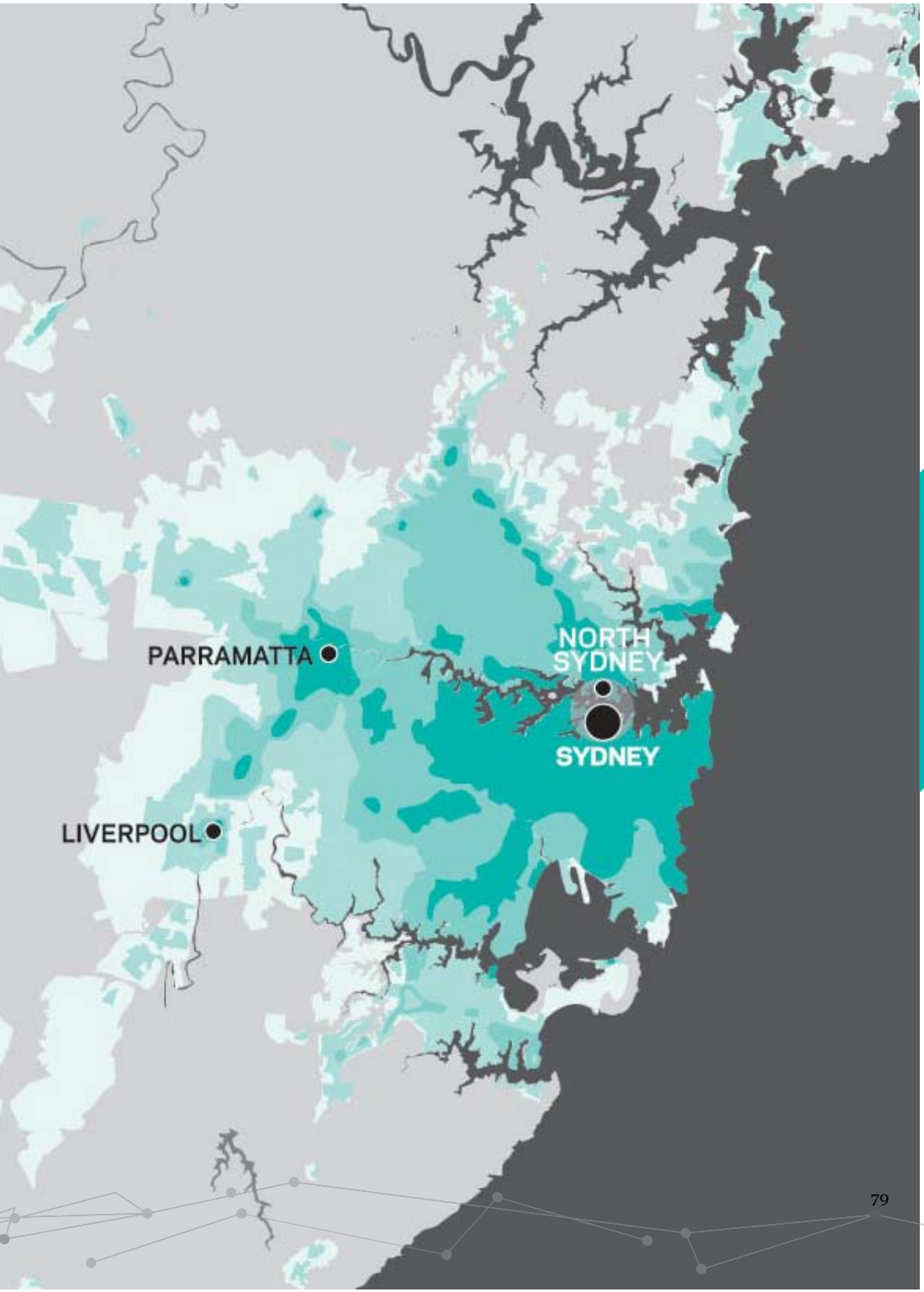


FIGURE 2
SYDNEY URBAN AREA GROWTH 1917–2005


PARRAMATTA
NORTH SYDNEY
SYDNEY
LIVERPOOL

CITY OF CITIES PLAN

The 2005 Metropolitan Strategy set out a new structure for metropolitan Sydney that was focused around a hierarchy of cities. The key diagram in the strategy was one looking like the Olympic rings with five circles focused around five key centres in the Sydney basin. These centres included Sydney and North Sydney as the traditional employment centres with three new rings around Parramatta, Liverpool to the south west and Penrith to the far west. The strategy went further to describe a hierarchy of centres from the global city of Sydney to Regional Cities, Major Centres and Specialised Centres. The Regional Cities focused on Parramatta, Penrith and Liverpool with around a dozen Major Centres and eight Specialised Centres. The strategy defined the characteristics of cities and centres. The Metropolitan Strategy was complimented by similar 25 year growth strategies for the Central Coast, Hunter Valley and the Illawarra. These strategies developed clear projections for population and job growth across the whole of the Greater Metropolitan Region.

SIX REGIONAL CITIES AROUND SYDNEY

The combination of the 25 year strategies led to the selection of six cities that became the focus for local jobs. The NSW Government's State Plan identifies a key priority: 'jobs closer to home'.

With rising fuel prices, increasing time spent by commuters in travelling to distant work locations and the impact of car use on air pollution, ensuring that jobs are closer to homes is an increasingly important objective. To drive a refocus on the network of regional cities a Cities Taskforce was established in the NSW Department of Planning to work closely with the six councils of Newcastle, Gosford, Penrith, Parramatta, Liverpool and Wollongong.

The Taskforce developed new city centre plans during the second half of 2006. During 2007 the plans were refined following public exhibition and gazetted. A series of new development applications have flowed from the work of the taskforce.

The Taskforce produced four planning documents for each city including a Vision Document outlining the role of the city centre, a Local Environmental Plan which set the statutory requirements, Development Control Plan which modelled the character of the city and a Civic Improvement Plan to guide the public domain.

SYDNEY'S STRATEGIC CENTRES

Global Sydney

The main focus for national and international business, professional services, specialised health and education precincts, specialised shops and tourism, it is also a recreation and entertainment destination for the Sydney region and has national and international significance.

Sydney City–North Sydney

Regional Cities

With a full range of business, government, retail, cultural, entertainment and recreational activities. They are a focal point for regional transport and jobs.

Parramatta, Liverpool, Penrith

Specialised Centres

Areas containing major airports, ports, hospitals, universities, research and business activities that perform vital economic and employment roles across the metropolitan area. The way they interact with the rest of the city is complex and growth and change in and around them must be planned very carefully.

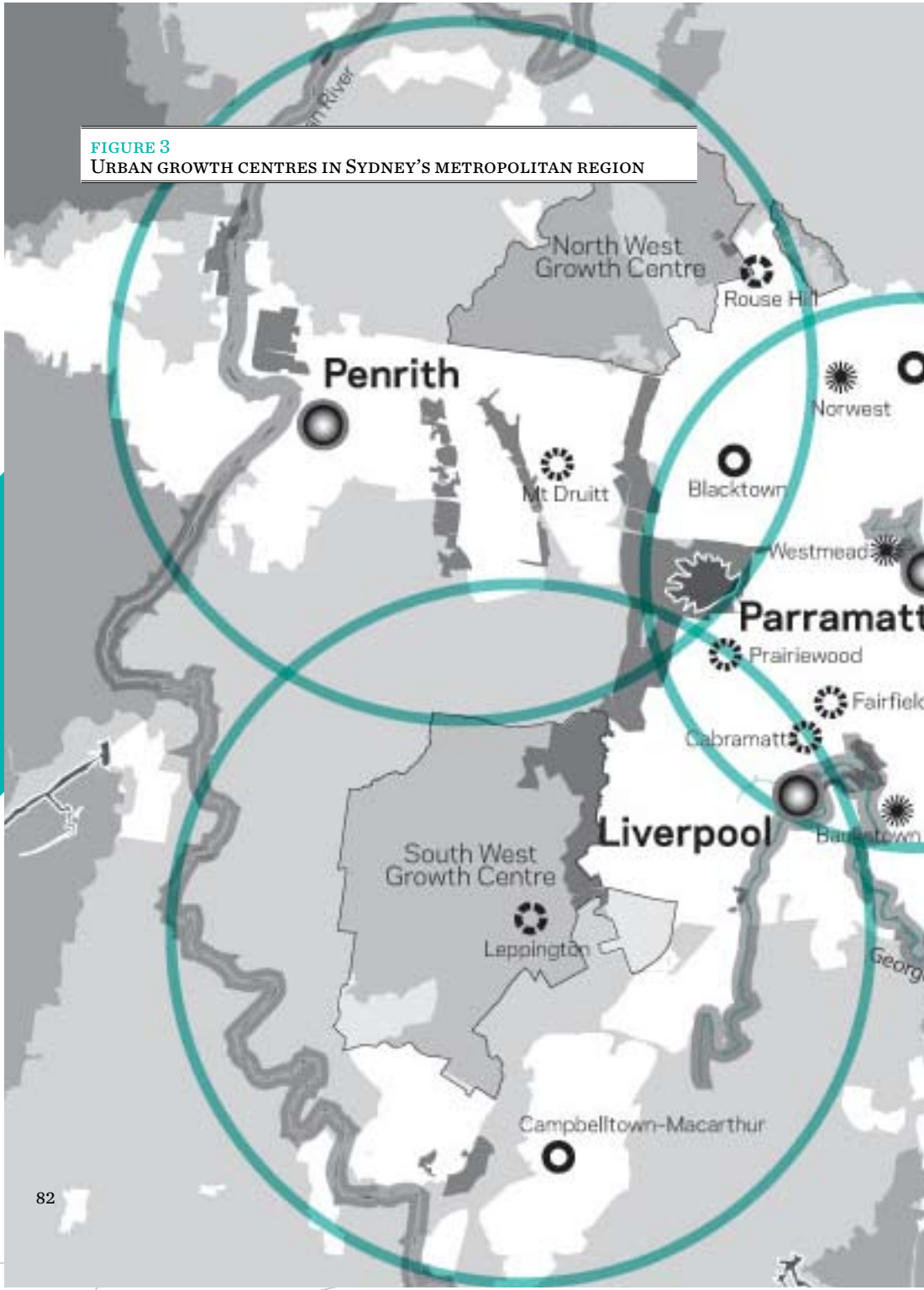
Macquarie Park, St Leonards, Olympic Park–Rhodes, Port Botany, Sydney Airport, Randwick Education and Health, Westmead, Bankstown Airport–Milperra, Norwest

Major Centres

The major shopping and business centre for the surrounding area with a full scale shopping mall, council offices, taller office and residential buildings, central community facilities and a minimum of 8,000 jobs.

Bankstown, Blacktown, Bondi Junction, Brookvale–Dee Why, Burwood, Campbelltown–Macarthur, Castle Hill, Chatswood, Hornsby, Hurstville, Kogarah

FIGURE 3
URBAN GROWTH CENTRES IN SYDNEY'S METROPOLITAN REGION




Hornsby
Castle Hill
Brookvale-Dee Why
Macquarie Park
Chatswood
Parramatta River
St Leonards
GLOBAL SYDNEY
North Sydney
Sydney
Olympic Park-Rhodes
Burwood
Bondi Junction
Bankstown
Green Square
Randwick Education and Health
Sydney Airport
Hurstville
Kogarah
Port Botany
Sutherland
Major Centre
Planned Major Centre
Potential Major Centre
Specialised Centre

REGIONAL CITY DEVELOPMENT PRINCIPLES

The primacy of the City Centre for employment, supported by high quality well located residential development was incorporated in seven principles:

1.

GROWING JOBS IN THE HEART OF THE CITY CENTRE

Regional Cities contain concentrations of job and service activities. Jobs need to be in the heart of the centre, close to public transport. Planning needs to allow for sufficient floor space to accommodate future job growth.

Community, education and government activities currently provide many of the high value, high skill job opportunities in the regional cities. The continued development of these activities, and related spin–off enterprises in the private sector, is fundamental to the future success of the regional cities as job locations.

A 'whole of government' approach is essential to ensure that assets are utilised to maximise outcomes for the good of the city centre as a whole. The utilisation of council assets such as libraries, civic centres, parks and land can effectively support city centre development.

2.

ENCOURAGING DIVERSE PRECINCTS AROUND THE CITY CENTRE

The regional cities all have assets which give them their pre–eminent status. Universities, hospitals, parks, light industry areas, cultural and entertainment facilities, river and waterfront assets and parklands –all make a contribution to the life and attractiveness of these places.

For example, Central Sydney is more than just the area between Circular Quay and Central Station. Darling Harbour, the university and education precinct, the waterfront, Botanic Gardens, the Rocks, the inner suburbs of Surry Hills and Ultimo–Pyrmont and the Domain, Hyde Park and even Centennial Park are all contributors. The regional cities all have a similar set of assets in and around their centres. Planning needs to extend beyond the City Centre to the wider catchment of assets and attractions to recognise and build on the inter–connections and relationships between them.

3.
CREATING A LIVING CITY

While a core employment role is fundamental, opportunities for additional mixed use and residential development in and around the city centre exist. Attracting new residents will bring additional retail and service activity and street life. High quality design outcomes, public places and civic improvements should be a priority in these areas.

4.
CELEBRATING THE SPECIAL CHARACTER OF THE CITY CENTRE

Each of the centres has a different role in its subregion and their assets underpin different competitive strengths. It is not anticipated that all the regional cities will be Central Sydney or even Parramatta replicas. They must develop with their own distinct character and roles. An understanding of the character and role of topography and landscape, the economic and community assets in each centre and the preparation of appropriate development settings is critical.

5.
IMPROVING THE DESIGN OF BUILDINGS AND PUBLIC AREAS

Places are more enjoyable where innovation in design and development is on display. Regional Cities need to be a symbol for better quality urban development.To encourage better design the new City Centre Plans require architectural competitions for projects above certain heights (55 m in Parramatta, 48 m in Newcastle, 36 m in Gosford). This has led to a number of competitions particularly in Parramatta leading to solutions that are demonstrating a new design quality for a regional city. To balance the design of individual buildings the Civic Improvement Plan outlines the importance of design quality for the public domain. Plans outlining the quality of footpath paving, the location of street trees and where improvements can occur to particular public places and parks give a long–term strategy to civic improvements.

6.
ENHANCING TRANSPORT AND ACCESS TO AND AROUND THE CITY CENTRE

As the regional cities are to become the focus for new investment and accelerated development, access to the city centres is fundamental. New and upgraded public transport links, improved private vehicular access and enhanced environments for pedestrians and cyclists must be a priority.

7.
IMPROVING THE NATURAL ENVIRONMENT

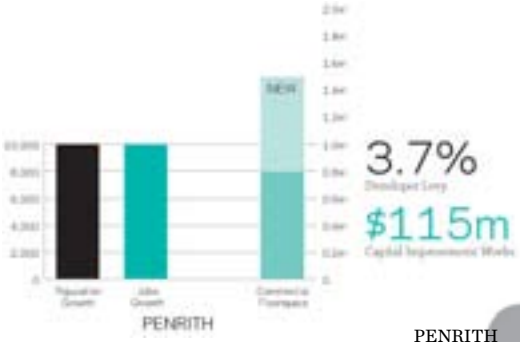
With looming climate change the sustainability of our cities is under increasing scrutiny. The regional cities need to be models for best practice in energy and water consumption, solar access for public spaces and in encouraging transport forms that minimise pollution.

SETTING TARGETS

The Vision Document describes the regional character of each city, its context and the local characteristics. A detailed economic analysis of each city was undertaken.

Demographic trends were examined to determine targets for jobs and population growth for each city. This led to an increase of over six million square metres of floor space across the six cities which has been assessed as increasing land value by up to $3 billion.

The current development growth potential for each city was assessed against the targets. Allowance was made for uneven take–up and the need to over–provide development potential. This process led to an up lift in floor space for each city centre which was delivered through significant increases in the existing Floor Space Ratio (FSR) and height limits.



PENRITH

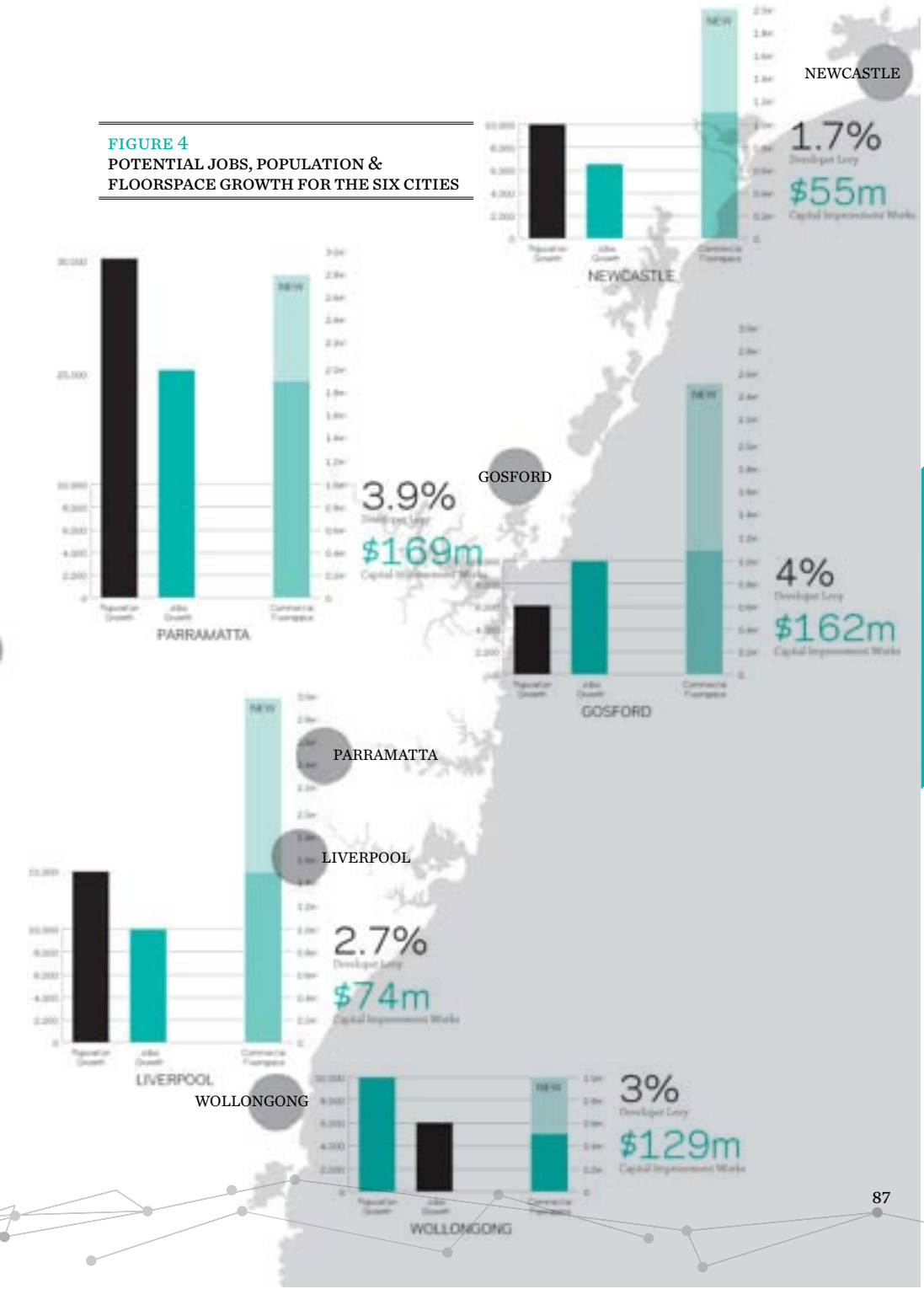
While the development industry may appreciate the uplift in development potential the cities Taskforce was concerned also about the character of each City Centre and the need for civic improvement to the public domain. To fund improvements a small levy of around 3% was applied to the City Centre development sites where a significant uplift in floor space had been given.

