Thema 1

Evaluation of Trust Facets in Data Ecosystems and Data Spaces

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

Since the beginning of digital information processing in the 1960s, the relevance and impact of data has emerged to an essential part for people and organizations. Today, organizations increasingly see data as a strategic asset enabling them to drive innovation and create competitive and advantageous value propositions (Fassnacht et al., 2023; Gelhaar & Otto, 2020). Sharing data among organizations requires the stakeholders to trust each other on the handling and origin of the data. With the emergence of data ecosystems and data spaces current assumptions on the requirement of trust when sharing data are challenged. Moreover, in data ecosystems different trust facets are important and need to be considered (Söllner, 2016).
In this seminar paper students will dive into the field of trust research, especially different trust facets in the context of data ecosystems and data spaces. While the role of trust in interorganizational relationships is known in research and practice for some time, the emergence of new ways to share data in large decentralized networks, such as data ecosystems challenges the current understanding.

The seminar paper should employ quantitative or qualitative methods (e.g., interview study) to explore the different trust facets that are relevant in data ecosystems and data spaces.

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Literaturhinweise

Möller, F., Jussen, I., Springer, V. et al. Industrial data ecosystems and data spaces. Electron Markets 34, 41 (2024). https://doi.org/10.1007/s12525-024-00724-0

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Thema 2

Developing Robust Reporting for Green Energy in Data Centers

UNIVERSITÄT BAYREUTH

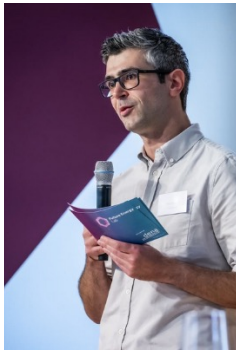
Beschreibung des Themas

The rapid growth of new technologies and services, such as artificial intelligence, streaming platforms and other digital services, is driving a sharp increase in data center electricity consumption. Data centers in Europe are projected to consume 98.5 TWh of electricity in 2030, a 28% increase from 2018. To address this trend, the European Union has introduced regulatory measures, which requires data center operators to report key performance indicators to increase transparency and promote sustainable practices, including increasing the share of renewable electricity.

However, significant challenges remain in implementing effective reporting mechanisms. A key issue is how to collect fine-grained and verifiable data without imposing an excessive administrative burden on data center operators, particularly for virtualized infrastructure and cloud services where resources are dynamically shared. This challenge is further compounded by the inherent limitations of existing reporting frameworks, in particular the varying quality of renewable energy certificates.

In this seminar, students will explore this topic and identify practical challenges and possible solutions. The research should be conducted with quantitative or qualitative methods, such as a semi-structured interview study with experts from the field.

Felix Paetzold



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Literaturhinweise

Babel, M., Gramlich, V., Körner, MF. et al. Enabling end-to-end digital carbon emission tracing with shielded NFTs. Energy Inform 5 (Suppl 1), 27 (2022).

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Thema 3

How Smart is Smart Enough?

Systematische Analyse von technischen Anforderungen für die Messdatenübertragung, Steuerung und Abrechnung von energieflexiblem Verhalten

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

Zur Gewährleistung der Versorgungssicherheit muss zu jedem Zeitpunkt das Gleichgewicht aus Stromeinspeisung und Stromverbrauch in den Stromnetzen sichergestellt werden. Um die zunehmend wetterabhängige, volatile Stromeinspeisung aus erneuerbaren Energien auszugleichen, bedarf es daher einer diesen Schwankungen entsprechenden, flexiblen Stromnachfrage. Über verschiedene Anwendungsfälle (dynamische Strompreise, zeitvariable Netzentgelte, Systemdienstleistungen für Netzbetreiber) kann ein solch energieflexibles Verhalten entsprechend angereizt werden, allerdings bedarf es – spätestens bei der Abrechnung der erbrachten Energieflexibilität – u.a. feingranularer Messdaten über Stromeinspeisung und Verbrauch, welche über das Smart-Meter-Gateway (SMGW) übertragen werden sollen.

