Služby – nová specializace v praxi a ve výuce

SSME - Service – Science, Management and Engineering = služby –věda, řízení a realizace

Jaroslav Zelený, IBM ČR,
16.09.2009

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Osnova

- **Co je SSME, příčiny vzniku**
- **Současné aktivity**
  - v USA
  - v Evropě
  - v ČR
- **Studijní program pro univerzity**

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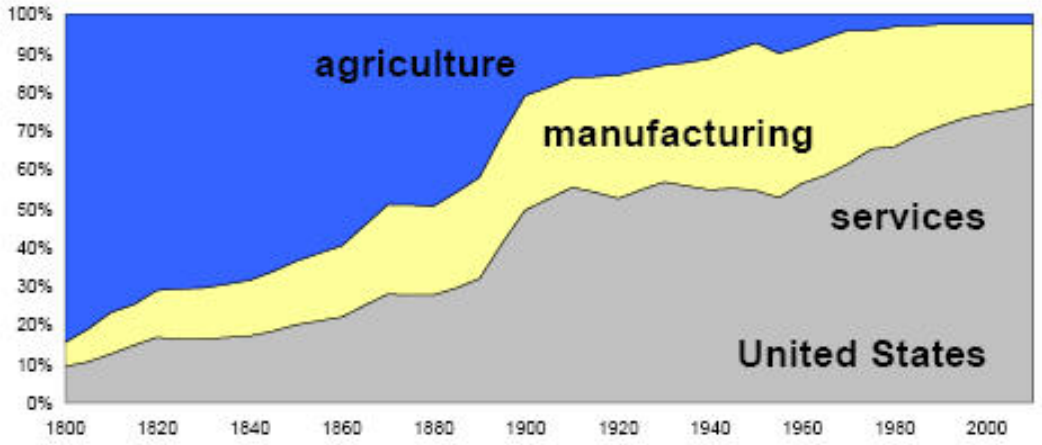
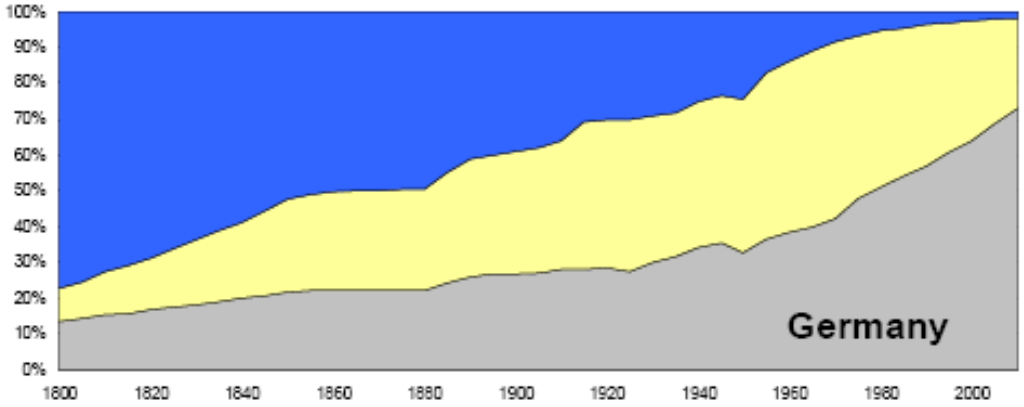
Národní ekonomiky





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IT – typický příklad oboru se zvýšeným charakterem služeb

- **IT přestává být specifickým prostředkem, stává se univerzálním nástrojem, službou, která realizuje stále širší škálu potřeb lidské společnosti , jak jednotlivců, tak organizací.**
- **Uživatel již většinou ani neví, nebo jen tuší, že službu realizuje IT (ITC)**
- **Výsledkem je, že stále více IT specialistů pracuje v této oblasti, klesají požadavky na existující specializace, ale vznikají požadavky na zcela nové,související s charakterem služby**

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- **Problémem ale je, že potřebná specializace dosud neexistovala !!!!**

Snahy po jejím zavedení vedly k vytvoření SSME – Service – Science, Management and Engineering (and Design – SSMED)

Definice: ?!?

SSME je multidisciplinární použití vědy, managementu a inženýrských disciplin se zaměřením na služby.

Úlohou SSME je studium servisních systémů, jejich návrhu, struktury, procesů a reálných dat s cílem zvýšit produktivitu služeb, jejich kvalitu, snížit existující rizika, zajistit inovaci a uplatnění v ekonomice.

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Kdo by se měl na této aktivitě podílet:

- Univerzity – výzkum, výuka
- Uživatelé služeb - zadání, kontrola, zpětná vazba
- Poskytovatelé služeb – racionalizace procesů, pochopení požadavků uživatelů, nabídka od produktů ke službám

Konkrétní výstupy:

- Učební osnovy
- Výzkum a jeho závěry

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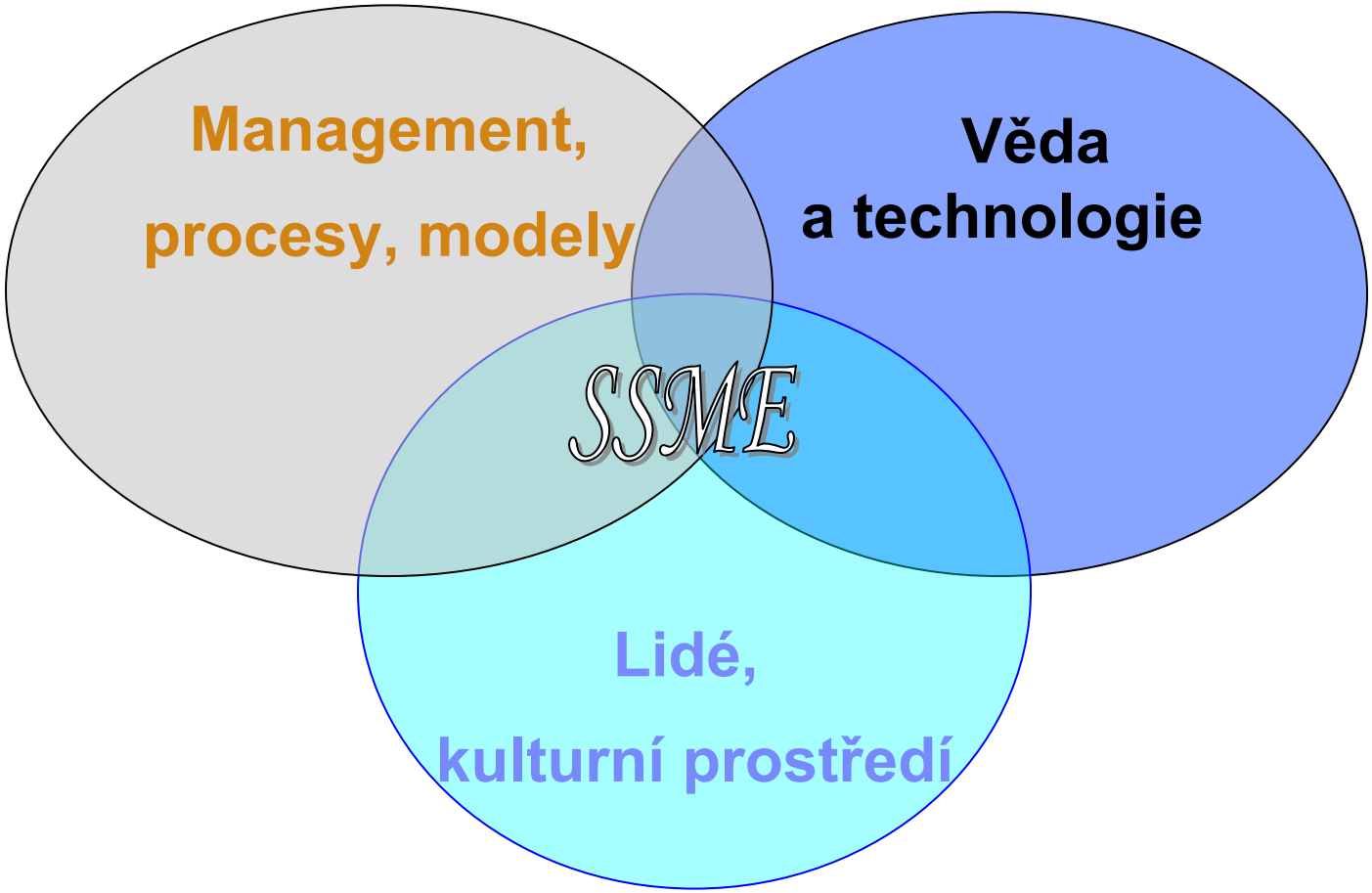
Multidisciplinární prostředí



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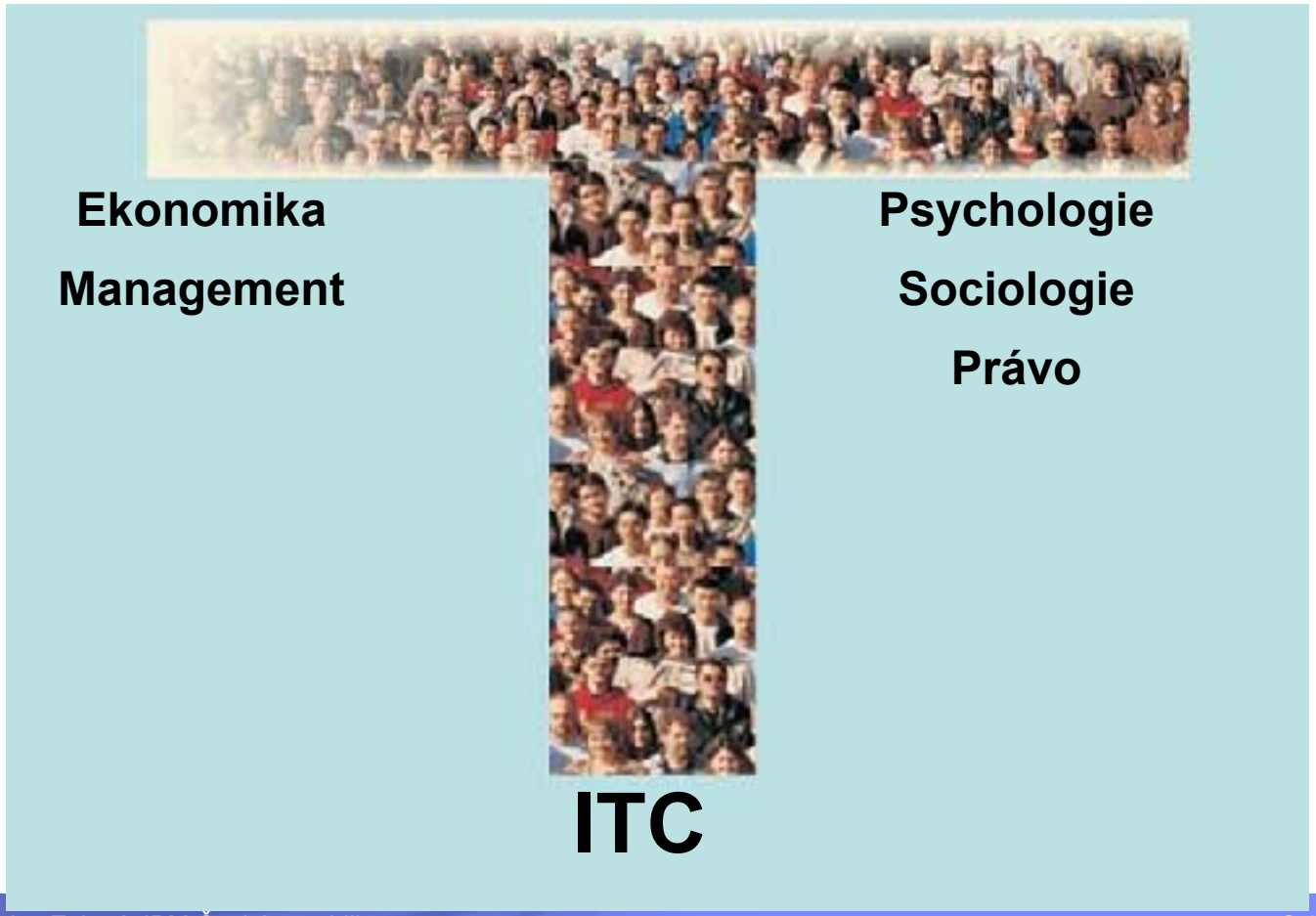
- **Specialisté na služby musí být konkrétní realizací známých pohádkových osobností Dlouhý, Široký a Bystrozraký – široké znalosti z mnoha disciplin, hluboké v minimálně v jedné a kvalitní.**
- **V anglické terminologii tzv. T- shaped people**



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Service Science
Discipline Classification System

A. General
1. Service Science Education
2. Research in Service Science
3. Service Science Policy
4. History of Services
5. Case Studies
6. Miscellaneous

