2.6
REFUTATION AND THE KNOWLEDGE BASE OF URBAN PLANNING

Chris Webster

1. Introduction
Karl Popper, one of the great intellectual products of the Austro-Hungarian Empire, was deeply disturbed by some of the other intellectual ideas emerging in Europe in the early twentieth century. Among them were Sigmund Freud’s psychoanalysis and Karl Marx’ material determinism. Popper’s problem was not political or ideological but practical and methodological: such was the all-embracing nature of these general social theories that he was not at all sure anyone could ever disprove either of them. For this reason he concluded that they were pseudo-theories that couldn’t be relied upon to build a body of valid, reliable and useful scientific propositions. Refutation, he suggested (following others before him), was the superior principle to guide knowledge accumulation.

In this chapter, I reflect on the state of the knowledge base in urban planning and suggest that it is in need of methodological overhaul. Using illustrations taken from recent personal experience as a planning thinker, adviser, teacher, practitioner and researcher, I call for more rigour, continuity and coordination in planning research, which is currently characterised by an irrelevance to practitioners; inability to engage with research from the more scientific disciplines queuing up to work with planners on sustainability, health and economic development issues; too little sustained knowledge accumulation; lack of generalisable findings; too little well-formed theory; and possibly (though it could not be proved) too much pseudo theory.

2. Knowledge deficits in planning

Knowledge for practice
The distinction between theory for and theory of planning made by Andreas Faludi (1973) and recently used by Mike Biddulph (2012) in defence of the Anglo-American urban design niche is a useful one for starting this discussion. When any subject goes into a university, it experiences the same tension. Nursing and physiotherapy have experienced it in the UK since switching to a university-based education in the 1980s. So also has surveying and construction management, since the opening of surveying schools in British ‘polytechnic’ universities in the 1960s.
Planning and architecture first became university subjects in the early twentieth century in England and have had a longer time to separate academic from practical scholarship. The British journal *Planning Theory and Practice* was an enlightened project in this respect and has no doubt helped patch the divide in places. The *Journal of the American Planning Association* and *Journal of Planning Education and Research* do a similar job in the US, but a recent paper and accompanying published debate (Goldstein and Maier 2010) suggest that these journals, which were recently rated as the most important in a survey of American planning academics but have relatively low impact factors, may mainly cater for *readers* rather than for *writers*, with much of the research in planning published in more highly cited specialist and interdisciplinary urban journals (Webster 2011). Even in learned journals, the practice-research divide seems inevitable.

Among the drivers of knowledge creation in planning schools, unanswered researchable questions from practitioners are not very prominent. I recently participated in an EPRC (UK Engineering and Physical Sciences Research Council) project that at great expense flew twenty or so Chinese senior planning practitioners, together with researchers from four prominent UK university planning research units, first to London and then to Shanghai to develop a fundable research programme. Several viable projects were specified but, as far as I know, none made it to the funding council. The programme seemed to abort not through lack of academic ideas but for lack of interest among the practitioners. There were literally no compelling research questions that they wanted answered. The anecdote highlights a more generally applicable problem. Planning apparently is a type of activity where it is difficult to pose practically relevant scientific research questions. This must partly be to do with the nature of the activity and the (wicked) problems it addresses; but as I elaborate ahead, it is also something to do with the nature of the knowledge base developed in academia and underlying professional training. In China, that knowledge base is predominantly design-focused. In the UK and the US, it has become predominantly social science–based. Neither is ideal on its own for evidence-based planning practice and practitioner-relevant theory.

**Knowledge for cross-disciplinary studies**

The knowledge base of planning is found wanting in another respect: links with that in other disciplines. On two occasions recently, I have been embarrassed on account of this.

The first was during a UK Treasury review of the national land use planning system, in which Treasury officials asked the question “Does planning inhibit economic growth?” At a meeting of prominent planning scholars hosted by former prime minister Gordon Brown, while he was chancellor of the exchequer, it was quite clear that most of the planners found great difficulty in articulating their understanding of the purpose and practice of planning in a way that allowed the chancellor’s question to be answered factually.

The second was at a meeting between public health academics from a prominent UK medical school and a group of urban planners and designers interested in engaging with the public health agenda. The epidemiologists wanted answers to the very reasonable questions “How do you judge the effectiveness of your urban designs and other planning interventions?” and “How do you design a healthy city?” Not only were many of the planners unable to align their own knowledge to these focused questions, but some were openly antagonistic to the idea of being able to measure cause-effects in any field of enquiry. It was the urban designers’ antipathy towards science that broke the dialogue.

