Services as a Key Component of Economic Growth.

Of the largest 25 economies in the world, all but one are dominated by services, in that services comprise more than 50% of the GDP. Information services, by 1997 already constituted the largest sector in the US private economy in terms of GNP. [Karmarkar] The Bureau of Labor Statistics has shown that the growth of US employment in services has been a continuing trend for decades. This trend continues, as during March the goods-producing sector lost 77,000 jobs last month, but the services sector added 85,000 new jobs [ADP Monthly Employment Report, 2 April 2008].

Services account for more than 80 percent of the U.S. gross domestic product, employ a large and growing share of the science and engineering workforce, and are the primary users of information technology [NAE 2003]. Service-providing industries are projected to account for most US job growth, generating almost 19 million new jobs between 2004 and 2014. This is due, in part, to increased demand for services and the use of ICT in automating service tasks [Occupational Outlook Quarterly 2005]. This growth is in addition to any jobs lost to offshoring, as IMF analyses demonstrate that the United States is the largest recipient of business services from abroad and runs a sizable trade surplus in business services with the rest of the world.

Recent analyses showed that skilled human capital have more impact than that of total human capital and has a stronger growth-enhancing effect in economies which are closer to the technological frontier, where innovation matters more. Another factor that matters more at this frontier is tertiary schooling. More flexible labor markets, such as services, have had greater use of ICT, leading to greater multi-factor productivity (MFP) growth and technological diffusion crucially depends on domestic R&D intensity and human capital. The effects of human capital are economically significant: an increase in the share of high-skill workers in total labor compensation by one standard deviation (13 percent) would lead to an acceleration of industry multi-factor productivity (MFP) growth of 0.5 percent annually.

However, the “academic research enterprise has not focused on or been organized to meet the needs of service businesses” [NAE 2003]. IBM has undertaken a number of activities to spur this interest among academics. In the same timeframe,
Carnegie Mellon University began examining needs for service-focused educational programs, hosting a symposium to better understand educational needs in 2004 and began teaching a Masters-level concentration in service management in 2005.

The Palisades Conference.

In 2006, IBM hosted a critical conference that attracted more than 250 participants from 22 countries. This 2006 conference, Service Science, Management, and Engineering (SSME): Education for the 21st Century, designed to discuss the current status and foster the development and advancement of SSME. Papers explored the ways SSME has been introduced into curricula, services research that is underway or is planned, and recommended actions for academia and governments to establish SSME as its own discipline. An edited volume has been published in a new Springer book series on Service Science: Research and Innovation in the Service Economy, containing 55 papers from 56 institutions in 14 countries.

Key topics from the Palisades conference addressed the service economy, human capital in services, and service science research. The global economy is indeed becoming a service economy, reaching a tipping point where a service-dominant logic can apply and technological advances such as network ubiquity and resulting new states of openness and connectedness, support sharing of personal information to sharing of technological and transactional specifications. Business design advances through horizontally-integrated operations allow for dynamic transformation with limited disruption to the organization. Organizations are adopting new views of revenue expansion and customer equity as key corporate metrics, and increasing their focus on service innovation. In fact, I am teaching a new course in service innovation this term. However, innovation is a culture, not a department or a function, and successful service innovation is a test of leadership for the academy, government, and industry. There is a need for service innovation because services are not seen as being innovative and yet they are often highly dependent on the use of ICT.

Human capital discussions highlighted the need for trained and hirable people, and especially the urgent need for Professional Masters programs in service-related topics. There is a recognized need for domain experts and for people who have focused knowledge in one or two domains and spectral knowledge about related domains (T people or pi people). This is especially true at the boundary of ICT and services, as there is a strong demand for people skilled at fusing their technical competency with industry-specific knowledge and business-process expertise.

Service Science research topics focused on the need to continue to improve the state of services curriculum and research, demonstrated through a surge of services programs at the Masters level and samples of program development and evolution. There is a need for an integrated research program that generates a more coherent and standard definition, language, and insights around services and builds on research that is underway, with an integral focus on value, overcoming the tendency for productivity- and efficiency-focused work.

Global Activities in Service Science

Several nations are moving quickly to establish high-priority research and education programs in service science. Germany invested $87M in its Innovation with Service program, while the European Union established the Networked European Software and Services Initiative (NESSI). NESSI is tied to EU Framework Programme (FP7) and has the goals of developing the Web 3.0 for the 2010’s, and replacing the “Net economy” by the “Service economy”. China has deployed a massive Five Year Plan in Modern Services, and Japan has invested $30M in Service Productivity activities.

What is the US doing? While the US is the largest net exporter of services, its service science research support mostly lies within the NSF SEE program (buried within Manufacturing). In 2007, the America COMPETES Act (Public Law 110–69—Aug. 9, 2007) was passed. It calls for a study to be conducted, within 1 year, by the Director of the Office of Science and Technology Policy, through the National Academy of Sciences, to report to Congress on how the Federal Government should support, through research, education, and training, the emerging management and learning discipline known as service science.

The Opportunities

Today, virtually all national economies are shifting to services – service systems are an important type of complex system that needs to be better understood, managed, and workforces prepared to successfully navigate within. New workforce skills are needed - to better understand, participate in, manage, and engineer service systems. Our educational system is slowly shifting toward services; however, national priorities and support are sorely lacking, given the importance of services in the economy. National systems are slowly shifting policy to recognize services and the importance of service innovation as engines for economic growth; however, much more can be done, beginning with the America COMPETES mandated study to identify how the Federal Government should support service science activities through research, education, and training.
Appendix A – A National Agenda to Address Service Science Opportunities in the US

**Stronger support for pre-tertiary education**
Recent data from the Organization for Economic Cooperation and Development indicate that the US is now ranked 12th among major industrialized countries in higher education attainment.
There is a need to overcome insufficient preparation of high school graduates, especially among low-income, rural, and minority students.

**Support tertiary education in key growth areas: professional and business services & healthcare and social assistance**
Ninety percent of the fastest-growing jobs in the new information and service economy will require some postsecondary education.
Job categories that require only on-the-job training are expected to see the greatest decline.
In high-demand fields, the value of postsecondary credentials and skills is likely to rise.

**Coordinated support for innovative services curriculum development and clearinghouse**
At a time when innovation occurs increasingly at the intersection of multiple disciplines (including business and social sciences), curricula and research funding remain largely contained in individual departments.
Carnegie Mellon led in the development and dissemination of software engineering curriculum modules, which supported the establishment of numerous software engineering programs.
We have proposed to take a similar leadership role in a collaborative effort with other universities and thought leaders to create and make available a robust curriculum in services science, as we did with software engineering.

**Support for Professional Masters programs in service-related topics**
Several schools have launched service science programs
Graduate programs: Carnegie Mellon, UC Berkeley, NC State
Undergraduate: Michigan Tech

**Establish national priorities on services**
Begin bootstrapping investments in research and education through targeted programs
Address issues on intellectual property protection for service innovation
Establish new innovation policies and metrics around services
The government has a key role in creating historical data sets to understand reality and drive policy decisions