The funds from the levy were allocated to a schedule of civic improvement works clearly defined in a Civic Improvement Plan (CIP). The CIP also outlined the importance of the public domain in each city centre and included plans for street trees, pavement quality and nominated civic improvement projects.

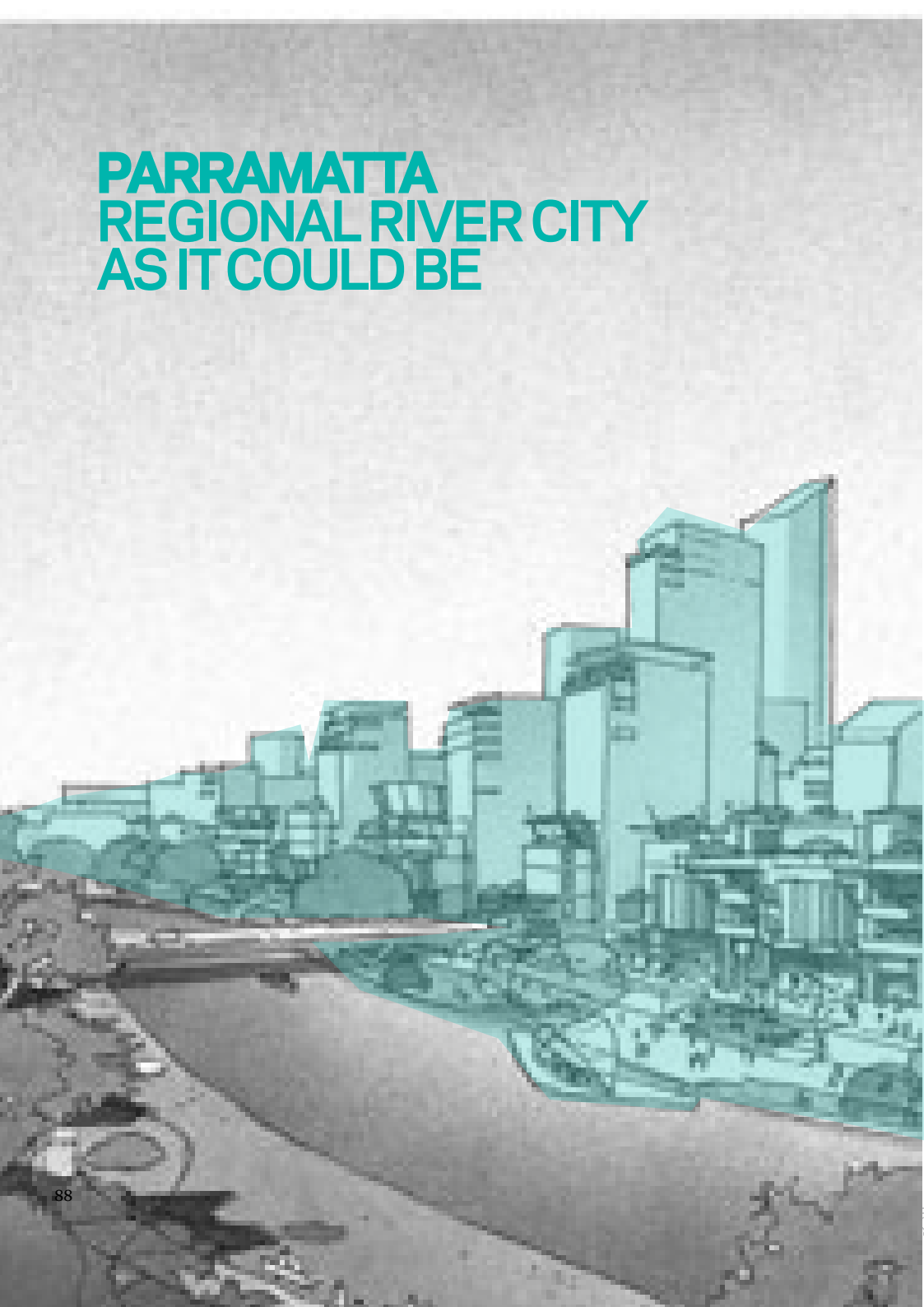
The value of the levy and the Civic Improvement Plan was that the encouragement of growth in the city centre would have an important by–product through the improvement of the character of the city for all users. Much of the publicity that surrounding the release of the City Centre Plans was about the new vision that incorporated improved foreshore parks, new facilities and civic places. In this way growth was seen to contribute to a better city.

The city centre plans were not only about delivering more floor space. The Development Control Plan for each city carefully defined

FIGURE 4
POTENTIAL JOBS, POPULATION & FLOORSPACE GROWTH FOR THE SIX CITIES



PARRAMATTA REGIONAL RIVER CITY AS IT COULD BE



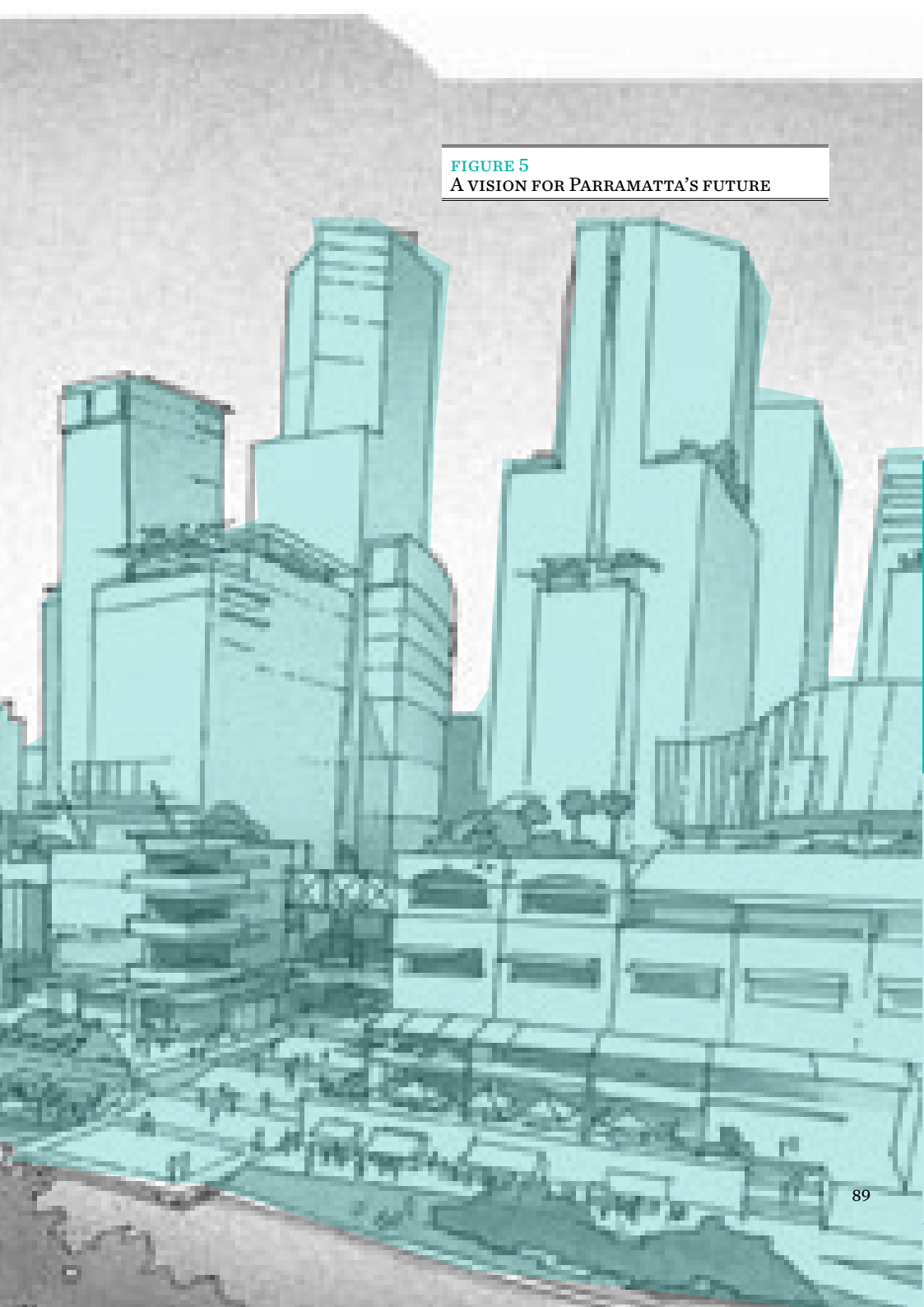


FIGURE 5
A VISION FOR PARRAMATTA'S FUTURE

street walls of a comfortable scale with high rise set back. The plans modelled corner sites and relationships to existing buildings. Importantly design excellence was enshrined for larger buildings by requiring architectural competitions with a bonus of 10% extra floor space and 10% extra height for successful outcomes.

DEMOGRAPHY

Parramatta City Centre is highly ethnically diverse with around 60% of the population born overseas. The cities population is much more multicultural than either the Parramatta local government area as a whole or the Greater Metropolitan Region (GMR) with 35.8% and 27.3% migrants respectively. A high proportion of the population 35%, are of Asian origin, compared to 9% of the population of the GMR.

The City Centre has a relatively young population with a high concentration in the 20–39 year old age group and a lower proportion of children and older residents than the metropolitan average. There are currently around 5,000 residents in Parramatta's City Centre (which includes residents in non–private dwellings). The population is forecast to increase by 20,000 by 2031. By 2031, the boundary of the centre is likely to increase to encompass precincts to the east on Parramatta River and to grow to the south and north west. Total population in this broader catchment has a capacity of around 26,000 residents, which would require a total of approximately 11,300 new dwellings.

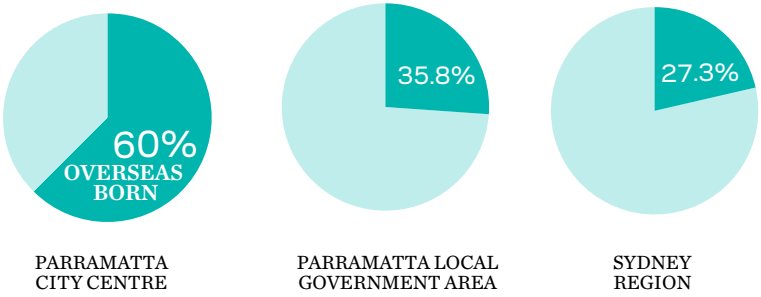


FIGURE 6
Overseas born populations

PARRAMATTA IS EMERGING AS A MAJOR BUSINESS CENTRE, NOT ONLY FOR WESTERN SYDNEY BUT INCREASINGLY IS TAKING ON A WIDER METROPOLITAN FOCUS PARTICULARLY IN FINANCE AND BUSINESS SERVICES, JUSTICE AND ADMINISTRATIVE FUNCTIONS

ECONOMY

As the second CBD for Sydney, Parramatta centre economy is undergoing rapid change and growth. The centre has attained a sustainable growth path and is becoming increasingly complex and diverse. Parramatta is emerging as a major business centre, not only for Western Sydney but increasingly it is taking on metropolitan functions particularly in relation to finance and business services, justice and administrative functions.

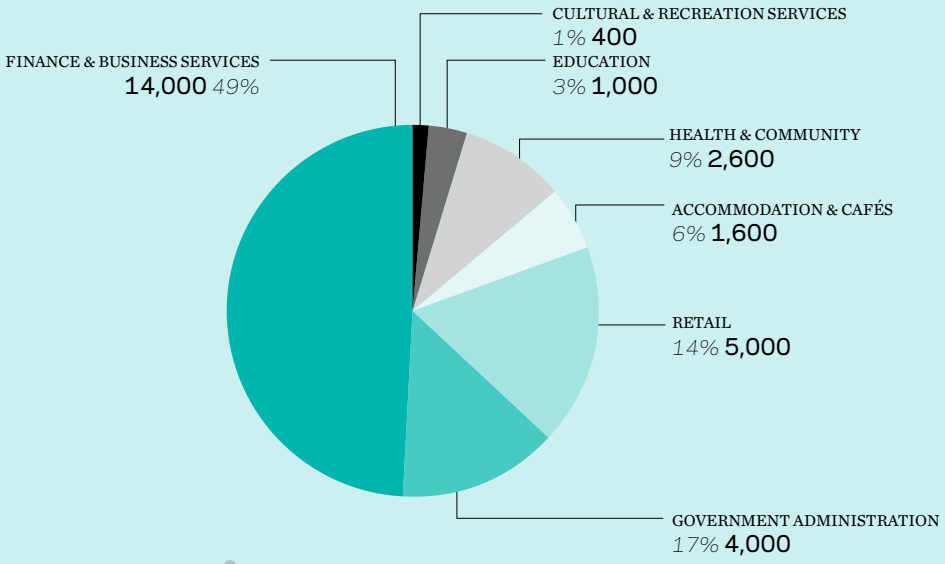
Key employment statistics include:

- Around 14,000 people were employed in finance and business services. This includes banking, management, accountancy, insurance, real estate, law and IT services and a high concentration in the city centre. The number of people employed in finance and business is approaching 50% of total jobs, making it by far the dominate sector. This is an important indicator of the importance of Parramatta as an emerging business centre.
- Around 4,000 people were employed in government administration in 2001. The number of people employed by the public sector is increasing dramatically with the headquarters of NSW Police and Sydney Water moving to Parramatta.
- Around 5,000 people were employed in retail with more than two–thirds in the centre core and the rest in the broader centre catchment area.
- Accommodation and cafés employed over 1,600 workers or 6% of total centre jobs.
- Health and community services contained around 2,600 jobs, around 6% of total jobs in the centre core and broader catchment area.
- Education employed around 1,000 people, around 3% of total jobs.
- Cultural and recreation services employed around 400 people just over 1% of total jobs.

COMMERCIAL DEVELOPMENT

Parramatta is developing a sophisticated office market. The City Centre with 600,000m² of office space is the third largest suburban office market in Australia and the ninth largest nationally. Parramatta's status as Sydney's second CBD, with infrastructure improvements and government commitments to invest in and relocate departments to Parramatta, has spurred private sector investment. Parramatta's commercial core had over 11,000 jobs in finance and insurance and property and business services ten years ago. Major corporations with a presence in Parramatta include Capital Finance, AGC, SunCorp, Colonial First State, Telstra and NRMA. Since 2000 the Parramatta's commercial office stock has grown by around 10% which is comparable with Sydney's CBD and far out strips other major metropolitan commercial office markets such as Chatswood and North Sydney.

FIGURE 7
Parramatta employment by industry, 2001



2007 CITY CENTRE PLAN

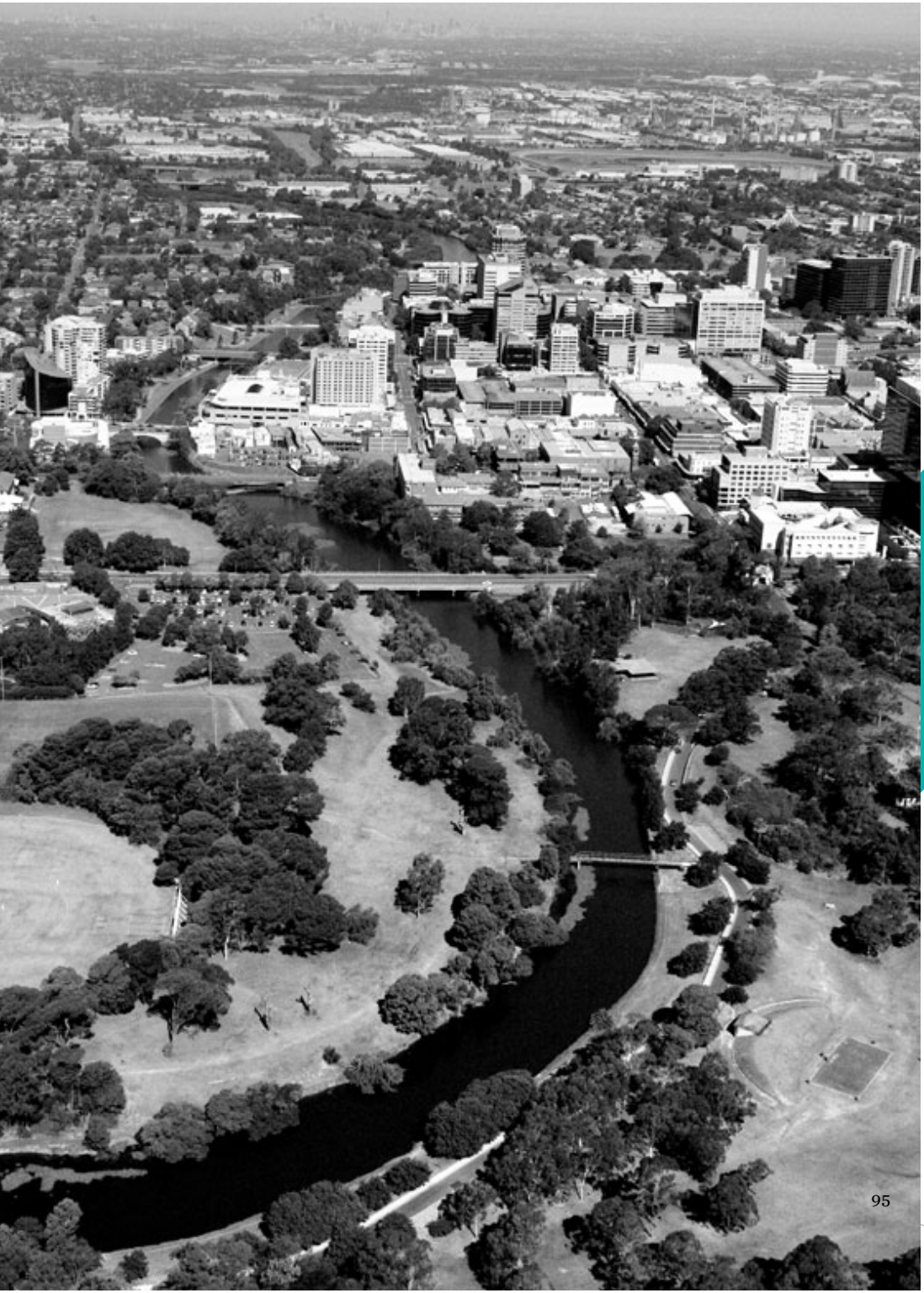
The 2007 City Centre Plan sets out to add 20,000 more residents and 30,000 new jobs to Parramatta. It does this by making significant changes to the existing floor space ratios and heights in the city centre precincts.

A special clause was contained in the Local Environment Plan requiring all development above 55 metres to be the subject of an architectural competition to achieve design excellence.

Following the adoption of the new City Centre Plan a series of Development Applications have been submitted all based on design excellence. Parramatta is now up to its fourth architectural competition with all projects being for commercial buildings with a total area of around 70,000 square metres.

