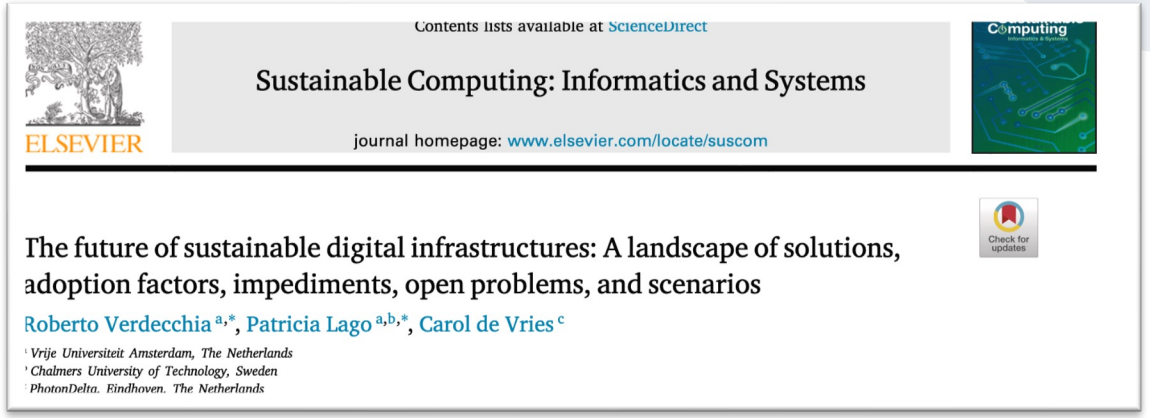
The Future of Sustainable Digital Infrastructures – A European Study

Presented by Sebastian Werner, TU Berlin

Follow-up Study to: **Roberto Verdecchia, Patricia Lago, Carol de Vries**, “The future of sustainable digital infrastructures: A landscape of solutions, adoption factors, impediments, open problems, and scenarios” 2022, https://doi.org/10.1016/j.suscom.2022.100767.

Roberto Verdecchia et. Al.

- Mixed-method empirical study
- Conducted in 2020/2021
- 48 unique participants from the Netherlands



