

# Intensive urbanisation: Levels, networks and central places

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Urbanisation is one of the defining issues of our time, shaping a fast-changing world, with our urban economies and societies and urban places produced in the process itself, along with their sustainability and enabling potentials. However the ways we conceive urbanisation leaves a lot of this process extremely unclear. Urbanisation is more than the transition of people from rural to urban modes of production and ways of life. It is an historical process in which the urban world emerges as a tightly structured path-dependant but also non-linear process. The product of this process is a humanly constructed space, or layering of human spaces, that challenges the way we think not just of the city but also of our social grounding in it. Space syntax has gone part of the way to opening a path to our understanding of this process and space through its representations of urban fabrics and their centralities at a fine grain. However, other discourses on the city and urbanisation have considered much larger scales. Here, critical interpretations of Peter Taylor's 'world-city network', sociotechnical systems and space syntax are brought together in order to propose an interpretation of the different spaces, scales and layers of urbanisation, and a model of urbanisation and central place formation that crosses these scale differences. This model can, it is suggested, help us construct strategies for more layered, sustainable and socially enabling urbanisation and central place development in the future.

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## **Urbanisations and modernisations**

Urbanisation is one of the key processes of our time and our understanding of this process and our ability to steer it in positive directions is crucial to the future of planet and species. But urbanisation is a complex and variable phenomenon. It is historical: emerging relatively recently in the history of humankind, its forms have always been tied to forms of politics, society and economy in particular times. These forms have not simply followed each other in any straightforward evolutionary way however, they have been associated with progressive impulses of new technologies and new social and cultural forms we understand today in terms of 'modernity'. We need only think of David Harvey's Second Empire Paris (Harvey, 2003), or Georg Simmel's metropolitan Berlin (Simmel, 2002), or Marshall Berman's New York (Berman, 1982). Processes of urbanisation are historically specific, come connected to

technologies, to the 'new' and ideas of 'modernity' and 'modernisation'.

Today we see a massive process of economic 'modernisation' in parts of the so-called 'developing' world. In China, the largest migration the world has ever seen is taking place as hundreds of millions of rural dwellers become urbanites almost overnight. However, this process has already taken a huge toll socially and in terms of environmental quality, and the continuation of this process in an unchanged form will almost certainly result in social and environmental catastrophe (Miller, 2012). Meanwhile, in other 'developed' parts of the world, the so-called 'counter-urbanisation' of people moving away from the dense centres of the industrial era is nothing of the sort. Here, the movement of people away from cities is in response to another version of modernity, with its own distinct set of values and technologies

(Jackson, 1985; Fishman, 1987), as the spaces between the centres rapidly urbanise.

'World systems' and other '*longue duree*' thinkers have historicised the notion of modernity to the point we recognise now that there have been many of these impulses, multiple modernities, that have shaped cities and societies together. Charles Tilly has challenged urban thinkers to become interpreters of the ways macro-processes like these articulate with everyday lives (Tilly, 1996). For Tilly, social history is about connecting everyday life to historical structures, and the way we may do this is through a deeper and better historicised understanding of cities and processes of urbanisation. Modern societies are urban and social history is urban history; but more than that, the societies of any era are shaped by the same processes that build their cities.

The differences between the relatively gentle processes of pre-industrial urbanisation and the urbanisation taking place in China today are not simply differences of the speed and force of a singular process of 'agglomeration', but essentially different processes producing different types of cities and urban societies. The aim of this paper is to contribute to a better understanding of processes at the centre of contemporary social, economic and environmental developments. Better understanding implies better thinking and strategy when it comes to planning and otherwise intervening in and guiding these processes. The model proposed will spatialise urbanisation – not in relation to an 'absolute' space or as an accumulation or 'agglomeration' of rural people or agricultural 'surplus' or the spoils of trade to an urban centre, but in relation to the networks that are the spatial datum to the urbanisation processes themselves. Urbanisation can potentially take place on any scale of network, so this model will in this way suggest the beginnings of a simple scalar typology of the social and urban forms resulting from urbanisation. It is hoped the model will support and

provoke new ways of understanding (and new questions about) urban societies. It is hoped it will help us see cities in terms of processes that produce vitality, centrality and social and public space and help us think about making these in a variety of types and at a variety of 'levels' and scales.

### **An historical-relational process**

Some of the problems we face are conceptual, tied to historical-material processes and the ways we understand these. Urbanisation is perhaps most often defined today as a process of transition from a rural to an urban way of life (Wirth, 1938). This is a definition intended to emphasise a qualitative, cultural aspect of cities and overcome a physical or quantitative bias associating urbanisation with the material sizes or densities of cities. It recognises for example the non-intuitive fact that urbanisation can be rather diffuse, as we see in suburban and exurban development in Europe today (Stanilov, 2007), or in the deltas of China in the 18<sup>th</sup> and 19<sup>th</sup> centuries (Pomeranz, 2000). The association we have between urbanisation and concentration needs to be modified and the causes of urbanisation better specified. Today, cities-as-concentration are increasingly considered the 'jetsam of another age, vertical settlements in a horizontal world, artefacts of a time before distance died' (Storper and Manville, 2006, p.1248), but the association of urbanisation with concentration is still heavily implicated in urban thinking through notions of 'agglomeration' in spatial economics (Fujita and Thisse, 2002) and in new economic geography (see Storper, 1997). The association of density with intensity, vitality and creativity plays a part also in celebrations of the creative potentials of cities (Jacobs, 1969), urban cultures (Zukin, 1995) and the 'compulsion' of face-to-face and proximity (Boden and Molotch, 1995).

We do not appear to have the instruments to find or explain how, at a large range of different levels, scales and scopes, places become economically

active, or imbued with the culture of urbanism or with the creative potentials and human capital to which Jacobs, Zukin and Boden and Molotch point. It could be that the first problem is one which cultural urbanisation shares with urbanisation as density or proximity. Both treat the space of the city as a 'container', incorporating logics of what David Harvey calls 'absolute space' (Harvey, 1969). They both work by imagining that urban mass, or amenities, or qualitative attributes or human or social capital can be poured into the places they are located, or that these will be shifted around and located according to logics of preference or choice (Storper and Manville, 2006). Centrality cannot be simply attributed to patterns of density, culture or preference. In fact centrality itself must form, at least to some extent, patterns of density and behaviour in cities. We know from space syntax that the fabrics of inner cities display fine-grain differentiations that are mirrored in social and economic differentiations, and that the choices which city users and builders make refer and even defer to these patterns.

