Innovation in Government: Good Public Policy

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Treasury Colloquium
Boston, MA
September 29, 2004

It is my pleasure to personally welcome each of you to the United States, to our city, and to the Federal Reserve Bank of Boston. I was so pleased when my old friend Dick Gregg asked me to speak to you, particularly since many of the issues you are addressing in your colloquium are shared challenges for all of us. The need to be innovative and increasingly productive is a common theme today whether you are in the private or public sector. How can we build a workforce for the future? How should the complex systems for accounting, reporting, and cash management be developed in a rapidly changing world, with, I'm sure, scarcer resources? And, how can we exploit new and existing technologies like the internet, smart cards, and XML to make payment systems and economies in general more efficient, effective, and secure? These are important topics facing you, and your governments, and facing us in the Federal Reserve as well as we work to shape and serve our own organizations, and the U.S. payment system, and work with our partners in the U.S. Treasury.

Now, I think if I were addressing an audience from the private sector, in the United States or elsewhere, there might be a bit of resistance as I put the terms efficient and effective together with government. It is a given to some that high rates of productivity growth, and the innovation that underlies them, is the province of the private sector driven as it is by the strong competitive forces of our world today. But I have witnessed in my career with the Federal Reserve, as many of you probably have in your countries as well, that innovation and productivity in government is alive and well. It is a keen contributor to developed economies, and a sought after attribute in the developing world. Innovation in the government arena is vital as economies evolve. Moreover, it can often spur complementary commercial innovation, thereby leveraging public sector investment for even broader public good.

I want to talk about innovation in government today as I have witnessed it working in the Federal Reserve System and with the U.S. Treasury. I want to look at some examples of our work together to illustrate the power of innovation in the public sector. And I want to offer some thoughts about the steps we all need to take to promote innovation in our organizations. Let me begin by placing innovation and productivity growth in the broader context of the overall U.S. economy.

One of the enduring hallmarks of the U.S. economy over the past decade has been its tremendous, in some respects awe-inspiring, growth in productivity. As some of you probably know, the U.S. lagged behind most of the developed world in productivity growth in the '70s, '80s, and early '90s. We were late comers to the party, so to speak, but starting in 1995 things began to change. From '95-2000, productivity averaged 2.5%, or better than double its pace for the previous 30 years. Then the pace accelerated even more through the U.S. equity market bust, the recession, and the current long slow recovery. Even now, four-quarter growth in productivity is 4.6%, or better than three times what it was just a decade ago.

Clearly, some of this is cyclical, and some reflects the unusual nature of the events surrounding this economic period in the U.S.. Faced with geopolitical uncertainty, and, in the wake of Enron, World Com and other scandals, uncertainty born out of a new regime of intense focus on corporate reporting and transparency, U.S. businesses have worked hard to do more with less. They have worked hard to exploit the technology purchased during the late '90s boom, and until the last year or so, they have met increasing demand

without hiring new staff; in fact, staff levels were reduced. The "job-loss" nature of the recovery puzzled everyone, but with productivity growing at a pace about equal to or above the rate of growth in GDP, increased staff weren't necessary, and pressure on resources, and resulting inflationary growth, was small.

With the moderate pace of job growth in recent months, this puzzling period in the U.S. economic cycle appears to be ending. Businesses are hiring again, and the unemployment rate is down. Moreover, growth worldwide put pressure on key commodity resources, while geopolitical upheaval in the Mid-East has contributed to higher oil prices. Inflation surged in the second quarter, and subsided more recently, but, the message for U. S. monetary policy makers seems clear. Highly accommodative policy that was appropriate for the situation the economy faced earlier now must be rethought, and brought into balance with real growth and the potential for increased pressure on resources and that process has begun.

But, through all of this, productivity is likely to remain strong, at least based on everything that we hear anecdotally. To some degree, productivity rises or fall as economic cycles ebb and wane, but its underlying growth - or the so-called structural rate of growth – seems to have moved to a new level. Businesses, large and small, confirm that even now they continue to be focused on working harder and smarter, using technology more effectively, and restructuring management processes to be more efficient. They've seen the light and aren't going to change what has been a winning strategy. In the early '90s, we thought structural productivity growth might be below 1%. Now, most analysts believe it is 2.25% or better. Over time that kind of change can mean

that U.S. standards of living will double in about half the time – truly a remarkable achievement.

