NATIONAL POLICIES AS PLATFORMS FOR INNOVATION

Reconciling a Flat World with Creative Cities

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THE ASSOCIATION FOR COMPETITIVE TECHNOLOGY (ACT) IS AN INTERNATIONAL ADVOCACY AND EDUCATION ORGANIZATION REPRESENTING MORE THAN 3000 SMALL AND MID-SIZE INFORMATION TECHNOLOGY FIRMS FROM AROUND THE WORLD. ACT ADVOCATES FOR AN ENVIRONMENT THAT INSPIRES AND REWARDS INNOVATION, AND PROVIDES RESOURCES LIKE THE INNOVATORS NETWORK TO HELP MEMBERS LEVERAGE THEIR INTELLECTUAL ASSETS TO RAISE CAPITAL, CREATE JOBS, AND CONTINUE INNOVATING.

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EXECUTIVE SUMMARY

Innovation is the "secret sauce" for the growth and prosperity of economies. Countries around the world are seeking to improve their competitiveness with strategies to spur innovation.

Innovation occurs in many forms, including business models, products and services, and supply chains. Innovation flourishes in environments that allow easy immigration, flexible hiring and firing of employees, and risk taking.

In addition, countries with an educated workforce, low taxes, strong intellectual property laws, and a sophisticated network of financial institutions to fund small business startups will have innovative, successful economies. National policies that further these areas are critical for competitiveness — at the global and local level.

An economy's cultural, economic and legal environment forms a kind of "ecosystem" that can alternatively be fertile or hostile to innovation. Ecosystems that allow businesses to quickly adapt to change will create resilient, prosperous and innovative economies.

Cultivating the right regulatory and social environment for promoting an innovation ecosystem is complex, but it's worth the effort. National policies provide platforms that are critical for competitiveness at the global and local level.

New York Times reporter Thomas Friedman writes about competition at the global level. In his book, *The World Is Flat: A Brief History of the Twenty-first Century*, Friedman says that national boundaries do not matter as much in a "flat" — or connected — world. Economist Richard Florida, in *Cities and the Creative Class*, calls cities the "cauldrons of creativity" and writes about competitiveness at the local level. He analyzes why certain cities become innovation centers.

Friedman's global view and Florida's local perspective make valuable contributions to the competitiveness literature. However, each is incomplete. In a globally connected world where certain cities innovate above the rest, *national* policies are vital.

Certain national policies are essential to *enable* a country's participation in the global economy and a city's quest to be an innovation center. In this regard, global and local innovation depend heavily on a favorable national legal and regulatory ecosystem.

Antitrust law, intellectual property rights, and international trade stand out as distinctly national policies for promoting innovation and increasing competitiveness. Markets need a sensible national competition policy — particularly one that does not frown upon the integration of innovations — so that a country's economy can adapt to changing conditions. Intellectual property law provides incentives for innovation and provides legal mechanisms for protecting and monetizing intellectual assets. Nations that open their markets to the forces of competition will see greater productivity and prosperity.

INTRODUCTION

Fearful of losing jobs to global competition, traditional economic powers are anxious to help their industries and research institutions compete and innovate. Governments are focusing on improving education and finding the best ways to embrace technology. The rhetoric is surprisingly consistent — no nation wants to be left behind.

The economic literature is also unified on innovation. Economists generally view innovation as the competitive driver for economic growth and high living standards.[1] Countries that innovate will prosper; those that do not face a steady decline in productivity.

While it is easy to recognize that innovation is important, nations cannot recreate their own Silicon Valley without pro-innovation policies. Some nations are more innovative than others, largely due to the different economic and legal policies countries implement at the national level.

> ***Genius is one percent inspiration and ninety-nine percent perspiration.***
>
> – THOMAS EDISON

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INNOVATION TAKES MANY FORMS, YET IS SINGULARLY IMPORTANT

Innovation furthers a nation's economic growth and prosperity. Yet, creating a fertile climate for innovation remains an elusive pursuit for economic planners around the globe. Misguided policies undermine the kind of initiative and risk-taking required for innovation. If nations are to be innovative leaders, policymakers must understand what innovation is, why it is important, and how it is cultivated.

What is Innovation?

Innovation is multifaceted and hard to specifically define. A dictionary definition for innovation is *the act of introducing something new.*[2] There is a useful distinction between invention and innovation.

> ***Whereas research is taking money and investing it into knowledge, innovation is the process where knowledge is transformed into money by generating a product, a service or a license.***
>
> – JORGO CHATZIMARKAKIS, GERMAN MEMBER OF EUROPEAN PARLIAMENT

Invention is the discovery of new knowledge. *Innovation* occurs by understanding the implications of invention and developing ideas into something of value, resulting in either physical or intellectual property. Legal, business and cultural factors that affect how products get to market directly affect a country's rate of innovation.

Somewhat paradoxically, innovation is often about destruction — rendering current ideas obsolete. This process was described as "creative destruction" by economist Joseph Schumpeter in 1942.[3] In his 1997 book *The Innovator's Dilemma*, Clayton Christensen describes "disruptive technologies" as innovations that are generally "cheaper, simpler, smaller, and, frequently, more convenient to use."[4] Innovation can lead to breakthroughs that re-shape an entire industry in a matter of a few years or even months.

However, innovation is not limited to radical "big bang" events. Incremental innovation that builds upon existing, well-practiced technologies creates value and extends a product's usefulness.[5] Moreover, existing products that are continuously enhanced by new features often provide platforms for innovation by others. As an example, cellular phones are now integrated with web browsing, music and video capabilities in ways that have large, if not disruptive, impacts on traditional camera, computer and audio devices.

Innovation can occur in many forms, including:[6]

- **BUSINESS MODEL INNOVATION**
  Business model innovation is about changing the way business is done in terms of capturing value. It includes the creation or alteration of business structures, practices, and models, and may therefore consist of new marketing methods with improvement in product design or packaging, product promotion or pricing. Viral marketing is an example of business model innovation.

- **PRODUCT AND SERVICE INNOVATION**
  Product and service innovation involves the introduction of a good or service that is new or substantially improved. This might

include improvements in functional characteristics, technical abilities, ease of use, or any other dimension. Examples include TiVo and Apple's iPod.

- **SUPPLY CHAIN INNOVATION**
  The supply chain includes the sourcing of inputs from suppliers and the delivery of outputs to customers. Supply chain innovation involves the implementation of a new or significantly improved production or delivery method. Wal-Mart is regarded as a leader in supply chain innovation.

Why is Innovation Important?

Technological innovation has become the major driver of economic progress.[7] Raw materials and capital were the building blocks for economic growth during the industrialization of the 19th and 20th centuries. Today, innovation occupies the central role once accorded to raw materials as a determinant of a nation's economic success.

Innovation is part of a "virtuous circle" whereby growth creates the opportunity for more growth. According to Roger McCain, a professor at Drexel University, in a virtuous circle "intensified division of labor raises labor productivity, increasing incomes, increasing demand, creating larger markets which then afford the opportunity for further increase in the division of labor, starting the spiral over again."[8] Innovation has become the key determinant for supporting a nation's high standard of living.

Industrialized countries, consequently, cannot afford to rest on their laurels or adopt regulations that enforce the status quo and resist change. For instance, Germany's economy — the world's fifth largest — measures $2.73 trillion.[9] But its growth rate has averaged less than one percent over the past five years.[10] Poland and the Czech Republic — Germany's neighbors to the east — have smaller but rising economies with respective 2005 growth rates of 3.2% and 6%.[11]

Growth from countries historically defined as "developing" threatens today's economically powerful nations. A Goldman Sachs report grabbed headlines in 2003 when it created the concept of the BRIC — Brazil, Russia, India, and China. The report predicted that in another generation, the combined BRIC economies would exceed the combined economies of the United Kingdom, France, Germany, Italy, Japan, and the United States, and that China could be the world's second largest economy in 10 years.[12] Political leaders — reacting to this new competition — have made increasing innovative output a priority.