We see as well that the 'absolute' spatialisation of the city misses qualities of the urban that are recognisable in everyday experience and activity. We experience an urban world in which the trans-local is as pervasive and everyday and as accessible as the paving beneath our feet; we do not experience the city through the characteristics of absolute space – through area-defined urban places with clear boundaries in which the local is the only level of the urban scalar spectrum present to us. In many urban fabrics, clear boundary definitions of districts or neighbourhoods or of the city itself are hard to find and we already understand that the way distant things are made present is important for the way the city is known and used. Harvey's 'relational' space makes things immediate and less abstract, but because 'relational' space escapes our cartographic spatial intuitions it presents us with the problem of how to define it analytically. This relational space

will be the main focus of this paper, and it follows on from another (Read, forthcoming) which looked at space syntax in order to articulate the structures in urban fabric that space syntax reveals – though rather indirectly – and that make space syntax work. The present paper will start with methods of understanding centrality and central places at much larger scales and will go on to join these up with the spaces revealed by space syntax. This will lead to a model of forms of urbanisation, articulating the formation of central places at different scales and 'metageographical levels'. Part of the discussion will be about the nature and character of these 'levels'.

### **Putting cities first**

This section begins by introducing and gently critiquing contemporary ideas of city networks. These networks will become the basic frame on which to build the rest of an account of urbanisation processes.

Our contemporary understanding of and discourse on cities and their development is led by ideas of global and world cities (Friedmann, 1986, 1995; Sassen, 1991; Beaverstock et al., 1999). A strong underlying theme here is the relative autonomy of cities and city-networks as an 'architecture' (Sassen, 1991, p.354) of larger geo-political entities. It is an idea that is strongly connected today to notions of globalisation, the emergence of a different sort of global economy and network society, and the rise of new global regions and new actors to join with nation states in influencing international and global affairs. It leads also, however, back to an older and better historicised idea of a 'world-economy' that 'always has an urban centre of gravity, a city, as the logistic heart of its activity' (Braudel, 1984, p.27).

Peter Taylor has followed Jane Jacobs (Jacobs, 1969) in 'putting cities first' (Soja, 2000, p.26) and focusing on how cities are implicated in the huge changes that societies have undergone since such settlements first appeared several millennia ago. He

combines a notion of 'agglomeration' with his own network theory, seeing cities as themselves actors in this drama of human change. According to him, cities agglomerate not just the skills and energy of people but also the exponentially increasing numbers of proximate relations between people in a 'communication theory' of the growth of social and urban complexity (Taylor, 2012). It is through this exponential increase in embedded potential relations that cities can be represented as qualitatively different to what came before and 'completely new social worlds of human experience' (*ibid.*, p.418). However, Taylor understands people and relations agglomerating and concentrating in bounded 'container' spaces.

He uses central place and network models to distinguish local and global 'levels', associating central place theory with towns rather than cities and drawing a functional distinction between 'town-ness' and 'city-ness'. Town-ness is

'a relatively simple flow of people to the 'town' to access public goods or buy private goods. City-ness, on the other hand, deals with non-local flows of people, commodities and information between cities, which has been termed "central flow theory"' (Taylor, 2012, p.419).

The central place model is a 'supply-led' evolutionary model of urban origination in surpluses of agricultural production, while the central flow model is 'demand-led', seeing cities originating in trading networks and economic specialisation and the unprecedented population concentrations these stimulated. According to Taylor, cities, joined together in a strong and permanent trading network could usher in explosive economic expansion based on the creation of new work in new urban centres. He uses Ian Hodder's excavation of Çatalhöyük to argue for an increasing internal complexity in these cities, from an early state of 'domestic modes of production' (Sahlins, 2004) in which households participated relatively independently in emerging

economies of new work, through increasing levels of social organisation involving divisions of labour and urban spaces of exchanges of skills and materials.

Early cities created spiralling demands and, Taylor suggests, the innovative potentials to start fulfilling these. Taylor characterises these potentials as a 'combination of cluster/agglomeration processes within cities and network/connectivity processes between cities. These processes create unprecedented communication potentials that make cosmopolitan cities the crucibles of new ideas, innovations and inventions' (Taylor, 2010). However, the notion of 'communication' is pitched here at the local and relies on bounded territorial clustering, repeating territorial suppositions of a bounding 'container' space. Taylor has reduced cities themselves to 'containers' of 'agglomeration'. One result has been a relative neglect of non-local network conditions themselves – the active dimension of cities is firstly a highly localised attribute of proximate relations, secondly glossed as 'clustering', and finally separated from material conditions as an attribute of 'immaterial' knowledge or creativity.

It is already apparent in Taylor's account that 'agglomeration' is way too crude an idea. His account calls for a model better capable of specifying the spatial aspect of this 'organised complexity'. The reliance on a central place model for what is an urban organisation at the local level also seems crude. Rather than cities being local bounded repositories of knowledge, skills and social relations, they should themselves be seen as organisations for effecting exchanges across different domains of networked knowledge and practice. It is suggested that what cities do is organise people and societies in the nexus of local and trans-local exchanges, rather than simply gathering them in dense little clusters.

#### **Modern worlds, world-cities**

The state of cities today is consequent on a centuries-old sequence, outlined by Braudel, of shifting

cores of the capitalist world-economy. Peter Taylor has characterised this sequence in terms of three 'prime modernities' that have represented transitions of world hegemony from a 17<sup>th</sup>-18<sup>th</sup> century mercantile Dutch modernity to an 18<sup>th</sup>-19<sup>th</sup> century industrial British modernity and a 20<sup>th</sup> century consumerist modernity (Taylor, 1999). With this we move beyond the conflation of the idea of modernity with industrial society, to sequences of modernities and world-economies (and of societies). Each of these 'modernities' represents a 'massive historical shift of forces' (Braudel, 1984, p.32) with concomitant shifts in the 'centre' of the world-economy from Amsterdam to London to New York. These 'world-economies' are progressively more global, have unified divisions of labour and accumulation processes stretched between their 'always more advanced, historically enlarging, and geographically shifting core and ... always less advanced, disproportionately enlarging, and geographically shifting periphery' (Hopkins, 1982, p.11).

