

TUTORIAL ISD2025

Enhancing Agility in Business Model Design using Digital Twins: The Scene2Model Approach to Design Thinking

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Abstract. The rise of disruptive business ecosystems introduces new challenges in the development and operation of information systems. Managing change across multidisciplinary teams and leading innovation at a global scale requires new approaches. **Design thinking** serves as a key instrument to address this complexity, leveraging designer-driven problem-solving techniques for agile ideation, prototyping, and testing. Through stakeholder co-creation, it fosters innovation by visualizing different aspects of a problem within a structured solution space, where collaboration is central.

However, traditional methods are often constrained by the physical presence and availability of stakeholders. Absent participants must be informed later, which is not always seamlessly supported. This **hands-on tutorial** introduces OMiLAB's **Scene2Model** (<https://scene2model.omilab.org>), a software tool that enables the creation of digital twins of design thinking artifacts. These digital representations can be shared across globally distributed teams, information systems developers, and stakeholders, maximizing the potential of **collective intelligence** and an **innovation-driven mindset** in the digital age.

In this context, **digital twins** act as conceptual models that can be refined, enriched with domain knowledge, and integrated with existing business assets. By combining **conceptual modeling** with **design thinking**, Scene2Model bridges the gap between freeform design artifacts and structured formal abstractions, enhancing **digital agility** and fostering innovation in digital **product/service development**.

Keywords: digital design thinking, conceptual prototyping, conceptual modeling, storyboarding, digitalization of design artifacts, digital twins,

1 Description of the tutorial

The digital age requires a re-evaluation of the infrastructures, networks, and processes needed in designing and managing innovative products and services. The need for new and disruptive business ecosystems is rising due to the influences of globalization, continuous technological advances, and the business's journey toward digital interaction to meet market and user demands [1]. This comes with challenges not only in creating,

implementing, and deploying digital products and services but also in managing and leading the changes that this imposes in its business ecosystems. Within this context, experimentation environments are necessary to facilitate collaboration, knowledge transfer, and idea generation among stakeholders from various domains in a co-creative effort. Any innovation process must enable stakeholders to exchange ideas and seamlessly co-create and assess design artifacts [2]. One significant aspect of the digital age is the human-oriented focus of innovative business models in their offering of products and services [3]. Based on these observations, design thinking is one of the approaches that facilitate human-centered visions, as it applies designer problem-solving techniques for agile, ideation, prototyping, and testing in innovative processes through collaboration [4]. For software-intensive businesses striving for digital agility, it is an instrument to define and discuss novel ideas on an adequate level of abstraction, to establish a shared level of understanding for all participants enabling them to develop an intelligent offering as input for further conceptualization and feasibility assessment. By involving the customer, multi-disciplinary teams, and stakeholders in the early exploration and design process of new services and smart products, the response to technological change will be more positive, as it embeds an innovation-led mindset from early on and gathers early (user) feedback, that is used afterward to improve the service, product, or idea itself [5].

Held as a hands-on tutorial it gives the participants the chance to experience a design thinking session, in a co-creation environment, where the design artifacts are transformed into digital twins, semantically enriched with domain knowledge, and connected to conceptual business models. These models play an essential role in connecting the innovation to its business context and work environment as they capture relationships between different facets of the targeted problem. The interplay of conceptual modelling and design thinking fosters this relation and establishes a connection between unrestrained design artifacts and more formal abstractions (e.g., business process models) [6]. Dedicated software tools, that implement this middle ground, support a richer representation of the problem and ideation space. Machine-readable semantics are needed to enable model-value functionalities such as analysis and simulation, while at the same time supporting understanding and interpretation through visual means. Two layers of interpretability are enabled – one for users, and the other for machines, as automated mechanisms are enabled in support of design assessments and decision-making [6].

1.1 Goal and specific area of interest

The tutorial will introduce participants to storyboards as a selected design thinking method. A use case is chosen for the participants to work on during the tutorial. Haptic paper figures (SAP Scenes^{TM1}) are used to develop innovative ideas and build a visual storyboard of the identified challenge and proposed innovative solution/offering. Participants will observe the end-to-end process of a tool-supported transformation from haptic scenes into digital twins of the realized design artifacts. The Scene2Model software tool (<https://scene2model.omilab.org>), not only enables this transformation but

¹ SAP ScenesTM: <https://apphaus.sap.com/resource/scenes>

also semantically enriches the digital twins and facilitates their value-added processing to embed the collective intelligence of distributed teams in an organization and the larger community of stakeholders and collaborators in iterative cycles [2]. The representation of digital twins as conceptual models from a haptic design is input for a detailed analysis on different levels of abstraction: business, organizational, and technological aspects to be assessed on the design level before experimental validation. Scene2Model also acts as a software-supported environment for co-creation in a Digital Innovation Environment, aiming to break the limitations of the working environment and distributed teams, facilitating the transfer of ideas from the physical to the virtual world [7].