The planning intervention into the City of Parramatta has given the city a boost which has put it firmly on the path of achieving its growth target. At the time the City Centre Plan was released in December 2006 the headlines on the front page of the local Parramatta Advertiser shouted 'Sydney, Lookout'. The headline is exactly what the Cities Taskforce was looking for—a demonstration that the city centres surrounding Sydney need to develop as centres that threaten the importance of the historic centre around Sydney Harbour.

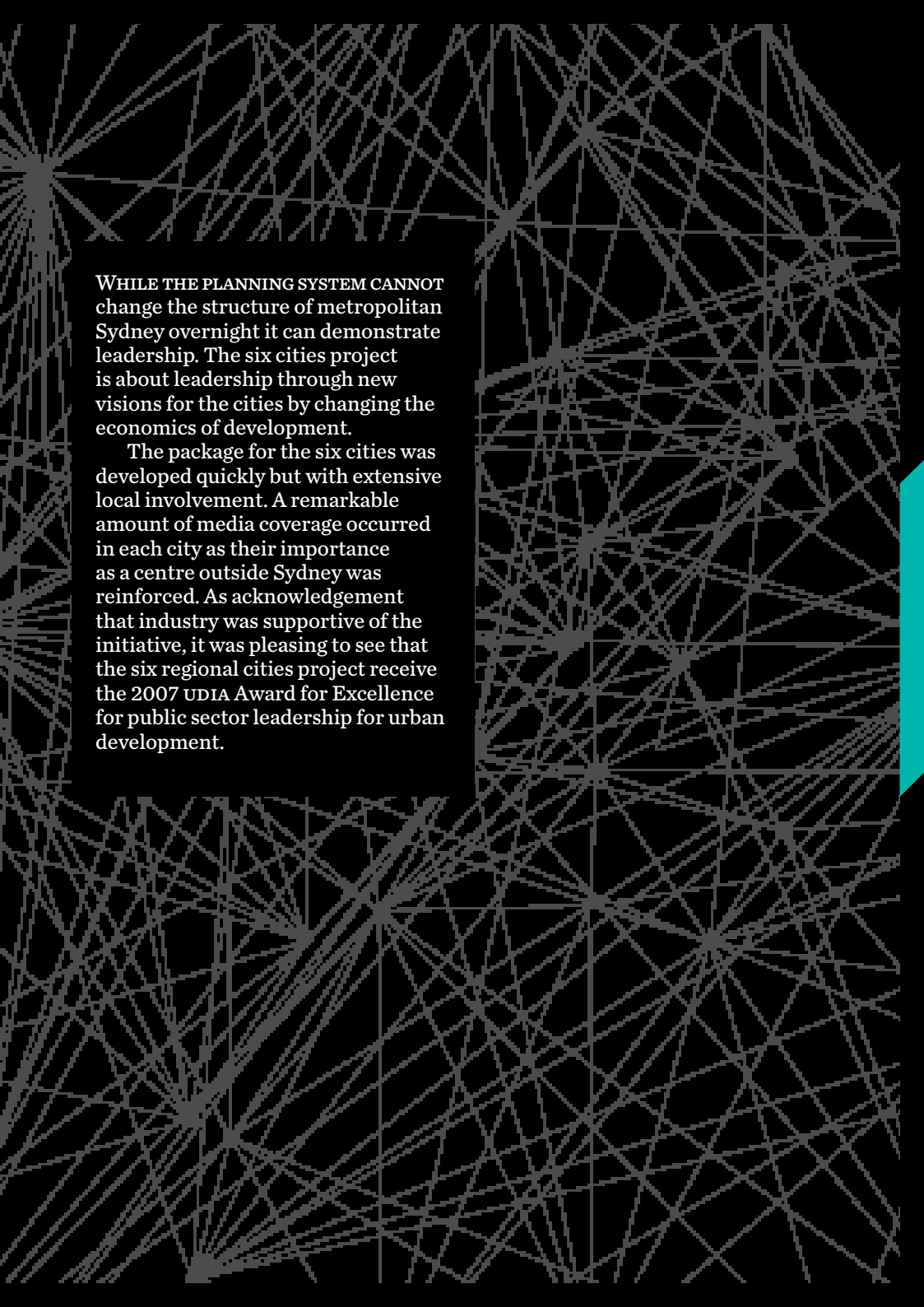
As the network of six Regional Cities around Sydney develop as centres of employment with accompanying cultural, retail and residential functions. The metropolitan region will develop as a polycentric metropolis with the richness of an omelette as opposed to the traditional mono–centred fried egg.




Cumberland Hospital
Mirvac Park
Westmead Private Hospital
Darcy Road
Westmead Hospital
Catherine McAuley Catholic High School
Marist High School
University of Western Sydney Redevelopment Site
St Patricks Catholic Primary School
Our Lady of Mercy College
Westmead
PARRAMATTA REGIONAL PARK
Parramatta Stadium
Old Kings Oval
Alexandra Avenue
Marist Junior School
Westmead Public School
Old Government House
Westmead South
Parramatta Golf Club
Park Parade
The Park
1 km radius
Parramatta Westfield Shopping Centre
PARRAMATTA TO LIVERPOOL TRANSITWAY
Parramatta to Blacktown
Parramatta to Liverpool
Parramatta High School
Great Western Highway
PARRAMATTA
Jones Park
Old Willow Reserve
Fleame Park
WESTERN MOTORWAY
Coleman St Shops
Parramatta West Public School
Hilltop Rd Shops
Holroyd Special School
Holroyd Sportsground
Holroyd Gardens
Pitt Street
Merrylands Park
Holy Trinity Catholic Primary School
2 km radius

FIGURE 8
PARRAMATTA REGIONAL CITY & WESTMEAD SPECIALISED CENTRE


THE SIX CITIES PROJECT IS
ABOUT LEADERSHIP THROUGH NEW
VISIONS FOR THE CITIES OF SYDNEY



While the planning system cannot change the structure of metropolitan Sydney overnight it can demonstrate leadership. The six cities project is about leadership through new visions for the cities by changing the economics of development.

The package for the six cities was developed quickly but with extensive local involvement. A remarkable amount of media coverage occurred in each city as their importance as a centre outside Sydney was reinforced. As acknowledgement that industry was supportive of the initiative, it was pleasing to see that the six regional cities project receive the 2007 UDIA Award for Excellence for public sector leadership for urban development.

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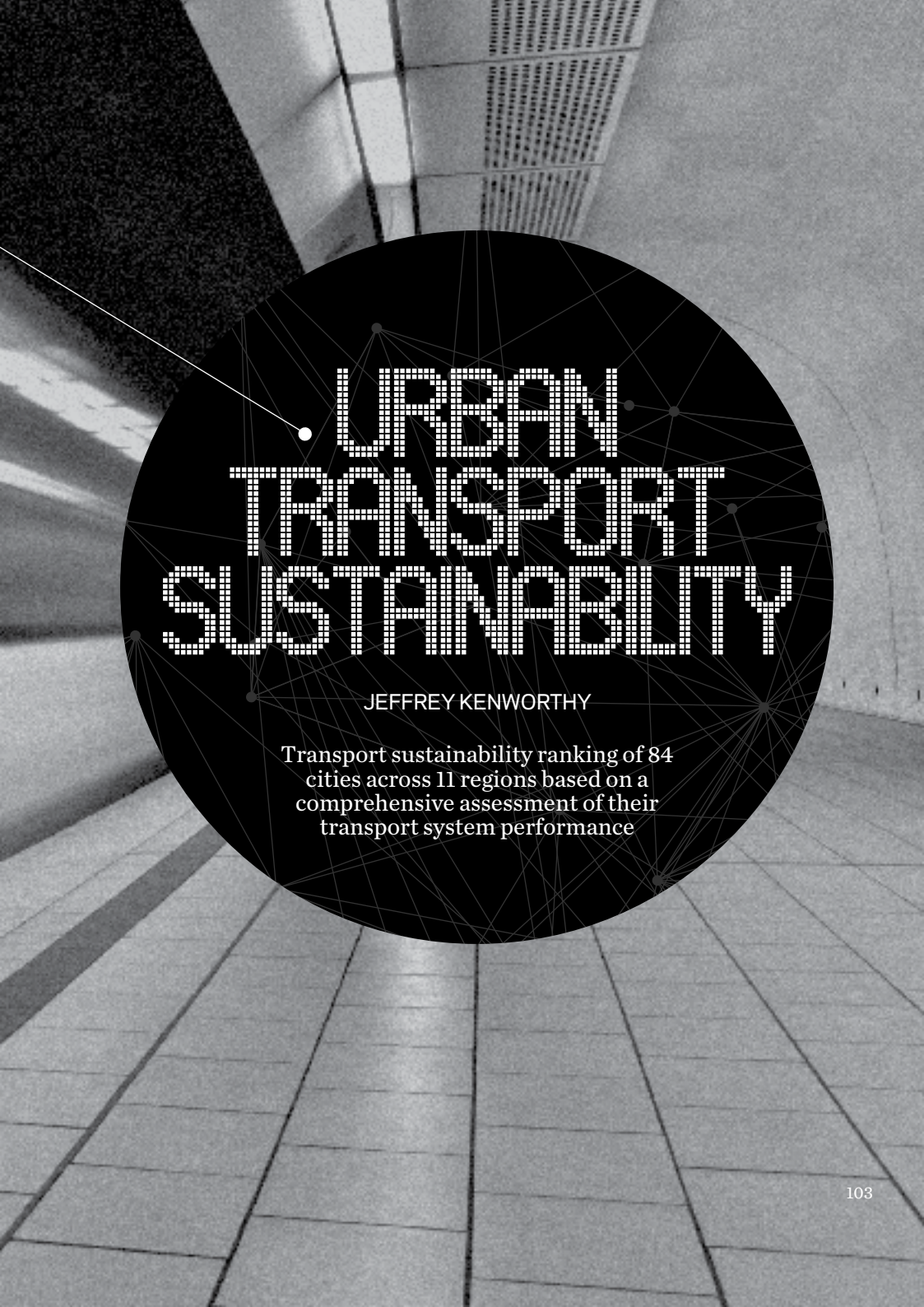


URBAN TRANSPORT SUSTAINABILITY

JEFFREY KENWORTHY

Transport sustainability ranking of 84 cities across 11 regions based on a comprehensive assessment of their transport system performance

TRANSPORT SYSTEMS HAVE LONG BEEN THE FOCAL POINT OF STRATEGIES TO PROMOTE SUSTAINABILITY IN THE WORLD'S MAJOR METROPOLISES

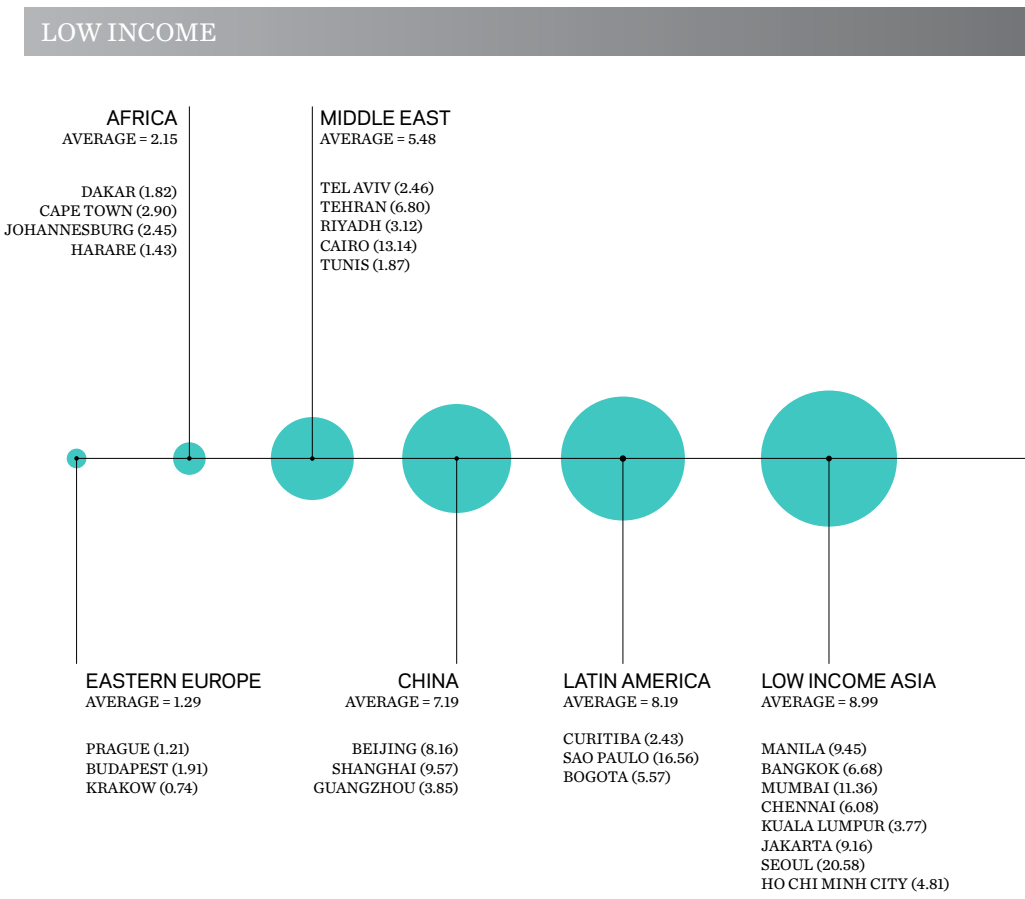
Transportation systems have long been the focal point of strategies to promote sustainability in the world's major metropolises. Indeed, transport activity is a key determinant in the sustainability of a city in economic, social, and environmental dimensions. Increasingly, cities' transport systems are under pressure to not only promote energy–efficiency and reduce carbon emissions for environmental friendliness, but also to ensure that aspects such as user–friendly costs and accessibility for public transport systems are established.

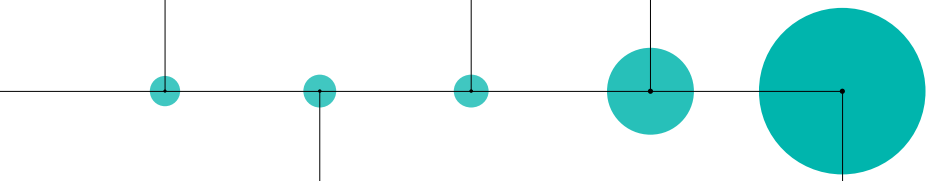
But how do cities' transportation systems actually rank based on these criteria? With a spectrum of factors in mind, this chapter assesses the transport systems of 84 cities from all over the world and ranks them on this basis. Data to conduct this study are drawn from the Millennium Cities Database for Sustainable Transport compiled by Kenworthy and Laube for the UITP in Brussels, which provides data for 100 cities. The corresponding data for 84 of these 100 cities have been used to rank cities in the US, Australia, New Zealand, Canada, Western Europe, Asia (both high income and low income areas), Eastern Europe, the Middle East, Latin America, Africa, and China.

FIGURE 1

CITIES BY POPULATION AND AVERAGE POPULATION OF GEOGRAPHICAL REGIONS, 1995 (MILLION)

The 84 cities are put into 5 clusters and the values for each variable are averaged so that some patterns can be drawn out of the data.





AUSTRALIA & NEW ZEALAND

AVERAGE = 2.0

BRISBANE (1.49)
MELBOURNE (3.14)
PERTH (1.24)
SYDNEY (3.74)
WELLINGTON (0.37)

CANADA

AVERAGE = 2.30

CALGARY (0.77)
MONTREAL (3.22)
OTTAWA (0.97)
TORONTO (4.63)
VANCOUVER (1.90)

UNITED STATES OF AMERICA

AVERAGE = 5.74

ATLANTA (2.90)
CHICAGO (7.52)
DENVER (1.98)
HOUSTON (3.92)
LOS ANGELES (9.08)
NEW YORK (19.23)
PHOENIX (2.53)
SAN DIEGO (2.63)
SAN FRANCISCO (3.84)
WASHINGTON (3.74)

WESTERN EUROPE

AVERAGE = 2.17

GRAZ (0.24)
MILAN (2.46)
VIENNA (1.59)
BRUSSELS (0.95)
COPENHAGEN (1.74)
HELSINKI (0.89)
LYON (1.15)
BARCELONA (2.78)
BOLOGNA (0.45)
ROME (2.65)
AMSTERDAM (0.83)
OSLO (0.92)
NANTES (0.53)
PARIS (11.00)
MARSEILLES (0.80)
BERLIN (3.47)
GENEVA (0.40)
FRANKFURT (0.65)
HAMBURG (1.71)
DUSSELDORF (0.57)
MUNICH (1.32)
RUHR (7.36)
GLASGOW (2.18)
STUTTGART (0.59)
ATHENS (3.46)
MADRID (5.18)
STOCKHOLM (1.73)
BERNE (0.30)
ZURICH (0.79)
LONDON (7.01)
MANCHESTER (2.58)
NEWCASTLE (1.13)

HIGH INCOME ASIA

AVERAGE = 11.03

OSAKA (16.83)
SAPPORO (1.76)
TOKYO (32.24)
HONG KONG (6.31)
SINGAPORE (2.99)
TAIPEI (5.96)

FIGURE 2 DIMENSIONS OF SUSTAINABLE URBAN TRANSPORT SYSTEMS

URBAN FORM

Urban density and the proportion of jobs in the CBD of cities, or the degree of centralisation, are important determinants of transport patterns. Low densities are shown to correlate very strongly with high levels of car dependence. Both higher densities and higher centralisation are supportive of a greater role for public transport. More centralised cities tend to have less central city parking, stronger rail systems and more use of public transport for radial trips.

WEALTH

The Gross Domestic Product (GDP) per capita of the metropolitan region is a good indicator of its relative wealth and is an important indicator in economic sustainability of the city. No city is aspiring to be poor. Wealth or GDP per capita does not explain levels of car use in the higher income cities, where many wealthy cities in Europe and Asia are comparatively low in car use and many less wealthy cities in North America and Australia are very high in car use.

COST OF TRANSPORT

The cost to the user of an average car trip and average public transport trip is important. These factors are expressed as a fraction of the city's GDP to normalise the data for wealth. If car travel is relatively cheap it will encourage greater use and vice versa, and likewise with public transport.

TRANSPORT INFRASTRUCTURE

The provision of transport infrastructure is also an important determinant of transport sustainability. More freeways are associated with higher car and energy use. Parking provision in the CBD has an important influence on trips to the central areas of cities, with more rail-oriented cities having very much reduced levels of CBD parking.

VEHICLE OWNERSHIP

Private vehicle ownership is naturally an important factor in the picture of transport infrastructure in cities. In many of the poorer cities, especially those in Asia, motorcycles are particularly important.

PUBLIC TRANSPORT INFRASTRUCTURE

It is also very important for public transport to be supplied with first class infrastructure. One important measure of the quality of public transport is the amount of reserved right-of-way, which allows public transport to be more speedy and reliable and to better compete with the car.

PUBLIC TRANSPORT SERVICE

Public transport quality is also partially determined by the level of service provided. The total seat kilometres per capita of public transport service is a good measure of service provision, which distinguishes whether cities operate mainly on buses or rail.

PUBLIC/PRIVATE TRANSPORT SPEED RATIO

One of the most important qualities of public transport is that it competes in speed terms. The ratio of public transport to private transport system speed effectively depicts this.

