

**KNOWING THE UNKNOWNABLE:
THE EPISTEMOLOGICAL AUTHORITY OF INNOVATION POLICY EXPERTS**

WILLIAM DAVIES

Williamdavies10@gmail.com

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ABSTRACT

Contemporary developed Western economies are commonly referred to as 'knowledge-based' economies, which compete through drawing on the innovative and creative capacities of their local populations. Economic policy-makers must invest in and conserve the social, cultural and public resources which underpin dynamic and disruptive competitive activities, namely technological innovation and entrepreneurship, which bring new ideas and products to market. But these resources defy orthodox forms of economic knowledge and quantification. Their trajectories and outcomes are intrinsically uncertain. The paper draws on interviews with experts who advise governments on innovation and competitiveness, to understand what expert strategies are used to deal with this epistemological problem. Such experts must project and retain epistemological authority, but without lapsing too far into quantitative, economic and bureaucratic forms of reason. The paper identifies three ways in which knowledge of the future can be validated, but without disguising uncertainty: it can be presented as practically useful; as aesthetically appealing; and as hinting at some 'ultimate' form of ontological knowledge.

Developed economies are widely perceived to have moved into a post-industrial era of wealth creation, as the concept of the 'knowledge economy' implies (Bell 1973). This produces certain epistemological crises, as investors, managers and economic policy-makers find themselves struggling to quantify and value intangible entities. The value that is created in knowledge economies derives from communication, ideas, enthusiasm, social interaction and care, or what some theorists have termed 'immaterial labour' (Lazzarato 2004; Hardt & Negri 2005). These same theorists have highlighted the epistemological challenges produced by dematerialisation, referring to the 'crisis of measure' that afflicts post-industrial capitalism (Virno 2004). There is no standardised or 'objective' way of quantifying the forms of human, social and cultural interaction, that now lie at the heart of such economies. Neo-classical economics may be able to offer the metaphor of 'human capital' as a basis on which to calculate processes of knowledge commodification, but this is a clumsy, excessively rationalist scientific tool, which cannot capture the dynamics of how knowledge is actually acquired, shared and implemented (Fine 1998; Foucault, 2008). As Frank Knight, the first generation Chicago School economist, stressed, economics is a technology with which to convert uncertainty into risk (Knight 1957). But in doing so, it eliminates – or rather hides – many of the more fluid and contingent aspects of economic life that actors exploit and judge when taking decisions. It is for this reason that economics is a relatively useless tool for decision-makers, such as managers of firms, when they are navigating intrinsically uncertain situations (Thrift 2005). Qualitative knowledge techniques and judgement have an indispensable role in both the valuation and the management of intangible assets.

Government policy-makers share many of these epistemological and methodological challenges. States which no longer rely on manufacturing for wealth-creation must ensure that their populations are sufficiently well-trained and well-disposed to engage in knowledge-based, interactive, affective and innovative forms of work and entrepreneurship (Burchell 1996; Rose & Miller 2008). Public institutions, such as libraries, universities and arts organisations, must be governed in such a way as to serve the needs of local economies, hence one might say that the 'social' must now be governed in the interests of the 'economic' (Jessop 2002). But it is not only a shift from tangible to intangible production that characterises the post-industrial economy, but a shift from 'static' to 'dynamic' competition (Cerny 1990; Fougner 2006). Where static

competition involves a group of similar firms seeking to expand their market-share by gradually improving the efficiency of their production techniques, dynamic competition involves the invention of an entirely new product, resulting in a new market that the inventor can temporarily monopolise. It potentially renders an entire rival market redundant, hence Schumpeter's famous term for this process, 'creative destruction' (Schumpeter 1976). Change will occur in a market of static competition, but it will be predictable through calculation of *risk*. Where change occurs of a dynamic nature, it is entirely unforeseen, a feature of the fundamental *uncertainty* that characterises technological and institutional upheaval (Knight 1957; White 2002). It is this radical, Schumpeterian innovation that theorists of the knowledge economy see as the path to wealth creation in contemporary Western states, and leads them to promote intellectual property rights as a means via which policy-makers can defend innovators (Jessop 2005). If these economies are to avoid competing in the same markets as low wage economies such as China, it is reasoned, they must constantly create *new* markets with *new* products based on *new* ideas, while also asserting legal 'ownership' over the innovations that they have already achieved.

The challenge confronting policy-makers in post-industrial economies, therefore, is to embrace creative destruction by deliberately ushering uncertainty into the economic process. It is not knowledge alone that these economies require, but new knowledge that is not widely distributed and difficult to value using orthodox quantitative techniques. This introduces a number of requirements. Long before knowledge can be commodified, a scientific community must first attain it, potentially several decades before it is developed into the sort of innovation that can be sold on a market. A scientific culture dedicated to experimentation is required, that cannot be wholly governed by the pursuit of profit or the exploitation of existing assets. In between this sphere of enquiry and the marketplace, meanwhile, a set of entrepreneurial relations is needed to bridge between the realms of knowledge production and commodification (Saxenian 1994). This too cannot be organised entirely around the logic of capital accumulation, but requires some normative commitment to creating social networks and institutions for their own sake. It is dependent on norms that often owe nothing to business imperatives (Boltanski and Chiapello 2006). A paradox becomes apparent: post-industrial capitalism requires the discovery of new facts, ideas and products, and must therefore safeguard creative and

experimental practices which are anathema to its own quantitative logic. For innovation to be disruptive, it cannot simply be unlikely (i.e. a calculated possibility), it must be genuinely surprising (i.e. a symptom of uncertainty).