Der derzeit schleppend verlaufende SMGW-Rollout hemmt entsprechend die flächendeckende Einführung verschiedener Anwendungsfälle von Energieflexibilität und gefährdet somit zunehmend die Versorgungssicherheit in Deutschland. Da aus technischer Sicht nicht alle potenziellen Funktionen des SMGWs für alle Anwendungsfälle benötigt werden, könnte die Pflichtnutzung des SMGWs für systemunkritische Anwendungsfälle (bspw. dynamische Strompreise) ausgesetzt und stattdessen die Verwendung niederschwelliger Alternativen zum SMGW erlaubt werden werden.

Ziel dieser Arbeit ist es daher bspw. durch eine strukturierte Literaturrecherche oder semi-strukturierte Experteninterviews die technischen Mindestanforderungen für die sichere Datenübertragung, Steuerung und Abrechnung von Energieflexibilität für unterschiedliche Anwendungsfälle systematisch zu analysieren, um transparente Kriterien für die Einordnung von Anwendungsfälle in Pflichtnutzung des SMGWs und Möglichkeit der Nutzung niederschwelliger Alternativen zum SMGW abzuleiten.

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Thema 4

Leveraging Sustainability Data for Transformation

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

Companies are facing increasing regulatory requirements to collect and disclose sustainability data in reports. While these reports are primarily informational in nature, the underlying data provides a valuable foundation for transformative sustainability initiatives. The challenge, however, is that many companies do not have or leverage the necessary skills to use sustainability data strategically beyond pure reporting purposes. Research shows that sustainability data is becoming increasingly available and comprehensively collected. Studies emphasize the value of such data for strategic decision-making and organizational transformation. However, it remains unclear what internal capabilities are needed to effectively use this data and initiate transformative action. There is a lack of clear understanding of what organizational capabilities are required to use sustainability data not only for reporting but also as a basis for organizational transformation. This seminar aims to address the following questions:

- What capabilities are needed to effectively capture and analyze sustainability data?
- How can these capabilities contribute to enabling corporate transformation towards more sustainability?

The work contributes to the discussion on the strategic use of sustainability data and extends existing theories in the field of organizational capabilities and transformation. It offers new perspectives on the role of data in corporate sustainability strategy. The results can support companies in taking targeted measures to develop the necessary capabilities. This not only facilitates compliance with regulatory requirements, but also supports the implementation of concrete sustainability strategies.

Methodologically, both a literature review and an interview study or a combination of both could be used in this seminar.

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Literaturhinweise

- Püchel, L., Wang, C., Buhmann, K., Brandt, T., von Schweinitz, F., Edinger-Schons, L. M., ... & Mardahl, T. D. (2024). On the Pivotal Role of Data in Sustainability Transformations. Business & Information Systems Engineering, 1-18.
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Thema 5

ChatGPT Hits the Books

Could Your Next Personalized Tutor Be a Large Language Model?

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

As we delve deeper into the digital age, AI is making significant strides, especially in education. Large Language Models (LLMs), such as ChatGPT, represent the next evolution in AI-based learning tools. They open promising avenues for personalized learning, enhancing education outcomes, and bridging learning gaps. ChatGPT, acting as an AI-powered conversational interface, can provide learners with a responsive, adaptive, and customized educational experience. Given its potential to transform education, it's important that we assess its practical implementation and effectiveness. Consequently, research should explore ChatGPT's potential as a tool for personalized learning in diverse educational contexts. Simultaneously, it's crucial that we uncover any constraints or challenges in introducing ChatGPT to the educational sector. In the long term, assessing the model's impact on improving students' comprehension and retention of course material is critical.

To provide detailed insights into the potential of AI-based learning tools in educational settings this seminar paper should carry out a literature review combined with interviews/focus group discussions, which derives initial design objectives for implementing LLMs like ChatGPT into learning, following the first steps of the research process proposed by Peffers et al. (2007).

