Dynamics of Service Businesses

David Ing
IBM Canada Ltd. and the Helsinki University of Technology
September 10, 2009, at Metropolia

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Agenda

A. Introduction

B. The changing world, and SSMED

C. Service-dominant logic

D. Service as a paradigm

E. A smarter planet

F. Artifacts / feeds to follow

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daviding-opensource-l
daviding-software-upd
daviding-systems
daviding-systems-c
DI Business
DI Imaginary Friends
DI-Sideline
News that expires

Readings you may have done

- Thomas L. Friedman, *The World Is Flat: A Brief History of the Twenty-First Century*, Farrar, Straus and Giroux, 2005
- Stephen L. Vargo and Robert F. Lusch, "The Four Service Marketing Myths: Remnants of a Goods-Based, Manufacturing Model", *Journal of Service Research,* Volume 6, Number 4, (May 2004) 324-335.
- Christopher Lovelock and Evert Gummesson, "Whither Services Marketing? In Search of a New Paradigm and Fresh Perspectives", *Journal of Service Research,* Volume 7, Number 1, August 2004, pp. 20-41.
- Add two more!
  - Vargo & Lusch, "Evolving a Services Dominant Logic", *Journal of Marketing*, 2004
  - Bolton (editor), "Invited Commentaries on 'Evolving to a New Dominant Logic for Marketing'", *Journal of Marketing,* 2004
- Charles A. O'Reilly III, Michael L. Tushman, "The Ambidextrous Organization", *Harvard Business Review*, April 2004.
- Geoffrey A. Moore, "Strategy and Your Stronger Hand", *Harvard Business Review,* Dec. 2005, Vol. 83, Issue 12 (includes "Two Organizational Models")

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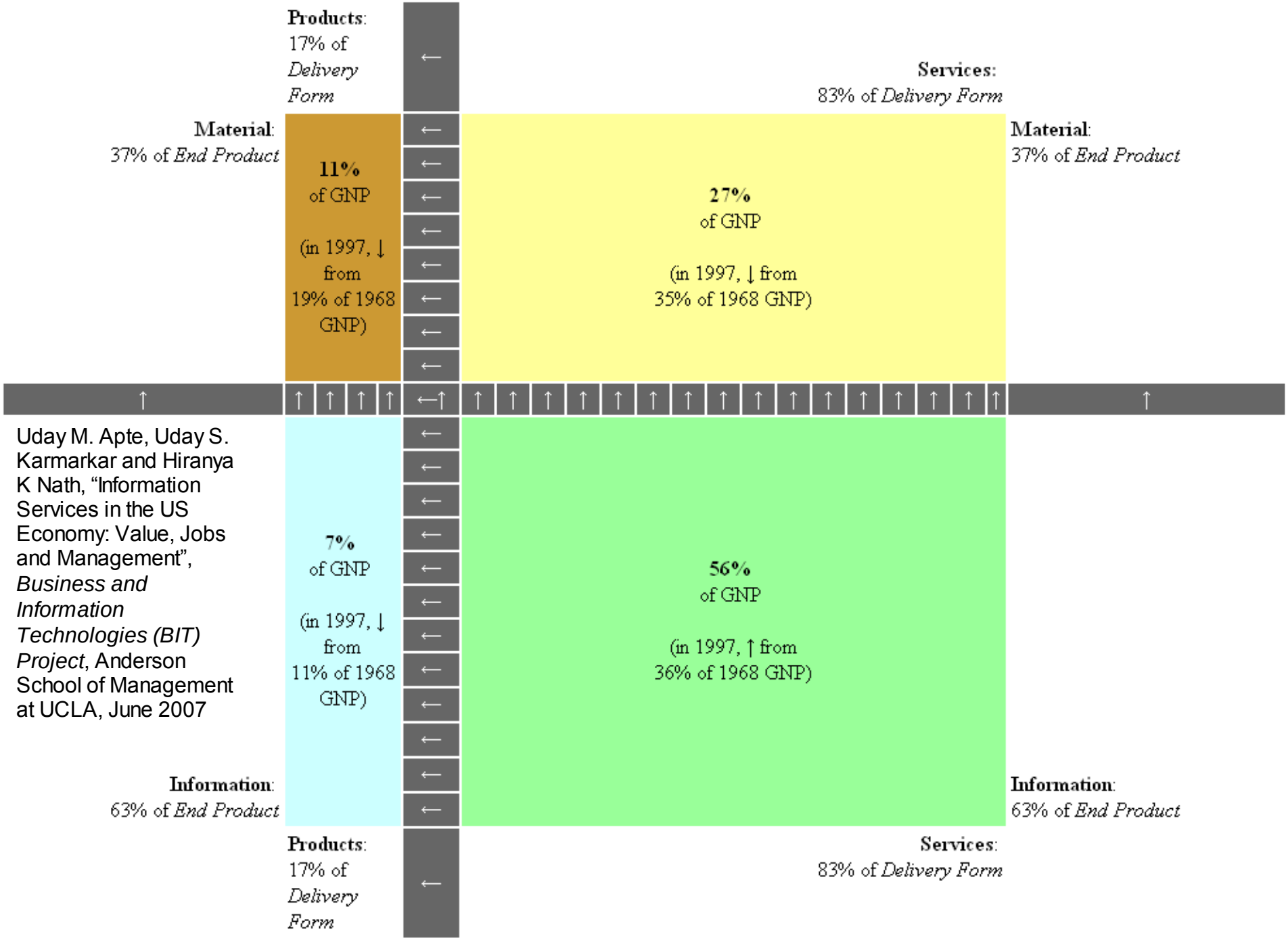
Ten flatteners characterize a triple convergence

Ten Great Flatteners		
1.	Fall of the Berlin Wall	The events of November 9, 1989, tilted the worldwide balance of power toward democracies and free markets.
2.	Netscape IPO	The August 9, 1995, offering sparked massive investment in fiber-optic cables.
3.	Work flow software	The rise of apps from PayPal to VPNs enabled faster, closer coordination among far-flung employees.
4.	Open-sourcing	Self-organizing communities, a la Linux, launched a collaborative revolution.
5.	Outsourcing	Migrating business functions to India saved money and a third world economy.
6.	Offshoring	Contract manufacturing elevated China to economic prominence.
7.	Supply-chaining	Robust networks of suppliers, retailers, and customers increased business efficiency. See Wal-Mart.
8.	Insourcing	Logistics giants took control of customer supply chains, helping mom-and-pop shops go global. See UPS and FedEx.
9.	In-forming	Power searching allowed everyone to use the Internet as a "personal supply chain of knowledge." See Google.
10.	Wireless	Like "steroids," wireless technologies pumped up collaboration, making it mobile and personal.

It is this **triple convergence** – of **new players**, on a **new playing field**, developing new processes and habits for **horizontal collaboration** – that I believe is the most important force shaping global economics and politics in the early twenty-first century.