Articulating world-economies is a succession of world-city networks, where, in the network, 'world' and 'city' stand in mutually constitutive relations with one another. While discussions about global or world-economic 'systems' tend to de-emphasise the historicity, multiplicity and contingency of these processes, Eric Slater reminds us that the possibility of bi- or multi-polarity of world-economies and world-city networks was already established with those that preceded Taylor's 'prime modernities'. One of these 'proto' world-economies was divided between centres in Antwerp and Genoa for example. Slater also emphasises the multivalency of world-economies, pointing out that, even earlier, Venetian hegemony was a result of commercial and naval power, while Genoa's was based on finance, and Antwerp was a market for merchants from different networks (Slater, 2004, p.593). With the rise of Amsterdam comes a more coherent series of world-economies, each progressing to (near) hegemony

before being overturned by the next (*ibid.*). Slater argues however against a too strict or literal global systematicity in Sassen's model for example, to re-emphasise history and variations and shifts in the 'flickering' structure in the past and present of the global city (*ibid.*, p.605). Peter Hall has also emphasised the multivalency of world-cities – and the multiplicity of world-city networks – showing that the different world-cities of London, Paris, Randstad-Holland, Rhine-Ruhr, Moscow, New York and Tokyo sit at the top of different world-city networks in fields of politics, trade, communications, finance, culture, technology and higher education (Hall, 1966).

It is intended here to take forward this emphasis on contingency, multivalency and multiplicity in order to argue that networks integrating processes of society, economy and culture have existed at all levels of urban life and progressed historically to (near) hegemony in their turn. In addition, although there is some discussion, especially from critics (for example Robinson, 2002) about what is included and not included in the system, in world- and global-city networks it is still 'the system' that sets the terms of the discussion rather than the patterns of being in or out of it that is highlighted here. Attention to the systematicity and structure of networks has kept attention away from the 'structural' effects of being *out of* the network, or of the relations between *different* networks. This is very true in the world-city discourse where peripheralisation, for example, is often thought of as an effect of the network and what is lost is the peripheralisation that is not a network effect so much as an effect simply of being out of the network (and perhaps in another). Lost also is the way interrelationships between *different* networks may be a systematic means to bring different logics together necessary for complex processes that can never be reduced to one system or one network. While there is no argument that urban networks are systems, and that these internalise systemic logics, what is emphasised here is that these systems are

historical – they and their logics are products of construction, adjustment, politicking and negotiation over time – and that cities sit at the nexus of *different* networks.

We could think of these systematisations as being built into a fragmented world in order to establish coherence across particular regional ranges and scopes of human activity. ‘Systematisation’ here implies partiality because it is not the whole of human affairs that is systematised in any one network but only that part related to the business and scope of the network itself. Different networks will integrate different scales and scopes of societal and economic process, and different networks will then have to come together somewhere to draw together the different logics that constitute complex productive and reproductive processes. It will be suggested later that hierarchy, understood as a product of a centre to periphery gradient within networks, should be seen instead as a vertical relation *between* networks organised in horizontal ‘levels’.

Jonathan Israel has argued that while Amsterdam was building its hegemonic world-economy, it was simultaneously drawing on the dynamism of an earlier construction of a coherent system of waterways covering most of the cities in Holland, Zeeland and Friesland, at something approaching a national scope and scale. This network interlinked different urban economies and facilitated the rapid circulation of goods and passengers between cities (Israel, 2002). This complicates the world-city argument in an interesting way. Amsterdam was no longer acting simply as a city at the centre of its world-city network, but as a node at the crossing of two networks, one of them a network of Dutch cities more coordinated and coherent than was to be found anywhere else in Europe (*ibid.*, p.16). Israel argues for the ‘creativity’ of this crossing between a proto-national state and a world-city network, as across this intersection flowed not just money and people, but knowledge, technologies and other

assets developed in cities like Leiden and Haarlem for example. The United Provinces may have lacked many of the attributes of a modern state, but, according to Braudel ‘it certainly cannot be said that the Dutch government was non-existent’ (Braudel, 1984, p.193-5, p.205). There were considerable organisational structures set up in early modern networks of economy and government, and where Peter Taylor talks of the ‘creativity’ of relations contained within urban walls, what these sorts of structures emphasise are the *crossings of different* economies and cross-scalar relations at the points of intersection in cities.

However, in order to articulate this idea of layered network organisation and the ‘complexity’ of the productions of the crossings of different networks, it will also be necessary to understand the ‘simplicity’ of different networks – themselves built and converging historically to a state of being (near) generic ‘levels’. The ‘simplicity’ concerns the establishment of organisational ‘levels’ built for intelligibility as much as for anything else. What is the nature of these ‘levels’? We are accustomed to the idea of the world being organised geographically into regions, nations, cities, neighbourhoods and so on, but we also imagine that these geographical entities are ‘container’ spaces with clear borders. The different model proposed here has network spaces as ‘levels’, each with a ‘metageographic’ (Lewis and Wigen, 1997) character, as structures through which people order their knowledge of the world. These establish geographic and geo-political entities like regions, nations, cities and neighbourhoods. It has just been demonstrated how networks of different scales and ‘levels’ may establish ‘world’ and ‘nation’ in the example above, but without the borders and with a certain ‘meta-stability’ about them which still allows the possibility of profound shifts and re-articulations as networks are reconfigured. The complexity produced in the crossing of ‘world-city network’ and ‘nation-city network’ in Amsterdam



is facilitated by the simplicity of the two intelligible levels of metageography. This complexity is manifest as complex work and divisions of labour in the emerging nation as well as in the city. What Israel is suggesting is that Amsterdam's urbanisation and development could be seen as a creative *product* of this intersection. The construction of levels is itself historical and a construction and a 'system' in terms developed further in the next section.