PUBLIC/PRIVATE TRANSPORT INVESTMENT RATIO

If cities are to build good public transport systems they need to invest heavily in them compared to what they invest in roads, especially new freeways. The ratio of annual investment in public transport infrastructure compared to road investment partly reflects the priorities in this area.

PUBLIC TRANSPORT RESERVED RIGHT-OF-WAY TO FREEWAY RATIO

This shows whether cities are oriented more to freeways or reserved public transport right-of-way (mainly rail systems).

MODAL SPLIT FOR NON-AUTO MODES

The percentages of total daily trips by non-motorised and public transport modes are one indication of the relative balance between private motorised transport and non-auto modes. Developing more sustainable transport systems in cities is critically dependent on improving the modal share of non-auto modes, especially walking and cycling.

PUBLIC TRANSPORT BOARDINGS

Another common measure of public transport success in cities is how often people actually use the service, reflected in the number of annual boardings per capita.

PRIVATE PASSENGER TRANSPORT USAGE

The key measure of actual distances travelled in private passenger transport in cities is the per capita passenger kilometres by cars, motor-cycles and taxis combined (the latter two modes being very important in many lower income cities, but almost negligible in most high income cities).

PROPORTION OF TRAVEL ON PUBLIC TRANSPORT

It is important to know what proportion of motorised travel (passenger kilometres, as opposed to just trips) is undertaken by the more sustainable modes of public transport.

GDP SPENT ON PASSENGER TRANSPORT

All of the transport patterns discussed so far combine with pricing factors in each city and culminate in a total economic cost of passenger transport in each city. This is summarised into a single variable normalised for wealth—the proportion of metropolitan GDP spent on passenger transport. This variable includes all the private and public transport operating and investment costs for all purposes and from all sources.

ENERGY USE AND CO_2 FROM PASSENGER TRANSPORT

The transport patterns in cities also result in a series of environmental and social impacts. Two important factors are the per capita use of energy for transport (public and private) and the corresponding levels of CO_2 production. Reducing energy use and CO_2 production in transport is a critical sustainability goal, especially in high income cities, and a pressing issue in rapidly motorising cities.

TRANSPORT SMOG EMISSIONS

A more localised and important environmental issue for cities is the amount of smog producing emissions that are emitted from transport sources. The combined per capita levels of CO, HC, NO_x and SO_2 as well as the same emissions on a spatial basis (kg per urban ha) measure the relative differences between cities.

TRANSPORT DEATHS

A key social (and economic) impact of transport systems is the number of transport deaths per 100,000 people and per billion passenger kilometres. Urban travel in low-income environments is a more risky activity than in higher income cities where traffic and driver education is more regulated and better enforced and there is better separation between motorised and non-motorised travel.

PURSUING A SUSTAINABLE URBAN TRANSPORT SYSTEM

Sustainable transport comes as a 'package deal' and policies for sustainable transport must address a wide range of dimensions. Higher urban densities and greater centralisation are consistently associated with more sustainable transport. Fewer freeways, more reserved rights–of–way for public transport (particularly, a higher ratio of public transport reserved right–of–way compared to freeways), more public transport service and less parking in the CBD, tend likewise.

Greater private vehicle ownership tends in the opposite direction. More expensive private transport assists sustainability in transport by discouraging purchase and use of cars, as do greater investment in public transport relative to road investment and higher public transport speeds relative to the speed of traffic. Cities with these characteristics consistently have higher proportions of total daily trips by public transport and non–motorised modes, more annual public transport boardings per capita, less private vehicle travel and a higher proportion of total motorised travel by public transport, less energy use in transport, less CO_2 production and less per capita generation of smog emissions. Though the pattern is not steady, cities with the most sustainable transport have fewer transport deaths per 100,000 people (7 compared to 11 to 13 in the other clusters).

Total car, motorcycle and taxi passenger kilometres per person, which is in some ways a litmus test of transport sustainability. It illustrates the considerable gap between the least sustainable transport cities with almost 15,500 passenger kilometres per capita per annum, compared to 3,500 in the most sustainable transport cluster (Figure 3).

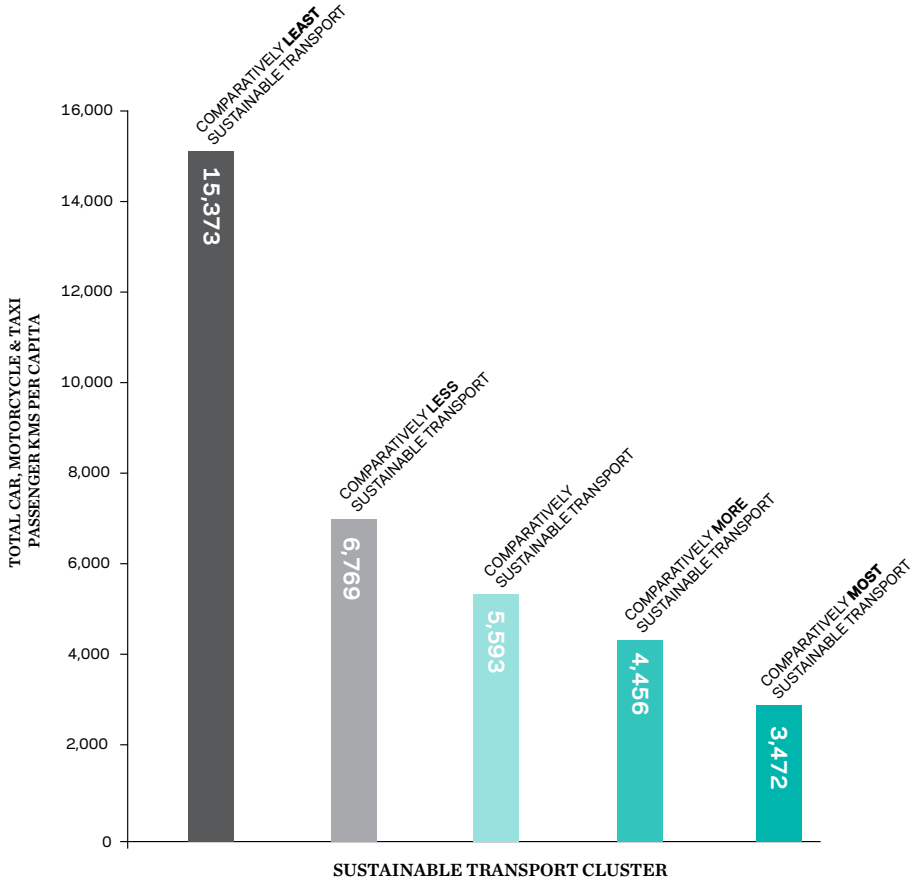
There are other important considerations in judging the transport sustainability of cities. In particular, the quality, beauty and vibrancy of public spaces, and the community that this encourages, are very important factors. This is where many European cities excel with their pedestrianisation and traffic calming schemes. It is on the other hand where many other cities that have scored highly in transport sustainability in this ranking fall short. Thus some measure of the quality of the public realm in each city, which tends to be destroyed through excessive levels and poor management of private motorised transport, would have rewarded some cities and penalised others, thereby altering the rankings and final clusters. Notwithstanding the high sustainability ranking achieved by Osaka and Tokyo, and the undoubted success of their rail systems, they are very uncomfortable in the peak periods and involve stress for their users. A public transport user comfort factor would reduce the sustainability of these cities in relation to cities with less crowded public transport systems, though it is not going to totally nullify the other important dimensions of these cities.

With the highest transport sustainability ranking of any city at 78%, it is clear that no one city has achieved 'absolute' transport sustainability. Sustainability attempts to integrate a complex array of social, economic, environmental and cultural dimensions, and in the case of transport in cities, a whole range of urban form and transport characteristics that cut across all these dimensions, and yet do not sit comfortably under any of them. This is by nature a complex affair and sustainability is an ongoing process of change, not an end state.

However, it is equally clear that there are lessons to be learned from the high ranking champions of sustainable transport. These cities serve as examples of the potential that transport development possesses, provided that the appropriate land use and transport policy interventions are put in place. Policies promoting public transport, walking and cycling over car use can be successful regardless of the historical context or cultural norms of the city.

FIGURE 3

TOTAL PRIVATE PASSENGER MOBILITY (PASSENGER KM) PER CAPITA BY SUSTAINABLE TRANSPORT CLUSTER



MOST SUSTAINABLE

10

RANK	CITY	SCORE %
1	HONG KONG	77.8
2	TOKYO	76.7
3	CHENNAI	74.4
4	DAKAR	74.1
5	OSAKA	73.8
6	LONDON	71.3
7	BEIJING	71.0
8	MUMBAI	70.1
9	KRAKOW	69.5
10	BERLIN	67.7

RANK	CITY	SCORE %
11	PRAGUE	67.6
12	MUNICH	67.5
13	VIENNA	66.1
14	CAIRO	65.8
15	SHANGHAI	65.2
16	BERNE	64.8
17	ZURICH	63.7
18	BARCELONA	63.6
19	SAPPORO	63.4
20	SINGAPORE	62.6

50 60

RANK	CITY	SCORE %
46	ROME	52.4
47	JOHANNESBURG	52.3
48	COPENHAGEN	52.2
49	NEWCASTLE	52.0
50	GLASGOW	50.8
51	MANCHESTER	50.1
52	CURITIBA	49.8
53	BANGKOK	49.8
54	GENEVA	49.8
55	RUHR	49.1
56	ATHENS	48.8
57	MARSEILLE	47.5
58	LYON	46.3
59	HO CHI MINH CITY	45.5
60	TEL AVIV	44.3

RANK	CITY	SCORE %
61	SYDNEY	43.0
62	KUALA LUMPUR	38.3
63	NEW YORK	37.3
64	NANTES	35.9
65	TORONTO	35.8
66	WELLINGTON	34.2
67	MONTREAL	33.9
68	BOLOGNA	33.7
69	BRISBANE	32.5
70	VANCOUVER	32.4

FIGURE 4 TRANSPORT SUSTAINABILITY RANKING OF 84 CITIES

The process of ranking various systems is based on a judgement about the relative importance of different variables. The percentages are measured out of a total possible best score.

20

RANK	CITY	SCORE %
21	BRUSSELS	62.5
22	SEOUL	62.5
23	STUTTGART	62.3
24	BUDAPEST	62.0
25	TUNIS	61.9
26	DUSSELDORF	61.8
27	BOGOTA	61.4
28	MANILA	61.1
29	SAO PAULO	60.9
30	AMSTERDAM	60.3

30

RANK	CITY	SCORE %
31	JAKARTA	59.9
32	HELSINKI	59.5
33	MADRID	58.8
34	PARIS	57.9
35	HAMBURG	57.7
36	FRANKFURT	56.8
37	CAPE TOWN	56.6
38	STOCKHOLM	56.6
39	OSLO	56.4
40	HARARE	55.9
41	GUANGZHOU	55.6
42	MILAN	55.3
43	TAIPEI	55.0
44	TEHRAN	53.8
45	GRAZ	52.9

LEAST SUSTAINABLE

70

RANK	CITY	SCORE %
71	MELBOURNE	32.3
72	PERTH	31.0
73	OTTAWA	28.7
74	WASHINGTON	28.4
75	CHICAGO	28.2
76	CALGARY	27.8
77	SAN FRANCISCO	26.5
78	LOS ANGELES	19.9
79	RIYADH	18.3
80	SAN DIEGO	16.8

80

RANK	CITY	SCORE %
81	ATLANTA	14.7
82	DENVER	13 .4
83	PHOENIX	11.6
84	HOUSTON	11.4

US CITIES DOMINATE THE POOREST TRANSPORT SUSTAINABILITY SCORES, ALONG WITH CANADIAN AND AUSTRALIAN CITIES

LEAST	LESS		MORE	MOST
LEAST SUSTAINABLE TRANSPORT	**LESS SUSTAINABLE TRANSPORT**	**SUSTAINABLE TRANSPORT**	**MORE SUSTAINABLE TRANSPORT**	**MOST SUSTAINABLE TRANSPORT**
15.1%	**34.0%**	**51.3%**	**57.3%**	**64.6%**
HOUSTON	BOLOGNA	MANCHESTER	PARIS	ZURICH
PHOENIX	MONTREAL	GLASGOW	MADRID	BERNE
DENVER	WELLINGTON	NEWCASTLE	HELSINKI	SHANGHAI
ATLANTA	TORONTO	COPENHAGEN	JAKARTA	CAIRO
SAN DIEGO	NANTES	JOHANNESBURG	AMSTERDAM	VIENNA
RIYADH	NEW YORK	ROME	SAO PAULO	MUNICH
LOS ANGELES	KUALA LUMPUR	GRAZ	MANILA	PRAGUE
SAN FRANCISCO	SYDNEY	TEHRAN	BOGOTA	BERLIN
CALGARY	TEL AVIV	TAIPEI	DUSSELDORF	CRACOW
CHICAGO	HO CHI MINH CITY	MILAN	TUNIS	MUMBAI
WASHINGTON	LYON	GUANGZHOU	BUDAPEST	BEIJING
OTTAWA	MARSEILLE	HARARE	STUTTGART	LONDON
PERTH	ATHENS	OSLO	SEOUL	OSAKA
MELBOURNE	RUHR	STOCKHOLM	BRUSSELS	DAKAR
VANCOUVER	GENEVA	CAPE TOWN	SINGAPORE	CHENNAI
BRISBANE	BANGKOK	FRANKFURT	SAPPORO	TOKYO
	CURITIBA	HAMBURG	BARCELONA	HONG KONG

FIGURE 5
FIVE CLUSTERS OF THE 84 CITIES WITH AVERAGED SCORES


TRANSPORT
SUSTAINABILITY
PATTERNS

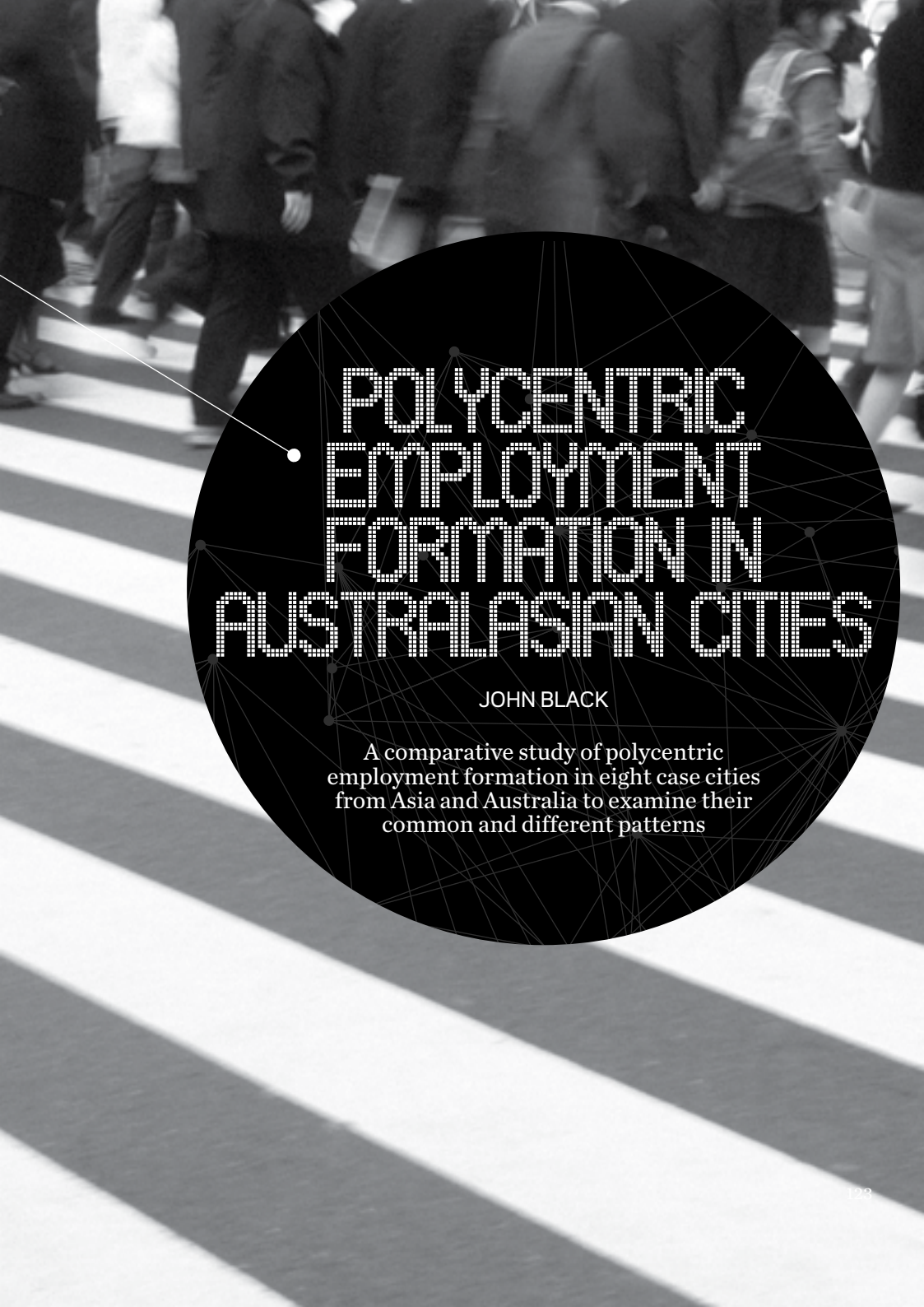
US CITIES DOMINATE THE POOREST transport sustainability scores, along with Canadian and Australian cities. Riyadh also ranks poorly, which is logical as it has, in modern times, developed on the US city model.

Between the least sustainable and most sustainable systems there are still a number of cities that have relatively poor sustainability, including Montreal, Toronto and New York in North America, as well as Wellington in New Zealand and Sydney, Australia. These cities are clearly the best cities within their respective countries in terms of the sustainability of urban transport, but globally they are relatively low ranking.

Many of the cities from Western Europe also fall in this group and it includes three French cities (Nantes, Lyon and Marseille), Bologna, which is the worst Western European city in this analysis, as well as Athens, The Ruhr and Geneva, the most auto-oriented Swiss city. The remainder of the cities are in the Asian region consisting of Kuala Lumpur, Bangkok and Ho Chi Minh City. HCM City is a motorcycle-dominated urban environment with almost no public transport system.

High-income Asian cities and a collection of Western and European cities have the most sustainable transport systems. The final or 'top' cluster for transport sustainability commences with the exceptional public transport cities of Zurich and Berne, and also includes Vienna, Munich, Berlin and London. Beijing and Shanghai also feature in this group, along with Prague and Cracow. Much less wealthy cities also appear in this group because of their very low dependence on cars (Cairo, Mumbai, Chennai and Dakar). Finally, Osaka, Tokyo and Hong Kong are considered to have some of the most sustainable transport systems in this sample of world cities.

5



POLYCENTRIC EMPLOYMENT FORMATION IN AUSTRALASIAN CITIES

JOHN BLACK

A comparative study of polycentric employment formation in eight case cities from Asia and Australia to examine their common and different patterns

THE SINGLE FOCUS METROPOLIS DISAPPEARED AND WAS REPLACED BY AN AMORPHOUS SPRAWL OF POPULATION WITHOUT A UNIFYING HUB

Lewis Mumford (1895–1990) made substantial contributions to the history of cities and urban planning practice. Writing in 1937, he anticipated the emergence of a new form of the metropolis called the 'polynucleated city', predicting that even without planning and 'intelligent public control' the decentralisation of urban functions would accelerate. By the late 20th century, researchers had described the processes leading to the polycentric form in some large North American cities. The employment share of the CBD is only 7.4% on average in a number of large American cities. Once, a single CBD was the undisputed focus of the metropolitan area, but, according to *The Metropolitan Revolution: The Rise of Post–Urban America*, by 2000 'Americans inhabited a radically different world from that of 1945'. The single focus metropolis disappeared and was replaced by an amorphous sprawl of population without a unifying hub, where the suburban landscape is dominated by the boom in business districts sprouting from previously undeveloped green–field sites around thriving shopping malls.