Public health academics and practitioners have rediscovered urban planning as “the ultimate public health intervention”, as one professor of public health recently put it to me. For planning, this takes us back to our modern roots in the nineteenth century. If we are to re-engage, we have
to reset planning scholarship within the scientific paradigm. Similar comments may be made about engaging with environmental scientists and building scientists to build energy-efficient and environmentally prudent cities, and with economists, financiers and property scholars and practitioners in building economically viable cities.

Well-founded theory

Urban planning, in my view, is best thought of as the coordination of private and collective plans for the use of land (see Webster and Lai 2003 and Webster 2007 for an elaborated argument). Although this is a broad definition, it is narrow compared to the range of theoretical and working definitions of planning found in the planning academy and illustrated in this book. It is not surprising therefore that planning academia has a tendency to sprawl into a generalist and unfocused subject area. One result has been the inability to develop and test well-founded theory for the subject. To do so would require more agreement on the subject of theory, on the questions that need answers and on appropriate methodologies.

Continuing to trawl recent experiences for evidence, consider the following sad example. I was called by a would-be developer to intervene in his negotiations with the local planning officer, who was insisting that he modify an unusually well-designed planned extension to his semi-detached countryside home. The planning ‘expert’s’ argument was that the development would overshadow the garden of the adjoining semi-detached house and lower its value. The owner-developer reasonably counterargued that the adjoining owner was happy with the design, believing it to add quality and style to the pair of properties and that in any case, the allegedly shaded area was not on the side of the property that the neighbours used for outdoor living. The planner’s response to this was that even though the current neighbour might be happy with the design, a subsequent owner might not be and it was the planner’s responsibility to maintain the quality of the built environment for future as well as present beneficiaries.

I hope that the absurdity of this is immediately apparent to readers. The fundamental error of professional judgement comes from a fundamental error of understanding. The planner failed to understand several axiomatic ideas. First, on behalf of the local state, he was invoking planning regulations to (a) reduce the current welfare of the owner-developer, (b) reduce the current welfare of the neighbour and (c) reduce by some marginal amount the volume of trade in the local building industry. Second, the alleged social gain achieved by these all-round private losses was the welfare of a subsequent private buyer of the neighbour’s house. The planner completely failed to appreciate that the effect of the proposed house extension would be priced into any buyer’s bid for the property, which may be higher or lower than the property without the development, depending on whether it added to or took away from the original specification of the house. Of course, the planner may have been guided by a more nuanced application of the same theoretical idea: that the alleged negative effect of the design would not be priced into the bid of a future buyer because of noisy or asymmetric information. But this would not have been a reasonable proposition given the facts and, in any case, the planner concerned displayed no sign of understanding elementary land economics. Had he had such understanding, he might have noted that he was both (a) raising the transaction costs of the minor development project by repeatedly objecting to a win-win design and (b) lowering the value of the transaction to all parties.

Given the dreary emphasis in UK planning on controlling the minutia of the residential development market over the decades, one would expect that somewhere central to the planning curriculum would be a well-founded theory of land and property values, starting with Aristotle and visiting Ricardo, von Thunen, von Mises, von Hayek, Coase, Alonso and others.
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(see Harvey and Jowsey 2004 or any other text on urban land economics for an introduction to land value theory). Somewhere in this, all students of planning should surely be tested on the idea that externalities, under certain conditions, can be expected to be internalised into the property market. If they were to look at even simple development control decisions from the lens of value theory, planners would be able to make really expert decisions based on well-founded logic and supporting evidence, rather than parroted precedents, ill-founded heuristics and flawed reasoning.

