databooster

HSLU Hochschule Luzern

Smart Services for a Smarter World

Referent: Shaun West, HSLU
Moderator: Simon Ashworth, ZHAW IFM
Einleitung: Isabelle Wrase, IFMA Schweiz

IFMA Switzerland Chapter
International Facility Management Association

Zürcher Hochschule für Angewandte Wissenschaften
zhaw

HSLU

Dr. Simon Ashworth, Mitarbeiter am IFM der ZHAW, Moderation

- Forschungsschwerpunkt BIM und andere Digitalisierungsthemen in Bezug auf Immobilien und FM
- Mehr als 20 Jahre praktische FM-Erfahrung aus den Unternehmen Serco sowie der britischen Verteidigungsakademie
- Seine Forschungsergebnisse sind unter Researchgate frei verfügbar

Shaun West, Professor at the HSLU, Speaker

- Professor of Product-Service System Innovation at the Lucerne University of Applied Sciences and Arts
- Member of the advisory board for ASAP Service Management Forum and member of the Swiss Alliance of Data-Intensives Services
- Research on supporting industrial firms to develop and deliver new services and service-friendly business models

Smart Services for a Smarter World

Technology can enable us to do more!

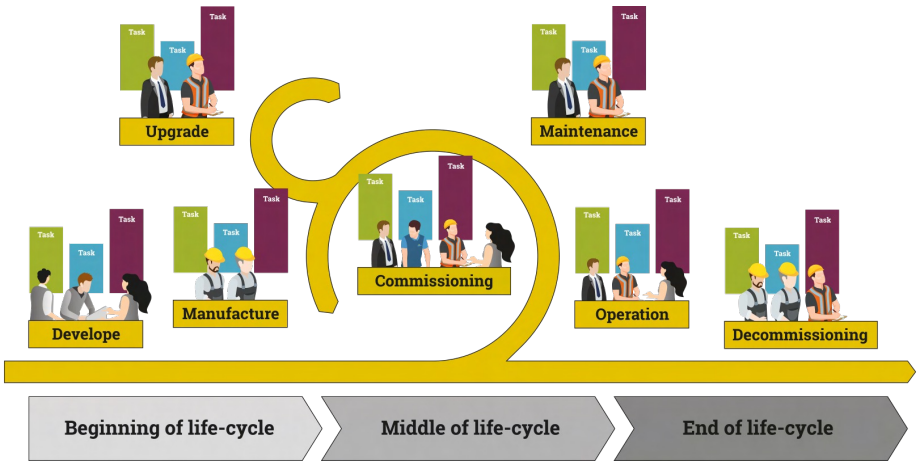
IFMA
2 October 2023, Zürich

Prof Dr Shaun West

Purpose
To provide an insight into smart service design

- We will introduce the concepts of the digital twin
- We will explore one of our cases
- We will describe our development framework
- Post a challenge to the audience…

The digital twin is a technological concept, that can support new value propositions via the creation of Smart Twins and Smart Services.

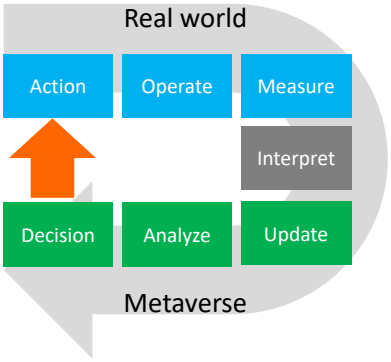


The Concept of the Digital Twin

The Concept of the Digital Twin
What is a digital twin?

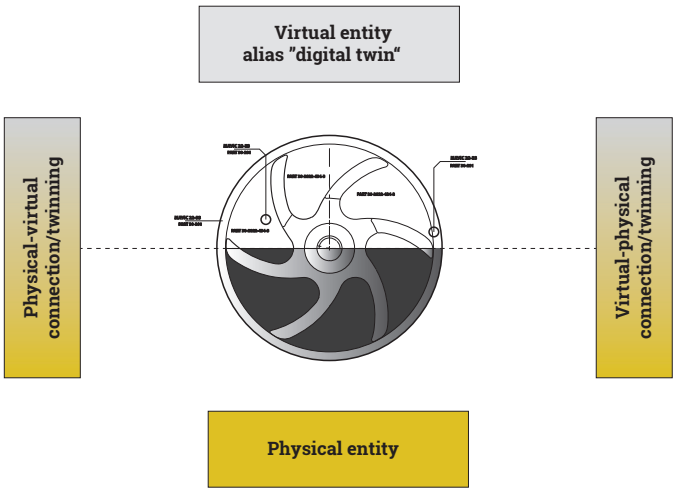
A digital twin is a virtual representation of an object or system that spans its lifecycle, is updated from real-time data, and uses simulation, machine learning and reasoning to help decision making.