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Literaturhinweise

Floridi, L., Chiriatti, M. GPT-3: Its Nature, Scope, Limits, and Consequences. Minds & Machines 30, 681–694 (2020). https://doi.org/10.1007/s11023-020-09548-1

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Thema 6

Integrating Bytes and Brains for Better Outcomes

Enhancing Decision Making through Decision Intelligence

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

Effective decision-making increasingly depends on the integration of data to uncover trends, reduce biases, and improve outcomes. However, many organizations struggle to connect their data to relevant decisions due to challenges such as accessibility, integration, and the lack of suitable methods. This seminar paper explores how organizations can systematically integrate data into decision-making processes to enhance decision intelligence. Through a structured literature review, the study will investigate existing methods, identify gaps, and propose approaches to optimize data-driven decision-making.

Possible objectives of the seminar paper: (1) Understand the current landscape of decision intelligence: Examine existing methods and frameworks that support data-driven decision-making in organizations. (2) Identify barriers to integrating data into decisions: Investigate common challenges organizations face, such as data accessibility, integration, or bias in decision-making processes. (3) Analyze the role of decision support methods: Evaluate the effectiveness of various methods in utilizing data to improve the quality and reliability of decisions. (4) Propose design recommendations for data-driven decision-making frameworks: Develop actionable insights and principles to enhance decision intelligence, tailored to organizational needs.

By mapping the current state of decision-making methods and exploring opportunities for improvement, this seminar paper will contribute to understanding how organizations can leverage data to make smarter, more informed decisions.

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Literaturhinweise

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Thema 7

The Role of Digital Technologies for Animal Welfare

An Information Systems Perspective

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

Digital technologies are widely used in animal husbandry, for instance, automated feeding and milking systems. While digital technologies might have negative impacts, such as causing stress and discomfort, they also offer many benefits, such as health monitoring. To fully leverage their positive potential and thus also improve animal welfare, it is crucial to understand the current interactions and impacts of digital technologies on farm animals. Currently IS research has paid limited attention to this topic, however other disciplines (e.g., veterinary sciences, behavioral biology) have stated to explore this interplay. Hence, the goal of this seminar paper is to conduct an interdisciplinary literature review to provide a comprehensive overview of the current state of knowledge on the interplay between digital technologies and farm animals, with a focus on animal welfare. The results can, for instance, be processed in the form of a taxonomy, which is evaluated through real-world examples.

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Literaturhinweise

Stachofsky, J., "Cleaning our Plates: Information Systems Contributions Toward Animal Liberation" (2024). Hawaii International Conference on System Sciences 2024 (HICSS-57). 3. https://aisel.aisnet.org/hicss-57/sj/justice/3

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Thema 8

Causal Machine Learning and Human-AI Teams

How causal information changes human perception of and human interaction with AI

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

Machine learning (ML) supports human decision-making, even in high-risk areas like healthcare, by predicting "what is" rather than "what if." For example, it aids in diagnosing diseases based on symptoms. Recently, causal ML has emerged to answer "what if" questions, such as the effects of a specific medication on a patient. This study focuses on how causal ML models, like causal large language models, influence human decision-making in collaborative settings. It aims to examine whether causal insights lead to over-reliance (blind trust) or under-reliance (excessive skepticism). A literature review will identify current knowledge and gaps, followed by designing an experiment to address a specific research question. Developing a suitable ML task for the experiment will be crucial.
The study will assess how causal insights impact decision quality in areas like healthcare, finance, and education, providing recommendations for designing AI systems that foster effective human-AI collaboration.