Source: Thomas L. Friedman, *The World Is Flat: A Brief History of the Twenty-First Century*, Farrar, Straus & Giroux, 2005; Summary of flatteners by Dan Pink, Wired Magazine



Uday M. Apte, Uday S. Karmarkar and Hiranya K Nath, "Information Services in the US Economy: Value, Jobs and Management", *Business and Information Technologies (BIT) Project*, Anderson School of Management at UCLA, June 2007

Contributions to GDP growth, G7 countries, 1995-2000 and 2000-05[1]

Percentage points

OECD Science, Technology and Industry Scoreboard 2007: Innovation and Performance in the Global Economy, p. 206, available from oecd.org.

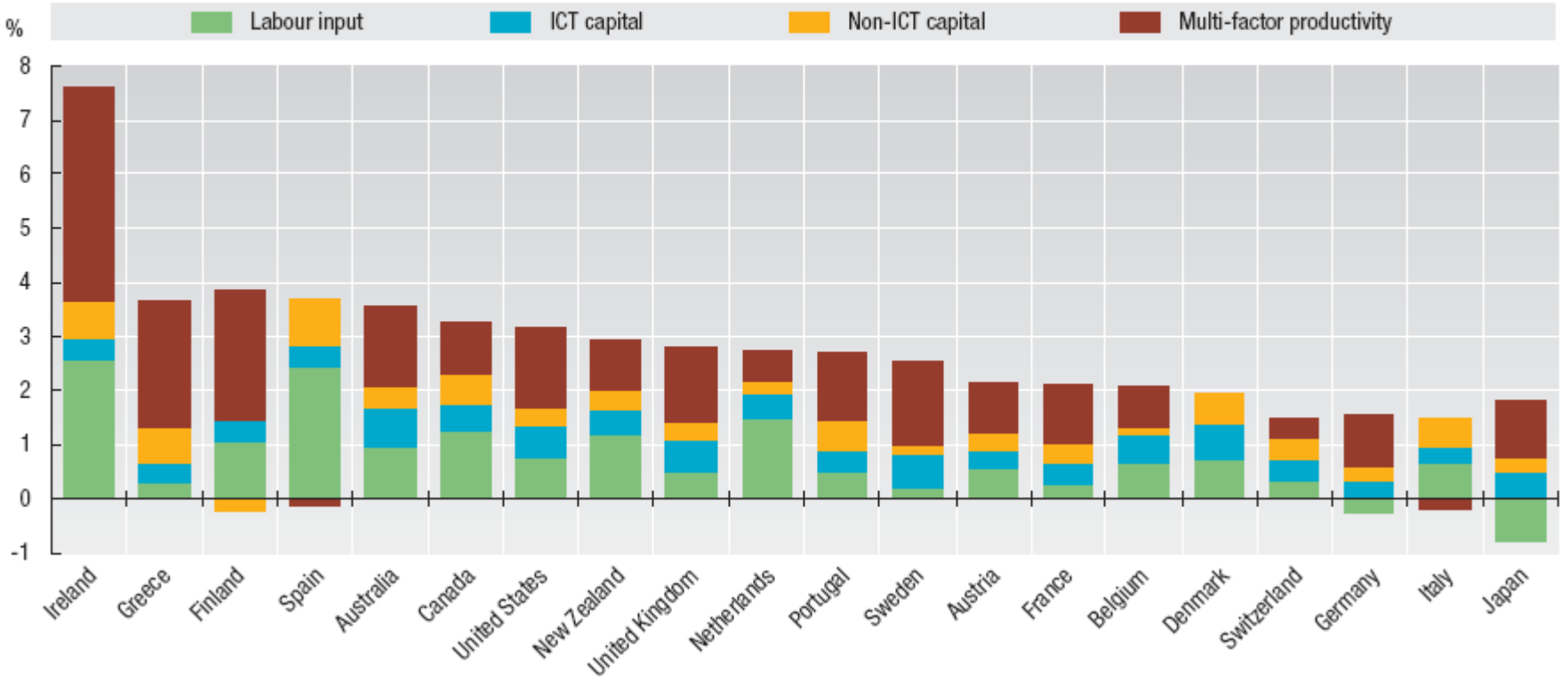
Contributions to GDP growth, G7 countries, 1995-2000 and 2000-05[1]

Percentage points

OECD Science, Technology and Industry Scoreboard 2007: Innovation and Performance in the Global Economy, p. 206, available from oecd.org.

Contributions to GDP growth, OECD countries, 1995-2005[2]

Percentage points



OECD Science, Technology and Industry Scoreboard 2007: Innovation and Performance in the Global Economy, p. 206, available from oecd.org.

Arming American Scientists: NSF and the Provision of Scientific Computing Facilities for Universities, 1950-1973

WILLIAM ASPRAY
BERNARD O. WILLIAMS

This article discusses the role of the US National Science Foundation in the provision of scientific computing facilities for colleges and universities in the period 1950 to 1973. In this period, the NSF played a major role in establishing computing facilities on American campuses for the purposes of scientific research and science education. By the end of this period, most of these programs at NSF had been disbanded, and the foundation was concentrating its support for computing not on the service of other scientific disciplines, but instead on the establishment of a theoretically oriented discipline of computer science. The primary focus here is on NSF institutional history, with only a few examples of the impact of NSF programs. But it is an important part of a larger story of the role of the federal government in establishing American hegemony in computing in this era.

Academic interest in computing grew to the point that, by 1959, 150 colleges and universities had introduced on campus some research or instructional use of computers. A survey of university computing conducted by Louis Fein for Stanford Uni-

The single strongest impulse for introducing computers on campuses in the mid-1950s did not come from the schools themselves or from any federal agency, but instead from IBM.

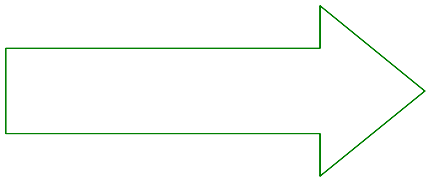
versity reported — perhaps with some overstatement — that universities, government, and industry were reorganizing to invent and apply new techniques of linear programming, game theory, automata theory, artificial intelligence, adaptive mechanisms, psychometrics, neural psychology, learning machines, information theory, coding theory, statistics, cybernetics, and a wide range of modeling techniques. Fein soberly reported that the universities were "having a hard time learning to cope with their new role in society in general and, in particular, learning how to effectively incorporate these new fields into the academic structure."[10]

Physicists

Electrical Engineers

Mathematicians

Philosophers (Boolean Logic)



Computer Science

W.B. Aspray and B. O. Williams 1994. Arming American scientists: NSF and the provision of scientific computing facilities for universities, 1950-1973. *IEEE Annals of the History of Computing*, 16 (4), 60-74.