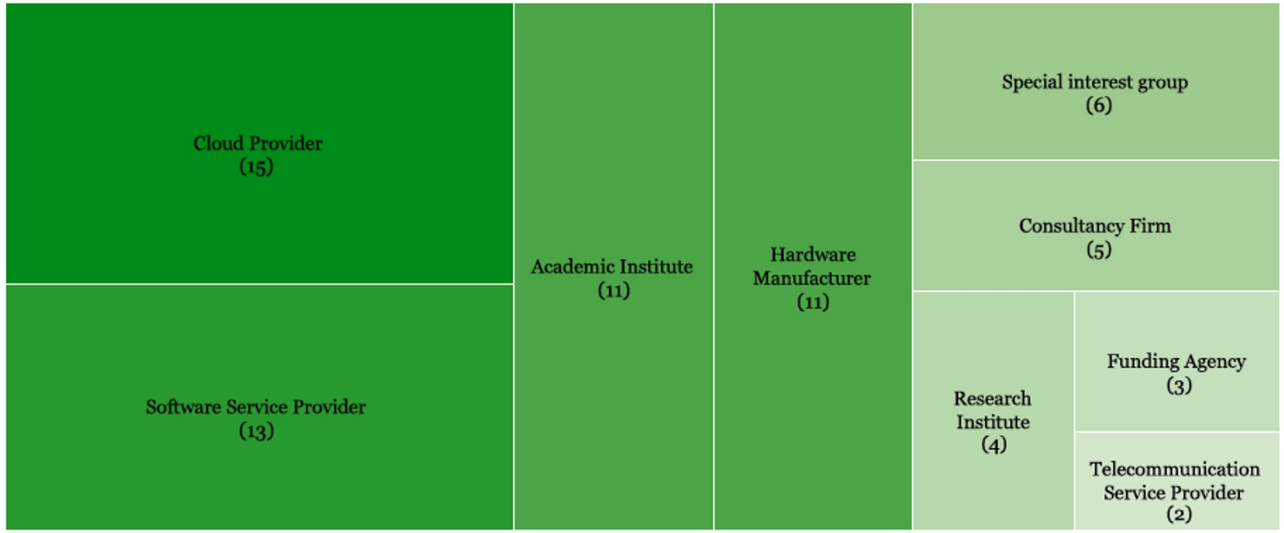


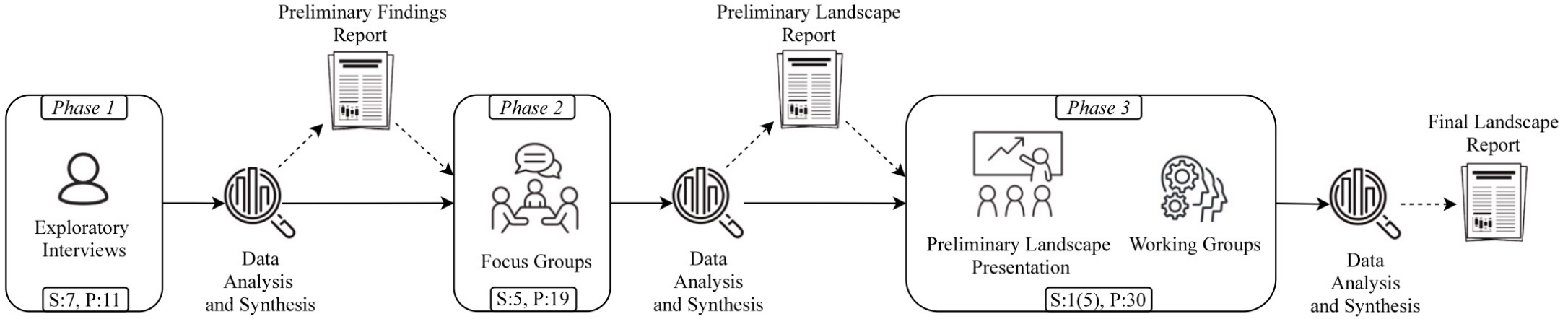
Fig. 2. Distribution of study participants across sectors.[2]

Research Question

“What is the future of sustainable digital infrastructures?”

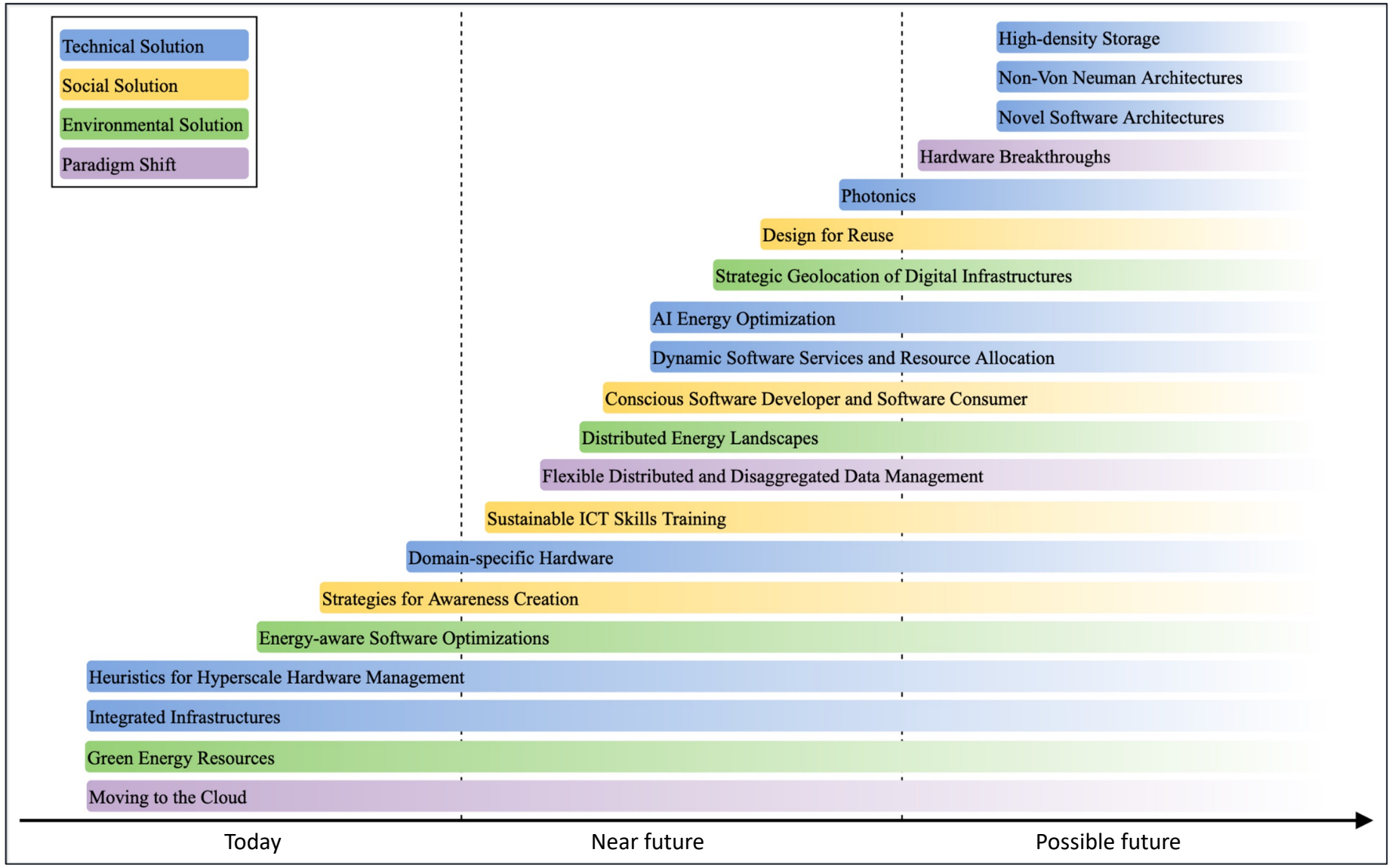
- What are the **solutions** to develop sustainable digital infrastructures?
- What **drives the adoption** of sustainable digital infrastructure solutions?
- What **hinders the adoption** of sustainable digital infrastructure solutions?
- What are the **open problems** related to sustainable digital infrastructure solutions?

