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Educational Policy in the Creative Economy

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No social order ever perishes before all the productive forces for which there is room in it have developed; and new, higher relations of production never appear before the material conditions of their existence have matured in the womb of the old society itself.

—Karl Marx, *Contribution to the Critique of Political Economy*

We can no longer succeed—or even tread water—with an education system handed down to us from the industrial age, since what we no longer need is assembly-line workers. We need one that instead reflects and reinforces the values, priorities, and requirements of the creative age. Education reform must, at its core, make schools into places where human creativity is cultivated and can flourish.

—Richard Florida, *Flight of the Creative Class*

Structural changes in capitalist production linked to digital technologies have been widely apparent since at least the early 1970s. Institutional reconfigurations in the management of industrial production, coupled to technological shifts in industrial systems, have led to a wide-range of forecasts regarding a coming post-industrial economy. Much as skilled labor was the dominant social and political

force in the twentieth century, knowledge workers are predicted to become the dominant social and political force in the twenty-first century. Beyond conventional discussions on the knowledge economy, however, many scholars today are now pointing to the growing importance of innovation and a *creative economy* (Rifkin, 2000; Leadbeater, 2000).

Richard Florida (2002), for example, argues that an emergent "creative class" is fomenting a shift in advanced economies from mass production to cultural innovation. Transcending and including knowledge workers (researchers, engineers, scientists), he suggests, is a growing segment of "cultural creatives" (writers, artists, producers, and designers) who form the vanguard of a coming creative age.

In this chapter, I examine the contours of the creative economy discourse and consider the implications of cultural production for institutions of learning and education. Beyond established arguments for a global knowledge economy, I argue that creativity is critical to the renewal of advanced capitalist countries. One major reason for the growing importance of creativity, I contend, is the convergence of creative industries and digital technologies in the context of a network-driven global economy.

Beyond the Knowledge Economy

Over the past half century, theorists like Peter Drucker (1966, 1985, 1993), Daniel Bell (1973), and Alvin Toffler (1970, 1980, 1990) have argued that the future of advanced capitalist countries is intimately connected to the exploitation of knowledge and information: Just as agricultural society was transformed by industrialization, so is industrial society being transformed by knowledge-based innovation. In his book, *A Whole New Mind* (2005), Dan Pink offers a cogent critique of this approach. He writes,

> For a nearly a century, Western society in general, and American society in particular, has been dominated by a form of thinking and an approach to life that is narrowly reductive and deeply analytical. Ours has been the age of the "knowledge worker," the well-educated manipulator of information and deployer of expertise. But that is changing. Thanks to an array of forces—material abundance that is deepening our nonmaterial yearnings, globalization that is shipping white collar work overseas, and powerful technologies that are eliminating certain kinds of work altogether—we are entering a new age. (p. 2)

In Pink's view, the knowledge-based economy has already peaked in advanced capitalist countries and is now migrating to Asia and elsewhere. Much as the rou-

tine mass production work that went before it, knowledge-based services in software, accounting, finance, telecommunications, and healthcare are increasingly shifting to newly industrializing countries (NICs). This is not to say that advanced economies no longer needs knowledge workers but that knowledge-based labor is migrating downstream to developing countries or simply becoming embedded in information and communication technologies (ICTs).

As a rising tide of knowledge workers continues to grow outside of rich countries, predictions of a coming Western-biased knowledge economy look increasingly naive. What is clear is that globalization is reconfiguring *all* parts of the global economy including "left-brain" knowledge industries. Perhaps even more problematic is the growing importance of computer automation. While early industrial machines simply leveraged physical labor, ICTs have begun to displace human labor entirely.

Since the earliest days of mass manufacture, technology has been a necessary instrument in the industrialization of capitalist production. With the introduction of computers, however, this process has accelerated dramatically (Zuboff, 1988). The use of industrial robotics in construction and assembly has both advanced productivity and enhanced quality control while significantly reducing the need for human labor. At the same time, the evolution of computerized control systems is now increasingly enabling various industries to manage production with greater ease and precision. This technological shift is having a disconcerting impact on labor. Clear evidence of this is seen in falling rates of workers in the manufacturing and service sectors worldwide (Hilsenrath & Buckman, 2003).

Globalization 2.0

Advanced industrialized countries now appear bereft of a coherent post-industrial economic model. The increasing ascendancy of Korean technology, Indian software, and Chinese mass manufacture appears to be reordering the organization and distribution of global economic power. Consider, for example, China's impact on the Asian region:

> China's production chains are now the focal point around which the Asian regional economy spins. Replacing both Japan and the US, China has become the largest manufacturer and trading partner in an interregional market that hit US$722.2 billion in 2001 and had the fastest rate of growth in the world since 1985. Recently, intraregional trade accounted for the majority of Asia's export growth, with much of the increase flowing to China. China is now both Japan's and South Korea's largest trading partner. In fact, much of Japan's growing recov-

> ery depends on goods going to China. Previously idle capacity in construction machinery, steel and shipbuilding is now running at full stretch. Over the last year, Japan's exports to China have grown by 33.8 per cent while exports to the US have fallen by 5.4 per cent. (Harris, 2008, p. 174)

In 2009, China became the second-largest economy in the world after the US. Within three decades, China is predicted to become the world's largest economy and India, the third largest. The simultaneous economic ascendance of China and India (two nations that together account for one-third of the world's population) is nothing less than astounding. Given their current trajectory, most economists predict that India and China will likely account for half of global output by the middle of this century.