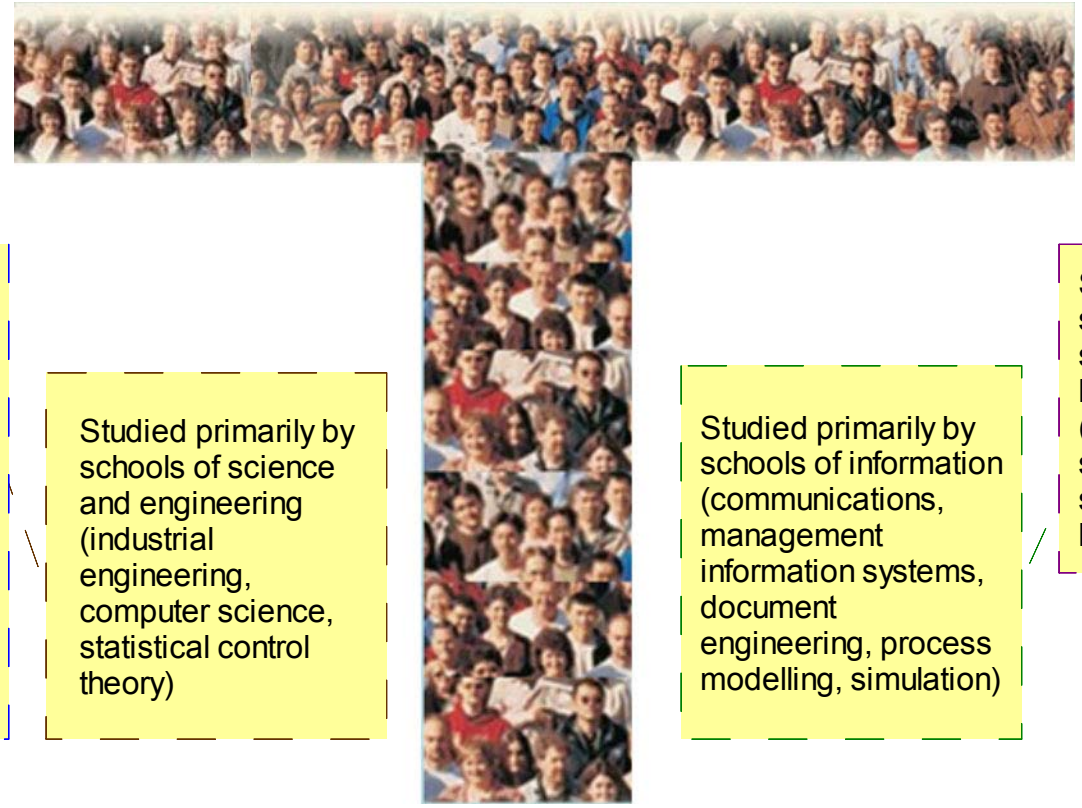
Develop T-shaped professionals along 4 resource types

(1) Whole businesses and organisations

(2) Technology

(3) People

(4) Shared information



Studied primarily by schools of management (marketing, operations management, operations research and management sciences, supply chain management, innovation management)

Studied primarily by schools of science and engineering (industrial engineering, computer science, statistical control theory)

Studied primarily by schools of information (communications, management information systems, document engineering, process modelling, simulation)

Studied primarily by schools of social sciences and humanities (economics, cognitive science, political science, design, humanities and arts)

Source: IfM and IBM 2008.

SSMED (Service Science, Management, Engineering and Design) ↔ Science of Service Systems

A service system can be defined as
a dynamic configuration of resources
(people, technology, organisations and shared information) that
creates and delivers value
between the provider and the customer through service.

In many cases, a service system is a complex system in that
configurations of resources interact in a non-linear way.
Primary interactions take place at the interface
between the provider and the customer.
However, with the advent of ICT,
customer-to-customer and supplier-to-supplier interactions
have also become prevalent.
These complex interactions create a system whose behaviour is
difficult to explain and predict. (IfM and IBM, 2008, p. 6)

Knowledge of service systems benefits from disciplines
(page 1 of 3)

Academic disciplines	(1) Whole businesses and organizations	(2) Technology	(3) People	(4) Shared information
Architecture and designed systems	x	x	x	x
Behavioral sciences and education			x	x
Cognitive science and psychology	x	x	x	x
Complex adaptive systems theory		x		x
Computer science and AI/web services		x		x
Computer supported cooperative work	x	x	x	x
Economics and law	x		x	x
Engineering economics and management	x	x		x
Experience design, theatre and arts			x	
Game theory and mechanism design			x	x
Human resource management	x		x	

Source: IfM and IBM. (2008). *Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government.* University of Cambridge Institute for Manufacturing, available at http://www.ifm.eng.cam.ac.uk/ssme/

Knowledge of service systems benefits from disciplines
(page 2 of 3)

Academic disciplines	(1) Whole businesses and organizations	(2) Technology	(3) People	(4) Shared information
Industrial engineering (IE) and systems	x	x	x	x
Industrial and process automation	x	x	x	x
International trade	x			
Knowledge management	x	x	x	x
Management of information systems	x	x	x	x
Management of technology and innovation	x	x	x	x
Marketing and customer knowledge	x	x	x	x
Mathematics and non-linear dynamics	x	x	x	x
Operations management (OM)	x	x	x	x
Operational research (OR)	x	x	x	x
Organisation theory and learning	x	x	x	x
Political science	x		x	

Source: IfM and IBM. (2008). *Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government.* University of Cambridge Institute for Manufacturing, available at http://www.ifm.eng.cam.ac.uk/ssme/

Knowledge of service systems benefits from disciplines
(page 3 of 3)

Academic disciplines	(1) Whole businesses and organizations	(2) Technology	(3) People	(4) Shared information
Project management	x	x	x	x
Queuing theory	x	x	x	x
Simulation, modelling visualization	x	x	x	x
Sociology and anthropology	x	x	x	x
Software metrics and development		x		
Statistical control theory		x		x
Strategy and finance	x	x	x	x
Supply chain management	x	x		x
System design and software architecture		x		
Systems dynamics theory and design	x	x	x	x
Total quality management, lean six sigma	x	x	x	x

Source: IfM and IBM. (2008). *Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government.* University of Cambridge Institute for Manufacturing, available at http://www.ifm.eng.cam.ac.uk/ssme/

Recommendations for education

1. Enable graduates from various disciplines to become T-shaped professionals, who are adaptive innovators with a service mindset and can make early contributions to the service-driven economy.
2. Promote SSME education programmes and qualifications as a way of developing a service mindset, in conjunction with industry recognition and recruitment of SSME qualified graduates.
3. Develop a modular template-based SSME curriculum in higher education, add new materials and refinements as research develops over time, and then extend to all levels of education.
4. Explore new teaching methods for SSME related education.

Source: IfM and IBM. (2008). *Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government.* University of Cambridge Institute for Manufacturing, available at http://www.ifm.eng.cam.ac.uk/ssme/

Recommendations for research

1. Develop an inclusive interdisciplinary and intercultural approach to service research.
2. Build bridges between disciplines through grand research challenges.
3. Establish service system and value proposition as foundational concepts.
4. Work with practitioners to create data sets to better understand the nature and behaviour of service systems.
5. Create modelling and simulations tools for service systems.

