

Editorial

At the crossroads of urban growth

The exploding metropolis of Wuhan lies at the junction of the Yangtze River that divides China into north and south, and the rail line linking Beijing, the capital in the north, with the megalopolis of Guanzhou-Hong Kong in the south, itself neatly dividing China into east and west, the coastal cities and the interior. I first visited the city in 2006 and found it to be a confusing place, with a lot of the old China but much of the new. I attended the fiftieth anniversary of the Wuhan Technical University of Survey and Mapping, which had merged with the University of Wuhan a little earlier, but had been set up in 1956 when Chairman Mao directed that all expertise in China in this area be brought to Wuhan to train the cadres of surveyors and engineers that would build the new China.⁽¹⁾ Back in 2006 I had little sense of how the city was formed, for there seemed to be several cities all competing for pride of place, and it did not help that in those days, instant web maps on phones were in their infancy; indeed smart phones were only just making their appearance. It did not seem to help either that I had examined a thesis at the International Institute for Geo-information Science and Earth Observation written by Jianquan Cheng on the cellular automata modelling of Wuhan supervised by Ian Masser (Cheng and Masser, 2003), but the maps and the model seemed far away from the imagery of the city or cities that I then encountered. In 2009 when I visited again, the city seemed even more complicated to figure out and no one was able to provide me with a detailed map. The airport was rather run down but there was massive construction, particularly of new freeways and metros, that made travel difficult. I have just visited a third time and, now equipped with my smart phone, I could figure out how the city was formed and got a real sense of the speed of its growth which is as rapid as anything I have ever experienced.

Wuhan is really three cities that occupy the three locations formed by the intersection of the Han River with the Yangtze. The Yangtze runs from southwest to northeast at that point and thus the area above the Han and on the west bank is Hankou, one of the original treaty ports that the Western powers extracted from the Qing Dynasty by way of economic and political concessions after the Opium Wars in the mid-19th century. Below the Han lies Hanyang, the Chinese settlement serving Hankou, and on the east bank there is Wuchang, the ancient Chinese town that is by far the oldest and which is rapidly becoming, after Hankou, yet another major business district. The city's population is now about 11 million but, as with all city definitions, it depends how far from the Han–Yangtze river intersection (the geometric and economic centre) one draws the boundary. It appears that Wuhan is about the size of Greater London plus its outer metropolitan area. Its rate of population growth is still phenomenal: from 6.5 million in 2000 to 7.9 million five years later, and 9.9 million in 2010. Three metro lines have now been built; two of these since 2010; a fourth opens next month; three more are planned by 2017. The old airport has been demolished, a new terminal built, and a second is under construction. A second runway is planned: a key requirement for a world city which it is fast becoming. There was even talk of a second airport before the old terminal of the first was demolished.

⁽¹⁾It is not really surprising that many of those trained in Wuhan now constitute one of the most dominant groups of Chinese scholars in GIS and remote sensing around the world, particularly in North America.

What is so remarkable about this city is the speed at which its evolving master plan is being implemented. Wuhan as a city contains a very diverse mix of modern manufacturing industries—many cars are built or assembled here (Nissan, Honda, GM, Peugeot-Citroen, etc)—but there is a massive concentration of education too. There are eighty-six universities and 1.2 million students which is not far short of the number of all the undergraduate students in Britain. To comprehend this scale and indeed the plans for how the city is generating ever-more growth and development, the rather quaintly titled city hall—The Wuhan Citizens' Home—itself a new 3 million ft² building, contains a remarkable exhibition of city planning prowess. This is a sort of one-stop shop for a mixture of citizens advice and local authority services. Some 30% of this enormous building is given over to this exhibition which contains at least three traditional physical models of the city and its region all augmented by different forms of information technology to aid those interacting with the exhibits. The entire history of the master plans for the city since the late 1940s is also laid out here. Wuhan is such a complicated place and its growth so massive that this kind of exhibition is almost essential for any newcomer to grasp the scale of development. The kind of surprise that I encountered on this last visit was due to the coming together of all these new developments which can only be appreciated with respect to future growth by examining the scale of what is being planned. Under construction, for example, is the second-largest skyscraper in China, the 606 building (named after its height in metres), and there are plenty more like this in the pipeline. From a situation some ten years ago when the scale of business activity was somewhat low key and mainly based in Hankou, several business districts are now planned. Complemented by a series of industrial clusters, the city is rapidly becoming one of the most visible examples of planned polycentric development.