IBM
https://www.ibm.com › topics › what-is-a-digital-twin
What is a digital twin? | IBM



Google and Wikipedia are quite helpful here!

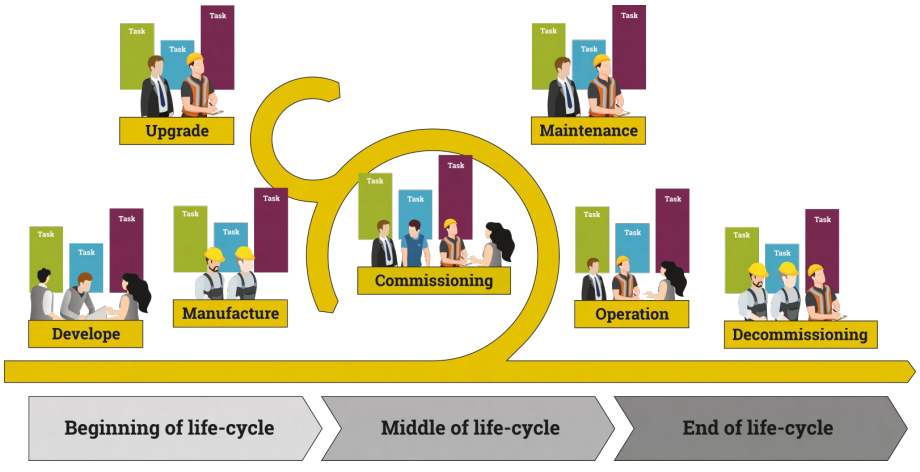
The Concept of the Digital Twin
Digital Twins for smart service opportunities



The Digital Twin
…can be a businesses, processes, or machines.
…should contain the current and past state,
…can help us capture and formalize knowhow and
…should link different lifecycle phases.

The Digital Twin helps us to make better decisions over the whole lifecycle.

The Concept of the Digital Twin
Where do we have opportunities for smart services?



Along the lifecycle, decisions need to be made …
… strategically
… tactically
… operationally

The lifecycle perspective facilitates smart service innovation

The Concept of the Digital Twin

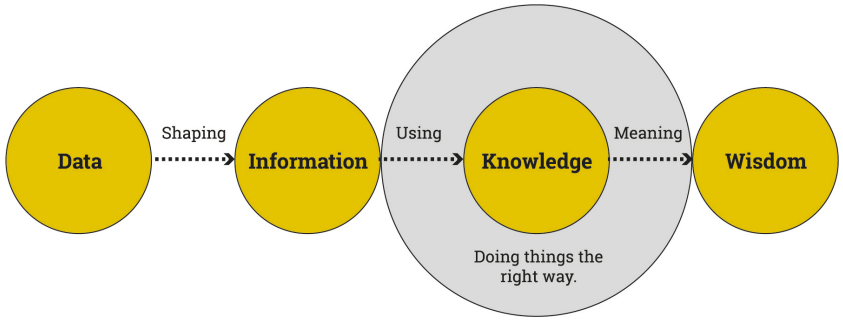
Where do we have opportunities for smart services?

People need to make practical and managerial decisions. These are often bases on questions and ambiguities …

We need to consider actors, roles and situations rather than just “users”

The Concept of the Digital Twin

How do we make decisions?



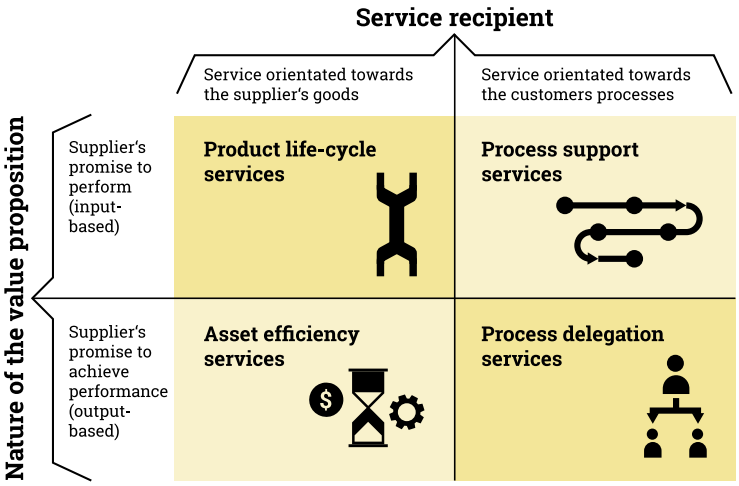
We first need to understand how data is used and how information is evaluated in the organisational context.

