

CREATIVE ECONOMY *and* CULTURE

CHALLENGES, CHANGES AND FUTURES FOR THE CREATIVE INDUSTRIES



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1

ECONOMY + CULTURE + TECHNOLOGY = NEWNESS

How can a system develop and yet remain true to itself?

(Yuri Lotman, 2009: 1)

Whose creative industries?

The question is: *Whose* creative industries? We need to ask it, because much of the discussion about the creative industries or creative economy (also called the cultural industries), in policy, scholarly and industry circles, presumes quite limited answers to that question. Thus, the standard answers are: 'Creative industries' describes a specialist sector of the economy; only certain types of work or occupations count as creative; not many countries can boast a creative economy. A presumption has taken hold that 'creative industries' refers to the 'copyright' industries, whose business plan is founded on making the creative outputs of talented individuals into 'intellectual property', and then selling that.

We don't think any of these are satisfactory answers. In this book, we want to pose the question anew, by making the answers as broad and inclusive as is possible. Here, the answers – which we call 'the three bigs' – are:

- The creative industries are not confined to an elite of trained artists or firms; they encompass (or could encompass) *everyone*.
- They are not confined to one sector of the economy; they characterise (or could characterise) *everything*.
- They are not a feature of advanced or wealthy countries; they are (or could be) *everywhere*.

The difference between ‘are’ and ‘could’ in the formulations above is not meant to be normative, but rather to describe a situation where – we would argue – a more expansive answer is possible, but unnoticed or even unknowable using current approaches. Thus, posing the question ‘Whose creative industries?’ is to some extent a ‘thought experiment’, because quite clearly this expansive conceptualisation of the role of creativity in contemporary cultures and economies is not in place as an everyday reality, nor is it part of everyday talk among those who comprise the ‘conceptual community’ or ‘discourse public’ of the creative industries, whether they are scholars, policymakers, consultants or industry insiders. Therefore, the overall purpose of this book is to develop a coherent perspective and an argument that will put these answers on the table, so to speak, as an alternative to current conceptual settings. We are not so much arguing that the creative economy and culture *could ever* capture the creative productivity of everyone, everywhere, across everything, but, rather, we want to set that idea as a new bar or yardstick for testing whether the *full potential* of the creative industries is being realised, or *could ever* be realised using existing definitions, ambitions, policies and practices; and if not, what alternative conceptualisations and arrangements can take their place.

We are motivated to do this because we think there is something missing from the picture so far: several ‘somethings’ in fact. Here they are:

- *Populations*: The most important element missing from current conceptualisations of creative industries is *everyone* – the general population, who, since the emergence of digital technologies, social networks and user-created content, can be seen (not just claimed) to be engaging in mass creative productivity, which we call *microproductivity*, that is a major driver of economic development.
- *Technologies*: This combination of ‘everyone’ with ‘digital networks’ is crucial to our purpose, because we do not locate creativity in the individual person, talented or otherwise, but in *systems*. We see culture and the economy as systems too, albeit more complex and multiple (systems of systems) than any technology to date. Because of their scale and variability, ‘natural’ cultural systems are hard to study. Technological systems, on the other hand, are an empirical form of human connectedness that can be studied (Arthur, 2009). Of these, we think two are more important than others. One is very old: cities. The other is very new: the internet. We see urban and digital technologies, their productivity and capacity to create new ideas and to distribute them across whole populations, as a proxy for those same qualities in human culture. It follows that we think the predominant

conceptualisation of creative industries has not integrated ‘creative production’ sufficiently with ‘digital networks’ or with what we call ‘urban semiosis’.