Now, why am I rattling on to you about productivity change in the United States? Well, I would argue that there is a strong correlation between innovation and the rate of productivity change. Technological innovation, as a key driver of increased productivity, has enabled businesses to do more with less in an ever-increasingly competitive global market. However, innovation and productivity growth are is not just the province of the private sector. I see those of us in the Federal Reserve, and certainly our partners at the U.S. Treasury, working both to meet the market demands of a more technologically sophisticated set of users and to be ever more innovative and productive in the delivery of those services. Few would argue about whether some level of innovation is needed in government, and that public money spent on increased government efficiencies is public money well spent. However, because there are often unforeseen benefits to government innovation, it seems to me that it can be good broad public policy as well. Now some would argue that innovation is best left to the private sector with its requirement to meet a market test. They would ask how can one be sure that the best innovation is adopted if it is backed by public vs. private funds. This is an issue and it is one reason public sector innovators must take care. We try to deal with this in the arena of Reserve Bank payment services by charging market rates for those services. This is required by law, but even the law allows adjustments when new technology and new systems are being implemented. Meeting market tests has to be balanced against the broad benefit that can be derived from public sector innovation.

So that takes me to the question of how innovation happens, or, more importantly, how does innovation spur the productivity change that is so important to both private and public sectors? As you can imagine, this has been a subject of some interest to us in the Federal Reserve System, particularly over the last 15 years as productivity first appeared to slow in the early '90s even from its low rates of the '70s and '80s, and then speed up dramatically as I noted earlier. This coincided with dramatic rates of increased investment in technology, in computers, software and telecommunications in the late '90s, both to meet the demands of the marketplace and to address the challenges of Y2K. But why should technological investment spur productivity change in the '90s, when such investment had not seemed to do the trick in the late '80s. After all, it was in 1987 that Nobel Laureate Bob Solow made the famous comment "you can see the computer age everywhere but in the productivity statistics."

Well, it appears that the path from technological change to productivity growth often is not smooth. As Stanford professor Nathan Rosenberg argues, the full value of a new innovation can rarely be seen in its early raw form. It is as if we are ignorant of the full range of possibilities. Why? Well, innovation doesn't happen overnight. It takes a long time to implement, because it requires replacement of an existing system, redesign of a complex process, restructuring of an organization, additional investment, retraining, or other major change and integration. And even when an innovation is finally implemented, acceptance can be slow.

Furthermore, innovations are usually developed for a particular application, without knowing the full range of possibilities. At an early stage, an innovation may even be viewed as insignificant or a failure. Its full value may

be derived from improvements on the original creation by others. The benefits of the innovation can be in an area outside what was originally intended, or not at all what was expected or predicted. Some benefits will not be realized until complementary innovations happen in totally different areas. So, in these cases "ignorance" does not mean stupidity, it's simply that we don't have all the information that we need initially to see all the possibilities.

But government investment in new technologies can help the process of transforming innovation into productivity change. As professor Rosenberg argues, and as we have seen in the Federal Reserve, government investment can lead to broad public benefit over time as businesses build on the seminal technological investments made by the public sector. For Reserve Banks, innovation is required to meet the System's mission to promote economic growth and financial stability, and to provide the secure and efficient payments systems that underpin economic activity. As the Banks implement new technologies, frequently together with the Treasury, often the private sector uses them to transform its own operations. This, then, drives further change in the public sector. The seed investment is public, and the evolution of innovation has broad benefits for all.

One example that clearly illustrates these points is the Automated Clearinghouse, or ACH. Initially in the United States, a group of banks on the West Coast developed the concept of electronic transfer of retail payments among themselves and their customers. They turned to the Reserve Banks, given our scope of operations and broad geographic reach, to implement the concept nationwide. The Federal Reserve System developed the ACH primarily for direct deposit of payroll and to support the services provided by

the banks to corporations, such as cash management. The U.S. Treasury in its early use of the ACH for social security and other payments drove the expansion and maturation of the Reserve Bank system, both within the U.S. and internationally. This was vital as it took quite a while for the ACH to gain traction beyond its initial users. But now, the tide has finally turned and the ACH has become the backbone of most new U.S. electronic payment systems. The private sector, retail organizations in particular, has taken the ACH beyond its original uses, for example, to support the truncation of checks at the point of sale or at a lock-box location. With the development of complementary internet and web technologies, the private sector is also now using the ACH as the back-end system for electronic banking services. We certainly didn't envision these possibilities in the early days of investment in the ACH. Nonetheless, our original investments have been leveraged for benefit many times over by the private sector.