Study Process



Results from the previous study by Roberto Verdecchia et. Al.

Roberto Verdecchia et. Al.



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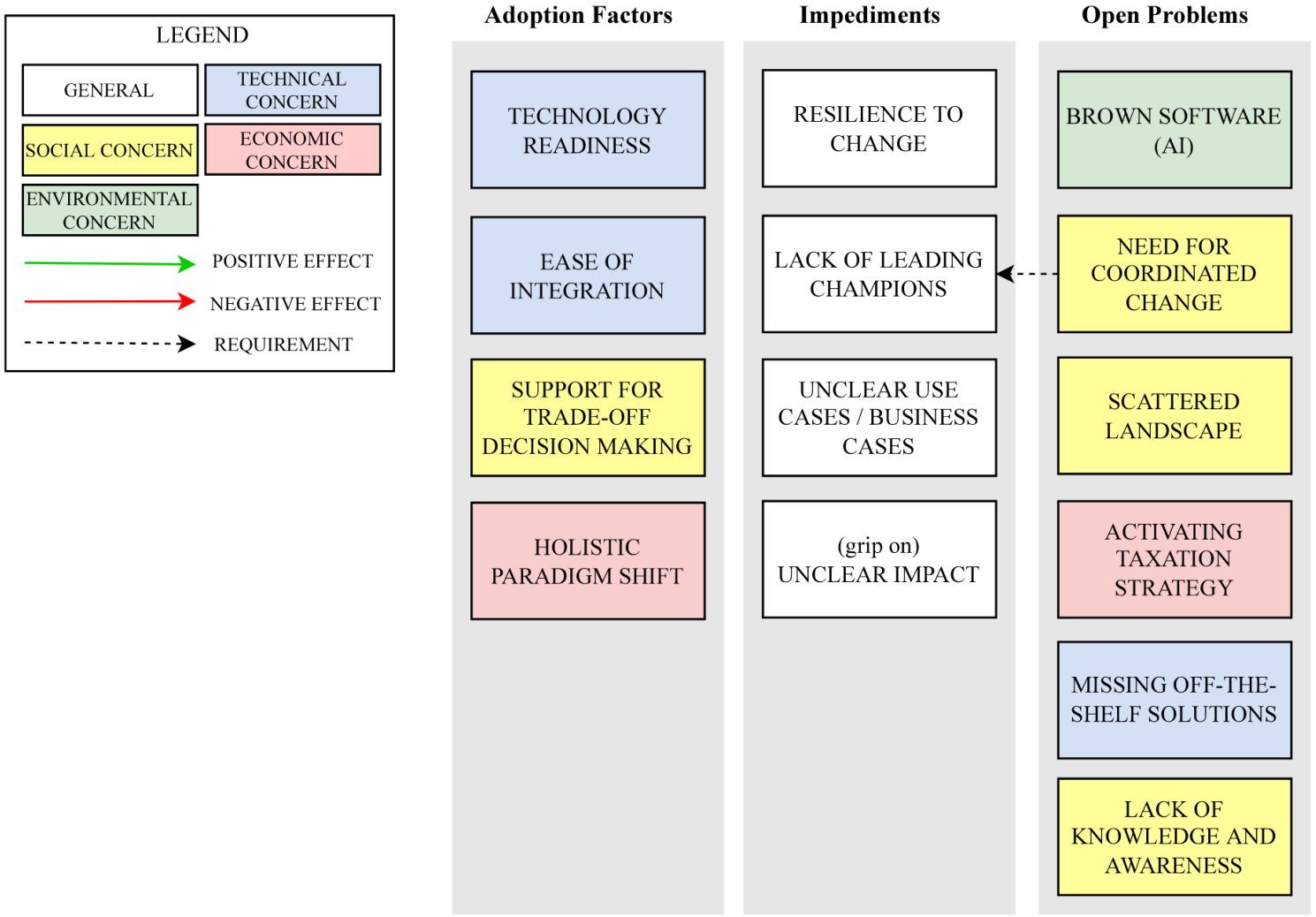

