Building Skills for a Smarter Planet

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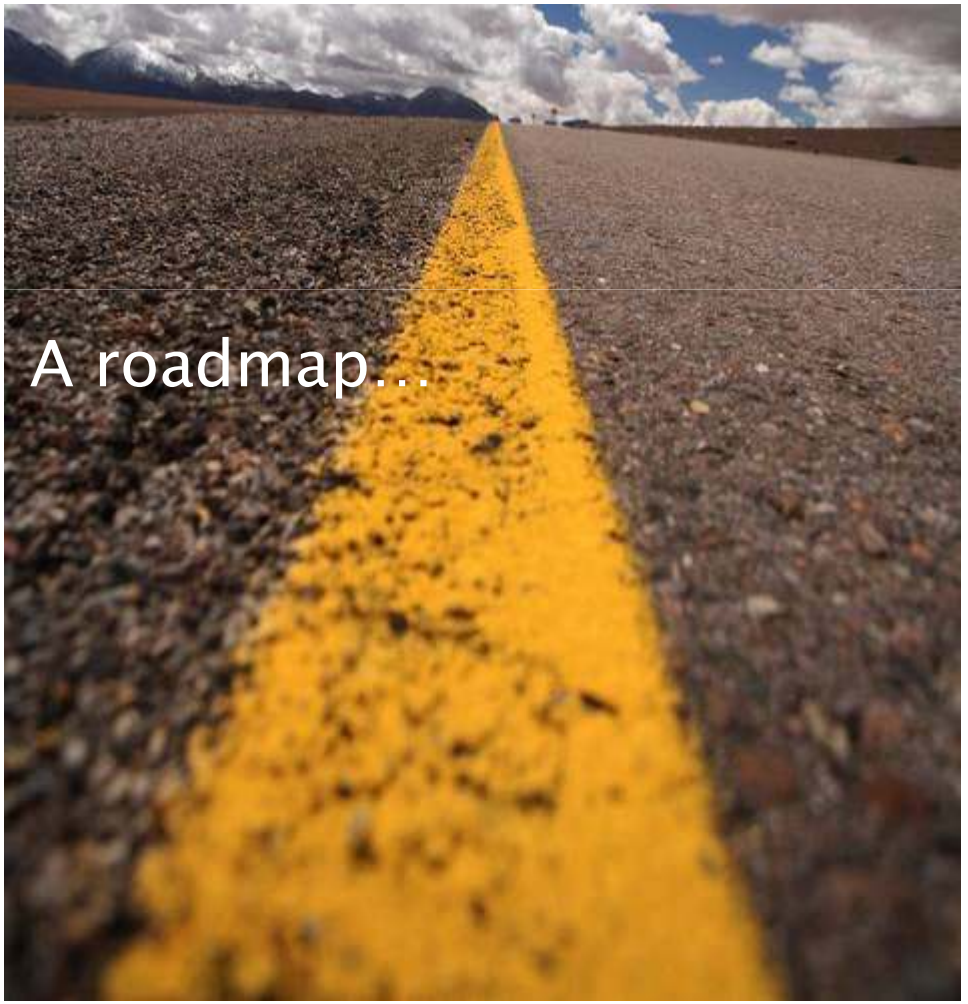
Servicii si formare de personal

Create a modern framework for training and competencies development in higher education, in the domain of **service science, design and management**.

Promote innovation in service industry, based on a model of open and continuous education and a distributed information infrastructure organized as a Cloud, with virtualized resources, accessible as services and interconnected with European structures.

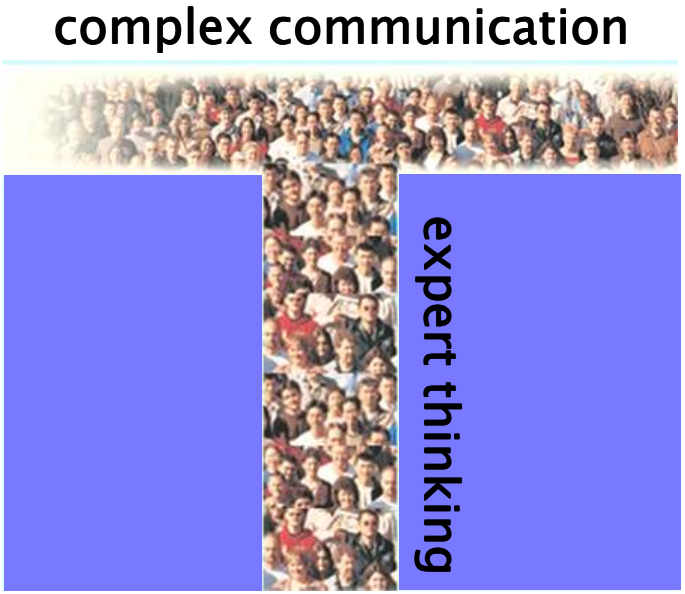
- New types of services: **knowledge** intensive, scientifically founded, computerized
- T-shaped education for service innovation
- A new science is born: **Service Science**
- Service development and **innovation** influenced by the Service Science



Service Science Skills, Abilities and Knowledge

T-shaped professionals are in high demand because they have both depth and breadth

They combine expert thinking (depth in one or more areas) and complex communications (breadth across many areas)



- Orientation towards services (processes, products, technologies)
- Service system design, management, and modeling
- Value co-creation analysis
- Service lifecycle analysis (for quality assurance)
- Service supply and demand management
- New service development
- Cross-disciplinary communication
- Business case development and analysis
- Organizational change management
- Marketing and sales
- Creative and critical thinking
- Communication skills
- Leadership and collaboration skills

Specific objectives

1. Developing an open and continuous **education model**, with a flexible institutional framework for initial formation and for maintaining competencies in conception, design, implementation, execution and management of service oriented systems.

