Please quote as: Tuunanen, T.; Böhmann, T.; Leimeister, J. M. (2023). Introduction to the Minitrack on Digital Service and Service Digitalization. Hawaii International Conference on System Sciences (HICSS). Maui, Hawaii, USA.

Introduction to the Digital Services and Service Digitalization Minitrack

Tilo Böhmann
Universität Hamburg
tilo.boehmann@uni-hamburg.de

Jan Marco Leimeister
University of St. Gallen
janmarco.leimeister@unisg.ch

Tuure Tuunanen
University of Jyväskylä
tuure@tuunanen.fi

The purpose of the minitrack is to attract research on the innovation, design, development, management, and use of digital services and the digitalization of services. The key drivers in this area of research are the multiplying technological opportunities for digital services, such as ubiquitous connectivity, artificial intelligence, wearable devices, cyber-physical systems, Internet of Things (IoT), virtual/augmented reality, web3, and so on. The minitrack provides a discussion forum for researchers interested in theoretical and practical problems related to such services (Huang & Rust, 2013; Lusch & Nambisan, 2015).

In a broad sense, digital services can be defined as systems that enable value co-creation and limit value co-destruction through the development and implementation of ICT-enabled processes that integrate system value propositions with customer value drivers (Tuunanen et al., 2010; Li & Tuunanen, 2022). Such services meld the worlds of bits and atoms and promise to transform many sectors like the media industries before them. They draw on different technologies such as sensors, real-time data analytics, augmented and virtual realities, computer hardware, software, and human and system actors. Such technologies form a service platform where different actors (Storbacka et al., 2016) assemble the service together, *in situ*, as argued by Grönroos (2006). As a result, the embedded systems of today and the Internet-of-things of tomorrow are the precursors for the upcoming era of cybernized services (Tuunanen et al., 2019). Examples of such services are, e.g. biomedical and healthcare systems such as telerobotic surgery, (semi)autonomous vehicles and intelligent highways, augmented human capabilities with body net sensors and virtual reality, and intelligent machines.

Furthermore, there are substantial opportunities for ICT and digitalization-driven service innovation in industrial and business-to-business settings. These opportunities exist particularly in manufacturing, where innovation activities increase product digitization and production processes. We see that the global awareness of the power of the manufacturing industry will be linked to horizontal cyber-physical systems that enable value co-creation and co-destruction in the networked business environment. The cyber-aspects of such systems are ICT infrastructure, computer hardware, software, and different sensors and actors. These components turn cyber-physical systems into platforms for designing and operating services. The data on products and processes gained through networked cybernized services and the ability to act on this data through control systems and actors enables novel ways of co-creating service in industrial contexts.

This emerging area of research raises interesting questions (Barrett et al., 2015). For example, traditional development approaches focus on improving the efficiency and effectiveness of organizational processes. However, the design of such services may require an emphasis on the socio-psychological aspects, such as the value-in-use and user/consumer/co-creator experiences. Digital services create novel ways of engaging customers and other actors in service ecosystems, raising the question of effective patterns of such digital actor engagement Tuunanen et al., 2010; Storbacka et al., 2016; Li & Tuunanen, 2022). Moreover, digital services facilitate data-driven and analytics-based service design and development, particularly if the service is linked to the physical world through sensors and/or people's interactions.

The shift of consumer and enterprise personnel from *users* to *co-creators and co-destructors of value* calls for a significant re-appraisal of our current design and development approaches. Relevant topics for this minitrack include (but are not limited to):

Digital and ICT-enabled services, industrial services, mobile services, and consumer information services and systems

- Discovery, fuzzy-front end, and innovation processes
- Continuous and experimental service design and development processes and methodologies
- Analytics-supported service design and development

URI: https://hdl.handle.net/10125/102755
978-0-9981331-6-4

- Design and evaluation of novel digital services
- Service ecosystems, platforms, and novel architectures
- Consumer and enterprise user aspects, novel forms of actor engagement
- Service ecosystems and effective patterns of actor engagement in digital services
- Hedonic ICT-enabled services
- Socio-psychological aspects of ICT-enabled service use
- Understanding social and cultural contexts

Cyber-Physical and IoT-enabled services, Cybernized Services:

- Cyber-Physical and IoT-enabled services from different disciplinary perspectives, such as information systems, operations research, software engineering, service science, and service research
- Service innovation based on Cyber-Physical and IoT-enabled services
- Cyber-Physical and IoT service ecosystems, platforms, and novel architecture
- Theoretical aspects of Cyber-Physical and IoT enabled services research
- Cyber-Physical and IoT-enabled services as artifacts
- Use and adoption of Cyber-Physical and IoT-enabled services

Artificial-intelligence-enabled services:

- Service Robots and Service Robot enabled services
- Services enabled by natural language assistants
- Human-machine interaction in AI-enabled services
- Operational aspects of AI-enabled services, e.g., monitoring and support
- Ethical and regulatory considerations in designing AI-enabled services
- New technology-enabled services, e.g., services enabled by smart television, smart watches, wearables, mobile devices, and phones, or other technologies like augmented/virtual reality, blockchain, IoT, etc.

Web3-enabled services:

- New decentralized service innovations
- Service automation with Web3 technologies

This year's articles are summarized below.