### Spatial technologies

The sort of networks Taylor talks of have long been associated with technology, and Paul Edwards points out that technology is pervasive in modern lives. He points out at the same time that technology becomes quickly naturalised and today television, indoor plumbing, and telephony are hardly mentioned in relation to modernity, while 'ceramics, screws, basketry, and paper, no longer even count as "technology"' (Edwards, 2003, p.185). Edwards defines infrastructures as 'the basic facilities, services, and installations needed for the functioning of a community or society' but also makes the point that infrastructure is best defined negatively, as 'those systems without which contemporary societies cannot function' (*ibid.*, p.187). The 'system' or 'infrastructure' developed here is exactly one of those pervasive, naturalised systems without which urban societies cannot and could not, throughout history, have functioned.

Infrastructures are not just 'hardware': they are *sociotechnical* in nature and incorporate and deliver social organisation. This organisation consists of 'socially communicated background knowledge, general acceptance and reliance, and near-ubiquitous accessibility' (*ibid.*, p.188). Infrastructures do not just give us 'systemic, societywide control over the variability inherent in the natural environment' (*ibid.*), they also organise things into a distinct 'modern world', delivering capacities that have themselves become naturalised and standards of

convenience and comfort unknown outside such a world. According to Star and Ruhleder (1996), infrastructure has five properties: it is embedded in other structures; it is transparent; it has reach or scope; it is learned as part of membership of a 'community of practice'; and it shapes and is shaped by the conventions of that 'community'. Infrastructures are 'material culture', learned as part of membership in communities, while this knowledge is by extension a prerequisite to membership. Infrastructural knowledge is 'a condition of contextuality in which understanding any part requires a grasp of the whole that comes only through experience' (Edwards, 2003, p.190).

Infrastructural knowledge is an internally related self-contextualising whole, a Wittgensteinian 'form of life' (Wittgenstein, 1958), in which the different elements and practices in the network make sense by virtue of their mutual interrelationships in a sort of cultural or life 'paradigm'. Here we understand the notion of paradigm in the relational sense used by Thomas Kuhn: as a set of practices (and associated material elements) that bind a 'community of practice' (Kuhn, 1962). In this sense, infrastructures integrate the practices and elements of a community or society and become *environment* to them. 'To live within the multiple, interlocking infrastructures of modern societies is to know one's place in gigantic systems that both enable and constrain us' (Edwards, 2003, p.191). 'Building infrastructures has been constitutive of the modern condition, in almost every conceivable sense. At the same time, ideologies and discourses of modernism have helped define the purposes, goals, and characteristics of those infrastructures. In other words, the co-construction of technology and modernity can be seen with exceptional clarity in the case of infrastructure' (*ibid.*).

We can account for the simultaneous invention and mutual coordination of different parts of 'systems' by using Thomas Hughes' concept of

the 'reverse salient' (Hughes, 1987). System or infrastructure builders like Thomas Edison require multiple technical components as well as social, cultural and economic factors to function together for a complex system to work. All these components and factors are unlikely to be developed at the same rate, with those that drag behind forming a 'reverse salient' in the advance of the 'front' of the whole system. These problems hold up the progress of system building so that wherever they occur they focus attention and 'command extraordinary theoretical, practical (engineering), and economic interest' (Edwards, 2003, p.209). It is with the reverse salients in system building that much of the research we do is concerned. Solutions to problems may restore progress in system building, or they may redirect development along alternative lines, as happened for example with the introduction of alternative current to overcome the problems that direct current electrical grids were experiencing (Hughes, 1983).

This further indicates that infrastructures are not simply 'technology expanded' and that it is not simply railway engines or motorcars which change the course of modern life. Infrastructures are tightly organised integrations of multiple social, cultural, economic and technical factors and components. These integrations have real presences in the world, with distributions, scopes, ranges, transparency or intelligibility, public access points, protected 'technical' zones, and designed and undesigned or collateral effects. We could understand them as sociotechnical spaces which operate at every level of urban societies including, but not limited to, the world-economy.

World or global infrastructures are not the only ones operative in any prime modernity; there are also infrastructures at national levels, many at urban levels, supporting the basic daily patterns and relations of our cities, and many more at levels above and below this. In fact, there is a multiplicity of infrastructures supporting modern economies,

cultures and societies. And these infrastructures do not simply exist in a pre-existing 'container' or absolute space. They are themselves spaces, incorporated in, supporting and supported by, systems of geographical 'levels' and places. Amsterdam existed before it existed as a node in a system of air travel; and it existed before it existed as a stop in a national rail system. Likewise, its relations with New York and with Leiden were already in place before these systems were built. International, national and urban relations have always been involved in different 'ways of life' and 'communities of practice'. And the international, national and urban forms themselves exist in ways that make them available for appropriation by new 'communities' and their 'practices' and the technological systems appropriate to new 'ways of life'.

New systems are built over old ones. These create worlds, regions and cities, but they also join up with already existing systems in ways that maintain or strategically transform structures already established and incorporated into practical lives. Metageographical levels give ranges and scopes to economies, cultures and societies, from those at levels and scales of world-economies, to others at regional, national, urban and other levels and scales. These levels interrelate in order that the whole complexity of production, consumption and other processes that sustain and animate modern life become operational. It is this multiplicity of geographical levels and their crossings, itself an infrastructure, or set of infrastructures, that will be outlined here and in the next section.

Rather than particular technologies like light bulbs, telephones, railway engines or motorcars transforming lives, multiple technologies are enrolled in creating and recreating spaces which connect with social lives and the spaces these lives are already embedded in. Light bulbs and telephones connect with electrical reticulation and telephone lines, meter reading and billing systems,



**Notes:**

<sup>1</sup> These would be elements that make conceptual sense in relation to one another. Kuhn's ideas of the 'paradigm' and 'community of practice' and Wittgenstein's 'way of life' have been used here to hint at the forms and qualities of these spaces. Previously (see Read et al., 2013) Greimas's semiology and some 'environmental' theory (Markoš et al., 2009) were used to do the same.

but they also link with the cities and neighbourhoods of houses which preceded them and into which they were initially installed. Railway engines and motorcars connect with railway tracks, stations and modern highways, but they connect also with the networks of cities and harbours that preceded them. These spaces do not just equip us to do things, they equip us in a world already structured, legible and distributed in networks. Their spaces connect with or merge with spaces already existing. In many cases, certainly when it comes to airways, railways, highways and public transportation systems, their spaces *reinforce* those legible spaces and make them even more legible, as individual systems incorporate and embed not just the places but also the systemic logics of the relations of places to each other to enable us to see the world better at different levels or scales, and to act faster or more conveniently at these levels and scales.