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Thema 9

Leveraging Large Language Models for Information Extraction

Building up structured data and insights for predictive analytics and strategic insights

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

Organizations increasingly rely on data-driven insights when making decisions. However, a significant portion of organizations' valuable data remains unstructured and underutilized, especially in domains such as project management, healthcare or legal. Large Language Models (LLMs) offer transformative potential to automatically identify and extract structured information from unstructured or semi-structured data sources, such as text documents, emails, web pages, or reports. Hence, LLMs are capable of identifying specific entities (e.g., names, dates, locations), relationships (e.g., "person works for company"), and other relevant pieces of information from raw textual content. By converting unstructured text into structured data, information extraction can facilitate the use of advanced data analysis techniques, machine learning models, and decision-support systems.

The goal of this seminar paper is to conduct a structured literature review (and optional semi-structured interviews with experts) on the use of LLMs for information extraction. Based on the findings, the seminar paper should derive design objectives in the sense of design science research to guide the development of effective systems for transforming unstructured information into structured formats for predictive analytics and strategic insights.

The scope of the term paper may vary depending on the students' progress in their studies.

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Literaturhinweise

Huang, A. H., Wang, H., & Yang, Y. (2023). FinBERT: A large language model for extracting information from financial text. Contemporary Accounting Research, 40(2), 806-841.

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Thema 10

Techno-Sustainable Decisions: Wie kann Nachhaltigkeit in IT-Management-Entscheidungen verankert werden?

UNIVERSITÄT BAYREUTH

Literature Review zu Relevanz und Gestaltungsmöglichkeiten

Beschreibung des Themas

Immer mehr Produkte und Abläufe in Unternehmen beinhalten digitale Technologien. Dabei werden bei der Gestaltung von IT-Systemen in Unternehmen zumeist Ziele wie hohe Performance, durchgehende Verfügbarkeit, oder flexible Skalierbarkeit verfolgt. Durch die Optimierung der genutzten IT im Hinblick auf diese Zieldimensionen, erhoffen sich Unternehmen einen maximalen Beitrag zu ihrer Wertschöpfung und den „klassischen" Unternehmenszielen. Allerdings verfolgen Unternehmen neben den klassischen Zielen des Wachstums, der Produktivität, oder der Effizienzsteigerung immer häufiger auch Nachhaltigkeitsziele. Auch die in Organisationen eingesetzte IT ist dabei ein relevanter Faktor, denn IT-Systeme tragen weltweit über 2% der globalen CO2-Emmissionen bei. **Problematisch ist, dass auf Nachhaltigkeit ausgerichtete Zieldimensionen in der Regel grundlegend verschieden zu den klassischen, etablierten Zieldimensionen des IT-Managements sind.**

Vor diesem Hintergrund ist das Ziel der Arbeit, zu untersuchen, wie Nachhaltigkeitskriterien in typische IT-Management-Entscheidungsprozesse integriert werden können. So könnten z.B. in der Softwareentwicklung Machine Learning Modelle nicht mehr nur nach ihrer Performance bewertet werden, sondern auch der Energiebedarf bei Training und Inferenz berücksichtigt werden. Im Rahmen der Arbeit soll (i) ein Überblick über aktuelle Zieldimensionen und KPIs von IT-Management-Entscheidungen erarbeitet werden und anschließend (ii) aufgezeigt werden, wie Nachhaltigkeitsziele in den identifizierten Entscheidungsprozessen integriert und verankert werden können.

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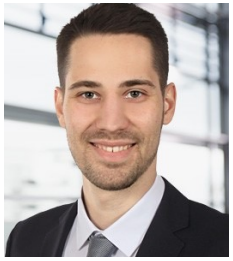

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Harmon, R.R., Demirkan, H. und Raffo, D. (2012): „Roadmapping the next wave of sustainable IT". Foresight, Vol. 14 No. 2, pp. 121-138. https://doi.org/10.1108/14636681211222401

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Thema 11

Techno-Sustainable Decisions: How can sustainability be integrated into IT management decisions?