The evolution of the ACH began in the private sector, but it took public sector adoption to make it a platform for broad private sector use. But innovation also can begin in the public sector, in the Reserve Banks for example, and particularly in the collaborative work we do with the U.S. Treasury. A couple of examples here should be helpful as illustration.

In the U.S., unlike the rest of the world, paper checks are still a major payment method. While check volumes have been declining for the past several years, approximately 40 billion checks were written in 2003. Years ago, many people predicted the end of the check and the dawn of a paperless retail payment. We are closer to that nirvana than we have been in the past, but such a brave, new world still hasn't arrived. Checks continue to be written by the

billions in the U.S., and processing and collecting them continues to be a labor-intensive, costly business.

Innovations to improve or eliminate check processing, such as those involving digital images, have been evolving for decades. In the early 1980's, we in Boston worked with several vendors to determine whether image capture technology could be applied to high-speed check processing. At that point in time the private sector saw no use for digital images in the high speed check collection world. The technology was expensive, there were no translation standards, and transmitting images between locations was prohibitively costly. But Reserve Banks saw the need for high-speed image capture in their operations, and we began to invest in true R&D. In early tests, we actually taped a check to a drum and experimented with how fast a camera could capture pictures of the check on the spinning drum.

Having completed the basic experimentation, which proved promising, we worked first with the Treasury to apply the new technology. Both the Treasury and the Reserve Banks saw a unique opportunity to streamline and improve the process for handling and storing hundreds of millions of Treasury checks. Together we developed the first check digital image archive. In the process we engaged industry groups, vendors, banks, and economists. As new obstacles and issues arose, the groups worked together to design solutions and standards that were compatible. At the same time innovation and competition began to emerge in the private sector.

The Reserve Banks leveraged their experience with the Treasury image archives to build a new and improved commercial check image archive. One

innovation often spawns another, often better innovation. The Reserve Banks are now in the process of moving all of the Treasury's existing images from the original Treasury archive to the new and improved commercial check image archive. This will result in increased productivity gains and financial savings for the Treasury.

During the 1990's, we made progress in improving the check image process, albeit slowly. Two complementary events occurred that proved to be the catalysts for the movement to more improved electronic check collection. The first was the internet. The internet provided a low-cost, efficient delivery channel for many electronic transactions, including check images. The Fed, along with the many others, saw the benefits and embraced the internet to develop new check image products that support home banking and other internet-based services to consumers and corporations.

The second catalyst was September 11th. Prior to that tragic day, while many saw benefits from sending and receiving digital images rather than paper checks, no one anticipated a complete halt to airline transportation, leaving checks "stranded" for multiple days and the retail payments system in potential upheaval. It was only through the addition by the Federal Reserve of about $20 billion to cover check float, which allowed depository institutions to credit customers prior to collection, that kept the retail payment system going. The tragedy of 9/11 provided the economic impetus to create new federal legislation, the so called Check 21 Act. This legislation provides a new legal framework that will accelerate innovation in the U.S. check-collection system.

A second example in which we have worked with the U.S. Treasury to apply and improve on a new technology in an innovative way, is smart card based stored value cards. You will hear more about this topic Friday from Gary Grippo of the Treasury and Jim Cunha from the Boston Reserve Bank, but I want to touch on it briefly here.

Stored value cards, especially those based on computer chip smart card technology, are much more popular in most of your countries than they are in the United States. We have seen an increase in the use of stored value cards in recent years in the form of gift cards, transit fare cards and most recently payroll cards. The Treasury began piloting the use of stored value card systems in 1997 to help solve a number of problems faced by the United States military. Over the years we have experimented with a number of different programs, and have worked with every branch of the military, including trainees and active service personnel.

As a result of this hard work and innovation, two programs are now being implemented worldwide. The Federal Reserve is working in partnership with the Treasury on these efforts, which also involve private sector technology and financial organizations.

Innovations in other areas led to improvements for the stored value card program as well. ATM manufacturers are now producing Windows-based self-service kiosks, many being used for hotel check-in or self-service check-out at stores. Here at the Boston Fed we are taking these self-service kiosks to Honduras and Qatar to allow soldiers to load value onto their cards from their U.S. bank accounts. I am sure that the ATM vendors never envisioned this

particular application for innovations. Further improvements in the smart card technology itself will allow us to store larger software programs in more flexible languages. As a result, we have been able to develop a new generation "e-purse" that will provide even more services to military personnel.

