



Fellow	Katja / Bley
Host Organisation	Norwegian University of Science and Technology (NTNU)
Scientific coordinator	Ilias / Pappas

I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

During this fellowship, the fellow conducted research on the assessment and evaluation of digital processes and data-driven technologies, as well as the abstraction of information systems research in the design science discipline. Furthermore, she was involved in research on the motivational factors of employee-driven digital innovation.

The research activity focused mainly on applying emerging technologies, like big data and artificial intelligence, and how companies can use such tools to implement or improve data-driven decisions and for becoming – in its highest form of transformation – data-driven organizations. Multiple activities have been conducted, i.e., submissions to IS journals, submissions to leading IS conferences, and chairing tracks on international IS conferences. The research on the elements and evolution of data-driven organizations was initiated during the period of the fellowship and involves international researchers from the University of Auckland and continues after the end of the fellowship. Finally, the research on employee-driven digital innovation, in which the fellow was involved with colleagues from the hosting institution, is another project which continues after the end of the fellowship.

The following list of publications reflects the scientific activity conducted during this fellowship.

II – PUBLICATION(S) DURING YOUR FELLOWSHIP

1. Bley, K., Hentschel, R., Pappas, I. (2022). An Information Systems Design Theory for Digital Broker Platforms. In: Drechsler, A., Gerber, A., Hevner, A. (eds) The Transdisciplinary Reach of Design Science Research. DESRIST 2022. Lecture Notes in Computer Science, vol 13229. Springer, Cham. https://doi.org/10.1007/978-3-031-06516-3_1. (Published)

Abstract: Service platforms are becoming dominant drivers of daily business operations in a digitalized environment. Research focuses on technological and network effects of such platforms, while socio-technical opportunities remain limited. Guidance support in selecting appropriate digital services on a multisided market platform may help companies with low domain knowledge as it increases their benefits by reducing existing barriers in adopting emerging technologies. We adapt the concept of a broker to a digital platform, which instantiates guidance support on multisided markets as core platform element. Further, we abstract the concept of a digital broker platform as an Information Systems (IS) design



theory. By providing the necessary components of an IS design theory, we offer the possibility to derive digital broker platform artifacts, which are theoretically and conceptually grounded. We provide design principles for the method artifact and describe their applicability in an exemplary instantiation of the design theory in the domain of cloud computing. Lastly, we present the artifact's mutability as well as its testable propositions.

2. Bley, K., Rønningen, M., Spagnoletti, P., Pappas, I., Hentschel, R. (2022). "Development of a Strategic Decisional Support System for Soccer". DESRIST, Tampa, Florida. https://www.usf.edu/business/documents/desrist/paper_118.pdf. (Published)

Abstract: Soccer, in comparison to other popular sports, is a fluid game with high degrees of freedom, which makes analyzing games or the performance of individual players more difficult and challenging. In this context, big data analytics offers an advantage in automatically assessing and synthesizing data from multiple sources, as well as delivering insights that go beyond the analytical capabilities of individual human specialists. We focus on this opportunity by creating a design science research approach to a big data analytics web application artifact that intends to provide strategic decisional guidance support for managers and specialists. The prototype provides the visual presentation of single players' strength and weaknesses in polar charts and can therefore be used to support the tactical and strategic decisions about upcoming game set ups. Thus, we are able to show the potential of big data based analytical tools for strategic decisions in sport and offer an alternative to existing, merely intuitive approaches by experts.

3. Brosig, C., Bley, K., Strahringer, S., Westner, M. (2022). "The Missing Piece – Calibration of Qualitative Data for Qualitative Comparative Analyses in IS Research". ECIS 2022 Research Papers. 37. https://aisel.aisnet.org/ecis2022_rp/37. (Published)

Abstract: Over the last years, configurational research has become increasingly popular in the Information Systems (IS) discipline. Researchers value configurational methods like Qualitative Comparative Analysis (QCA) as their application contributes to a better understanding of complex phenomena. QCA helps to uncover interrelations of conditions that lead to an outcome, building on the principles of equifinality, conjunctural causation, and asymmetry. More recently, IS researchers have started to analyze qualitative data, like case study data, with QCA. However, there is a lack of methodological guidance on how to calibrate qualitative data into set membership values for QCA. Therefore, this paper structures methodological steps and the associated options to calibrate qualitative data from an interdisciplinary perspective and critically reviews the observed methodological choices in IS research. This paper also gives recommendations for calibrating qualitative data to support informed methodological choices for future research.