UNIVERSITÄT BAYREUTH

Literature Review on the relevance and design options

Description of the topic

More and more products and processes in companies involve digital technologies. In most cases, companies pursue goals such as high performance, continuous availability, or flexible scalability when designing IT systems. By optimizing the IT used with these target dimensions in mind, companies hope to maximize their value creation and achieve their "classic" corporate goals. However, in addition to the traditional goals of growth, productivity, or efficiency, companies are increasingly pursuing sustainability goals. The IT used in organizations is also a relevant factor here, because IT systems contribute to over 2% of global CO2 emissions worldwide. The problem is that sustainability-oriented target dimensions are fundamentally different from the classic, established target dimensions of IT management.

The aim of this work is to investigate how sustainability criteria can be integrated into typical IT management decision-making processes. In software development, for example, machine learning models could no longer be evaluated solely on the basis of their performance, but also on the basis of the energy required for training and inference. The work will (i) provide an overview of current target dimensions and KPIs of IT management decisions and then (ii) show how sustainability goals can be integrated and anchored in the identified decision-making processes.

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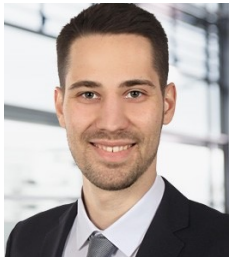

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Jones, N. (2018): „The information factories". Nature Vol. 561, pp. 163-166. https://doi.org/10.1038/d41586-018-06610-y

Thema 12

Do We Have to Sacrifice Privacy for Utility in Information Systems?

Exploring the behavioral and technical aspects of the trade-off between utility and privacy

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

Motivation: Information systems often rely on large volumes of personal and behavioral data to deliver benefits like accurate predictions, personalized recommendations, and improved decision-making. However, these advantages come with significant privacy concerns, raising questions about the acceptable trade-offs between privacy and utility. For example, while patient data can enhance medical diagnoses through AI-driven models, the sensitive nature of this information often makes individuals hesitant to consent to its use. Striking a balance between data utility and privacy protection remains an unresolved challenge, leaving ample opportunity to explore behavioral drivers or technical solutions in a seminar paper.

Possible objectives:

1) **Socio-economic focus:** Explore privacy theories and frameworks (e.g., privacy calculus or contextual integrity) and identify key drivers that affect user decisions in data-sharing contexts.
2) **Technical focus:** Investigate privacy-enhancing technologies (e.g., federated learning, differential privacy, cryptographic methods) and derive design objectives for their development and application in information systems.

Method: Depending on the objective, structured literature reviews or empirical approaches (such as surveys or interviews) may be utilized.

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Literaturhinweise

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Thema 13

Stress durch Technologie?

Eine empirische Analyse der Einflussfaktoren von Technostress in der digitalen Arbeitswelt

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

Die fortschreitende Digitalisierung hat zahlreiche Vorteile für moderne Arbeitsumgebungen mit sich gebracht. Die Automatisierung von Prozessen, die Verfügbarkeit innovativer Tools und die Möglichkeit zum Home-Office haben die Arbeitswelt nachhaltig transformiert. Doch mit diesen Veränderungen kommen auch neue Herausforderungen zum Vorschein. Die ständige Erreichbarkeit und die Entgrenzung von Berufs- und Privatleben können psychische Belastungsreaktionen hervorrufen. Ein zentrales Phänomen in diesem Kontext ist der sogenannte Technostress, der bei Mitarbeitenden zu erhöhtem Druck und gesundheitlichen Beeinträchtigungen führen kann. Vor diesem Hintergrund ist es entscheidend, die Ursachen hinter Technostress besser zu verstehen, um Unternehmen und Mitarbeitende gleichermaßen bei der Bewältigung dieser Herausforderungen zu unterstützen. Ziel dieser Seminararbeit ist es, den Einfluss individueller Faktoren (z. B. Alter, Geschlecht) und situativer Faktoren (z. B. Branche, Arbeitsplatzgestaltung) auf das Auftreten von Technostress empirisch zu untersuchen. Im Rahmen einer Online-Befragung sollen Daten erhoben werden, die anschließend mithilfe statistischer Methoden ausgewertet werden sollen.