This may then enable the building of knowledge.

Decisions depend on the context and the way, information is used

The Concept of the Digital Twin

Questions are key to business decision making



We can support decision-making in different areas.

For each we need to understand the questions people ask and in which situation they are in.

Decisions drive action within a business

The exploration of a use case

Exploring a use case
Facility Management

HSLU

The organisation is a small firm providing facility management services. They offer end-to-end services to the building owner and occupiers, from designing and planning to constructing and operating a complex office building. With third-party suppliers, they deliver complex offerings.

This is one of five cases in the Handbook – *a typical manufacturing case*

HSLU

Exploring a use case
Where do we have opportunities for smart services?

Beginning of Life

Integrating the Digital Twin in the design phase enhanced risk management and cost optimization. It also enabled data-driven commissioning and reduced lead time, avoiding critical path delays.

Middle of Life

Automated operational work instructions driven by equipment failure data enhance risk management and server room availability. The Digital Twin supports management of critical spares.

End of Life

The Digital Twin played a crucial role in tracking the server room's "as-built" and "as-maintained" states, supporting replacement strategies and obsolescence management.

The value proposition was based on the server room‘s availability.

Exploring a use case

Where do we have opportunities for smart services?

Where could we make life easier for the FM team and the server room operators?

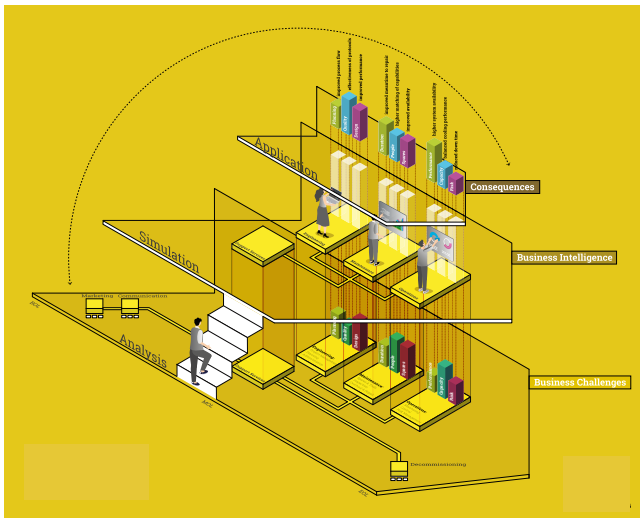
1. How will the building really perform?
2. How will the building influence the lifecycle of the servers?
3. Can I automate tasks with Digital Twin?

BIM was the backbone to the FM-based services. These become possible with the development of Smart Service. Automation of the services is possible with Digital Twins.

The Smart Twin shows the real opportunities

Exploring a use case

How do we could we use the Smart Twin business?



The Digital Twin supported decision-making and provided a degree of delegated automation. The Digital Twin support simplified operations through this automation, informing the operators of its decisions and the likely impact on the facility‘s operation.

Linking the technical issues to consequences for management is key

Exploring a use case

Three papers that describe how and where to use Smart Twins

Generative Design in an Architectural, Engineering and Construction Project Early Phase

The paper explores the integration of Generative Design with Building Information Modeling (BIM) to optimize early design in the AEC industry. The developed algorithm, enhanced with Machine Learning-based heuristics, demonstrates significant algorithmic sophistication but reveals a potential need for further analysis to assess the results' robustness and accuracy.

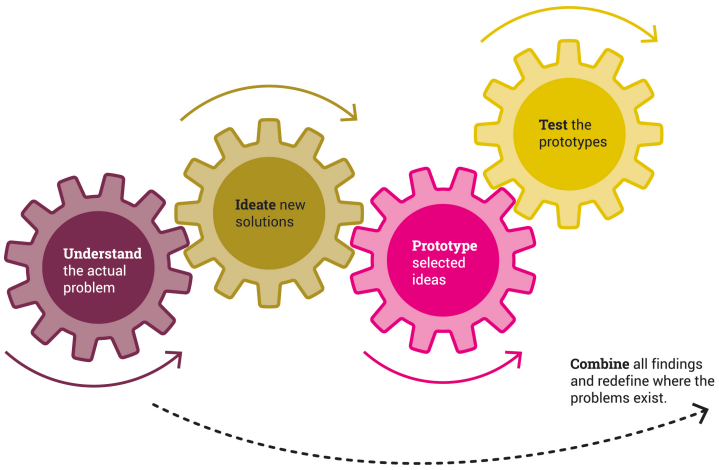
A graph-based Monte Carlo simulation supporting a digital twin for the curatorial management of excavation and demolition material flows

This paper introduces an approach utilizing a digital twin system to analyze and optimize resource flows in the construction industry, addressing the challenges of material procurement, recycling, and volatile economic factors. By modeling transportation networks, price structures, and stakeholder decisions, this method helps government agencies make effective decisions and predict the impact of potential measures in resource management.