2. Developing, implementation, accreditation [CNCIS, ACPART, ARACIS] and integration in the European higher-education system of
   - a new master program: "**Service Engineering & Management**"
   - **new educational modules for bachelor degree and master degree** for sector services: e-health, e-business, e-government, manufacturing, supply chain, telecommunications, energetics, electrical engineering and metrology.
   - a new master program: "**Service Oriented Architectures for Automatic Control and Management of Enterprises**" cu replicare multi-regionala in CPIOMS pentru servicii de fabricatie si lanturi de aprovizionare
   - **new educational modules of continuous education** in the service systems area offered to employees

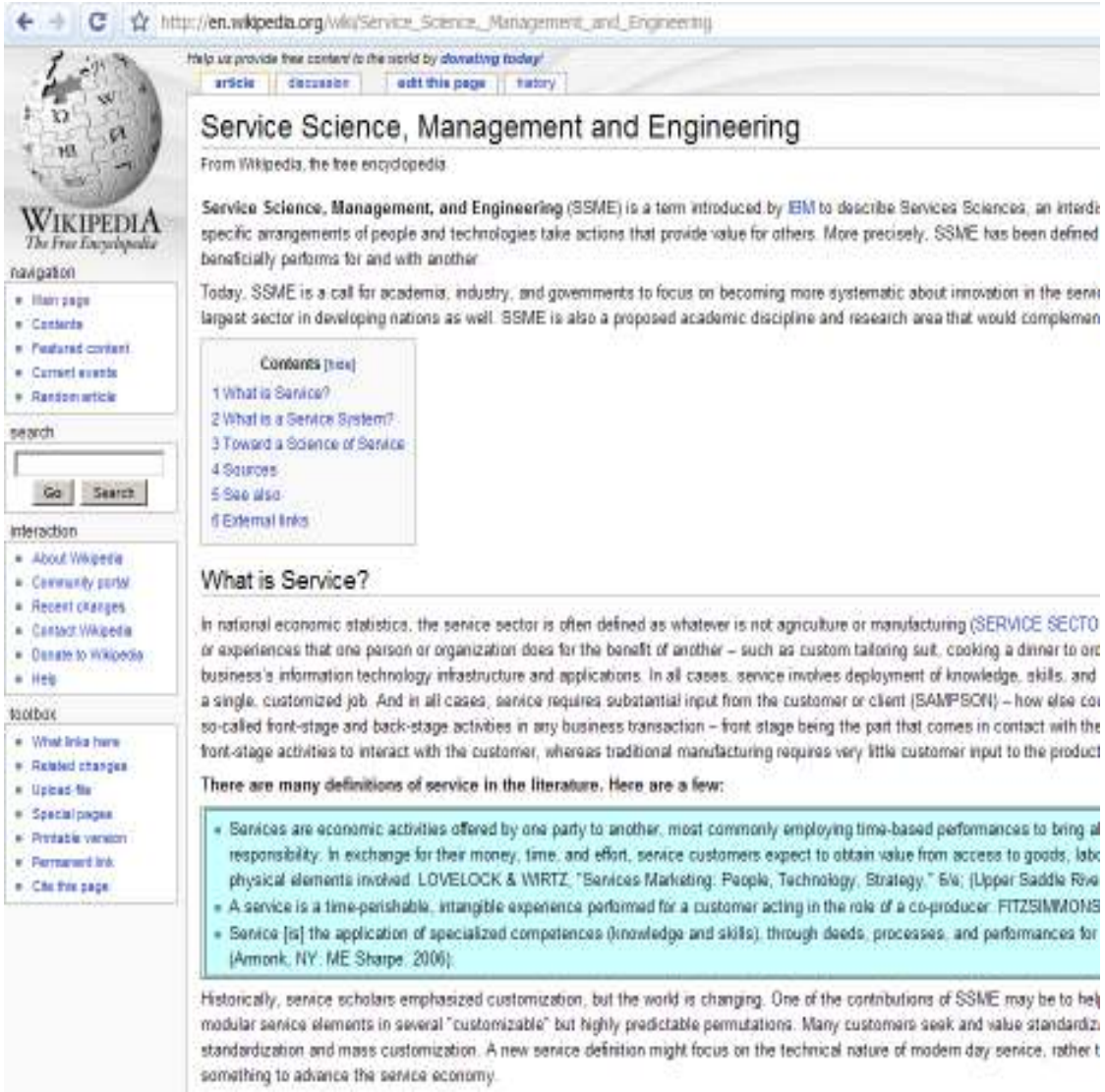
3. Realizing a **distributed information infrastructure as a Cloud with virtualized resources**, accessed as services, and a multidisciplinary e-learning platform, used for collaborative on demand learning, for documentation and sharing research and development resources/results.

4. Creating **an open, interactive and collaborative space**, INSER@SPACE for universities, industry, governmental institutions and European structures, for promoting service innovation.

Service Science, Management, and Engineering – SSME

SSME :

- A term introduced by IBM to describe *Service Science*
- An interdisciplinary approach to the *study, design, and implementation of services systems* – complex systems in *which specific arrangements of people and technologies take actions that provide value for others*.
- SSME has been defined as the application of science, management, and engineering disciplines to tasks that one organization *beneficially performs for and with another*.



SSME – a step into a new society

Today, SSME is a call for academia, industry, and governments to focus on becoming more systematic about innovation in the service sector, which is the largest sector of the economy in most industrialized nations, and is fast becoming the largest sector in developing nations as well.

SSME is also a proposed academic discipline and research area that would complement – rather than replace – the many disciplines that contribute to knowledge about service.

SSME is an action component for a Smarter Planet – increase of life quality, economic worth

Service Science – Definition

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
- social sciences
- 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.