If the twentieth century was the American century, then the twenty-first century is likely the Chinese century. By every measure (consumer markets, investment, domestic savings, energy use, global exports, rate of growth) China is becoming a global super-power. Globalization itself seems to have entered a new phase in which NICs have considerable competitive advantage (Frank, 1998). The spread of global value chains, for example, has created a new level of complexity in international markets that is unprecedented. Steady deindustrialization of advanced capitalist countries alongside the rapid industrialization of countries in Asia has made the Asian region the center of industrial manufacturing. This trend will only grow deeper as education and skills development in NICs continues to improve.

The recent financial crisis in the U.S. and Europe has only served to exaggerate this global economic restructuring. The crash of 2008 inflicted profound damage to Western countries and their dominance over global trade and finance. The IMF (International Monetary Fund) estimates that loan losses for global financial institutions will eventually reach $1.5 trillion (Altman, 2009). In an article for *Foreign Affairs*, Altman outlines some of the geopolitical consequences of the recent crisis. As he concludes, the Western dominated international financial system has been devastated. While the U.S. share of world GDP has been declining for the past seven straight years, its geopolitical authority has now been significantly crippled. In response to the financial crisis, central banks in the United States and Europe have injected a total of 2.5 trillion dollars of liquidity into the credit markets (by far the biggest monetary intervention in history). What is obvious is that the credibility of Anglo-American laissez-faire capitalism has collapsed. As Altman concludes, Western governments simply "have neither the resources nor the economic credibility to play the role in global affairs that they otherwise would have played" (p. 1).

China, on the other hand, has been relatively insulated from the Western financial contagion. While experiencing its own economic slowdown, China's financial system was largely undamaged. Its foreign exchange reserves now approach $2 trillion, making it the world's strongest country in terms of liquidity. In financial terms China was little affected by the financial crisis:

> [China's] entire financial system plays a relatively small role in its economy, and it apparently has no exposure to the toxic assets that have brought the U.S. and European banking systems to their knees. China also runs a budget surplus and a very large current account surplus, and it carries little government debt. Chinese households save an astonishing 40 percent of their incomes. And China's $2 trillion portfolio of foreign exchange reserves grew by $700 billion last year, thanks to the country's current account surplus and foreign direct investment. (Altman, 2009, p. 5)

Largely driven by domestic demand, the IMF forecasts Chinese GDP to continue to grow at a rate of 8.5 percent. As China and the Association of Southeast Asian Nations (ASEAN) move closer to building the world's largest free-trade area, China has the opportunity to solidify its strategic advantage as a global power. With China's GDP projected to become the largest in the world, East Asia's geopolitical importance has become undeniable.

Economic Policy in the Creativity Economy

One increasingly important question that advanced economies must now seriously consider is "what next?" *What remains after we have mechanized agriculture, industry, and messaging technologies* (Lèvy, 1997)? Alongside discourse on a knowledge economy, many economists are now pointing to the increasing importance of *creativity* and a creative economy. Florida (2002), in particular, has argued that a new creative class made up of intellectuals, artists, and designers is an ascendant force today that is reshaping advanced capitalist countries. He elaborates,

> In 1900, creative workers made up only about 10% percent of the U.S. workforce. By 1980, that figure had risen to nearly percent. Today, almost 40 million workers—some 30 percent of the workforce—are employed in the creative sector. . . . When we divide the economy into three sectors—the creative, manufacturing and service sectors—and add up all the wages and salaries paid, the creative sector accounts for nearly half of all wage and salary income in the United States. That's nearly $2 trillion, almost as much as manufacturing and services combined. (Florida, 2007, pp. 29–30)

Commentators have debated changes to the industrial economy for several decades now. Beginning with Peter Drucker's (1959, 1966) predictions of a rising class of knowledge workers in the 1960s and continuing through Daniel Bell's (1973) explorations of a coming postindustrial society in the 1970s, contemporary discussions on the creative economy are only the most recent waypoint in this cultural migration (Healy, 2002). Linking discussions on the creative economy to broad structural mutations in the technologies underlying capitalist production, there are at least four common threads linking this discourse:

1. The diffusion of ICTs and consequent transformations in Fordist production.

2. The growing significance of a global market and globally fragmented production systems.

3. The increasing importance of highly educated workers or human capital within continuous cycles of creative innovation.

