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TAKING **COOPERATION** FORWARD

📍 4Steps International Conference „Best Practice Day" (online)

💬 **DIH in Austria and efforts of FHV: towards a Hub for Business Intelligence & Innovation – Smart Manufacturing of the Future**

👤 Vorarlberg University of Applied Sciences, Dptm. Business Informatics, Dr. Florian Maurer

Vorarlberg University of Applied Science

- Founded 1994
- Excellent student-staff-ration: 1.500 students/250 employees
- 19 degree programmes
- Six research centres
- Core competences: Business Informatics, Digital Innovation, Digital Factory, Engineering and Technology, Design, Social Work and Healthcare, Energy

Presenter

- Dr. Florian Maurer
- Dptm. Business Informatics (since 2011)
- > 20 years of work experience (in business, industry, government & academia)
- Research domains: digital innovation hubs, factory of the future, mobility of the future
- Research interests: resilience engineering, dynamic capabilities, service science, innovation management & technology impact assessment, transport logistics & supply chain mgmt.
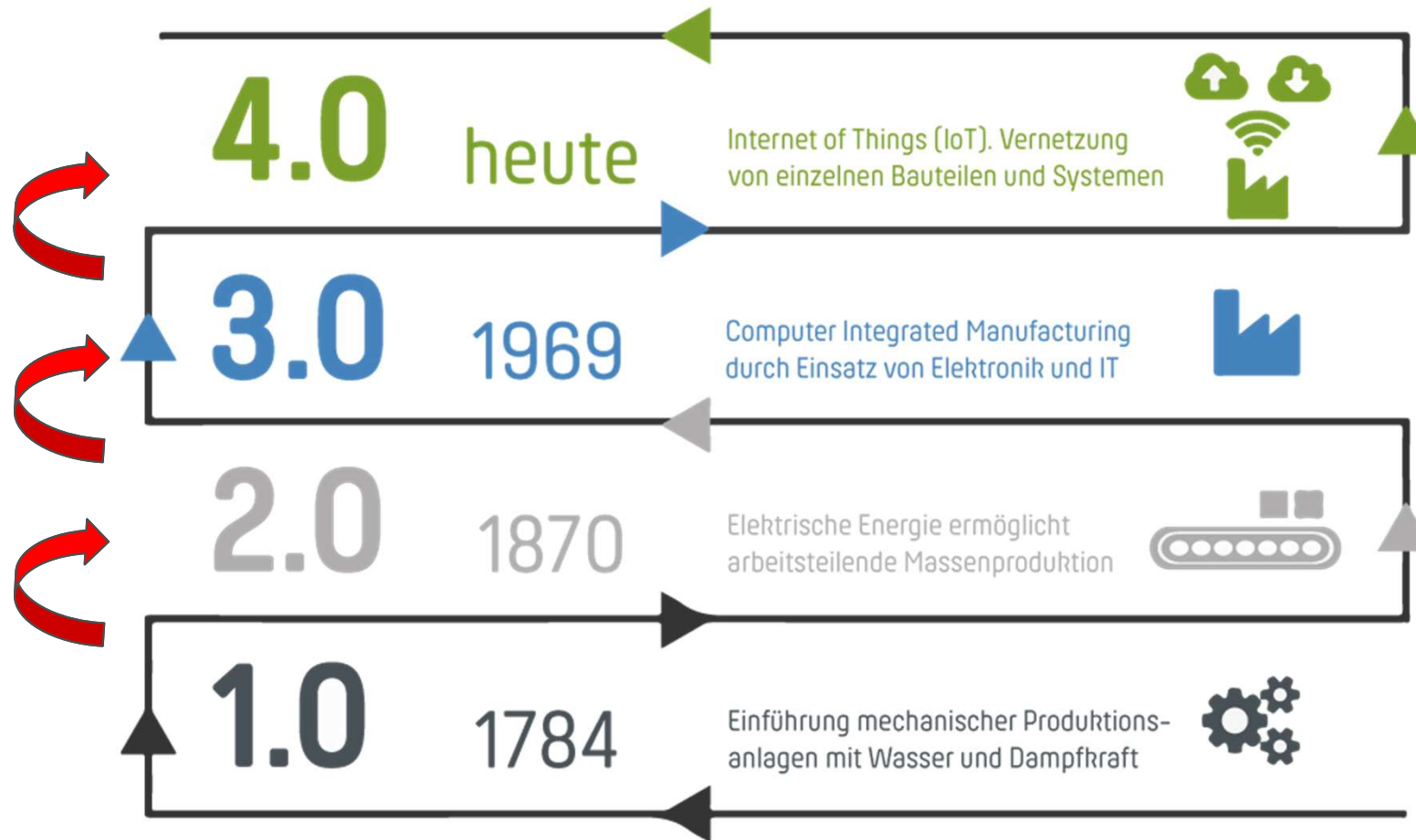
Europe is at the beginning of a new industrial revolution, labelled Industry 4.0