This chapter analyses polycentric employment formation in Asian and Australian cities—a neglected topic until a recent international collaborative research effort funded by the East Asian Society for Transportation Studies (EASTS) that includes Australia as a member country. All case study cities have a history of metropolitan plans that aim to achieve a polycentric employment pattern. This chapter introduces the case study cities and their socio–economic characteristics. Different patterns of employment location—including polycentric employment patterns—are explored from a theoretical perspective. Employment and travel data for these cities are analysed to provide insights into distributions of employment density and changes in these patterns over time where data are available. Data availability and an international network of researchers willing to undertake original analyses of primary data from Census collections or from urban transport studies largely determined the selection presented in this chapter. All metropolitan regions studied have experienced, or are experiencing, problems of rapid urbanisation.

CASE STUDY AUSTRALASIAN CITIES

Figure 1 indicates that a broad geographical definition of Asia is taken, stretching from Istanbul in the west—straddling Europe and Asia—to the Japanese island of Hokkaido and the city of Sapporo in the east. Case studies from Asia and Australia include a diversity of population size, urban planning regimes (from planned new towns to dominant market–driven development), whether the dominant urban spatial structure was centralised or polycentric, and the broad stage of economic development. Some Asian cities have grown from imperial control and territorial administration (Istanbul and the Ottoman Empire; Tokyo–Edo and the Tokugawa shoganate; Canberra as Australia's national capital); others from colonial administration (Delhi); and some out of colonial ports (Dalian under the Japanese; and Sydney, under British colonisation).

Figure 2 shows the population and employment base for selected Asian and Australian cities at the beginning of the 21st Century, ranging in size from the smallest at 320,000 to the largest at 35 million. The table also estimates the share of the gross domestic product attributed to the metropolitan centre—44% for Bangkok in Thailand and 32% for Tokyo in Japan.

Figure 1
Case Study Cities Analysed in EASTS Project

FIGURE 2

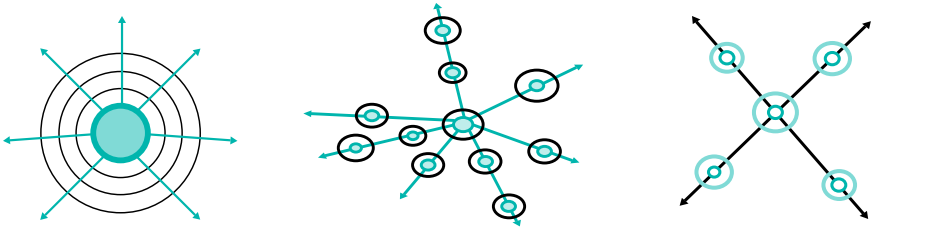
BASIC SOCIO–ECONOMIC CHARACTERISTICS AND NATIONAL IMPORTANCE OF THE CASE CITIES, EARLY 21ST CENTURY

City–Region	Population National share%	Area km² National share	GDP National share	Employment
BANGKOK Metro Area	2005	2005	2005	2005
	10,670,000	7,732	$91,385M	5,980,000
	16.8%	1.5%	44.2%	
CANBERRA, Australian Capital Territory	2001	2007	2001	2001
	321, 000	805	$6,700M	180,400
	1.60%	0.01%	1.1%	
DALIAN Greater Area	2003	2003	2003	2003
	2,710,000	2,415	$21,623M	872,000
	0.2%	0.025%	1.4%	
DELHI National Capital Territory	2001	2001	2004	2003
	13,850,000	1,483	$1,400M	2,148,000
	1.3%	0.05%	0.20%	
ISTANBUL Metro Area	2006	2007	2005	2005
	12,000,000	1,600	$53,000M	3,000,000
	17%	1%	22%	
SAPPORO, Central Hokkaido	2004	2004	2005	2005
	1,757,000	1,121	$51,800M	933,000
	11.8%	0.3%	1.15%	
SYDNEY Metro Area	2001	2007	2001	2001
	4,300,000	12,100	$172,000M	1,628,500
	21.1%	0.16%	28%	
TOKYO Metro Area *Dai–Toshiken*	2000	2007	2004	2001
	35,000,000	26,500	$1,300,000M	16,000,000
	29.2%	7%	31.5%	

POLYCENTRIC EMPLOYMENT FORMATION AND DENSITY

All very large metropolises sooner or later have to face the problem of spatial reorganisation from a predominant monocentric employment structure to a multicentric employment structure as central land prices and internal transport costs rise. These cities can go upwards (higher density) or spread outwards over increasingly larger areas (at lower overall density). Often, there is a combination of development intensification in certain locations and sprawl elsewhere. The theoretical metropolitan employment structures are sketched in Figure 3.

A monocentric region has its employment clustered in the centre with much lower density employment serving the residential suburbs in the outer areas. Free standing towns with their own employment and linked by public transport is another possible layout. Finally, there is the pattern where the centre retains a significant share of employment but the rest is dispersed into discrete subcentres.



1. Large centralised mono–centre
2. Compact settlements linked by public transport
3. Dispersal in to polycentric pattern

Figure 3
Alternative city layouts for employment

As the case study cities vary greatly in their size and densities of urban development, cross–city comparisons require simple measures. In most analytical studies of this kind, employment density by small areas (zones) is grouped into four clusters for each metropolitan region. Thus, each case study region has four levels of employment density that define four clusters, but the magnitude of employment density varies across cities. To make the numbers more manageable we first take the natural logarithm of the employment per hectare (gross density). The larger the natural logarithmic number for each zone, the higher the employment density. Secondly, each zone is ranked by its employment density—from the largest to the smallest. First, we define employment clusters based on their gross employment density in each case study. The rank size distributions are plotted as a two–dimensional graph, where break of slope (rounded to the nearest integer number for employment density) identifies the point of transition from one cluster to another (Figure 4).

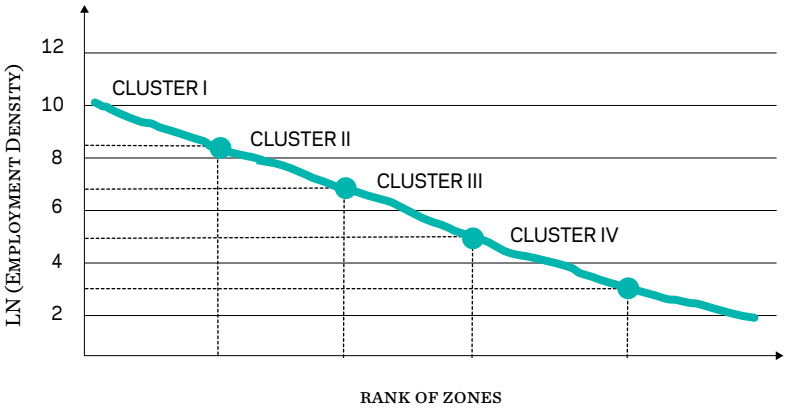


Figure 4
Rank size distribution of zonal employment density per ha (natural logarithmic scale)

Figure 5 gives the range of employment densities for each cluster as defined in the eight case study cities. The largest number in this table is calculated from the greatest employment density in one zone in each city (Cluster I). Values for Cluster IV are not shown because the smallest number in Cluster III defines the maximum employment density in cluster IV with all other zones in Cluster IV having a lower density. In Cluster I, the peak employment densities are found in Bangkok (13: approximately 442,400 jobs/ha), Delhi (12.5: approx. 268,300 jobs/ha) and Sydney (12: 162,800 jobs/ha). The smallest peak employment densities are found in Sapporo (6.5: 665 jobs/ha) and Istanbul (7: 1100 jobs/ha). When comparing the numbers in the three clusters of Figure 5 it is interesting to note that Bangkok, Delhi and Sydney have similar densities of employment in the peak zone.

Metropolitan Area	Cluster I	Cluster II	Cluster III
Bangkok	13-10	10-8	8-6
Canberra	9.5-7	7-5	5-4
Dalian	11.5-9	9-8	8-7
Delhi	12.5-10	10-8	8-6
Istanbul	7-5	5-4	4-3
Sapporo	6.5-5.5	5.5-4	4-3
Sydney	12-10	10-8	8-6
Tokyo	11-8	8-6	6-4

Figure 5
Range of employment density (natural logarithm) in clusters, case study cities, various years

Dynamics is concerned with change over time. Examining the clusters with the available data set for two (or more) time points is needed to understand the change in job location patterns and the embryonic emergence of some new sub–centres. The rank size distribution changes can tell us more about the pattern of growth by comparing the rank size distribution over two time periods (FIGURE 6). Various patterns are possible, although we would expect to see a decentralisation of employment over time in Australasian cities if spatial planning achieves desirable patterns of urban development.

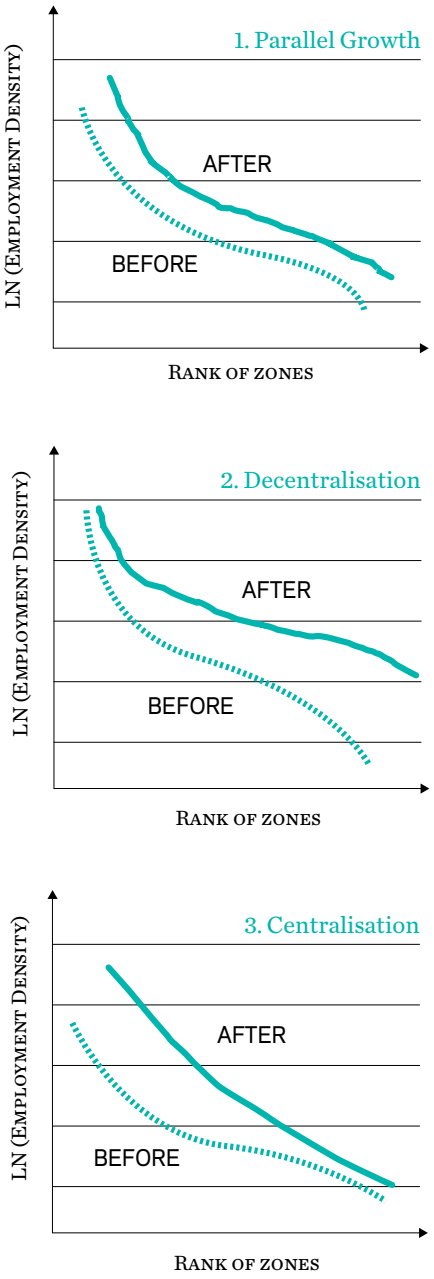


FIGURE 6
DYNAMICS OF RANK–SIZE DISTRIBUTIONS FOR CENTRALISATION AND DECENTRALISATION OF EMPLOYMENT

BANGKOK METROPOLITAN AREA

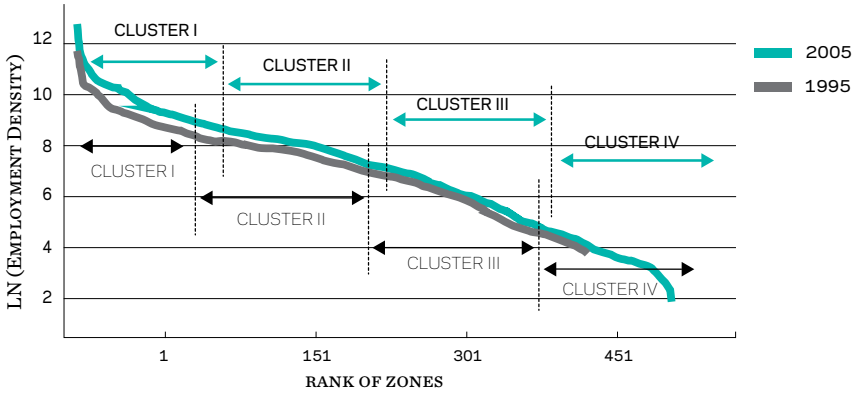
Study Area

The total population in 1995 and 2005 was 9,692,872 and 10,661,047 respectively. The total employment in 1995 and 2005 was 5,374,334 and 5,962,497 respectively. There are satellite towns on the western and the west–southern areas. The data used in this study including the population, household, employment, land use, and transportation data in 1995 (505 traffic analysis zones) and 2005 (625 traffic analysis zones) is the official dataset used in the transport planning/analysis of the Office of Transportation Policy. From 1987 to 2000, the population of the inner area decreased, but it increased in the outer area. The inner area population density decreased from 15.27 to 11.09 thousand/km^2 (3.25 to 2.36 million people). The outer area density increased from 0.77 to 1.28 thousand/km^2 (0.67 to 1.12 million people).

Rank Size Distribution and Clustering of Employment

Logarithmic employment density is plotted against the rank size classifying the employment zones into four clusters. The cut off points chosen between Clusters I, II, III, and IV are the logarithmic employment density value of 10.3, 8.0, and 6.0, respectively

FIGURE 7 BANGKOK 1995—2005
RANK SIZE DISTRIBUTION AND CLUSTERS OF EMPLOYMENT



(Figure 7). The numerical analyses of the clustered employment pattern in the two years are summarised in Figure 8.

From 1995 to 2005, the total employment in the Bangkok Metropolitan Area increased by 10.9%. The increments are distributed mainly in the first three clusters. However, in terms of clustering, Cluster I has gained a greater share of employment compared to the other three clusters with the number of zones belonging to Cluster I increasing by 23 zones—most of which have shifted from Cluster II and partly from Cluster III. This implies that jobs are relatively more concentrated at some employment nodes in a rather concentric pattern.

In 1995, there was clearly one large employment cluster at the centre of the study area; by 2005, these high density zones in Cluster I have expand to other places along the urban railway (BTS and MRT lines) to the north and the east. These areas are considered as new employment centres that have a big potential to form as urban sub–centres. Here, jobs agglomerate and attract workers living across the whole of the city, particularly those commuting by mass transit. Zones in Cluster II have moderate employment density in the mix–use area of residential and commercial activities. The newly developed Cluster II zones in the northern area (in Nonthaburi Province) are a result of the development of the second stage expressway that has attracted many residents and business firms to locate nearby.

Similarly, an area to the east of the centre has shifted from Cluster III in 1995 to Cluster II in 2005 as a result of the new airport construction—now operational—at a far–east location of the study area. These areas have potential to form sub–urban subcentres, where employment and residence should be more self–contained. Zones in Cluster II have low employment density in residential settings that are surrounding the large city core. Zones in Cluster IV form the remainder of the sub–urban areas and/or the preserved green areas, which are less developed and accessible. Bangkok Metropolitan Area is still centralised but is developing in the future toward a polycentric structure where concentration of employment follows major transportation facilities.

Figure 8 Bangkok 1995—2005 Employment clustering changes

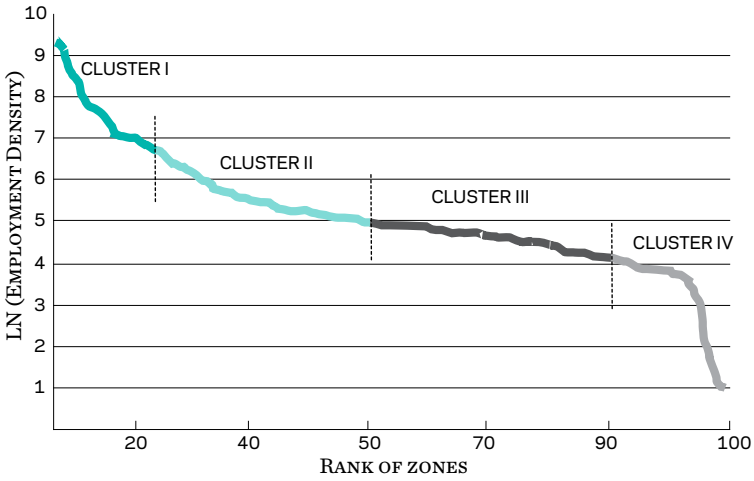
	1995		2005		
	TOTAL EMPLOYMENT	SHARE OF TOTAL	TOTAL EMPLOYMENT	SHARE OF TOTAL	10 YEAR CHANGE
CLUSTER I	1,544,352	28.7%	1,839,889	30.9%	+19.1%
CLUSTER II	1,569,821	29.2%	1,682,028	28.2%	+7.2%
CLUSTER III	1,577,617	29.4%	1,747,121	29.3%	+10.7%
CLUSTER IV	682,543	12.7%	693,459	11.6%	+1.6%

CANBERRA, AUSTRALIAN CAPITAL TERRITORY

Study Area

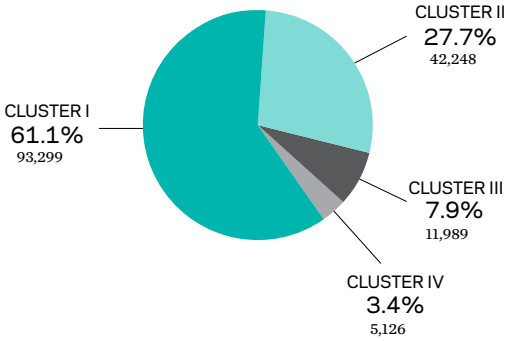
Currently, approximately 376,000 people live in Canberra, Australian Capital Territory (ACT), which makes it the largest inland region in Australia. The 2001 Journey–to–Work (JTW) data are derived by the ACT Planning and Land Authority from its 2001 Census of Population and Housing undertaken by the Australian Bureau of Statistics (ABS). There were about 180 000 jobs at the 2001 Census. The JTW data set provides information on the trip to work on the Census day undertaken by all employed people aged 15 years and over who were enumerated in the JTW Study Area on Census night.

FIGURE 9 CANBERRA 2001
RANK SIZE DISTRIBUTION AND CLUSTERS OF EMPLOYMENT



Rank Size Distribution and Clustering of Employment
Canberra is unique amongst our case study cities in that it is a planned new town with an adherence to a hierarchy of retail and commercial centres. Rank size distribution of zonal employment to identify four clusters of employment is given in Figure 9 and the employment stock of each cluster and share over the total are summarised in Figure 10. Cluster I consists of a significant share of employment (approx. 60% of total employment) in the main employment centres including Civic, Russell, Belconnen, Fyshwick, etc. Cluster II consists of other local centres (e.g. Acton, Weston, Campbell, etc). Cluster III and Cluster IV mainly consists of rural areas. A balanced distribution of employment has been achieved in Canberra (in the first two clusters in Figure 10) through adherence to a spatial plan formulated in 1967, the deliberate constraint of redevelopment in Civic, and the location of government and private sector employment into the new towns.

