

Science and Innovation Policy and the New (and Old) Economics of Creativity

Mark Matthews

Executive Director

Forum for European-Australian Science and Technology cooperation (FEAST)

and

Research School of Social Sciences

The Australian National University

mark.matthews@anu.edu.au Tel: +61 (0)2 6125 2238

The social object of skilled investment should be to defeat the dark forces of time and ignorance which envelop our future. (John Maynard Keynes, 1964)

Economics is all about the choices people have to make whereas sociology is all about why they have no choices to make. James Duesenberry.

1 Introduction

This paper offers a policy-oriented perspective on contemporary academic discussions of the rise of the “creative industries”. This is a topical issue in Australia because the recently commenced *Review of the National Innovation System* involves a particular emphasis on the importance of the creative industries in modern economies. This emphasis on the creative industries sits alongside a recognition that the service sector is an important locus for business innovation (sometimes but not necessarily enabled by technological innovation) and, as such, plays a key role in the modernisation and *internationalisation* of economies (many professional services are exported, eg. architectural services).

The paper seeks to illuminate the ways in which economists who started by seeking to understand science, technology *and* innovation (more generally) through adopting a non-neoclassical theoretical perspective are now interacting with scholars concerned with *creativity* as an innovative process. This focus on *creativity*, and the intellectual property norms and social and economic/market behaviours involved, may, in turn, end up being very significant for how we think about science and innovation policy more generally. One point is obvious: analyses of innovation that *assume* given levels of creativity are missing *the* critical enabling factor in innovation. This raises the question: *to what extent does work on the creative industries help us to get a better grip on creativity as a general characteristic of both individual and collective/social human behaviour?*

To this end, I use this paper to frame and promote the following three propositions. These are derived (loosely) from experience in applying “neo-Austrian” economic theory in real public policy settings:

- (i) *Many aspects of creativity and innovation seek to translate ignorance into uncertainty and risk – they reflect a dislike of ignorance and a preference for pattern recognition methods that, in turn, help us to manage uncertainty and risk;*
- (ii) *How this creativity and innovation takes place is culturally-embedded, hence culture can also be analysed with regard to how uncertainty and risk are approached;*
- (iii) *Consequently, an alliance between advocates of the creative industries perspective and heterodox economists with this focus on creativity as a means of translating ignorance into uncertainty and risk may help us integrate our understanding of the creative industries and scientific/ technological advance and business innovation.*

This paper is exploratory and is written from a policy analyst's rather than an academic perspective. This concern with policy explains why I have focussed on trying to understand the nexus linking the creative industries with science and innovation policy through the "lenses" of *ignorance, uncertainty and risk*. We have governments partly in order to handle the uncertainties and risks that markets cannot cope with. Governments support the fundamental research that translates ignorance into uncertainty and risk because the knowledge spillovers are, unsurprisingly, so powerful (any agent who has a preference against ignorance stands to benefit).

The essence of what I have to say is that we should all, in both the creative industries and the science and the innovation policy communities, be paying more attention to how creativity translates ignorance into uncertainty and risk – whether this be in literature, art and the new digital media or science, technology and business innovation. This perspective places culture centrally in both the creative industries and science and innovation policy. In so doing, such a focus places us at the very edge of what economics conventionally deals with, but far more centrally with what cultural studies and the creative industries deal with (identifying patterns and telling stories amidst great complexity and using choices that are inter-dependent in a social context).

The paper avoids rehearsing definitions of the nature and scope of the creative industries – taking that as a given. It also assumes general familiarity with relevant aspects of contemporary economics as picked up in the literature on the creative industries, together with broad familiarity with contemporary public policy concerns – particularly with regard to knowledge-based economic development. In the spirit of seeking additionality the paper also takes it as given that the rise of the creative industries has important lessons for science and innovation policy with respect to open source intellectual property, user-led innovation and inter-disciplinarity.