- *Culture*: We think ‘culture’ is misunderstood and restricted in most public thought about the creative industries. As we will argue in this book, we see culture as a human invention whose function is to produce *groups* or ‘demes’ – groups which can survive where individuals do not (Pagel, 2012a; Hartley and Potts, 2014; and see Chapter 3 below). We argue that what binds these groups is *knowledge*; and that the ‘output’ of culture is not heritage, customs, art, or even artefacts (goods and services), but *innovation*: culture is the mechanism for ‘producing newness’ in conditions of uncertainty (Potts, n.d.; Hutter et al., 2010). Thus, for us, culture faces the future. It is the driver of economy, and not the other way around. It needs to be reconceptualised and integrated into economic thought and policy; equally, those devoted to culture and the arts as presently configured need to understand its role in economic evolution.
- *The Planet*: Finally, we think something rather larger than the proverbial ‘elephant in the room’ is missing from most accounts of creative industries, and creativity more generally, whether in its cultural or economic dimension: the planet. It is only since the mid-nineteenth century that ‘we’ (humans in general) have even known the extent of the planet and what it is made of, where its land and sea masses are located, what its geological, biological and human resources comprise, and how its systems interact. In the long course of human history, *knowledge* of the planet as a whole is less than two centuries old. Among the slowest disciplines to ‘globalise’ their view of their subject matter are the humanities (culture) and social sciences (economics), which retain a local, sectarian or national perspective, rather than seeking ways to understand their object of study as a planetary phenomenon. It would be weird if geologists, oceanographers, environmental scientists, meteorologists or even miners restricted themselves to this or that corner of the world without seeking to understand how and where it connects with others. But the study of meaning-creation and the study of wealth-production (i.e. cultural studies and economics; which this book will treat as integrated) have both remained aggressively parochial. The idea of a planetary cultural system, or creative economy, is almost *unthinkable* in current circumstances, except by visionaries from other disciplines like Jared Diamond (geography) or E.O. Wilson (biology). Indeed, much ‘critical’ writing is in a state of denial about the global

stretch of culture as a system, seeing ‘globalisation’ only negatively, as a political issue, for which large corporations or powerful countries are to blame. In this book, in contradistinction to that, we treat culture as a ‘semiosphere’ (Lotman, 1990), a dynamic system of differences whose local peculiarities (identities and expression, values, artefacts, actions) can only be explained by means of the dynamics and interactions of the systems that generate them.

How to study the creative economy

Attempting a book about the creative industries, or more generally the creative economy, is a risky business from the outset, because ‘creative industries’ is an unloved concept (Miller, 2004; Ross, 2007; Cooke and Lazzeretti, 2008; McGuigan, 2010; O’Connor, 2010). Nevertheless, it is our belief that its time has only just begun: this is the ‘age’ or era of the *creative economy*. We see the creative economy not as a sector but as an ‘epoch’ (see Figure 2.3, page 21 below), following from previous (accelerating) epochs, each one associated with explosive expansions in knowledge–technologies, thus:

- The *Hunter–Gatherer era*, coincident with communication by *speech and stone*; from about 70,000 years ago (Harari, 2014).
- The *Agricultural era*, coincident with *writing*, husbandry and cultivation by hand; from about 10,000 years ago (agriculture) to 5,000 years ago (writing).
- The *Industrial era*, coincident with mechanical communication – *printing*, machines, etc.; unevenly adopted between the sixteenth and nineteenth centuries.
- The *Information era*, coincident with *electronic* communication – the telegraph, cinema, radio and TV broadcasting, computers; late nineteenth to late twentieth centuries.
- The *Creative era*, coincident with *the internet*, and population-wide, planetary communication among interconnected users and makers; now on.

This book, therefore, is about the creative economy as an *emergent* phenomenon in a *longue durée* timeframe. We are interested in its future, which is uncertain, of course, but it may be much more significant than its past, if it is well conceptualised, observed and nurtured by those with ‘skin in the game’ – economic, intellectual or creative.

In order to imagine and predict how that future may turn out, it is important to understand past and present arrangements: what elements, dynamics and processes are already in train and what actions may help or hinder any future potential to be realised. In the case of the creative economy, this is where the problem lies, because conceptualisation and research to date has been confined to too narrow a band of activities, agents and places – the so-called creative *industries* as a subset of the economy as a whole. As a result, the greater phenomenon that the term seeks to describe often slips from view.