4. Bley, K., Rønningen, M., Spagnoletti, P., Pappas, I. (2022). "The Potential of Big Data Analytics for Decision Support in Sports – The Case of Soccer". AMCIS 2022 Proceedings. 9. https://aisel.aisnet.org/amcis2022/conf_theme/conf_theme/9. (Published)

Abstract: Compared to other popular sports, soccer is quite a fluid sport with high degrees of freedom, which is why evaluating games or single players' performance is more demanding and complex. Even though the availability of different types of soccer data has increased steadily over the last few years, the process of strategic and tactical decision-making is still traditionally done by single specialists. In this context, the potentials of big data analytics (BDA) provide an advantage in automatically assessing and assembling data from various sources and generating insights that exceed the analytical capability of individual human experts. We focus on this potential by developing a design science research-based BDA artifact, which aims at providing strategic decisional support for managers and experts. In several evaluations with different soccer and sports experts, we are able to show advanced usability of the artifact's instantiation over traditional tools provided by large stats providers.

5. Bley, K., Fredriksen, S., Skjærvik, M., Pappas, I. (2022) "The Role of Organizational Culture on Artificial Intelligence Capabilities and Organizational Performance". In: Papagiannidis, S., Alamanos, E., Gupta, S., Dwivedi, Y.K., Mäntymäki, M., Pappas, I.O. (eds) *The Role of Digital Technologies in Shaping the Post-Pandemic World*. I3E 2022. Lecture Notes in Computer Science, vol 13454. Springer, Cham. https://doi.org/10.1007/978-3-031-15342-6_2. (Published)

Abstract: In recent years, artificial intelligence (AI) has become increasingly relevant for organizations to exploit business-related databases and remain competitive. However, even though those technologies offer a huge potential to improve organizational performance, many companies face challenges when adopting AI technologies due to missing organizational and AI capability requirements. Whereas existing research often focuses on technological requirements for the application of AI, this study focuses on those challenges by investigating the influence of organizational culture on a company's AI capability and its organizational performance. We conducted a quantitative study in Scandinavia and employed a questionnaire receiving 299 responses. The results reveal a strong positive relationship between organizational culture, AI capabilities, and organizational performance.



6. Scharfe, P., Ludwig, H., Bley, K., Wiener, M., Schmidt, T. (2022) "Data-driven Failure Management: An Ontology-based Speech Recognition App for Failure Capturing in Manufacturing Processes." ITAIS/MCIS 2022, Catanzaro, Italy. (Published)

Abstract: Manufacturing processes are characterized by an increasing complexity, making them susceptible to failures. An effective strategy to avoid such failures, or at least to minimize their impact, is data-driven failure management. However, for many small and medium sized manufacturers, this strategy is not feasible due to a paucity of relevant failure data, which can be explained by the severe limitations and shortcomings of available solutions: ranging from the error proneness and high efforts of manual solutions to the high costs and implementation efforts of automated solutions. Against this backdrop, our study follows a design science research approach to design, develop, and evaluate a novel ontology-based speech recognition app that addresses key shortcomings of currently available solutions. Main contributions of our study are the development of design requirements and principles, as well as their instantiation in an app prototype for collecting failure data in the context of manufacturing processes.

7. Fischer, H., Wiener, M., Strahinger, S., Kotlarsky, J., Bley, K. (2022) "From Knowing to Data-Driven Organizations: Review and Conceptual Framework". ACIS 2022 Proceedings. 42. <https://aisel.aisnet.org/acis2022/42> (Published)

Abstract: With companies and other organizations increasingly striving to become (more) data-driven, there has been growing research interest in the notion of a data-driven organization (DDO). In existing literature, however, it seems that different understandings of such an organization emerged. The study at hand sets forth to synthesize the fragmented body of research through a review of DDO understandings in the IS and related literatures. Based on the review results and drawing on the concept of the 'knowing organization,' our study identifies five core elements of a DDO (data sourcing & sensemaking, data capabilities, data-driven culture, data-driven decision-making, and data-driven value creation), which we integrate into a conceptual DDO framework. Most notably, the proposed framework suggests that an ideal-typical DDO combines an outside-in view with an inside-out view, thereby setting itself apart from its predecessor, the knowing organization. Theoretical and practical contributions as well as directions for future research are discussed.

8. Opland, L. E., Bley, K., Pappas, I. (2023) "Is Motivation always the Key? – Antecedents of Employee-Driven Digital Innovation." Hawaii International Conference on System Sciences. 2023, Maui, Hawaii. (Published)

Abstract: Understanding the factors that can explain innovation has received a lot of attention among researchers in the last decades. During the same period, different approaches to innovation have also seen the light of day, among them employee-driven innovation and digital innovation. In this study our aim is to look at a concept that merges these two types of innovation and see how motivation affects employee-driven digital innovation. In our research model we look at how intrinsic, social, and internalized extrinsic motivation affects employee-driven digital innovation, and how variables like strategy and organizational culture can act as explanatory and moderating variables.