Source: IfM and IBM. (2008). *Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government.* University of Cambridge Institute for Manufacturing, available at http://www.ifm.eng.cam.ac.uk/ssme/

Recommendations for business

1. Establish employment policies and career paths for T-shaped professionals.
2. Review existing approaches to service innovation and provide grand challenges for service systems research.
3. Provide funding for service systems research.
4. Develop appropriate organisational arrangements to enhance industry-academic collaboration.
5. Work with stakeholders to include sustainability measures and create actionable service innovation roadmaps.

Source: IfM and IBM. (2008). *Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government.* University of Cambridge Institute for Manufacturing, available at http://www.ifm.eng.cam.ac.uk/ssme/

Recommendations for government

1 Promote service innovation for all parts of the economy and provide funding for SSME education and research.

2 Demonstrate the value of Service Science to government agencies, and thereby create methods, data sets, and tools to inform and challenge current education and research support.

3 Develop relevant measurements and reliable data on knowledge-intensive service activities across sectors to underpin leading practice for service innovation.

4 Make government service systems more comprehensive and citizen-responsive.

5 Encourage public hearings, workshops, briefings with other stakeholders to develop service innovation roadmaps.

Source: IfM and IBM. (2008). *Succeeding through Service Innovation: A Service Perspective for Education, Research, Business and Government.* University of Cambridge Institute for Manufacturing, available at http://www.ifm.eng.cam.ac.uk/ssme/

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Vargo & Lusch (2004), "The Four Services Marketing Myths"

Dimension	Myth	Dispelling the Myth	Perspective
Intangibility	Services lack the tactile quality of goods	• Services often have tangible results • Tangible goods are often purchase for intangible benefits • Tangibility can be a limiting factor in distribution	• The focus on manufactured output is myopic and good oriented • Consumers buy service even when a tangible product is involved • Intangibles such as brand image are important
Hetero-geneity	Unlike goods, services can not be standardized	• Tangible goods are often heterogeneous • Many services are relatively standard	• Homogeneity in production is viewed heterogeneously in consumption
Insepera-bility	Unlike goods, services are simultaneously produced and consumed	• The consumer is always involved in the "production" of the value	• Other manufacturing benefits from efficiency of separation • Separability limits marketability
Perishability	Services cannot be produced ahead of time and inventoried	• Tangible goods are perishable • Many services result in long-lasting benefits • Both tangible and intangible capabilities can be inventoried • Inventory represents and additional marketing cost	• Value is created at the point of consumption, not in the factory

Lovelock & Gummesson (2004), "Whither Services Marketing?

- "…marketing transactions that do not involve a transfer of ownership are distinctively different from those that do."
- "We contend that services involve a form of rental or access in which customers obtain benefits by gaining the right to use a physical object, to hire the labor and expertise of personnel, or to obtain access to facilities and networks"

Rented goods services	e.g. vehicles, power tools, furniture, construction equipment, formal clothing
Place and space rentals	e.g. hotel room, a seat in an aircraft, a suite in an office
Labor and expertise rentals	e.g. cleaning a house, car repair, surgery, management consultancy
Physical facility access and usage	advantage and enjoyment of e.g. museum, theme park, spa, conference site
Network access and usage	e.g. telecommunications, utilities, banking, insurance, specialized information services

Vargo & Lusch (2004), "New Dominant Logic for Marketing"

Dominant Logic	*Traditional Goods-Centered*	*Emerging Service-Centered*
Primary unit of exchange	People exchange for goods.	People exchange to acquire the benefits of specialized competences (knowledge and skills), or services.
Role of goods	Marketers take matter and change [goods] form, place, time, and possession.	[Goods] are intermediate "products, that are used by other operant resources (customers) as appliances in value-creation processes.
Role of customer	The customer is the recipient of goods.	The customer is a coproducer of service.
Determination of value	Value is determined by the producer.	Value is perceived and determined by the consumer on the basis of "value in use."
Firm-customer interaction	Customers are acted on to create transactions with resources.	Customers are active participants in relational exchanges and coproduction.
Source of economic growth	Wealth is obtained from surplus tangible resources and goods. Wealth consists of owning, controlling, and producing operand resources.	Wealth is obtained through the application and exchange of specialized knowledge and skills, it represents the right to the future use of operant resources.

Bolton (2004), "Commentaries"

Day	• "information technology advances that enable universal access to knowledge" • "firms need to select whether to make superior relational value a central or a supportive element of their strategy"
Gummesson	• "Providers stand between consumers and need-satisfaction." • "… joint contributions through interaction." • The *parties* become *partners*.
Hunt	• For resource-advantage theory, resources are the "tangible and intangible entities available to the firm that enable it to produce efficiently and/or effectively a market offering that has value for some market segment(s)," and resources are categorized as financial, physical, legal, human, organizational, informational, and relational.
Prahalad	• (1) ubiquitous connectivity …, (2) convergence of technologies, and (3) globalization of information • 1. …. Customers, customer communities, and firms interact. • 2. … what is cocreated is the experience. • 3. New building blocks are … dialogue …, access and transparency to information … and risk assessment • 4. …Often, a network of firms must work together …