Cumulative knowledge

Lack of well-founded theory means many poor decisions leading to a weak profession. It also makes it difficult for knowledge to build cumulatively. Instead of orderly and progressive paradigm development and shifts, you get fashions of thought, unguided by the utility or efficacy of knowledge or by the demands of logic, proof, refutation or evidence. You also get reinvention of wheels. That itself may not be a problem if later wheels are rounder than earlier ones, but some are clearly squarer due to discontinuities in thought. The top Chinese planning journals (led by Tongji University’s Urban Planning Forum) are full of an innovative mix of old and new ideas in search of theory useful to practice and in search of peculiarly Chinese urban theory. There is some reinvention and some innovation, but one thing many writers share in common is bewilderment about postmodern and later western urban theory. You still find charts and tables and equations in Chinese planning journals, along with jargon-free discussion uncluttered by high-level social theory – in search of models, theories and ideas that might help answer practical questions, such as: what is the optimal mix of uses in different parts of the city; how big should a new town with a subregional finance economic base be; on which side of Xi’an should a satellite city be built; and what is the impact on GDP of growing a city by radial expansion compared to shifting the CBD to the city fringe? Practising planners in China, as I have noted, are generally too busy to structure such questions. Chinese academic planners, however, are a good source of truly useful research questions, although, ironically, most are too busy with second jobs as consultants to embark on serious programmes to answer the questions they pose. They look to the West and its century of modern urban planning scholarship for answers but do not find many. It is an indictment on those of us in western planning schools that our Chinese counterparts have to cite so many old research papers in pursuit of useful theory.

3. Generalisation

I have taken to conducting PhD workshops in planning schools around the world, where I invite the brave to expose their research designs to critical peer appraisal. These have proven popular for a number of reasons, including the sense of enlightenment that breaks out when students realize that research design is a matter of common sense, not bookish philosophy. One of the first issues usually to surface in discussion is that of generalisation.

In one session, I went head-to-head with a postdoctoral researcher who had conducted his PhD study on the use and meaning of small urban parks. I asked how many parks he had studied and he said, “One”. I asked what the findings had been and the answer was “stories of park users”. I asked what particular insights from this might be generalisable and he said, “None”. It was a case study and the intention was not to generalise. I asked who might be interested in the stories then and he said those who use the park. At this point I suggested that this was not social science but art. The proof is in the output – namely, ‘stories’, or literature.
What started, no doubt, as a valuable philosophical and methodological debate has become something of a suicidal fixation in social science. It was an entirely good idea to borrow from the humanities more systematic methods of textual analysis, such as literary criticism and hermeneutics. But at some point, ends as well as means were borrowed and beauty and elegance in thinking, conceptualising, writing and speaking became as important as, or more important than, clear understanding. As with a piece of literature, embellishment and obfuscation became more important than simplification and enlightenment. You can tell an urban scholar who has slipped, wittingly or unwittingly, from social science to art: he reads his talk from a script. I have seen enough clever scholars doing so to be convinced that the reason they read verbatim is not because they have failed to master the language of their chosen (usually French) paradigm. They do so, I think, because what they are engaged in is art and the lecture, for them, has become performance. I found convincing existential evidence of this at a recent talk from a particularly erudite visiting scholar at my school. At the end of the talk I searched in vain for anything useful that I had learned. But in spite of this I came away feeling strangely inspired. She had failed to explain anything but had lifted my spirits – like spending an hour in an art gallery. Critical social and cultural theorists are not alone in this diversion from science. My own conversion from neoclassical urban economics to so-called new institutional economics and other heterodox theories that rediscover the more unified political economy of the Scottish Enlightenment and earlier came at an international gathering of theoretical welfare economists. The mathematico-deductive models that I had finally mastered proved to be no less fictional than the over-wordy stories of cultural theorists. The best of them were awesomely elegant: a numerical form of art.

To generalise responsibly you need empirical science. The first step in empirical science is categorisation. Literature also needs categories and literary stories can be described by category (types, formulaic plots, styles and so on) and can also be used to generalise (as in fables, parables, myths, allegories and so on). But to produce generalisable answers to questions about cities and city planning you need to follow scientific principles: well-founded typologies and theoretical models to describe patterns displayed by the types and to describe, explain and predict relationships between them. You also need categories that you can measure. And you need to make claims of knowledge cautiously.

4. Refutation in design and science

There are different approaches to creating a body of generalisable knowledge. Precedent case studies are a good start. Medical researchers and practitioners make use of online repositories of case histories, which they use to observe patterns, identify instances of drug interaction effects, drug side effects, unusual outcomes from multiple pathologies and so on. Urban designers, like architects, like to use precedents as a source of ideas in solving a design problem. The process can be thought of as analogous to the philosophical method of refutation.

A designer explores alternative precedents in search of inspiration – patterns of solution that might apply in whole or in part to the current design problem. While no two design problems are identical, there may be generalised solutions – abstractions hiding the details of an infinite number of permutations of detailed elements but nevertheless recognisable as a discrete category of ‘solution space’ (giving rise to distinct design genres, for example). The better the designer, the more fluidly can she move between discrete and continuous solution space (mixing genres, for example).