This can be looked at in another way. Bureaucracies, be they business or governmental, attain power and legitimacy through their capacity to gather and process knowledge (Weber 1978). Rationalisation and quantification are techniques which organise objects, people and events under pre-existing categories. Innovation, on the other hand, means imagining the possibility of entirely new categories. It is not so much a marshalling of one's knowledge, but an attitude that is taken towards *ignorance* (Friedman 2005, 2009; McGoey 2007). Attaining entirely new knowledge means retaining enthusiasm and respect for that which I don't (yet) know. If the question is 'where will radically new knowledge come from?', the only appropriate answer is 'I don't know'. Stark argues that innovation requires keeping *multiple principles of evaluation in play*, that is, avoiding reliance on a single, stable, routinised form of measurement (Stark 2009). It is therefore not only the logic of capital that needs suspending, but that of bureaucratic rationalisation. The crisis of measure is therefore twofold: for not only must policy-makers pursue investment strategies in intangible assets that resist easy quantification or economic valuation, they must also strive to remain agnostic regarding the likely outcome.

This epistemological challenge is, if anything, more pressing for public decision-makers than for private firms. Inasmuch as the state is not governed by the short-term needs of profit-maximisation, it has the potential to invest more heavily in scientific and technological research that embraces uncertainty to a greater extent, for instance via space and military programmes. It can spend more heavily on 'high end', 'blue sky' scientific research where experimentation without any clear economic rationale is permissible. But as consciousness of the 'knowledge economy' becomes more widespread and subject to policy interventions, the temptation to view innovation quantitatively in terms of inputs and outputs, and using more tangible metaphors of 'capital' and 'property', grows stronger. Policy-makers may demand to *know* the underlying logic of haphazard processes of discovery, in order that money can be better targeted towards economic goals. They want to *know* how long it will take for a given

scientific investment to be converted into a financial return. Oblivious to the fact that research and development (R&D) involves uncovering things which are not-yet-known, they want to know what the return on investment is for R&D. Locked in a mentality that views the future through the orthodox economist's lens of risk, they struggle to make space for engagement with uncertainty. As Power illuminates, there has been an explosion of risk analyses and risk management since the mid-1990s, engulfing public and private sectors in far-reaching systems of audit and evaluation (Power, 2007). How does an expert set about advising policy-makers that they should *not* seek objective, statistical, causal knowledge of this kind? How might such an expert retain epistemological authority in a field that resists – or benefits from resisting – rationalist, scientific objectification?

This paper examines how innovation experts respond to contradictory demands, drawing on interviews with twenty-five innovation and competitiveness experts in Britain, Switzerland and the United States. The interviewees are a mixture of academics who advise governments, employees of think tanks specialising in innovation and competitiveness and what might broadly be called policy 'gurus' and their acolytes. They were selected on the basis that they operated in an ambiguous space, between academia, government and private consultancy. Experts were initially chosen on the basis that their ideas circulated publicly, via the media and policy documents, but I also sought to 'snow-ball' potential interviewees, by asking my interviewees for advice on additional names. In view of the fact that many experts in this sphere see their time as very scarce and of high monetary value, or treat their policy work as confidential, I was inevitably dependent on the goodwill and trust of those who agreed to be interviewed; many did not. Of the twenty-five interviewees, four were from the UK, two were from Switzerland (where two of the leading national competitiveness think tanks are based) and the other nineteen were from the United States.

The issues that they advise on sit in the highly problematic space, mid-way between the frontier of innovation and the market. It is up to them to blend together the contradictory logics of each, to somehow take the fundamental uncertainties that belong to the world of scientific and technological development, and organise them into something more like a set of calculable economic risks that make sense to the policy bureaucrat. The latter

demands knowledge of something that, by its very nature, can't be known, at least not in the rationalist quantitative fashion that they would like. The paper examines how experts respond to this demand, offering an ethnographic insight into the epistemological contradictions of knowing the unknowable. By focusing on actors who straddle the world of uncertain technological innovation and disruptive competition, and the world of linear, economic and bureaucratic decision-making, the paper examines a space which lies between the sociology of future expectations (Brown & Michael 2003; Berkhout 2006) and the sociology of economic expertise and advice (Babb 2001; Mitchell 2002; Fourcade 2009; Davies, forthcoming). Interviews were semi-structured in nature, and focused on the nature of the knowledge that was offered to policy-makers, the intended uses of that knowledge, the value of relative methodologies, perception of temporal horizons (when talking about 'the future' and 'effects'), definitions of key terms (such as 'competitiveness'), perceived disciplinary boundaries (especially with neo-classical economics), institutional boundaries (with academia, media, government, business), and ambitions for innovation policy in practice.

It is important to note that these interviewees are advisors, and not permanent government employees in the mould of a Weberian civil servant. This, in addition to the fact that they do not offer typically rationalist knowledge, means that they problematise Weberian and Foucauldian assumptions about bureaucratic and liberal-governmental knowledge (Weber, 1978; Foucault, 2007). They seek to influence and 'de-rationalise' aspects of modern bureaucratic policy-making, rather than legitimise it in a Weberian sense or constitute it in a Foucauldian sense. As we shall explore towards the end of the paper, these experts are as much concerned with maintaining and extending their own power and authority, as consultants and 'gurus', as they are with delivering policy solutions. The state can come to appear as a block standing in the way of their vision.