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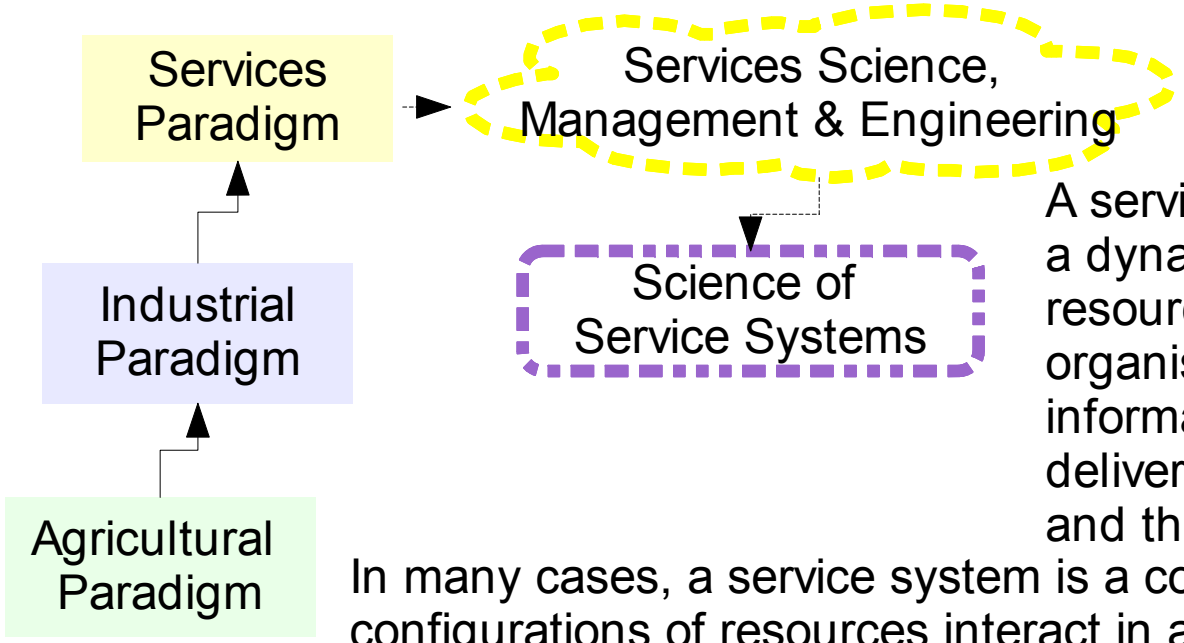
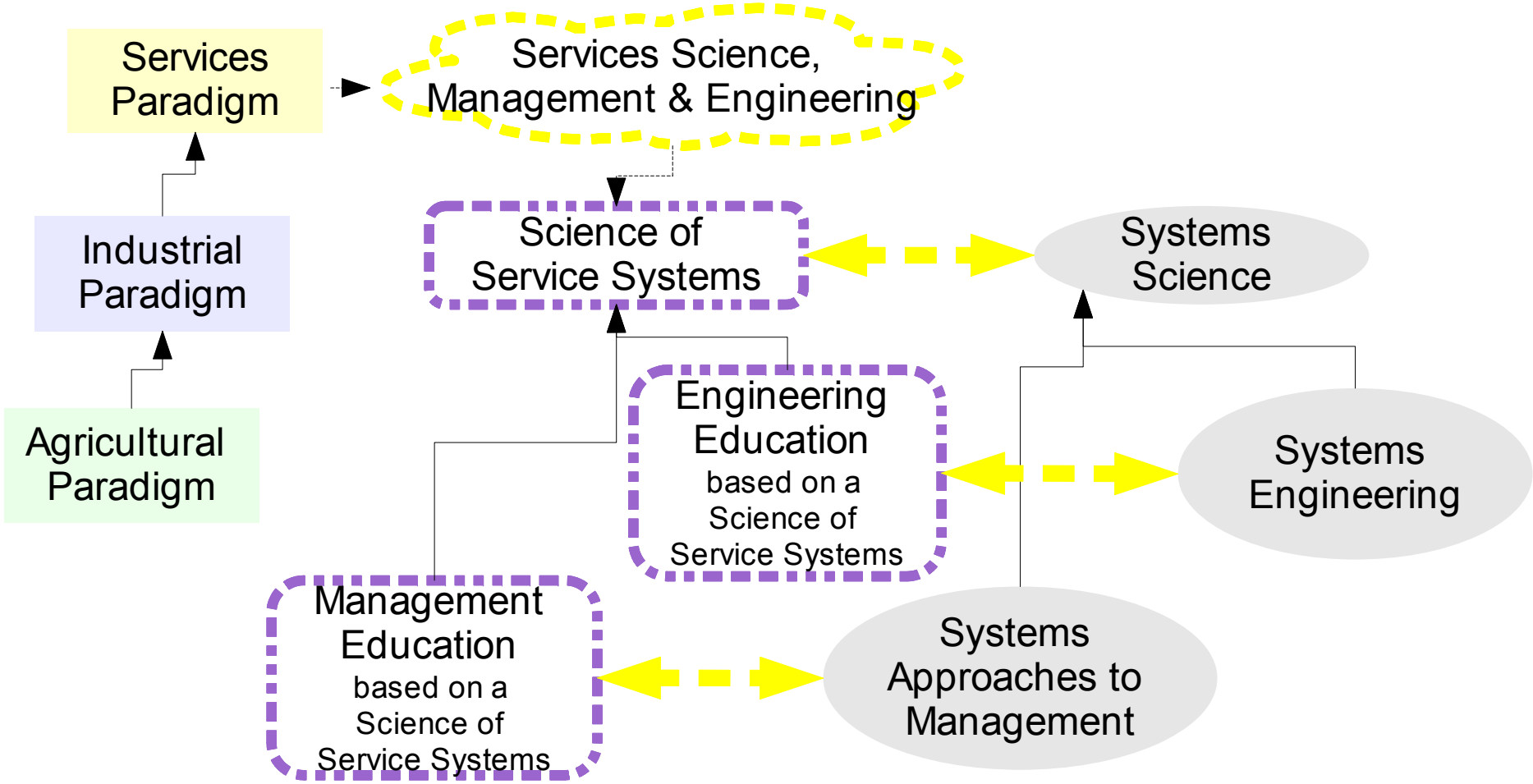
A. The challenge of evolving economic paradigms ...



A service system can be defined as a dynamic configuration of resources (people, technology, organisations and shared information) that creates and delivers value between the provider and the customer through service.

In many cases, a service system is a complex system in that configurations of resources interact in a non-linear way. Primary interactions take place at the interface between the provider and the customer. However, with the advent of ICT, customer-to-customer and supplier-to-supplier interactions have also become prevalent. These complex interactions create a system whose behaviour is difficult to explain and predict. (IfM and IBM, 2008, p. 6)

... with engineering, management, and systems



B. *Business models* as a focal point for study ...

The business model defines the value-creation priorities of an actor in respect to the utilization of both internal and external resources.

It defines how the actor relates with stakeholders, such as actual and potential customers, employees, unions, suppliers, competitors, and other internal groups.
It takes account of situations where the actor's activities may