Our study advances the argument that the creative industries need to be reimagined on an entirely bigger scale than heretofore. This is not to fall for ‘hype’ or ‘cultural populism’, ‘celebrating’ some ‘neoliberal’ ruse to power and profit. Surprisingly little of that sort of talk makes sense in the places we intend to visit. The reason for enlarging the scale of inquiry is to make sure that we have understood where creativity comes from, how it connects people, and what it is used for. That’s where culture comes in. As our title indicates, the creative economy and culture are inseparable, the more so as cultural activities based on sociality, identity, communication and meaningfulness have migrated to the web and to digital media, both commercially marketed and self-represented, such that culture, technology and the economy are now a single object of study. This poses a challenge to existing disciplinary distinctions, which have long preserved a distinction between the social sciences, where the economy is studied, and the arts and humanities, where culture is a central, albeit contested, concept.

Part of the problem about the study of the creative industries in the university setting, therefore, is that the ‘creative’ aspect belongs to one scholarly tradition while the ‘industries’ part belongs to another. Researchers from these different traditions come upon the topic – and each other – with different skills and training, different methods and aims, housed in different parts of the campus with different measures of success and achievement and, to make matters worse, in-group and out-group allegiances and ideologies that can make each side suspicious of the other. For example scholars in economic or industry portfolios are more likely to work from a pro-market perspective that would minimise the role of the state in creative and cultural affairs, while those in cultural and creative portfolios are likely to support public culture and be critical of market-based commercial culture.

In such a context, where *how* we know seems to have a disproportionate influence on *what* we know, there is a need to work beyond existing disciplinary boundaries, to learn from other disciplines and contribute to them, and to adopt methods of study that take researchers beyond their individual comfort zone (i.e. their specialisation), in order to do justice to emergent objects of study that defy traditional categorisation.

The creative economy is just such a domain. It combines the most intimate levels of personal identity and expression with global-scale markets and systems; and confronts both citizens and researchers with a situation where, in Mehita Iqani's suggestive pun, human 'I contact' (2012: 148) is made through a mediated, symbolic environment in which who 'I' am – and how I establish my identity – is inseparable from the workings of global systems (media, markets) and technologies (networks, 'big data' and communication devices) (Leaver, 2012). Further, technological and social change has been so rapid in this environment that the disciplinary distinctions inherited from the nineteenth century are no longer capable of explaining what is going on (Lee, 2010) – what is cause and what is effect, and how best to study the creative, cultural and economic aspects of contemporary life. In such a context, the challenge for students of the creative economy is not to confine themselves to ever more specialist silos, but to team up with others (see Chapter 14) in order to develop a multidisciplinary approach that can take seriously the *relations* among different phenomena: creativity and economy; selves and systems; culture and technology; existing knowledge and emergent trends or future probabilities.

Culture as the source of innovation

The present authors come to this quest from the perspective of *cultural science* (Hartley and Potts, 2014), which offers a *systems* view of communication, culture and therefore of creativity, rather than an individualist or behavioural view, and an *evolutionary* rather than choice-theoretic view of economics. As will become clear, we do not start, as do most 'industry' or 'policy' definitions of the creative economy (following DCMS, 1998), from 'individual talent'. We don't deny that individuals are talented; in fact we believe that more people are more talented than has been *realised* (especially in the economic sense of that term) and that the creative economy, properly – i.e. ambitiously – conceptualised and enabled, will allow such talents to flower and prosper at general rather than elite-only or commercial-only scope and scale.