The paper is organised into three sections, corresponding to three different ways of advising on uncertain economic and technological processes. My working assumption is that there are insufficient epistemological foundations for the knowledge that these experts purport to have, and that they must therefore seek *non-empirical* foundations for their epistemological authority. Firstly, I look at ways in which knowledge is validated in practical terms, that is, with the promise of achieving consensus on what to *do*. Here the

expert starts to justify her knowledge on the basis that it will help policy-makers move forwards, and create a shared language game for addressing uncertainty. Secondly, I look at ways in which knowledge is validated in aesthetic terms, that is, with the promise of being *new or exciting*. The knowledge provided by a 'guru' or knowledge that is constantly re-packaged to appear novel would be examples of this. Finally, I reflect on a more utopian sentiment expressed by my interviewees, that one day it might be possible to *really* know the logic buried within uncertain processes. The dream of some 'ultimate' social science, which transcends disciplinary boundaries - and perhaps even the finitude of our cognitive faculties - lingers in the imagination of my interviewees, a hope that one day they may *actually* be able to know the unknowable.

Practical defences of knowledge

Fundamental to the problem encountered in innovation policy is that the sources of innovation lie outside of the realms of what is conventionally considered to be 'the economy' (Jessop 2002). The experts I interviewed were all highly sensitised to the fact that the root causes of transformative innovation lie in the culture, values and history of a particular population or set of institutions. Unlike, for instance, neo-classical economists who lend advice purely on how to allocate resources in the most efficient manner, my interviewees each had their own more holistic notion of what the goal of policy should be, such as 'prosperity', 'standard of living' or 'well-being', and shirked narrowly economic categories. Whatever innovation policy might mean, it cannot be something that is restricted to the realms of 'economic policy', but must be diffused across various state agencies.

The major methodological response to this has been a boom in benchmarking studies, which attempt to compare the 'competitiveness' of various cities, regions or nations (Bruno 2009). 'Competitiveness' is a term that will recur throughout this paper, and is a term popularly used to refer to the various assets (economic, social, cultural, political etc) which a specific economy can draw on to boost its innovation, productivity and overall capacity for wealth creation (Porter 1998; Sum 2009). Competitiveness studies draw up a wide-ranging list of 'indicators' of phenomena that approximate to innovation,

then set about comparing different economic territories (nations, regions or cities) quantitatively, using the indicators selected. The breadth of what is measured is intended to reflect the cross-cutting nature of the challenge at hand. Ducking the intrinsic uncertainty of how and where innovation occurs, competitiveness studies create a semblance of quantitative logic. The first question is - how to select an indicator?

There are various imperfect strategies adopted. One option is to quantify phenomena which tend to *correlate to* high levels of innovation, such as a high proportion of small businesses or venture capitalists. In a more notorious example of this, Richard Florida has attempted to quantify and benchmark the 'creative class', the type of people that symbolise an entrepreneurial, well-networked culture (Florida 2002; Peck 2005). Another option is to quantify phenomena that are *inputs* to innovation, such as spending on science and number of scientists in the region per head. Finally, there are studies that quantify phenomena that might be considered *outputs* of innovation, such as number of patents filed or economic growth itself. Many benchmarking studies throw all of these together, and synthesise the numbers to produce a table of rankings, with the most competitive nation (or territory or city) at the top, down to the least competitive one at the bottom. This will be sometimes known as a 'scoreboard'.

Competitiveness rankings are perhaps the most prominent example of the work produced by this policy industry. However very few of my interviewees were prepared to defend them, at least not on scientific grounds, despite having been involved in producing them. When asked what the value of these comparative exercises was, the responses always tended to be heavily pragmatic, and of two principle varieties. The first variety valued them on account of what we might call their bridging or entrepreneurial properties. As one respondent put it to me:

If I'm known at all in the media it's from the indicators, but I really use the indicators as a hook. I understand the limitations of them. They're really a hook for people to start taking the whole agenda seriously.

Elsewhere, a US competitiveness researcher explained to me that:

We like to use [the benchmarking] document to go to [Capitol] Hill and to the administration and have a conversation about what we think are critical strains or challenges, weaknesses, vulnerabilities, opportunities.

Very little scientific confidence is expressed in the quantifying exercises involved, but the advantage of numbers is that they represent a broad, over-lapping language game, that can unite disparate groups in a way that qualitative narratives are less likely to do (Porter, 1995). The thirst for numbers, both in the media and in the state, is quite cynically sated, so as to grab attention, before moving forward into a more detailed discussion of the issues at stake.

The second variety is equally pragmatic, but focused on a different set of practical problems, namely of developing a consensual policy programme. As many of my interviewees reflected, policy-makers are less worried about how the world *is* than what they should *do* about it. And yet in the absence of any clear idea of how the world is, it is very difficult to have any confidence in how one should act upon it. One of my British respondents went as far as to argue that his 'story' about the knowledge economy had offered a relevant government department a useful argument against being shut down! In this respect, the benchmarking table can become a touchstone for discussion or even a basis for a shared identity in a given policy community, transcending institutional or political divides. As one respondent argued:

I think they focus people's attention, and people love the big table stuff like that even though we are more sceptical about that... [And] it allows you to move from a very ideological debate – what's admissible, what needs to be done - to a more fact based discussion, and say, well, let's look at the data.

The knowledge produced has to be capable of helping powerful people get things done, which requires trade-offs between adequately representing the complexity of the problem, and not allowing that complexity to become over-whelming. I asked one of my interviewees how he set about selecting the appropriate number of indicators for a benchmarking study, and he emphasised the need to resist too much data-collection:

[It's about] trying as much as we can to come up with ways of saying 'what are the one or two really interesting things that it's worth going forward with'. It's trying to understand and look at how we can learn something new. But doing it so that we don't have a list of 75 indicators. That doesn't help. It's nice, it's comprehensive, but it's not really useful.