2 A co-evolution dynamic linking heterodox economics and the creative industries?

A potentially interesting "co-evolution" dynamic that appears to be emerging. This links economic theorising about innovation and scientific and technological advance with a forensic examination of the causes and consequences of the rise of the creative industries. This link is exemplified in the use of the Schumpeterian phrase "creative destruction" in relation to the creative industries. I refer to a co-evolution dynamic

because the economic theorising being drawn upon by those studying the creative industries was itself stimulated by the perceived inability of neo-classical economics to handle scientific and technological advance as processes that are endogenous to economic growth and development. Characteristically, the neo-classical perspective involved scientific and technological advance being treated as exogenous “shocks” to established equilibrium conditions. For several decades economists, and scholars commenting upon economics from related disciplines, have sought to define approaches in which scientific and technological advance are treated as *endogenous* to the processes of growth and development.

One aspect of this ‘endogenisation’ project has been a trend toward merging the fairly technocratic concepts of scientific and technological advance with the far more general and business practice-oriented concept of “innovation”. This has resulted in a situation in which we no longer talk of “technological innovation” and “business innovation” as distinct processes (distinct in the sense that business innovation can be driven by marketing and strategy and need not entail any scientific and technological advance to be successful). Rather, we now use a portmanteau term that seeks to collapse the variety involved in innovation – a fashionable stance that, arguably, generates entropy in debate by encouraging arguments over causality that would not occur if the “old school” terminology had been maintained.

Another factor has been the inputs into the creative industries from “complexity science” – mathematical work on complexity in which feedback, self-organisation and other properties generate features that are “emergent” from the system due to the types of complexity involved. In the early 1990s this author published some work (based upon research funded by the European Commission) that sought to open up an analytical window for understanding how culture influences the evolution of science and technology. This was in order to try to counter-balance what, at the time, seemed to be a rather technocratic orientation to “heterodox” economics linked to the rise of advanced non-linear mathematic methods (see Farmer and Matthews, 1991 and Matthews and McGowan, 1992). At that time there seemed to be insufficient attention paid to the social construction of technology in the heterodox economic literature – a shortcoming that, arguably, risked missing the whole point of *not* adopting a neo-classical stance. From that standpoint, it is therefore particularly interesting that complexity science is now having a more direct impact on studies related to culture and creativity.

Then, as now, the literature examining the social construction of technology provides a useful interface between the creative industries and science and innovation policy precisely because it can illuminate how national cultures and socio-political structures and norms influence the directions taken in technological advance: *technology is in essence congealed decision-making by social actors*. It would therefore be interesting to do rather more to apply complexity science to the analysis of the social construction of technology. Many technologies have so many technical design parameters that the actual design choices made inevitably reflect economic and socio-cultural factors rather than simply technical “optimisation” (which tends to be theoretically impossible in purely technical terms if there are more than seven inter-related technical parameters).

3 The new (and old) economics of creativity

The paper has a particular focus on the potential importance of subjectivist “Austrian” economic perspectives precisely because these may offer insights into how social organization around creativity actually works in practice. These perspectives are characterised by radically different assumptions about knowledge, information and the existence of sheer *ignorance* about what the future has in store than are found in neo-classical economics. Interestingly, this work also has an emphasis on ‘self-organisation’ (spontaneous order in social systems) that pre-dates complexity science. I won’t explore this latter aspect here, but it is pertinent to current work on the creative industries.

Firstly, with regard to uncertainty, rather than a world of quantitative “parametric uncertainty” the more radical Austrian perspectives describe a human condition in which creativity is a necessary response to qualitative uncertainty (effectively ignorance) over what the future has in store – both good and bad. In some circumstances there are no probabilities to assign to future states of the world, but rather the necessity to act *creatively* in order to generate parameters that can be assigned probabilities (and hence managed “rationally”). The resulting competition is *inherently* a process of discovery and innovation. Arguably, a core project for the radical subjectivists is to operate in terrain ruled out of bounds as economics (because probabilities cannot be assigned hence rational behaviour cannot take place) but within the domain of psychology.