YUMA – An AI Planning Agent for composing IT Services from Infrastructure-as-Code Specifications by Florian Baer and Michael Leyer. The paper looks at how infrastructure-as-code enables cloud architects to automate IT service delivery by specifying IT services through machine-readable definition files. The authors argue that cloud architects should specify IT services as compositions of sub-processes to allow for the reusability of the infrastructure-as-code specifications. The authors design a search-based problem-solving agent named YUMA according to a design science research process to resolve this problem. YUMA holds a search tree reflecting the state space and transition model. It includes an algorithm for building the search tree and two for determining the minimum composition plan. The underlying IT service composition problem is explicated for the infrastructure-as-code context and formulated as a search problem.

Managing Continuous Digital Service Innovation for Value Co-Creation by Jenny Elo, Kaisa Pekkala, and Tuure Tuunanen. The paper looks at how service organizations across various industries increasingly implement continuous development methods and practices to transform their digital service innovation and development processes. The authors argue that continuous digital service innovation is becoming a way to react to today's dynamic markets by proposing value to customers quickly while maintaining service quality. However, little is known about how organizations can enable value co-creation in their continuous digital service innovation processes. The paper focuses on organizational-level continuous DSI processes. Based on findings from 23 industry informants from six Finnish digital service organizations, the paper presents a preliminary framework depicting three integral and interdependent dimensions of managing continuous digital service innovation for value co-creation.

More Isn't Always Better – Measuring Customers' Preferences for Digital Process Transparency by Katharina Brennig and Oliver Müller. The paper states that digital technologies have made the line of visibility more transparent, enabling customers to get deeper insights into an organization's core

operations than ever before. The authors argue that this creates new challenges for organizations trying to deliver high-quality customer experiences consistently. The paper reports an empirical analysis of customers' preferences and willingness to pay for different degrees of process transparency, using the example of digitally-enabled business-to-customer delivery services. Applying conjoint analysis, the authors quantify customers' preferences and willingness to pay for different service attributes and levels. The paper's contributions are two-fold: For research, we provide empirical measurements of customers' preferences and their willingness to pay for process transparency, suggesting that more is not always better. Additionally, the paper offers a blueprint of how conjoint analysis can be applied to study design decisions regarding changing an organization's digital line of visibility.

Decentralized Service: An Initiation of Blockchain Value Creation into Service Science by Nico Wunderlich, Jan Schwiderowski, and Roman Beck. The paper looks at how value is created through a service that has recently undergone massive changes. Centralized service provision with clear distinctions between service offerers and beneficiaries is increasingly superseded by value creation within decentralized networks of distributed actors integrating digital resources equally. The authors argue that blockchain technology is one of the drivers of this transformation. Applying the lens of service-dominant logic and discussing examples of blockchain-based decentralized finance, the paper sheds light on how properties of decentralized technology stimulate value creation in service ecosystems. With this conceptual research, the paper presents five propositions of decentralized value creation along the axiomatic foundations of the service-dominant logic. The paper contributes by offering an extension of the service-dominant logic to the context of decentralized ecosystems.

Individualizing Patient Pathways through Modularization: Design and Evaluation of Healthcare-Specific Modularization Parameters by Christoph Peters and Peggy Richter. The paper argues that some classes of person-oriented services, such as healthcare services, require individualization to be effective. Individualizing services and corresponding patient pathways are costly. Service modularization is known as a solution to provide such services in an individualized but efficient manner. Until now, modularization parameters that take healthcare specificities into account are missing. To resolve this problem, authors apply a design science research approach to build and evaluate a set of healthcare-specific modularization parameters iteratively. For requirements elicitation, refinement of the modularization parameters, and their evaluation, the authors conducted interviews with domain experts from patient pathways in oncology care and with service design and business development experts. The paper contributes by providing design knowledge for the modularization of healthcare services.

References

Grönroos, C. (2006). Adopting a service logic for marketing. *Marketing Theory, 6*(3), 317-333.

Barrett, M., Davidson, E., Prabhu, J., & Vargo, S. L. (2015). Service Innovation in the Digital Age: Key Contributions and Future Directions. *MIS Quarterly, 39*(1), 135-154.

Huang, M. H., & Rust, R. T. (2013). IT-Related Service: A Multidisciplinary Perspective. *Journal of Service Research, 16*(3), 251-258.

Li, M., & Tuunanen, T. (2022). Information technology–supported value co-creation and co-destruction via social interaction and resource integration in service systems. *The Journal of Strategic Information Systems*, *31*(2), online first.

Lusch, R. F. & Nambisan, S. (2015). Service Innovation: A Service-Dominant Logic Perspective. *MIS Quarterly, 39*(1), 155-175.

Storbacka, K., Brodie, R. J., Böhmann, T., Maglio, P. P., & Nenonen, S. (2016). Actor engagement as a microfoundation for value co-creation. *Journal of Business Research, 69*(8), 3008-3017.

Tuunanen, T., Kazan, E., Salo, M., Leskelä, R.-L., & Gupta, S. (2019). From Digitalization to Cybernization. *Scandinavian Journal of Information Systems,* 31(2), article 3.

Tuunanen, T., Myers, M. D., & Cassab, H. (2010). A Conceptual Framework for Consumer Information Systems Development. *Pacific Asia Journal of the Association for Information Systems, 2*(1), 47-66.