The goal once working inside the policy-making machine is to identify priorities that can engage a broad range of individuals and institutions, from both public and private sector, and across the political spectrum. Given the fact that innovation is not a problem that can be dealt with by hierarchical, bureaucratic techniques alone, it is crucial that representations of it make sense to a broad, cross-cutting community of officials, rather than to one area of officialdom only.

Benchmarking is therefore explicitly viewed as a pseudo-science, whose value is gauged in what it can get done, rather than its accuracy of representation. Confronted with an uncertain situation, the benchmarking study produces a shared reality, even though it cannot be treated as a trust-worthy one. Indeed, there is a risk attached to such apparently objective pieces of research, that policy-makers will view them as bases for calculative, utilitarian types of intervention; numbers and rankings run the risk of 'gaming', where decision-makers focus on improving their statistical score and rank, rather than improving what is supposedly being measured (Espeland & Sauder 2007). The numbers risk down-playing the intrinsic fuzziness of the issues at stake, even as they may help produce some cross-cutting community of interest. To counter this threat, the indicators of 'competitiveness' are constantly changing from year to year, indeed the very meaning of competitiveness is constantly being refreshed, with one respondent describing it as a "constantly moving target".

We can see that the knowledge produced by competitiveness experts is partly validated through its ability to generate a community out of the disparate groups of people for whom innovation is a concern. However something like the inverse is also the case: the community is legitimated through its ability to contribute potentially valid knowledge. Research is generated in order to give various stakeholders something to gather around and discuss, but a central part of what they need to discuss is what should be the next

object of research. I asked one interviewee how he could be sure that he was not missing what might turn out to be an important indicator of future competitiveness, and he replied as follows:

You are in an environment where you meet a lot of enterprises because we have courses and we have conferences, and they tell you, they interact with you. So this is very important, as you get feed-back from the roots. And finally I think we receive and we discuss with a lot of countries, at nations level. And the way we operate is we have more than 50 partner institutes around the world who are working with us on competitiveness, and they are feeding us with policies, with data, with everything. And then you start to get the message that 'this seems to be very important for us' and then you start to have delegations coming here, and you start to get the feeling that something is happening, and then you look into it.

The fundamental problem – that, by definition, nobody can predict unforeseen innovations – results in a circular project of collecting information to generate community, and generating community to collect information.

The hope is that this is a virtuous circle, in which the ideas and intuitions of a large community of interested parties are constantly circulating and refreshing themselves. The task at hand is to create a language game that is in constant flux, but which all parties participate in to sustain a consensus on where the economy is headed. A typical example of this in action was reported to me as follows:

We convened a group down in Silicon Valley a few days ago... of futurists, economic development analysts, large companies like Google, small high-end entrepreneurs in the biotech and nanotech space, and people who have worked with other global agencies, to say 'how is innovation happening here in 2007 in Silicon Valley and the Bay Area, and how does that relate to what's going on globally?' So we're going to publish that and there'll be on-going discussions around that, and one of the things that the participants tell us is that actually the interaction with each other is what they value. They wouldn't have the ability to get together across all those different sectors and have that conversation.

Epistemological authority is distributed throughout these communities, making it impossible for anyone to enter a discussion and define or quantify an issue once and for all. One interviewee told me that their organisation had recently been concerned by national security as a factor in competitiveness, but had recently shifted to a concern for national 'resilience'. The distinction seemed to be more a practical one, in terms of updating their shared identity, than an empirical one about a reorientation of research perspective. Concepts that stagnate or start to attain empirical bite risk fracturing the community, and lending themselves to monopolisation by narrower communities of experts.

Aesthetic defences of knowledge

The practical defences of knowledge offered by my interviewees stress its bridging properties, both in terms of gaining the interest of disparate communities, and of enabling them to work together with a shared sense of the issues at stake. Faced with an uncertain situation, it provides them with a course of action, the results of which must be constantly fed back into the research networks. But it becomes clear that not any type of community is sufficient; it must be a dynamic and innovative one in its own right, that remains open to the ontological uncertainties that characterise the world of innovation. The policy-makers who are the audiences and customers for expertise in this area may well be content with formulaic advice, based on rationalist, scientific knowledge-claims, even if the latter were bogus. One innovation specialist who had previously served on a White House Council of Economic Advisors said to me:

There is a deep hunger for an oversimplified view of what the heck the issues are and what the choices are. And some sophisticated policy-makers understand that that is rather silly, but they have to go through with it. And large numbers of them don't understand it's silly. And that's why most governments in this country are in a lot of trouble.

The risk is that, even once a community has been created and engaged in taking innovation seriously as an issue, that they will sooner or later collapse back into the bad bureaucratic habit of re-framing uncertainty as risk by seeking to quantify it. In Stark's terms, they instinctively prefer to operate within a single 'order of worth', with a single, internally coherent set of measurement devices.

The knowledge offered by the innovation expert must therefore act to resist this rationalist tendency, which it promises to do so through its aesthetic attributes. To put this in Kantian terms, where rationalist knowledge subsumes particular sensual intuitions under general epistemic concepts, aesthetic judgement arrives at general concepts from particular sensual intuitions (Kant 2007). Modern epistemology, like modern bureaucracy, deprives things of their particularity; aesthetic judgement restores this particularity, disrupting rationalisation in the process. With respect to innovation, strategies must be adopted to ensure that policy-making is open to fresh and unexpected events which may not fit neatly into existing categories and practices. Aesthetics must be periodically privileged over knowledge, and intuitions privileged over concepts.