One feature of the exhibition space is something equivalent to what is being called a City Dashboard. Some of us have recently written about such dashboards which are essentially portals, usually web-based pages that link directly to some raw data or some simple translation thereof captured from real-time data feeds, usually involving data that can be archived from APIs (applications programming interfaces) (Kitchin, 2015; O'Brien et al, 2014). In essence, they are simply displays of data available in real time, often close to the original data with little or no interpretative spin being put on the data by those who compile them in this form. The most effective of such data are those pertaining to traffic and movement for they provide a sense of the functioning of the city in real time. Other feeds, such as the weather or what is trending on Twitter, are often of serendipitous value for they cannot easily be used in city planning other than as background information. In the Wuhan city exhibition there is a dashboard monitoring traffic as it is moving in real time in the city where the state of congestion on the system is graphed as flow maps. Pictures of this from web cams mounted on the roadside and a simple analysis of the patterns of movement over the past 24 hours are shown. These data are in fact supplemented by GPS data in real time from 7000 buses, 15 000 taxi cabs, and the 2 million or so users of the metro system whose journeys are recorded from their radio-frequency identification payment cards. The exhibition reflects a strange mix of the present and the future. Cities in Western countries have all-but abandoned strategic planning, but pride themselves on automating their functions with smart-city technologies. Wuhan is doing both. There are no hangups about the fact that all of this is control, planning, and management from the top down while at the same time those affected are being informed through exhibitions such as this which operate from the bottom up.

There is much to admire in what is happening at breakneck speed in Wuhan, for the city is not only growing but, in the process, regenerating and lifting itself up in terms of dealing with the worst excesses of pollution and social inequality. But Wuhan once again raises the perennial question as to where such urban growth comes from. Migration from the countryside and indeed from other cities is clearly the driver, but the actual cost of development and the

provision of infrastructure do not relate to any obvious links to innovations in technologies, services, and manufacturing, to markets in the traditional sense of the word. Wuhan does not appear to be inventing anything that will change the world. There are no Apples here, no Silicon valleys, no Samsungs, no Acers even. But there is an enormous desire to build world-class financial services, high-tech manufacturing, higher education, and so on, all things that one assumes are way down the economic chain that is usually associated with spillovers from technological innovation.

So what is driving this urban growth in China in general and Wuhan in particular? The BBC economics correspondent Robert Peston (2014) has little doubt that all this is financed on debt. In a hard-hitting and highly entertaining BBC documentary entitled “How China fooled the world”, he argues that, after Lehman Brothers collapsed in September 2008 heralding the Credit Crunch and the Great Recession, the collapse in demand for Chinese products was so catastrophic that the State Council virtually forced banks to print money and to lend it out wherever possible. In a land where the population still prefer to save rather than spend, this meant lending to the building industry. The debt in China has accelerated from \$4 trillion in 2008 to over \$12 trillion now, some 250% of the entire GDP of the Chinese economy. In fact, it is the increase in its debt from 100% of GDP in 2008 and its rate of growth that is the most worrying factor. This is still far outstripping the increase in economic growth; it shows no sign of slowing down; and the prognosis is dire. Peston illustrates what this means in terms of urban growth and his example is Wuhan.

It is almost impossible to know what Wuhan’s debt actually is. As anyone reading this editorial who follows the world’s recent economic crisis will know, much of its financing is behind closed doors, in shadow banks. But at the local level, at the level of a city, we have never had much clue about how debt or credit, or any kind of income for that matter, is associated with different localities. The figures are aggregated in ways that mean that spatial disaggregation is virtually impossible. The big question is what will happen if growth stalls. Already in places like Wuhan, many new buildings remain empty because demand is already completely out of sync with supply. There is rampant inflation in housing markets, for example, with little sign of any adjustments taking place. At some point growth must slow down, but the prospects for a soft landing are ever more unlikely. In modern times, we have never had rates of urban growth like this and at some point growth must end. Is China in general and Wuhan in particular fast heading towards this crossroads?

Michael Batty

References

- Cheng J, Masser I, 2003, “Modelling urban growth patterns: a multiscale perspective” *Environment and Planning A* **35** 679–704
- Kitchin R, 2015, “Knowing and governing cities through urban indicators, city benchmarking, and real-time dashboards” *Regional Studies, Regional Science* forthcoming, https://rd-alliance.org/sites/default/files/KitchinLauriaultMCardle_DRAFT-Indicatorspaper_RSRSsubmitted.pdf
- O’Brien O, Batty M, Gray S, Cheshire J, Hudson-Smith A, 2014, “On city dashboards and data stores”, paper presented at Big Data and Urban Informatics Workshop, The University of Illinois at Chicago, 11–12 August, <http://urbanbigdata.uic.edu/>
- Peston R, 2014, “How China fooled the world”, BBC Two, 18 February, http://www.dailymotion.com/video/x1zcgvo_how-china-fooled-the-world-discovery-finance-business-documentary_tv