

---

# CHALLENGES OF MEASURING PRODUCTIVITY OF INNOVATIVE KNOWLEDGE INTENSIVE SERVICES

XXI. RESER Conference, September 9<sup>th</sup> 2011

---



Sabine Biege  
Gunter Lay  
Thomas Schmall  
Christoph Zanker

---

# I Introduction

---



- Productivity measurement concepts in **manufacturing**:
  - Introduced decades ago
  - Based on contrasting input and output
  
- Productivity measurement concepts in **services**:
  - Currently under intense research
  - Measurement concepts from manufacturing cannot simply be transferred due to the service peculiarities
  - Even more challenges for measuring productivity of innovative and knowledge-intensive services

➔ What are the requirements for a productivity measurement concept for services that are innovative AND knowledge-intensive at the same time?

---

# Presentation Structure



---

I Innovative and Knowledge-Intensive Services

II Service Peculiarities Revisited

III Requirements for Measuring Productivity of Innovative, knowledge-intensive Services

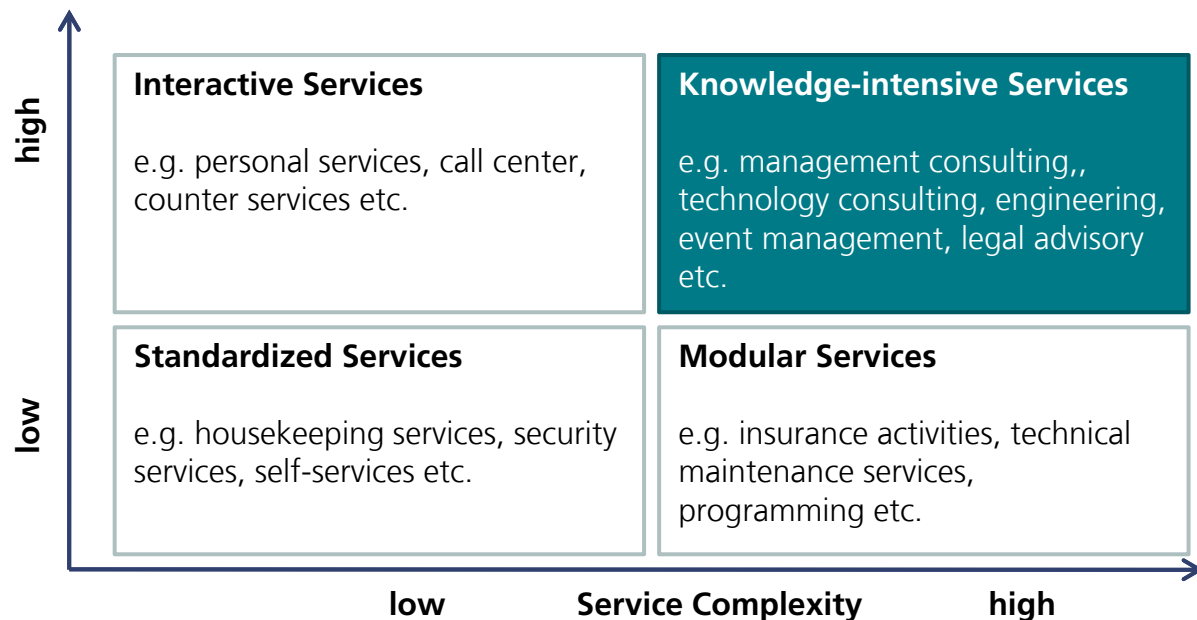
IV Existing Concepts of Measuring Service Productivity in the Light of the Requirements & Need for Further Research

- Only in very rare cases service innovations are radical
- Strong linkage between organizational learning and service innovation:
  - „real innovations“ come from innovation processes , are repeatable
  - „organizational learning processes“ are incremental innovations, based on adaptations for the customer undertaken by the service worker, often not repeatable (Sundbo, 1997)
  - Difference between these both cannot easily be quantified (Hipp/Grupp 2005)
- Development process happens “ad hoc”
- Short life cycle of services
- Investments lower than for product innovations, hence risk is lower as well (Martin/Horne 1992)

# Knowledge-Intensive Services



- Knowledge-intensive services are delivered by service and manufacturing companies
- Supplied to organizations, not individuals
- Heavily depend on the knowledge of experts
- Knowledge and information from customer needed for service production AND innovation
- Carried out as projects
- No dedicated R&D team in most cases