The kinds of infrastructures that embed places also embed, as networks organised in levels, the logics of places' relations with each other. Through them we understand our territories and our places in them, and through them other sociotechnical networks are woven. A relatively low-tech, socio-tech, network of known and named places that we could think of as 'metageographical' has preceded the contemporary mobility and information 'revolutions', and it is through this historical network logic that new network logics of modern travel and communication and social and business organisation are still mediated. There exists a visceral human geography of network 'levels', itself a set of 'spaces' quite different to the 'absolute' and the cartographic. These 'spaces' and 'levels' establish sets of normative, horizontally related 'isotopic' elements<sup>1</sup> (world-cities, national cities, and as we will see, metropolitan places, urban places and neighbourhood places). These levels are vertically related in ways that impact on the social complexity and functional organisation of places. The spaces

of our human geography are organised close and distant places, made present to us as sets of relations with specific metageographical logics of size and scale. Even those who have never visited Karachi or Shepherd's Bush know these as places amongst other global or urban places and know that the social and technical structures are in place to get us there – or in contact with someone else who is there – should the wish or need arise.

**What we learn from space syntax**

In a previous paper it has been argued that space syntax reveals a structure embedded in the urban fabric, and that this structure is historical and a product of a specific phase of the reconstruction of the Western European city in the 19<sup>th</sup> and early 20<sup>th</sup> centuries. Space syntax has been involved, especially in its earlier and formative phases, with fabrics for the most part constructed in the industrial expansion of cities in Europe, and while there may be parallels with fabrics built in different regions, times and conditions, we should see them all as historical constructions. Typologies and generalities in urban fabrics should be thought of in the first instance as historical and empirical rather than theoretical matters (Read, forthcoming). It has been argued that what this industrial urbanisation consisted of was a 'structuration' of neighbourhoods and centres around new 'grids' of transportation networks at speeds and scales higher than those of the foot, hoof and wagon of pre-industrial times.

This industrial mode of urbanisation was succeeded in turn by a post-industrial, car-based urbanisation which started after the middle of the last century. This transition corresponds with the shift from Taylor's second (industrial) to his third (consumer) mode of modernity. Whereas the neighbourhoods and centres of industrial urbanisation were distributed on, and oriented towards, mainly public transportation networks within the industrial city, those built after mid-century were distributed on

and oriented towards inter-city commuter highways and railways. Although the motorcar was a feature of urban life before the middle of the 20<sup>th</sup> century, it was not until after mid-century that it became a mode of everyday mass transportation, and the specific transportation networks associated with this mass transportation mode began to be systematically built (Schipper, 2008). Industrial and post-industrial urbanisation modes produced on the one hand the dense inner-city fabric characteristic of the industrial city, and on the other the diffuse inter-city urbanisation of the post-industrial city (Read, forthcoming).

The argument is that the structure of industrial city fabric could be characterised as an effect of a particular type and scale of movement grid characteristic of industrial city fabrics. This can be identified as the network of main streets (as opposed the neighbourhood or back streets) overlaying the more general street and block grid of European urban fabric. In space syntax we know this grid already: in axial maps what we have called the 'supergrid' stands out as a joined-up network of generally longer axial lines at a grid scale several times larger than that of the regular grid. This 'supergrid' has been defined before, on the basis of empirical measurements of movement rate distributions in Dutch cities (Read, 1999), as that grid of locally higher levels of traffic that overlays the basic street and block grid of urban fabric. However, this grid is not simply a structural effect but also an historical construction emerging in the industrial period – in Amsterdam's case, constructed quite deliberately as an armature for the organisation of residential, industrial and commercial facilities and their integration through public transportation.<sup>2</sup>

The significance of this grid for space syntax is considerable because while space syntax gets a lot of its legitimacy from the fact that its measures correlate with movement rates in urban streets, if there is a pattern of streets strategically constructed for very significantly higher levels of traffic that

are also likely, because of the way the fabric is structured,<sup>3</sup> to have very significantly higher space syntax measures, then the fact there is a correlation between high syntax values and high traffic rates locally should not be a surprise. It has been argued that we should be looking at the supergrid as a structuring entity in its own right and as a strategic construction of social and technical organisation, rather than finding it more indirectly through the graph theoretical treatment of axial lines.

The supergrid consists of urban main-streets, which also centre neighbourhoods and connect them as parts into a whole of the city, while the street and block grid connects parts at the level of houses or shops into a whole of the neighbourhood. This is a description of a nested hierarchical structure; however, the diagram in which this hierarchy is constructed is not that of the familiar bounded areas and circles within circles (Figure 1), but rather of grids laid over grids (Figure 2).