Service Innovation

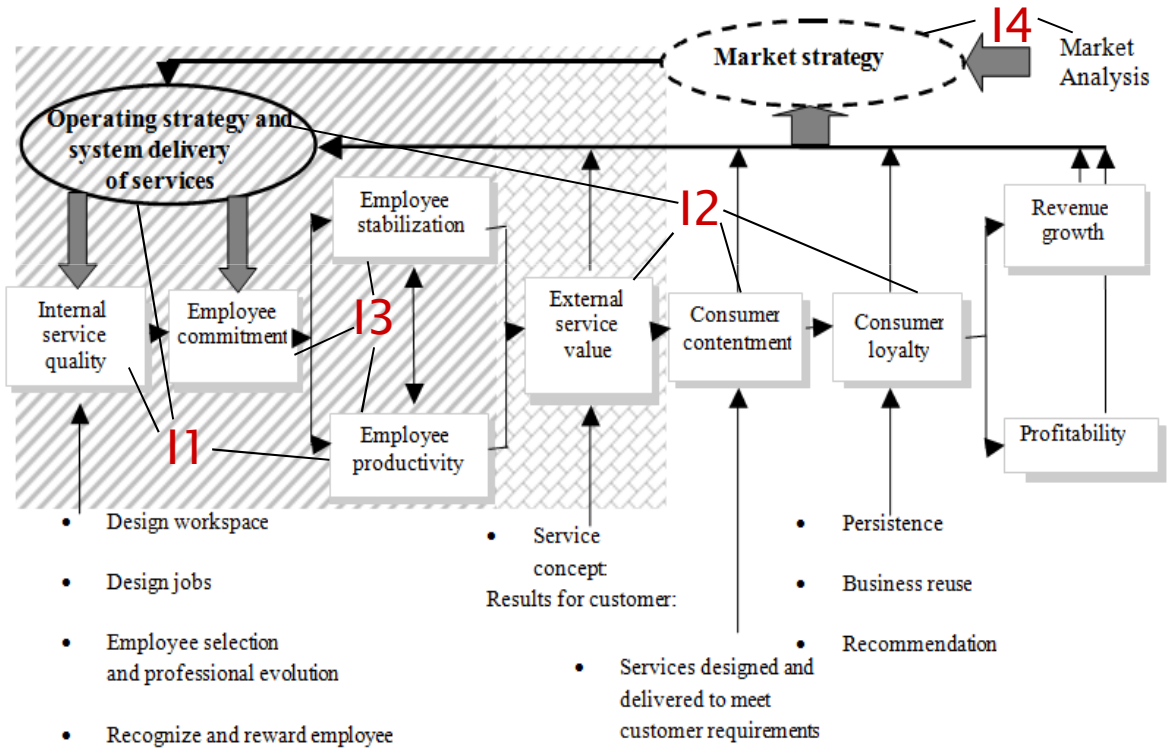
Service innovation is a combination of;

- *Technological* Innovation(I1);
- *Business Model* Innovation (I2);
- *Social Organizational* Innovation (I3), and
- *Request* Innovation (I4)

Business Model Innovation: the creation, design, offering, negotiation, implementation (update) of a *value proposition* – for the training and improvement of a service system, is provided by:

- the analysis:of (i) the client reaction (contentment, loyalty); (ii) the service profitability and of the increase in supplier's income;
- an improved (new) operational strategy
- an improved (new) service delivery system.

Service innovation purpose: the improvement of existing service systems [**incremental innovation**], or the creation of new value proposition[**new types of offerings**], or the creation of new service systems[**radical innovation**].



Profit-service chain interconnects profitability, customer satisfaction and employee satisfaction – is consistent with the dominant logic of the type service

Service Innovation

Social Organizational Innovation supports the profit-service chain that works by the following principles:

(P1) *Client loyalty* determines provider's profitability and revenue growth

(P2) *Client's contentment* stimulates client's loyalty

(P3) *Service value* [encapsulates **social organizational innovation** and **business model innovation**] assures client contentment:

(P3.1) *Employees' productivity* assures value

(P3.2) *Employees' loyalty* increases productivity

(P3.3) *Employees contentment* stimulates their loyalty

(P4) *Internal quality* [encapsulates **technological innovation**] stimulates employees contentment

(P5) *Service profitability and provider's growth*s determines internal quality service growth

Demand Innovation- related to all actions that lead to *growth* or *emergence of new markets*.

Provider's **strategy**- the way a company defines its business and interconnects the two types of resources that are truly important in today's economy:

- **knowledge system** and
- **relations system**.

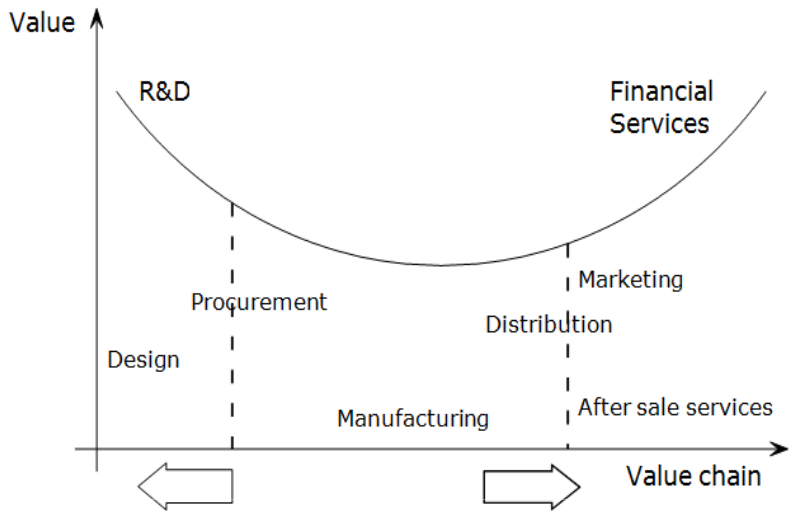
Therefore, *strategy is the art of creating value*.

Service Innovation

The major feature of services in terms of process compared to manufacturing is a deep commitment of customers.