But individualism is not our starting point, because we see the flowering of talent as an *output* of *complex systems* (not a cause of individual action). The system that generates creativity is *culture* – not technology or the economy directly, and not individuals by themselves. However, it is in the economic and high-tech sectors that the term 'creativity' has attracted most policy and critical attention over recent years. This is because creativity has become associated with innovation in the business environment. Thus, *creative innovation* is a much sought after quality that is said to drive contemporary post-industrial economic performance as a whole. At the same time, creativity is also the stock in trade of the humanities and the creative arts, which (at least according to one way of thinking) are strange bedfellows for economics and

technology. This is, however, the reason for taking an interest in culture, communication, creativity, the arts and humanities, with all their critical and often antibusiness ideological baggage, when trying to understand an apparently simple economic phenomenon like the creative economy.

Culture is the source of what Michael Hutter and his colleagues (2010) call *newness*.¹ Culture is based on communication within and among groups or demes (Hartley and Potts, 2014). It is the *source* of newness because culture works at the level of *groups* rather than individuals; and culture is also the context in which innovation is *used*. Usage impels innovations that adapt new technologies, from steam power to internet connectivity, through myriad acts of tinkering and experimentation, some of which go on to be generally adopted. In turn, newness, as distinct from novelty, is another word for innovation.

The difference between novelty and newness is this: novelty is, as it were, a ‘conjecture’ or ‘experiment’, which will not survive unless it is taken up and used across a system or network, be that technical or social. ‘Newness’ occurs not at the point of invention or discovery but upon acceptance by others, in the socio-instrumental implementation of new ideas (see Potts, 2011). Newness is thus the *use* of novelty – it is cultural rather than technological or economic in nature. In evolutionary terms, novelty is ‘variation’, which is individual and effectively random, while newness is ‘adaptation’, which is selected and replicated among a population.

Cultural sources of innovation, albeit at an anonymous, artisanal or user-created microproductive scale, may thereby explain macro-level developments up to and including the dynamic growth associated with the Industrial Revolution (Mokyr, 2009), even though ‘innovation’ is usually seen strictly as a business process. Indeed, it is seen by many in business, technology, economics and government to be the one essential requirement for growth and prosperity in turbulent times. Here’s a typical example of how innovation is discussed in business forums:

*Innovate or die has been the catch phrase of the 21st Century. The modern organisation operates in an ether of discontinuous change and is faced with numerous influences that continually challenge its integrity and survival. These include the impact of rapid globalization, discontinuous change, increasing levels of competition, technological change, unstable economic conditions, transition from an industrial to knowledge-based society, diversified workforce and increasing complexity of the external environment.*²

This mode of expression may be couched in catchphrase and cliché, but that’s because it describes a now-commonplace reality: companies that don’t innovate are prey to ‘creative destruction’ (Schumpeter, 1942) by nimble newcomers. Even big firms cannot rely only on industrial scale, organisation and cost-cutting to survive.

Culture drives industry and technology

From start-ups to tech giants, firms need entrepreneurial imagination, adaptability and energy to thrive in an uncertain environment. They also need to pay attention now, more than ever before, to collaboration and relationships (with each other, with users, and with the zeitgeist); and to design, narrative, meaningfulness and fashion-forwardness, not just in 'creative' products like movies but also in telecoms – for example, smart phones – built structures, even foodstuffs. In other words, the humblest commodity, from coffee to quinoa, is saturated with signification, and it is this that determines its economic value. Innovation is thus the process of successfully assigning new meanings (thence, new users and values) to existing objects or processes.

Granted that innovation is now a well-established contemporary business value, what has this to do with creativity, culture and communication? Let one of the tech giants, Intel, answer that question. In 2013, Intel commissioned a survey of 12,000 people over 18 years old, in Brazil, China, France, India, Indonesia, Italy, Japan and the USA. The results reveal that:

Millennials [18–24 year-olds] globally show a stark contrast to their reputation as digital natives who can't get enough technology in their lives. A majority of millennials agree that technology makes people less human and that society relies on technology too much.³

In other words, the segment of the population most immersed in the world of digital technologies, social media and online participation is also the most critical of that world's personal and social impact – it 'makes people less human'; and society 'relies on technology too much'. That's a worry for a firm like Intel, no matter how innovative it may be at the technical level. If there's such a thing as a 'millennial malaise' and young people are beginning to reject the very technology in which they are assumed to be 'native', then the prospects for economic sustainability are uncertain indeed. Is culture *trumping* technology and economics?