- Digital Transformation & the Manufacturing Industry
- Smart Specialization
- Digital Innovation Hub
    - Theoretical underpinning
    - Regional needs
    - Service definition
- Best practices: Business Intelligence & Innovation as a 'living' (Service) System

DIGITAL TRANSFORMATION

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The paradigm: Industry 4.0*

4.0 heute — Internet of Things (IoT). Vernetzung von einzelnen Bauteilen und Systemen

3.0 1969 — Computer Integrated Manufacturing durch Einsatz von Elektronik und IT

2.0 1870 — Elektrische Energie ermöglicht arbeitsteilende Massenproduktion

1.0 1784 — Einführung mechanischer Produktions-anlagen mit Wasser und Dampfkraft

*Advanced Manufacturing Programm (US)

Challenges of SME's

- Increased speed of the Digital Transformation
- MNC's & start-ups
- Lack of resources: human, digital, technological, financial, knowledge & expertise
- Increased (global) competition

EU, national & regional initiatives

- Smart Specialisation (S3) is a location strategy concept with the aim of promoting structural change towards knowledge- and innovation-driven growth.

- Knowledge and innovation are no longer seen as isolated policy areas, but as a lens through which economic structural change becomes visible.

- Universities and research institutions, as leading institutions in their region, should actively participate in the development of this new generation of location strategies together with politics and business.

- Over 120 S3 strategies have been developed; target: 15.000 new products, 140.000 new start-ups, 350.000 new jobs by 2020
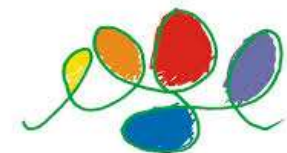
EU, national & regional initiatives
Vorarlberg

- Perspective, for example, systemic science, research and innovation politics, internationalization of the region, coherence with national (Aut) and international level (EU & partners)

- Focus on:
  - Smart textiles
  - Energy- and energy efficiency
  - Human and technology
  - Education and health
  - **Intelligent production**

Examples

Intelligent Production

Factories of the Future
Public Private Partnership

DIGITAL INNOVATION HUBS
Helping companies across the economy make the most of digital opportunities

- **EU** > initiative to develop technologically mature and competitive ... but also ... clean, highly performing, environmentally friendly and social sustainable manufacturing businesses and industries