The *current* point of view refers to the **constellation value**:

1. The strategy does not consist in positioning a fixed set of activities along a chain.
2. Strategic focus is not referred to the company [service provider] or the industry [of services].
3. The focus is on the value creation system:
   - The main task is to reconfigure the roles and relations between the players;
   - The goal is to encourage new ways and actions of creating value.
   - The target is to constantly improve the suitability degree between the skills and the clients;
4. **Strategy is a social systemic innovation**:. continuous design and redesign of complex business systems.



Value migration from manufacturing to service functions

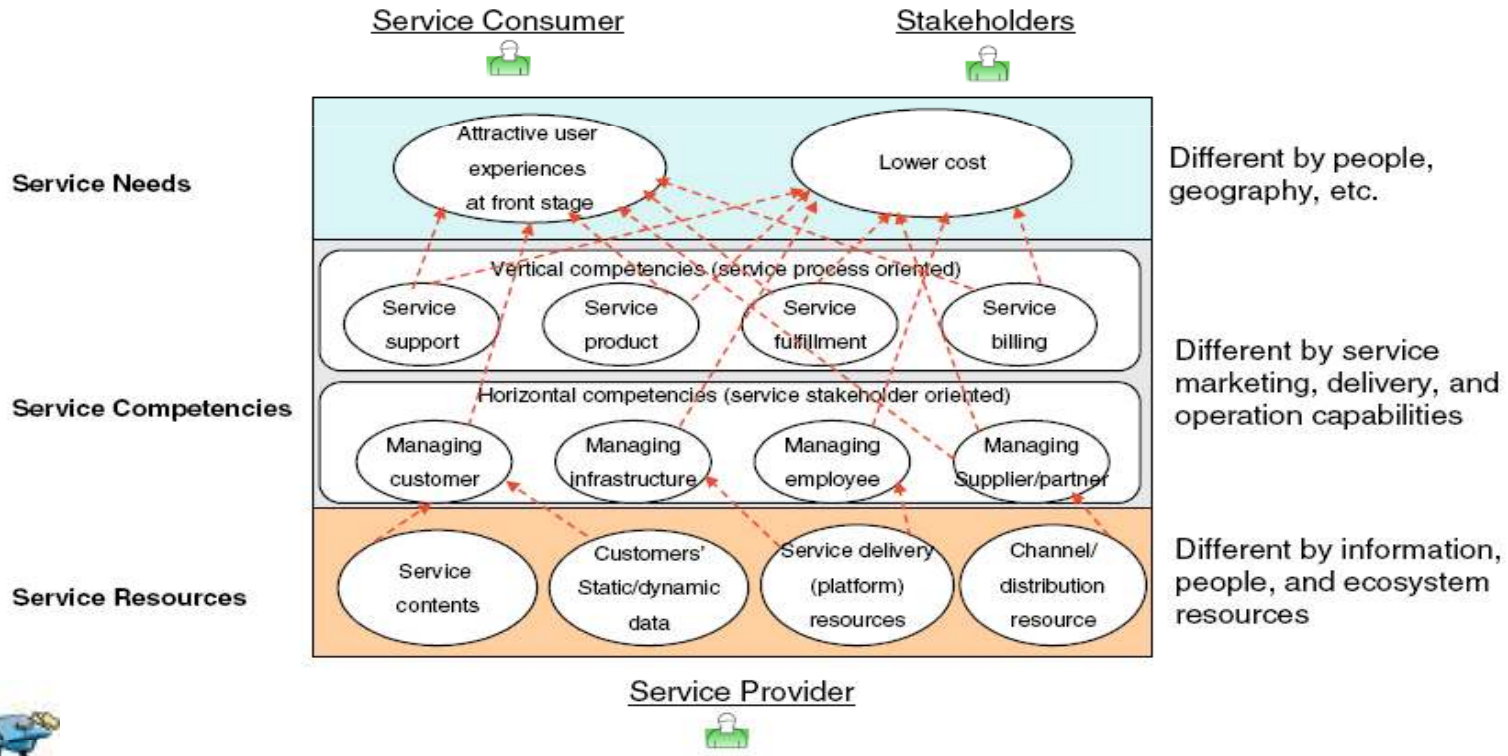
In the value chain of a company, *service*-related functions as: design, research and development (R & D), marketing, distribution and financial services *have greater value added productivity* than manufacturing.

Service Innovation

Every service has its own **lifecycle** which covers:

- *service requirements* from service consumers
- *capabilities of service providers*
- *interactions among the service roles* in a service project
- procesul de *livrare a serviciilor*;
- service *operation*

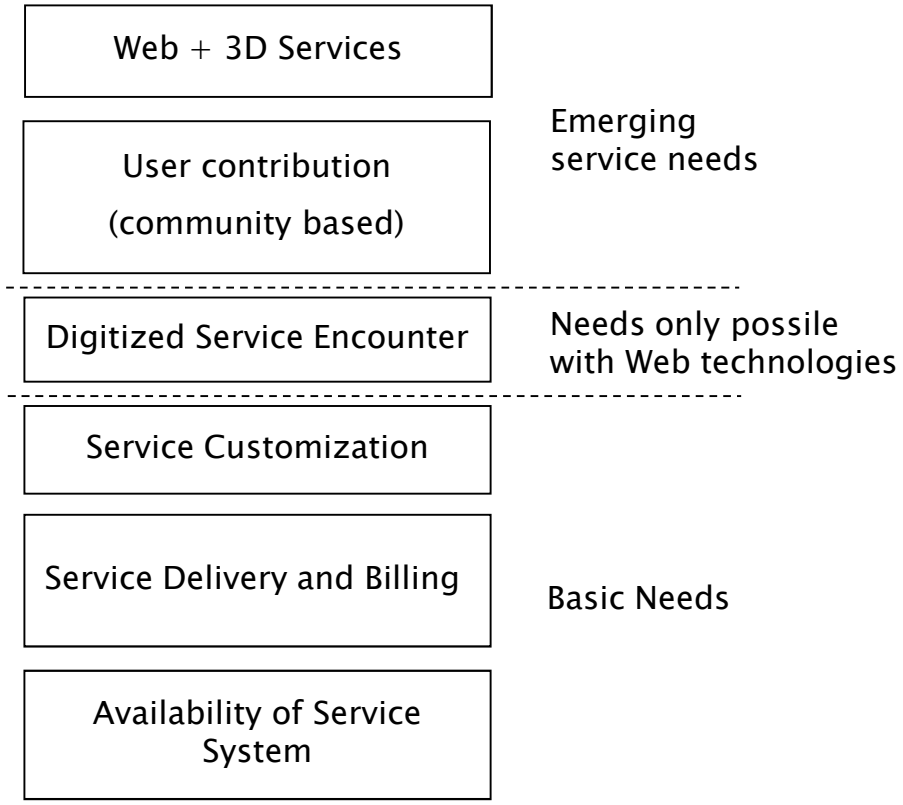
The three-layer framework for services science—service map