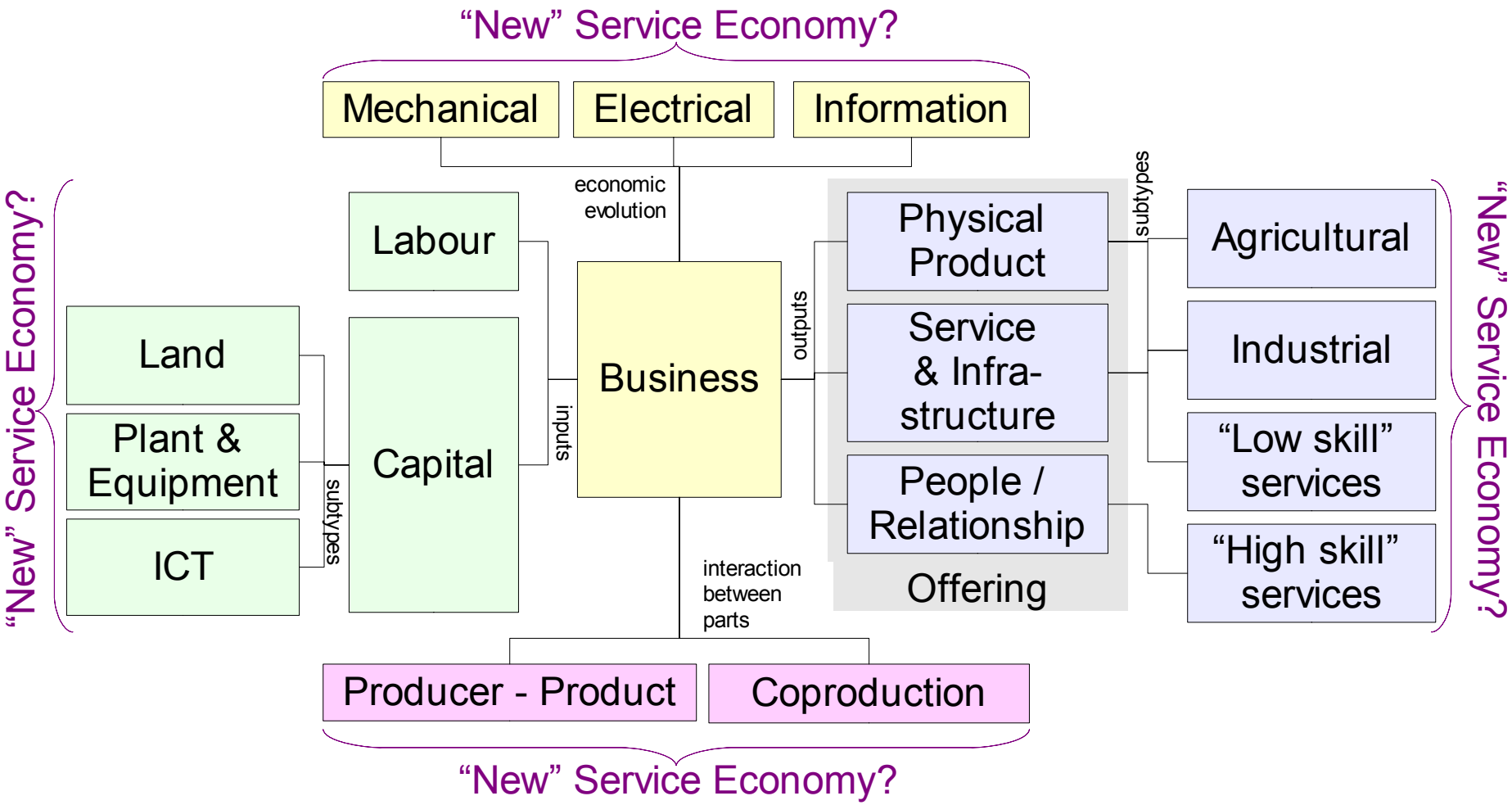
(a) affect the business environment and its own business in ways that create conflicting interests, or impose risks on the actor; or

(b) develop new, previously unpredicted ways of creating value.

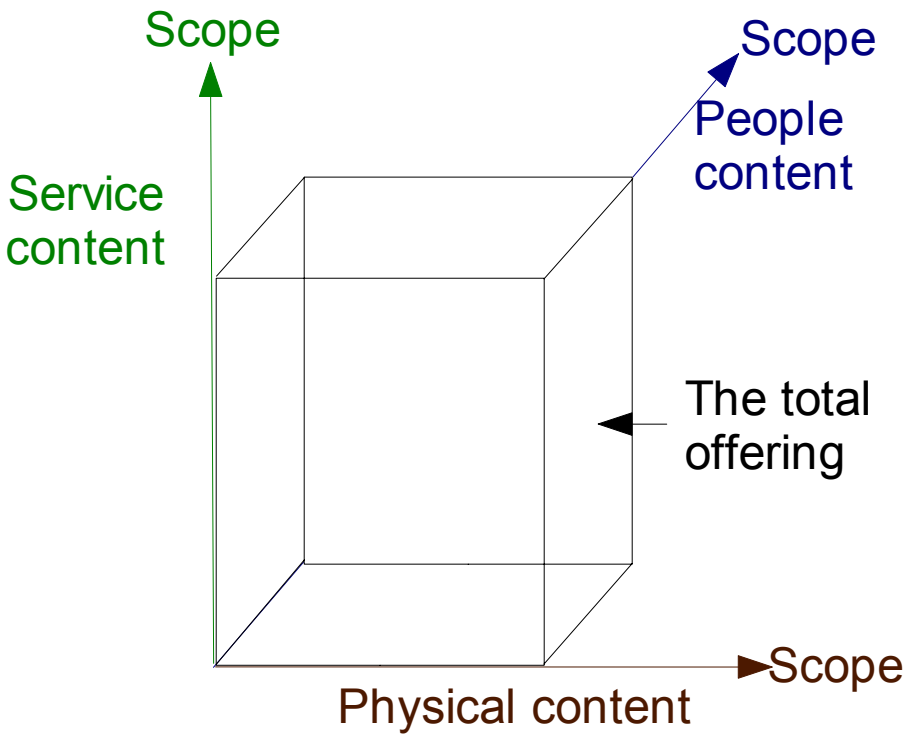
The business model is in itself subject to continual review as a response to actual and possible changes in perceived business conditions.

Johan Wallin, *Business Orchestration: Strategic Leadership in the Era of Digital Convergence*, Wiley 2006, p. 12.

... from multiple perspectives ...



... and an understanding of offerings



... it is useful to examine the offering in terms of a three-dimensional activity package ....

- The physical content of the offering consists of elements such as the core product, the packaging, the quality and dependability of the good and its material components, the product range, etc.
- The service content includes distribution, technical support, product modifications, customer training, on-line advice, troubleshooting, warranties and other trust-supporting insurance aspects, information brochures, brand reputation, complaint handling, invoicing, integrated information systems, etc.
- The people content covers issues like long-term partnerships, interpersonal trust, reputation, human resource co-development, etc.

... different customers will emphasize different axes of the offering.

Rafael Ramirez and Johan Wallin. *Prime Movers: Define Your Business or Have Someone Define It Against You*, 2000, pp. 58-59.

2008/07 Business Models and Evolving Economic Paradigms: A Systems Science Approach

Submitted by daviding on Fri, 09/05/2008 - 00:15.

Author

David Ing

Abstract

For professionals at the beginning of the 21st century, much of the conventional wisdom on business management and engineering is founded in the 20th century industrial / manufacturing paradigm. In developed economies, however, the service sector now dominates the manufacturing sector, just as manufacturing prevailed over the agricultural sector after the industrial revolution. Simultaneously, as end products have transitioned from material outputs to information in digital form, traditional business models are under siege. The economic sociology in this new world challenges the integrity of models, methods and interventions successful in an earlier paradigm.

Since 2005, IBM has encouraged universities to develop a new field of Services Science, Management and Engineering (SSME). Researchers are responding with development of a new science of service systems, but mature foundations will require years of collaboration. In the absence of a well-established science from which educational curricula can be deduced, teachers can develop educational programs for joint learning, guided inductively by relevance and pragmatism.