4. The rise of alternative centers of production outside advanced industrial countries.

Generally speaking there are two heavily overlapping modalities for understanding what is meant by the "creative economy." The first modality argues that *creative industries* and the cultural sector more broadly, represent a highly energized and growing portion of the broader economy. The second modality explores *creativity as an axial principle* underlying postindustrial shifts linked to globalization. Looking at both modalities in detail we see significant differences in their definitions of the "creative economy."

1) Creative Industries

The first modality for defining the creative economy is linked to discussions on "creative industries" as a growing sector. These industries include publishing, music, visual/performing arts, film, media, architecture, advertising and design. Since the 1990s, policymakers have developed fairly elaborate definitions of creative industries in the context of broader national innovation strategies. The idea of creative industries has existed for some time, however. Beginning with Adorno and Horkheimer's (1944/1977) early neo-Marxist critiques of mass media and the "culture industry" and evolving into a complex, though highly contested discourse on the nature and function of art and culture in the global market.

Creative industries today are estimated to be growing globally at an average rate of 8.7% per year (UNCTAD, 2008, p. 24). U.S. creative industries (defined in terms of arts, media, and design), for example, are estimated to make up 8% of the national GDP, outstripping auto production, aircraft production, agriculture, electronics, and computer technologies (Siwek, 2002). The annual growth rate of creative industries in OECD countries during the 1990s was twice that of the service industries overall and four times that of manufacturing overall (Howkins, 2001, p. xvi). World exports of visual arts, for example, more than doubled from $10.3 billion in 1996 to $22.1 billion in 2005. Between 2000 and 2005, for example, world trade in creative goods and services reached $424.4 billion in 2005 or 3.4% of the total world trade:

> World exports of creative products were valued at $424.4 billion in 2005 as compared to $227.5 billion in 1996, according to preliminary UNCTAD figures. Creative services in particular enjoyed rapid export growth—8.8. per cent annually between 1996 and 2005. This positive trend occurred in all regions and groups of countries and is expected to continue into the next decade, assuming that the global demand for creative goods and services continues to rise. (UNCTAD, 2008, p. iv)

While developed countries produce and consume the lion's share of the global market in creative products and services, many developing countries, particularly countries in Asia, are beginning to see growing returns. One striking example of this emerging pattern is the increasing dominance of Asia in the area of technology-related creative goods, such as computers, cameras, televisions, and audiovisual equipment. From 1996 to 2005 exports in these key industries grew from $51 billion to $274 billion (UNCTAD, 2008, p. 6). Not surprisingly, China has (since 2005) become the world's leading producer and exporter of value-added creative products.

The major challenge for understanding the creative economy in terms of creative industries, however, lies in defining the scope and breadth of these industries. More problematic than this are their relatively marginal levels of employment. Taken as a whole, the percentage of employment in the creative industries is quite small. In the United States, for example, creative industries accounted for just 2.5 per cent of total employment in 2003. Nederveen Pieterse (this volume) puts it this way,

> If we interpret the cultural economy as a sector (including, e.g., Hollywood, television, the arts, design, fashion) it is vibrant and significant, but not nearly significant enough in job creation to make up for the millions of jobs lost in

> manufacturing and through outsourcing . . . The cultural economy, though surely significant, is simply not large and substantial enough to employ enough American workers; just as software, high-tech and back office services in India will never employ enough of India's workforce.

2) Creativity as Axial Principle

The second modality for understanding the creative economy is much broader and more diffuse. It views creativity as vital to the economy in general and fundamental to a technology-driven global economy in particular. Following this line of reasoning, Howkins (2001) and Florida (2002) make creativity the axial principle of postindustrial capitalism. Building out from a "super-creative core" of scientists, engineers, architects, designers, musicians, artists, educators, and entertainers, Florida suggests that the creative economy constitutes 30% of the U.S. workforce (with the supercreative core representing only 12% and a larger contingent of creative professionals in business, finance, health, law, accounting, and related professions representing 18%).

Underlying this version of the creative economy is an argument that creativity is now the key driver of global innovation. This does not mean that creativity is itself an economic activity but that creativity becomes an economic activity "when it produces an idea with economic implications or a tradable product" (Howkins, 2001, p. x).

Critics of this version of the creative economy argue that the celebration of creative workers minimizes class stratification and ignores the systems of exploitation that undergird capitalist economy. From a conventional class analysis, the creative economy does not fundamentally change the nature of exploitation within capitalist production. In this sense, the "Creative Class" is only the newest link in a very long chain of social prophecies extending back through discussions on the evolution of modern Western civilization (Barbrook, 2006). Though differing in emphasis, each of these predictions finds a common root in a Western eschatological approach to history. Oscillating between a "new ruling class" and a "new working class," each prediction has attempted to make sense of the mutations in capitalist economy and society. From Adam Smith's "Philosophers of Industry" (1776) and Karl Marx's "Proletariat" (1848), to Max Weber's "Bureaucrats" (1910/1948), Frederick Taylor's "Scientific Managers" (1911/1967), Joseph Schumpeter's "Entrepreneurs" (1942/1976), Peter Drucker's "Knowledge Workers" (1959), Daniel Bell's "Knowledge Class" (1973), Alvin Toffler's "Prosumers" (1980) and Jean-Francois Lyotard's "Postmodernists" (1984).

