University of Cologne  
Faculty of Management, Economics and Social Sciences  
Information Systems Area

Bachelor and Master Thesis Topics

Winter Term 2018/2019

Chair for Information Systems and Systems Development (Prof. Dr. Recker)

Contact information:
Prof. Dr. Jan Recker (jan.recker@wiso.uni-koeln.de)
Dr. Karl Werder (werder@wiso.uni-koeln.de)
Dr. Janek Richter (janek.richter@wiso.uni-koeln.de)
Roman Zeiß (zeiss@wiso.uni-koeln.de)
Julian Lehmann (julian.lehmann@wiso.uni-koeln.de)
Christian Hovestadt (hovestadt@wiso.uni-koeln.de)

Topic Areas
We offer a variety of relevant and exciting research problems for students to work on. Broadly, these problems fall into the following topic areas. You are also welcome to approach us with your own topic idea.

Conceptual modeling during Systems Analysis and Design
Systems analysis and design concerns the conceptualization, development and eventual implementation of new information systems. Our focus is largely on the use of conceptual models – graphical representations of the relevant features of a real-world domain (think data models, process models or similar) for purposes of information systems analysis, design or development. We seek to improve the important practice of modeling organizational and technological systems to achieve operational excellence, IT design, workflow efficiency or business innovation. Systems analysis and design is a core activity and problem for IS professionals and at the heart of the field information systems.

Relevant recent papers that provide background include:

Master or bachelor thesis research in this area can involve experimental work, empirical field work but also design work and literature reviews. Specific thesis areas could be (1) experiments with multiple models, (2) meta-analyses of experimental research in this area, or (3) creation of open science repositories in support of conceptual modeling research.

Supervisor: Prof. Jan Recker

**Digital Processes**

Digitalized processes describe operational procedures, routines and workflows that are at least partially automated and/or involve both human and technological agents, and which leave “digital process data” as footprints. Our focus is two-fold: one, how can we effectively describe, study, analyze and explain digital processes using process modeling tools such as BPMN, ProM, Threadnet or others; and two, what changes when processes are digitalized?

Relevant recent papers that provide background include:


Master or bachelor thesis research in this area can involve case study work, survey research, process mining, literature reviews, or design science, among others. Of particular interest at the moment are (1) the application of Threadnet ([http://routines.broad.msu.edu/ThreadNet/](http://routines.broad.msu.edu/ThreadNet/)), (2) studies of process digitalization attempts in industry, (3) the study of increased agency of digital autonomous tools in processes.

Supervisor: Prof. Jan Recker, Christian Hovestadt

**Understanding Software Development through Software Repository Mining and Analysis**

In today’s highly dynamic and complex environment, it is critical to establish high-performance software development teams. In order to investigate related behavioral and affective processes that explain performance differences, researchers increasingly rely on larger data sources, such as GitHub and Source Forge, allowing them to answer research questions that are challenging to answer otherwise.

Relevant recent papers that provide background include:


Master or bachelor thesis research in this area can involve repository mining, case study, or design science, among others. Of particular interest at the moment are (1) the longitudinal analysis of team processes and affective states, and (2) tool support for construct and measurement alignment when mining software repositories.

Supervisor: Dr. Karl Werder

Understanding the effects of game changes toward engagement

The game industry is expected to be valued 138bn USD with an increasing interest in eSports communities that award up to 141M $ to professional gamers. In order to maintain engagement of gamers throughout the time (seasons, patches, extensions), game publishers employ different mechanisms. We seek to identify and understand the effect of these mechanisms towards gamers engagement.

Relevant recent papers that provide background include:


Master or bachelor thesis research in this area can involve survey research, web mining, case study, or systematic literature review, among others. Of particular interest at the moment are (1) different types of changes and mechanisms applied by a game publisher, and (2) the effect of game changes toward engagement.

Supervisor: Dr. Karl Werder
Agile in Hardware Development

In order to increase the responsiveness to change, organizations adopt agile methods. Given the success of agile methods in software development, the approach is applied in other areas, such as hardware development. Yet, when trying to synchronize the flexibility of agile methods with the longer cycled traditional methods, different conflicts arise. We seek to identify and understand these conflicts in order to develop solutions that facilitate the adoption of agile methods when developing hardware or embedded systems.


Master or bachelor thesis research in this area can involve case study, survey research, or experimental work, among others. Of particular interest in the context of hardware development are (1) the development of a process model perspective toward the adoption of agile, (2) the investigation of agile practices, (3) the investigation of ambidexterity and uncertainty.

Supervisor: Dr. Karl Werder

Continuous Practices in Software Development

Organizations managing digital platforms continuously improve and release new features using continuous practices. Besides others, such practices include continuous integration, continuous delivery, and continuous deployment. While continuous practices provide manifold benefits, such as swift development feedback and increase software quality, these practices provide new challenges to software development teams, such as increased pressure and workload for the team members.