- To create an EU-wide network where companies can access all necessary competences
- To help companies improve their processes, products and services through the use of digital technologies
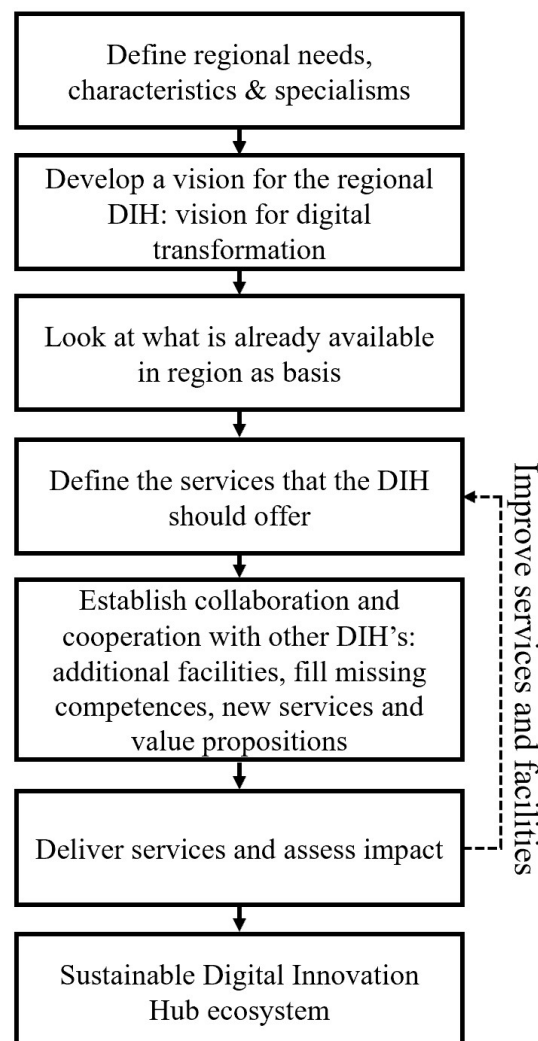
Shift to fully-integrated cyber-physical manufacturing systems → smart service (eco-) systems

(*recommended*) Design & Development Process

Define regional needs, characteristics & specialisms

↓

Develop a vision for the regional DIH: vision for digital transformation

↓

Look at what is already available in region as basis

↓

Define the services that the DIH should offer

↓

Establish collaboration and cooperation with other DIH's: additional facilities, fill missing competences, new services and value propositions

↓

Deliver services and assess impact

↓

Sustainable Digital Innovation Hub ecosystem

Improve services and facilities

FOF: BIFOCAlps

(How can ordinary supply chain stakeholders innovate and evolve to a smart Factory of the Future?)

- Human factor: education, training and qualification

- (Strategic) Partnerships, networks and alliances

- Shift from proprietary systems to collaborative systems
(Island mentality)

- Readiness: IT, IT infrastructure

- Data & data management

(E)DIH: 4Steps

(Motivation, Adaption, Strategy)

- **Motivation: internal & external innovation – adaption, renewal & change**
  Expectations: reduction of material consumption within their organization through the implementation of new technologies, processes and services; adaption, design and development of new products and services; increased managing quality and organizational robustness; new and changed business models

(E)DIH: 4Steps

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- **Adaption: increased use of digital technologies; behaviour**
  e.g. cloud technologies (87,10%, +16,13%), big data & analysis (80,65%, +9,68%), (industrial) IoT (77,42%, +25,81%), cybersecurity (77,42%, +12,90%), etc.