A scientist might hypothesise an initial state, end state or mechanism of change. A designer is principally concerned with hypothesising a mechanism of change (restructuring the built
environment). He will also make assumptions about initial and end states: the design will be intended to address certain existing or anticipated problems in a way that produces a more desirable end-state. The hypothesis (design or plan), as a mechanism of change, is ‘tested’ against the desired end-state (the brief) or perhaps against the difference between initial and end-states. Rejecting or modifying a design is equivalent to rejecting the hypothesis that the design creates the desired end-state. A good designer will actively attempt to reject her working designs, looking for flaws at successive levels of detail in order to find a better fit between initial state, mechanism of change and end-state. In this way, good design works through refutation. Large city architectural studios might employ tens or even hundreds of designers, each attempting to refute (and improve) different parts of a working design.

The same can be said of urban planning more generally, be it urban design at a building, street or block scale or more complex neighbourhood, corridor, city or regional plans. But as we move higher in scale and complexity, so the refutation process gets more problematic. It is relatively easy for the designer of a domestic bathroom to select between three alternative designs on the basis of a few performance parameters such as privacy, movement, aesthetics, range of functions, ventilation, light and drainage. It is made all the more easy by unitary property rights: the design has to please only one client (although the client may have to resolve the interests of multiple users – such as family members – each with different demands). Scaling up inevitably involves less complete sampling of solutions space and more dimensions against which to test hypothetical solutions.

The nature of the design process changes qualitatively when you move from single to multiple property clients – that is, when planning the public realm. This roughly equates to the boundary between architecture and planning as a professional activity. At this point the burden of proof in testing plans becomes higher because the designer/planner/policymaker has to justify the solution to multiple stakeholders. While an architect designing even a large project for a single client under a unitary property right can argue the case for one design over another around a boardroom table or over a Starbucks, a public domain plan that aims to coordinate the private plans of many individual property right holders has to be justified with more carefully composed and evidence-based arguments. ‘Refuting’ working plans in such circumstances will require more sophisticated skills, including assessing options in terms of future benefits and costs. The client, representing the interests of multiple stakeholders, may require more than intuitive reasoning based on precedents and design heuristics: she may require energy models, discounted cash-flow models and models of pedestrian footfall, land-use transportation and retail expenditure. A plan for multiple clients will have to proceed with a more complex mode of ‘refutation’. The planning process will become more politics backed by science and less of an art (but always a mixture of both). Particular stakeholders will want evidence that their preferences have been accommodated, and where they have not, they will want careful justification of the reasons. Planners and policymakers will need defensible propositions and theories to ‘fix’ a particular distribution of rights and resources in a plan according to the politics of the collective decision authority.

So the mayor of a newly designed Chinese eco-city once asked me, “How do I know if my master plan maximises land values?” A civil servant at the UK Treasury once asked me, “What’s the minimum population size to support a tram system?” A gated community developer in South Africa once asked me, “What’s the optimal size of a private neighbourhood?” A senior planner in England’s Department for Communities and Local Government once asked me on a train journey, “How should we calibrate the new Community Infrastructure Levy?” and relatedly, “What is the maximum that could be taken from land profit to fund social infrastructure?”
The Laffer curve in economics postulates the existence of an optimal tax rate for any particular tax base, with estimates of between 32 per cent and 35 per cent in recent empirical calibrations for the US. Move beyond the curve’s peak and the tax base diminishes as higher taxpayers leave the country, move their businesses offshore, find legal loopholes or cheat. The volume of overall tax receipts goes down as the tax rate goes above this level and no one gains. What is the equivalent rule for land value taxation? For planners in the UK, negotiating exactions (also known as developers’ contributions, compensation payments, betterment levy, etc.) in cash and kind has been routine for many years, and it strikes me that had we researched this behaviour systematically, planners might have something roughly equivalent to the Laffer law to guide them – and of course to test and improve through refutation. The Turkish government recently enacted a pragmatic step-function land value tax curve: a five-year 40 per cent tax on land betterment. After five years of continuous ownership the tax reduces to zero. This partly accounts for the flow of investment funds into Istanbul and hot spots on the country’s Riviera. Had the 40 per cent tax not been time-limited, the tourist industry would not be as buoyant and many Turkish towns would not have started to grow in wealth and public facilities. An early British experiment that took virtually all development profit brought the post-war land market to a grinding halt, as the Laffer curve predicts.