In order to understand what structure means here, we need to clarify certain urban relations and relational terms like 'inside' and 'outside'. Whereas inside and outside are understood in Figure 1 in a background space divided into insides and outsides by boundaries, being in or out of a network (Figure 2) is another way of understanding these terms. In the network we have a construction in which systemic logic and 'context' are internalised. A structure of 'insideness' may be understood in relation to the logic or sense internalised in the network, and things outside the network will not join in this sense-making logic. In layering different networks and relating them to each other we have a construction in which different 'contexts' and systemic logics – of neighbourhood and city here – may be interrelated at their points of contact or crossing. The experience of being *in* the city is delivered by the supergrid (red in Figures 2 and 3), while the experience of being *in* the neighbourhood is delivered by the regular grid (grey in Figures 2 and

#### Notes:

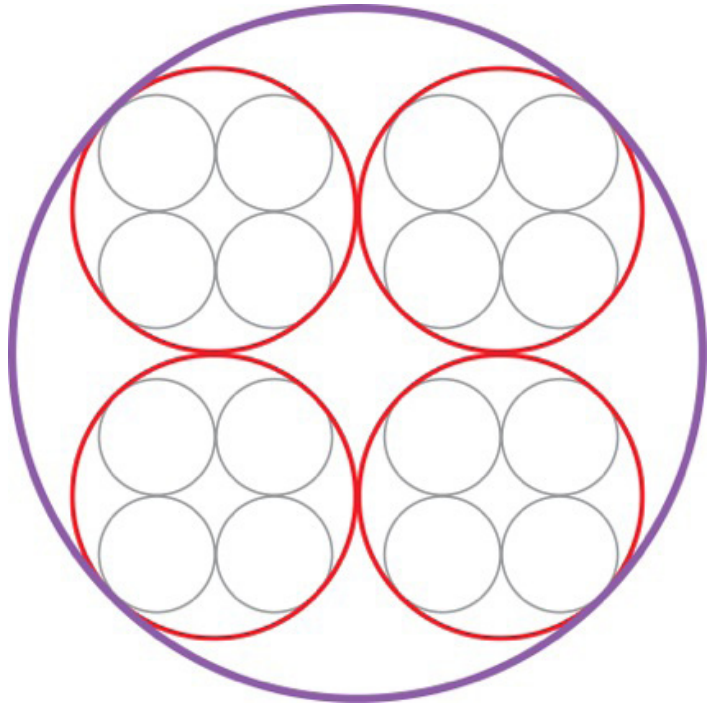
<sup>2</sup> There are obvious parallels between the 'dual structures' of 'supergrid' and 'regular grid' as defined here and Hillier's 'foreground' and 'background' grids (see Hillier, 2012). Their critical difference is that what is emphasised here is their historical origin, and what is insisted is that their significance is in the fact they form part of an historical conjuncture of technologies and social and spatial forms tied to an idea and moment of 'modernity'. The impulse that drives the emergence of urban economies and societies is less the sort of 'structuration' of interlinked 'spatial emergence' and 'spatial agency' that Hillier proposes (although the idea is attractive and useful), and more the historical and contingent events, technology transfers, constructions and structural adjustments we understand in the emergence of specific large sociotechnical systems. The danger with Hillier's 'structuration' is that it idealises and unifies a process that in the time of its occurrence is highly contingent and political with critical moments of choice and a wide range of possible outcomes. See both Rabinow (1989) and Harvey (2003) on Paris and France of the Second Empire.

<sup>3</sup> The joined-up grid of longer lines systematically shortens line to line relations across the axial map.

**Figure 1:**

**Areal ('container'  
space) definition of  
metageographical  
entities.**

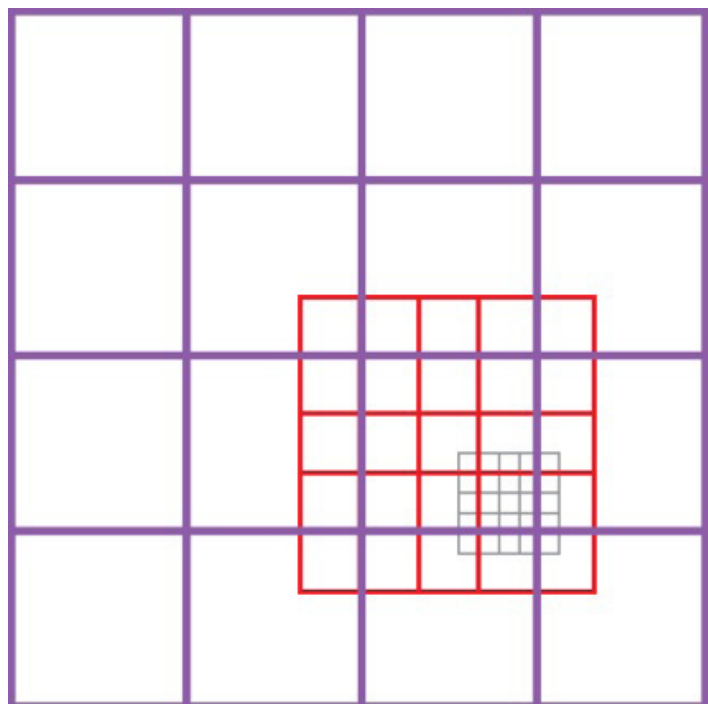
*(grey – neighbourhoods;  
red – cities;  
purple – city regions).*



**Figure 2:**

**Network definition  
of metageographical  
entities.**

*(grey – neighbourhoods;  
red – cities;  
purple – city regions).*



3). Being in the city or in the neighbourhood become conditions defined in grids and without boundaries. The main street itself is the place where one is in the city and in the neighbourhood simultaneously and where the 'creative' consequences of this crossing are encountered. Again, the stimulus of difference captured in this crossing can be seen as creatively *producing* urbanisation and the vitality of a 'central place'. The 'diagram' of this is in principle similar to the case described earlier where the world-city network met the nation-city network in early modern Amsterdam. Amsterdam became a 'central place' where the logics and activities internalised in the world-city network were brought into relation and reconciled with the logics and activities internalised in the nation-city network with, according to Israel and in the spirit of Jacobs, creative place-forming and urbanising consequences.

The supergrid has one structural role in the industrial city, while the street and block grid has another. These respective roles are to define and enact the 'space' of the city on the one hand and the 'space' of the neighbourhood on the other. Structure is a form of knowledge and the knowledge enacted in the respective grids is of what city and neighbourhood respectively are and how they relate to one another formally, functionally and intelligibly. This is so integral that one could say the knowledge is *in* the physical fabric itself (Read, forthcoming). The senses of 'world' and 'city' implied in Peter Taylor's world-city network concept are exactly analogous to the senses of 'city' and 'neighbourhood' here in city-neighbourhood or 'supergrid' networks. The 'world' is a condition of being in a network and between cities; the city is a condition of being in a network between neighbourhoods; and the neighbourhood is a condition of being in a network between houses.