> ***Innovation is the central issue in economic prosperity.***
>
> – MICHAEL E. PORTER,
> HARVARD BUSINESS SCHOOL

In response to growing concerns over competitiveness, the Bush Administration introduced the American Competitiveness Initiative, whereupon President Bush emphasized that "[o]ne of the great engines of our growing economy is our nation's capacity to innovate."[13] Similarly, Angela Merkel, Germany's Chancellor, has declared that her country "can only maintain prosperity if we make innovation an absolute priority."[14]

Furthermore, in the U.S. Congress there is bipartisan belief that innovation is important to national prosperity. In total, 348 bills from the 109th Congress make reference to "innovation."[15]

In summary, innovation is multifaceted and fundamentally important for economic competitiveness. Governments are eager to pursue policies that foster greater innovation in their own economies.

HOW SUCCESSFUL ECONOMIES DRIVE INNOVATION

This section examines different approaches that governments are taking to drive innovation, using benchmarks and indices to compare results of their efforts.

Governments have direct and indirect control over factors affecting innovation — including laws for starting a business, rules governing business operations, and regulations that manage competition and markets. As an example, the steps to start a business differ among countries and often require the filing of formation documents and registration with tax offices. Starting a business takes 5 days in the United States, compared with 24 days in Germany and 47 in Spain.[16]

It seems simple, but business formation should be one area where governments should simplify further. The genesis of innovation often begins with the starting of a company. In addition, there are other factors that can be used for benchmarking economic competitiveness and innovation.

In Europe we have struggled to generate the dynamic approach which has helped to put the U.S. economy on top of the world.

– HON. STEPHEN BEYERS, FORMER BRITISH SECRETARY OF STATE FOR TRADE AND INDUSTRY

1. Benchmarking Economic Competitiveness

Countries take differing approaches toward business and economic regulation — with varying degrees of success, according to certain indices that score national competitiveness. The following section highlights three different studies that rank a country's economic competitiveness.

Doing Business — A Report by the World Bank Group

Doing Business, a publication of World Bank Group, benchmarks business regulations in over 155 countries on how local regulation impacts 10 economic activities: starting a business; dealing with licenses; registering property; employing workers; obtaining credit; enforcing contracts; closing a business that is failing; paying taxes; protecting investors; and trading across borders.[17]

Singapore, New Zealand, and the U.S. top the list for 2006. These top three countries ranked highly because their regulatory environments make it relatively easy to start a business and to hire and fire workers. In addition, these countries have strong legal protections for investors, including rules for corporate disclosures, director liability and the rights of shareholders.

New Zealand and Singapore scored better than the U.S. in the amount of taxes that companies pay, the time and costs of complying with licensing and permit requirements, and the costs and procedures involved in importing and exporting a shipment of goods.

Surprisingly, many highly-developed economies scored poorly in the rankings. For example, Germany ranked 21st, while France was 35th, Spain was 39th, and Italy was 82nd.[18] In part, these countries ranked poorly due to labor laws that make hiring and firing workers difficult. Germany's rigid labor rules ranked 129 out of the 175 countries profiled,[19] while Italy's and Spain's labor rules ranked 101 and 161 respectively.

Index of Economic Freedom

Another rankings composite of different economies, the *Index of Economic Freedom* from the Heritage Foundation and the *Wall Street Journal*, measures 161 countries against a list of 50 independent variables divided into 10 broad factors of economic freedom. These categories include: trade policy; fiscal burden of government; government intervention in the economy; monetary policy; capital flows and foreign investment; banking and finance; wages and prices; property rights; regulation; and informal market activity.[20]

The *Index of Economic Freedom* lists Hong Kong, Singapore and Ireland as the countries with the freest economies in the world. These countries score well due to their low levels of taxation and low regulatory barriers to capital flows and foreign investment. The United States, Australia and New Zealand are tied for 9th in the Index. Both Hong Kong and Singapore beat the U.S. in the regulation category, in part due to burdens of U.S. laws.[21]

Overall, regulatory policies should encourage the swift startup of companies and flexible employment practices instead of serving as a barrier for companies to adapt and new entrants to compete. Regulatory red tape has a disproportionate effect on small businesses, yet these ventures are the foundation of innovation. A U.S. Small Business Administration report estimates that small firms make up 40% of highly innovative U.S. companies.[22]

Global / Business Competitiveness Index

The *Doing Business* report measures the effect of business regulations on specific economic activities and the *Index of Economic Freedom* measures degrees of government intervention in a country's economy. A third index, the World Economic Forum's *Global Competitiveness Index* (GCI), considers a broad range of macroeconomic, legal, political, and social factors that affect economic competitiveness, such as the strength of a country's infrastructure, institutions, and educational systems.[23]

The 2006-2007 GCI ranks Switzerland, Finland and Sweden as the world's most competitive economies. These countries rank highly because of a strong institutional and infrastructure profile. According to the GCI, Switzerland's top ranking is due to high levels of innovation and a sophisticated business culture. The report expands further on Switzerland's number one ranking by saying that:

> *The country has a well developed infrastructure for scientific research, with close collaboration between the leading research centers and industry. Companies spend generously on research and development. Intellectual property protection is strong and this has helped spur high levels of technological innovation, as measured by per capita patents registration, for which the country is ranked sixth in the world. Business activity in the country benefits from a well-developed institutional framework, characterized by respect for the rule of law, an efficiently working judicial system, and high levels of transparency and accountability within public institutions. Flexible labor markets and excellent infrastructure facilities are two healthy features of the business environment.*[24]

Denmark, Singapore, the United States, Japan, Germany, the Netherlands and the United Kingdom round out the top ten.

Taking a more microeconomic view of competitiveness, the 2006 Business Competitiveness Index (BCI) is a subset of the GCI.[25] Devised by Professor Michael Porter of Harvard Business School, the BCI covers company-specific factors conducive to improved economic efficiency and productivity.

The BCI ranks countries by their microeconomic competitiveness, identifies competitive strength and weaknesses in terms of a country's business environment quality and company sophistication, and provides an assessment of the sustainability of countries' current levels of prosperity.[26]

The costs of regulation impact small businesses the most — companies with less than 20 employees spend $2,000 more per employee than larger firms to comply with government regulation.

– W. MARK CRAIN, "THE IMPACT OF REGULATORY COSTS ON SMALL FIRMS," 2005 U.S. SBA REPORT

The U.S. ranks first in business competitiveness due to its strength in the business environment, including the intensity of local competition, effectiveness of antitrust policy, venture capital availability, and university/industry research collaboration. Germany, Finland, Switzerland, Denmark, and the Netherlands complete the top five BCI ranks.

2. National Profiles in Innovation

As the above indices reveal, no single nation has a monopoly on innovation and each has a unique approach for cultivating it. The U.S. economy has benefited from market discipline, well-developed intellectual property laws and a culture that encourages risk-taking. Japan, on the other hand, has successfully developed with greater government involvement than the U.S., although Japan is now trying to shed some of its industrial planning heritage. By contrast, countries like Ireland have made relatively recent efforts to attract investment by relaxing labor rules and lowering taxes — and have succeeded. Finally, many members of the European Union — while successful on many levels — have economies with very low growth rates.

The United States — Setting the Bar for Innovation

Steady growth, low unemployment and inflation, and rapid advances in technology characterize the United States economy. Strong incentive systems exist at the national level for innovation creation, such as the protection for intellectual property. In addition, relatively low tax rates, well-developed financial markets, and flexible labor policies allow the economy to adapt to new technologies and resist downturns.