And so we move from design to science. How can we know the answers to such fundamental principles of urban planning and management? Only by careful study and progressive refinement of theories on the basis of evidence. And the safest method, for well-documented and widely accepted (but not undisputed) reasons, is refutation (Popper 1934/2002).

I once saw two black swans swimming on Lake Taupo, New Zealand. For me that is sufficient evidence to refute the hypothesis that all swans are white. Had it been the first reported sighting of black swans, it might not have been sufficient. I would have sold the photo for a high price and the world’s ornithologists would have flocked to Taupo to verify and explain the sighting. Had they found that these were two mutant creatures, a chance product of Taupo’s otherworldly geothermal landscape perhaps, then they would not have verified the hypothesis that all swans are white; they would have merely have failed to refute it. But along with all the other sightings, my photo does refute it. So ornithology and philosophy can move on. (Karl Popper illustrated his notion of refutation by examining the claim that ‘all swans are white’, which many in Europe at the time assumed was the case.)

Popper’s argument is that we can only refute knowledge claims. We cannot prove them to be enduringly true. This is not an approach that has been widely adopted in the social science underpinning urban planning. Under the influence of the worst kind of social science (see penultimate section ahead), knowledge about the complex adaptive processes that create, sustain and change cities has faltered. Untested or inadequately tested claims are made all the time, so much so that it makes more sense to talk in terms of planning doctrine rather than planning knowledge.

We hardly know what we know, and what we do know, we find great problem in applying to the normative and creative processes of planning and design.

5. Examples of knowledge building by refutation: in pursuit of design parameters for healthy, wealthy and green cities

Some years ago I published a paper specifying the policy design parameters for a sustainable city (Webster 1998). It was something of a tongue-in-cheek exercise in general equilibrium modelling. Its one redeeming feature, perhaps, was to make the point that to shape a city we need to
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have some understanding of the trade-offs between the quantity of private and public goods and of the way they co-produce wealth and welfare.

A far more useful class of model in trying to parameterise an optimally specified city is social network analysis applied to two-dimensional urban space, or to a topological model of that space. sDNA (spatial Design Network Analysis) is one such approach: a simple tool we have created at Cardiff University to make use of the complex information stored in a city’s road grid (www.cardiff.ac.uk/sdna). Remarkably but, if you think about it, not surprisingly, a city grid that has evolved over many years, decades or centuries holds a lot of hidden information about the way individuals interact with each other. A city, after all, exists because individuals need to transact with each other; a grid shows us many things about how they order themselves in pursuit of transaction opportunities.

Bill Hillier invited me to give a talk at the seventh International Space Syntax Symposium in Stockholm, where at risk of seeming rude, I expressed cynicism about the claim that measures of general accessibility [which is what space syntax (SSx) is] (see also Chapter 5.7, this volume, where Törnqvist makes use of space syntax) could outperform measures of special accessibility (defined ahead) in predicting the spatial pattern of activities in a city (Webster 2010). So my team at Cardiff set about trying to refute the notion: first, by developing a variant of SSx that can handle large networks fast and that overcomes some of the technical problems of SSx (sDNA was the result); second, by initiating a research programme to test the power of SSx and sDNA network metrics in explaining important patterns of urban performance measures central to the concerns of practising planners and designers.

Healthy cities

In a recent paper, the Cardiff team set out to refute the hypothesis that space matters when it comes to obesity and mental health. More specifically, we wanted to refute the rather fanciful idea that where you live in a city and the physical design of your neighbourhood affects your body mass index and mental health (measured by a standard psychological instrument). The study is reported in Sarkar, Gallacher and Webster (2013) and so there is no need to repeat the details. The basic gist, however, is as follows. Caerphilly, a small settlement system of about 150,000 people in industrial South Wales, is one of the most intensely studied epidemiology and public health laboratories in the world, having been researched closely for over three decades by pioneering epidemiologists Cochrain and Elwood and others at Cardiff University’s Medical School. We decided to add SSx and sDNA measures to well-founded epidemiological models of individual health. This would test the notion that the general accessibility conferred by urban configuration and design adds independent explanation to models of health variation.