A new seminar on business models – ways in which business organizations operate and evolve – is proposed. Complementing traditional management and/or engineering curricula, this course

Publications

- 2005/10 Negotiated Order and Network Form Organizations
- 2007/11 Services Engineering and Management, Value Coproduction, and Situated Practices
- **2008/07 Business Models and Evolving Economic Paradigms: A Systems Science Approach**
- 2008/09 Offerings as Commitments and Context: Service Systems from a Language Action Perspective
- 2008/10 SSMED and SOA: Service Science, Management, Engineering and Design and Service Oriented Architecture

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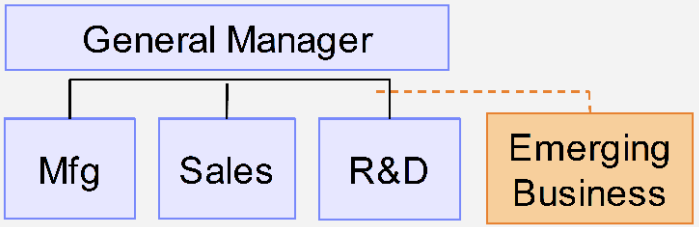
Innovation as exploitative and exploratory

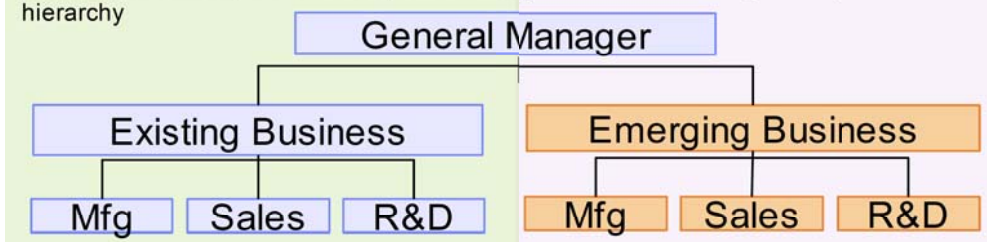
Unsupported Teams

are set up outside the established organization and management hierarchy



Ambidextrous organizations

establish project teams that are structurally independent units, each have its own process, structures, and cultures, but are integrated into the existing management hierarchy



Alignment of:	*Exploitative Business*	*Exploratory Business*
Strategic intent	cost, profit	innovation, growth
Critical tasks	operations, efficiency, incremental innovation	adaptability, new products, breakthrough innovation
Competencies	operational	entrepreneurial
Structure	formal, mechanistic	adaptive, loose
Controls, rewards	margins, productivity	milestones, growth
Culture	efficiency, low risk	risk taking, speed, flexibility
Leadership role	authoritative, top down	visionary, involved

Ambidextrous Leadership

Different alignments held together through senior-team integration, common vision and values, and common senior-team rewards.

Source: Charles A. O'Reilley III and Michael L. Tushman, The Ambidextrous Organization, Harvard Business Review, April 2004, pp. 74-81.

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Coevolving Innovations

... in Business Organizations and Information Technologies

Converging digital and physical infrastructures: instrumented, interconnected, intelligent

Posted on December 30, 2008 by davidingd

I was listening to Sam Palmisano's talk on "A Smarter Planet" as part of the Technology and Foreign Policy discussion at the Council for Foreign Relations — the audio version, because I prefer to not sit at my computer to watch the video. He said that as the world gets "flatter", smaller and more interconnected, the planet is becoming smarter. Smarter means that ...

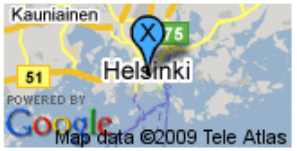
> ... digital and physical infrastructures of the world are converging.

Three advances in technology are driving this change.

- The world is becoming *instrumented*: transistor technology is embedded in the mobile phones of 4 billion mobile subscribers today, and there will be 30 million RFID (Radio Frequency Identification) tags within 2 years.
- The world is becoming *interconnected*: the Internet not only means 2 billion people connected person-to-person, but also the ability for instruments / devices to connect machine-to-machine.
- Things are becoming more *intelligent*: since instrumented devices generate data that can be stored and analyzed, advanced analytics enables intelligence that can be translated into action — with nearly-continual real-time updates streaming from supercomputers.

The talk continued with a discussion about how much waste — in energy, gridlocked traffic, supply chain inefficiencies, unsystemic healthcare, and water usage — in the physical world might be reduced through acting smarter. In the pure information world, financial institutions were able to *spread risk*, but not *track risk*, which undermined confidence in the markets.

Where is David?
checked in about 23 hours ago



Status

davidingd posted a text message @ Annankatu 16
talked with Johan about service systems and smarter planet. Chilling to beat jet lag. (Helsinki, Monday)