Indeed, this is also a domain that more conventional economists, and those who study business innovation, have also stressed the importance of. The movement from invention to innovation, that is to say the *commercialisation* of an invention, involves taking abnormally high investment risks in order to generate the (usually remote) possibility of making abnormally high returns. Keynes’ “animal spirits” at work – idiosyncratic behaviours often linked to “creative destruction”. When this process is particularly successful the result is, in statistical terms, simply an ‘outlier’ – a rare event that deviates from the norm. Comparatively little attention is paid to these outliers in (neo classical) economics and econometrics because these events are viewed as transient phenomenon that reflect a temporary disturbance to normal competitive circumstances. Business schools also devote comparatively little attention to the leap from invention to innovation because these are, by definition, ‘pre-competitive’ activities, (Hartmann and Myers, 2001). Both creative endeavours in the arts and media and those in business, science and technology tend involve this “against all odds” behavior. Those who define how history unfolds, particularly with regard to creative destruction, are driven to try out ideas and to try to make these ideas work in ways that make them statistical outliers. These may indeed be “difficult” personalities not suited to routine, transparency and accountability, project management etc. In short, these outlier personality types may be exactly the type that “managed” resource allocation systems seek to avoid – yet if such people are screened out then, as Hartmann and Myers (2001) observe “individual human ingenuity may fail to connect with long-term macroeconomic growth”. Surely therefore, it makes sense to recognize that we can seek to nurture this creativity - by recognizing the conditions that will kill it off – without adhering to the radical methodological individualism associated with the more extreme “Austrian” positions.

From this perspective, the creative industries advocates may have the most to offer general science and innovation policy if they balance understanding of the social

domain, Social Network Markets for example, with the need to tolerate the “outlier” personality types that can sometimes be critical agents of creativity. Being too “politically correct” on the individualism front may potentially limit the relevance of what the new economics of creativity has to say.

There is of course the well-understood Bergsonian “short-cut” feature of creativity – the creative insight that may emerge unexpectedly but that can later be reconstructed logically, as Gerald O’Driscoll and Mario Rizzo comment:

After this undivided insight is gained, an analyst may *reconstruct* the solution in a series of steps that others, at least in principle, are capable of following. The original leap can then be portrayed as the condensation of the reconstructed steps into a single, undivided one. (O’Driscoll and Rizzo, 1985, p67).

Looking backwards in time, the creative insight or act can appear to be at risk of not occurring because the logical steps can be followed *only* after the fact. But, before the creative act or insight takes place we may be in a state of ignorance as regards if and when that creative insight or act will take place. This is an important point from a policy perspective because our most fundamental exploratory research may be beyond “risky” – it is not a matter of taking long-odds so much as a matter of ignorance over whether progress is possible at all. However, our risk-averse research funding procedures seek to focus support on good bets, in so doing encouraging efforts for which the logical steps can be forecasted and, therefore, project managed. This raises the question: *have the creative industries evolved alternative methods for avoiding this risk-aversion problem via complexity and social network markets?* If so, the lessons for science and innovation policy could be profound.

It appears to be the case, therefore, that this (old) Australian perspective aligns with key aspects of the new economics of creativity. By implication, we should be seeking to capture as many insights as we can from Austrian approaches, not least in order to avoid the re-invention of concepts. This is the window that neo-Austrian perspectives are able to open on how culture impacts on creativity.

5 Example: A cultures of risk-based twist to the Chinese Century

Given the interest in the rise of China amongst students of culture and the creative industries it is worth drawing some links between Chinese culture and attitudes toward uncertainty and risk. The following points are derived from examining cultural aspects of investment risk in China. They are presented here in order to illustrate the strength of cultural factors relevant to uncertainty and risk – business behaviour as a reflection of wider cultural norms.

Whilst China developed advanced mathematics it never developed probability theory – even though gambling has been popular for a considerable amount of time. Arguably, this mathematical lacuna is logical given the importance placed on fate. A belief in fate, in this gambling sense, can encourage risk-taking. Indeed, it is plausible that loss of face is less of an issue in those business situations in which a deal goes sour due to unanticipated external developments rather than incompetence.