Over a hundred accessibility metrics were computed for each of over one thousand members of the Caerphilly Prospective Study, including, for example, measures that capture a location’s accessibility to health centres and to green space; measures of population density at a location; and the degree of use-mix within walking distance (all these being special accessibility metrics). Two general accessibility metrics were computed, each at multiple radii: closeness and betweenness (following tried and tested SSx methods; Hillier 1999). Closeness measures the degree of connectivity of a location to all other locations within a search radius. Computing this at walking distance radius indicates a location’s advantage for interacting with all other available locations by walking. Computing the same index for the whole city or some part of it above walking distance radius measures the advantage a location confers in respect to interacting with all other locations by car (or if the search area is adjusted to transit points, by public transport).
Betweenness, on the other hand, computes an interaction matrix of shortest paths between all pairs of locations in a city (links on a network) and indexes a location by the number of those shortest paths passing through that location.

Our test involved attempting to refute the hypothesis that the general accessibility measures of closeness and betweenness improved an otherwise well-founded medical model explaining variation of (a) body mass index and (b) mental health among elderly men in the city of Caerphilly. The null hypothesis was that there is no relationship between urban configuration and individual health. To our surprise, several of the special accessibility indices and both closeness and betweenness were significant in ‘explaining’ variation in these two health measures, holding all other factors (age, health history, smoking and drinking patterns, socio-economics and so on) constant. We thus had to reject the null hypothesis that urban configuration doesn’t matter and, in so doing, identified new working hypotheses about specifically how it does matter – hypotheses about designing healthy cities for the elderly. These hypotheses provide the basis for principles that might be expected to feed into planning solutions and the planner’s own solution hypotheses.

For example, we found that distance to green space was negatively related to obesity, *ceteris paribus*. This turns a popular urban planning doctrine on its head. It appears that elderly men in Caerphilly tend to include a walk to a green area in their regular time budget such that those who live further away walk more and thus tend to be less obese. Or perhaps they purposefully choose to walk to further away green spaces in order to achieve a target exercise diet. Similarly, men living on steeper slopes (measured by the standard deviation of digital terrain model height within a certain radius) had lower body mass index. Our results suggest that communities planned for mobile elderly people should be built on slopes and at a challenging distance from recreational green space.

A layperson might expect this kind of evidence and the research methods and theory behind it to be part of the bedrock of urban planning knowledge and expertise. If it were, perhaps the academic-practitioner divide would not be so great and perhaps practising planners would wield more influence in shaping cities.

**Wealthy cities**

In another Cardiff study (Yang, Orford and Webster, forthcoming), we tested the idea that measures of general accessibility taken purely from the geometric and topological information contained in a city’s road grid can add explanation to a well-founded hedonic model of house price (a model that predicts house price on the basis of component on-site and off-site attributes and isolates their respective contribution to value). If this hypothesis is upheld by evidence, we can use road grid geometry to help designate housing market areas, identify functional neighbourhoods, find locations more likely to respond to different kinds of regeneration investment and so on. The paper contains the details.

In summary, for sample neighbourhoods in the city of Cardiff, South Wales, we regressed house transaction price taken from the national Land Registry against a standard set of hedonic variables, including age of house, number of rooms, type of building, distance from CBD, distance from a major park and so on. To these we added closeness and betweenness measures for each house. Our null hypotheses were that these measures contribute no additional explanation of variation in house prices, other hedonic variables being held constant.

Again, with some surprise, we rejected the nulls and found evidence supporting the idea that urban design influences house prices above and beyond traditional morphological measures,
such as distance to CBD. In fact, the test exposed an intriguing feature of the relationship between grid-connectivity and house price. *Closeness* was positively correlated to price, *ceteris paribus*, and *betweenness* was negatively correlated with price. Other things being equal, a house located on a link in the grid that is geometrically (not empirically) on many shortest paths through the network empirically has a negative price premium. A house on a link that geometrically has a high index of connectivity to every other link in the network has a positive price premium. What we have discovered, we hypothesise, is that negative and positive agglomeration externalities can be distinguished from network morphology alone. This corroborates the finding from the health study that negative and positive health externalities can be picked up from urban morphological models.

The hedonic house price modelling literature is extensive and provides a stock of findings that should help planners evaluate plans. Like the growing health-built environment literature, it is neither pursued consistently enough by planning researchers nor used enough as working knowledge. The latter problem is no doubt partly due to the former. Our findings from the Cardiff housing market study generated a new set of hypotheses. Other researchers need to try to refute them in favour of better alternative hypotheses.

**Green cities**

The black swan story shows that knowledge can develop by refutation without statistical modelling. To show that this is the case in planning, consider the case of Cairo’s green space.