Service Innovation

Service needs include:

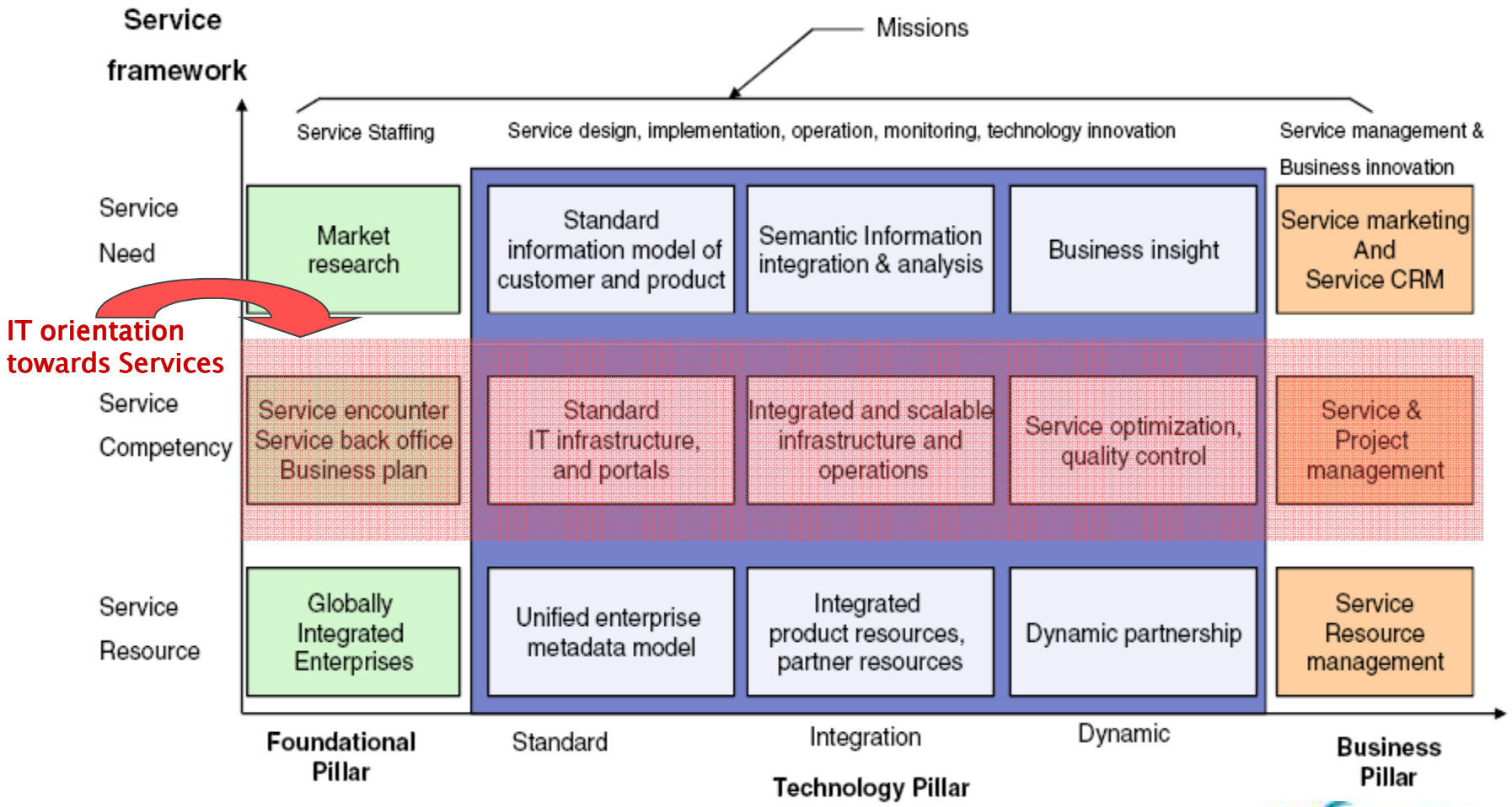
1. Basic needs: *availability of service system, service delivery and billing, service customization*
2. Needs only possible with Web technologies : *digitized service encounter*, for example using ATM machines to replace service staffs as bank tellers in the case of simple banking transactions.
3. Emerging service needs : *community based services through user contribution*, and new service types enabled by 3D/virtual services.