Intel is famous for investing massively in R&D for innovation. Its company research budget is said to be bigger than Australia's national one.⁴ It has relied on research investment because at the beginning of each year it could not know which invention would be its bestseller by the end of the year, since it hadn't been invented yet. That was because of Moore's law.⁵ This is Intel co-founder Gordon Moore's prediction that the number of transistors on a microchip would double about every two years; a prediction that was bold in 1965 when he made it, but has held true for over half a century. The company has risked its future on Moore's law, so far with success (despite the increasing cost of maintaining an exponential rate of development). In turn, the increased capacity of their chips has improved the performance and range of the myriad devices and applications with an 'Intel inside'. Intel has achieved pre-eminence

in the technical field by innovating at speed as well as scale. If, now, people think that technology dehumanises them, then Intel will be the loser.

But perhaps culture does not *trump* technology in this direct way. Perhaps culture is the very place where technology finds meaningfulness and usefulness, and thus the determinant of success. It's not an 'either/or' or a zero sum game. Get the culture right and technology integrates with it, to such an extent that people may not recognise what they are using as technological. This is certainly what Australian anthropologist Genevieve Bell thinks. She directs 'interaction and experience research' for Intel, running a research lab with a \$35m annual budget and a staff of 100 (again, a much more significant investment in the intersection of culture and technology than is made by most countries). Bell interprets the Intel survey thus:

At first glance it seems millennials are rejecting technology, but I suspect the reality is more complicated and interesting ... A different way to read this might be that millennials want technology to do more for them, and we have work to do to make it much more personal and less burdensome.⁶

The lesson is not that culture and technology cannot mix, but that they *must* mix. Companies must understand the users of technology at least as well as the physics. At a presentation at RMIT University in Australia,⁷ Genevieve Bell entertained the audience with a pair of slides showing the 'image' of the user that typically circulates in company boardrooms and laboratories, compared with pictures of actual users and the circumstances in which the company's technology actually operates. The two images could not have been more different. We can reproduce her thought experiment here, using similarly contrasting images (Figures 1.1. and 1.2). The image of the consumer in the minds of company executives and computer scientists remains pretty much that of the 1950s nuclear family as portrayed in advertising (Figure 1.1). Ads like this one for TV sets were open to criticism even when first published (Spigel, 1992), because 'TV happiness' is proffered to an entirely abstract or idealised white, suburban, heterosexual couple with two children. It's all smiles as everyone gazes at their technological gadgets, each one equally open to being pleased by advertised commodities. Social realities such as poverty or differences in class, gender, race and sexual orientation are banished beyond the closed drapes, while happiness is construed as the shared consumption of dramatised images of the same nuclear family on the TV screen – without a hint of mutually conflicting preferences.

Culture, as the admitted source of newness, is construed here as 'family happiness', but the family is not the source of *products*. The chain of causation is clear: culture is the source of emotion, affect, and family roles, but all this can be converted into one act – consumption – because those complicated feelings, relationships, identities and meanings, shared or otherwise, can be achieved through purchasing what clever technologies and even cleverer brand names have done to express them in material form 'because of 25 years of pioneering

in the electronics industry', as Motorola claims about itself. This kind of thinking is where the *industrial* model of innovation has its own origins, confining invention, technology and the growth of knowledge to producers, and making culture the domain of consumption, seen in strictly behavioural terms, where the main thing is to 'add plenty of pleasure'. The home is seen as a work-free (unproductive) refuge of conspicuous consumption, even as Mother works as provider, where the wants, needs, desires, and shared meaningfulness of 'all the family' are known in advance to the corporate marketing department (Spigel, 1992), but where 'the consumer' plays no role in establishing those meanings beyond the act of purchase. In the Motorola version of 'family happiness', people have relationships with technologies rather than with each other, and the idea of a productive family making creative use of their time together to produce meaningfulness for themselves is not on offer.