We see this in the rise of what Thrift calls 'affective knowledge' in the 'cultural circuit of capital' (Thrift 2005). Expertise on innovation consists partly in the collecting and processing of subjective impressions. This is partly because it is simply impossible to be objective about many of the more significant elements of the innovation process. As one interviewee put it to me:

I think you have two dimensions with regard to innovation. You have the hard facts. I mean you can still look at innovation, for example, by seeing the number of patents that are being held by various countries, you can look at the things that can be measured. And then you have the entire aspect which is a bit – is it entrepreneurial, do you have an entrepreneurial spirit, do you have a good relationship between the research centres and companies etc?

Subjective impressions may therefore be the only available means of representing the subtle cultural elements that these experts are seeking to grasp cognitively. The more

scientifically inclined amongst them may actually attempt to quantify and analyse the opinions and judgements of those whose views may be held to count. For instance, the IMG competitiveness ranking includes a survey of the views of 4,000 'opinion leaders', which it then converts into statistics that eventually constitute one third of a country's overall competitiveness score. The 'Delphi survey' technique which underpins this is credited with converting subjective and aesthetic judgements into objective, quantitative data, rather as a focus group is used to gradually convert different forms of taste into stable facts (Lezaun 2007).

But there is another slightly separate reason for this emphasis on intuition and judgement. How a certain nation, region or city is perceived by the high-level community concerned is not only a representation of its assets, *it is one of its assets*. The impression that a place is innovative is something that policy-makers seek to nurture, in the hope that this will attract investment and certain types of institutions and people. As one respondent put it to me:

Perception is reality... A great example of this is what we're going to do in Portland. Portland is a brand new regional economy... and there's a perception in Portland that there's not a very strong business community there. The economy there is pretty sour. But in reality that is not the case. In reality it's probably the leader in sustainable technology, all the venture capitalists will tell you that that's where they're going, 11% of new venture capital this year alone with the new technologies, employment is a lot higher than people think, the housing market... A lot of it is about educating folks from outside the community, but also education of people within the community

Once again, there is a hope of a virtuous circle, in which knowledge – or in this case, opinion – circulates, generating excitement and community that then becomes an active agent in producing the types of innovative practices that are sought after. Self-fulfilling prophecies are entirely plausible in this environment.

Specific types of expert practices are involved in generating and communicating knowledge with these types of aesthetic properties. It is a mantra in this policy industry

that, when it comes to innovation and competitiveness, there are 'no one-size-fits-all solutions', in contrast to orthodox, neo-classical economists who are regularly accused of being attached to inflexible theoretical models. There is something disingenuous about this, because the industry remains centralised around a small number of institutions, personalities and ideas, which are marketed to a global audience of policy-makers. When an expert says, as one of my interviewees did, "it's very interesting that in Venezuela 80% of the people are anti-innovation in their values, whereas next door in Columbia it's 50%", it's not obvious that the danger of 'top-down', rationalist epistemology has been averted. But the mantra is repeated by these experts almost as if to remind themselves to keep adapting and keep networking.

The tonic to rationalist, quantitative forms of knowledge is the anecdote. Where numbers can perform an important function in purporting to rationalise the various aspects of competitiveness and innovation, they can not represent things in their novelty and particularity. The anecdote is the aesthetic vehicle for knowledge, which people – especially those outside of expert social sciences – relate to on an intuitive level, without too much concern for how representative it is in a quantitative sense. As one British innovation specialist put it to me:

I think politicians find it difficult to understand big trends unless you can convey them in stories, so unless you can convey them in quite simple terms that they then can explain to voters. Their main concern is how do I explain this or sell this to people out there.

In cases where phenomena are entirely new, the attempt to impose a quantitative logic upon events is fundamentally impossible, and things must be judged in particularistic terms. While policy-makers might be inclined to ask 'what was the rate of return on this investment in innovation?', the experienced ones know that investments can only really be assessed anecdotally.

Story-telling becomes a skill in its own right, and introduces the possibility of big name story-tellers. One of the most notorious means of injecting aesthetic properties into knowledge in this field is the mobilisation of personality or charismatic authority, via what

is colloquially known as a 'guru' (Du Gay 2000). This individual is a highly significant agent in both the authorisation and the circulation of knowledge about innovation and competitiveness, representing one possible means of orientating policy in the face of uncertainty. As Knight put it 'instead of taking the decisions of other men in situations more or less similar objectively' – as the Delphi survey, for example, does - 'we may take decisions of the same man in all situations' (Knight 1957: 228). Confronted with a future that is intrinsically unknowable, the force of the guru's charisma and confidence succeeds in categorising and simplifying the matters at hand. Michael Porter, for instance, has argued for nearly twenty years that the key determinant of competitiveness is the presence of 'clusters' of firms and universities, and this has now become the concept with which his name is most heavily associated. Despite the antipathy in this industry to 'one-size-fits-all solutions', it is fairly well understood that if, for instance Porter is hired, that the advice he offers will focus heavily on clusters, just as if Richard Florida is hired, the advice offered will focus on the 'creative class'. These gurus build businesses around their ideas. Their 'brands' sit alongside each other in a competitive market, and in many cases they treat their core ideas or research techniques as a form of intellectual property. One policy consultant explained to me that

As opposed to a lot of other consulting firms, [we have] really rigorous techniques which we publish on and we branded. We have business process patents. Not only do other firms have nothing like them, most consulting firms don't even have patents. We also publish in peer-reviewed books and articles which very few consulting firms do. So we're really really aggressive about intellectual property, like a software firm.