B. Service Foundations
1. Service Theory
2. Service Philosophy
3. Economics of Services
4. Theoretical Models of Services
5. Mathematical Models of Services
6. Service Complexity Theory
7. Service Innovation Theory
8. Service Foundations Education

C. Service Engineering
1. Service Engineering Theory
2. Service Operations
3. Service Standards
4. Service Optimization
5. Service Systems Engineering
6. Service Supply Chains
7. Service Engineering Management
8. Service Systems Performance
9. Service Quality Engineering
10. New Services Engineering
11. Computer Services
12. Information Technology Services
13. Service Engineering Education

D. Service Management
1. Service Marketing
2. Service Operations
3. Service Management
4. Service Lifecycle
5. Service Innovation Management
6. Service Quality
7. Human Resources Management
8. Customer Relationship Management
9. Services Sourcing
10. Services Law
11. Globalization of Services
12. Service Business Education

E. Human Aspects of Services
1. Service Systems Evolution
2. Behavioral Models of Services
3. Decision Making in Services
4. People in Service Systems
5. Organizational Change in Services
6. Social Aspects of Services
7. Cognitive Aspects of Services
8. Customer Psychology
9. Education in Human Aspects of Services

F. Service Design
1. Service Design Theory
2. Service Design Methodology
3. Service Representation
4. Aesthetics of Services
5. Service Design Education

G.Service Arts
1. Service Arts Theory
2. Traditional Service Arts
3. Performance Arts
4. History of Service Arts
5. Service Arts Education

H.Service Industries*
1. The Service Industry
2. Utilities
3. Wholesale Trade
4. Retail Trade
5. Transportation and Warehousing
6. Information Services
7. Finance and Insurance
8. Real Estate and Rental
9. Professional and Technical Services
10. Management Services
11. Administrative and Support Services
12. Educational Services
13. Health Care and Social Assistance
14. Arts, Entertainment, and Recreation
15. Accommodation and Food Services
16. Public Administration Services
17. Other Service Industries

** service industries based on NAICS 07*

Claudio Pinhanez, Paul Kontogiorgis, IBM
Presented at 2008 Frontiers in Services,
October 5-7, 2008.

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Konkrétní aktivity:

- Zejména v oblasti IT. Důvod – největší nárůst v oblasti služeb.
- Ale nejen v IT – hlavně v oblasti managementu
- Více jak 250 univerzit v 50 zemích světa nabízí kurzy SSME
- Je vyhlášeno 102 studijních programů, 88 magisterských, 14 bakalářských
- Bylo založeno 24 výzkumných center SSME

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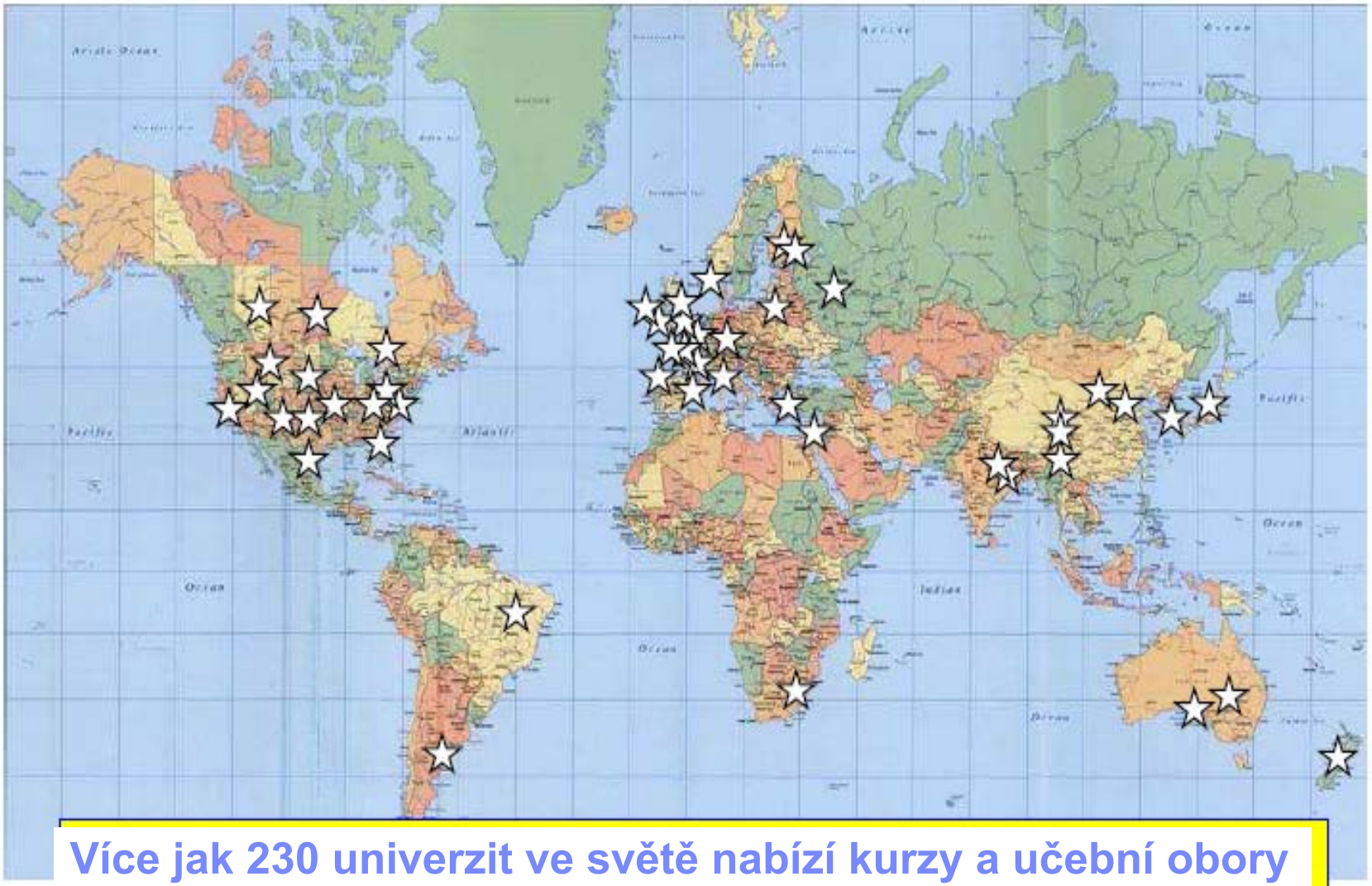