Its innovative leadership has allowed for a sustained period of productivity growth that exceeds the rest of the industrialized world. The U.S. economy has been on an upswing for more than four years, growing 4.2 percent in 2004, and 3.5 percent in 2005. Since the beginning of 1982, the U.S. has had 16 months of recession, compared with 43 in France, 70 in Germany and 82 in Japan.[27]

In January 2006, U.S. unemployment stood at a four-year low of 4.7 percent, compared with 8.4 percent for Europe.[28] Every year, the U.S. creates the economic equivalent of a Sweden

— or two Irelands or three Argentinas. In dollar terms, a growth rate of 3.5 percent in the U.S. is equivalent to surges of 16% in Germany, 20% in the U.K., 26% in China and 70% in India.[29]

However, the news is not all good for the U.S. economy. The United States fell from first place in the 2005 Global Competitiveness Index to sixth in this year's rankings. According to the GCI, large macroeconomic imbalances, particularly rising levels of public indebtedness, and public institutions underpinned by levels of efficiency and transparency that do not match those of the most developed industrial countries threaten the overall competitiveness of the United States.

Increased regulatory burdens threaten to drive U.S. business abroad.[30] Regulatory costs make up a large portion of business spending. One survey estimated that U.S. businesses would spend $27.3 billion in 2006 to comply with regulation, with 22% of spending devoted to Sarbanes-Oxley compliance.[31]

A broader view of regulatory costs considers all of the economic, environmental, workplace and tax compliance costs, including price and entry restrictions and price supports that transfer wealth. Under this set of considerations, regulatory costs amount to $1.127 trillion, equivalent to 9 percent of U.S. gross domestic product.[32] The costs of regulation impact small businesses the most — companies with less than 20 employees spend $2,000 more per employee than larger firms to comply with government regulation.[33]

Japan — Making a Successful Economy More Flexible

Japan's economy has been marked by heavy government involvement with research and technology planning since World War II. The Japanese have a unique system of state-assisted capitalism that initially helped grow the economy but now serves as a barrier to economic adaptability. Japan ranks 10th in the World Bank's *Doing Business* analysis, and ranks 27th in the Heritage and *Wall Street Journal Index of Economic Freedom*. It is ranked 7th in the GCI and 9th in the BCI.

Japan's economic recovery in the 1950s and the East Asian miracle of the 1980s were the result of government strategy. But in the long run, this is prone to problems compared to a market driven by competition. Competition forces innovation, the single most important factor to economic development.

– TOYOO GYOHTEN, SENIOR ADVISER, BANK OF TOKYO-MITSUBISHI, JAPAN

The Japanese economy has historically been distinguished by a culture of cooperation among manufacturers, suppliers, distributors, and banks in closely knit groups called *keiretsu*. In addition, Japan's economy has been characterized by powerful enterprise unions, cozy relations with government bureaucrats *(shuntō)*, and the guarantee of lifetime employment *(shushin koyo)* in big corporations. Government intervention and favorable treatment of Japanese firms was the norm until defeat of the Liberal Democratic Party in 1993. It was only then that a move to liberalize the Japanese economy began in earnest, reflecting in part the weakening culture of the *keiretsu* and *shuntō*.

The government announced plans to privatize the world's largest depository institution

— the Postal Savings system — beginning in 2007, but that effort is currently stalled. However, according to the *Index of Economic Freedom*, "Japan has passed several laws liberalizing financial services, strengthening capital requirements, making regulations more transparent, allowing banks and insurance companies to engage in securities businesses, and permitting foreign exchange trading on the margin."[34]

Japan routinely ranks highly in terms of the raw number of patents filed and granted.[35] Moreover, by almost any measure, Japan can be regarded as an economic success story. But Japan's future may very well hinge on how it can make its economic system more flexible so that its companies can respond more quickly to competitive challenges and keep pace with global competition.

Ireland — Magnifying Advantages Through Regulatory Reforms

Ireland has greatly benefited from regulatory reforms that promote investment and advance innovation. Ireland currently ranks 11th in the World Bank's *Doing Business* analysis. According to the Heritage and *Wall Street Journal Index of Economic Freedom*, Ireland ranks 3rd, up from a rank of 17th a decade ago. It ranks 21st in the GCI and 22nd in the BCI.

When Ireland joined the EEC in 1973, it was the community's poorest nation. For 13 years the Irish economy recorded an average annual growth rate of less than 2% a year.[36] But from 1990 to 1995 the Irish economy grew by 5% per annum. And in the next five years it really took off, growing at more than 9% a year.

How did Ireland do it? Ireland became a magnet for offshoring beginning in the mid-1980s when it took a radical course of slashing public expenditure, abolishing agencies and cutting taxes and regulations. The top marginal rate of tax was cut from 80% in 1975 to 44% in 2001. The standard rate of income tax was reduced from 35% in 1989 to 22% in 2001. Corporation tax was cut from 40% in 1996 to 12.5% in 2003. Ireland modified its labor laws so that employees are relatively free to be hired and fired. This reduction in labor costs, along with a relatively educated, English-speaking workforce, allowed Ireland to become an entry point for companies wanting to do business in the EU.

The European Union — Stuck in Low Gear

Taking a cue from observing successful economies, European leaders have expressed general concern that they are not innovating as fast as they would like.

Countries in America and Asia are doing much better than us in developing new markets and new products — gaining the competitive edge.
– Neelie Kroes, European Commissioner for Competition, November 2005.[37]

It is essential for us to rediscover a taste for risk and pride in innovation.
– French President Jacques Chirac, April 2006.[38]

Commissioner Kroes and President Chirac are concerned about innovation in Europe, a concern that is substantiated by the *European Innovation Scoreboard* (EIS) 2005 report. Developed by the European Commission, the EIS is an evaluation of the innovation performance of each EU member nation. The study suggests that it could take fifty years for the entire EU (including its new members) to catch up to the US in terms of innovation performance.[39] The

EIS also highlights "a consistent innovation gap existing between the European Union and the U.S." according to the French Office of Science and Technology.[40]

The *European Innovation Scoreboard* includes a list of 26 innovation indicators. Particular emphasis is given to five key dimensions of innovation — innovation drivers, knowledge creation, innovation and entrepreneurship, applications, and intellectual property rights.[41] The report found that Sweden, Finland and Switzerland are the European innovation leaders, followed by Germany and Denmark.

In an effort to increase innovation, European leaders met in Lisbon, Portugal and declared their ambition to make the EU "the most dynamic and competitive knowledge-based economy in the world by 2010." The result has been referred to as the Lisbon Agenda (also called the Lisbon Strategy), a plan that created guidelines for measuring the progress of EU member nations in implementing policies that would cultivate more innovation-friendly economic conditions.

However, a 2004 report by the High Level Group of Independent Experts, chaired by former Netherlands prime minister Wim Kok, found that the EU was not on task to meet the Lisbon Agenda's goals.[42] As a result, the European Commission created a revised Lisbon Strategy with a narrower focus on economic growth and employment.

The 2005 revised Lisbon Strategy has a growth and jobs strategy: make Europe a more attractive place to invest and work; promote knowledge and innovation; and create more and better jobs.

The European Commission set two specific targets to meet these goals: investment of 3% of Europe's GDP in research and development and an employment rate (the proportion of Europe's working age population in employment) of 70% by 2010.[43]

However, a more recent report from the London School of Economics similarly finds that the Lisbon Agenda "seems to have made little difference for Europe's innovation performance."[44] Productivity as measured by GDP per hour is still 17% higher in the U.S. compared to Europe.[45] The study found that the level of regulatory burden on businesses in the EU decreased between 1998 and 2003, but is still higher than that faced by U.S. firms.[46] It concludes that the EU should continue to push policies that lower product and labor market regulation.