1.2 Tutorial format

The tutorial will be held as a 90 min session with physical presence of participants. The tutorial combines theoretical and practical work sessions in teams, as follows:

A. Theoretical Foundations: Design Thinking in the Digital Age (15min)

The design thinking concept, its characteristics, and selected methods are discussed, to establish the participant's common knowledge of the topic. The motivation to integrate design thinking among software-intensive businesses and benefits for managing change in innovation-led projects is discussed as well, along with the relation to Digital Innovation Environments.

B. Practical session: Digital Twins in Design Thinking (75min)

The participants form groups, develop collaboratively an innovative idea and start creating haptic scenes using SAP Scenes™. The transformation of the design thinking artifacts into digital twins is performed by the participants, using the Scene2Model software tool, with guidance and support from the organizers. Thus, experience hands-on the transformation of the design artifacts from the haptic environment into the digital twin environment. Model-value concepts, as well as LLM-based object description and attribute generation are introduced to support the digital agility of businesses. Participants reflect also upon the transformation and value-adding benefits of digitalizing the design thinking artifacts for software innovation projects.

2 Organizers

The tutorial is guided by two instructors with expertise in conceptual modelling, design thinking concepts and methods, and the Scene2Model environment. Both instructors have previous experience in organizing and hosting similar tutorials (e.g., at the NEMO Summer School Series, ISD2022/2023/2024) for participants with different professional backgrounds.

Dr. WILFRID UTZ received his PhD from the University of Vienna, Research Group Knowledge Engineering in the field of metamodel design and conceptual structures. He has been involved in international research and innovation projects and gained experience in the field of modeling method conceptualization, meta-model design, and implementation of modeling tools using ADOxx in various application domains. His

research and professional interest relate to the knowledge representation using meta-modeling concepts and platforms.

IULIA VAIDIAN received her master's degree at the Vienna University of Economics and Business in Supply Chain Management and gained experience in design thinking, business process management, and conceptual modelling concepts and technologies in her responsibilities as part of the Research Group Knowledge Engineering from the University of Vienna and the OMiLAB team. She is responsible for the organization of the NEMO Summer School Series, has been involved in various EU-funded projects, and coordinates the OMiLAB Community of Practice.

3 Participants

The tutorial targets students, researchers, and practitioners who have a research interest in conceptual modeling, and business ecosystems, as well as software developers and software users within digital transformation initiatives. The Scene2Model software tool addresses researchers who want to experiment with the digital transformation of diagrammatic models and their semantical enrichment, students to learn and understand the prototyping phase of design thinking, and all users interested in developing their expertise in digital design thinking and the co-creation process of disruptive business ecosystems.

3.1 Prerequisite Knowledge

The tutorial is for design thinking beginners and experts alike. Even though no prior knowledge is needed, interest in design thinking is desired and a basic background in business administration/business informatics is recommended as the hands-on session will introduce design thinking techniques.

3.2 Value-added of the tutorial for the ISD2025 participants

During the tutorial, participants are challenged to experience and work hands-on on an innovative design challenge in a specific domain. As such the theoretical foundation of design thinking is translated into a well-defined methodology and applied throughout the session practically.

Sharing the experience of different stakeholders and backgrounds (levels of expertise, domain knowledge) in the form of a group session will stimulate discussion and reflection on (a) how disruptive business models can be created, (b) the value of digital design thinking for software-intensive businesses, (c) model value in relation to diverse business-related purposes, (d) software potential and applicability for innovation projects and disruptive business models. The initial results achieved are provided as input for all participants as a case for further reflection.

The participants will gain knowledge in different ways about how disruptive business models can be designed, and the capabilities provided by the chosen environment – the Scene2Model software tool - through the use case from the practical part

and the value of transforming design artifacts into digital models. Furthermore, they will be introduced to the OMiLAB Community of Practice² and the importance of the learning loop generated by active members and shared passion for driving innovation through model-value.

3.3 Required Infrastructure

Material and interactive elements are provided by organizers throughout the tutorial. Participants are required to install in advance the Scene2Model software tool, available as an open-source implementation at <https://scene2model.omilab.org> on their laptop/notebook, to follow hands-on the practical session. A stable internet connection, projector and table setup is needed to provide interactive means and a group-based setting.

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² OMiLAB Community of Practice: <https://www.omilab.org/community/>