"Governing the Global Knowledge Economy"

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Markets Drive Innovation…

Economic prosperity depends now more than ever on the continual generation of new ideas and the conversion of those ideas into profitable products and higher-productivity processes. Countries that aspire to a high and rising standard of living must infuse even their oldest industries with innovation in order to generate and sustain competitive advantage. They must also take part in at least some of the newest industries that flow from technological breakthroughs.

The knowledge economy in which countries and their citizens participate is increasingly global in scope. The tiger economies of East Asia, such as Singapore, South Korea and Taiwan, no longer merely assemble products, they generate designs and inventions as well. The first ten employees of a "mini-multinational" founded by Israeli engineers may well include computer programmers in Russia and marketing experts in the U.S. And, of course, the "three billion new capitalists" (as Clyde Prestowitz titled his book) of China and India include a rapidly growing population that is highly educated, technologically sophisticated, and entrepreneurially minded.

The engine driving innovation around the globe is demand. Twentieth century breakthroughs were often the byproducts of government-led, usually military, technology "push" programs. In the twenty-first century, markets dominate. One figure tells the tale: in 1964, the U.S. government provided 66.8% of the nation's R&D funds; in 2000, that share was just 24.9%.

The shift toward markets is, on the whole, good for the innovation process. Innovation by its nature is both uncertain and complex. The only way to find out what will work is to try lots of things. The market's promise of great reward motivates continual experimentation, both technologically and organizationally. By voting with their wallets, users get to decide which of these experiments will survive; the features that they value are selected, rather than those that appeal to a technological elite or government bureaucracy.

…But Markets Are Not Enough

But innovation, like people, cannot thrive by markets alone. Indeed, markets themselves cannot function without a supportive institutional framework. We need look no further than the failure of "shock therapy" in eastern Europe and the former Soviet Union. An ineffective legal system embedded in a culture of widespread suspicion provided fertile ground for cronyism rather than capitalism to flourish there in the 1990s.

Markets for knowledge-intensive goods and services, in fact, require a more extensive institutional framework to function effectively than other kinds of markets. Knowledge is harder to create and harder to exchange than material goods; it may also be more disruptive, provoking backlash. Some pieces of the requisite framework have been erected at the global level, but they are far from forming a complete whole.

The best-developed institution for governing the global knowledge economy is the intellectual property rights regime of the WTO, or "TRIPS." Such a regime is essential to provide confidence to those who risk their money, time, and energy on innovative activity. They must know that they will be rewarded handsomely if they happen to hit the jackpot. The threat of imitation is a powerful deterrent to such risk-taking, and in a world in which technological capabilities are widely diffused, potential imitators lurk everywhere.

TRIPS has come under fierce attack in recent years. Some of this criticism is merely a cover for continued imitation. Some of it is misguided, conflating means and ends. One version of the critique, however, is quite right: the intellectual property rights regime by itself does not constitute an institutional framework that is adequate to nurture the global knowledge economy over the long run.

An Institutional Framework for Knowledge Creation...
TRIPS must be supplemented first of all by a global research and education system that goes well beyond that which the market will support. The payoffs from investments in intellectual and human capital are typically too distant and uncertain to warrant support from firms or financial institutions. Yet, such investments make up the "seed corn" of future innovation, without which future crops will fail.

Governments have historically solved these market failures, but in a world of mobile ideas and talent, the rationale for such interventions is weakened. The payoffs from public investments in education and research, even at the national level, may be reaped by foreign competitors, rather than domestic constituents. If the payoff is global, the investment must also be global. There is, in addition, a vast pool of underdeveloped talent that lies beyond the reach of the current system, due to state failure as well as market failure.

Private foundations and non-profits have a crucial role to play in establishing a global institutional framework for research and education. Their constituencies are not bounded by political jurisdictions. They can also serve as conveners and deal-makers across national and sectoral boundaries. The Bill and Melinda Gates Foundation, among others, has begun to play this kind of catalytic role.