TV happiness shared by all the family!



Model T200—in mahogany and lined oak, 17 inch TV. FM and AM radio. A great photograph.

Whether it's a party for friends or just a quiet evening at home... your Motorola TV will add plenty of pleasure with its variety of entertainment. Drama, music, sports and educational programs... all these are yours on Motorola's big-screens, photo-perfect television! Hear your favorite recorded music faithfully reproduced with Motorola's dependable and easy-to-operate "Multi-Play" record changer. And for the best in both FM and AM radio, there is nothing finer than Motorola's famous "Golden Voice" tone that's as rich and true as the original sound itself.

Motorola TV

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ONLY MOTOROLA GIVES YOU THESE EXCLUSIVE FEATURES... IN FASHION AWARD CABINETS!

GLARE GUARD 100 PERCENT REFLECTION SCREEN	TWO SIMPLY CONTROLS Turn on, turn off, turn with... Turn it on... with one button... Turn it off... with one button... Turn it with... with one button... Turn it with... with one button...	THREE SPEED RECORD CHANGER Turn on, turn off, turn with... Turn it on... with one button... Turn it off... with one button... Turn it with... with one button... Turn it with... with one button...	"GOLDEN VOICE" AN AM-FM RADIO Turn on, turn off, turn with... Turn it on... with one button... Turn it off... with one button... Turn it with... with one button... Turn it with... with one button...	LONG LIFE "RECORD-MAKER" SCREEN Turn on, turn off, turn with... Turn it on... with one button... Turn it off... with one button... Turn it with... with one button... Turn it with... with one button...
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SEE YOUR CLASSIFIED DIRECTORY FOR THE NAME OF YOUR NEAREST MOTOROLA DEALER. Specifications subject to change without notice.

FIGURE 1.1 Culture and technology, exhibit A: 'TV happiness shared by all the family!' 1951 advertisement (*Time Magazine*).

Picture courtesy of John W. Hartman Center for Sales, Advertising and Marketing History, Duke University Library.8

But the reality, as Genevieve Bell pointed out, can be very different. Figure 1.2 shows an example from Hong Kong. The same elements are present: domestic interior, family member, consumption and electronic devices for screen and sound. Looked at one way, the two images merely record the mismatch between idealised corporate desire and people's so-called real lives. We've moved from WASP monoculture to global, ethnic, multi-culture, and from 'conspicuous consumption' (consumer goods as 'costly signalling' trophies) to 'always-on' connectivity, where technology is integrated into the personal environment. Looked at another way, Figure 1.2 shows *user ingenuity and inventiveness*, given that people can adapt the most unlikely spaces to accommodate their TVs, phones (two in this picture) and other devices, not to mention books, magazines, newspapers and photos. True, the conditions are so cramped that a Motorola family-of-four couldn't fit in the room, so this is not an idealised image, but at the same time it should not be read as entirely negative either. Instead, it shows home not as a refuge but a working user-space as well as resting place, where the outside world impinges on private life, and social connections are maintained electronically.



FIGURE 1.2 Culture and technology, exhibit B: 'Over 100,000 people live in tiny "cubicle apartments" in the city [Hong Kong] ... Residents go about their lives in these confined spaces, sleeping in one corner, eating in another, storing their belongings in a third, and perhaps watching a TV that's found in a fourth'. Photograph courtesy of Society for Community Organisation/Publicis Hong Kong.⁹

Perhaps most people's experience lies somewhere between these extremes. Either way, and this is what concerns Bell and Intel, if corporate culture gets too far out of step with user culture, the aspirations of one side of the relationship will fail to connect with those of the other. When that happens, it's the corporation that loses out in the end. So companies must understand culture as well as technology. How a given invention fares in the world depends really on a combination of fantasy and reality, where ordinary consumers as well as corporate executives may have an impossible image in their heads (at once nostalgic and aspirational) but a grubbier reality at their feet. Both image and actuality are part of culture, where economics plays a part, especially for those with constrained space and time for leisurely consumption.