Service Needs Clasification

Service Innovation

Grouping of SSME curriculum based on the three-layer service framework



Innovation support for competency services: **Services Computing**

IT Support for Innovation Services

Current trends support of the process of **improving service skills** [of providing organizations] – **IT service orientation** (or *service oriented IT*) of work processes (business enterprise, citizen and business assistance in administration, healthcare in the medical system), and **service systemic** characterization, by:

1. Informatic infrastructure omnipresence intra- and inter individual organizations, and systems of organizations (de ex. government, administration, healthcare) aggregated at different levels that make services;

2. Standardization of technology (Web 2.0);

3. Service orientation of physical resources (informational agents association, process/operations characterization as services);

4. Work process representation as services, process shaping through service components and standard interconnecting them (SOA) through ESB – *Enterprise Service Bus*; Integration (through ESB; integration middleware of business services);

5. Composing services – composite services (as SOA)

6. Systemic service approach – service system

Educational Model SSME

SSME Model based on the three-layer service framework
(education courses, curriculum areas, skills)

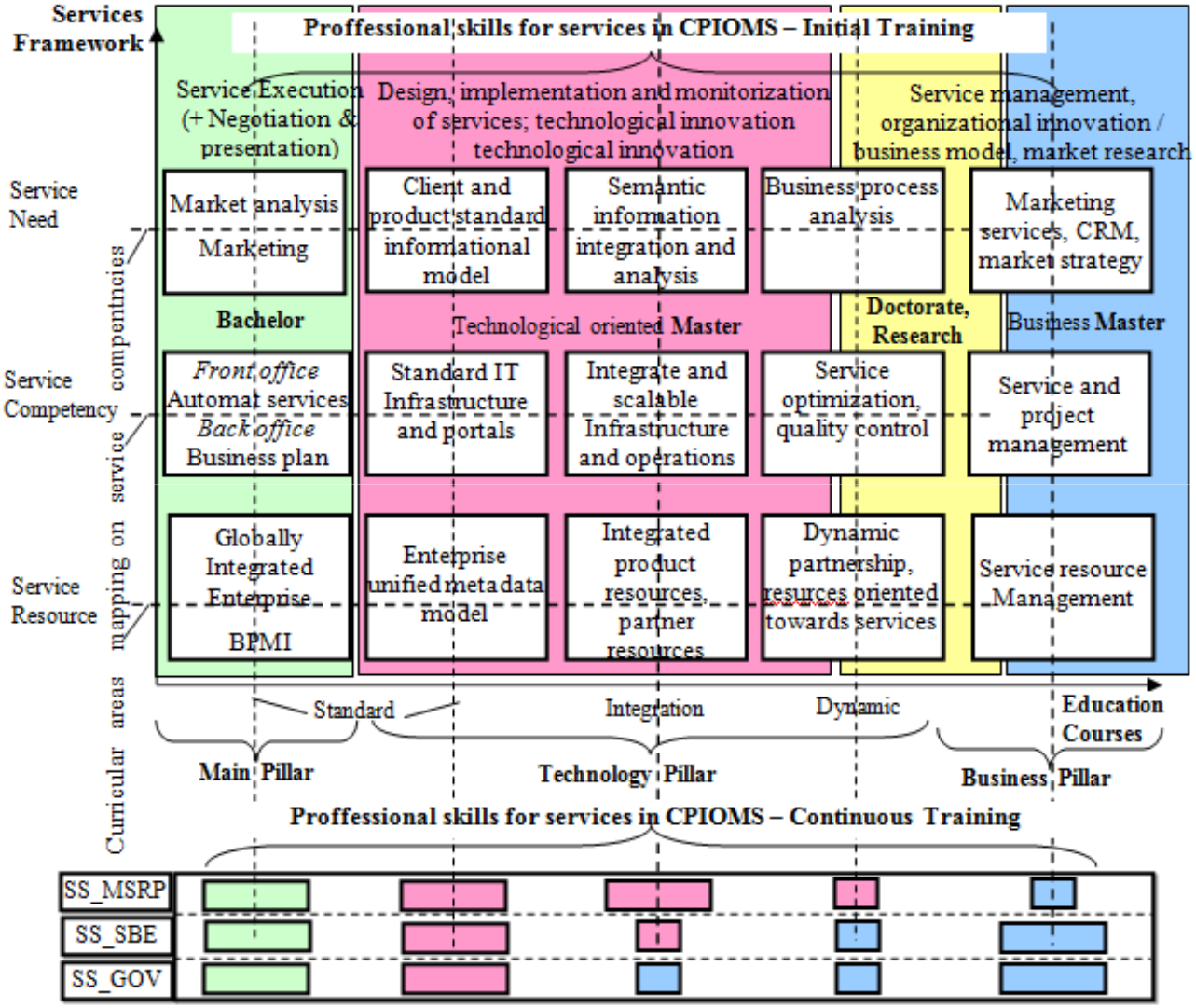
A new *fundamental domain*: **Service Sciences**?

Two new *study domains:*

- **Service Engineering**
- **Service Management**

Master Programs:

- General
- IT Oriented:
Services Computing; IT Services, Software Services
- Business Oriented:
Business Services, ...
- Sector Oriented Services:
Healthcare Services, administration, e-Gov, manufacturing, supply



Educational Model SSME

SSME Model provides professional competences in CPIOMS for service systems on the three cycles of education mapping the curricular areas on the three levels of the multilevel framework for innovation (*resources*-, *competencies* and *needs for services* [rcc_in@ser]):

1. **Bachelor** [Service Engineering/ Management] provides *competences* of performance of services(three levels overview rcc_in@ser), negotiation and presentation.

2. **Master** [IT&C oriented] provides *competences* of design, implementation and monitorization of services and competences for technological innovation for services (level of resources- and competencies for services from rcc_in@ser).

3. **Master** [Business oriented] provides *competences* of service management, organizational innovation for services, new business models, research, forecast and market strategy (levels of competencies- and requests for services from rcc_in@ser).

4. **Master** [Sector oriented services] provides *competences* of resource management to ensure training, maintenance and development of the ecosystem of services in a particular area (health, administration, manufacturing, ...) according to specific needs of that area (selectively from all the three levels of the rcc_in@ser).