…And for Knowledge Exchange
In addition to fostering the creation of knowledge, the institutional framework should also encourage its exchange. Much innovation involves combining knowledge from diverse sources: old and new, technical and social, foreign and domestic. Combinatorial growth, as Harvard's Martin Weitzman has labeled it, is maximized when the pool of ideas is maximized. Yet, the temptation of "intellectual protectionism" may be hard for firms and nations to resist. The opportunity costs of such policies would be large.

An adequate framework for knowledge exchange would have several components. For codified knowledge (that is, knowledge that can be transmitted through written documents), the key challenge is to balance intellectual property protection with a thriving public domain. The institutions that drive research at the global level should support a culture of openness in which publication, rather than patenting, is the default option for dissemination. Publications should be made available on as broad a basis as possible, utilizing the full potential of the Internet.

Tacit knowledge, by definition, cannot be captured in words and must be shared in person. "Brain circulation," as UC-Berkeley's Annalee Saxenian has called the process of global tacit knowledge exchange, requires travel for extended periods and even a limited degree of permanent migration. In the global knowledge economy, such movements lay the basis for continual recombination, because the migrants often build active networks between their countries of origin and of residence.

Governments have maintained tighter control over the movement of people than over other factors of production, seeing such control as one of the last bulwarks of sovereignty. Coordinated liberalization might be facilitated through the intervention of non-governmental actors, including multinational firms, NGOs, and private foundations. A "variable geometry" approach involving shifting configurations of actors seems more likely to yield results in this domain than the World Migration Organization called for by Columbia University's Jagdish Bhagwati, among others.

Coping with the Pace of Technological Change…

The institutions sketched above are intended to bolster the innovation process and diffuse its benefits more widely. But the global knowledge economy imposes costs as well. Competitive advantage shifts quickly and unpredictably as product cycles accelerate. Unanticipated externalities accompany novel goods and services. There are both pragmatic and principled reasons for constructing global institutions that will defray or avoid some of these costs.

The pragmatic reasons for global institution-building involve the potential for backlash from people and groups bearing the costs of technological change. These costs are often highly concentrated, in the form of closed factories and bankrupt firms, while the benefits tend to be widely diffused. Opposition to change, including that of governments, may thus be more easily mobilized than support.

To head off backlash based on material grievances, global institutions might in some cases provide compensation, particularly in a form that facilitates economic transition. Support for education and entrepreneurship, for instance, along with temporary maintenance of income and human services, could ease the pain of change and enhance the potential for productive reinvestment.

…And Steering Change in New Directions

Other kinds of costs may not be so easily defrayed nor should they necessarily be. Environmental externalities, for instance, are more difficult to address when technological

capacities are globally diffused. The scope of regulation in such instances must match the scope of the threat and combined with support for alternative technologies.

Technological challenges to value systems, especially those flowing from biomedical research, also warrant further development of global institutions. Values issues are not often susceptible to negotiation and compromise, but dialogue and education may reduce tension. In some cases, a normative consensus to divert the path of change may even take hold, as seems to have been the case thus far with respect to manipulation of the human germ line.

The third sector has a critical role to play in creating global compensatory and regulatory institutions. These institutions will have to grapple with profound ethical dilemmas, not merely transcendent questions about human nature and environmental stewardship, but also humanistic matters of social justice and equity. Private foundations and non-profits have the freedom to experiment, as is required by this social innovation process, and the credibility to identify and scale up those experiments that prove to be successful.

Toward "Embedded Liberalism"

Governance of the global knowledge economy at the moment falls far short of the ideals advanced above. Global forums for discussing critical elements of governance are rudimentary, action remote. Representation in the forums that do exist is lop-sided.

As Karl Polanyi showed in his 1944 masterwork *The Great Transformation*, free markets sow the seeds of their own demise. Society will inevitably act to protect itself, but may do so in ways that are even more destructive. In the industrial age of which Polanyi wrote, misguided attempts at protection resulted in global depression and world war.

In the information age in which we live, the consequences of what Polanyi called "the double movement" could be even worse, as hard as that may be to imagine. The postwar system created by the U.S. and its allies surprised the pessimistic Polanyi, gaining the benefits of liberal trade and open entry by embedding the market in the welfare state and the western alliance. That system has now been swept away, and it is up to this generation to begin to re-embed the knowledge economy on a global basis.