The stereotypic view is reported to be that Chinese business people are more risk averse than their Western business counterparts. However, the Chinese business community (whether mainland based or elsewhere) has access to extended informal networks able to supply low cost finance at short notice. This can mean that the

‘downside’ impact of things going wrong is less severe. This, in turn, can lead to a greater preference to take certain kinds of investment risk (see for example Hsee and Weber, 1999, and Lau and Ranyard, 2005).

History has some lessons in this respect. In the early years of the twentieth century China was major host for foreign investment. Bonds were issued in order to pay for defence spending and infrastructure modernisation (railway building etc). Domestic Chinese investment tended to focus on the higher risk, higher reward areas associated with the investment opportunities associated with a “gold rush” economy, this left a gap that foreign investors filled.

European investors, in particular, were well positioned to finance such investments because they had been pursuing portfolio diversification and were therefore able to handle the associated risks and longer time horizons. This inflow of foreign capital caused major political tensions within China associated with a view that legal protections for foreign investors represented an infringement of Chinese sovereignty. Rising debt levels associated with these large-scale infrastructure investments were subsequently used by the Great Powers (Britain, France, Germany, Russia and Japan) as a basis for political influence driven by expansionist territorial aims. The political backlash associated with clashes between domestic and international investors and international political tensions contributed to the 1911 revolution in China (Goetzmann and Ukhov, 2001).

Recent econometric work has confirmed that Chinese investors in equities continue to avoid portfolio diversification in order to offset risks. Chinese stocks and shares tend to be priced on the basis of levels of total risk prevailing in the market rather than company-specific risks: unsystematic risk is priced but systematic risk is not. There is also a strong preference for liquidity in investments. The finding on risk pricing is at odds with established portfolio theory and robust quantitative analyses of how stocks and shares are priced in Western financial markets. Combined with the preference for liquidity, this re-enforces the view that there is a culturally-based pre-disposition for speculative investments over short term time horizons within China (Eun and Huang, 2002).

Findings of this type indicate that the sheer size of the Chinese economy, combined with some particular approaches towards the risk-reward relationship, lead to a historical tendency to generate a “gold rush” economy. Gold rush economies are associated with high levels of speculative short-term investment that exploit the large scale of economic opportunities, and which open up substantial niches for foreign investment in infrastructure related investments with longer-term, lower rates of return. The existence of these culturally driven “risk profile niches” in turn leads to political tensions relating to foreign inward investment. It is significant that this pattern may be persisting.

Unlike in China, the main thrust in the development of probabilistic Western thought in economics and finance is to use the statistical properties of large numbers to manage risk. This is exemplified in how banks and other financial institutions handle portfolio and lending risks. The broad aim in the West is to make sure that there is a fall back position in the “safe” statistically likely region whilst still endeavouring to generate a more favourable position in the risk-reward relationship.

This strategy is re-enforced by Western norms of corporate governance and financial accountability and transparency (e.g. “Prudent Man” legislation).¹ The general thrust

of corporate governance and financial reporting legislation has been to re-enforce the attractiveness of generating business investment propositions in the prudent “statistically likely” region. Whilst this does increase risk-aversion in many areas of business, particularly in publicly quoted companies, it has the advantage that it facilitates greater flows of investment by virtue of a fairly conservative and transparent approach to investment risk-taking (a principle that did not apply to sub-prime mortgages over recent years).

The Western approach to the risk-reward relationship can be contrasted with the Chinese (and more generally, Asian) approach. From the latter perspective the prudent statistically likely region of the risk-reward relationship is of lesser interest. The starting point is to search for a far more privileged position in the risk-reward relationship than can be found in the statistically likely region.

To give a practical example of this approach, there is currently a tremendous emphasis on reforming the performance of banks in China. Improved governance (transparency and accountability) is seen as central to this. The high incidence on non-performing loans (a problem not just restricted to China in Asian terms) has been attributed in part to a failure of bankers to understand and apply the statistical norms reflected in the risk-reward relationship. This lacuna becomes a particular problem when economic downturns impact on collateral values, default rates etc (see Hamid 2005).