As the above section indicates, policymakers worldwide are keen to increase their national competitiveness. Some governments score better than others on competitiveness indices because they regulate business activity in ways that promote productivity and competitiveness. Yet, there is no simple policy that, enacted alone, will create an innovative economy. Instead, policymakers should view innovation creation as the confluence of many inputs that flourish under favorable regulatory conditions.

INNOVATION OCCURS IN ECOSYSTEMS

Previous sections have addressed why innovation is important and the different approaches that governments take to drive innovation as well as ways to benchmark their success. But an elementary question has yet to be answered — where does innovation come from? We tackle that question in this section.

Innovation occurs more frequently in nations that provide institutional systems conducive for business formation and economic growth — or in other words, *create a fertile regulatory climate and innovative seeds can grow*. Required institutional structures include enforceable property rights, efficient banking and financial systems, and a reliable legal framework for resolving disputes.

While these foundational structures are necessary preconditions for innovation, they are not in themselves sufficient. Rather, a complex variety of economic, legal and societal inputs — an "ecosystem" — allows innovation to blossom.

An "ecosystem" is commonly defined as a system formed when communities interact with their physical environment.[47] An "innovation ecosystem" relies on environmental inputs such as financial, human and physical capital. National policies that affect these inputs provide the basis for innovative regions, cities, and city clusters.[48]

"Innovation ecosystem" was the subject of the President's Council of Advisors on Science and Technology in a 2004 report entitled *Sustaining the Nation's Innovation Ecosystem*. The phrase appears over 19,000 times in Yahoo! and approximately 12,000 times in Amazon.com searches.[49]

As noted earlier, Clayton Christensen first coined the term "disruptive technology" in his book, *The Innovator's Dilemma*. However, in his sequel, *The Innovator's Solution*, he replaced "disruptive technology" with the term "disruptive *innovation*."[50] Christensen recognized that few technologies are intrinsically disruptive. Rather, it is the overall business climate for transforming seed ideas into profitable enterprises that enables the disruptive impact of particular innovations.

But there is more than just the overall business climate that affects innovation. As the product of a complex ecosystem, innovation relies on numerous cultural, economic, and legal factors. A proper understanding of an innovative ecosystem takes into account the various aspects of competitiveness — at the global, national and local level.

1. Innovation is Born Locally, even if it's *Borne* Globally

Global companies and economies work in local competition and within global structures — sometimes called "glocalization."[51] A multifaceted mix of local and national policies creates ecosystems that enable innovators to create locally and compete globally.

New York Times reporter Thomas Friedman writes about competition at the global level. In his book, *The World Is Flat: A Brief History of the Twenty-first Century*, Friedman says that national boundaries do not matter as much in a "flat" — or connected — world.[52] Economist Richard Florida, in *Cities and the Creative Class*, calls cities the "cauldrons of creativity" and writes about competitiveness at the local level.[53] He analyzes why certain cities become innovation centers.[54]

According to Thomas Friedman, "[i]n a flat world, you can innovate without having to emigrate."[55] Friedman suggests that there is a *global* innovation ecosystem, where entrepreneurs can plug into the world economy from any location. Technological advances and decreased trade barriers have made it possible to do business across the planet.[56]

Friedman is correct about how products are borne — or produced and delivered — worldwide. The world may be flat for distribution and offshore production, as globalization creates one market for goods and services. But local environments matter for the hatching of innovation. Far from being flat, certain regions and cities appear as economic mountains with spikes in innovation creation.

Harvard professor Michael E. Porter highlighted the importance of "clusters" — geographic areas with competitive success in particular fields — for global competition. In his book *The Competitive Advantage of Nations*, Porter asserts that local knowledge centers are a vital source of competitive advantage for advanced and emerging countries.[57] Prominent economic geographer Michael Storper similarly articulates the importance that regions continue to play even in a global age in *The Regional World*.[58]

Building upon this and other research, economist Richard Florida at George Mason University reveals that "[b]ecause globalization has increased the returns to innovation, by allowing innovative products and services to quickly reach consumers worldwide, it has strengthened the lure that innovation centers hold for our planet's best and brightest, reinforcing the spikiness of wealth and economic production."[59]

He further states that only a select group of cities or large population centers — a megalopolis — dominates global innovation:

> *The global economy takes shape around perhaps 20 great Megas — half in the United States and the rest scattered throughout the world. These regions are home to just 10 percent of total world population, 660 million people, but produce half of all economic activity, two thirds of world-class scientific activity and three quarters of global innovations.*[60]

Florida's point is not to focus on large urban areas, but to highlight *innovative* metropolitan areas. According to Florida, innovative areas include such cities as Tokyo, Seoul, New York, San Francisco and the Silicon Valley area, Boston, Seattle, and Toronto.[61] These metros share similar characteristics, including a well-educated and diverse workforce and many firms that pursue patents for their inventions.

The ultimate limits to growth may lie not as much in our capacity to generate new ideas, so much as in our ability to process an abundance of potentially new seed ideas into usable form.

– MARTIN L. WEITZMAN, PROFESSOR OF ECONOMICS, HARVARD UNIVERSITY

These cities compete against one another by attracting more educated professionals. Florida even asserts that — at least in the U.S. — the educated elite are clustering in a few cities and leaving the rest of the country behind.[62] Extrapolated globally, geographic differences in workforce skills and other innovation inputs will require the physical migration of innovators so that they can compete and succeed. One study shows that in 25% of technology and engineering companies started in the U.S. from 1995 to 2005, at least one key founder was foreign-born.[63] Another study of Silicon Valley startups in the late 1990s found that one-quarter had Chinese or Indian executives.[64]

The following case study describes how local innovation ecosystems weigh heavily on the ability of companies to grow and compete globally.

Case Study: Skype

Skype is a Voice over Internet Protocol (VoIP) provider company based in Luxembourg. CEO and co-founder Niklas Zennström, when commenting on his experience in starting up his company, criticized the no-risk

business climate in the EU. In the U.S. for example, "if you have a start-up and it doesn't work out, you have gained an experience. In Europe, you have made a mistake."[65] He went on to further say that the lack of entrepreneurial spirit is "a cultural problem in Europe. People want to keep all their comforts, all their security, vacations, all their job packages."[66]

> ***The question now is how we take this forward — and how far. The British author T.S. Eliot gave us a clue, when he said: 'Only those who will risk going too far can possibly find out how far one can go.'***
>
> ***It's time to find out how far we can go together.***
>
> ***It's time to take risks, together.***
>
> ***In short, it's time to make Europe more innovative, together.***
>
> – JOSÉ MANUEL BARROSO,
> PRESIDENT OF THE EUROPEAN COMMISSION

In addition, Zennström cited the lack of easy financing in Europe. "We went around Europe trying to raise money for one year to close our first round. If we were a Silicon Valley company, it probably would have taken us one month."[67] Indeed, in 2004 venture capital investments were € 10.8 billion in the EU versus € 16.5 billion in the U.S.[68] Early stage deals in technology average only € 0.9 m in Europe versus € 6.1 m in the U.S.

2. Essential Ingredients that *Enable and Support* Innovation

It's a simple precept: people innovate, and people naturally respond to incentives and rewards structures. As local, national and even international makers of policy, governments play a key role for implementing policies that create incentives for people to innovate.

History is replete with economic systems — from feudalism to mercantilism to socialism — that fortify economic power in the hands of a vested few. Highly regulated economies often shield producers and middlemen from change, creating a system that discourages innovation.