- **Strategy: ambiguous picture**
  e.g. managers vs. employees; innovation strategy & industry 4.0 strategy vs. risk assessment strategy; financial resources vs. investment strategy, etc.
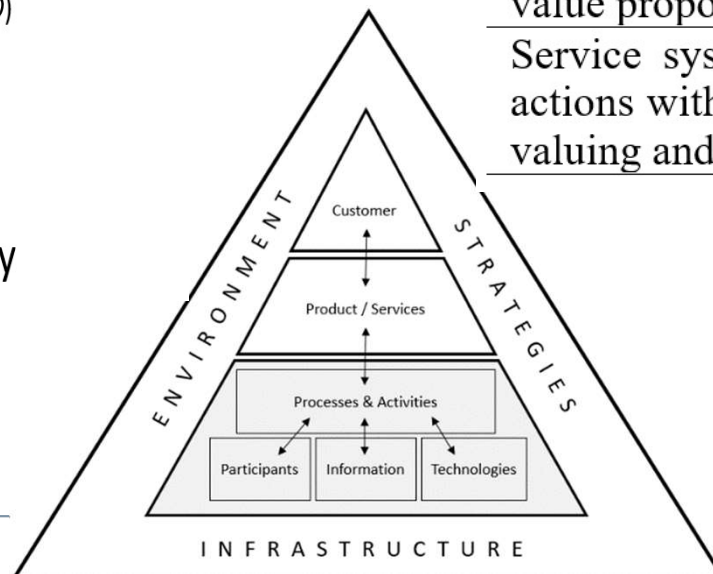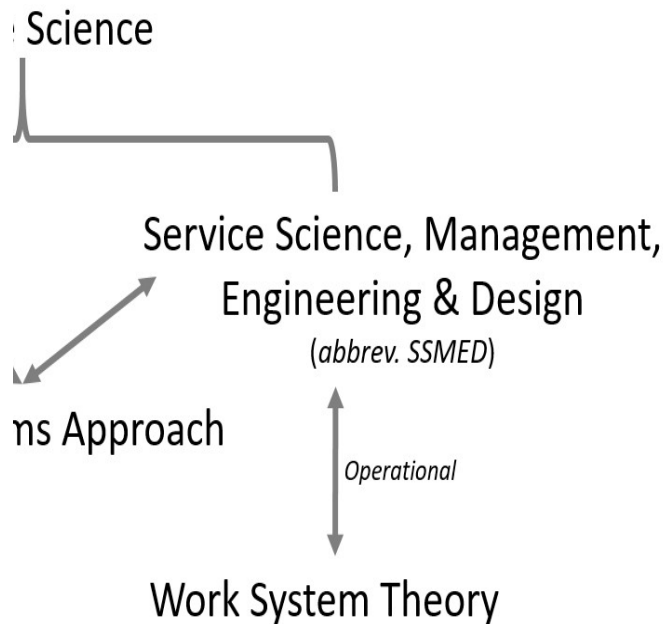
Academic field of Service Science

- Shift from Goods-Dominant Perspective to Service-Dominant Perspective
- (*Increased*) Thinking in systems and services
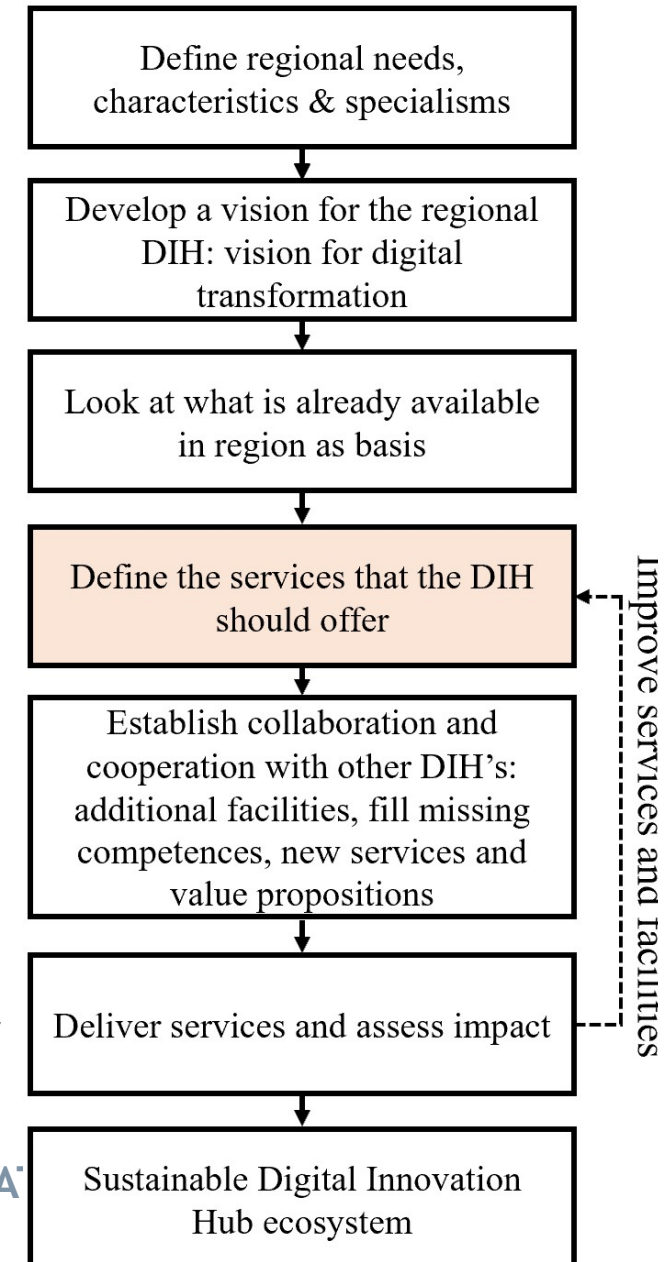- Service systems as the main abstraction