Více jak 230 univerzit ve světě nabízí kurzy a učební obory SSME

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Open SSME Website – ibm.com/university/ssme

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USA

- **univerzity:**
  - Bakalářské studium
  - Magisterské studium
  - Doktorandské studium

  UC Berkeley, North Carolina State University, Michigan Technological University

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SSME at UC Berkeley, School of Information

http://isd.ischool.berkeley.edu/ *(http://ssme.berkeley.edu/)*

- **Course: Information System and Service Design: Strategy, Models, and Methods** http://courses.ischool.berkeley.edu/i290-1/f08/ISD-Fall2008-Syllabus.html
- **Paper: Designing a service science discipline with discipline, R.J. Glushko**
  http://www.research.ibm.com/journal/sj/471/glushko.pdf

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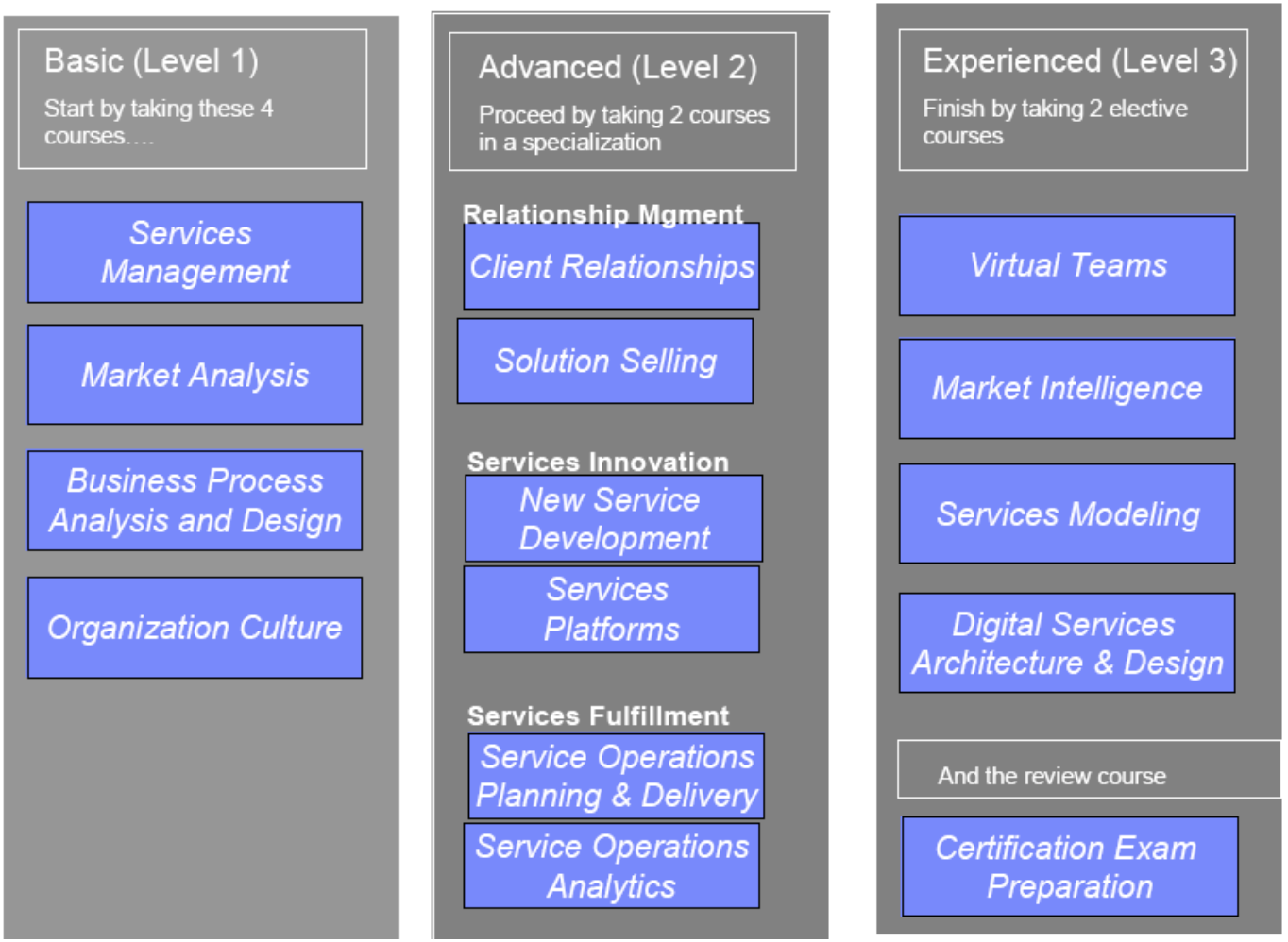
SSME at North Carolina State University

http://www.ssme.ncsu.edu/



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Michigan Technological University, College of Engineering

Service Systems Engineering - http://www.sse.mtu.edu/

- NSF funding to develop new undergraduate curriculum
  - aimed at satisfying the engineering needs of the service economy

- Eight new courses
  - World of Service Systems Engineering
  - Service System Design and Dynamics
  - Analysis and Design of Web-based Services
  - Human Influences on Service Systems
  - Service System Operations
  - Optimization and Adaptive Decision Making
  - Project Planning and Management for Engineers
  - Managing Risk

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SRII - Service Research and Innovation Initiative → SRIC - Service Research and Innovation Community

http://forums.thesrii.org/

- SRII announced March 2007
- Consortium of technology companies, government agencies and universities dedicated to fostering advancements in service research
- SRIC - Interest areas
  - Customers & Markets
  - Service Operations and Excellence
  - Service Business Strategy and Governance
  - Government and University Programs

Founding partners

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Podpora ze strany státu .

The U.S. National Innovation Investment Act

- US House and Senate voted to approve on August 2nd,, 2007; President has signed.