Digital Twin Providing New Opportunities for Value Co-Creation through Supporting Decision-Making

This paper addresses the existing research gap in understanding how digital twins facilitate value co-creation and decision-making by presenting findings from a multiple case study involving ten cases in various environments. The study identifies eight managerial considerations for developing digital twins to support multi-stakeholder decision-making and value co-creation.

We need to link simulation with the real world

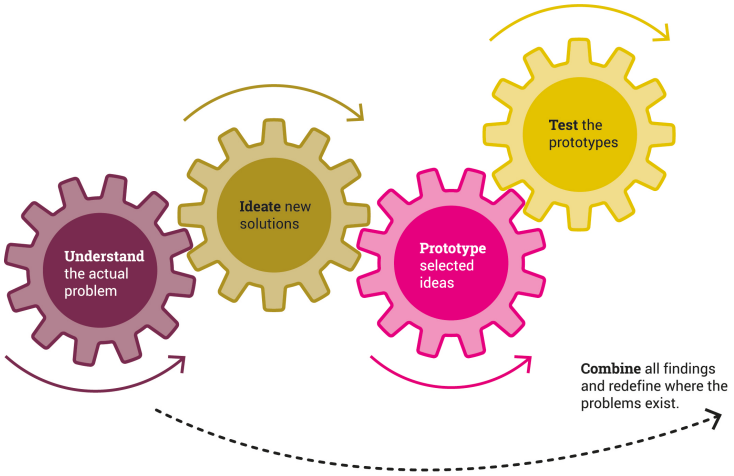


Smart Service Design & Data2Action

HSLU

Smart Service Design & Data2Action

Service Innovation Method



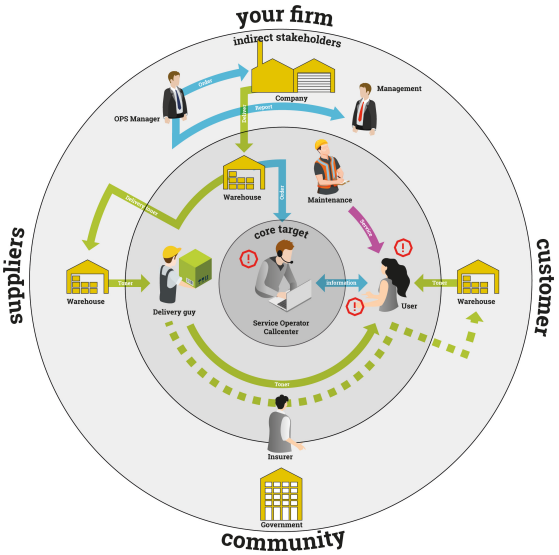
The Data2Action framework allows us to understand the problem(s), ideate solutions, prototype the solutions and test them in a structured way.

The method uses Design Thinking, Service Design & Systems Thinking

HSLU

Smart Service Design & Data2Action

The ecosystem

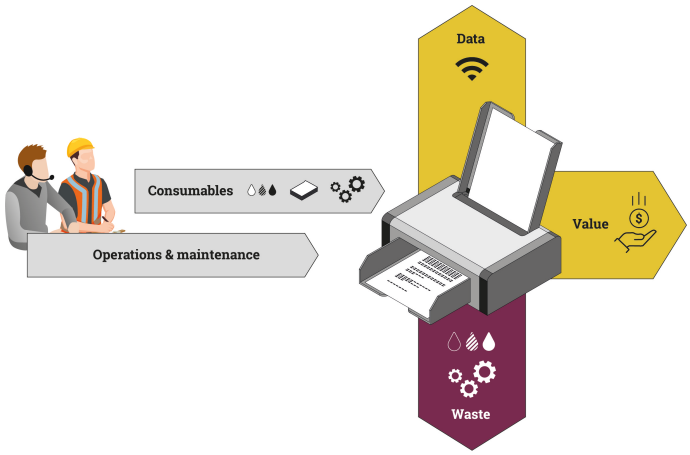


Ecosystem mapping allows you to see the connections between different actors, avatars within the firm and between firms.

Do you know how everyone relates to each other?