Where will these innovations lead us and others in the industry, and what new innovations are ahead? What other undefined payment system needs are there that can be met with additional innovation? We can't yet see all the possibilities, but we will be looking for them. And, as they develop, we will work to implement them into our systems. I am sure our colleagues at the U.S. Treasury will be encouraging us, to put it mildly, to update and innovate for them as well. As we do so, the cycle of innovation, and its spread between public and private sectors, will form a vital part of continuing U.S. productivity growth.

Hopefully, by now you are all convinced that one of your most important roles is to promote innovation within your own organizations and governmental bodies. So how can we as leaders in the public sector promote the types of innovation that are illustrated in the examples I've talked about? I want to suggest four lessons we've learned about innovation to provoke some discussion with you. I am sure that you will have your own ideas about how to unleash the creative energies of the people who work for you, and how to help them be successful as they seek to be more innovative.

First, innovation requires an environment in which it can thrive and is considered part of the culture. This involves commitment and effort from the very top to the very bottom of the organization. It involves building a workforce

that owns this philosophy. This is an area we have really tried to focus on here at the Federal Reserve Bank of Boston. Over the past three or four years we have had a creativity initiative in the Bank. A cross-functional group drawn from different areas and levels in the Bank has identified barriers to innovation through internal focus groups. The members of the group conducted interviews with best practice companies and searched the literature. They identified a number of elements that need to exist in our culture to promote creativity and innovation. We have conducted training with our entire management team and have deployed a "Creativity Kit" that helps middle management engage staff. We recognize that establishing an environment that encourages creativity and innovation is a journey. We have only just begun this journey, but continuing it excites us all.

Second, the walls of internal organizational silos must be broken, and regular and open communication must take place within the organization and with outside entities. This is sometimes very hard in a public sector setting. We here in Boston realized that all too often we focused internally not externally--doing what we are required to do right, but maybe not always doing the right things in a market that is evolving so rapidly. Innovations need cross-pollinization to grow; this happens when people communicate outside their group, company, industry, even country, as you are today. The Treasury/Fed partnership is a case in point. Together, we have been able to bring a number of very important innovations to market; these projects have provided opportunities for us to meet and talk with technology vendors and other Federal agencies, organizations we might not have had contact with otherwise.

Third, all of us need to be realistic about the costs and benefits of innovation. On the cost side, most innovations involve a great deal of persistence by understaffed groups as well as funds from overtaxed public budgets. However, there can be creative ways to support these efforts by streamlining ongoing operations and other self-funding approaches. Several years ago one of our officers developed a proposal to create new web-based accounting services. At the time we were not delivering any web services to our depository institution customers. The project required a significant level of funding and entailed a high degree of risk. Groups within the System were reluctant to approve additional funding for this effort. We persisted because we believed in this innovation, and we found ways to fund it by reducing ongoing operating costs. Now these web accounting services are proving to be more in demand by depository institutions than anticipated, and we are gaining internal efficiencies. As noted earlier, the ultimate benefits of these types of innovations are difficult to anticipate and measure and are often understated in the early cost benefit analysis. But if pursued intelligently, they can mature in unexpected and beneficial ways.

Finally, a lesson we have learned the hard way, start small and then build. Innovation by definition involves risks. Risks need to be defined and managed to the extent possible. But to be innovative you must be willing to accept some calculated risk. If you take small steps, such risks can be identified sooner and mitigated. In our experience, large complex projects take too long to bring to market and, as a result, often do not achieve the expected payback. The Internet Payment Project (IPP) in which we are currently engaged with the Treasury, is following this principle. It started small, involving just a few government agencies to build acceptance and pilot the software, and as each success is

achieved, we have expanded the program. Start small, make the inevitable mistakes, learn from them and then expand. It may seem to take longer but in the end this type of process brings faster success.

In conclusion, I go back to the incredible period of U.S. productivity growth that we have lived through over the last 10 years. There are many challenges the U.S. and the world faces, but meeting those challenges is just a bit easier given the underlying economic strength that comes with rapid productivity growth. Innovation underlies productivity change, and innovation in the public sector has been and will continue to be an important lever to private sector change as well. Reserve Banks have seen that in our work in the payments system, and we have certainly seen that in our many partnerships with the innovative folks at the U.S. Treasury. Your presence at this colloquium and the subjects you will be pursuing are testament, I think, to your recognition of the importance of innovation in your countries and governments as well. I hope some of the lessons we've learned, and that I enumerated for you, provide a few things for you to think about as this colloquium proceeds. I certainly wish you well in this important endeavor.

Thank you.