- ***SEC. 1106. STUDY OF SERVICE SCIENCE.***
  - *(a) Sense of Congress- It is the sense of Congress that, in order to strengthen the competitiveness of United States enterprises and institutions and to prepare the people of the United States for high-wage, high-skill employment, the Federal Government should* ***better understand and respond strategically to the emerging management and learning discipline known as service science.***
  - *(b) Study- Not later than 270 days after the date of enactment of this Act, the Director of the Office of Science and Technology Policy, through the National Academy of Sciences, shall conduct a study and report to Congress regarding how the Federal Government should support, through research, education, and training, the emerging management and learning discipline known as service science.*
  - *(c) Outside Resources- In conducting the study under subsection (b), the National Academy of Sciences shall consult with leaders from 2- and 4-year institutions of higher education, as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)), leaders from corporations, and other relevant parties.*
  - *(d) Service Science Defined- In this section, the term `service science' means curricula, training, and research programs that are designed to teach individuals to apply scientific, engineering, and management disciplines that integrate elements of computer science, operations research, industrial engineering, business strategy, management sciences, and social and legal sciences, in order to encourage innovation in how organizations create value for customers and shareholders that could not be achieved through such disciplines working in isolation.*

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Evropa

Univerzity – rozsáhlá podpora, snahy o multidisciplinární program mezi fakultami nebo i školami

Průmysl – snahy po inovaci služeb, spolupráce s univerzitami, zaměření od produktů ke službám

Státní podpora – granty na kurzy a studijní obory, na výzkum

EU Framework Program FP7 – služby jako výzkumný program

Snaha po založení evropské verze SRI

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Univerzity – program se intenzivně rozbíhá

- **Portugalsko –** Porto, Lisabon
- **Italie** , Francie, Finsko,Nizozemí, Belgie, Španělsko
- **Německo** - Karlsruhe
- **VB –** SSMEnetUK www.ssmenetuk.org 5 členů**,** **Manchester** - Warwick, Sussex, Leeds
- **Maďarsko –** University of West Hungary
- Rumunsko, Turecko, Rusko

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Konsorcia, vládní podpory

- **NESSI- Networked European Software and Services Initiative**
  - konzorcium, iniciativa EPT - European Technology Platform, sponzorované European Commission
  - přes 300 členů, SAP, Siemens,IBM, HP, Nokia,Telecom, Telefonica atd.
  - www.nessi-europe.com
- **UK EPSRC** – Engineering and Physical Sciences Research Council – vládní grantová agentura SSME v UK
  - SSMEnet UK – www.ssmenetuk.org
  - www.ssmenetuk.org/netactivity.asp

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Services research programs in Germany

- Programs funded by the German Federal Ministry of Education and Research (BMBF)
  - **Services for the 21st Century** initiative - http://www.dl2100.de/
  - **Innovation through Services** research program announced in March 2006 (70M EUR over 4 years)
  - Workshop series "**Innovative Dienstleistungen auf dem Weg zur Weltspitze**"– 8 themes covering different service sectors (Sept. 2007 – Feb. 2008)
  - ….
- Service research at Fraunhofer Institute for Industrial Engineering (Fraunhofer-Institut für Arbeitswirtschaft und Organisation IAO)
  - Service Competence, Service Performance, Service Engineering
  - http://www.dienstleistung.iao.fhg.de/english/profile.htm
- Service curricula and research programs at many German universities
- First International Symposium on Services Science being organized by Leipzig University, March 23-25, 2009 - http://isss.uni-leipzig.de/

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SSME in Finland

- **Serve** - Innovative Services Programme 2006-2010 funded by Tekes (Finish Funding Agency for Technology and Innovation) http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/Serve/en/etusivu.html
- **Innovation University** announced in May 2008
  - Brings together the Helsinki University of Technology (HUT), Helsinki School of Economics (HSE) and the Helsinki University of Arts and Design
  - Three 'factories' defined to carry multidisciplinary program leveraging the skills of the three original universities – Design Factory, Media Factory and
  - **Service Factory** with Living Labs service paradigm
- Helsinki School of Economics, Master's program in Information and Service Management - http://www.hse.fi/EN/education/programs/p_21/ismi/
- **BestServ Forum** – an innovation forum for industry and research for facilitating profitable growth through services - http://www.bestserv.fi/

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University of Porto, Portugal - Faculty of Engineering (FEUP)

- Master in Engineering of Services and Management
  - approved by the Portuguese Ministry of Education in early 2007, started in September 2007 - http://www.fe.up.pt/mesg

1st Year

1st Semester

Management
- **Business Process Modeling**
- **Information Systems**
- **Organizational Behavior**
- **Decision Support Systems**
- **Human-Computer Interaction**
- **Data Base Systems and Information Management**
- **Creativity**

2nd Semester

Service Operations Management and Logistics
- **Services Marketing**
- **Accounting and Financial Management**
- **Requirements Engineering for Services**
- **Multimedia and New Services**
- **Human Resources Management**
- **Cognitive Psychology**
- **Introduction to Research Project I**

2nd Year

1st Semester

New Service Development and Design
- **Information Systems Architecture**
- **Capital Budgeting**
- **Enterprise Management Architecture**
- **Corporate Strategy**
- **Customer Relationship Management**
- **Project Management Laboratory**
- **E-Business Technologies**
- **Introduction to Research Project II**

2nd Semester

Dissertation – Research or Internship Project

Study plan from http://gnomo.fe.up.pt/~mesg/studyplan.html

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U nás

- **Přednášky na univerzitách** – MUNI FI, VUT Brno FIT, VŠE, Technická univerzita Liberec
- **Podpora od IBM**
- **FI MUNI**, studijní obor, první mezinárodní pracovní seminář, http://kirlab.fi.muni.cz/en:ssme
- **Jednotlivé aktivity** , nekoordinované navzájem, jen přes IBM
- Odborná sekce při ČSSI (webová stránka http://ssme-cz.blogspot.com/ ale není aktualizována)

Celosvětové konference a pracovní semináře

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Příležitost pro univerzity a pro studenty

- Perspektivní obor
- Výchozí znalosti
- Přechod na moderní formy spolupráce mezi katedrami, fakultami
- Rozsáhlé možnosti mezinárodní spolupráce
- **Podpora IBM** – spolupráce, grant pro zavedení výuky

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DODATKY

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Example References

Computer Science

Carnegie Mellon

MichiganTech

Service Engineering

Peking University

U.PORTO

Georgia Tech

MIT

IT Service Curriculum

Missouri State University

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ

Service Marketing, Management

UNIVERSITY OF MARYLAND

TECNOLÓGICO DE MONTERREY.

