Academia Dissects the Service Sector, but Is It a Science?

By STEVE LOHR
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On his Asian trip last month, President Bush urged Americans not to fear the rise toward prosperity of emerging economies like India. Education, Mr. Bush said, was the best response to globalization, climbing further up the ladder of skills to "fill the jobs of the 21st century."

But a ladder to where? That is, where are educated young Americans likely to find good jobs that will not be shipped off to India or China?

The answer, according to a growing number of universities, corporations and government agencies, is in what is being called "services science." The hybrid field seeks to use technology, management, mathematics and engineering expertise to improve the performance of service businesses like transportation, retailing and health care — as well as service functions like marketing, design and customer service that are also crucial in manufacturing industries.

A couple of dozen universities — including the University of California, Berkeley; Arizona State; Stanford; North Carolina State; Rensselaer Polytechnic Institute; and Georgia Tech — are experimenting with courses or research programs in the field.

The push for services science is partly a game of catch-up — a belated recognition that services now employ more than 75 percent of American workers and that education, research and policy should reflect the shift. "Services is a drastically understudied field," said Matthew Realff, director of a new program at the National Science Foundation to finance university research in the field. "We need a revolution in services."

Kurt Koester, a 24-year-old graduate student in engineering at Berkeley, is eager to take part. Yet engineering alone, he observes, can often be outsourced to lower-cost economies overseas.

Mr. Koester’s special interest is biomedical engineering, which combines engineering and biology. He is also taking the services science course at the Haas School of Business at Berkeley. He figures it will someday help him manage teams of technologists, spot innovations and new markets, and blend products and services.

"I love engineering, but I want a much broader and more diverse background," he said. "Hopefully, that will be my competitive advantage."

His personal strategy, according to economists, is the best way to prepare for an increasingly global labor market.

"This is how you address the global challenge," said Jerry Sheehan, a senior economist at
Academia Dissects the Service Sector, but Is It a Science? - New York ... http://www.nytimes.com/2006/04/18/business/18services.html?_r=1&or... the Organization for Economic Cooperation and Development. "You have to move up to do more complex, higher-value work."

Representatives from several technology companies, including I.B.M., Accenture, Electronic Data Systems and Hewlett-Packard, and a few universities and government agencies met in Washington in December to discuss how to raise interest in services science.

A further step is a conference on education in services science being held at the National Academy of Sciences today.

Whether services science will ever become a full-fledged academic discipline with departments of its own is uncertain. So far it mainly consists of graduate-level courses and research by professors, though Berkeley will begin a certificate program in the field this fall for graduate students in the schools of engineering, business and information and management systems.

The melding of fields in services science is sure to be tricky. Scientists and engineers tend to regard what is taught in business schools as a mushy combination of anecdotes, success stories and platitudes, wrapped in jargon. Put a few success stories together, and they become a "best practice."

Yet a similar skepticism greeted computing decades ago. When some advocates started promoting the idea of "computer science," traditionalists sneered that any course of study that had to add the term "science" to its name was not a science.

Eventually, computing won over the skeptics. And today, computer science departments are academic fixtures.

I.B.M. was an early champion of computer science, and it is now a leading corporate proponent of services science, sponsoring workshops, awarding research grants and helping develop course materials.

I.B.M. itself is a striking example of the shift toward services over the last decade or two. Once known as a computer maker, the company now gets half its revenue from services. And increasingly, I.B.M. is moving into sophisticated technology services, by working with corporate customers to automate and streamline business tasks like purchasing, human relations and customer relations programs.

In recent years, I.B.M. has shopped the global labor market, expanding significantly in India, especially for software programming work. But it has also reoriented and retrained its existing work force to support the swing to services.

The researchers in its laboratories were dubious at first. "The response here was there is no science in services," recalled Paul M. Horn, the senior vice president in charge of the I.B.M. labs. "But as people got into it, they got excited by working on the fascinating problems in services."

Baruch Schieber, 48, is one of the converts. After joining I.B.M. in 1987, Mr. Schieber did basic research and published articles in scholarly journals, mostly on algorithms that optimize computing calculations. Yet the math techniques used to make work flow efficiently through a computer — a complex system — can be applied to other complex systems in business. That is what Mr. Schieber did, first in manufacturing and later in services.