Indeed, government policies can influence innovation in positive or negative ways. Laws that restrict market adaptation and flexibility create obstacles for innovation. However, regulations that provide incentives for the creation of new products and services and allow for flexible labor practices help promote an innovative ecosystem.

The following table lists policy areas that are essential ingredients for innovative ecosystems:

As the table shows, both national and local policies influence innovative environments. Moreover, education is mostly a local issue in the U.S., and city and state policies significantly impact the performance of grade schools and universities.

Furthermore, cities can implement initiatives that complement national policy areas. While immigration laws are national, local communities can, through their own policies and ordinances attract immigrants.

A few are almost entirely national in scope, including intellectual property and competition regulation. For the most part, it "takes a nation" — not cities — to provide incentives for intellectual property creation, regulate antitrust and competition, and set rules for international trade.

The above section compares perspectives on innovation from author Thomas Friedman and economist Richard Florida. Friedman's global and Florida's local perspectives make valuable contributions to the competitiveness literature. However, each is incomplete. In a globally connected world where certain cities innovate above the rest, *national* policies matter — more so than ever, as the next section will show.

INGREDIENT	NATIONAL POLICIES	LOCAL PRACTICES
Antitrust & Competition Regulation	Single-firm behavior, product integration and merger review	**National—not local**
Education	Federal spending and standards settings	K-12 and universities educate a local workforce and serve as research hubs
Finance	Banking and securities law	Networks for venture funding
Immigration	Visas and citizenship rules affect how foreign talent can emigrate	Cities can attract and cultivate immigrant communities
Intellectual Property	Patents, copyrights and trade secrets protect economic returns on investment	**National — not local**
International Trade	Tariffs, quotas and subsidies harm global sales of innovative products	**National — not local**
Labor	Labor union and anti-discrimination rules apply nationally and should be flexible to react to economic change	Skills and wages are locally determined; worker retraining programs
Taxes	Income and capital gains taxes and R&D credits affect returns on investment	Income and sales taxes, along with R&D credits can affect where companies locate

NATIONAL POLICIES CULTIVATE INNOVATION ECOSYSTEMS

This section discusses certain national policies that *enable* countries to participate in the global economy and cities to become innovation centers. In this regard, global and local innovation depends on a favorable national legal and regulatory regime that provides the essential ingredients for innovation ecosystems.

Countries use laws and regulations to enhance or constrain business investment, productivity, and growth. A generation ago, the per capita Gross Domestic Product (GDP) of North and South Korea was roughly the same. Then North Korea opted for a centrally planned economy that is closed and inflexible, while South Korea pursued policies that were open, externally focused, and adaptable. Today, South Korea's per capita GDP is 12 times that of North Korea.[69]

National policies set the foundation for ecosystems that support innovation. Cities and regions can only do so much on their own to attract creative talent and upstart businesses. Underlying institutions that promote research and development, protect intellectual property rights, engage in sensible competition policy, and reduce trade barriers provide the plateau from which innovative cities spike and global companies compete.

1. Fiscal Measures that Promote Innovation

National governments engage in a host of fiscal measures to promote innovation within their borders. Through government direct investment, governments can engage in basic research and exert power as a purchaser. In addition, a system of credits and grants provides funding to private sector research and development (R&D).

Government Direct Investment

Federal basic research and development can play a critical role for creating inventions that underlie future innovations. When made widely available to the commercial sector, the results of federal R&D will be commercialized and eventually distributed to the benefit of businesses and consumers.

Governments can affect research decisions when they act as a customer. With massive purchasing power, governments can set *de facto* standards for the way products and services are manufactured and distributed. Smart governments that demand innovative products can help stimulate innovation creation.

Tax Credits and Government Grants

Policymakers often stress increased research and development spending. R&D can lead to innovative breakthroughs, so countries often benchmark their competitiveness based in part on their current level of R&D spending.

As an outgrowth of the Lisbon Agenda, the EU set the "Barcelona target" of increasing R&D to 3% of GDP by 2010. Yet, a 2005 study by the European Commission found that average spending on R&D as a percent of GDP is under 2% in the EU, compared to 2.6% for the U.S. and 3.2% for Japan.[70] Regarding the state of R&D in the EU, European Commissioner for Science and Research Janez Potocnik said that "[i]f the

current trends continue, Europe will lose the opportunity to become a leading global, knowledge-based economy."[71]

In an effort to become global leaders, governments attempt to seed innovation through research and development in two major ways — credits and grants. Grants are a direct subsidy to a particular project or company. Grants can be an invaluable tool to promote basic research, where returns on investment are far off in the future. However, it is notoriously difficult to predict the industries or technologies that will drive future economic growth. Therefore, grants targeted towards particular sectors are not always the most efficient application of public money.

Tax credits are available to all businesses. The credit is designed to stimulate company R&D over time by reducing after-tax costs. Generally speaking, companies that qualify for the credit can deduct or subtract from corporate income taxes an amount equal to a certain percent of qualified research expenses above a base amount.

A tax credit policy — as opposed to targeted grants policy — allows the innovation ecosystem to decide where the greatest opportunities to improve competitiveness lie. However, governments will always feel pressure to provide grants, even in areas that are more deserving of credits. As an example, French President Chirac promised grants of $298 million to finance a half dozen public-private R&D projects.[72] The grant projects are the first round to be funded by the national Agency for Industrial Innovation, created in 2005. A portion of the funding will go to Quaero, a web search company that would attempt to compete with Google and Yahoo!.

This approach has the government picking winners and losers. According to Alexis Mons, Managing Director of GroupeReflect, a French IT consultancy group, a top-down solution shows that Europe has a long way to go and that "there is no innovation in innovation management in Europe."[73] Another example of the EU's tendency to direct innovation is the standardization of mobile phone wireless technology [See Appendix, Case Study 1].

> ***The bitter experience of history has demonstrated that engineering the creation or protection of national 'champions' — yielding to the temptation for governments to 'pick winners' — is not the way to succeed in the global economy.***
>
> – NEELIE KROES, EUROPEAN COMMISSIONER FOR COMPETITION

2. Regulatory Policies that Promote Innovation

Intellectual property rights, competition law, and international trade stand out among national policies that provide incentives for and have an effect on innovation.

Intellectual property protections encourage innovation by allowing innovators to reap the value of their efforts. Antitrust and competition law that recognizes the various ways innovation occurs — particularly the integration of innovations — is vital for the introduction of new products and business models. International trade increases the available market for innovative products.

Antitrust & competition policy and intellectual property law can both foster innovation. A 2003 report by the Federal Trade Commission (FTC), *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy* discusses the interplay between patent and antitrust law.[74] The report states that "[c]ompetition and patents are not inherently in

conflict. Patent and antitrust laws are complementary, as both are aimed at encouraging innovation, industry, and competition."[75]

Nations that promote a strong, well-developed system of intellectual property rights, sensible antitrust enforcement, and open global markets create national platforms for innovation.