---

# Service Peculiarities

---



- Services were regarded as being of inferior productivity for a long time
- Gap between manufacturing productivity and service productivity was seen as “service immanent”
- Characteristic features of services (IHIP-criteria) were detected as reasons for that gap in measuring results:
  - **I**ntangibility: services are incapable of being perceived, especially by the perception of touch (physical and mental intangibility)
  - **H**eterogeneity: services are unique products (or unique processes)
  - **I**nseparability : services are consumed whilst production and customer interaction is required
  - **P**erishability: service capability without corresponding demand cannot be utilized to meet future demand

# Service Peculiarities and Innovative and Knowledge-Intensive Services

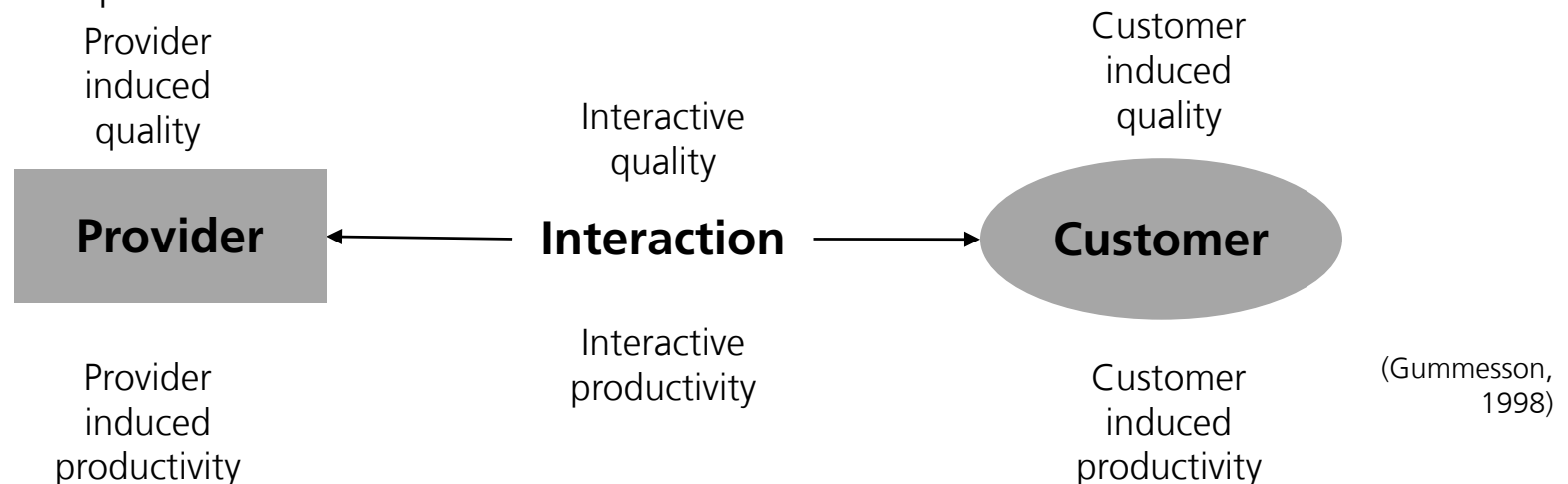


| Criterion             | Innovativeness   | Knowledge-Intensity  |
|-----------------------|--|--|
| <b>Intangibility</b>  | "mental intangibility of services": the outcome of innovative services is uncertain; close interaction with the client is needed | outcome of knowledge-intense services is intangible  |
| <b>Heterogeneity</b>  | no previous experience with the service within the providing company   | project based structure of business: service delivery is regarded as a project – results hence vary<br><br>outcome of service production strongly depends on the personal component on both sides, provider and customer |
| <b>Inseparability</b> | client participation in both, service production and service innovation  | production and consumption cannot be separated: outcome of the service production does not only depend on the service worker, but also on its counterpart on the customer side   |
| <b>Perishability</b>  | no previous experience with the level of service-readiness needed within the providing company                                   | experts and their knowledge are one of the most important factors of service readiness   |

# Requirements for productivity measurement of innovative, knowledge-intensive services



- Besides output quantity and output quality, innovativeness of the output shall be covered and compared
- “Internal output” of service process has to be included into productivity formula
- Provider’s and customer’s input and also interactive inputs, e. g. time and costs induced by interactive loops