Grundkenntnisse in Statistik werden vorausgesetzt. Erste Erfahrungen mit Analyse-Tools wie SPSS oder R sind wünschenswert, jedoch keine zwingende Voraussetzung.

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Sprache: Die Seminararbeit ist in deutscher oder englischer Sprache zu verfassen

Literaturhinweise

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Thema 14

Nudging Users Towards Environmentally Conscious Decisions in the Context of Large Language Models (LLMs)

Strategies and Integration Approaches

UNIVERSITÄT BAYREUTH

Beschreibung des Themas

Large Language Models (LLMs) like GPT-4o are democratizing the use of AI. In November 2022, the release of ChatGPT set the record for the fastest generation of users, achieving 1 million users in five days. With newer models, the number of users and the performance even increased. Along with that, these better and bigger models are more expensive and create higher CO2 emissions. For example, training competitive LLMs uses as much water as manufacturing 370 BMWs. While developers of these models should be engaged to use renewable energies for model training, model use constitutes an important part in energy consumption. For example, the electricity consumption of ChatGPT could rival entire nations, like Sweden, by 2027. To fight the increasing amount of energy consumption through LLM use, green digital nudging can manipulate users into more conscious usage. Nudging suggests that non-coercive interventions can assist individuals in making socially desirable choices that they may not have made otherwise (Thaler and Sunstein, 2009). Digital nudging refers to "[...] the use of user-interface design elements to guide people's behavior in digital choice environments" (Weinmann et al. 2016, p. 433). Green nudging is a part of research on Pro-Environmental Behavior (PEB), which explores interventions that aim to reduce the adverse environmental impact of human behaviors (White et al., 2019). The goal of this seminar thesis is to identify strategies and derive integration approaches on how to nudge users to be more sustainable. A multivocal literature review that integrates peer-reviewed and grey literature should be conducted to reach the goal of the seminar thesis.

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Literaturhinweise

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Thema 15

Digital durchstarten!? Wie das CFIR-Framework bei Imple-mentierung von digitalen Technologien unterstützen kann

UNIVERSITÄT BAYREUTH

Ein Überblick über die Forschung zum CFIR-Framework im Bereich digitaler Technologien

Beschreibung des Themas

Digitale Technologien spielen eine zunehmend größere Rolle in unserem Leben, doch ihre Implementierung scheitert oft. So werden elektronische Patientenakten (EPA) wegen komplizierter Bedienung oder schlechter Integration in bestehende Workflows selten effektiv genutzt – häufige Gründe sind mangelnde Akzeptanz, fehlende Schulung oder organisatorische Hürden. Genau hier setzt das **Consolidated Framework for Implementation Research** (CFIR, Damschroder et al. 2009, 2002) an. Es ist ein umfassendes Framework, das entwickelt wurde, um die Implementierung von Interventionen in der Praxis systematisch zu bewerten und zu verbessern. Es besteht aus fünf Hauptdomänen, die Einfluss auf die Umsetzung haben: Innovationseigenschaften, äußeres Umfeld, inneres Umfeld, Merkmale der Personen, Prozess der Implementierung. Es kann so als Leitfaden dienen, um Barrieren und fördernde Faktoren für die Implementierung systematisch zu analysieren und zielgerichtete Strategien zu entwickeln.

In dieser Seminararbeit soll **anhand eines SLRs** nach Webster und Watson (2002) **oder einer bibliometrischen Analyse** (Donthu et al. 2021)ein **Überblick über den aktuellen Stand der Forschung zum CFIR-Framework im Bereich digitaler Technologien** gegeben werden. Die Ergebnisse sollen dann anhand des CFIR-Frameworks und verschiedenen Anwendungsfeldern (z. B. Gesundheitsbranche, Verwaltung etc.) eingeordnet, analysiert und gegenübergestellt werden.

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Literaturhinweise

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