



Service Science: The next frontier in service innovation

Service Science, Management and Engineering (SSME) or Service Science is a new academic discipline designed to develop the skills required in the world's increasingly service-based economies. This new field will bring together ongoing work in computer science, operations research, industrial engineering, business strategy, management sciences, social and cognitive sciences, and legal sciences.

SSME aims to provide a foundation for the service sector to study and understand how to create and deliver reusable assets so that service engagements can be more easily replicated and more effectively delivered.



Dr. Jim Spohrer
Director, Almaden Services Research
Almaden Research Center
IBM Research

Jim Spohrer is the Director of Almaden Services Research at IBM's Almaden Research Center in San Jose, California. He is responsible for creating and deploying service innovations that matter and scale well internally to transform IBM, and externally to transform IBM's client capabilities. He is leading IBM's SSME efforts globally.

“SSME is not just for service companies. Manufacturing and product companies should embrace SSME and develop new approaches to service innovation.”

Interview with Jim Spohrer

In recent years, IBM has been an active advocate of SSME. What do the "science" and "engineering" of service refer to?

Service “science” refers to the mathematical modelling of service systems, and the social sciences that are relevant to understanding the human, organisational, and cultural aspects of service systems.

Service “science” also refers to understanding of the origins and life cycles of service systems, ranging from business components, to business models, to value networks of many businesses linked globally.

Service “engineering” refers to the design, development, deployment, operations, and maintenance of service systems based on IT, knowledge workers, outsourced organisational or business components -- all configured to co-create, deliver, and capture value between a provider and a client.

Why is there a need for an academic discipline in SSME?

The sad truth is that if we don't teach students about the service economy, even though they are embedded in it, we are preparing students for jobs that existed in the 20th century manufacturing economy, instead of preparing them to be adaptive innovators in the 21st century service economy.

For example, how many students know the following?

1. Most Science and Engineering graduates will have jobs in the service sector;
2. Between now and 2014 the fastest growth in US jobs is projected to be in Business and Professional Services as well as Healthcare and Social Assistance Service jobs;
3. Entrepreneurs have successfully exploited service delivery via IT platforms (eBay, Amazon, Salesforce.com, Google, Yahoo and Second Life, etc.);
4. eBay's eCommerce services provide jobs for 13,000 employees and are the primary or secondary source of income for 1.3 million

Service Science: The next frontier in service innovation

people around the world. Entrepreneurs are combining eBay's reputation service, PayPal (financial service), and Skype (communication service) to create entirely new businesses;

5. 40% of the world's labour force is now employed in the service sector, compared with 38.7% in agriculture and 21.3% in manufacturing.

Can you share examples where SSME has been successfully applied by organisations?

IBM, as the prime contractor responsible for solution design, development and operation, has worked closely with the Swedish Road Administration and the city of Stockholm to launch a trial congestion charging system covering a 24 square kilometre area of the inner city.

Using mathematical modelling, the system helped reduced traffic by 25%; increased public transport usage by 40,000 users per day; and dramatically cut peak-time road congestion, within two months of the system launch.

Using a component-based business model methodology, IBM enabled the Bank of America's card services division to identify US\$40 million of potential simplification and cost savings projects over two years.

Business Insights Workbench (BIW), developed by IBM's Almaden Research Center, embeds a suite of information analytics and data processing technologies to improve the calibre of decision making for

enterprises. BIW has successfully addressed a wide range of business issues in different industries, including finance, healthcare and life sciences, intellectual property and customer relationship management. BIW has been particularly successful in the following application domains: IP analytics; CRM analytics; and healthcare and life sciences analytics.

Is SSME relevant only to service companies?

SSME is not just for service companies. Manufacturing¹ and product companies² should embrace SSME and develop new approaches to service innovation as well.

The support for SSME is growing. For example, the Service Research and Innovation Initiative (SRII) -- a non-profit group made up of industry, academic, and government -- was formed with the mission to increase investment in service research and innovation. Similar organisations already exist, such as the BestServ Forum in Finland.

“While SSME and Service Science are still emerging, many nations have made service innovation a priority.”

What can governments do to help small and medium enterprises (SMEs) embark on SSME?

First, many governments are already doing a lot. For example, Germany last year announced an Innovation with Service initiative. Japan announced a Service Productivity initiative. China included a "Transition to a Modern Service Economy" in its 2006-2011 five-year plan. The US National Science Foundation has a Service Enterprise Engineering effort, and awarded a grant to Michigan Technology University to pilot a Service Systems Engineering undergraduate major. The European Commission has a Networked European Software and Services Initiative (NESSI) program that calls out Service Science and Service Systems initiatives.