As Barbrook observes, there is in fact a deep structural meta-narrative underlying discussions on the creative economy that links it to a much longer history of social prophecy. The basic theme of this eschatological vision is an anticipation of the future by linking the whole of society to the trajectory of a principal segment. In this sense, the contemporary focus on a new revolutionary creative class has deep historical roots:

> Far from rejecting Florida's approach, the most influential thinkers on both the Right and the Left are promoting their own versions of the Creative Class. Just like him, they're also convinced that the new economic paradigm will vindicate their own political stance. According to taste, the growth in the number of information workers can be interpreted as the imminent triumph of either dotcom capitalism or cybernetic communism. Although often bitterly divided in their politics, these gurus still share a common theoretical position. Whether on the Right or the Left, all of them champion the same social prophecy: the new class is prefiguring today how everyone else will work and live tomorrow. (Barbrook, p. 16)

According to Barbrook, contemporary struggles for creative liberation from the stifling limitations of monolithic systems have a significant cultural history in capitalist society, stretching back through the Hippies in the mid-twentieth century and the Bohemians in the early nineteenth century. In the contemporary milieu, however, creativity and innovation remain a privilege of the few. A creative minority can indeed make their living as leaders in the creative economy, but only because of the support afforded them by the mundane labor of everyone else.

> For over two centuries, creativity has been at the centre of the struggle between capital and labour. As the industrial system has evolved, the contending classes have fought not only over the division of the fruits of production, but also over the control of the workplace. In *The Wealth of Nations*, Adam Smith showed how the increasing division of labour allowed capitalists to replace self-governing skilled artisans with more submissive unskilled employees. (Barbrook, 2006, p. 25)

As Barbrook goes on to point out, much of the rhetoric undergirding post-Fordist celebrations of entrepreneurs has simply perpetuated Fordist assumptions that a ruling class is necessary to lead society towards a future "promised land." In the contemporary milieu, however, the focus is increasingly shifting to a new mode of production altogether. While under Fordism, the path to a successful career was found in internalizing the routines and procedures of the corporate machine, today these are exactly opposite to the skills needed to advance contemporary cap-

italism (Barbrook, 2006). Unlike the rigid hierarchies of industrial capitalism, the dominant model of organization today is not the Fordist bureaucracy but the *network*. This has been occurring in part because of the rise of network capitalism and its capacity to leverage *democratization* in production.

Network Capitalism: Democratizing Innovation

Perhaps the most important strand in understanding the contemporary notion of the creative economy is the recent technology-driven shift from industry to services. Since the onset of the "new economy" in the 1990s, business strategists have been moving beyond efficiency gains in the production of goods and services and become increasingly focused on innovation systems and the exploitation of information. Technology has emerged as the "infostructure" for enterprises competing on a global scale, and IT has provided the platform on top of which knowledge-driven organizations create value (Tapscott, 1997). More recently, networked connectivity has added a new social dimension to business enterprise, transforming IT into ICTs and making multimedia content critical to networked modes of production and consumption.

Much as the assembly line shifted the critical factor of production from labor to capital, today the computer is shifting the critical factor of production from capital to innovation. Beyond the command systems characteristic of industrial production, ICT networks have become infrastructural to new modes of value-driven design and innovation. Underlying this socioeconomic restructuring is the critical importance of information and communications networks (ICNs) to leveraging distributed creativity. As Rycroft & Kash (2004) explain, the capacity of networks to coordinate rapid self-organization is now foundational to global innovation:

> The most valuable and complex technologies are increasingly innovated by networks that self-organize. Networks are those linked organizations (e.g., firms, universities, government agencies) that create, acquire, and integrate the diverse knowledge and skills required to create and bring to the market complex technologies (e.g., aircraft, telecommunications equipment). In other words, innovation networks are organized around constant learning. Self-organization refers to the capacity these networks have for combining and recombining these learning capabilities without centralized, detailed managerial guidance. The proliferation of self-organizing innovation networks may be linked to many factors, but a key one seems to be increasing globalization. Indeed, globalization and self-organizing innovation networks may be coevolving. Changes in the organization of the

> innovation process appear to have facilitated the broadening geographical linkages of products, processes, and markets. At the same time, globalization seems to induce cooperation among innovative organizations. (p. 1)

Moving beyond the simple "one-to-many" linear model of industrial manufacturing, ICNs are facilitating "many-to-many" production. As Eric von Hippel (2005) has pointed out, this new logic is giving rise to a democratization of innovation that is in fact problematizing the divide between producers and consumers:

> When I say that innovation is becoming democratized, I mean that users of products and services—both firms and individual consumers—are increasingly able to innovate for themselves. User-centered innovation processes offer great advantages over manufacturer centric innovation development systems that have been the mainstay of commerce for hundreds of years. Users that innovate can develop exactly what they want, rather than relying on manufacturers to act as their (often very imperfect) agents. Moreover, individual users do not have to develop everything they need on their own: they can benefit from innovations developed and freely shared by others. (p. 1)

This democratization of innovation reflects a larger potential emerging with ICTs in the creative economy. Building out from specialized communities-of-practice, there is a noticeable shift from passive consumption to active cultural production. Fundamental to this shift is an emerging understanding that tools that facilitate design in the context of learning-by-doing are becoming critical to the advancement of both culture and economy (Foray, 2004).