Typically the guru is the figure who conceives of the central concept which will perform the various practical and aesthetic functions required of it, and then this is backed up with a supporting team of researchers, who may often be far more qualified as social scientists (and perhaps far more knowledgeable), but lack the charisma to create an authoritative and accessible discourse in the face of a maelstrom of confusing cultural and economic phenomena.

The methodology and research skills housed in this support team may be referred to as the ‘technology’ – the cognitive equipment which takes the guru’s central idea or intuition and uses it to process real data. It is, in a sense, the bridge between the subjective realm of the guru’s beliefs about the world, and an objective realm of data and policy advice. Sometimes sustaining two such different types of commercial offering becomes too difficult, as one interviewee described:

If someone calls and says ‘Hey, we want [x guru] to come and speak for us’ it’s easy to say ‘ok, that’ll be \$50,000 and a couple of first class plane tickets’. It’s very easy to say take it or leave it... but on the consulting side, so much of it is hand-holding and working with the regions and really helping them understand where they are, and why they need to do this stuff, and why they need us to help them do it. It’s a very different kind of process. I think that it just didn’t work to have the speaking things handled by the same people who were handling the consulting stuff.

This team of researchers and analysts are employed for their cognitive skills, providing what a member of such a team described to me as the ‘steak’ to accompany the guru’s ‘sizzle’. It helps, therefore, if they have a certain amount of faith in the story that the guru they are associated with is telling. Yet the attempt to weld together aesthetic with scientific capabilities is fraught with risk, and the support team frequently become alienated. Not only does it become clear that the job of the guru is easier and vastly more lucrative than that of the team members, but those with a more orthodox economic or sociological training may become disillusioned with the narrative that they are being employed to sustain, which may come to seem repetitive or arbitrary.

It is implicit in this culture of expertise that the gurus in question do not actually *know* what determines innovation. The choice between rival gurus is not a choice between differing levels of empirical validity, but a choice between different paradigms within which to proceed. As discussed in the previous section, paradigms can be judged according to their practical utility in achieving productive consensus – one interviewee who worked in one of Michael Porter’s organisations said that ‘a big role that this cluster thinking plays is actually to exactly get that kind of dialog going’. But precisely because

the guru's paradigm is sold partly on its aesthetic merits, it will also go in and out of fashion. This breeds cynicism not only from those outside of this ideas industry, but also from rivals within it. I suggested to one interviewee that clusters were a popular way for policy-makers to think about innovation, and he replied 'well from time to time. Some years clusters are really fashionable and other years they sort of disappear from view. I guess they're up now!' Another attacked Porter for the fact that 'his technology hasn't really improved for a while' while a former colleague of Porter's described him to me as a 'jerk' who no longer bothers to test his thinking against any form of empirical reality at all.

Dreams of total knowledge

As we have seen, knowledge of innovation processes can be defended in terms of its practical utility and in terms of its aesthetic qualities. These two ultimately start to pull in opposite directions, with the promise of consensus contained within the practical defence being undermined by the promise of originality and novelty contained within the aesthetic defence. The diversity and competing nature of the knowledge paradigms that are on the market is at odds with the stated desire to unify decision-makers around a shared agenda. Underlying all of this is the sustained fear that the representations of innovation and competitiveness offered by these experts suffer an epistemological deficit, as, to some extent, they must. In this final section I look at how experts confront this epistemological lack head-on. I argue that there is a latent teleology in their understanding of their own expertise, which promises to deliver 'total' knowledge in some very distant future, with peculiar political implications. As I noted in the introduction, these experts are both external to the state, and critical of bureaucratic and rationalist ways of knowing and governing. Modern bureaucratic government is ultimately a source of frustration to many of my interviewees, who view disruptive entrepreneurship as a more potent economic and creative force. But what type of state do they imagine instead? Frustrations with the limits of modern knowledge can sometimes bleed into frustrations with the limits of modern, liberal government, with some quite strikingly authoritarian implications, as will be seen.

We first see the roots of this in the phenomenon of inter-disciplinarity (Strathern 2004; Barry, Born & Weszkalnys 2008). It is a prominent feature of expertise in this field that it is trans-disciplinary, with particular stress placed upon the fact that it is not limited to the field of economics. The problem mentioned previously, that the sources of innovation often lie well outside of what is usually considered to be the 'economy', means that a range of social sciences is needed in order to capture adequately the various behaviours and phenomena that are involved. Much of what is considered to be competitiveness or a driver of innovation lies deep within a national or local culture, in the psychology and value systems of a society's members. As one respondent put it to me:

Competitiveness isn't for the narrowly trained, and a lot of the things that need to be done can't be measured. I'll give you an illustration based on what we were saying previously. How can you tell that children are being inculcated with values that are consistent with and support innovation? How can you measure that? But that's probably the most important factor in future competitiveness. Are children optimistic about the future?... Do they believe in competition as a force for positive change? These are the greatest factors in future prosperity but nobody's measuring them and it would be very difficult to measure them.

The cultural, spatial and psychological elements of competitiveness and innovation call for an adoption of social sciences that are appropriate to these issues.

The same entrepreneurial spirit which applies to bringing separate fields of policy and business together to discuss innovation must therefore take hold within the social sciences. In fact, it is not only the boundaries between the social sciences that need dissolving or transcending, but the boundary separating the social sciences from natural sciences. Experts in this field pride themselves on adopting a pragmatic mentality, which allows them to jump seamlessly from one field to the next. As one put it to me:

We look at what we're doing as fairly new and fairly different, and say we're still trying to understand what's going on here and the basic mechanisms. And we know we want to draw from Jane Jacobs and from Lucas and from Adam Smith. And we want to draw from sociology and psychology and all these other areas,

as these are the interesting things when you start talking about people and what's going on, it's a lot more than the standard economic thinking that applies.