From the perspective advocated in this paper, the basis of dominant Chinese business strategies is to exploit the existence of risk-reward clusters associated with cultural factors and extended networks as a basis of comparative advantage. This hypothesis is supported by the emphasis placed on trust in a fairly ‘binary’ manner within the Chinese business community. There is a tendency to seek to choose between potential business partners via trust-building activities with the aim of determining who is and who is not trusted. Once that decision has been made (and it may take a considerable amount of time and effort to arrive at a decision) then things can happen quickly – and profitably. A preference to exploit outlier clusters in the risk-reward relationship places great emphasis on excluding partners who may increase the risks faced – and in so doing undermine the value of that outlier cluster (for all those involved).

The Chinese tend to approach control processes in business in terms of individual people, mind-sets and relationships rather than as formal processes. This is understandable given these attitudes towards risk – strict adherence simply to formal processes tends to be associated with statistically likely outcomes rather than the outlier regions of the risk-reward relationship associated with individuals and associated inter-personal relationships. This is also a perspective that helps to illuminate attitudes towards corruption.

This digression into Chinese cultural issues impacting upon investment risk illustrates how central culture is to the politico-economic process. In turn, this lends some support to the central tenet in this paper – the evolution of cultural attitudes to uncertainty and risk provide a strong link between cultural studies and the creative industries and science and innovation policy. Above all, looking at culture and creativity through an uncertainty and risk lens appears to generate analytically tractable and compelling insights.

4 A way forward?

My main argument is that advocates of the creative industries perspective may be best positioned to contribute to science and innovation policy if they were to place a particular emphasis on understanding the cultural dynamics of creative processes – framed as *the* critical elements in uncertainty and risk related innovative processes. The current policy framework assumes creativity as a given and focuses on various reasons why this creativity is not translated into useful outcomes (i.e. from invention to innovation/use). Similarly, the new economics of creativity seems to focus excessively (though still usefully) on the structural environment in which culturally-related creativity is exploited (e.g. Social Network Markets) rather on the nature and extent of creativity *itself*. It is all too easy to treat creativity, mathematically, as a random mutation and to focus on how social structures and markets select between these mutations. The problem is that this is not ontologically correct because it neglects the human agency in creativity.

There is still an important role for entrepreneurs in an “Austrian” sense: the individual people who take “outlier” risks in order to be creative and exploit this creativity. We must balance individualism with collective action in order to grasp how creativity works, in so doing rectifying shortcomings in both the Austrian and contemporary new economics of creativity. These creative entrepreneurs and creative “collectives” share a distinctively Austrian project in the sense that, as rational agents, they are *not* in the game of assigning and responding to probability distributions. Rather, they operate in the world of (passing) time and (troubling) ignorance about what the future has in store. From this perspective, creativity can be thought of as a response to the challenges of time and ignorance, a response that continually generates the probabilistic world that conventional economics can cope with (because it is mathematically tractable).

This “mutation mechanism for probabilities” is only part of the story, but it may help us to understand what the new (and old) economics of creativity can do to inform science and innovation policy: *creativity and innovation as culturally-embedded efforts to respond to time and ignorance*. As human beings operating in societies we prefer to face a future for which we *can* assign probabilities (and therefore attempt rational responses) and when we face such fundamental uncertainty that we cannot assign probabilities we react with *creativity* aimed at translating this fundamental uncertainty into *risk*. Creativity in this context can be thought of as the product of a deep psychological, and culturally embedded, preference for risk and uncertainty over ignorance – as the Chinese example illustrates.

It is not hard to show that this is also a feature of many technological inventions and that (subsequent) innovations are driven by the fundamental human desire to transform ignorance into uncertainty and risk. There are whole rafts of imaging technologies (X-ray methods, microscopes, telescopes etc) that provide us with data that we would not otherwise have access to (i.e. that translate ignorance into indications). Much scientific theory is concerned with translating ignorance into uncertainty and risk (i.e. the analysis of complex data sets in order to generate patterns of risk – such as crop planting strategies in the face of unpredictable weather patterns). The list is almost endless. Indeed, I have argued elsewhere (and with some success in influencing policy thinking in Australia) that we should pay far more attention to the ways in which public science provides us with “prescience and preparedness”. This outcome class works by alerting us to uncertainties and risks that

we may face in the future, in so doing allowing us to change our behaviour *now* – in turn changing the future to take some paths that we prefer more than others (see Matthews 2006). This outcome class can be far more valuable than research commercialisation per se (viz the current emphasis on acting earlier in order mitigate climate change risks).