9. Bley, K., Pappas, I., Strahinger, S. "A Configurational Approach to Maturity Model Development – Using fsQCA to Build an Innovation Capability Maturity" Submitted to Communications of the AIS (pending)

Abstract: Maturity models can be used as tools which depict the developmental trajectories of entity classes in domains and evaluate the relative position of an entity within this framework. Their development process, however, has been focus of researchers and practitioners ever since, leading to different procedures, development approaches, and conceptual models. Thus, a major criticism of maturity models is the often missing conceptual and theoretical grounding when it comes to the interpretation of the concept of maturity. To address this shortcoming, our research approach focuses on the rigorous development of a maturity model in the domain of innovation capability in small industrial companies. By following a sequential process, which has a theoretical grounding, the resulting maturity model can be regarded as an instantiation of the predefined conceptual components and characteristics. We present and discuss the resulting sector and size-specific maturity model, which is developed by applying configurational methods on a data set and thereby offers multiple pathways to maturity. This concept of equifinality is central to our approach. So far it was rarely considered in maturity model development research, although it offers the potential of building more realistic models with higher applicability, especially in domains with many interdependencies.

10. Hentschel, R., Bley, K., Pappas, I. "A Performance-based Assessment Approach for Cloud Service Provider Selection" Americas Conference on Information Systems 2023, Panama City (pending)

Abstract: More and more companies are increasingly using cloud services. Accordingly, the decision for a cloud service provider is crucial for the added value of the cloud service to the company, which is why the selection should be subject to a well-planned process, and the final decision must be made carefully. Since cloud service providers make resources available via the internet, performance parameters are important for assessing cloud service providers and play an



important role in the decision-making process. Therefore, this paper addresses which network performance metrics are relevant for selecting a cloud service provider and how these can be collected and evaluated. It provides an assessment method that can be used in the future as guidance for cloud service provider selection.

11. Opland, L. E., Bley, K., Pappas, I. “The Motivation Behind Employee-driven Digital Innovation” (pending)

Abstract: Motivating your employees is often the first step on the way to creating commitment and ownership in innovation processes which can lead to the creation of new products and services. Research in the last 20 years have revolved around increasing the understanding of factors that can explain innovation, with motivation being one of them. When competition increases, knowledge into what motivates employees to contribute to innovation might be decisive to constantly stay ahead of the competitors. In this paper we combine the quantitative method of structural equation modelling with fuzzy set qualitative comparative analysis to illuminate how intrinsic, social, and internalized extrinsic motivation affects employee-driven digital innovation, and how independent variables like strategy and organizational culture play a mediating role in understanding the causal relationships behind the concept.

III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

International Conferences

1. 19th Mediterranean Conference on Information Systems (itAIS/MCIS 2022). October 2022, Catanzaro, Italy.
2. 21st IFIP Conference on e-Business, e-Services and e-Society (I3E 2022), September 2022, Newcastle upon Tyne, UK.
3. 28th Americas Conference on Information Systems (AMCIS 2022). August 2022, Minneapolis, USA. (virtually)
4. 30th European Conference on Information Systems (ECIS 2022), June 2022, Timisoara, Romania.
5. 17th International Conference on Design Science Research in Information Systems and Technology (DESRIST 2022), May/June 2022, Tampa, USA.

Track Chair/Associate Editor for International Conferences

1. ECIS 2022, 30th European Conference of Information Systems, Timisoara, Romania, June 2022, Associate Editor for the General Track
2. ECIS 2023, 31st European Conference on Information Systems, Kristiansand, Norway, June 2023, Associate Editor for the Track “Artificial Intelligence in IS Research and Practice. <https://ecis2023.no/submissions/track-descriptions/?track=aiisrp>
3. AMCIS 2022, 28th Americas Conference of Information Systems, Minneapolis, Chair on the Mini-Track “Strategic Impact of Digitized Products”. <https://amcis2022.aisconferences.org/submissions/track-descriptions/#toggle-id-20>
4. AMCIS 2023, 29th Americas Conference of Information Systems, Panama City, Chair on the Mini-Track “Strategic Impact of Digitized Products”. <https://amcis2023.aisconferences.org/track-descriptions/#toggle-id-30>
5. itAIS/MCIS2022, 19th Mediterranean Conference on Information Systems (itAIS/MCIS 2022). October 2022, Catanzaro, Italy., Chair on the Track “Innovating Sustainability: Strategic Impact of Digital Processes, Products, and Services”. <http://www.itaais.org/conference/2022/wp-content/uploads/sites/12/2022/03/15-Innovating-Sustainability.pdf>

IV – RESEARCH EXCHANGE PROGRAMME (REP)

The fellow did not participate in the Research Exchange Programme.