Many of these experts repeated this sense that what they're doing is relatively new (one repeated that "we've only just begun"), but that it represents some form of epistemological progress from an age in which anthropology, economics and psychology operated in separate 'silos', the pejorative consultancy term for vertically differentiated cultures.

Divisions between the social sciences, and between the social and natural sciences, are therefore seen as entirely regrettable. That these divisions inhibit knowledge and will gradually dissolve as knowledge advances is taken as obvious by many of my interviewees. But some were more aggressive in what they viewed to be the problem at hand. The professional divisions were not only obstructive means of insulating cultural, economic and psychological analyses from one another, but means of dividing different *styles* of expertise that would ideally be united. One respondent focused especially on the differing approaches taken by economists and anthropologists:

Culture is critical, it's the part that economists refuse to talk about because they have no tools to get around it. Anthropologists can talk about it but they're so disenfranchised and so irritating as people, and unwilling to talk to others, because they're so egocentric around their technology, that nobody listens to them. One of the things about most anthropologists is they believe that cultures should be studied but not transformed.

By contrast this same interviewee saw his own expertise as being innocent in this regard:

So as you can probably tell from me right now, I can talk about anthropology, I can talk about economics, and I sure as hell can talk about business strategy

While, as we have seen, the innovation expert may be reluctant to defend their knowledge in scientific terms, preferring instead to offer practical and aesthetic

justifications for their expertise, they still make a claim to epistemological authority. Although they have teams of researchers working within the various disciplines that they draw on, they have the rare cognitive capacity to transcend these disciplines, both in terms of the content and the form that otherwise delineate disciplinary boundaries. It is not just their knowledge across multiple fields of society that gives them greater authority than orthodox specialists, but their ability to think and communicate in multiple ways.

The dissatisfaction that these figures express towards conventional scientific and social scientific disciplinary divisions reflects a view that such division is intrinsically counter-entrepreneurial. Just as it is obstructive, in their view, to split problems into those belonging to public policy and those belonging to business (because innovation and competitiveness is everyone's problem) it is equally obstructive to split one's description of the world into categories such as 'economy', 'culture', 'state', and so on. And although the innovation expert seeks to transcend these disciplines, she still finds herself tethered to them whenever she wants to present empirical evidence of something; there is no better available set of categories available. As one respondent put it to me, 'we are not building a discipline. We are happy to have all these disciplines inform us, but we are not building a discipline'. A genuinely entrepreneurial form of knowledge would be one that suffered no limits of its explanatory power at all. One might argue that neo-classical economics is an example of just such a form of knowledge, in that it can be applied to all forms of human interaction, whether inside or outside the market (Fine & Milonakis 2009). And yet this would be viewed as insufficiently attuned to cultural and psychological subtlety to serve the purposes of the totalised knowledge dreamt of by the innovation expert. Knowledge adequate to grasp uncertainty objectively – a paradoxical proposition – would resemble no existing type of social science at all.

Some of my interviewees gave a sense of how they imagined this form of total knowledge. One respondent argued to me that:

As it turns out there are actually eight domains that will opine about prosperity, none of which will listen to any of the others.... There's eight domains and if we had the answers to all eight in an integrated fashion, we could foster

competitiveness and create a change programme. But right now the advice is narrow, and linear and biased.

Another respondent quoted a colleague of his who was equally frustrated with professional division in the social sciences:

He said 'I want a unified theory of place. I want us to be able to sit down with policy-makers and decision-makers in a region and be able to say to them – tell me what you want to do, tell me where you want to go, alright, here are the things you need to get there and we guarantee it will work'.

The split highlighted earlier between anthropology and economics appears to be the most troublesome for these interviewees. The sort of cognitive equipment necessary to be able to rationalise uncertainty, while somehow retaining respect for its particularity, would be some perfect hybrid of cultural and economic science, that could represent the economic role of norms, traditions and contingency in a concrete, empirically valid fashion. National 'culture' and national 'economy' would collapse into one another, and a unified cultural-economic form of policy would become possible, in which innovation could be generated deliberately and scientifically.

This trans-disciplinary, or perhaps post-disciplinary, type of knowledge carries with it certain political and governmental implications. Overcoming the distinction between quantitative and qualitative forms of knowledge is politically radical, as well as epistemologically radical. Breaking out of methodological scientific procedures may also mean breaking out of organisational routines that constrain power. The great challenge for the state when faced with the contingent nature of competitiveness is to be able to pay respect to this contingency, rather than bureaucratise it out of sight. Interviewees with more humble cognitive or political ambitions were ready to accept that there were many crucial aspects of innovation that had simply to remain outside of the reach of firm policy analysis. One asked himself 'how do you sort of move the dial there?' while another admitted that 'one needs to have a kind of realistic sense of what can be achieved?' But for those who envisage an ultimate form of knowledge, in which the division between the cultural and the economic (along with the psychological and

sociological) were transcended, it is plausible for the state to act upon national values, psyches and culture in the same way as it acts upon markets. One interviewee saw the political task at hand as one of changing the very cultural and psychological fabric of a nation, which he offered policies to do:

Culture gets changed when there's a crisis, and galvanises people to think differently. It also gets changed inter-generationally, meaning children can grow up a little different from their parents. The four major levers of that would be family, government, media and the education system. The most important of which is family. So part of the advice I give nations is to support young mothers who teach their children deep paradigmatic concepts before the age of 4. And to try to get young men, young fathers, to role model these behaviours, because that's the most effective way of changing a nation.