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Agenda

A. Introduction

B. The changing world, and SSMED

C. Service-dominant logic

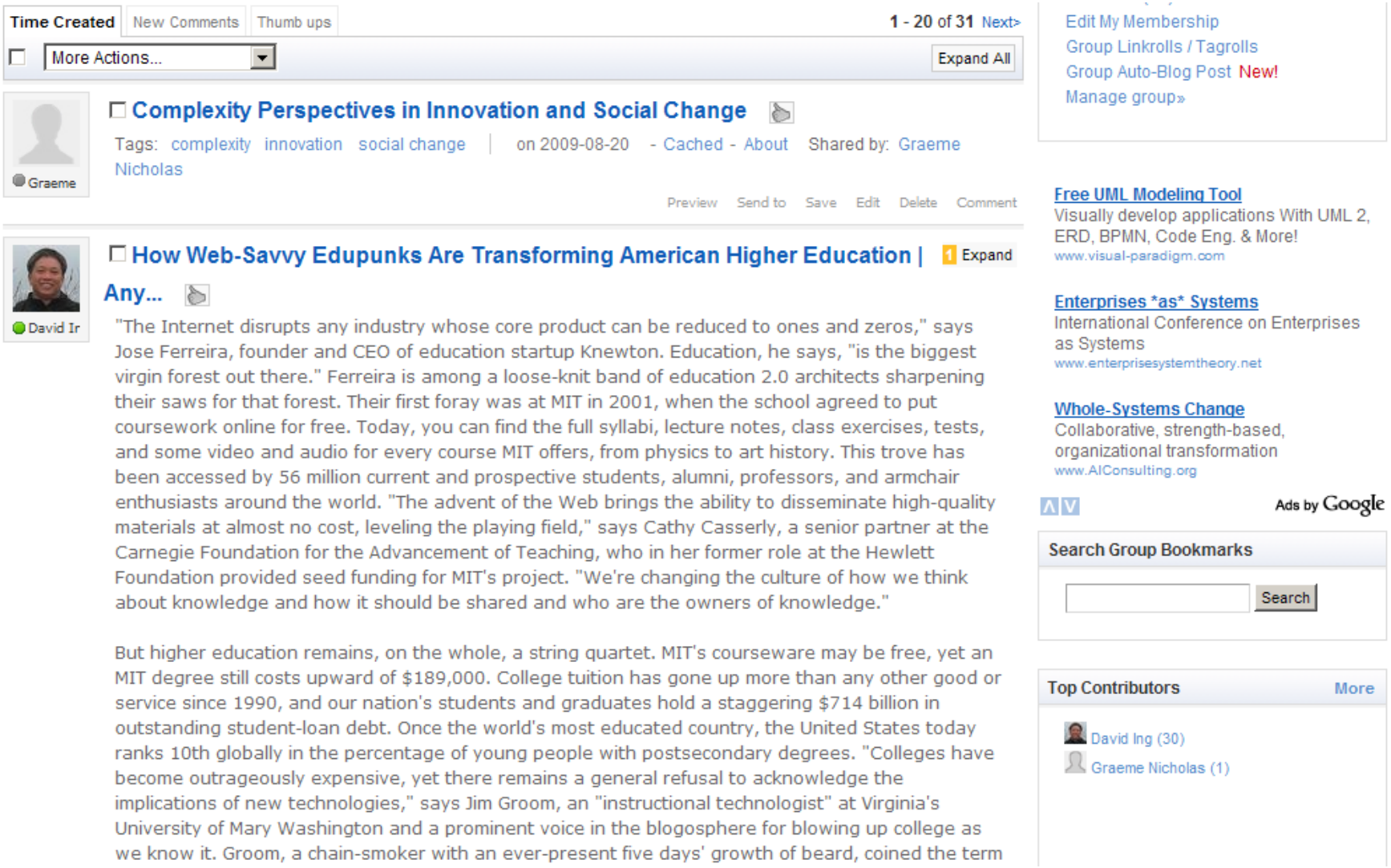
D. Service as a paradigm

E. A smarter planet

F. Artifacts / feeds to follow

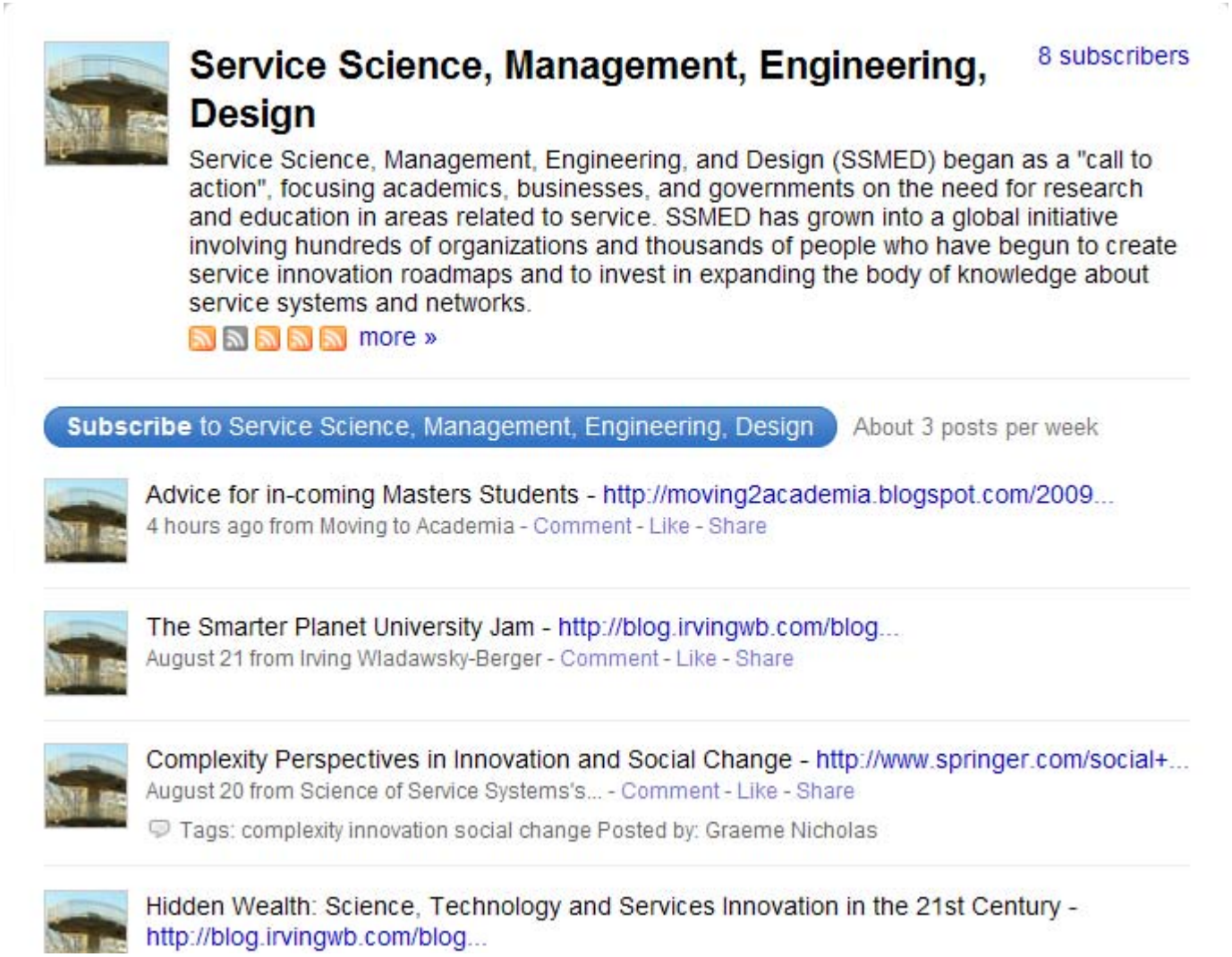
Artifacts: (public/web) social bookmarking

http://groups.diigo.com/groups/science-of-service-systems



Artifacts: (public/web) news feed

http://friendfeed.com/ssmed



Coevolving Innovations

... in Business Organizations and Information Technologies

Extending the legacy of social ecology into an emerging science of service systems

0

Posted on September 08, 2009 by davidingI've been approaching the development of an emerging science of service systems from a background of the systems sciences. Describing and designing service systems — not only in business, but also in the public sector — includes the evolution and development both of human organization and of technology. A large body of knowledge on *social systems science* was developed in the post-war industrial age, e.g. research conducted by the Tavistock Institute of Human Relations (1941-1989). This work has been categorized in three perspectives:

- the socio-psychological perspective;
- the socio-technical perspective; and
- the socio-ecological perspective.

The socio-ecological perspective emerged while facing cases where "von Bertalanffy's concept of open systems" was not sufficient to deal with the degree of change in the environment.

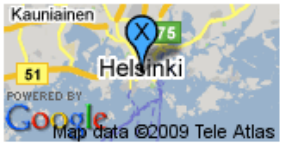
> We gradually realized that if we were usefully to contribute to the problems that faced the cases mentioned above we had to extend our theoretical framework. In particular, we had to discard the assumption that systems or individuals could not know their environments and the unipolar focus on the system, or individual as system. In a positive sense we had to theorize about the evolution of the environment and the consequences of this evolution for the constituent systems. (Emery 1997, pp. 38-39)

In 1967, Fred Emery summarized needs that the social sciences should have prepared to meet over the next thirty years. More than a decade beyond that, we now have the Internet, globalization, and the prospect of an instrumented, interconnected and intelligent "smarter planet".

The bridge in social ecology from the Tavistock legacy to current times is made in the 2008

Where is David?

checked in about 23 hours ago



Status

daviding posted a text message @ Annankatu 16 talked with Johan about service systems and smarter planet. Chilling to beat jet lag. (Helsinki, Monday)

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