In a third Cardiff paper (Kadafy, Webster and Lee, forthcoming), we set out to test a proposition borrowed from the economic theory of property rights. The theory states that clarification of property rights over a scarce resource will not only protect the resource from depletion but also reverse the depletion process, increasing supply. The classic case is ocean fishing: the invention of technological and institutional innovations for ocean fish farming has been shown empirically to both reverse declining stocks and increase the variety of species.

Applying this to green space in the extremely arid and populous city of Cairo, we hypothesised that (a) such is the scarcity of greeneries that institutions are likely to have evolved to enclose green space public goods (defined as green space that is jointly consumed) in order to preserve it from depletion; and (b) neighbourhoods with more enclosed green space will also have a greater total amount of green space (the assumption being that enclosure tends to increase supply). We tested these by (a) measuring the amount of enclosed green space recorded in municipal government records and (b) directly measuring green space in Cairo ourselves from a satellite image, classifying it as enclosed/non-enclosed, and looking at the pattern across seven types of neighbourhoods with distinct morphological, property rights and socio-economic profiles.

The first test can be thought of as analogous to the black swan test. With no knowledge of the economics of urban parks in Cairo, the team went into the field and found that 67 per cent of all publicly owned parks in Cairo are gated and charged for at the point of entry. This is sufficient evidence to refute the proposition that a city’s public park system has to be open access and therefore inevitably subject to dissipative overuse. We have found at least one example of a city that has apparently chosen to enclose its parks for the sake of preserving a scarce environmental resource, and we take this as support for (a) our application of theory to green infrastructure in arid cities and (b) our hypothesis that scarcity drives property rights allocation over (enclosure of) urban public goods. We have not *proved* these hypotheses, and further tests are needed to establish more rigorously the motivation behind the enclosures and the evolutionary path of the enclosure institutions. Subsequent research might set out to refute our explanation – for
example, by conducting a multi-city study across the Middle East or a study of cities varying in
several dimensions thought to be important to urban space enclosure (Cséfalvay and Webster
2011), one of them being aridity.

Given the difficulty in obtaining good quantitative data in urban research, refutation by case
study has an important role in advancing cumulative knowledge in urban planning (Flyvbjerg
2006). The problem with much planning research is that case studies are too commonly used to
tell stories about complex particulars or to ‘prove’ positive assertions, not to generate generalisable
hypotheses or to test useful ideas developed from well-founded theory.

6. Methodological individualism

One of the greatest barriers to practice-focused theory development in urban planning is the
dominance among academics of social science paradigms that reject the individual as the primary unit of analysis and the object of theory. The strength of antipathy towards so-called methodological individualism probably comes from two sources: it is the method of economics (a deeply unpopular discipline among some branches of social science) and it is (wrongly) associated with liberalism (old and neo-).

The reason why theory should be based on models of individual behaviour can be simply stated: none of us sit in our offices or homes thinking, “What structural forces in society are driving me to make decisions today?” On the contrary, we act like, and believe ourselves to be, autonomous decision makers and during the course of any one day make multiple autonomous decisions that affect the allocation of our and others’ resources, albeit under various kinds of constraints and environmental and inherited influences.

To understand the complex behaviour that gives order to cities, we therefore need behavioural models of constrained decision-making agents: individuals, households, firms and governments. Much planning theory and research today operate with models of society that are poorly linked to models of the individual. In an attempt to render social structure models useful, convoluted philosophical gymnastics are required to link structure to agency (structuration, actor network theory, etc.), and the result is scholarly language that is impenetrable to even the smartest planning professional and theories that the averagely intelligent non-academic can easily see are not always intrinsically insightful.

The purpose of many of them is to prop up systems of knowledge built on something other than the obvious starting point for understanding social order: individual behaviour. Life would be much simpler if social theorists simply acknowledged the obvious and built theories of collective behaviour based on theories of micro-behaviour (recently deceased Nobel laureate Eleanor Ostrom provides a powerful example of how this can be done in a way that adds social insight to economics and adds value to social enquiry; see Ostrom 1990, for example). Where should we turn to find useful theoretical structure based on constrained individual behaviour?

There are plenty of sources: psychology; some strands of anthropology and sociology; economic geography and geographical economics; some strands of political science; and economics.

Economics is an increasingly rich source, but not the mathematical micro-economics of the twentieth century. That particular intellectual project started off with useful insights, such as the marginal theory of value, but bet on the wrong horse, making the fatal mistake of viewing its otherwise useful model of the individual as the base component of a deterministic model that viewed the economy as a machine. To achieve this, neoclassical economists effectively ditched the idea of individualistic models by building a system of theories around a model of ‘the representative individual’.
If such models are disaggregated sufficiently, then great insights can be gained. But this doesn’t overcome the other handicap of neoclassical economics: perfect information and the flip side, zero transactions costs. Twentieth-century neoclassical economics has predictably run out of steam as a result of these two (and other) misplaced foundations and modelled itself into irrelevancy.