Protecting Economic Investment in Intellectual Property

Intellectual property is equally important to entrepreneurs and established firms on the cutting edge of technological innovation. "IP rights should be seen as encouraging firms to engage in competition, particularly competition that involves risk and long-term investment," according to Thomas Barnett, Assistant Attorney General for the U.S. Department of Justice Antitrust Division.[76]

Barnett further elaborates by saying:

> *Properly applied, strong intellectual property protection creates the competitive environment necessary to permit firms to profit from their inventions, which encourages innovation effort and improves dynamic efficiency.*

Former Federal Reserve Chairman Alan Greenspan also recognized the importance of intellectual property in modern economies, devoting a speech to the subject in February 2004, in which he states:

> *In recent decades, for example, the fraction of the total output of our economy that is essentially conceptual rather than physical has been rising. This trend has, of necessity, shifted the emphasis in asset valuation from physical property to intellectual property and to the legal rights inherent in intellectual property.*[77]

Among intellectual property rights, patents are particularly effective in helping firms — especially startup businesses — raise capital for research and development and protect their inventions from imitators.[78]

There were almost 50 percent more patents granted by the U.S. Patent Office in 2005 than were granted in 1992.[79] As much as three-quarters of the value of publicly traded companies in America comes from intangible assets, up from around 40 percent in the early 1980s.[80] Furthermore, intellectual property is the only area in which the U.S. runs a global trade surplus — in 2003, U.S. trade in intellectual property produced a surplus of $28.2 billion.[81]

Strong intellectual property protection, while vital for the U.S., is just as important for any nation that wants to compete in the global economy. The World Economic Forum's GCI reveals a correlation between the intellectual property rights and national competitiveness. In 2004, the 20 countries that rated highest in were perceived as having the most stringent intellectual property protection were classed ranked among the top 27 in the GCI.[82] Conversely, the 20 countries perceived as having the weakest rated lowest in intellectual property regimes protection were ranked among the bottom 36 for growth and competitiveness.[83]

Nations that want to grow their economies are embracing ways to incentivize intellectual property creation. China serves as one example where policymakers are embracing IP to increase their domestic economy. According to Federal Reserve Chairman Ben Bernanke, "small- and medium-sized enterprises are emerging as an engine of job creation in China — as they are in the United States — even as they promote innovation and help to create a more dynamic and diversified economy."[84]

By 2010, home-grown innovations will make up 20 percent of China's total export volume for mechanical and electronics products, according to a recent statement by Chinese Vice Minister of

Commerce Wei Jianguo.[85] The Chinese Ministry of Commerce has made "rejuvenating trade with science and technology" a priority, said Wang Qinhua, a ministry director.[86] The Chinese government also has set aside $62 million to support domestic industrial innovations. Government efforts to encourage innovation eventually will result in 160 new proprietary products ranging from electronics to biotechnology, according to the country's Ministry of Science and Technology.[87]

China and other countries that choose to innovate, not imitate, will enhance their global competitiveness. A study by University of Colorado professors Keith Maskus and Murat Iyigun suggests that software imitation can limit innovation incentives and has less risk than innovative development:[88]

> *The main ideas are that R&D costs in imitation are lower than in innovation, and that imitated products compete with innovated products, thereby reducing the returns to innovative software products. Competition from imitations reduces the returns to innovative software products, thereby limiting incentives for innovation and the funding available for R&D.*[89]

In an effort to increase enforcement decrease of intellectual property theft, China recently announced an "Internet Anti-Piracy Initiative."[90] If China is to become a leader in the creation of intellectual property, it must overcome generations of piracy and cultural resistance to intellectual property protections. According to Professor Pamela Samuelson, infringement "damages China's efforts to promote innovation and economic growth in its economy."[91]

Competition Rules Shouldn't Impede Innovation

Government policy initiatives can help promote — or deter — innovation. The best way to achieve a healthy technology environment is to foster market mechanisms that promote competition, investment and innovation. The proper development and application of antitrust laws are vital to this goal.

However, while the ideals of antitrust regulation are appealing, its reduction to practice can be a costly endeavor. Antitrust law sometimes does more harm than good, prompting one commentator to say that "in their static way, [antitrust laws] ban activities for which officials and scholars have not yet discovered the rationale; markets are more dynamic than that."[92] In particular, antitrust laws can impede innovation through restrictions on tying, especially when applied to the integration of features.[93]

Feature integration is an essential way to improve products and motivate existing consumers to upgrade. In *Dealing with Darwin: How Great Companies Innovate at Every Phase of Their Evolution*, Geoffrey Moore asserts that companies create competitive advantages through what he terms "integration innovation."[94] According to Moore, integration innovation "reduces the customer's cost of maintaining a complex operation by integrating its many disparate elements into a single centrally managed system."[95]

Antitrust law generally forbids companies with dominant market power in one product (the tying product) from requiring buyers to accept a second product (the tied product) as a condition of sale or lease. The antitrust goal is to prevent monopoly abuse and market foreclosure. The fear is that a firm with market power in one market will leverage this power into another market where it is not dominant in order to foreclose the market to its competitors.

However, product integration can increase consumer welfare by adding functionality, and is often the result of — not a hindrance to — market competition.[96] Moreover, antitrust law has difficulties in dealing with tying arrange-

MOBILE PHONES: INTEGRATION IS GOOD FOR CONSUMERS

Cell phones have evolved into much more than an enabling device for a two-way voice connection. Phones now include cameras, .mp3 players, and video record and playback capabilities. These additional capabilities beg such questions as "will cell phones replace Swiss Army knives?" or "is it a phone, or is it a computer?"

The current generation of multi-functional cell phones is the result of integrating multiple innovations. Chips are designed to decrease power consumption. Display quality and resolution have improved. Processors have increased in power while decreasing in size.

The integration of non-voice functionality into cell phones has been wildly popular with consumers. The estimated number of cell phone subscribers in the U.S. has jumped by nearly 50 million between 2003 and 2005. The number of worldwide cell phone subscribers has risen by almost 600 million since 2003, from 1.4 billion to 2 billion.

This consumer demand has even affected the Internet. Web sites are now specifically designed for the small display screens of mobile devices. The new Mobile Top Level Domain, called dot-mobi, was created specifically for mobile Internet users.

ments. If product integrations reduce price or improve quality of service for the consumer, they can be pro-competitive even if the tie harms competitors. Harm to competitors is not the same as harm to consumers, the latter being the concern for U.S. antitrust law.

Furthermore, tying cases pose the difficult threshold question as to whether there are one or more products. This initial inquiry is made even more difficult when the product consists of software that appears as one tangible thing.

As shown in the mobile phone example on the left, producers often integrate features in ways that compete against other product lines. The integration of photo and video capability enables phone makers to enter a new market and compete against camera manufacturers.

Given that so much innovation occurs through feature integration, antitrust regulators must not presume that product integration amounts to tying that is per se illegal. Rather, policymakers should embrace an approach that considers the pro-consumer and pro-competitive effects of product integration.

A growing proliferation of antitrust laws globally threatens innovative environments, and rules about tying should be harmonized. In a flat world, products are quickly distributed across the globe, but interventionist enforcement actions by antitrust regulators threaten to penalize innovation integration in some countries.

Set forth below is a comparison of tying rules in the U.S., EU, Korea, Taiwan and China.

United States

Antitrust cases that involve the restraint of trade, typically through contracts and horizontal business arrangements, invoke either a *per se* inquiry or a "rule of reason" test. The differences between each analysis are dramatic — the *per se* inquiry leaves little room for a successful company with significant

market share to engage in product integration.

A *per se* violation means that certain kinds of restraints are always against the law. Merely by showing that the restraint came into existence, the plaintiff proves its case and defendants are not allowed to defend by saying that the restraint did not hinder competition. Because the U.S. requires a showing of market power, the U.S. adheres to a "modified" *per se* test for determining tying violations.[97] Because it requires a showing of "dominance" to prove a tying violation, the EU also applies a modified *per se* test.

The United States has adopted the rule of reason test for cases of tying that involve software.[98] This approach recognizes the pro-consumer benefits of bundling and the nature of incremental innovation to existing products and services.[99]

European Union

The EU often differs from the U.S. on competition policy issues. This divergence relates, in part, to the differences in each jurisdiction's antitrust law and philosophy.

U.S. antitrust law has two main priorities: promote competition and consumer benefits. Europe, by contrast, has focused on competitor welfare, rather than the welfare of consumers. European companies with a "dominant position" in the market have a legal duty to not eliminate competition, while in the U.S. only monopoly power imparts this duty. American culture, partially reflected in antitrust law, holds that the competitive process of driving other companies out of business makes an economy efficient and innovative.