- Knowledge as input AND output factor

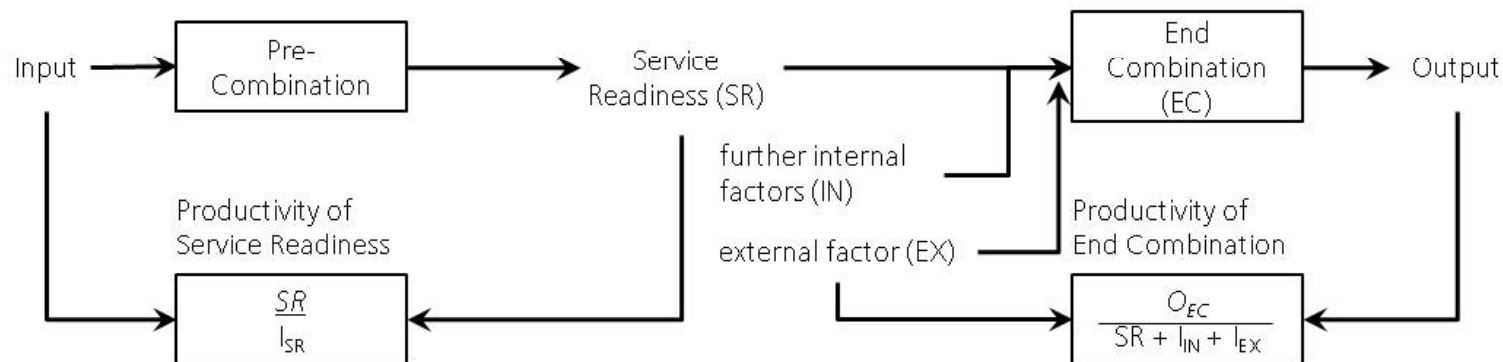


# Service Productivity Measurement Concepts

- Streams of literature dealing with measuring service productivity (Bartsch et al., 2011):
  - industrial productivity (e. g. Levitt, 1972)
  - service production (e. g. Corsten, 1994)
  - customer integration (e. g. Johnston/Jones, 2004)
  - service marketing (e. g. Grönroos/Ojasalo, 2004)

## Service production: Corsten, 1994

- Based on approach from production theory, using a service provider point of view:

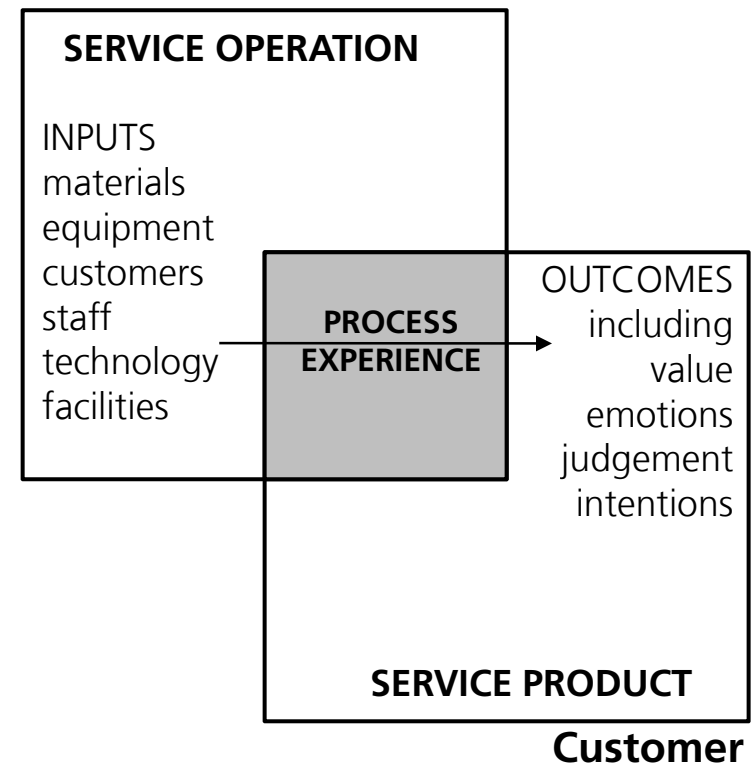


# Service Productivity Measurement Concepts (Cont.)

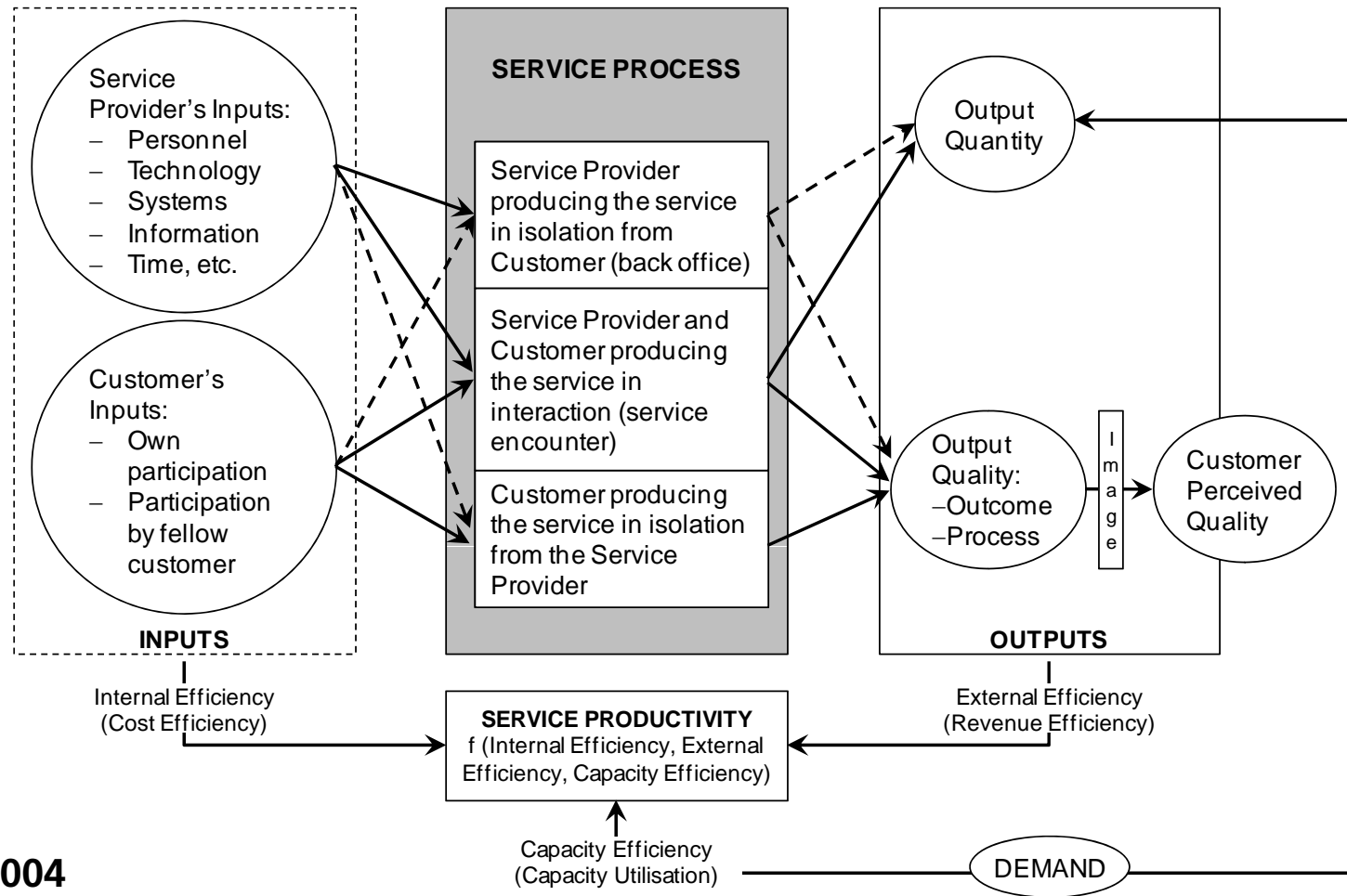
## Customer integration: Johnston/Jones, 2004

- Based on two perspectives (“client productivity”):
  - Operational productivity: “function of the ratio of operational outputs to inputs over a period of time” (Johnston/Jones, 2004, p. 205)
  - Customer productivity: function of the ratio of customer outputs and value to customer inputs
- Principle of manufacturing productivity cannot be transferred to services
- Process of service delivery and customer’s experience overlap due to customer’s role as co-producer of service

## Operation



# Service Productivity Measurement Concepts (Cont.)



**Service marketing:  
Grönroos/Ojasalo, 2004**

---

# Service Productivity Measurement Concepts in the Light of Requirements

---



Wrap up:

- Neither of the existing concepts does already fulfil the requirements
- Most promising approach is to enhance Grönroos' and Ojasalo's model

Next Steps:

- Revisit "classic" controlling literature on productivity measurement concepts from manufacturing and manufacturing-related services
- Use dynamic modelling to examine the mid- and long-term effects of innovativeness and knowledge-intensity on service productivity

---

# Thank you for your attention

Sabine Biege

Competence Center Industrial and Service Innovations  
Fraunhofer-Institute for Systems- and Innovation Research

+49 721 6809-325

<mailto:sabine.biege@isi.fraunhofer.de>

<http://www.isi.fraunhofer.de>

<http://www.inprowid.de>