Educational Model SSME

Curricular areas mapped on the competencies in CPIOMS for services are associated to the rcc_in@ser levels as follows:

1. Resources for services: resources / platforms for implementation of services; service content and performant resources; enterprise modeling; resource integration; distribution services resources / channels; resource management for services.

2. Competencies for services: processes for services (support, manufacturing, execution, delivery, billing); ERP; processes and partners integration (beneficiary management, -employees and -communication infrastructure, -suppliers, -partners, -projects, SCM, quality control).

3. Needs for services: analiza si strategii de piata, analiza proceselor de afaceri, managementul relatiilor cu clientul (CRM), managementul capitalului uman (HCM).

4. In *business oriented* master programs the following curricular areas are found: CRM, SRM, SCM, ERP, HCM, social organizational innovation, business model innovation, innovation demand.

5. In *IT oriented* master programs the following curricular areas are found: skill modeling (operations, supply, capacity, ...) for services, new technology services (web / SOA, grid, autonomic computing, cloud) service architectures (data, applications, performance) analysis, design and optimization services ; technological innovation.

Educational Model SSME

Transposing:

- The multilevel framework, organizational and technological innovation methodologies and directions in order to ensure the service requests, competencies and resources;
- The context of partnership in co-creating value through services (supplier, customer competitor, regulation authority);
- The principles and methodology of configuration, interconnecting, integration, exploration and innovation of services (people, technology, shared information, organizations) needed for services implementation,

in sets of disciplines for curricular areas, associating :

- **Service Resources** level with the following discipline set: *technologies* (platforms/resources for implementation services, distribution resources/channels), *shared information*(service content, client data), and *personnel* (resource exploitation);
- **Service Competencies** level with the discipline set related to:

  organizations: horizontal competencies for services (oriented towards staff and organizational infrastructure management);

  competitor: horizontal competencies for services (oriented towards partnership in implementing services – supplier, partner, competitor)

  supplier: vertical competencies for services (oriented towards processes and services- support for services, manufacturing, service execution, service billing)

- **Service Needs** level with the discipline set related to the *customer* (service availability, service customization, service digitized, customer/community contribution in executing a service, Web services, innovation demand, cost analysis, market analysis) and the *authority*(supplier-customer relation settlement, contractual regulation, consumer protection).

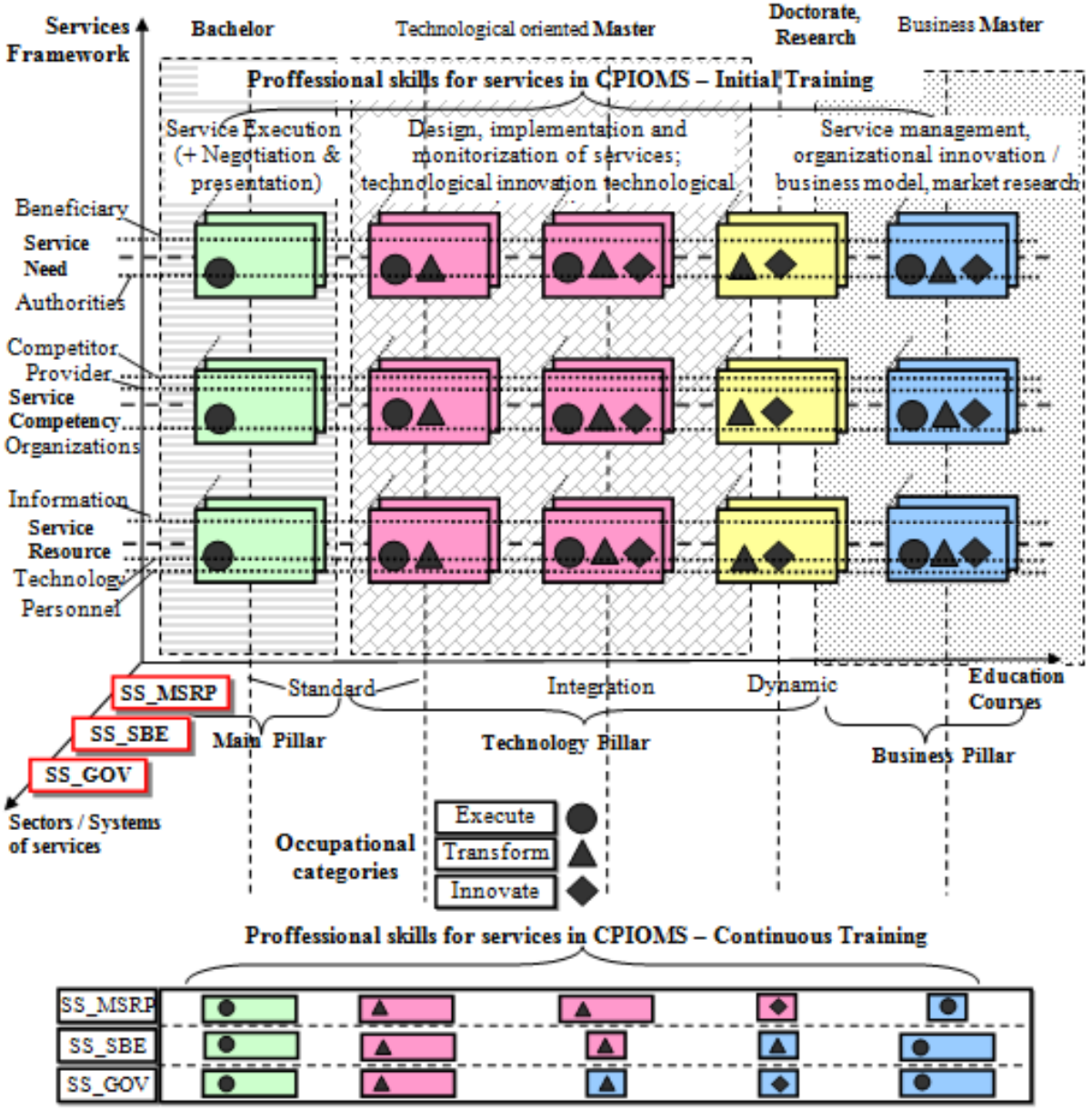
Educational Model SSME

Positioning occupations/careers in the service field

(a) **Service execution**– specialist in: execution–, presentation–, marketing– and service negotiation