In March 2004, the European Commission announced its ruling against Microsoft. It imposed a record $665 million fine, mandated the licensing of certain software source code for server applications, and ordered the company to sell a version of Windows in Europe with Windows Media Player software code stripped out. In July 2006, the EC fined Microsoft $357 million for failing to fully comply with the 2004 ruling.

The primary focus of the EC ruling was on the impact of the company's products on

LEGAL TESTS FOR DETERMINING TYING VIOLATIONS

Modified *Per se* Test

1. The tying and tied goods are separate products;
2. The defendant has market power / dominance in the tying product market;
3. The defendant gives consumers no choice but to purchase the tied product from it; and
4. The tying arrangement forecloses a substantial volume of commerce.

Rule of Reason Test

1. Entities in the tying arrangement intend to harm or restrain competition;
2. An actual restraint on competition occurs; and
3. The restraint is unreasonable as determined by balancing the restraint against any pro-competitive or pro-efficiency effects of the restraint.

competitors such as Sun Microsystems and Real Networks. Microsoft was accused of anti-competitive behavior because it integrated its Media Player into the Windows operating system. The EC concluded that this integration constituted a *per se* tying violation, contrary to the outcome in the Unites States, where a federal court in the Microsoft case determined that the bundling of one product to another does not *inherently* harm competition.

Korea

Over in Asia, Korean regulators have taken action against tying arrangements. Much like the EU, regulators are skeptical about the integration of new functionality into a product. Instead of viewing integration as beneficial, Korean regulators have characterized it as a *tying* of one product to another, and condemned such tying as an "abuse of dominance."

Acting on competitor complaints,[100] the Korean Fair Trade Commission (KFTC) found that Microsoft had "abused" a "dominant position" in Korea by integrating media and instant messaging software into Windows. According to a summary of the decision released on December 7, 2005, the KFTC ordered Microsoft (1) to sell in Korea a version of Windows that does not include either Windows Media Player or Windows Messenger functionality; (2) to facilitate consumer downloads of third party media player and messenger products selected by the KFTC; and (3) to sell in Korea a version of its server software that does not include Windows Media Service.[101]

China and Taiwan

Developments in China and Taiwan would make it even easier to prove illegal tying. As most tying cases require that the seller have market power, companies with a "dominant" position are at greater risk of violating antitrust law when they integrate features. A test for illegal tying that liberally applies the concept of "dominance" invites regulatory scrutiny — possibly at the request of competitors — of otherwise pro-competitive and pro-consumer product integrations.

According to Taiwan's competition law, a company with at least one half of a specific market is dominant. A company is also dominant if it and another company make up two-thirds — and for three enterprises three-fourths — of a particular market.[102] A rigid threshold for dominance more thoroughly scrutinizes companies with large market share, but as a result less successful competitors engage in rent seeking behaviors with regulators.

Currently, Taiwan's government is investigating Yahoo! for possible antitrust violations after some users complained about the company's new fee policy for its auction service. Yahoo!, Taiwan's largest Web portal, announced that it will charge users a three percent transaction fee on most auctioned items, in addition to current fixed fees for listing and other various functions.[103]

China should not follow Taiwan's definition of market dominance if it wants to become an innovative leader. For example, the current draft of a new Anti-Monopoly Law in China,[104] now under consideration by China's National Peoples' Congress, takes a vague and expansive approach to defining "abuse of dominance."[105]

One provision of China's draft law outlaws abuses of dominance either by a single undertaking or by "several undertakings as a whole." It is troubling to predict how this novel concept of "group guilt" could be applied. Could it be used to outlaw standards-setting activities by IT firms, for example, if those standards are thought to exclude rivals?

Once a firm or group of firms is found to be "dominant," another provision in China's

draft law would bar them from "tying products or imposing other unreasonable trading conditions" in transactions. This could lead to cases against beneficial product integrations, similar to those occurring in Europe and South Korea.

In addition, China's draft law creates an antitrust offense for "abuse" of intellectual property rights. One can imagine enforcement regimes that would undermine incentives to create intellectual property and could potentially lead to compulsory licensing.

In summary, antirust regulators in the EU, Korea and other countries should recognize that innovation occurs in many forms — including the *integration of innovations*. Whether operating systems and components, such as browsers and media players, are separate products "tied" as one or simply an integrated product with multiple functions is really a debate over supply and demand.

Consumers often prefer a bundled product that provides more value for the money. In response, the technology sector offers one package of combined services or a suite of software. A product that includes several items together will often be cheaper than if the items were priced individually, and can therefore result in price savings for consumers.

The integration of iTunes and iPod serves as a powerful reminder of the strong consumer demand for innovative, integrated products — and is unfortunately also the target of French regulators that desire mandated interoperability. France is forcing Apple to disclose its DRM source code to competitors, and by doing so disregards the benefits that integrated products provide [See Appendix, Case Study 2].

Reducing Barriers to International Trade

The third category of these nationally-implemented regulatory policies regards barriers to international trade. International trade helps promote innovation by increasing competition and allowing for better access to export markets.

The free trade principles espoused by Adam Smith and David Ricardo in the 18th and 19th centuries remain true today.[106] Nations that open up their markets to the forces of competition will see greater productivity and better products. The stronger the competition — whether it is domestic or international — the more innovation that will occur within a country's economy. In a Brookings paper, Jeffrey Sachs and Andrew Warner demonstrate that countries more open to trade tend to experience the highest rates of economic growth. Their study finds that during the 1970s and 1980s, developed economies with relatively open trade borders grew by 2.3 percent per year compared to a 0.7 percent growth rate

> ***The truth of our age is this — and must be this: Open and competitive commerce will enrich us as a nation. It spurs us to innovate. It forces us to compete. It connects us with new customers. It promotes global growth, without which no rich country can hope to grow wealthier. It enables our producers, who are themselves consumers of services and raw materials, to prosper. And so, I say to you in the face of all the pressures to do the reverse, we must compete, not retreat.***
>
> – PRESIDENT BILL CLINTON,
> ADDRESS AT AMERICAN UNIVERSITY,
> WASHINGTON, DC

for closed economies.[107] The results for developing countries were even more dramatic: Closed economies grew by 0.7 percent whereas developing countries with open economies recorded an average annual growth rate of 4.5 percent.[108]

Conversely, tariffs, import quotas and subsidies carry costs that can constrain innovation. These policies discourage firms and even entire industries from adapting to the challenge of foreign competition. As a result, these industries have less incentive to improve their operations and eventually become increasingly dependent on government support for their survival.

However, exposing national industries to global competition can often be disruptive. Domestic companies can begin to perform poorly and be forced to cut jobs. There will be significant pressure to protect these companies — but doing so slows the rate of innovation. Instead, policymakers can implement programs that will retrain workers with more productive and competitive skill sets.[109]

International trade provides access to export markets, which also creates incentives for innovation and technological progress. Open, market-based trade increases the size of a nation's market and thus its potential reward for innovation. As the economies of developing countries like China and India open, their huge populations draw the attention of profit-motivated innovators and entrepreneurs.

In addition, partnership opportunities with international companies allow for the diffusion of knowledge and skills required for innovative breakthroughs. Companies that invest in research and development need access to advanced tools, software and services. If barriers restrict the import of these innovation inputs, R&D will be less productive.

International trade is not limited to only large multinational corporations. The known export revenue of U.S.-based small- and medium-sized enterprises rose from $102.8 billion in 1992 to $203.0 billion in 2004, and SMEs were responsible for 28.6% of goods exports in 2004.[110]

However, international trade negotiations cover many issues including intellectual property and competition policy. A world market increases business opportunities, but innovation potential will ultimately be limited by the legal system of foreign markets. Nations that fail to protect intellectual property will see less foreign trade and investment.