Figure 10
Canberra 2001 employment clusters



With its leasehold land tenure system unique in Australia and a coordinated planning and development agency, Canberra has successfully achieved a polycentric employment distribution. A better idea of this decentralised linear pattern of town centres strung along a public transport spine can be seen in Figure 11. In 1967, the Government adopted the 'Y–Plan' for an open–ended population of one million. The consultants undertook a staging analysis of half a million people. Figure 11 shows for each major employment centre the number of jobs estimated in the Y–Plan and the number of jobs recorded in the 2001 Census. First, the decentralised pattern of employment into structured centres has occurred. Secondly, the degree of decentralisation has been faster than envisaged by the planners of the 1960s. About 59% of all metropolitan employment in the Y–Plan was centralised (North and South Canberra), where the 2001 Census revealed this share to be lower at 50%. The Y–Plan allocated to the four major towns of Belconnen, Woden, Tuggeranong and Gungahlin a share of about 25% of metropolitan jobs. At the Census there were 41% in those towns. The major difference is that the Y–Plan had allocated 13.5% of jobs to other centres (reflecting the larger population base of half a million) compared with 4% at the 2001 Census. Queanbeyan is a free standing town located in New South Wales, where forecast and actual employment are the same in absolute terms.

Figure 11
Comparison of employment spatial distribution Y–plan and2001 census, Canberra

CENTRE	CENSUS 2001	% SHARE	Y-PLAN	% SHARE
NORTH CANBERRA	54.2	30.1	70.0	37.7
SOUTH CANBERRA	36.1	20.0	39.2	21.1
BELCONNEN	25.4	14.1	22.5	12.1
WODEN	25.5	14.2	8.5	4.6
TUGGERANONG	17.0	9.4	10.9	5.9
GUNGAHLIN	5.9	3.3	5.0	2.7
QUEANBEYAN	9.2	5.1	9.4	5.0
OTHER	7.1	3.9	25.1	13.5
	180,150		185,500	

DALIAN GREATER AREA

Study Area

Dalian is a medium–sized, rapidly growing city of China. The first and only person trip survey was conducted in 2005, with 253 traffic analysis zones, 169 of which belong to the Central District and the remaining 84 to the three suburban districts (Lushun District, Jingang District, Jinzhou District). The candidates of strong sub–centres are given in Figure 7. By 2005, the central business district accommodated 81% of the total population (2,059,000) and 94% of the total job opportunities (39,000).

Rank Size Distribution

Dalian still has a monocentric structure accommodating half of the office stock in its central district—most of which are the Cluster I type of zones (Figure 12 and Figure 14). Dalian is also a somewhat unique case because of the geographical constraint of mountains that limit land availability and force a multicentric structure. This finding emphasises that for almost all cities topography is immutable and can be a major factor in urban form and directions for expansion.

Figure 12
Dalian employment clusters, 2001

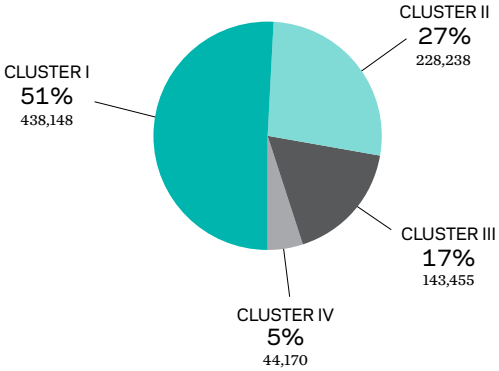


FIGURE 13
DALIAN GREATER AREA AND LOCATION OF URBANISED DISTRICTS AND POPULATION DISTRIBUTION

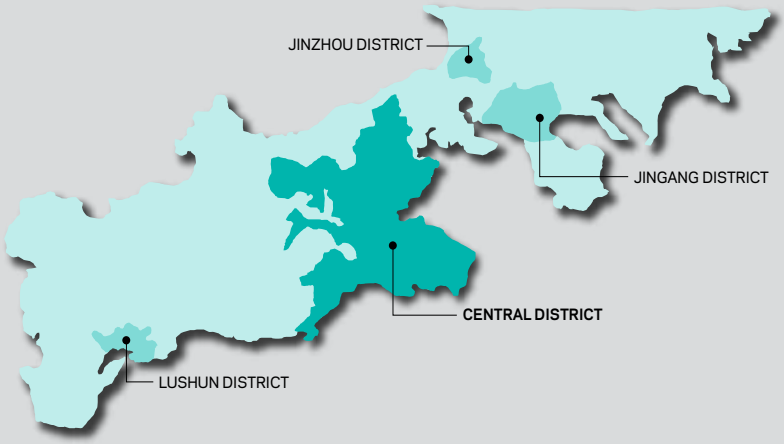
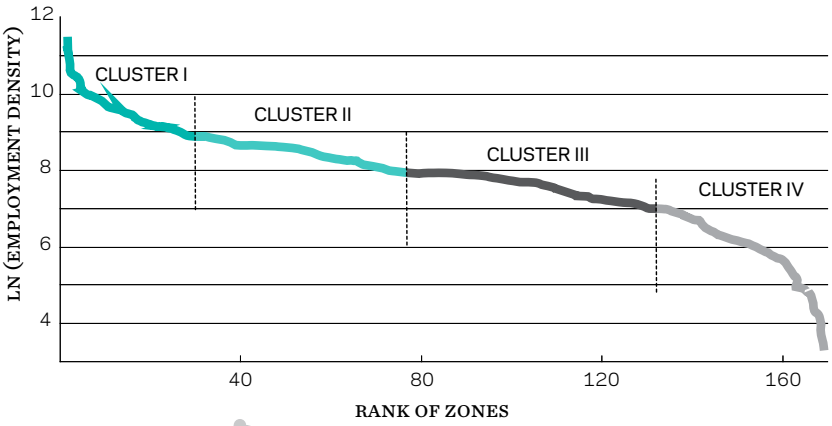


FIGURE 14
RANK ZONES OF DALIAN EMPLOYMENT CLUSTERS, 2001



DELHI NATIONAL CAPITAL TERRITORY

Study Area

The population of Delhi National Capital Territory (NCT) stands at almost 15 million with a population density of 10,360 persons/km^2. It ranked 10th amongst the most populous cities of the world in 2005. Between 1991 and 2001 the population grew by 4.1%, making it the fastest growing city in India. Employment opportunities have steadily increased in Delhi over the years. According to the Census of India, Delhi's workforce participation went up from 49% in 1991 to 53% in 2001.

The Delhi Metropolitan Area consists of the NCT region along with the important designated Satellite cities of Gurgaon, Faridabad, Noida, and Ghaziabad. Between 1991 and 2001 the change in the percentage of population in the core city areas has decreased and the city has spread outwards, contributing to the phenomenon of urban sprawl. The north–west district constitutes 20.7% of Delhi's population which is the highest share, whereas New Delhi district with 1.3% has the least population. In terms of area, the north west district occupies the largest share of 29.7% compared with the central district which occupies a mere 1.7% of the total area of NCT Delhi. At the 2001 census, the population density of NCT Delhi stood at 9,294 persons/km^2. The north east district has the highest density whereas the south west district has the lowest population density.

Rank Size Distribution and Clustering of Employment

As FIGURE 16 shows, and FIGURE 15 enumerates, the zones based on rank size distribution and clustering into four clusters. The number of zones in Cluster II is the largest (49%) as compared to Cluster I (26%). It may be inferred that the share of CBD in total employment in Delhi is decreasing. This may also be attributed to the policies which plan to decongest the city centre by relocation of employment centres, and policies which restrict the establishment of new employment centres in the core city. Employment stock cluster distribution drawn in FIGURE 16 also demonstrates the circular decentralisation pattern of jobs to the surrounding zones of the old CBD and to some of the obvious outer sub–centres.

FIGURE 15 DELHI 2001
EMPLOYMENT CLUSTERING

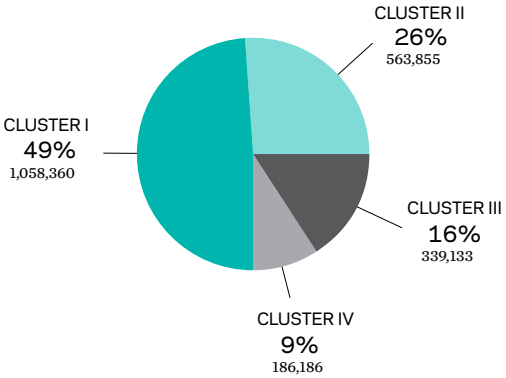
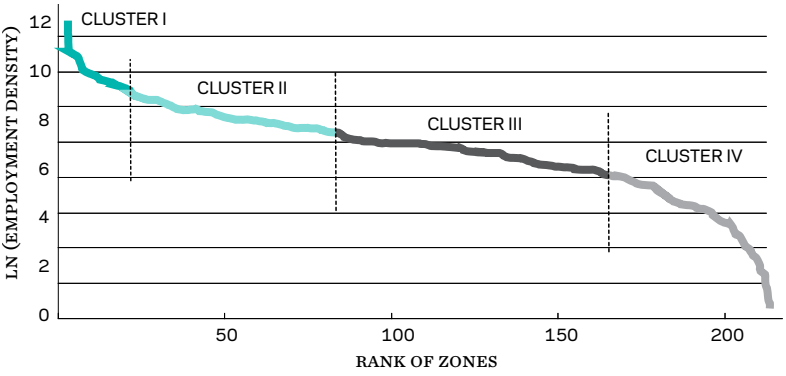


FIGURE 16 DELHI 2001
RANK SIZE DISTRIBUTION AND CLUSTERS OF EMPLOYMENT



ISTANBUL GREATER METROPOLITAN AREA

Study Area

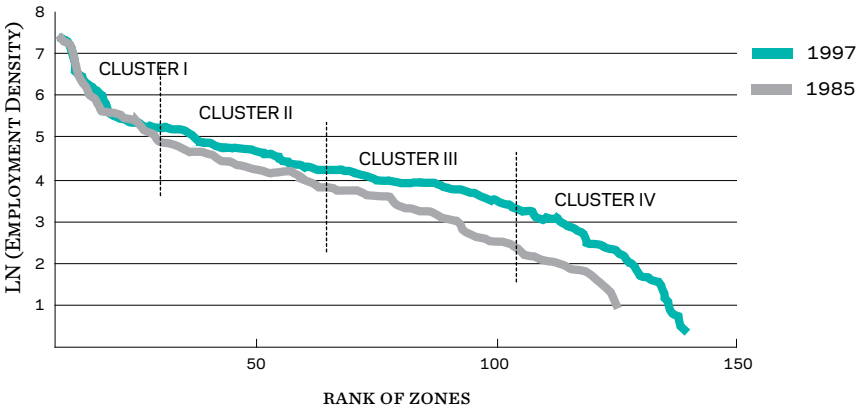
The total population of Istanbul was 806,863 in 1927, and this increased by 12.4 times and reached a population of 10,018,735 by 2000. The city continues to grow at an annual rate of 4%. The north part of the city is a rural area, with some open green space, and is sometimes called 'the lungs of the city'. However, with the construction of the second bridge and the Trans European Motorway, Istanbul has also undesirably developed towards the north, destroying some of its important natural features. Most of the population and employment agglomerations are on the European side. Only 35% of the total population and 27% of the total employment is on the Asian side.

There have been two transportation master plan studies—one in 1985 and the other in 1997 each with 209 zones. These form the data base for this analysis. During these years, population increased from 5,379,026 to 9,060,005 by 68%, and employment increased by 48% from 1,885,646 to 2,794,224. The changes of population and employment between 1985 and 1997, in absolute terms, show a decentralisation of population from the east to the west side. Some of this is along the coastal side and some of it is in the inner parts of the city. However, towards the north, there is slight dispersion of population. The changes in population are more widespread across the region than those of employment.

FIGURE 17 ISTANBUL 1985—1997
EMPLOYMENT CLUSTERING CHANGES

	1985		1997		
	TOTAL EMPLOYMENT	% SHARE	TOTAL EMPLOYMENT	% SHARE	10 YEAR CHANGE
CLUSTER I	626,213	33.2	773,347	27.7	+ 23.5%
CLUSTER II	496,514	26.3	954,975	34.2	+ 92.3%
CLUSTER III	449,955	23.8	766,793	27.4	+ 70.4%
CLUSTER IV	308,966	16.4	209,108	10.7	- 3.2 %

FIGURE 18 ISTANBUL 1985—1997
RANK SIZE DISTRIBUTION AND CLUSTERS OF EMPLOYMENT



Rank Size Distribution and Clustering of Employment

The rank size distributions for 1985 and 1997 are given in Figure 18. The change over the 12 years in Istanbul revealed a pattern that the real urban dynamics of change are occurring outside the Cluster I zones—all of which are in the old historical city centre. Istanbul has kept developing to preserve this traditional CBD centre without losing its primacy. One of the three main strategies of the Istanbul Metropolitan Area Subregion Master Plan is 'abandoning the concept of concentric development as the single biggest danger that can destroy the historical identity of Istanbul'.

The largest growth in employment is occurring in Cluster II and III zones, which has led to an urban form of local centralisation. The changes as percentages are in the last column of the Table 8. Because of a very slight growth in CBD and downtown employment, their percentage shares over the metropolitan area dropped from 12.9% to 8.9% and from 34.5% to 23.5%, respectively. Cluster I covers all of the CBD zones and most of the downtown zones and has only shown 1% increase in absolute terms in 12 years but has lost its regional share. On the other hand, the computed figures for Cluster II and III also demonstrate that the highest growth occurred in most of these zones, revealing a more multicentric urban form. Cluster II has the largest increase in jobs from 496,514 to 954,975—about 78% of the job growth from 1985 to 1997—and gained a considerable amount of the overall share (from 26.3% in 1985 to 34.2% in 1997). The employment share of Cluster IV has also fallen, from 16% to 11% as evidence of decentralised concentration into centres. There are also newly emerging centres along the southern costal side towards the east and west defined as 'Wing Attraction Nodes' by the Istanbul Subregion Plans.

The city of Istanbul constitutes a good example of market–driven forces that lead to a preference for clustered multicentric firm location. Although the Subregion Master Plan was not well–conceived with the policy measures and implementation programs to support the envisaged sub–centre formation to restrict the saturated spatial pattern, the city has shown a growth along the plan in many aspects. Particularly, the largest growth in employment has been observed for Cluster II and III zones proving an urban form of locally centralised rather than saturated development.


HOTEL BASRA
Budget
AK 24
SUNDAY

SAPPORO, CENTRAL HOKKAIDO

Study Area

Sapporo is a typical monocentric, medium sized city that has developed its first and its only sub–centre at Atsubetsu. It started to exceed a population of 1.1 million and total jobs of 0.55 million in the second half of the 1970's. The Sapporo Municipal Government controls development in the city. The main sources of data for this analysis are the 1972, 1983 and 1994 urban personal trip survey. The study area was divided into 53 zones. The total number of jobs in the study area increased from 335,218 in 1972 to 498,434 in 1983 and then to 606,116 in 1994—an extra 163,216 and 270,898 jobs, respectively, over each successive 11–year period (Figure 20). There was a relative decentralisation of workplaces, with the CBD (Zone 1) share falling from 28.5% of all metropolitan jobs in 1972 to 22.3% in 1983 and then to 19.5% in 1994. Nevertheless, the central area still remains the most important employment centre in Sapporo. The zone with the second greatest share of employment is 4.8% is Atsubetsu—almost one quarter the employment size of that for the central zone.

Rank Size Distribution and Clustering of Employment

Figure 19 contrasts how the zonal employment rank–size distribution has changed from 1972 to 1994. There are over 270,000 additional jobs in 1994 so we would expect to see the curve from 1972 shift upwards. The total number of jobs increased from 335,218 in 1972 to 606,116 jobs in 1994. The pattern confirms employment decentralisation, where much of the increment of jobs from 1972 to 1994 has occurred in Cluster III and IV.

Figure 20 summarises the job location dynamics in the metropolitan region of Sapporo over a 22 year period. The employment share of Cluster I has fallen from 35.9% in 1972 to 25.6% in 1994. The employment share of Cluster IV has also fallen, from 20.6% in 1972 to 16.0% in 1994. Cluster II has remained relatively stable between 1972 and 1994. Cluster III has gained about one–third of the 600, 000 jobs—about 40% of the job growth from 1972 to 1994 —and increased its metropolitan share from 17.7% in 1972 to 34.2% in 1994. Many zones in the northeast area changed from Cluster IV in 1972 to Cluster III in 1994

FIGURE 19 SAPPORO 1972—1983—1994
RANK SIZE DISTRIBUTION AND CLUSTERS OF EMPLOYMENT

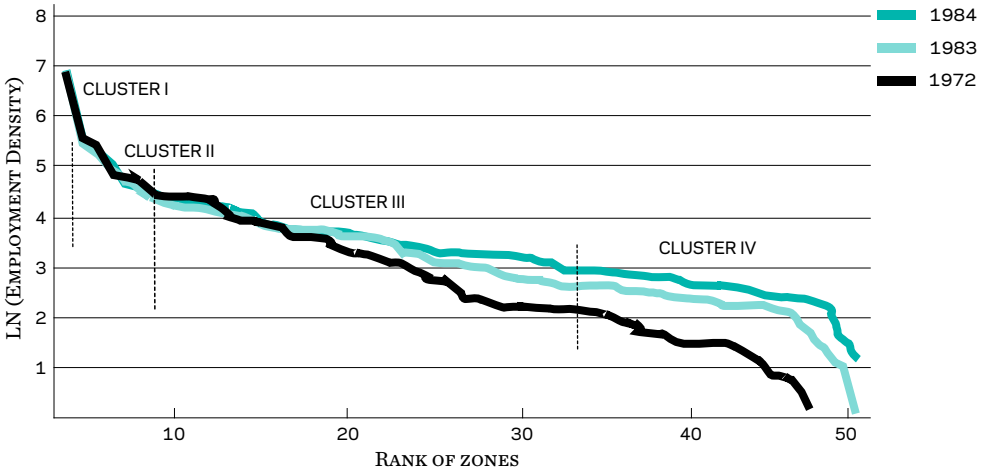


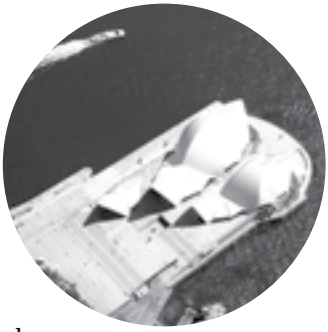
FIGURE 20 SAPPORO 1972—1983—1994
EMPLOYMENT CLUSTERING CHANGES

	1972		1983		1994	
	TOTAL EMPLOYMENT	% SHARE	TOTAL EMPLOYMENT	% SHARE	TOTAL EMPLOYMENT	% SHARE
CLUSTER I	187,152	35.9	213,335	29.0	238,945	25.6
CLUSTER II	134,129	25.7	144,354	19.6	226,203	24.2
CLUSTER III	92,431	17.7	208,916	28.4	319,156	34.2
CLUSTER IV	107,222	20.6	169,876	23.1	148,898	16.0

	1972-1983 CHANGE	1972-1994 CHANGE	1983-1994 CHANGE
CLUSTER I	+ 14.0%	+ 27.7%	+ 12.0%
CLUSTER II	+ 7.6%	+ 68.6%	+ 56.7%
CLUSTER III	+ 59.9%	+ 20.6%	+ 75.1%
CLUSTER IV	+ 58.4%	+ 38.9%	- 12.3%

SYDNEY METROPOLITAN AREA

Study Area



The population of metropolitan Sydney increased from 1,702,000 (in 1947) to 3,825,000 in 2005—more than doubling in 40 years. Sydney is characterised as a low density suburban city much like those in North America, with perhaps Toronto being the closest in population growth histories. Employment has remained more centralised than homes and Sydney is characterised by relatively low employment densities outside of the major centres. At the 1971 Census of Population and Housing the Sydney CBD contained 20% of metropolitan jobs, but this had dropped to 15% by 2006. Apart from some noticeable peaks, employment density is quite uniform across the region.