Service Science

Service-Dominant Logic

Foundational premise n°7

Service Science, Management, Engineering & Design

(*abbrev. SSMED*)

Viable Systems Approach

Operational

Work System Theory

SSMED & Work System Theory

Science

Service Science, Management,
Engineering & Design
(abbrev. SSMED)

ns Approach

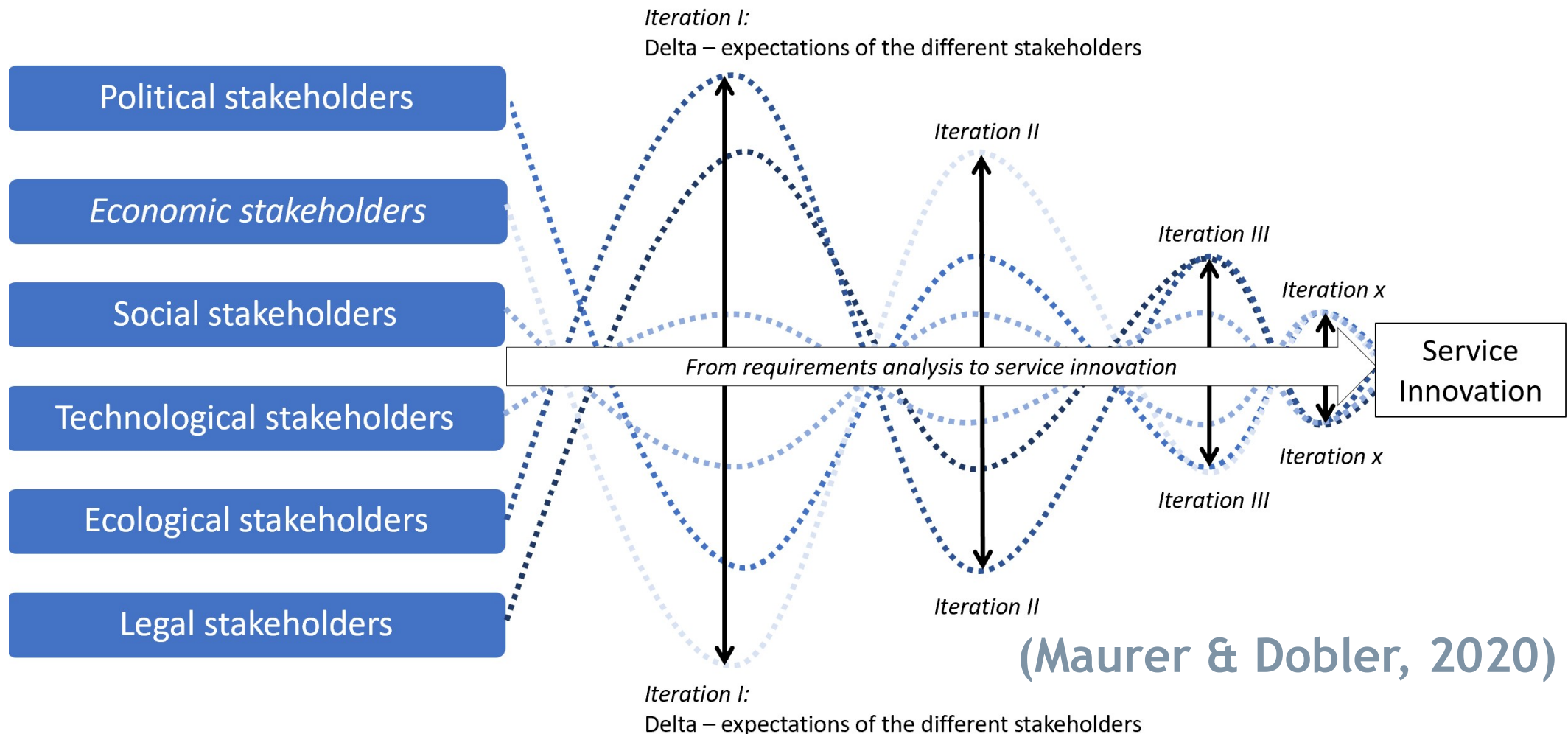*Operational*
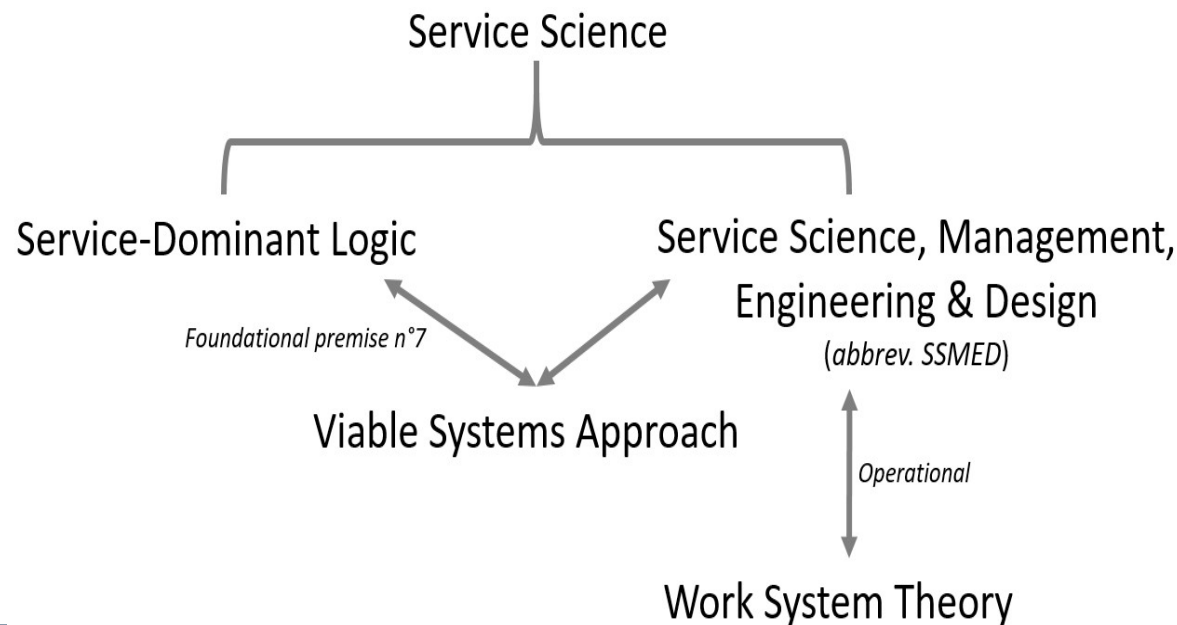
Work System Theory