Smart Service Design & Data2Action

Service innovation focus on the machines (avatars) as well

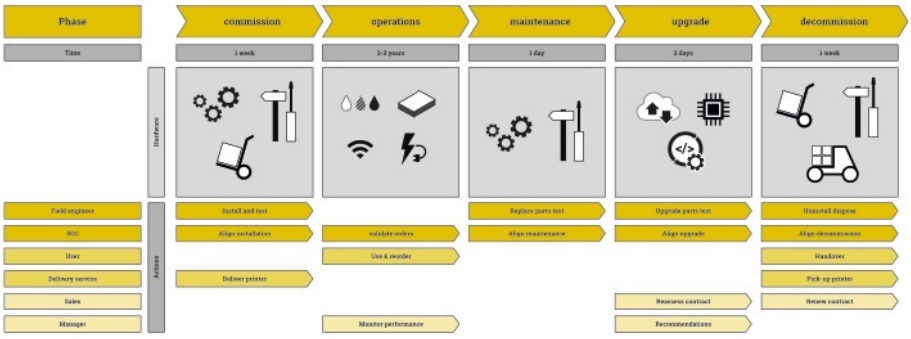


The machine many not be used as it was designed. The avatar will help you better understand how it is used in operations and looked after.

Do you understand the actors support the equipment?

Smart Service Design & Data2Action

Service innovation focus on different roles



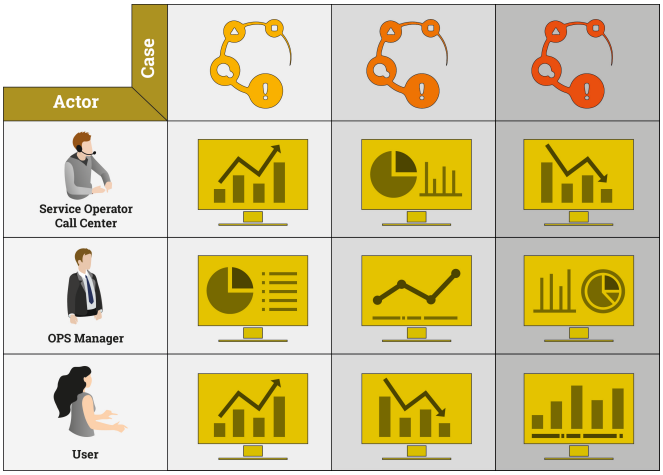
Mapping out all the transactions of the lifecycle you will gain new insights.

Can you identify the tasks that are done and who does them?

HSLU

Smart Service Design & Data2Action

Service innovation understands different situations



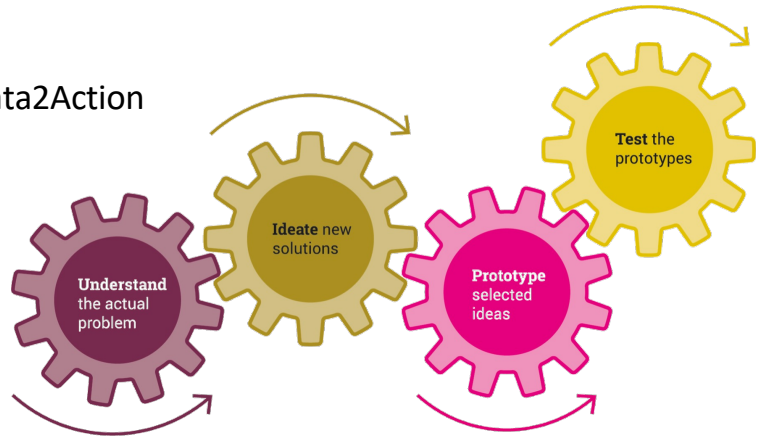
By identifying different cases and connecting them with different actors we start to understand in detail different situations and the emerging value.

Do you consider situational analysis when designing services?

HSLU

Smart Service Design & Data2Action

The Framework



→ The process of exploitation of the problem space to **UNDERSTAND** is iterative!

→ The **IDEATE** phase will show you where you have gaps in your understanding!

→ The **PROTOTYPE** phase is where you start to build the solutions that you will then test!

→ The **TEST** phase should be deeply integrated into the PROTOTYPE phase.

The process is rather iterative than linear.

Closing
Digital Twins are our friends!

- We have introduced the concepts of the digital twin
- We have explored one of our cases
- We had described our development method
- I have given you a challenge …

Now help me to improve the quality of the coffee!

HSLU Hochschule Luzern

Smart Services for a Smarter World
Technology can enable us to do more!

IFMA
2 October 2023, Zürich

Prof Dr Shaun West