In fact the notion of 'grid' here clarifies an aspect of networks that Jacobs emphasised more than Taylor – that rather than cities, it was actually networks that came first. Cities grew oriented to world-city

networks – but at the same time as urban elements grew oriented to urban grids. The condition of 'node' disappears as we interpret the urbanisation process itself as produced in the creative potentials in the *crossings* of grids. Of course, many sociotechnical networks like that of air travel have nodes built into them, but airports are there to facilitate the crossing of networks of global travel with regional and city networks. Looked at from this perspective, the city is an *effect* of the world network or grid, the neighbourhood is an effect of the city grid, and houses are effects of neighbourhood grids - while all of these have 'node-forming' consequences for the levels above. All these products are emergent, all of them urbanise oriented to particular grids. All will have moments of origination where they are less defined and defining and may even be surprising to the people experiencing them, and all of them will tend to become naturalised with time so that we forget their origins and think they have always been there.

The industrial period of the Western European city was also the time of the emergence of systematised public transportation. Indeed, the fact that public transportation uses the supergrid alerts us to the relatively higher 'level' of scale and 'publicness' of this network. This difference is reflected not just in the relatively higher rates and ranges of movement, but also in a more public role of the grid. The exemplary case is of course Haussmann's Paris, where the strategy of driving a joined up network of boulevards through the urban fabric to open it to city-wide traffic was also used to connect emblematic public buildings and railway stations. This city-level network defined a new public face of the city and this stood in contrast to the quiet streets joined directly with it which defined a more intimate neighbourly realm. As in Amsterdam, a more public 'supergrid' establishes the city level, as well as connecting this metageographical 'city' with neighbourhoods with neighbourhood-level

buildings and functions. These metageographical levels are factors of economy, society and governance. They enable the economic and social levels important in the production machine that is the industrial city. They underpin distinct municipal and neighbourhood 'community' and governance regimes characteristic of the industrial city. We can add these levels to those of the 'world' and the 'nation' mentioned earlier. Our historical construction of levels now consists of 'world-city' network, 'nation-city' network, 'city-neighbourhood' network and 'neighbourhood-house' network. These 'levels' are not abstract or metaphoric but perfectly real. They also *realise* the metageographic entities they

enact as places. This reality is emphasised by the empirical facts of the infrastructural 'grids' involved which are readily distinguishable and mappable.

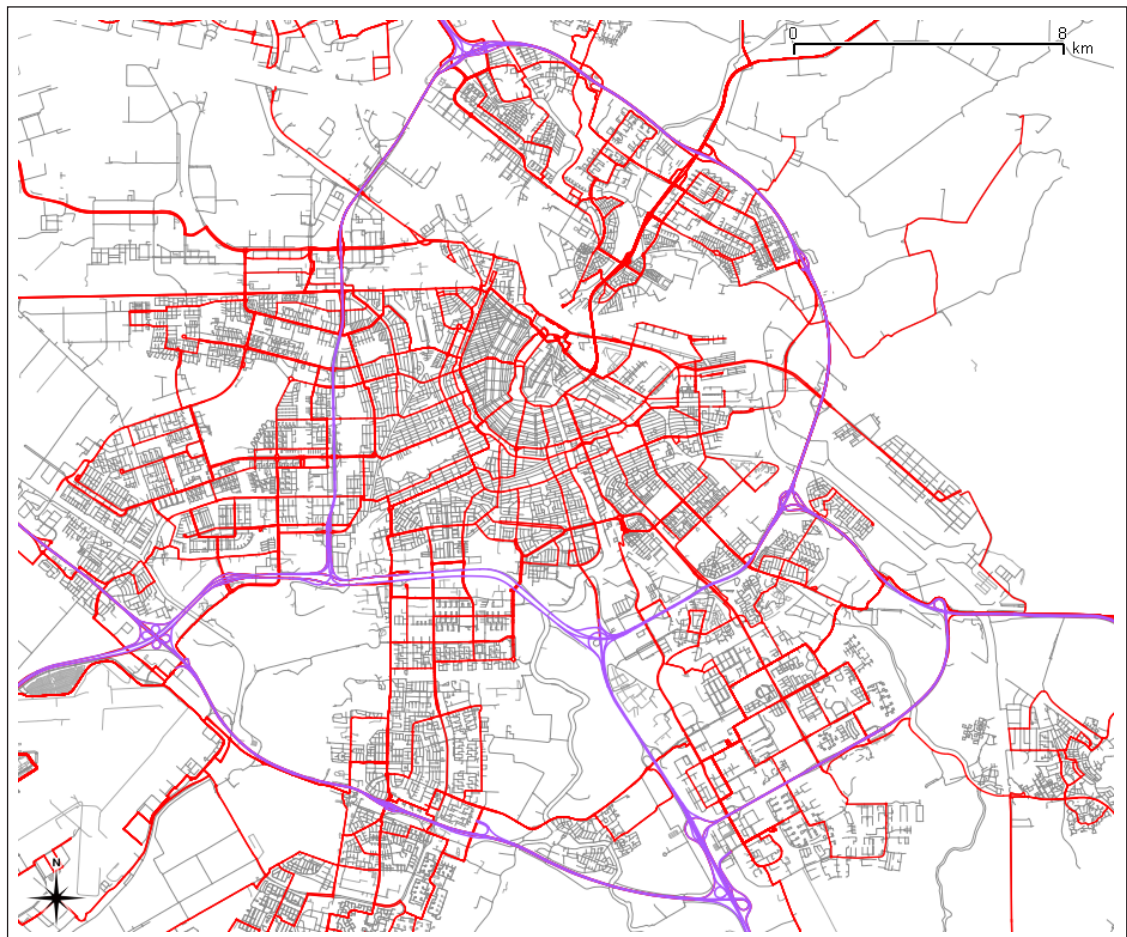
Some implications for the discussion of 'level' and 'scale' are now clearer. Scale is often thought of as size, but in urban thinking it has also been used to distinguish what we could call 'levels of analysis'. However, what these levels are is often not very clearly understood or articulated. In fact, the ontological status of scales has been contested, with many warning against their reification (Agnew, 1993) and some believing they do not exist really as anything at all (Marston et al., 2005). What has been described, however, is clearly something more

**Figure 3:**

**The mappable  
infrastructural 'grids'  
in Amsterdam's  
urbanisation.**

(colours correspond  
with those in Figures  
1 and 2 and with the  
discussion in the text).