Thus, culture does not trump technology; it *drives* it. Although it is true, as Bell suggests, that the big firms 'have work to do' to make technology more 'personal' for young people, they cannot do it in ignorance of the lives that such 'millennials' lead, or without linking their internal innovations to the creativity, purposes and networks of users. This is why a systems approach to creativity is needed, because it exceeds the organisational boundaries or control of any one agency, even the largest and most astute of firms.

Interestingly, the young 'digital natives' who have been among the most tech-hungry early adopters so far may be giving way to different demographics. The same Intel survey found that most of the very people who endure the conditions like those shown in the pictured Hong Kong apartment (Figure 1.2) held very different views, compared with disenchanted affluent youngsters in rich countries. Thus:

Women in emerging markets across ages believe innovations will drive better education (66 percent), transportation (58 percent), work (57 percent) and healthcare (56 percent). Women in emerging markets would be willing to embrace technologies others may consider to be too personal to improve their experiences: software that watches their work habits (86 percent), students' study habits (88 percent) and even smart toilets that monitor their health (77 percent).

A full 70 percent of Chinese women over 45 who responded to the survey thought that people 'don't use technology enough'.

This is why culture is so important to the economy and technology: it is the source of 'newness' or implemented novelty; the arbiter of uptake, and the determinant of a company's future. It is the domain of meaningfulness, identity and relationships, and these in turn determine the usefulness or otherwise of the latest app. At last, where technology meets usefulness, we can see the beginnings of a much-needed rapprochement between technological sciences, economic strategists, and creativity, understood not

simply as clever inventors working for firms but as a population-wide capability that can be developed and improved, or neglected and ignored (at corporate peril).

In this shifting boundary between the sciences, social sciences and arts, we see the creative industries as a kind of *marker-dye* for future trends. It reveals how entire systems operate and interact. We do not see the creative industries as just another sector of the economy. To take this approach further, it is necessary to shift to planetary scale and an evolutionary time-frame. Only then will it be possible to describe and discern how the creative future is formed.

Notes

1. See also www.wzb.eu/en/news/analyzing-innovation; and: www.wzb.eu/en/research/society-and-economic-dynamics/cultural-sources-of-newness.
2. John Kapeleris, writing for the *Australian Innovation Festival* website (n.d.), available at www.ausinnovation.org/articles/innovate-or-die.html. The post also offers a definition of innovation, in terms of new products/services, processes, marketing, organisational arrangements and business models.
3. 'Intel research reveals changing tech advocates and attitudes: millennials are tough on technology, women carry the tech torch and digital affluents share wealth of data', 17 October 2013, available at: http://newsroom.intel.com/community/intel_newsroom/blog/2013/10/17/future-of-technology-may-be-determined-by-millennial-malaise-female-fans-and-affluent-data-altruists.
4. According to CEO Craig Barrett at <http://mailman.anu.edu.au/pipermail/link/2002-September/020884.html>.
5. The Wikipedia entry on Moore's law is worth reading.
6. Source: http://newsroom.intel.com/community/intel_newsroom/blog/2013/10/17/future-of-technology-may-be-determined-by-millennial-malaise-female-fans-and-affluent-data-altruists.
7. Source: www.designresearch.rmit.edu.au/events/presentation-duck-dolls-divine-robots-designing-our-futures-with-computers-genevieve-bell-friday-28-september-2012.
8. Image source: Item ID: TV0213: <http://library.duke.edu/digitalcollections/media/jpg/adaccess/lrg/TV0213.jpg>.
9. *Cramped Apartments in Hong Kong Shot From Directly Above*, by Michael Zhang. PetaPixel, 19 Feb. 2013. Available at: <http://petapixel.com/2013/02/19/cramped-apartments-in-hong-kong-shot-from-directly-above/>; see also www.soco.org.hk/index_e.htm.