So while SSME and Service Science are still emerging, many nations have made service innovation a priority.

IBM has SSME collaboration underway linking government and universities in the US, China, Germany, Japan, India, Finland, England, Thailand, Australia, Korea, Taiwan, New Zealand, Italy -- in fact, more than twenty two countries and growing.

Second, specifically for SMEs, governments could explore creating the equivalent of the USDA Rural Development organisation.³

The US State of Vermont, for example, has created IT success stories, such as AI's Snowmobile, that show how local business can go global

Service Science: The next frontier in service innovation

by developing appropriate IT-based service systems.⁴

Finally, the US National Academy of Engineering and Organisation for Economic Cooperation and Development (OECD) both have reports that call out the need for more government, industry, and academic collaboration around service innovation. Funding more workshops with local universities, and including SMEs, would be a step in the right direction as well.

What are some common misconceptions about SSME that you have come across?

First, many people think a service system is just another word for a business or an organisation.

However, service systems can be either macro or micro. Macro refers to value networks or value chains composed of many businesses. Micro refers to departments or work groups or business components providing service within a business.

Some service systems depend on technology to deliver the service, such as eBay; some depend on people to deliver the service, such as a law firm.

All services systems are a blend of people, technology, shared information (language, laws, measures), and organisations (both internal and external) connected by value propositions.

Second, many disciplines which focus on the service sectors -- including healthcare, business consulting, retail, education, communications,

transportation, government, financial, etc. -- say they are already doing SSME.

However, these disciplines typically focus on only one piece of the service system -- the technology piece, the business piece, or the human-social piece.

SSME is the emerging integration of multiple methods and approaches from all these disciplines as they relate to understanding, designing, improving, and scaling service systems.

When computer science was emerging in the 1940s and 1950s, those trained in the field were often called mathematician, electrical engineers, physicists, even philosophers (Boolean logic), and other "smart people" working to build computational systems.

Today, SSME, or Service Science for short, is often viewed as a bunch of "smart people" working to design or improve service systems.

About Dr. Jim Spohrer

Jim Spohrer is the Director of Almaden Services Research at IBM's Almaden Research Center in San Jose, California. He is responsible for creating and deploying service innovations that matter and scale well internally to transform IBM, and externally to transform IBM's client capabilities.

From 2000 to 2003, he was CTO of IBM's Venture Capital Relations Group, where he identified technology trends and worked to establish win-

win relationships between IBM and VC-backed portfolio companies. Previously, Dr. Spohrer directed the IBM Almaden Research Center's Computer Science Foundation Department. Before that, he was senior manager and co-strategist for IBM's User Experience/Human Computer Interaction Research effort.

Prior to joining IBM, Dr. Spohrer was at Apple Computer, where he attained the title of Distinguished Engineer, Scientist, and Technologist (DEST) for his pioneering work on intelligent multimedia learning systems, next-generation authoring tools, online learning communities, and augmented reality learning systems. He has published numerous papers on speech recognition, artificial intelligence, empirical studies of programmers, next-generation learning systems, and service science. Dr. Spohrer graduated with a Ph.D. in Computer Science from Yale University (specialising in Artificial Intelligence and Cognitive Science) in 1989 and a B.S. in Physics from Massachusetts Institute of Technology in 1978.

References

¹ "Hiding in plain sight: Service innovation, a new priority for chief executives." IBM Institute for Business Value. November 2006. <http://www-935.ibm.com/services/us/index.wss/ibvstudy/gbs/a1026173?cntxt=a1000038>

² "Product provider to Customer Value Provider: Escaping the services maze"

Service Science: The next frontier in service innovation

May 2002. http://www-03.ibm.com/industries/aerodefense/doc/content/bin/ibv_p2s_3.pdf

³ USDA Rural Development Web site. <http://www.rurdev.usda.gov/rd/index.html>

⁴ 2004 – 2006 Report of the Information Technology Skills Taskforce. US Department of Labor, Employment & Training Administration. <http://www.doleta.gov/USWORKFORCE/communityaudits/docs/VT-Statewide/VT-Statewide-Product-ITSkillsTaskforceReport.pdf>



©Copyright IBM Corporation 2007

IBM Singapore Pte Ltd
9 Changi Business Park Central 1,
The IBM Place, Singapore 486048.

Produced in Singapore
June 2007
All Rights Reserved