ASU ARIZONA STATE UNIVERSITY

STADIA HELSINKI POLYTECHNIC

MBA SSME Concentration

NC STATE UNIVERSITY

Technology and Info Mgmt

UC SANTA CRUZ

Berkeley UNIVERSITY OF CALIFORNIA

Universität Karlsruhe (TH)
Forschungsuniversität • gegründet 1825

IT Management

BHARATIYA VIDYA BHAVAN'S
S. P. Jain Institute of Management & Research

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SSME Press

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University Response

- **More than 230 Universities in 42 countries are teaching SSME courses**
- **There are 102 degree programs in SSME worldwide**
  - 88 Masters degrees, 14 Bachelors
    - 39 Technical degrees
    - 38 Business degrees
    - 25 MIS-type degrees

- **Numerous SSME Workshops**

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Government Response

- Germany - Funded Innovation with Service
- European Union - Networked European Software and Services Initiative (NESSI)
- China – Five Year Plan in Modern Services
- Japan - Funded Service Productivity
- US NSF Service Enterprise Engineering (SEE)
- US – America COMPETES Act
- National Innovation Roadmaps - Australia, Netherlands, Korea STEP1.
- Finland's *Serve* Programme
- InSG Infocomm Singapore
- Thailand – National Science and Technology Department
- Malaysia - Innovation-led economy, IBM and 11 higher ed institutions
- Philippines - Commission on Information and Communications Technology
- Vietnam – MOU
- Egypt – MOU
- NYSTAR – NY State
- North Carolina Legislature 4/29
- Senator Richard Burr 5/19
- US Senate Committee on Commerce, Science & Transportation - Senator Inouye staff 1/7

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Industry Response:
SRII - Service Research & Innovation Initiative

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Service Research Centers - New in 2008

- Bahcesehir and Northeastern (Turkey) Universities
- Innovation University: Helsinki University of Technology (HUT)=Design Factory, Helsinki School of Economics HSE)= Service Factory and Helsinki University of Arts and Design (UAD)=Media
- India SP Jain Institute for Management SSME Center
- Karlsruhe Service Research Center
- Shanghai Research Center (Charles King, Pund-IT)
- National Tsinghua Institute for Service Science
- University of Amsterdam and the VU University Amsterdam will launch one of the first European university centers for service innovation
- University Federal de Rio de Janeiro SSME Research Group

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External Ecosystem Beyond Universities

- **SRII – Established SRIC, Grew Membership, New Conferences**
- **Center for Innovation Management Studies (CIMS) – Service Science Focus**
- **Conference Board – Service Innovation Interest**
- **American Society of Engineering Education – National Conference**
- **NESSI – SSME Workgroup**
- **Kauffman – Services Skills Initiative**
- **IEEE – SSME Skills Certification Workshop**
- **Extensive Government Involvement**

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NESSI - Topics and Working Groups

4.1	**Service-oriented utility infrastructure**
4.1.1	Service abstraction and virtualisation
4.1.2	Inherently Stable and Safe Architectures
4.2	**Service and System Engineering**
4.2.1	Service-centric systems building environments
4.2.2	Autonomic and adaptive properties of services
4.3	**Adaptive interactions**
4.3.1	Advanced human interaction with services
4.3.2	Definition and composition of user interfaces by end users
4.3.3	Human computer-mediated interaction and collaboration
4.4	**Openness**
4.4.1	New generation of Open Standards for interoperability
4.4.2	Core standards leverage
4.5	**Business process collaboration**
4.5.1	Collaborative business process management
4.5.3	Virtualisation of enterprises, new working environments
4.6	**Trust, security and dependability**
4.6.1	Widespread and large-scale deployment of Privacy Enhancing Technologies (PETs)
4.6.2	Strong identity management
4.7	**Linking technology to society**
4.7.1	Legal framework for Services
4.7.2	Understanding SME needs
4.8	**Building NESSI**
4.8.1	Poles of expertise and reference implementations
4.8.2	Requirements Gathering
4.8.3	Coordination with verticals ("Powered by NESSI")

NESSI Working Groups

- Business Process Management
- Semantic Technologies
- Service Engineering
- Services Sciences
- Service Oriented Infrastructure
- Software Engineering
- Trust, Security & Dependability
- User-Service Interaction

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Six New Service Science Books

- Service Science, Management and Engineering: Education for the 21st Century; Hefley, Bill; Murphy, Wendy (Eds.) 2008 www.springer.com/business/book/978-0-387-76577-8
- Services Science: Fundamentals, Challenges and Future Developments; Stauss, B.; Engelmann, K.; Kremer, A.; Luhn, A. (Eds.) 2008, www.springer.com/business/book/978-3-540-74487-0
- Advances in Services Innovations; Spath, Dieter; Fähnrich, Klaus-Peter (Eds.); 2007, www.springer.com/engineering/production+eng/book/978-3-540-29858-8
- Competing in a Service Economy: How to Create a Competitive Advantage Through Service Development and Innovation, Michael D. Johnson, Anders Gustafsson
- New Service Development and Innovation in the New Economy Bo Edvardsson, Anders Gustafsson, Michael D. Johnson, Bodil Sanden
- Product Development for the Service Sector: Lessons from Market Leaders by Robert G. Cooper, Scott J. Edgett

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SSME Roadmap for University Faculty

1. **Learn about Services as a Science**
   - Go to the IBM SSME website www.ibm.com/university/ssme:
     - Recommended reading list
     - SSME-related conferences
     - Course-related linkages

2. **Assess what your school is doing now in SSME-related studies and share with IBM and other universities. Identify gaps in curriculum and build SSME curriculum.**

3. **Collaborate with other Universities who are leaders in SSME research**
   - Berkley, CMU, Stanford, MIT, Oxford, Tsing Hua, NCSU, GA Tech, SJSU

4. **Participate in the SSME evolution:**
   - Champion efforts to promote SSME
   - Conduct research in various challenge areas
   - Apply for research and new curricula grants from Government and Foundations
   - Build new course curriculum for degree programs
   - Build case studies using IBM customer examples, industry studies and business issues studies
   - Post SSME curricula and courseware on IBM Academic Initiative website for collaboration
   - Engage in SSME conferences and events

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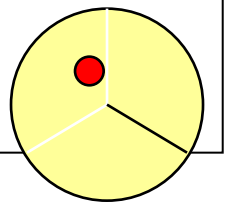
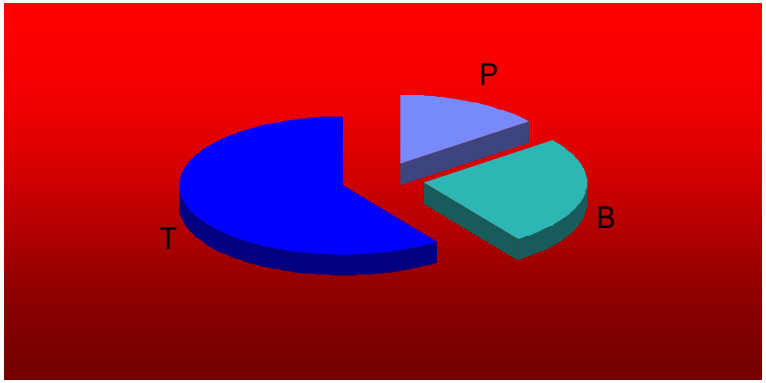
Michigan Tech, Service Systems Engineering





