Efficient Collaboration in Interdisciplinary Teams: an Electromobility Research Example

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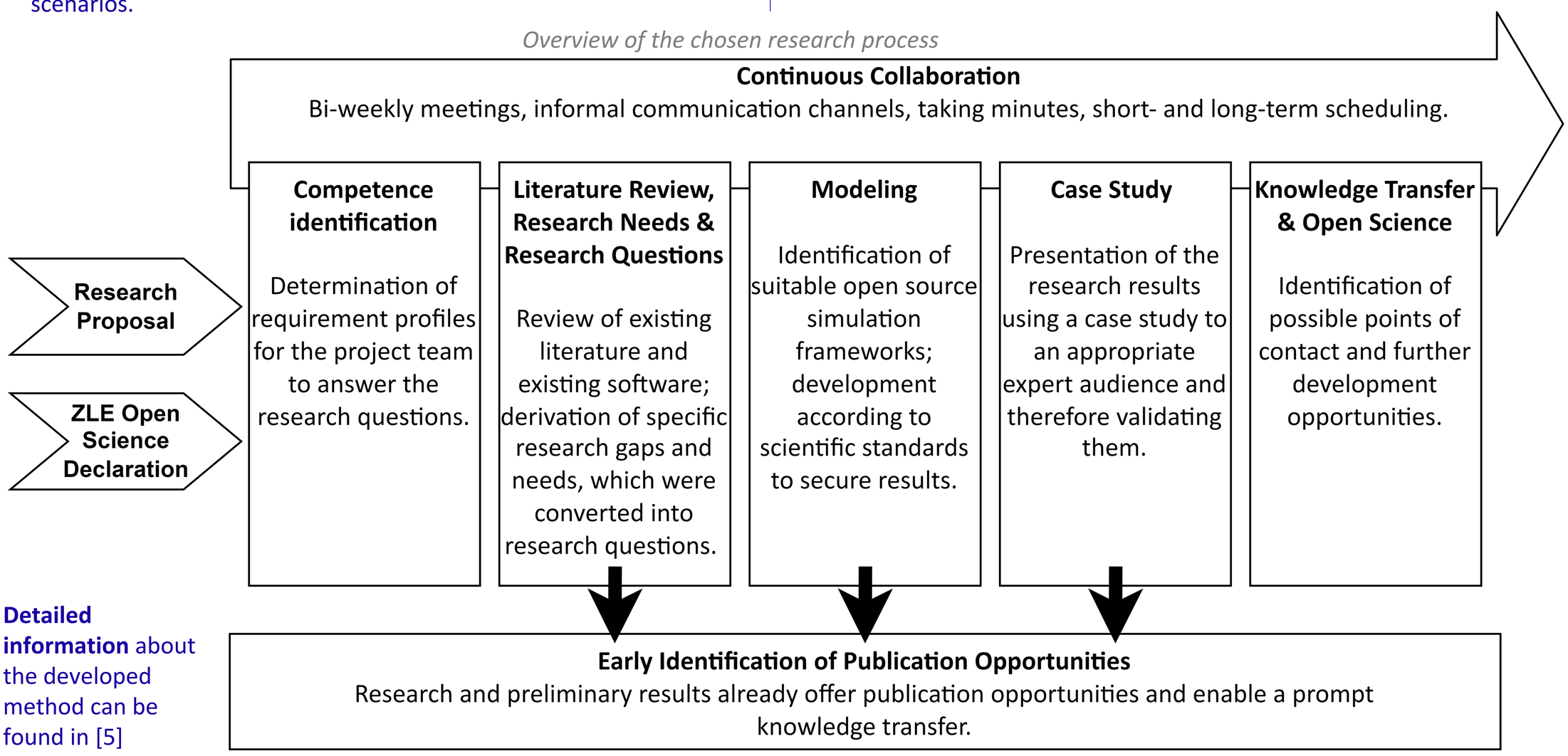
Introduction

- Researchers from the ZDIN-ZLE ("Zentrum für digitale Innovationen Niedersachsen, Zukunftslabor Energie", English: Center for Digital Innovations, Future Laboratory Energy) project documented their methodologies and created a best practice for an efficient and effective research process in interdisciplinary teams using their experience of investigating the grid integration of electric vehicles in existing residential districts.
- The research focused on energy system modeling and was based on open science standards to ensure knowledge transfer, transparency, and re-usability of the developed (co-)simulation models and scenarios.

Continuous Collaboration and early identification of publication opportunities

- Collaboration was systematically organized and planned using milestone planning, jour-fixes, and informal digital communication channels.
- Transfer to scientific literature at three points in the research process:
  - Systematic literature review [1]
  - Co-simulation modeling approach [2]
  - Case study using developed co-simulation tool [3]

Overview of the chosen research process



Detailed information about the developed method can be found in [5]

Competence Identification

- Competence analysis was conducted to optimize the use of the participants' individual strengths and knowledge base.
- Work packages as part of the overarching research process that required investigation in the context of the digitization of energy systems were identified.
- Project members assigned themselves to work packages after reflecting on their skills to ensure a high level of intrinsic motivation.
- Knowledge of programming languages and tools for energy system analysis was included in identifying the skills to enable joint work on the modeling phase.

Knowledge transfer and open science

- Scientists from ZDIN-ZLE committed themselves to an open science approach in their "Open Science Declaration" [4].
- All developed scenarios, raw data, and models are freely available in a public repository (see QR code).
- The data collected and created for the case study is also available in the public repository (see QR code).
- The chosen open science approach ensures transparency and enables an easy and highly accessible knowledge transfer and fast and continuous development within energy system modeling.

Repository **Co-Simulation**

- Open Source: models, data and scenarios of EIS 2022 publication

Documentation **Read-the-docs**

- Automatic generation of Read-the-docs using Sphinx

References

[1] S. Eckhoff, et al., "Electric mobility integration in energy communities: trending topics and future research directions," 5th E-Mobility Power System Integration Symposium 2021
[2] H. Wagner, et al.: "Analysis of the Grid Capacity for Electric Vehicles in Districts with a Major Need for Sustainable Energy Refurbishment: The Case of a District in Lower Saxony", EnviroInfo 2022, doi: 10.2370/9783844083293
[3] H. Wagner, et al., "Co-Simulation-Based Analysis of the Grid Capacity for Electric Vehicles in Districts: The Case of "Am Ölper Berge" in Lower Saxony," 6th E-Mobility Power System Integration Symposium (EIS) 2022, doi: 10.1049/icp.2022.2713
[4] S. Ferenz, et al., "ZLE Open Science Declaration," 2021, doi:10.5281/zenodo.5221234
[5] H. Wagner, et al. "Efficient Collaboration in Interdisciplinary Teams – an Electromobility Research Example", 2024, doi: 10.5281/zenodo.11570770

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