Rank Size Distribution and Clustering of Employment

Employment change across the Sydney region over time has analysed by conducting a rank size plot of the logarithm of the number of jobs in each zone of the metropolitan area, or employment density in each zone. As shown in FIGURE 21, rank size distributions are plotted from Census data for 1981, 1991 and 2001, where the spatial unit of analysis is the traffic zone, and an estimate is made for its shape in 2031 according to distributions of jobs projected in the latest spatial plan—the Metropolitan Strategy (2005).

In the 20 years from 1981 to 2001 there has been an increase in the employment density in all zones in Sydney. Higher density zones have shown the least change over this period, whilst the biggest change has occurred in lower density zones between 1981 and 1991. Relatively little difference has occurred between 1991 and 2001. The rank size distribution estimated from government plans for 2031 show a continuance of the current trend with little evidence of an overall increase in decentralisation. Employment decentralisation did take place but access to employment remained a political issue in the outer suburbs at the 1971 Census. Our analysis is from 1981 to 2001. FIGURE 22 shows the shares of regional employment in the four clusters: the shares are very similar—intensifying a little in Cluster I and reducing slightly in Cluster II.

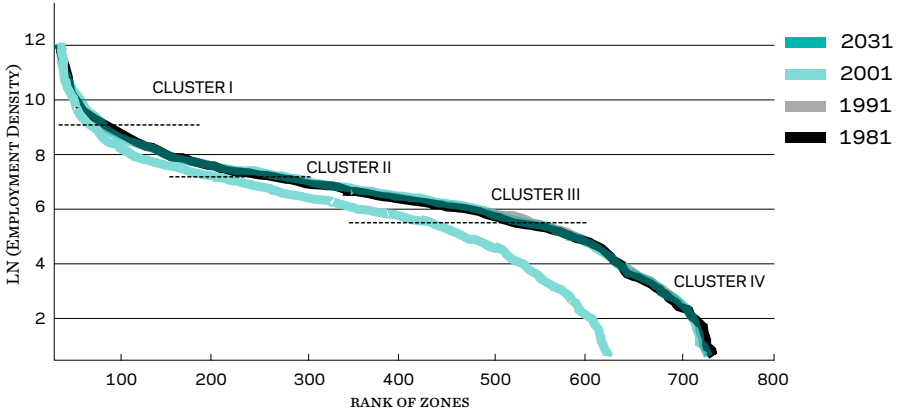
It is instructive to examine where these changes in jobs density have taken place from one Census period to the next. In this 20–year period, the increment of jobs has taken place in central areas, as well as in the designated planned centres but, also, elsewhere in a highly fragmented pattern. From this evidence, we cannot conclude that spatial employment restructuring has resulted in a clear polycentric pattern in metropolitan Sydney but note the stability of distributions over time.

Figure 21
Employment clustering changes, Sydney, 1981—1991—2001

	1963		1981		2001	
	TOTAL EMPLOYMENT	% SHARE	TOTAL EMPLOYMENT	% SHARE	TOTAL EMPLOYMENT	% SHARE
CLUSTER I	262734	28.1	363612	28.6	425469	30.2
CLUSTER II	359066	38.4	457222	26.0	500756	35.6
CLUSTER III	247720	26.5	445889	27.2	369896	26.3
CLUSTER IV	66429	7.1	103949	8.2	110449	7.9

	1981-1991 CHANGE	1991-2001 CHANGE	1981-2001 CHANGE
CLUSTER I	+38.4%	+17.0%	+61.9%
CLUSTER II	+27.3%	+9.5%	+39.5%
CLUSTER III	+39.6%	+6.9%	+49.3%
CLUSTER IV	+56.5%	+6.3%	+66.3%

Figure 22
Rank size distribution and clusters of employment
Sydney, 1981—1991—2001 and projections for 2031



TOKYO METROPOLITAN AREA

Study Area

Today, the Tokyo capital region is a global economic centre and accommodates 40 million people and 19 million jobs. It retains a highly centralised employment core. The Fourth and Fifth metropolitan plans firmly designated 'Business core cities', and defined these as the high density core settlements within the Tokyo central area; and 'Bases for large cooperation'—defined as the large centres outside the Tokyo central area. Plans articulate their primary aim as polycentric spatial restructuring within a circular development of stronger urban nodes outside the Tokyo central area. This is to ensure self–reliant regions, to strengthen the regional network and co–operation, and to mitigate the stress on the central core area. Despite the land use developments and the regeneration plans that have been addressing multicentric structure over the whole metropolitan area in order to mitigate the stress on the city centre and to ensure a balanced growth, the central area is still strongly dominating. As one consequence of economic boom during the 1970s and 1980s, a considerable amount of jobs located in the second tier zones—a pattern of concentrated decentralisation but rather more uniformly.

Person trips surveys over the 337 traffic analysis zones have long been conducted and this allowed us to track the changes almost over the last three decades at three time points (1963, 1981 and 2001).


ヨドバシカメラ
時計総合館
売場ご案内
PC・AV
デジカメ・家電
携帯電話
マルチメディア館
プリント
携帯館
ゲーム・ホビー館
現在位置
時計総合
5F クロック・ギフト
4F 腕時計・ブラン
3F スポーツ時計
2F 国産ビジネス時
1F カジュアル時計
B1F メガネ・レンズ・
B2F 時計メンテナンス
ヨドバシカメラ 時計総合館
ヨドバシカ

Rank Size Distribution and Clustering of Employment

The rank size distribution for gross employment density on the Y–axis and ranks on the X–axis revealed that there was no change in the shape of the Cluster I zones in the core of Tokyo. Specifically, there was no upward or downward shift of the rank size curve. The cut offs for Cluster I and Cluster IV—low density employment zones—are more apparent for 1981 than for 2001 (FIGURE 23). FIGURE 24 represents the characteristics of four clusters in terms of employment, and the share of regional employment, over the total and the changes between 1963, 1981 and 2001.

FIGURE 23 and 24 emphasise the primary role of Cluster I type of zones in accommodating approximately half of the total employment stock—with very little change over the last three decades (from 56% in 1963 to 53% in 2001). This is a different pattern compared with large North American cities, where notable changes have been occurring outwards and the old CBDS have been loosing their shares in the region.

In 1986, the government defined a number of suburban centre candidates for growth around the core. Most of them were Cluster I and II type of zones relatively near to the central areas (Yokohama and Kawasaki). They were already developed centres and therefore for these zones there was not a notable movement of a cluster rank up. Similarly, sub–centres further from the city centre did not develop as expected (such as Kisarazu and Oume) except for Tama. Tama New Town is a good example of a rapidly growing centre with many offices and commercial facilities, and so increased its cluster rank between 1981 and 2001.

There was enormous spatial restructuring in Tokyo from 1963 to 1981, but then in the following two decades, a consistent pattern of spatial growth of employment occurred with the second cluster intensifying. Land–use plans firmly designate urban nodes for high density centre developments both within and outside the Tokyo central area. Although there have been some successful stories of decentralisation, in general, Tokyo preserved its highly concentrated structure. The extensive rail network had been improved before, and, together with the rapid growth during the economic boom, has led to concentrations near by the major stations contributing to a high public transport share but, on the other hand, not encouraging a more decentralised structure.

FIGURE 23 TOKYO 1963—1981—2001
RANK SIZE DISTRIBUTION AND CLUSTERS OF EMPLOYMENT

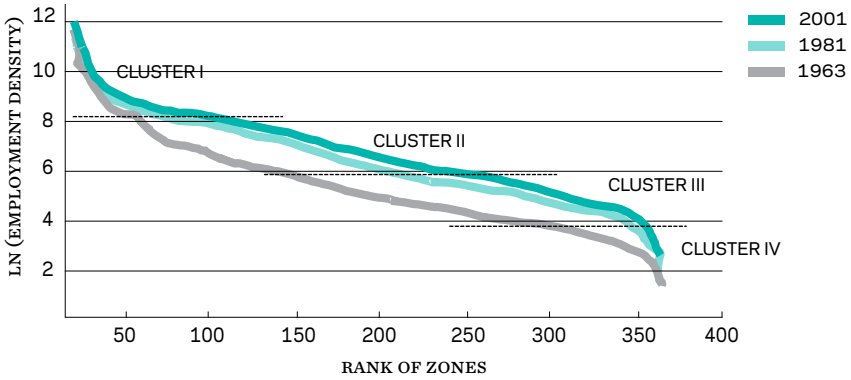


FIGURE 24 TOKYO 1963—1981—2001
EMPLOYMENT CLUSTERING CHANGES

	1963		1981		2001	
	TOTAL EMPLOYMENT	% SHARE	TOTAL EMPLOYMENT	% SHARE	TOTAL EMPLOYMENT	% SHARE
CLUSTER I	4,530,000	58.8	7,680,000	52.4	10,150,000	53.2
CLUSTER II	2,100,000	26.3	5,370,000	32.6	7,210,000	37.8
CLUSTER III	1140,000	14.3	1,530,000	10.4	1,666,000	8.7
CLUSTER IV	210,000	2.6	77,000	0.6	51,000	0.3

	18 YEAR CHANGE	20 YEAR CHANGE
CLUSTER I	+ 69.5%	+ 32.2%
CLUSTER II	+ 155.7%	+ 34.2%
CLUSTER III	+ 34.2%	+ 8.5%
CLUSTER IV	- 63.3%	- 33.8%

ALTHOUGH THERE HAVE BEEN SOME SUCCESSFUL STORIES OF DECENTRALISATION, TOKYO HAS PRESERVED ITS HIGHLY CONCENTRATED STRUCTURE

All case study cities have formulated spatial plans to guide the location of major employment. Polycentric employment formation has been one of the goals of metropolitan planning in Asian and Australian metropolitan regions.

However, formulation of spatial planning documents is a necessary but not a sufficient basis for guiding employment development. An appropriate and accepted implementation mechanism is needed. Although the cities in this study also have problems with limited space for expansion, some of them have been overwhelmed by the sheer pace of urbanisation and inability of governments to manage and pay for the implications (e.g. Delhi). An enforceable metropolitan spatial plan, and strong land–use and transport policies and instruments are needed to support this restructuring process for the distribution of employment, as shown in the case of Canberra.

There are five cities where data for different periods of time allow an interpretation of the dynamics of employment change. Three of these have very high densities of employment (logarithm of employment density) in the top cluster: Bangkok (13), Sydney (12) and Tokyo (11). Istanbul (7) and Sapporo (6.5) have considerably lower peak employment densities.

Patterns of change differ. In all the case study cities, Cluster I zones are dominating. Out of the five cities (Sydney, Tokyo, Istanbul, Sapporo, Bangkok) with temporal data sets, Istanbul and Sapporo Cluster I zones have lost their first place. Tokyo Cluster I zones are still predominantly accommodating half of the total employment stock. In contrast, noticeable lower shares of Cluster IV type of the zones indicate the existence of the agglomeration economy that the firms tend to form agglomerations to benefit from such scale economies.

TOWARDS POLYCENTRIC EMPLOYMENT FORMATION

Non mono–centric specific characteristics of selected metropolitan area

Bangkok
Metropolitan Area, Thailand
Circular growth pattern within 12 km diameter is first–ranked employment agglomerations and 18 km diameter second–ranked where a notable increase of density along newly developed urban railways (BTS and MRT lines).

Canberra
Australian Capital Territory
'Garden City' planning concept for New Towns with 'strong edge', free standing towns with all self–contained functions that are separated by green, open space with major employment centres connected with a public transport spine.

Dalian
Greater Area, China
Smaller scale city but developing its sub–centres because of geographical dissection by mountainous areas.

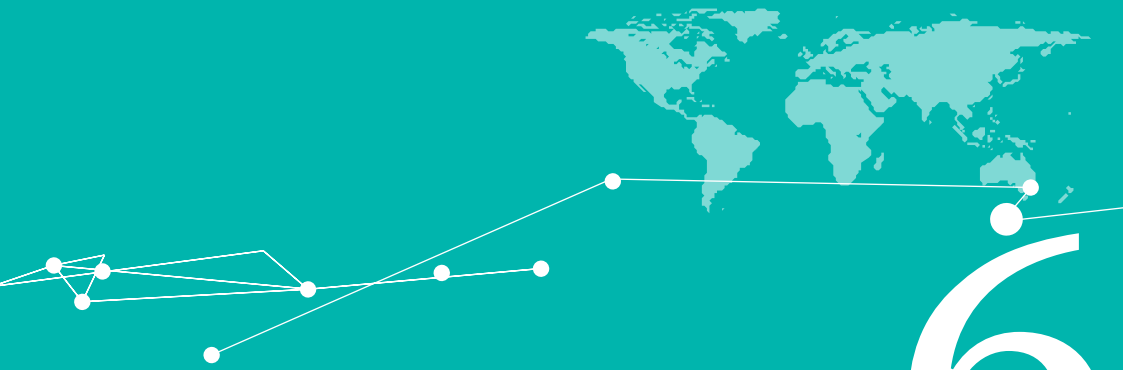
Delhi
National Capital Territory, India
Satellite towns have been promoted over the last decade and have emerged as new agglomerations providing better job opportunities but have been adding to longer trips by attracting workers from the inner city.

Istanbul
Metropolitan Area, Turkey
To preserve the historical identity of old CBD, restrictive policies for any new developments in the CBD have been effective whilst market–driven forces have a strong role for sub–centre formation and growth.

Sapporo
Central Hokkaido, Japan
A contrary example of a monocentric and compact city recently developing its urban spot approximately 7 km from city centre as a candidate for near future sub–centre.

Sydney
Metropolitan Area. Australia
De–centralisation of metropolitan employment continuously recognised as spatial policy since first metropolitan plan of 1948 with 16 major 'district centres', now revised to 5 regional cities in a sprawling, low density metropolis.

Tokyo Metropolitan Area
Dai–Toshiken , Japan
Economically developed large city with lower commuting costs due to extensive and well–connected suburban commuter railroads and subways which have developed in the early stage of economic and population growth.



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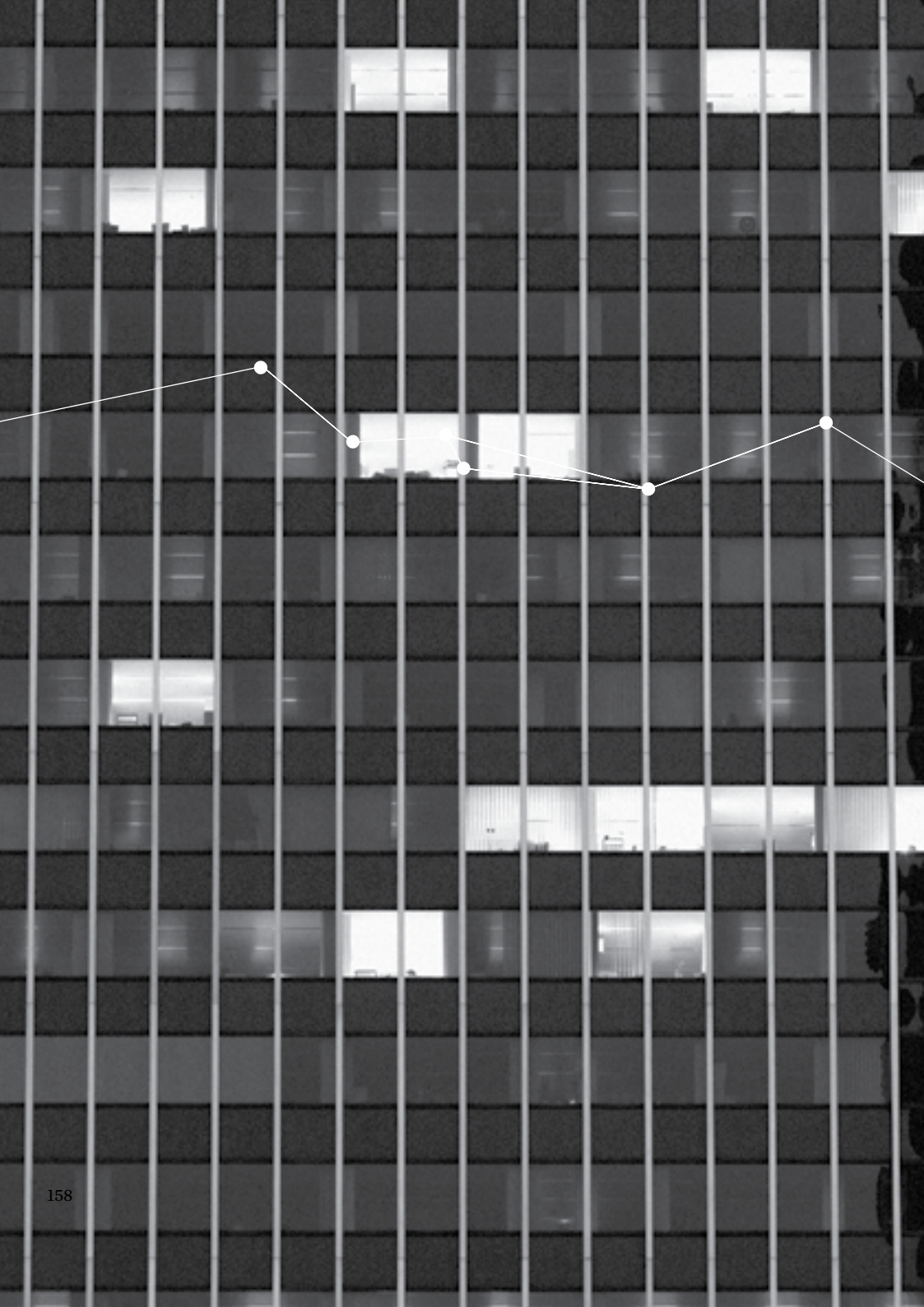


14 HOUR CITY

JAMES CALDER

A 14 hour working city concept which re–engineers the working days from the ‘nine to five’ model into an early and late shift with an overlap in the middle for urban sustainability

OUR PLANNERS AND GOVERNMENTS ARE STARTING TO REALISE THAT ADDING MORE INFRASTRUCTURE IS TOO EXPENSIVE AND USUALLY ONLY INCREASES DEMAND RATHER THAN IMPROVING EXISTING CONDITIONS

The information technology revolution that humankind has been creating since the invention and commercialisation of the telephone, radio, television, computers and internet is accelerating as new products are developed. Each new generation becomes more adept at living and working with information and communications technologies in new ways. Whilst these technologies can take only a few months to appear and be successful (such as the iPod and Facebook), our city infrastructures and systems are taking much longer to adapt to such fundamental changes. To use an Industrial Age analogy, James Watt's steam train has 'just left the station' in terms of our understanding of the impacts of the information technology revolution on our cities and society.

The climate change crisis that the planet is facing due to unsustainable use of the earth's resources is forcing us to look at new ways of doing more with less. There is no better place to start than our cities, where our archaic legacy systems from the Industrial Age and our own mindsets have created a system of breathless inefficiency and waste. Our planners and governments are starting to realise that adding more infrastructure is too expensive and usually only increases demand rather than improving existing conditions. There is now greater effort invested in maximising the efficient use of the existing systems, such as a renewed focus on high rise buildings in central business districts such as the City of London (although there is the potential risk that it will denigrate the urban fabric that make these places unique). However, this is still Industrial Age thinking where ruthless synchronicity, reinforced by Frederick Taylor and Henry Ford who first introduced systematic management and mass production, was vital. We are now in the technological age where knowledge is power and a different type of physical and virtual synchronicity is required by modern knowledge based organisations. It is possible to dramatically increase the utilisation of our cities by simply rethinking the 'nine to five' paradigm of work and creating the *14 hour working city*.