Human Influence in Service Systems

Operation of Service Systems

Managing Risk

Accounting, finance

Math & statistics

Engineering

MichiganTech

Undergrad

www.sse.mtu.edu/

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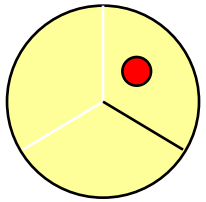
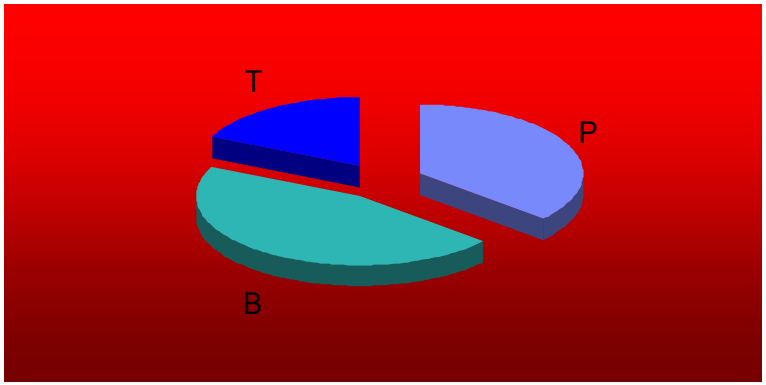
Singapore Management University
School of Information Systems, BS, ISM
Service Science & Systems concentration





Business Service science, management science

Anthropology of Services

IT Project management, IT Outsourcing, SOS

Buyer Behavior, Social Networking Analysis

Service management

Projects

SMU
SINGAPORE MANAGEMENT UNIVERSITY

Undergrad concentration www.sis.smu.edu.sg/programme/SSME/index.asp

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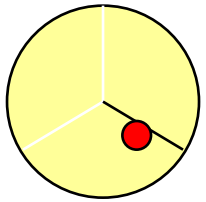
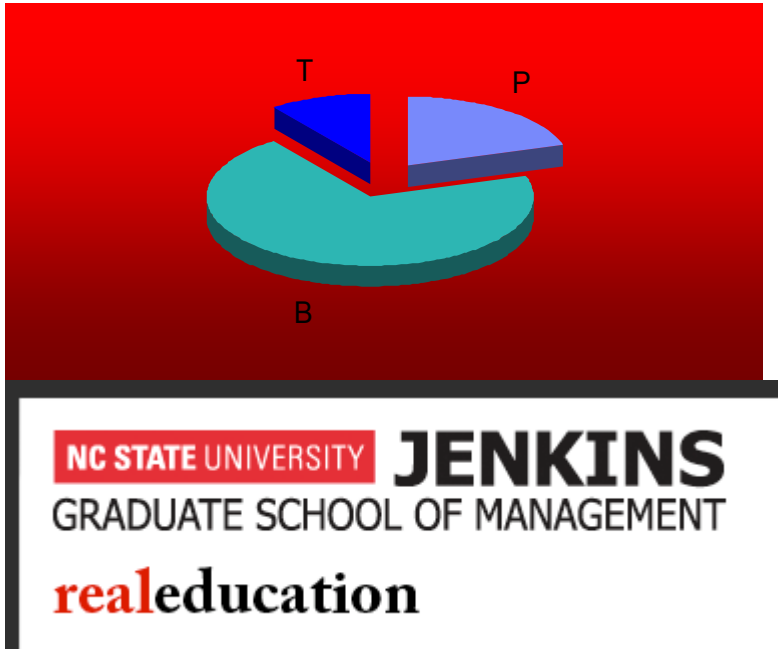
North Carolina State University MBA Services Management and Consulting Concentration





Concentration among:

Service Management

Process Analysis & Design

Organizational Culture

Design of IT Service Systems

Network Services and Systems

Relationship Management

Innovation Management

Graduate concentration

http://mgt.ncsu.edu/mba/future_students/full-time_mba/concentrations/services_about.php

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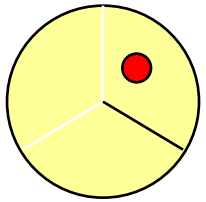
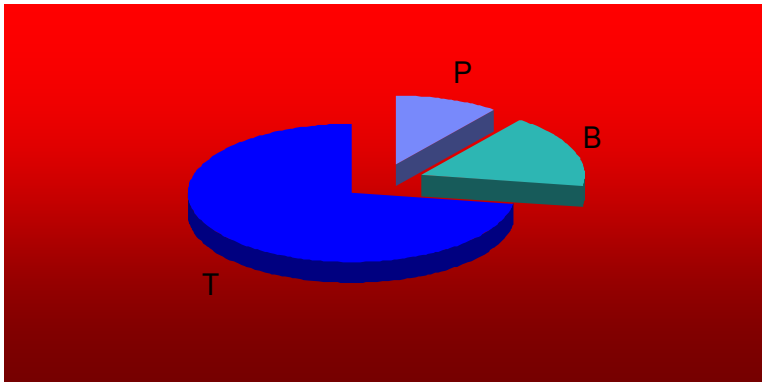
NCSU Masters in Computer Networking





Concentration among:

Service Management

Process Analysis & Design

Organizational Culture

Design of IT Service Systems

Network Services and Systems

Management of Technology

Management of People in High-Tech Organizations

Graduate concentration

http://networking.ncsu.edu/service.php

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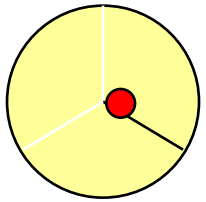
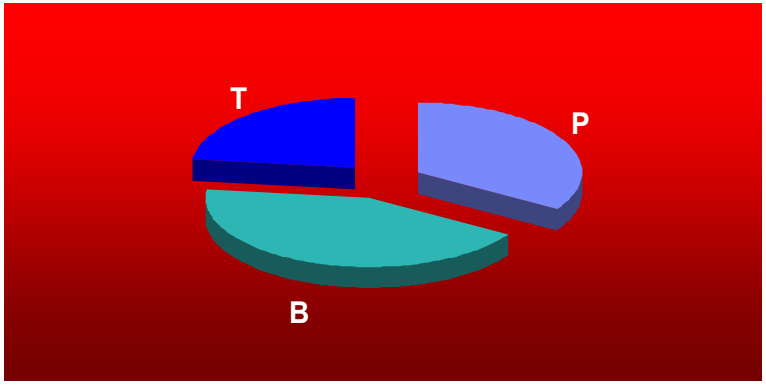
Carnegie Mellon, School of Computer Science,
MSIT-ITSM, Master Of Science
in Information Technology
in IT Service Management