Relevant recent papers that provide background include:

Master or bachelor thesis research in this area can involve survey research, experimental work, case study, or repository mining. Of particular interest at the moment are (1) team coordination demands during software development, (2) coping with increased work pressure and stress, (3) interpersonal sunk-costs during software development.

Supervisor: Dr. Karl Werder

**Workforce Agility and the Role of Self-Managed Teams**

The notion of the agile workforce has been discussed as central to creating the agile organization, which achieves superior environmental responsiveness in contexts of turbulence and change. Previous agility research has focused mainly on the organization (and its relevant parts and relations such as operations, customers, and partners), paying scant attention to the workforce. Workforce agility has been seen to achieve a number of organizational benefits such as increased productivity, profits, and market shares as well as to grow a business in a competitive market of continuous and unanticipated change and to enhance organizations’ prospects for survival in increasingly volatile and global business environments. The time has come to reassess the concept of workforce agility and to map its trajectory since its infusion the information systems domain with study of Breu et al. (2001).

Particularly, companies’ current endeavors for agile transformations have sparked the interest in agility and the role of self-managed teams that play a significant role in agile approaches. Self-managed teams have been identified as an enabling factor for the agile workforce, however, a comprehensive review and conceptualization of the relationship is missing from literature.

The objective of this research to identify and consolidate research articles to answer the question which role self-managed teams and related concepts play in the context of workforce agility. The research can be conducted either by the means of a review and theory development approach or by empirical research (e.g., survey-based, case-based).

Introductory literature:


Supervisor: Dr. Janek Richter
Scaling Agile in Digital Transformation

Digital transformation strategy has become a key concern of incumbent firms, which are pre-digital and established companies stemming from traditional industries. As one strategy, software-developing organizations are scaling-up their agile approaches to achieve organizational agility and ultimately cope with the digital transformation. Scaling agile approaches through organizational transformations represents a major challenge for incumbent firms that have implemented traditional forms of organization. The scaling-up of agile methods can have multiple interpretations: (1) the use of agile methods in large firms, (2) the application of agile methods in large projects / teams, (3) the usage of agile methods in large multi-team settings, and (4) the employment of agile practices and principles in firms as a whole (Dingsøyr and Moe 2014).

There is a recent upsurge in research investigating this phenomenon. However, research is missing a comprehensive overview of which types of agile transformations researchers are focusing on and what we are missing at the moment. The goal of this research is to conceptualize the phenomenon of agile transformations and to develop a research agenda.

Introductory literature:


Supervisor: Dr. Janek Richter

Conceptualizing Behavior Change Support Systems for the Sustainable Use of Consumer Electronics

Improper handling of household consumer electronics (e.g., dishwasher) leads to a reduced lifetime of the devices causing negative economic and environmental impacts on the consumer. An insurance company tackles this problem by developing a “device manager application” providing useful tips and tricks on how to properly handle consumer electronics over their entire lifecycle. We believe, providing this valuable information informed by latest insights from IS research (e.g., nudging mechanisms or persuasive systems design) will increase the information effectiveness and the probability of changing the consumer’s behavior in such a way that the lifetime of the consumer electronics is extended.
The goal of this thesis is to develop a conceptual prototype of a behavior change support system (BCSS) for the sustainable use of household consumer electronics.

The clear scope of the conceptual prototype, for instance the supported product category (e.g., dishwasher or washing machine), will be defined together with the cooperation partner at the beginning of the project.

We expect you to approach your thesis from two perspectives: First, you draw on the latest IS research, such as nudging mechanisms and persuasive system design, to inform the conceptual development of a BCSS. Second, you closely work with the insurance company and rely on its practical insights, which provides the contents and context for potential use cases of the BCSS.

Introductory literature:


Information about the cooperation partner will be provided upon request.

Master or bachelor thesis research in this area is both scientific and hands-on. It involves scientific rigor but also creative and conceptual thinking (e.g., requirement specification for an app solution). The thesis’ results shall shed light on opportunities, limitations, feasibility, and risks of information systems in the sustainable consumption domain.

Supervisor: Roman Zeiß

Increasing Customer Turnover in Digital Startups

New ventures suffer from the liability of newness, that is, because they are young organizations without a proven record, potential customers tend to trust them less. This is especially challenging for digital startups, who interact with potential customers only through their websites and/or mobile applications.
This thesis aims at investigating what trust-building mechanisms are most expedient in turning potential customers (e.g., people that visit a startup’s website) into actual customers.


Master thesis only. The thesis will be created in collaboration with MySchleppapp, known from the German TV show die Höhle des Löwen. Research in this area can involve case study, survey research, or experimental work, among others.

Supervisor: Julian Lehmann