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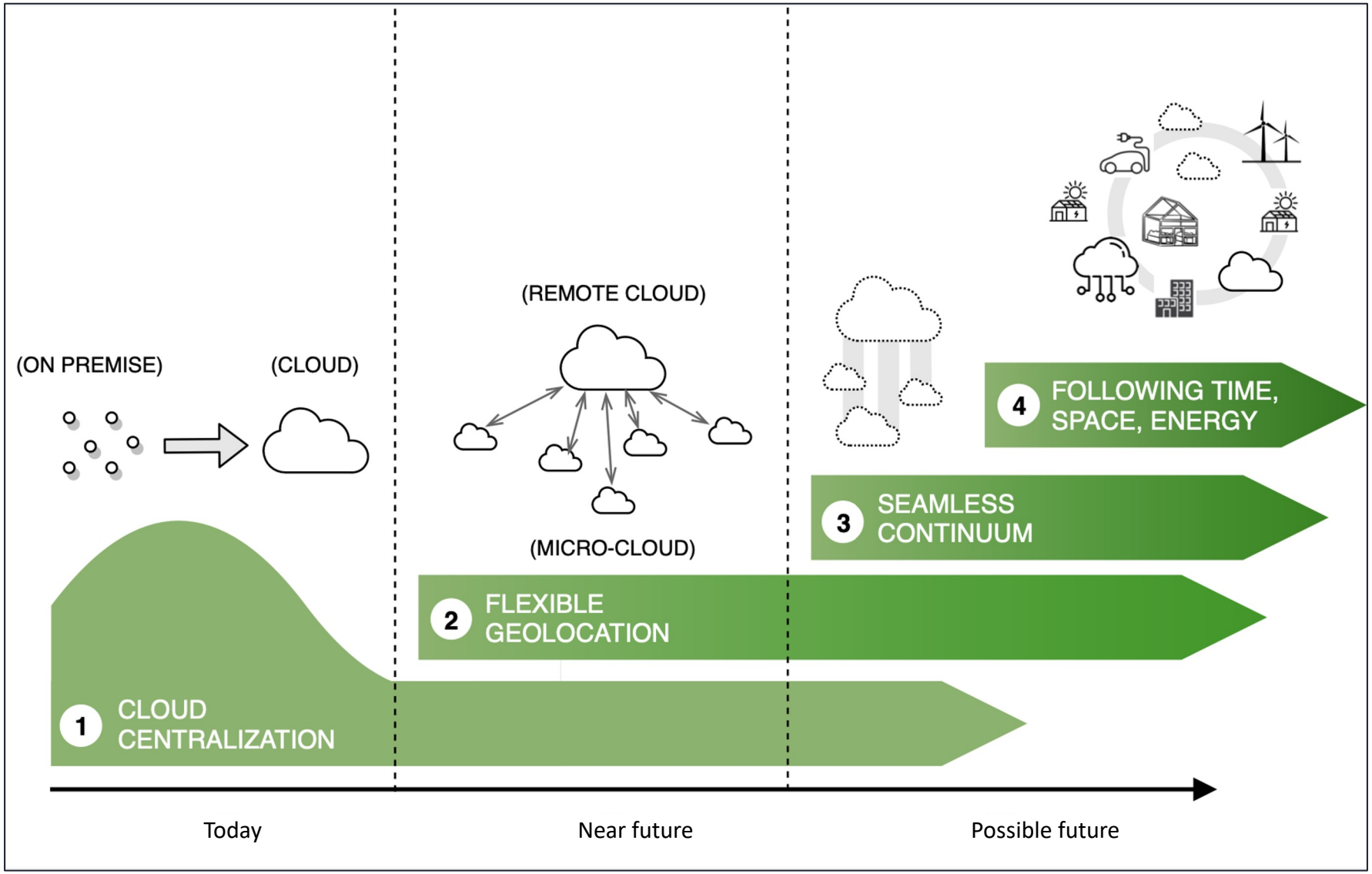