Networks of Prosumer Innovation

Tapscott and Williams (2006) refer to this as *prosumer innovation* (Toffler, 1980). As they suggest, the growing importance of prosumer innovation is directly connected to networks as platforms for mass collaboration. Using examples ranging from software, music, publishing, and pharmaceuticals, Tapscott and Williams link collaboration-driven Web services like Facebook, InnoCentive, Flickr, Second Life, and YouTube to the rising power of prosumer-driven creativity and design. In the online virtual environment of Second Life, for example, prosumers form broad user-communities that create rich value-added products and services. Open business models like Second Life invite customers to add value by offering a platform for creativity. Tapscott and Williams point out that technologies like Apple's iPod and Sony's PSP are now routinely "hacked" to enable creative changes in their

design and performance: "Whether it's modifying the casing, installing custom software, or . . . doubling the memory, users are transforming the ubiquitous music and media player[s] into something unique" (p. 133):

The rising influence of prosumer hacking is the result of a convergence of peer-to-peer networks and user-friendly editing tools. While consumers with the skills and inclination to hack commercial products like the iPod remain a minority, they are an expanding consumer segment. Rather than fighting this rising tide, Tapscott and Williams argue that companies should adapt to it by bringing customers into their business webs and giving them lead roles in next-generation products and services:

> Forget about static, immovable products. If your customers are going to treat products as platforms anyway, then you may as well be ahead of the game. Make your products modular, reconfigurable, and editable. Set the context for customer innovation and collaboration. Provide venues. Build user-friendly customer tool kits. Supply the raw materials that customers need to add value to your product. Make it easy to remix and share. We call this designing for prosumption. (p. 148)

As they point out, it may be true that prosumer hacking forces a company to risk losing control of its product platform, but it is also true that "a company that fights its users risks soiling its reputation by shutting out potentially valuable sources of innovation" (pp. 135–136).

Peer-to-Peer Production Ecologies

Prosumer innovation works because it leverages self-organization as a mode of production. Taken as a whole, the Internet represents a global sociotechnological platform in which the knowledge, resources, and computing power of billions of people are coming together into a massive collective force. Bauwens (2006), for example, has outlined a strong case for the rise of peer-to-peer (P2P) systems as a new mode of production. As he points out, what makes peer production systems particularly different from both state and market models is that they are largely independent of monetary incentives and fixed hierarchical organization. In P2P projects like open-source software (OSS), for example, resources are contributed spontaneously. Formal authority is "organic," emerging and receding with the domain-based expertise needed to complete specific tasks. In these democratic production ecologies, authority does not disappear, but neither does it cohere as permanent hierarchical structures. It is literally production that is dependent on the voluntary participation of partners.

According to Bauwens, the Internet as a point-to-point network infrastructure enables "equipotentiality" in the design and development of *commons-based* production regimes. Labor is "permission-less" and bottom-up. P2P is neither hierarchy-less nor structure-less but is shaped by flexible "hierarchicalization," which is entirely dependent on the free cooperation of autonomous agents. In P2P production systems, motivation is intrinsic and passion-based rather than an exchange of labor for financial reward. In the context of OSS, for example, projects are usually led by a core group of founders who head microteams in a patchwork of specialized tasks. Peer production systems are synergistic "hives" in which fluid modes of collaboration support emergent innovation that is collectively *grown*. While hierarchical organizations depend on a *panoptical* logic that steers production from above, networked production systems utilize a *holoptical* logic or "horizontal" intelligence. In P2P projects, all participants have access to the knowledge of what the others are doing, and the vertical knowledge of the project as a whole. As new skill levels evolve, peer contributors move from the periphery to the core without the need for fixed hierarchies or external mediation.

Harnessing the Hive

P2P represents one of the clearest models we have for harnessing complex systems in the production of design and innovation. In his book *The Wealth of Networks*, Benkler (2006) describes this emerging mode of production as "commons-based social production." While traditional systems of production depend on closed proprietary structures, commons-based production utilizes open networks to harness the creative energy of collective intelligence. For Benkler, the key to understanding this democratic cultural practice is that no single entity "owns" the product or manages its direction. While this new mode of production may depend on the technological capacity of networks, it is ultimately configured by an emergent socio-political structure grounded in open systems.