Image: Jorge Gil.





than 'level of analysis', 'abstraction' or 'metaphor'. David Prytherch contributes a reality check, pointing to Wal-Mart's 'geography of big things' given in 'the outsized spatiality of the big box and the global commodity chains in which it is embedded' (Prytherch, 2007, p.456). From an infrastructural perspective Wal-Mart's global operations depend on a tightly coordinated sociotechnical organisation, in which goods, people and machines are distributed and scheduled. The space-time of this organisation *is* this distribution and scheduling, which is maintained by managerial, administrative and technical operatives who enact complex sequences and interconnections, and guarantee the material and informational transactions and chains that flow across it. Like any strategic construction, this one is maintained, and any breakdown of this space-time is met by a remedial response.

It is argued, however, that the *scale* in Wal-Mart's 'geography of big things' is something this socio-technical system also inherits from another more 'generic' network metageography into which Wal-Mart's global operations are, and must be, fitted. It is this metageography that world-city networks and supergrids have pointed us to. Prytherch still suggests however that hierarchies of scale 'may inhere more in a territorialised imaginary in political geography than scale itself' (*ibid.*), suggesting that at least a part of the 'scale problem' concerns a difficulty we have in understanding how our socio-technically constructed worlds are at the same time objective and 'imaginaries' – real constructions that *incorporate* knowledge about that world.<sup>4</sup>

The construction described here is clearly not a 'nested hierarchy of bounded spaces of differing size, such as the local, regional, national and global' (Delaney and Leitner, 1997, p.93). It has been shown that our conventional understanding of the spatialisation of cities and neighbourhoods by a diagram of nested areas needs to be replaced by another diagram of overlaid grids. Space is no longer defined in

bounded entities at all, but in actual infrastructures supporting and enacting metageographic levels and places. Levels and scales are not abstract but inhere in the grids themselves, through the places enacted and known in them. Through these grids we can understand the structures of nested hierarchies of houses, neighbourhoods, cities, regions, nations, and the world – not as an abstraction but as an in-the-world human construction.

#### A 'diagram' of urbanisation

As knowledge attaches to grids, so do processes of urbanisation, as accretions of big things, medium-sized things and small things oriented to the grids in which these things make sense and are operationalised. These accretions are also products of the creative potentials of the crossings of different realms of sense and context. The shops spring up at the crossing of the neighbourhood and the city; the central business district springs up at the crossing of world and nation; and the prime commercial districts emerge at the crossing of the city of metropolitan commuters and the city of neighbourhoods – although also at the crossing of the world and the city of commuters. A starting question of this paper was how we could elaborate the process of urbanisation so that we could better understand this process at different scales and levels, and began with Peter Taylor's world-city network, noting that he invokes Jane Jacobs to give priority to cities. In fact, Jacobs gives priority to the networks and sees cities as products of those networks. The 'creativity' she and her followers talk of starts with a process of urbanisation – with the 'creation' of the city itself.

A sketch has been outlined of the urban as a superposition of a number of metageographical levels. Elements of Peter Taylor's world-city network have been taken and his association of the local with central place theory replaced with what has been learned about urban networks and central place formation from space syntax and its working

#### Notes:

<sup>4</sup> The ontologies of 'constructed realities' have been tackled from a perspective of the hermeneutical philosophy of science in Read, 2012 and Read et al., 2013.



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on industrial city fabric. This enables us to track the formation of central places – or the potentials for these – as intensive emergent effects of the crossings of differently scaled networks. These include levels below that of the city or region so that we can track the emergence of centrality into the finer grained fabric of the city and city region. We should think of this layering as an artefact; an historically constructed ‘system’ or set of systems and a sociotechnics of places. This sociotechnics has made close and distant places systematically available to us, while it has also defined the ‘growth points’ at the crossings of the different levels it incorporates. Levels distinguish the normative and intelligible scales and identities of everyday human geographies, but also the scale-dependent interests and logics embedded in and distributed with them. The crossings of the layers allows different domains and scales of our multivalent economic, cultural, social and human lives to be recombined in central places where different valencies meet, complex work is done, and societies and economies are constructed and organised.

This is an entirely different way of spatialising urbanisation. Instead of material flowing into a bounded space to agglomerate as density, spaces are constructed historically as networks, under the influence of ideas of ‘modernity’ and new technologies incorporated in logics of production, reproduction and scale. New spaces cross with existing spaces defining central places. How this pans out in real urban space can be seen not only in the global-scaled central business districts of contemporary world-cities but also in the shopping streets that support minor economies in the crossings of the ‘supergrid’ and regular grid in fabrics that were new in the industrial era. Urbanisation is a production not only of the networks and practices of global communications and movement, but also of the networks and practices of walking and public transportation. We can propose a provisional typol-

ogy of different urbanisations and types of central places based on this layering of levels: the neighbourhood urbanises around a grid that connects house to neighbourhood; the inner city urbanises around a grid that connects neighbourhood to city; the metropolitan city urbanises around a grid that connects city to metropolitan region. We could go on until we define the world as formed around a grid that connects world to city – while it also connects world to global region, nation and metropolitan region. There is a great deal that is complex about what is just written and needs to be explored further, but the framework and the diagram are clear – as clear as the world is most of the time to us living in the knowledge incorporated in our networked metageographies.

A typology of urbanisation levels opens ways of thinking about social, economic and cultural places at scales and scopes other than the global, and opens up more varied ideas about and strategies for future development. In China, for example, ‘an exploitative model of urbanisation’ has raised questions about whether future urbanisation should be led by a modernisation linked to a destructive economism, and as China’s cities continue to grow, the ‘biggest challenge is to find a healthier path to urban development’ (Miller, 2012, p.150). This path will need to create opportunities for a more varied spectrum of people and economies, and be based on a more layered, sustainable, and socially enabling urban model.

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