This is not the case with the field collectively termed heterodox economics, which draws on the most useful ideas from five or six centuries of classical political economy, plus new ideas from the fringes of twentieth-century economics, political science, sociology, history, anthropology, psychology, philosophy, physics and computer science. The so-called new institutional economics (Webster 2005) tends to keep the individual in the centre of theory but rejects the more indefensible modelling structures of neoclassical economics. Computational economics brings to life the idea of *emergence*, which must necessarily be there in a science that starts with the individual constrained-autonomous agent (structures and patterns emerge from individual behaviour). It does this by replacing the mathematico-deductive approach of neoclassical equilibrium models with bottom-up evolutionary models in which the outcome of many individual socialising and transacting agents leads unpredictably to global structure: markets, neighbourhoods, cities and systems of cities emerge as a result of constrained individual buying, selling and socialising behaviour.

It is the predictable part of emergent behaviour that should form the focus and bedrock of urban planning scholarship, theory and methodology. In particular, planning scholars should be experts at understanding the impact on multiple urban performance dimensions of various kinds of interventions, roughly of three types: regulation, direct investment and fiscal.

### 7. Conclusion

Paradigms evolve and fashions cycle. Hem levels of ladies’ skirts and dresses go up and down, we are told, with economic long waves and consumer confidence. But the art and science of fashioning garments move more monotonically – in the direction of better value for money, refinement in the details of design, production and marketing technology and so on. Without the disciplines of science, formal logic and philosophy, knowledge development can become faddish and lacking in direction and momentum. Fashions and cycles in knowledge are not bad in themselves since they can contribute to the forward march of insight as ideas get rediscovered, revisited, reviewed in new contexts and revised. There is currently a revived interest in systems theory among those concerned with building, managing and governing cities, driven by the holism of ecological and sustainability paradigms. But this time round, urban systems theory is arguably better founded, better constructed and more useful. Cybernetics has given way to complexity as a broad theoretical context for knowledge about how cities work as a whole. Evolutionary spatial economics improves upon neoclassical spatial economics.

We are at a period in the history of urban planning that is equivalent to critical points such as the late nineteenth century and post-war reconstruction. Planning is seen as a hugely important social function in delivering healthy, wealthy and environmentally, socially and financially sustainable habitats: equally so, but for different reasons, in the post-industrial West and newly developed, developing and underdeveloped countries. Western planning theory and practice and the methodology that underlies them need to adapt to survive. If they do not, much of academic planning will find itself on an irrelevant fringe. Planning needs to rediscover its engineering and design roots and intertwine these with the very best of social science, meaning social science that offers the most convincing and simplest explanations and the most powerful predictions. It
needs to move to a central ground of evidence-based spatial and institutional design. It should differ from architectural design scholarship by (a) a concern with higher spatial scales; (b) an emphasis on well-formed social-science theory that can guide practical and design-relevant research into the wider social-spatial-economic context of land development projects at all scales; and (c) a concern with institutional design. The planning scholar’s special art and science are to understand how spatial configuration and design on the one hand and institutional design on the other work together to effect change in cities and to affect their social, environmental and economic performance. If planning scholarship fails to adapt to meet this need, other professions and academic traditions will step in to fill the gap. I predict that landscape architecture is on the ascendency as a profession and academic tradition because it has evolved a niche that is particularly well placed to meet the new social demand for urban place making and master-planning. Construction management, property finance and surveying, similarly, are well placed as practitioner and academic fields to take over the job of coordinating private development plans within a city. In general, these disciplines often seem to understand the nature and purpose of private development plans better than planners and are therefore arguably in a better place to develop the science and art of ‘plans of plans’.

With a little adaptation, however, the planning academy has, in principle, the greater advantage in the competition for city shaping. With a much more focused methodological and scientific base, it could have it all: spatial design, urban dynamics theory and research methodology for scientific research. It should be able to talk the financial language of developers, the design language of architects and the scientific language of social, economic, political, environmental and medical scientists. In one sense, urban planning still remains and will always be something of the ultimate Renaissance activity. It could and should be the commanding urban discipline but urgently needs its own scientific renaissance.

References