By "importing" energy across permeable boundaries, open systems in nature are continually nourished. It is this capacity for self-creation or *autopoesis* that gives open systems in nature their incredible capacity for growth. When this same boundary permeability is translated into the domain of human socio-economic production, it manifests as a continually evolving collective intelligence. Much as other complex open systems, democratic production systems avoid "creative entropy" by continually absorbing energy and resources from new participants. As free labor is absorbed into shared economic practices, the creative potential for self-organization is continually replenished.

Entering a Creative Age

It has become fairly commonplace to say that creativity and innovation rest on cultural experimentation. In the context of lived reality, however, one can view the world's diverse cultures as "experiments" with innovation. "The more experiments humanity constructs, in other words the greater the cultural diversity, the more knowledgeable and innovative we are likely to be" (Griffin, 2000, p. 193).

We know that creativity flourishes among talented people, but what stokes this process and what sustains it? The answer, according to Florida, lies in geography. That is, a community's cultural capacity for openness or "absorptive capacity." In his view, tolerance for diversity and "low barriers to entry" attract and absorb talent while supporting the rich environments that stoke creative innovation. Zachary (2000) puts it slightly differently. In his view, creativity depends on cultural blending or *hybridity*. While monocultural chauvinism impedes creativity, hybridity renews it. In this sense, creativity emerges with the ability to integrate divergent and even contradictory cultural practices.

The capacity for communities and peoples to work creatively with cultural artifacts in the context of sustained innovation is emerging as a critical challenge today. In contrast to Thomas Friedman's notion of a "flat world," wealth and power are becoming increasingly concentrated in the hands of a highly educated elite living in the world's richest cities.

While the share of the world's population living in urban areas was just 3% in 1800, and 30% in 1950, it is 50% today (and as high as 75% in advanced capitalist countries) (Florida, 2007, p. xviii). Five mega-cities have more than 20 million inhabitants, and another twenty-four cities have 10 million inhabitants. According to Florida, the world's 40 largest mega-regions are now home to some 18 percent of the world's population and produce two-thirds of global economic output (including nearly 9 in 10 new patented innovations).

Even as the world's cities are increasingly absorbing larger and larger numbers of the global population, only a handful of cities make up the dominant share of wealth and power. Whether measured in terms of financial power or commercial innovation, only a very small number of cities in the world today dominate the global economic landscape. Staggering economic peaks like New York, Paris, London, and Tokyo form the major control nodes of the global economy (Porter, 1990; Sassen, 2001). If the world economy were measured for commercial innovation, wealth would in fact be even more concentrated. New York's economy alone is equal in size to that of Russia or Brazil. "Together New York, Los Angeles, Chicago, and Boston have a bigger economy than all of China. If U.S. metropol-

itan areas were countries, they'd make up forty-seven of the biggest 100 economies in the world" (Florida, 2007, p. xviii).

While theories of a "flat world" (T. Friedman, 2005), for example, accurately register the growing capacities of emerging countries like India and China to compete in the global market, they ignore the growing divide between the super-educated and the vast majority who have little or no access to advanced skills. Beyond the mobile "creative class," whose members are free to migrate between the world's economic peaks, live the vast majority who are left to toil in the world's economic valleys. Put simply, it is not that the world has become "flatter," but that the world's economic peaks have become slightly more dispersed (particularly as industrial and service centers have shifted to Asia).

Education in the Creative Economy

We seem to be entering a new world now, a world in which the major raw materials are no longer coal and steel produced by machines, but creativity and innovation produced by the human imagination. It is certainly true that all human beings are creative—this is a basic capacity of the human species, grounded in its ability to evolve and adapt. Unfortunately, it is only a small minority of people in the world today who are able to tap this creativity. In this sense, Florida is entirely correct when he suggests that the great challenge before us is to develop the systems and policies that harness the creative capacities that lie within all human beings.

If Florida and other advocates of the creative economy are right, then creativity is now fundamental to wealth and prosperity and cultural innovation is critical to its fecundity. Yet it is precisely creativity that is least valued by contemporary institutions. The vast majority of hierarchical organizations today deliberately submerge creativity beneath bureaucratic layers of command-and-control. This is equally true of contemporary systems of education. While it was once true that school systems effectively distributed the necessary skills for an age of industry (numeracy, literacy, symbol manipulation), it is equally true that these same institutions are not equipped to support the skills and capacities for an age of innovation.

Much as Franklin Roosevelt used the New Deal to reform the economic and banking systems in order to construct the infrastructure necessary to emerge from the Depression, so today must we develop the policy framework and infrastructural renewal to reform education for an age of innovation. "Like earlier efforts to build canals, railroads, highways, and other physical infrastructure to power industrial growth, the United States and countries around the world must invest in their *cre-*

ative infrastructure if they want to succeed and prosper in the future" (Florida, 2007, p. 249).