One recent assignment had Mr. Schieber studying drivers and dispatchers at Boston Coach, a limousine service that operates in 10 cities. His job was to create a computerized optimization system to make sure the company's vehicles and drivers in Boston and New York, where the company handles more than 1,000 rides a day, were used as much as possible.

The system gathered real-time data on car locations, reservations, travel times, traffic patterns, airport conditions and flight times, and it generated recommendations to the
dispatchers about which car and driver to send for each ride. As a result, the amount of
time the cars had passengers rose 20 percent, and revenue increased 10 percent.

Today, Mr. Schieber is working on a project for the National Wildfire Coordinating Group,
a team with representatives from five federal agencies including the Forest Service. His task
is to use computer models to help determine where to station limited manpower and
equipment around the country to minimize the destruction from forest fires. His models
use data on terrain, vegetation, wind, rainfall, public records of fires, and other variables.

Across the spectrum of services, Mr. Schieber sees plenty of opportunity to apply his skills.
"There's just so much room for optimization," he observed.

The service sector, to be sure, is huge and diverse. There are lots of service workers in
low-wage jobs, from fast-food servers to janitors. Services science will have scant effect on
them. Their incomes are limited by their lack of marketable skills, not by global
competition. Those kinds of local service jobs are not migrating offshore.

An accumulation of technological advances is behind the growing interest in services
science. High-speed Internet access, low-cost computing, wireless networks, electronic
sensors and ever-smarter software are the tools for building a "globalized services
economy," said Anatole Gershman, director of research at Accenture Technology Labs.
"That's what is new here."

The current wave of technology, according to Mr. Gershman, is the digital equivalent of
national railways and electric motors in the 19th century. They paved the way for new
companies, among them national retailers like Sears, and new kinds of industrial
organization, like assembly-line mass production.

He points to projects his company is doing as examples of services made possible by new
technology. In transportation, networked sensors and analytic software are being used to
diagnose the condition of engines. The goal is to make the mechanical upkeep of vehicles
like jets and municipal buses more intelligent, shifting from regimented maintenance
schedules to as-needed maintenance, which can reduce repair and maintenance costs by 50
percent, he said.

In health care, Mr. Gershman said, it should be possible to use tiny implants to monitor a
person's biological functions, whisk reports wirelessly to personalized databases,
automatically analyze the results and send alerts and updates to patients and doctors.

"Just what will be done with this technology we don't know," Mr. Gershman said. "But the
significant thing is that we now have the underpinnings for the construction of new
services."

Traditional service functions like marketing and customer service are also being
transformed by information technology. The rapid growth of the Web and e-commerce has
brought an explosion in the quantity of customer and market data, and a computerized
means for tracking consumer behavior.

Today, marketing researchers routinely use analytic and modeling software tools to test
hypotheses against statistics from customer databases, polling, economics and sociological
studies. "It's really made the field much more scientific," said Mary Jo Bitner, academic
director of the Center for Services Leadership at Arizona State University.

Even in manufacturing, the competitive edge of many American companies lies in the
intangible realm of service work. Look at the iPod. Apple Computer farms out the
manufacturing of its popular music player to subcontractors in Asia. But Apple designed
the iPod and wrote the software for easily finding, storing and playing music. It built the
iPod brand, and guided its advertising and marketing. In short, Apple keeps for itself the
most intellectually challenging, creative work, which adds the most value and pays the
highest wages.

The high-end work, experts say, typically taps several disciplines and requires conceptual
thinking and pattern recognition. Such work cannot be easily reduced to a simple
step-by-step recipe. "Those are the jobs that are very hard to automate or ship to India," said Frank Levy, a labor economist at the Massachusetts Institute of Technology.

Services science is an attempt to give university students a broader set of skills and adopt a broader research agenda for the economy of the future. "We in academia have to find ways to contribute research to improving our economic performance in services and to help students succeed in this knowledge-based services economy," said Henry Chesbrough, who is teaching the services science course at Berkeley.