A NEW MODEL

The re-engineering of our working days, from our current 9–5 model into an early and late shift with an overlap in the middle of the day will have profound benefits for our society, including:

- An increase in the productivity of knowledge workers as they have more ability to control their day into concentrated individual work and collaborative team work
- The productivity of global organisations will also increase as the overlaps of time zones around the world will be far greater creating a more seamless 24 hour global business environment
- An increase of around 30–40% in the utilisation of public transport, roads, and office buildings
- An end to the crushing futility of the morning and evening peak hour rush
- A more flexible approach to working hours that will help people to balance their work and life where matching personality type with job demands can increase productivity. Trotsky comments in *The Wall Street Journal* (1987), 'stated preferences are usually a clear indication of body clocks and, therefore, of efficiency'.

Furthermore, this can be achieved without the negative effects felt by some night time shift workers. Research on circadian rhythms suggests that certain personalities will naturally prefer either the morning or afternoon shift. It seems that these rhythms are genetic rather than learnt and that:

- 0.2% of the population are estimated to be 'larks': Bed at 9.30 pm, up at 4.30 am
- 4.5% of the population are 'owls': Bed at 3.30am, up at 11.30 am
- The rest cluster around the mean (12.30 am–8.30 am) according to a normal distribution

IMAGE: CORNWELL DESIGN

With this in mind, it is possible to cover the 14 hour work day without prescribing set shifts *per se*. It is assumed that the frequency distribution of people ranging from larks to owls follows a normal curve. Also, it is assumed that modern organisations are much more flexible about working hours, where many people (particularly knowledge workers) have some flexibility in their start and finish times (for example to share the school drop–off and pick–up duties). Therefore the natural range of types represented in an organisation's workforce should ensure that the nine hour block (6 am—3 pm and 12 noon—9 pm assuming an eight hour day with a one hour break) is resourced via a flexible process of self–selected hours.

Of course, every great idea comes with a curse. One downside may be greater pressure on some workers (particularly managers and specialists) to be working fourteen hours a day. The stock market may be forced to open longer hours, and traders will need to choose which part of the trading day they physically are in the office for, although new software is making it increasingly easy to trade from any location. Also, a stigmatisation into morning and evening people could develop, although in reality this type of work style choice is already apparent in knowledge industries where creativity is valued and personal choice is more tolerated.

BUILDINGS CONTRIBUTE MORE THAN 30% OF GLOBAL GREENHOUSE EMISSIONS AND YET ARE ONE OF OUR MOST UNDERUTILISED ASSETS

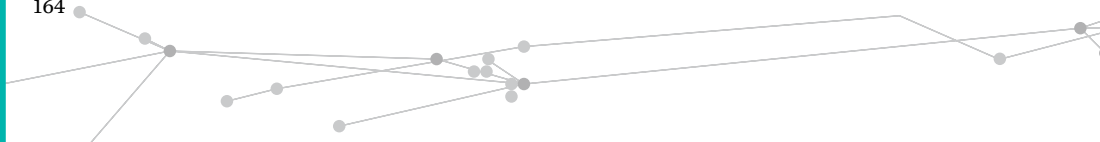
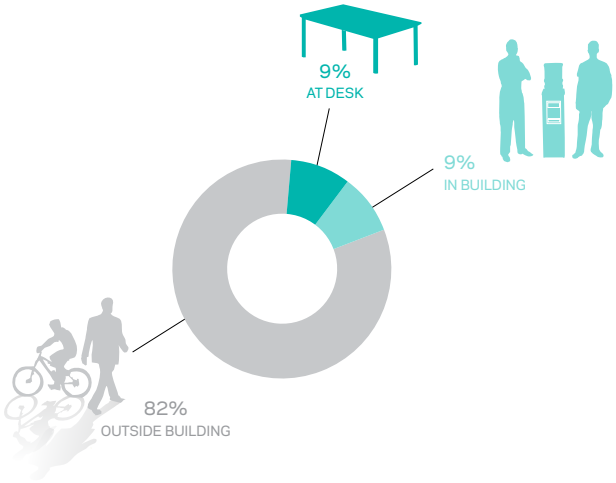


FIGURE 1
UTILISATION OF A TYPICAL OFFICE BUILDING



SUSTAINABILITY

IT IS ESTIMATED THAT BUILDINGS CONTRIBUTE MORE THAN 30% of global greenhouse emissions and yet they are one of our most under–utilised assets. The typical 9–5 knowledge worker spends approximately a third of their working day at their workstation or office and around another third in the building. This works out to a 9% desk utilisation and an 18% total building utilisation across the possible 168 hours in the week.

Increasing the utilisation of the workplace is the quickest and easiest path to the goal of sustainable design of office buildings. Good progress is being made around the world in terms of engineering, measurement and rating systems and this development is essential but does not address the changing nature of knowledge work. Many of the engineering models are still based on out of date thinking about work styles that assume everyone is at their desk from 9–5, that they are process workers rather than knowledge workers, that they still use typewriters rather than mobile devices.

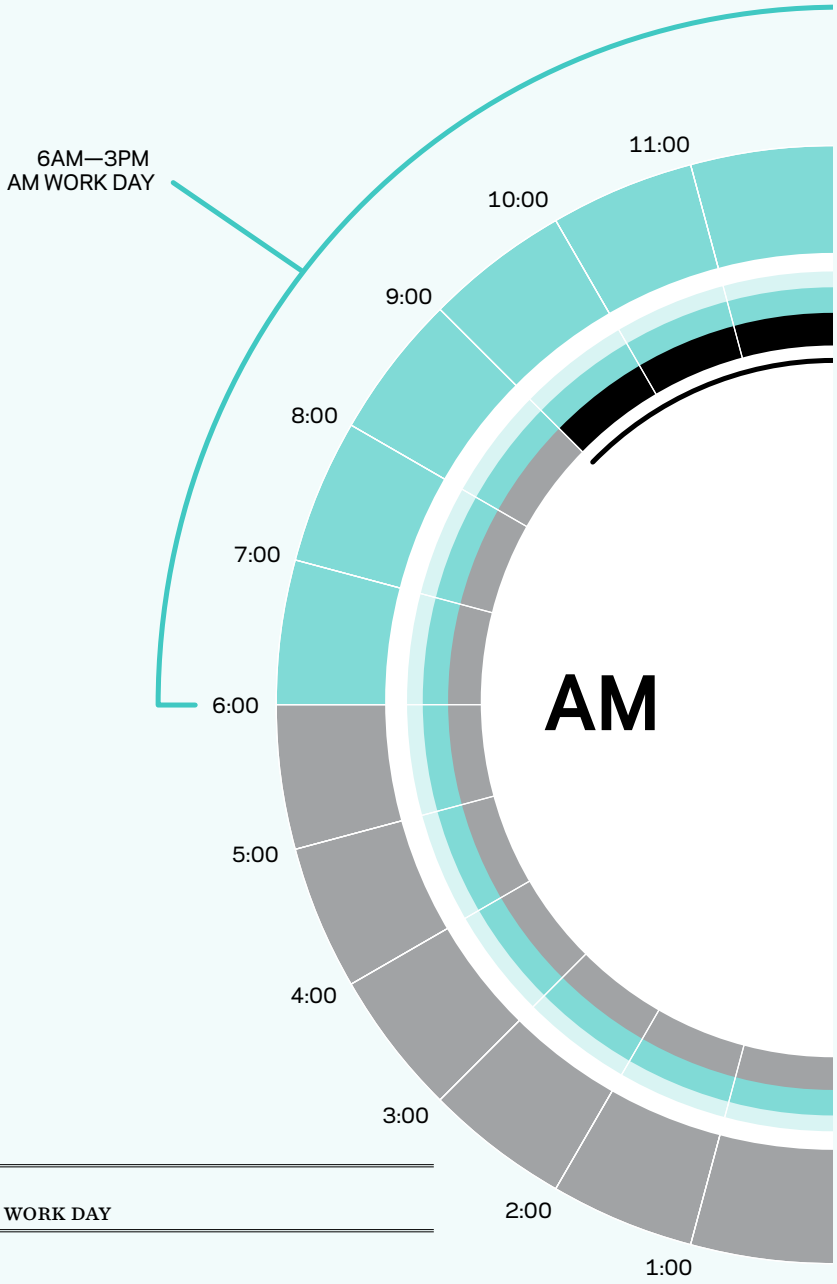
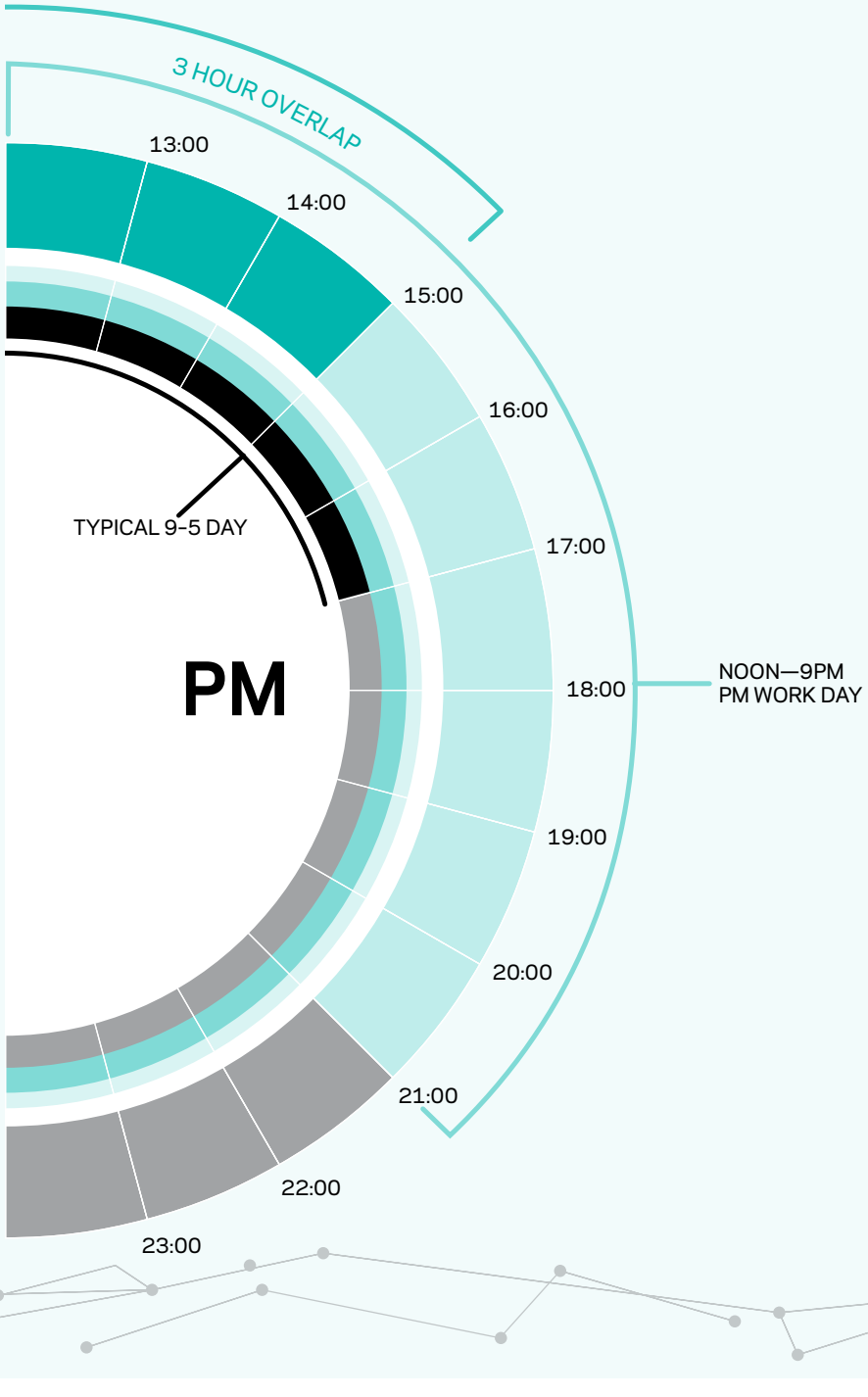


FIGURE 2
THE 14 HOUR WORK DAY


3 HOUR OVERLAP
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
TYPICAL 9–5 DAY
PM
NOON—9PM
PM WORK DAY

LEGACY SYSTEMS

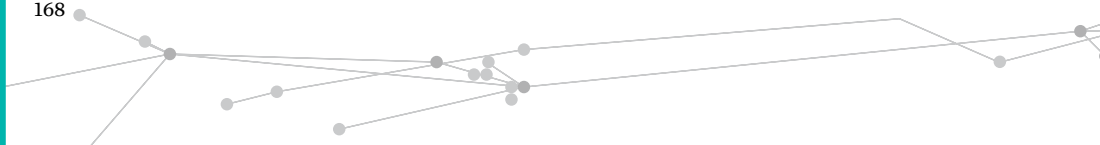
The beginnings of settlement, based on the ability to grow crops and domesticate animals, introduced humans to the cycles of nature—the seasons, the lunar cycles and the twenty–four hour rotation of the earth around our sun. We evolved with these cycles until the Industrial Revolution with the development of the clock, then electricity and the electric light bulb that allowed us to work in the most unnatural of ways—in a factory or clerical office. Synchronicity was an essential ingredient of the Industrial Revolution.

The invention of the PC and the internet has fundamentally altered the nature, location and necessity for the constant synchronicity of work. A combination of individual and team work is now essential in the knowledge economy. Furthermore, the jet plane has created physical connectivity and the internet virtual connectivity that enables us to work most effectively in the 24 hour global marketplace.

The IBM PC has only been around since 1984, and its impact is only being felt now. Our cities have not had time to respond to the fundamental changes of the information revolution and are fundamentally Industrial Age cities. Similarly, our planners and urban designers are only beginning to understand the implications of knowledge based economies and cities. Much of their thinking is based on Industrial Age synchronicity with little understanding of the new work and life styles. We are operating in a legacy system of physical infrastructure and urban design rationale.

There is much to learn about knowledge management and the new workstyles of knowledge workers. In most western economies around a quarter of all work is done at home, and the rapidly improving quality of virtual communication and its simultaneous reduction in price (Skype is free) will only increase this figure. At present the growth rate of work at home is around 5% per year.

These fundamental changes will have significant physical implications. An example of this is the rapid growth in conferences and the subsequent creation of conference and exhibition centres—this is a direct physical response to the power of the internet to connect people with a particular interest virtually. The role of the town hall and town square was critical in the Industrial Age. The Information Age will require quite a different clustering of activities and events for people to interact effectively. Knowledge management theory tells us that we will see an increase in the range of spaces for tacit knowledge exchange, and whilst the best of spaces from the



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Industrial Age city will remain useful (and extremely pleasant), a richer menu of spaces for the Information Age will be demanded.

Organisations are just beginning to structure themselves globally (rather than federally by time zone and region) and we are seeing the first of a new breed of organisation that has no physical presence. These changes are observable in the growing awareness of work–life balance as the demands on many workers to work extended hours increases due to globalisation.

As an aside, this has health implications in terms of circadian rhythms: Merrow, Spoelstra & Roenneberg explain in *Embo Reports* (2005), 'as our society moves towards a worldwide 24/7 culture, with shift work and jet lag almost the norm, circadian clock research is becoming highly relevant to human health, behaviour and quality of life'. Interfering with circadian rhythms can have a significantly negative impact on business: human fatigue is estimated to cost global business more than $370 billion annually. Rigidly sticking to the idea of synchronicity can also impact an organisation's ability to hire staff—probably the biggest issue facing many organisations at present. Flexible working arrangements are considered the best way to attract and retain staff. In a British study, one in three people (from a sample of 5000) said they would prefer the option to work flexible hours over a £1000 pay rise.

The question we need to ask is whether we can afford not to move to a better working model of utilisation, mobility and synchronicity that is more sustainable. The recent rapid increase in oil prices is forcing many people towards public transport and in most cases the investment in this infrastructure is decades away. We may have no choice but to change the 'software' of our mindset about work and our use of time, rather than the 'hardware' of infrastructure.

An extreme way of looking at our current workplace situation is that millions of people every day drag themselves to their cubicles, at great cost to the individual, organisation, and environment, so that they can send emails to the next cubicle. Knowledge management theory tells us that we need both individual concentrated work and collaborative work. By extending the working day, providing more choice as to how, where and when we work, but also ensuring a considerable overlap in the middle of the day for all workers (which coincides with the social activity of lunch), we will be supporting knowledge work and significantly increasing the productivity of our people and the success of our organisations.

Globalisation is forcing many organisations away from the 9–5 working day and the confinement of the office. Conference calls in the early hours or late into the night are extending the working day for many. Research conducted for a global financial services company seeking a new workplace highlighted this fact, where video conferencing in the office was seen as a negative by employees as it forced them to be there longer. Instead, a key strategy to better support work–life balance was to provide laptops with video conferencing capabilities so that people could go home to dial in, allowing dinner to be taken with the family.

ORGANISATIONS AND CITIES THAT ARE FIRST TO GRASP OPPORTUNITIES CREATED BY INFORMATION TECHNOLOGY AND PROCESS RE-ENGINEERING WILL THE FIRST TO PROSPER AND CREATE COMPETITIVE ADVANTAGES THAT WILL LAST FOR GENERATIONS … THEY WILL DRAMATICALLY HELP IN OUR DRIVE TO BE MORE SUSTAINABLE

CONCLUSION:

The recent rapid increase in oil prices is forcing many people towards public transport and in most cases the investment in this infrastructure is decades away. We may have no choice but to change the 'software' of our mindset about work and our use of time, rather than the 'hardware' of infrastructure.

Work process re–engineering based on mobile technology is beginning to fundamentally change the nature of our work from sequential to 'real–time' processes where decisions can be made instantly rather than pushed along the line. Competition and customer satisfaction will force many organisations to move in this direction. This shift significantly increases the amount of real–time face–to–face interaction within our office buildings and reduces the importance of the 'owned' cubicle to the point where for many workers it will become redundant. Once this re–engineering occurs on a larger scale it is easy to predict that the city will change—the city becomes the office. We have already seen the beginnings of this effect in places such as Sydney where the impact of information technology reduced layers of management during the 1990s, which in turn meant that workers had to communicate more with each other to undertake their work. Office fitouts could not quickly adapt to the need for more small meeting spaces and a direct physical consequence of this was the explosion of cafes around the streets of Sydney that are full of people meeting and working.

In the Information Age, the property industry, and in particular city planning, needs to quickly come to terms with the fundamental changes in our work styles and lifestyles. The time bomb of global warming has created a burning platform that demands urgent focus. The stakes are high. We can dramatically improve the utilisation and effectiveness of our cities by a simple rethink about synchronicity and work–life balance. The organisations and cities that are first to grasp these fundamental opportunities created by information technology and process re–engineering will also be the first to prosper and create competitive advantages that will last for generations ... and they will dramatically help in our drive to be more sustainable.

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SYDNEY

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