Education is critical to this creative infrastructure. Rather than understanding learning in terms of fixed objects that are transferred from one generation to the next, we need to begin to design educational systems that support knowledge and learning in terms of continuous cultural innovation. Education systems designed for industrial societies do not effectively harness the liquidity of creative innovation because they are too centralized. Transferring a fixed body of knowledge and practices from experts to amateurs is contradictory to an economy increasingly dependent on continuous flows of design and innovation. Allowing students to combine and blend cultural flows as a part of the larger continuum of cultural production is now fundamental to reconfiguring learning and education.

Education and Cultural Production

Cultural innovation is iterative. Contemporary cultural forms are themselves the products of countless prior iterations. In the arts and sciences, past cultural innovations serve as basic resources for future innovations. While established theories of cultural systems have traditionally interpreted cultures as closed systems, the pace of change in a rapidly globalizing world now requires a theory of culture that recognizes the continuous transformation of culture and cultural systems (Kress, 2000).

As Nederveen Pieterse (2004) suggests, our contemporary notion of culture combines two, somewhat contradictory meanings. The first concept of culture (culture 1) assumes that culture stems from a learning process that is geographically fixed: "This is culture in the sense of *a culture*, that is, the culture of a society or social group: a notion that goes back to nineteenth-century romanticism and that has been elaborated in twentieth-century anthropology, in particular cultural relativism—with the notions of culture as a whole, a Gestalt, configuration" (p. 78).

Unlike this self-contained and perpetually colliding notion of culture, however, a second approach to defining culture understands it to be something more akin to a shared and evolving social practice. This broader understanding of culture (culture 2) views it as general human "software," more akin to creative flows than locally bounded knowledge. This second notion of culture is closely linked to translocal learning processes and to theories of evolution and diffusion.

As Nederveen Pieterse points out, these two viewpoints are not incompatible; culture 2 finds expression in culture 1. Nonetheless, they are rooted in shifting ontological and epistemological boundaries. In this sense, culture may be linked to territorial and/or historical contingencies (culture 1), but it is not reduced to them.

If competency in the use of resources within existing cultural systems is the goal of literacy in traditional systems of education (culture 1), then cultural production and the reshaping of cultural systems must be the goal of education today (culture 2). The growing economic challenge for advanced economies is to develop social and economic policies that support sustained cultural innovation. As Venturelli (2005) puts it,

> The challenge for every nation is not how to prescribe an environment of protection for a received body of art and tradition, but how to construct one of creative explosion and innovation in all areas of the arts and sciences (see Venturelli, 2000, 1999, 1998b). Nations that fail to meet this challenge will simply become passive consumers of ideas emanating from societies that are in fact creatively dynamic and able to commercially exploit the new creative forms. (p. 396)

In this sense, legacy approaches to defining cultural policy become deficient to engaging the emerging importance of culture to the economy. As Venturelli observes, the most important question with regard to a given society today is not the cultural legacy of its past but the inventive and creative capacities of its present. This interpretation does not mean that established cultural forms are irrelevant to creativity and innovation in the creative economy. Established cultural forms are themselves the foundations on which new cultural forms are developed. Rather, it is to question the idea that cultural policy is merely a question of protecting cultural traditions:

> In a "museum paradigm," of cultural policy, works of art and artistic traditions are revered and cultural traditions closely guarded and defended. But when these become the predominant measure of cultural resources and the notion of legacy occupies the sole definition of the creative spirit, ultimately the development of that spirit would be undermined. . . . A culture persists in time only to the degree it is inventing, creating, and dynamically evolving in a way that promotes the production of ideas across all social classes and groups. Only in this dynamic context can legacy and tradition have real significance. (Venturelli, p. 395)

Achieving a model of education that supports this radical understanding of innovation is very likely the next major challenge facing countries in the twenty-first century.

Networks, Education, and Communities of Practice

New modes of education are critical to supporting a creative economy. In addition to arguments for investing in the knowledge economy through STEM (science, technology, engineering, and math) disciplines, it is equally critical to invest in art, design, and digital media as interlocking components of the broader creative economy. As Leadbeater (2000, p. 110) points out, contemporary education systems suffer from two lingering traditions that have been combined to severely hinder contemporary school systems: the monastery as knowledge repository and the factory as command production system. In contrast to these fixed hierarchical systems, we now require horizontal networks that allow "student-amateurs" to directly engage with one another in the practice of building and transforming ideas and practices.

In the world of technology, the cultural spotlight is increasingly moving to the "edge of the network," to distributed systems and open platforms in which mass collaboration is used to leverage large-scale projects like Wikipedia, Linux, the World Wide Web, and more recently the Barack Obama presidential campaign. Networked collaboration is highly conducive to learning and innovation because production is grounded in self-organizing systems of collective intelligence. In the increasingly unstable environment of modern education, students must be given access to educational systems that foster collaboration in the context of networked innovation.