6. Conclusion

Hayek’s interesting perspective is that: *it is all about pattern recognition*. Many dimensions of creativity, from science and technology, through business innovation and onto art and literature can be thought of as attempts to spot patterns in highly complex situations – by isolating particular patterns and telling their stories. As such, they contribute to our cognitive worlds and, in turn, help us to grapple with the *complexity, time and ignorance* that can so trouble us when we think about the past, present and future. Patterns are subject to aesthetic attributes. These aesthetic considerations are well known to come into play in disciplines like mathematics – notably in relation to parsimonious explanations: a simpler “elegant” representation is preferable to a more complex representation. We constantly strive to simplify complexity because complexity generates uncertainty and risk. Reduced complexity implies reduced uncertainty and risk – whether this is in engineering design, public policy or a “creative” endeavour.

The implication is that scholars concerned with culture and the creative industries might be well advised to join with the science and innovation policy community in exploring the extent to which culture and creativity can usefully be approached as an effort to translate *ignorance* into *uncertainty and risk* via culturally-embedded pattern recognition norms. Culture and psychology are of course major influences how patterns relating to uncertainty and risk are perceived. As Hayek commented:

“Many of the patterns of nature we can discover only *after* they have been constructed in the mind” (Hayek, 1967, p23).

References

- Hsee, C. Weber, E. (1999) ‘Cross-National Differences in Risk Preference and Lay Predictions’. *Journal of Behavioral Decision Making*. 12. Pp 165-179.
- Eun, C. S. and Huang, W. (2002) *Asset Pricing in China: Is there a Logic?* Working Paper, University of Hawaii.
- Farmer, M. K and Matthews, M. L. (1991) Cultural Difference and Subjective Rationality: Where Sociology Connects with the Economics of Technological Choice, in Hodgson, G. and Screpanti, E. (eds) *Rethinking Economics: Markets, Technology and Economic Evolution*, Cheltenham: Edward Elgar,
- Goetzmann, W. and Ukhov, A. (2001) ‘*China and the World Financial Markets 1870-1930: Modern Lessons from Historical Globalization*’ Working Paper 01-30, Financial Institutions Center, The Wharton School, University of Pennsylvania.
- Hamid, J (2005) “Governance – Before IPOs, Fixes for China’s Banks.’ *Far Eastern Economic Review*, 22 June.
- Hartmann G and Myers M (2001) Technical Risk, Product Specifications, and Market Risk in Branscomb L and Aursweld P (Eds) *Taking Technical Risks: How Innovators, Executives, and Investors Manage High-Tech Risks*, pp30-43, MIT Press. Cambridge, Mass.

Hayek, F. A. (1967) *The Theory of Complex Phenomena*. useful in this sort of context (it is Chapter 2 in *Studies in Philosophy, Politics and Economics*. London: Routledge & Kegan Paul

Lau, L. Y. Ranyard, B. (2005) 'Chinese and English Probabilistic Thinking and Risk Taking in Gambling'. *Journal of Cross-Cultural Psychology* 36(5) pp 621-627.

Matthews, M. L and McGowan, F (1992) 'Reconciling Diversity and Scale: Some Questions of Method in the Assessment of the Costs and Benefits of European Integration', *Revue D'Economie Industrielle*, No. 59.s

Matthews, M. L (2006) *Managing uncertainty and risk in science, innovation and preparedness: why public policy should pay more attention to financial and geopolitical considerations*. Discussion Paper commissioned by the Federation of Australian Scientific and Technological Societies. Howard Partners. August. Canberra. ISBN 0-9775991-0-8

O'Driscoll, G. P., Rizzo, M., J (1985) *The economics of time and ignorance*. Oxford: Basil Blackwell.

EndNotes

ⁱ Broadly, this requires that risks are only to be taken with other investor's money if the risks can be quantified in a transparent and auditable manner.