Propositions	Source
Service system entities dynamically configure (transform) people, technology, organizations and shared information	Spohrer et Spohrer & N
Service system entities compute and calculate value from multiple stakeholder perspectives	Spohrer et Spohrer & N
Service system entities reconfigure access rights to resources by mutually agreed to value propositions resp. the access rights associated with entity resources are reconfigured by mutually agreed-to value propositions	Spohrer et Spohrer & N
Service system entities compute and coordinate actions with others through symbolic processes of valuing and symbolic processes of communicating	Maglio & S

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DIH: Service Definition

- Foundation: empirical research within BIFOCAlps, 4Stepts project & Service Science literature

- Identification of seven needs
  - Artificial Intelligence
  - (Service) System Collaboration
  - Resilience Engineering
  - Innovation Research &
  - *Disruptive Innovation*
  - Methods & Tools
  - Co-Creators

- Additional requirement: design & development of a 'living system' – interactive and co-creative

Define regional needs, characteristics & specialisms
Develop a vision for the regional DIH: vision for digital transformation
Look at what is already available in region as basis
Define the services that the DIH should offer
Establish collaboration and cooperation with other DIH's: additional facilities, fill missing competences, new services and value propositions
Deliver services and assess impact
Sustainable Digital Innovation Hub ecosystem

Improve services and facilities

TAKING COOPERA...

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(Service) System Collaboration & Innovation Research

Political stakeholders

Economic stakeholders

Social stakeholders

Technological stakeholders

Ecological stakeholders

Legal stakeholders

Iteration I:
Delta – expectations of the different stakeholders

Iteration II

Iteration III

Iteration x

From requirements analysis to service innovation

Service Innovation

Iteration x

Iteration III

Iteration II

Iteration I:
Delta – expectations of the different stakeholders

(Maurer & Dobler, 2020)

HUB SERVICES & DEVELOPMENT

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Methods & Tools

(Maurer & Ulmer, 2020)

Layer	Tools
3	**Brainwriting, 6 Thinking Hats, Brain Charting, Mind Mapping, One-Shot Video, Rapid Prototyping, Make a box, Story Boards, Mock-ups, Expert Panel, Focus Group, Scales, Interviews, Surveys, Content Analysis, Clustering, Concept Evaluation,** Ishikawa Diagram, 5-Why-Method, Pictures instead of words, What's the opposite, Elevator Pitch, **Bulls Eye Evaluation**, One-shot video, Wildest idea technic, Random Words, Brain Shifter, Future Quickies
2	**Brainstorming, Prototyping, Pinboard Moderation, World Café, Qualitative Research, Quantitative Research,** SWOT, Hackathon, Business Model Canvas, *PESTEL/STEEP*, Balanced Scorecard, Synergy Diamond, Benchmarking, Round Table Discussion, TA-Assessment Matrix, Focus Group
1	**Workshops, Conferences, Environmental Scanning, Participant Observation, Mapping, Documentation,** Idea Emergency Kit, ARIZ
0	*Open Innovation* **& Co-creation process, Design Thinking, Policy Labs**, Case Study Research, TRIZ, Transformative Action Development, Action Research