IT Service Management core

Intro to service science

Service strategies

Organizational behavior

Financial management

Quantitative methods

Managing service organizations

Process & capability models

Practicum

Carnegie Mellon

Graduate http://www.servicemanagement.cs.cmu.edu

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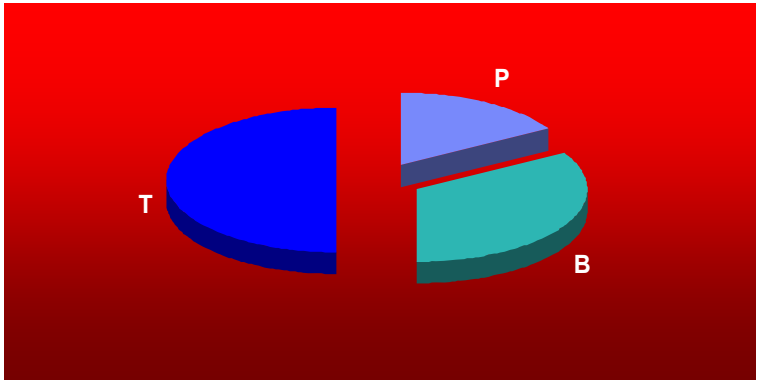
Helsinki Polytechnic Stadia
Master in Service Management



Principles of Business in services Economy and Business Research Methods

Customers, Business models and Innovations

Services in International Context

Service Leadership, Organizational Development and Teamwork

Service Delivery and Technology Architectures

Strategic Management, Intra/Interpreuership, Alliance and Venturing

STADIA
HELSINGIN AMMATTIKORKEAKOULU

Graduate http://www.hse.fi/EN/education/programs/p_21/ismi/

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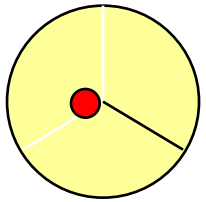
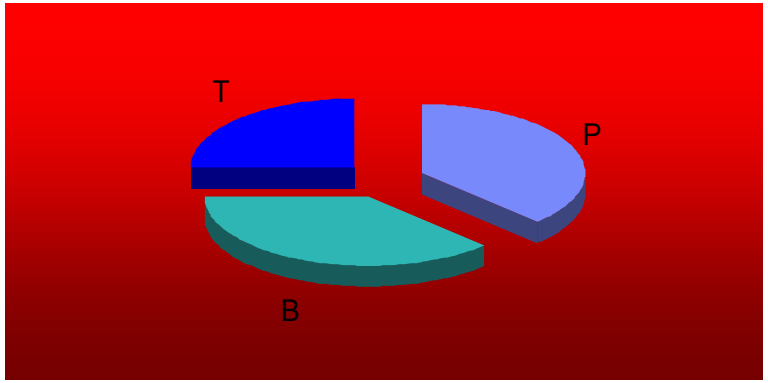
Rochester Institute of Technology
MS Service Management





- Critical service system thinking & service system development
- Service discovery, innovation and creativity
- Service performance metrics
- Learning to learn, changing our business paradigms
- Scenarios, strategic process and decision making in service environment
- Engineering service environments
- Human capital development
- Building customer experience and relationship development to obtain and retain customers.
- Service leadership

R·I·T

Graduate

http://www.rit.edu/programs/grad/colleges/cast/serv_mgmt.html

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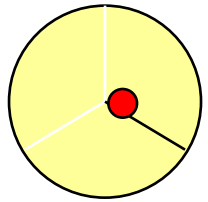
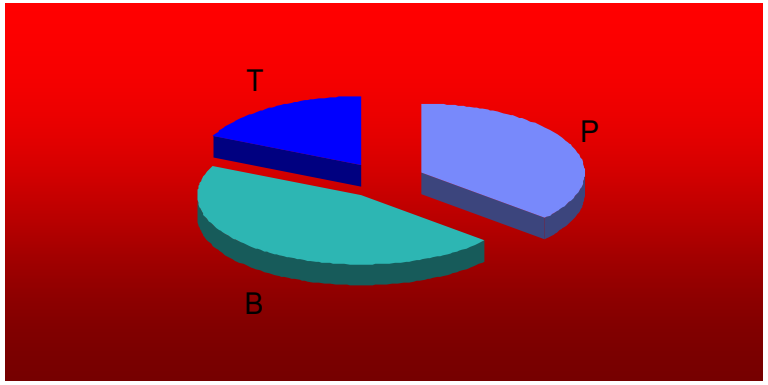
Royal Melbourne Institute of Technology, Master of Business Services Science





Business Service science, management science

Anthropology of Services

IT Project management, IT Outsourcing, SOS

Buyer Behavior, Social Networking Analysis

Service management

Projects

RMIT University

Graduate www.rmit.edu.au/programs/mc166

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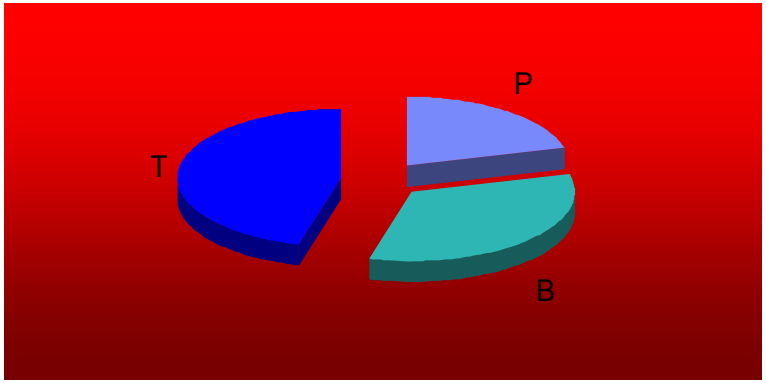
Stevens, Howe School of Technology Management, Service Management



Service segments

- Consulting
- Complex systems
- Outsourcing
- Business Process Management

Service specializations

- Supply chain
- Service development
- SOA
- Managing IT
- Knowledge Management & data mining

HOWE
School of Technology Management

Graduate

http://howe.stevens.edu/index.php?id=1420

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