John Seely Brown (2005), for example, has suggested that the next generation of education should be more closely linked to apprenticeship models of learning (Lave, 1988). Rather than learning *about* something, Brown argues for a studio-based model that focuses on directly acculturating students into sociocultural practices. Echoing Dewey, Brown's focus on practice emphasizes multimedia literacy (or digital literacy) in the context of the many distributed learning communities found on the Web. Much as Open Source Software production has been catalyzed by open collaboration, Brown argues that education can be catalyzed by social learning communities. With the growing reach and density of global ICTs, social learning networks have proliferated on the Web creating a vast learning platform:

> Note that what has been constructed here, largely as a by-product, is a vast learning platform that is, de facto, training thousands of people about good software practices. A powerful form of distributed cognitive apprenticeship that functions across the world has emerged. Today, there are about one million people engaged in open source projects, and nearly all are improving their practices by

> being part of these networked communities. The key to learning in these environments is that all contributions are subject to scrutiny, comment and improvement by others. There is social pressure to take the feedback from others seriously. (Brown, 2005: 21)

Powered by intrinsic motivation, social learning platforms like Linux and Wikipedia demonstrate the rising tide of participatory learning communities that are rebuilding the education landscape. This new education environment represents a significant shift from Fordist learning systems to passion-based learning systems, in which students are empowered by their own intrinsic motivation to be social agents. No matter how specialized an interest area may be, the Web offers a participatory platform for leveraging mass collaboration. Rather than the *supply-push* mode of learning that undergirds the industrial age, social learning networks enable a *demand-pull* mode of learning that leverages learning through participation. In the context of education, this shifts the focus from building up stocks of knowledge (learning-about something) to enabling participation in flows of cultural production (learning through experience).

The Internet is a rich resource and learning ecosystem that is enabling social learning communities to grow and flourish. There is no doubt that this rising social technology will have a significant impact on education. While in the industrial age, human creativity was divided into distinct activities (art, science, and business enterprise); today technology scaffolds so many varied disciplines that their recombination in new forms is becoming commonplace. In Brown's view, we should focus on shaping education through a kind of "elegant minimalism," in which the core curriculum remains focused on the foundational skills: literacy, numeracy, and critical thinking. However, surrounding this core curriculum is an open curriculum that is largely determined by students themselves as they navigate the proliferation of social learning communities available to them. As Brown points out,

> When new mechanisms for distributing content are combined with new power tools for creating that content, along with social software and recommendations systems for finding the content, we have the beginnings of an infrastructure for enabling the rise of the creative, always learning, class—people who want to create and have others build on, use, critique and, most importantly, acknowledge their creations. This presents a new set of possibilities for unleashing a culture of learning by creating, sharing, and acknowledging the work of others in a way that builds both social capital and intellectual capital simultaneously. (Brown, p. 28)

Educational Policy in the Creative Economy

The capacity of people to work creatively with cultural artifacts in the context of sustained innovation is emerging as a central feature of the global economy today. If we accept the arguments of creative economy theorists like Howkins and Florida, then cultural policy effectively becomes economic policy. This suggests that struggles over resource allocation, competing constituencies, and divergent goals will be even more contentious going forward (Healy, 2002). Educational policy will certainly play a critical role in this.

New policies and planning are vital to making creative work broadly accessible to all and not reserved for an educated elite. As peoples and governments begin to ponder the consequences of the recent collapse of the laissez-faire capitalism in the United States, Britain, and elsewhere, it is becoming obvious that developing coherent policy prescriptions for cultural innovation are now critical to long-term social and economic sustainability. One of the major questions that we must begin to answer today is: "What systems, policies, and structures are most conducive to making it possible for the largest number of people in a society to participate in the creation and development of new cultural forms?"

As the nexus of economic growth increasingly moves from labor-intensive "smokestack" industries to "design work," education is becoming central to both incubating knowledge and harvesting creative innovation. Much as the factory was the core institution of the industrial age, schools and universities may well be the core institutions of the innovation age. In many respects, however, the modern university is now outmoded. Shaped for a different era, the modern university was designed as a state apparatus. Knowledge was perceived as a local commodity and competition between schools mirrored competition in the rest of the marketplace. In a global age, however, the isolated nation-state is being reshaped by global circuits of trade and communication (Toffler, 1990; Castells, 1996). Rather than islands of concentrated knowledge in support of the nation-state, schools and universities must become cultural estuaries in support of creativity and innovation. As students become agents in their own learning trajectories, schools and universities must begin to explore modes of knowledge and learning that facilitate creativity in the context of collective intelligence.

Conclusion

Educational systems today are undergoing an enormously disruptive transformation that is moving them beyond their roots in nineteenth-century industrialization. The interconnected forces of globalization, cultural change, and digital

technologies are together democratizing agency and moving authority away from institutions of education. Beyond iterative cultural innovation, national education systems must now explore modes of education that catalyze radical innovation. It is clear that education systems designed for industrial societies do not effectively harness the liquidity of bottom-up innovation because they are embedded in hierarchies of command-and-control. Networks on the other hand, represent a clear model for harnessing radical innovation because they facilitate emergent creativity in the context of mass collaboration. Beyond established arguments for a global knowledge economy, network-driven creativity is critical to revitalizing advanced capitalist countries for an age of innovation.

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