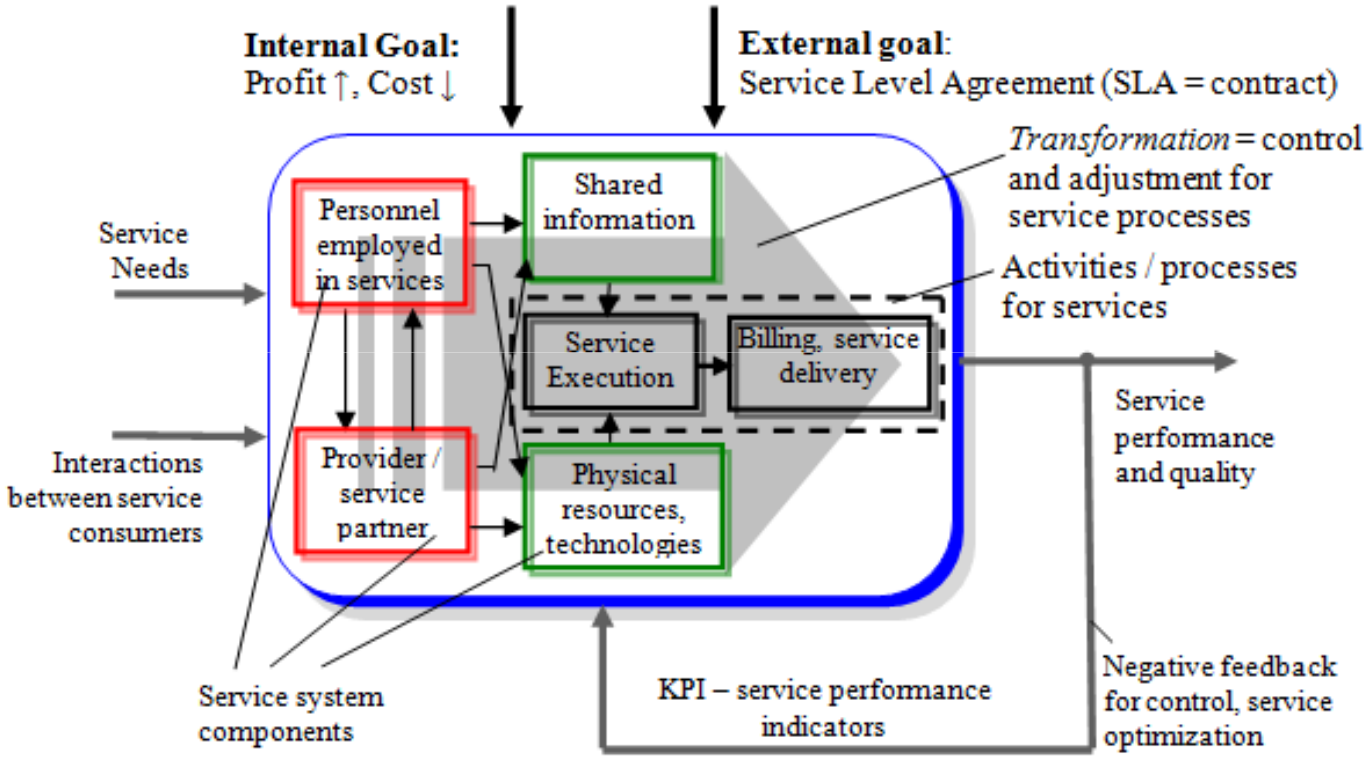
(b) **Service design, implementation and monitoring** and technological innovation – consulting, design, service management

(c) **Service management** organizational innovation and research / market strategies – research and development, expertise I system engineering services, IT architecture, marketing consulting and market strategy, entrepreneurship



Approach – Service Sytem

The educational model in services in centered on the concept of system services (SS)
supported by IT, scientifically founded by the systems theory.



Service system: I/O representation, components, control, feedback, performances

Approach – Service System

Service System (SS) concept *supported by IT, scientifically founded by the systems theory.*

SS = {Inputs, Outputs, Objectives, Changes, Components, Feedback}, having:

- *Inputs:* input information provided by service consumers needed for the SS to provide specialized and personalized services;
- *Outputs*: output provided by a service;
- *Objectives*: SS objectives as a set of predefined system requirements (internal/external);
- *Changes*: monitoring and control actions applied to SS and connections to other services;
- *Components*: main elements of the service system;
- *Feedback*: monitoring and detecting changes in the ambient environment (context) and presenting them to the system so that SS will react accordingly to provide quality services.

SS Performances:

- *Main performances*: stability, setting [value proposition, internal objectives (cost, profit) / external (service level agreement), productivity, delivery time];
- *Secondary performances*: contentment / customer loyalty, employee contentment;
- *Behavior / access performances*: observability, controllability, robustness to perturbations, sensitivity;

INSEED Project Activities

WP1. Elaborate the open and continuous education model, in the domain of service science, design and management(SSME)

WP2. Define, develop and perform a multi-regional interdisciplinary educational program for service analysis, design and management, in correlation with the National Qualification Framework for Higher-Education

WP3. Develop a collaborative, open, trans-national e-learning platform, with virtualized resources accessed as services, and sharing education and research resources for promoting service innovation

WP4. Promote service innovation by disseminating and facilitating research results transfer in the open, collaborative space INSER@SPACE

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