Another also invested great faith in the power of centralised authorities to manipulate value systems, though in a rather more traditional fashion:

I have to say that the way that governments manage the cultural impact is very disturbing in many ways, because most of the time they do not understand. At the company level it is managed by the corporate culture. And the corporate culture is nothing other than providing a set of values that are embodied by the management because you have the management walking around and showing that you walk the talk... But governments have a lot of difficulties to find one person at the top which would embody the value system of the country. To a certain extent I think the Queen of England is doing that... One of her roles is to be the keeper of not only the faith but also the value system.

The dreams of total knowledge, in which culture and economy become a single entity known through a flawless cognitive mechanism, become translated into dreams of ultimate political power, or in this instance, of monarchical government. In the final instance, competitiveness is a question of how people choose to live, and this choice needs governing if competitiveness is to be maximised. The expert runs up against the fact that they are advising forms of policy that may lie beyond the limits of what

rationalist governmental agencies can realistically achieve (such as transforming individual values). The question is whether to accept those limits, or fight against them.

Conclusion

The authority of economic knowledge has been subject to a number of pragmatist analyses. Institutionalists have highlighted the need for policy-makers to share certain cognitive paradigms through which uncertainty can be reduced and choices delimited (Hall 1989; Blyth 2002; Campbell 2002). Regulationists have argued similarly that the capitalist state employs economics as a particular 'fix' through which to stabilise and represent complex economic processes (Boyer 2001; Jessop 1990). Meanwhile, Science and Technology Studies has examined the 'performative' role of economics in the economy (Callon 1998; MacKenzie et al 2007) while the Convention School has studied how socio-economic knowledge is mobilised as a critical capacity or justification in every day economic situations (Boltanski & Thevenot, 1991; Wagner 1994). However, these various theories presuppose that decision-makers look to economic experts in search of reduced uncertainty and a narrowing of possible futures. The competitiveness and innovation experts interviewed in this article have to maintain their epistemological authority, but in ways that counter-act modern, routinised bureaucracy and rationalist economic theory, to a greater or lesser extent. They must still seek policy consensus on what to *do* in pursuit of economically valuable innovation, but are less likely to rely on quantitative data or models, to the extent that orthodox economists are.

The uncertain nature of how innovation occurs means that it is not something that can be scientifically grasped in any conventional sense. It can be scientifically represented, for instance through the quantification of certain elements of the process, but this attempt at rationalisation will exclude or do violence to decisive elements in it. As suggested in the introduction, the honest perspective to take on uncertain processes is to say that one is ignorant of exactly how they work and what determines their success. In a faintly Nietzschean sense, this admission of ignorance is already more truthful than claims of knowledge. A model of the 'knowledge economy' which is oriented only around that which can be scientifically known will sooner or later suffer from a lack of genuinely

new ideas and new knowledge. In seeking to keep policy-makers' minds open to the possibility that nothing is certain and that many of the most significant changes in the economy can't be predicted, my expert interviewees perform an important function in protecting government bureaucracies from their own will to know. They inject an anti-bureaucratic impulse into policy thinking, although this is a matter of degree – sometimes numbers are used to sweeten the pill of what might otherwise appear too irrational or too anecdotal.

These experts attempt not only to advise on the benefits of a flexible, entrepreneurial culture, they seek to embody its values. They themselves are links in a network in which new ideas, anecdotes, opinions and subjective impressions circulate rapidly, each performing a pragmatic or aesthetic function as it goes, then dwindling quickly into irrelevance. Rather than simply representing processes of innovation and uncertain change, they present themselves as *examples* of innovation and uncertain change. The policy-maker and the populations they govern must seek to become more like these experts, and suspend their rationalist epistemologies a little more, if they are to end up being winners in the process of creative destruction rather than losers.

To be entirely consistent, experts of this nature would themselves have a time-limited period of authority. They ought also to be created and destroyed, within the flux of dynamic competition, which to some extent is what does happen. Paradigms go in and out of fashion, even if some of them – like the term 'competitiveness' itself – purport to be in constant flux, 'moving targets' as one interviewee put it. An honest role for the innovation expert might involve talking through the experience and politics of uncertainty with policy-makers, in a quasi-therapeutic fashion. Some of my interviewees saw this as a central part of their advisory role, namely to encourage policy-makers to manage *without* numbers. An absence of numbers inevitably creates a form of legitimacy vacuum, which it is tempting for the advisor to fill with sheer force of personality. The deeper challenge for both advisors and policy-makers is how to operate without any stable, unifying sources of epistemological authority, to live with what Stark terms a 'heterarchy' of competing principles of action (Stark, 2009).

But the one thing many of my interviewees can't countenance is that they themselves will become redundant in the process. The lure of authority and the status attached to a traditional, more stable form of expertise is too strong to resist. This performative contradiction of expertly attacking all claims to epistemological authority has been identified as symptomatic of a Hayekian, neo-liberal intellectual program more generally (Mirowski 2009). But perhaps, these experts reason, it is not that uncertainty is at ontological odds with our cognitive capabilities, but simply that the disciplines of orthodox social science have not progressed to the point where they can grasp it. The injunction to embrace innovation and open up to the unexpected is subtly contradicted by the implication that the expert has some privileged position or talent via which to understand these processes. Practical and aesthetic defences of knowledge morph into scientific defences of knowledge, in which, through greater mental flexibility and entrepreneurship, the innovation expert can finally know the unknowable.

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