Resilience Engineering

(Maurer, 2020)
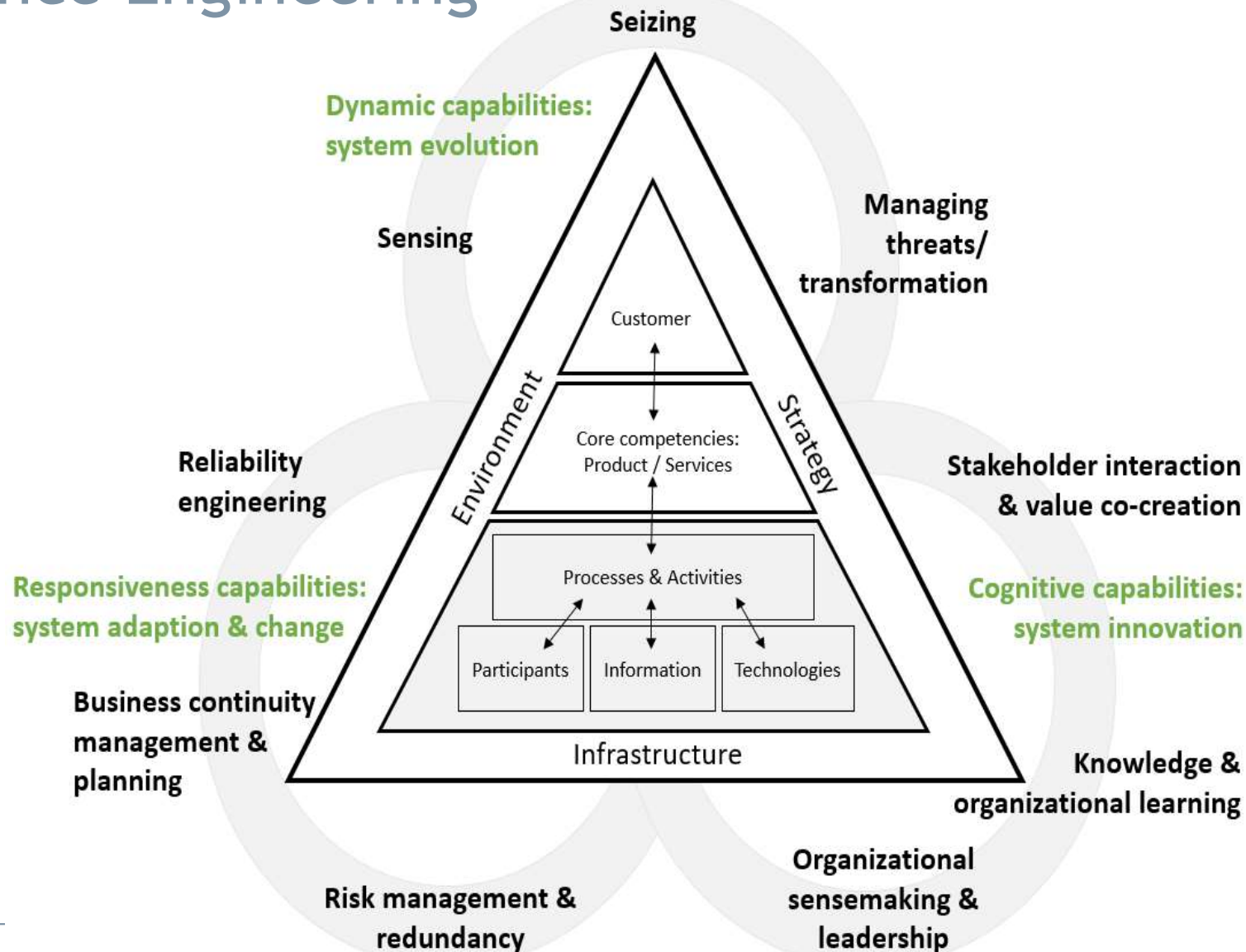
BUSINESS INTELLIGENCE & INNOVATION HUB

Digital

Physical

Disseminaton & exploitation: Do good and talk about it!

- FHV's 4Steps database – digital marketing
- 4Steps events – tailored workshops within WP2 & WP3
  (*FHV: Digital Skills for all – 30th Sept – 02nd Oct 2020@the HighTechSummit BW* ✓)
- Networking – Blickpunkt Wirtschaft, Startup Stube ✓ , WISTO ❓ ,
  Chamber of Commerce, Industry Association, Digital Factory, LRA,
  national & regional Government, Ressel Zentrum ❓ , …
- Best practices
  (e.g. C# upskilling course for apprentices and trainees … in collaboration with regional industry)
- Industrial projects – cascade funding
- Student projects on Bachelor- & Master-level
- Public relations – newspaper

MANY THANKS FOR YOUR ATTENTION

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