In summary, national policies that cultivate innovation ecosystems enable countries to compete in the global economy. Fiscal measures, such as direct investment, grants and tax credits, are explicit policies that governments can use to direct public and private investment into innovative research activities. Less explicit — but more encompassing on the overall economy, and therefore, innovation — are regulatory policies for intellectual property, competition and international trade. These regulatory policies are uniquely national in nature.

If a country is to succeed at innovation, it will need to create incentives for intellectual property creation, adhere to a competition policy that allows innovators to integrate new product features, and maintain open access to international markets.

CONCLUSION

Despite the emergence of competitive economies in China and India and the transforming effects of globalization, the world is not flat when it comes to innovation. And while entrepreneurs and inventive companies tend to cluster in certain cities, it is national policy that provides the underlying foundation for local innovation.

Although innovation occurs throughout the world, the rate of innovation differs dramatically among countries. The reasons for this disparity are apparent enough — nations have their own ideas about trade policy, intellectual property, and competition regulation. These laws can either enhance or restrict incentives for innovation.

The U.S. is far from perfect in the way it regulates industries — it does not rank at the top of major indices that rate economic freedoms and the ease of doing business. Yet the U.S. is the recognized world leader in innovation. This is due to a confluence of factors that — as the economy becomes more global — other nations are seeking to replicate.

Duplicating the proper regulatory and social structures for promoting innovation is complex. Innovation occurs in many forms, including business models, products and services, and supply chains. Adaptability is an important aspect to innovation — flexible labor markets and streamlined rules for legal immigration help innovation to flourish. In addition, an educated workforce, low taxes, strong intellectual property laws, and funding sources for startup businesses all contribute to successful economies.

Neither Friedman's global view nor Florida's local perspective tell the whole story about innovation. National policies are the foundation for a flat world and for cities bursting with innovative companies. Intellectual property laws, competition regulation and trade policy are almost entirely *national* functions, not global or local. Well-implemented intellectual property incentives, competition and free trade policies are essential to *enable* participation in the global economy and superior creativity in certain cities.

Nations must ensure that there are proper incentives for creating intellectual property. They must also enable the monetization of intellectual property through competition rules that allow businesses to combine and distribute innovations in new ways. Now and in the future, national fiscal and regulatory policies will play indispensable roles for creating innovation ecosystems and increasing global competitiveness.

APPENDIX

As the world becomes more interconnected, the interoperability of innovations has become the public policy issue *de jour*. Today, two major areas where interoperability demand is on the rise are technology standards and product integration.

Governments have played a role in the interconnection of communications networks and the standards setting process for new technologies. The first case study shows how top-down government mandates will achieve interoperability, but will have long-term effects on the market's ability to create the next innovative technology.

As mentioned, competition law often presumes that the integration into products of features and innovations is tying and *per se* illegal. Yet, these integrations are often beneficial to consumers. The second case study profiles the integration of Apple's iTunes software with its iPod hardware media player, and why this integration helped overcome significant barriers toward establishing a legitimate market for online music.

Government mandated interoperability — through standards setting or the use of competition law — should be scrutinized closely for its negative effects on innovation.

Case Study 1: Establishing Cellular Phone Standards in the EU and U.S.

The cell phone industry serves as a good case study on the long-term innovative effects of prescriptive interoperability through a universal technology standard.

The EU and U.S. took different approaches toward cellular phone standards that highlight the differences in creation of innovation. The U.S. government took a market approach and allowed wireless carriers to freely use non-interfering technologies within their licensed spectrum. The EU took a top-down approach when it required European carriers to adopt a GSM standard for all cellular spectrum. As a result, in the U.S. wireless carriers use multiple incompatible technologies, including CDMA, whereas GSM is the universal cellular system in the EU.[111]

Mandating one particular technology has its benefits. It allows for greater penetration, as GSM has been the most popular standard worldwide due to its interoperability throughout the EU.[112] In addition, both carriers and handset manufacturers can channel their resources and innovate around a single platform for add-on services and hardware devices.

However, there are also benefits to an approach that allows the market to determine the winning technology. Competition of standards enables a better standard (or standards) to evolve because they can better adapt to the unknown. Despite the fact that GSM has had the dominant penetration rate for voice cellular technology, the world's most popular cellular standards for *data* are based on technology created in the United States.[113]

Allowing for *adaptability* (or in this case, adoptability) — one of the key factors for innovation — may be one reason that the U.S. market gave birth to 3G high-speed wireless technologies.[114] Government policies that restrict technology choice can create regulatory hurdles for adopting new technologies. Adaptability, and therefore innovation, can suffer.

Case Study 2: Regulating Integration and Interoperability with Apple's iTunes and iPod

Apple's iPod music player and iTunes music download service are examples of how integrated proprietary platforms can be innovative and benefit consumers.[115] The iPod device and iTunes web store are not particularly innovative when analyzed as standalone products. Indeed, the iPod could be viewed as another iteration of Sony's popular Walkman and Discman devices. In addition, the iTunes music store engages in e-commerce similar to any store that sells online, downloadable goods. But the integration of the iTunes software with the iPod hardware was a wildly successful consumer-friendly innovation.

iTunes was introduced in April, 2003 and sells individual songs relatively easily and cheaply (e.g., $0.99, €0.99, £0.79). The iPod is the only portable music player that can play the purchased music. This exclusivity has helped the store become the most successful legal online music service.

When Apple introduced iTunes, there were several online music store competitors. However, these websites had poorly designed software that made it difficult for consumers to transfer purchased music to their hardware players. Apple's integration of software with hardware improved this process.

An article in *User Interface Engineering* describes Apple's innovative goal:[116]

Apple's designers could see something better emerging from this mess. They imagined a future where music listeners could find the specific song they wanted, click a single button and the system would instantly purchase the music, download it, and transfer it to the player, ready to listen to. The hardware had to be easy to use. A long-playing battery, crisp LCD display, simple controls, and sleek design were all part of their vision. The PC software would know about the hardware's features and seamlessly make the interface flow.

The 99-cent-per-song price point for music was as much part of the new experience as the hardware design. Picking and choosing just those songs the listener wants to own, without getting songs they aren't interested in, makes it easy for people to build a personal collection they love. Moreover, the slick design of the unit makes it more likely people will gloat about their new player.

The integration of iTunes and iPod has helped simplify a consumer's music purchasing experience, even in light of the vast number of online and offline ways for obtaining music.

The combined iTunes/iPod offering uses digital rights management (DRM) technology that limits the redistribution of music. This technology implementation — made possible through the integration of iTunes with iPod — calmed the piracy fears of nervous performers and distribution labels and allowed Apple to increase the online library of music available to consumers. Despite its benefits, some policymakers have singled out the iPod as an example of a dominant market participant that is hurting competition.

Indeed, the French government recently enacted what was popularly referred to as an "iPod law." Officially known as the DADVSI, the law is France's implementation of a 2001 EU Directive to harmonize copyright law by implementing rules similar to the U.S. Digital Millennium Copyright Act. The law mandates the interoperability of DRM systems with other competitors.

Underlying the rationale for the law is a notion of "platform competition" that disregards the pro-consumer, pro-competitive effects of integration innovation. Worse, forcing companies to share their innovations with competitors it destroys the incentive for creating the next generation of integrated devices that could similarly benefit millions of consumers.[117]

ENDNOTES

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[112] GSM accounts for 82% of the global worldwide cellular market, according to GSM World — the world wide web site of the GSM Association. Q2 2006 data available at http://www.gsmworld.com/news/statistics/index.shtml.

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