European Study

First insights

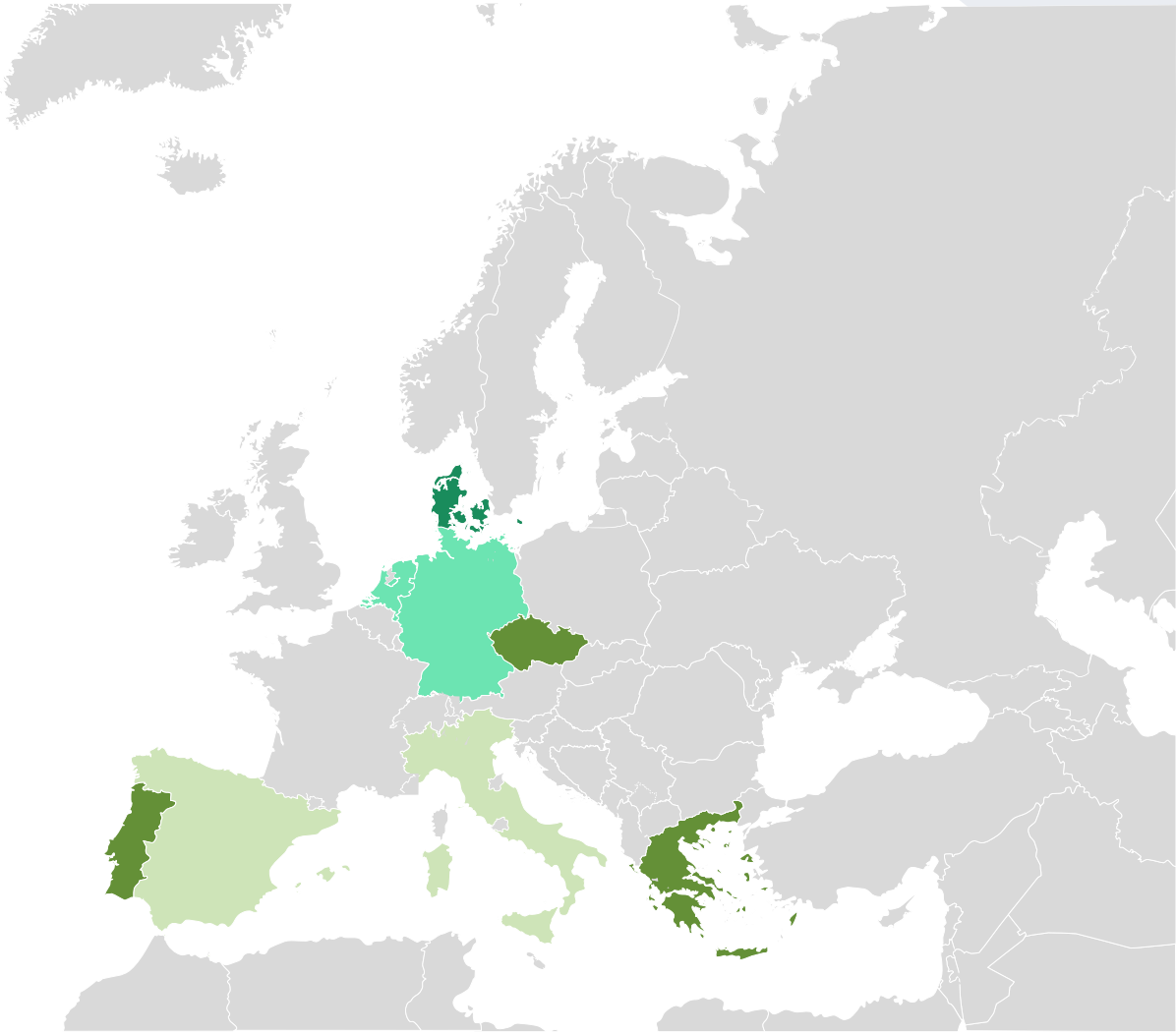
The European Study

By leveraging the Green ICT WG of Informatics Europe, we aim to replicate and update the study from a European perspective.

1. Conducting the interviews across Europe

2. Focusing on how the landscape changed from 2022 to 2025

3. Review if the landscape is different across parts of Europe



The European Study

North:

- Denmark

West:

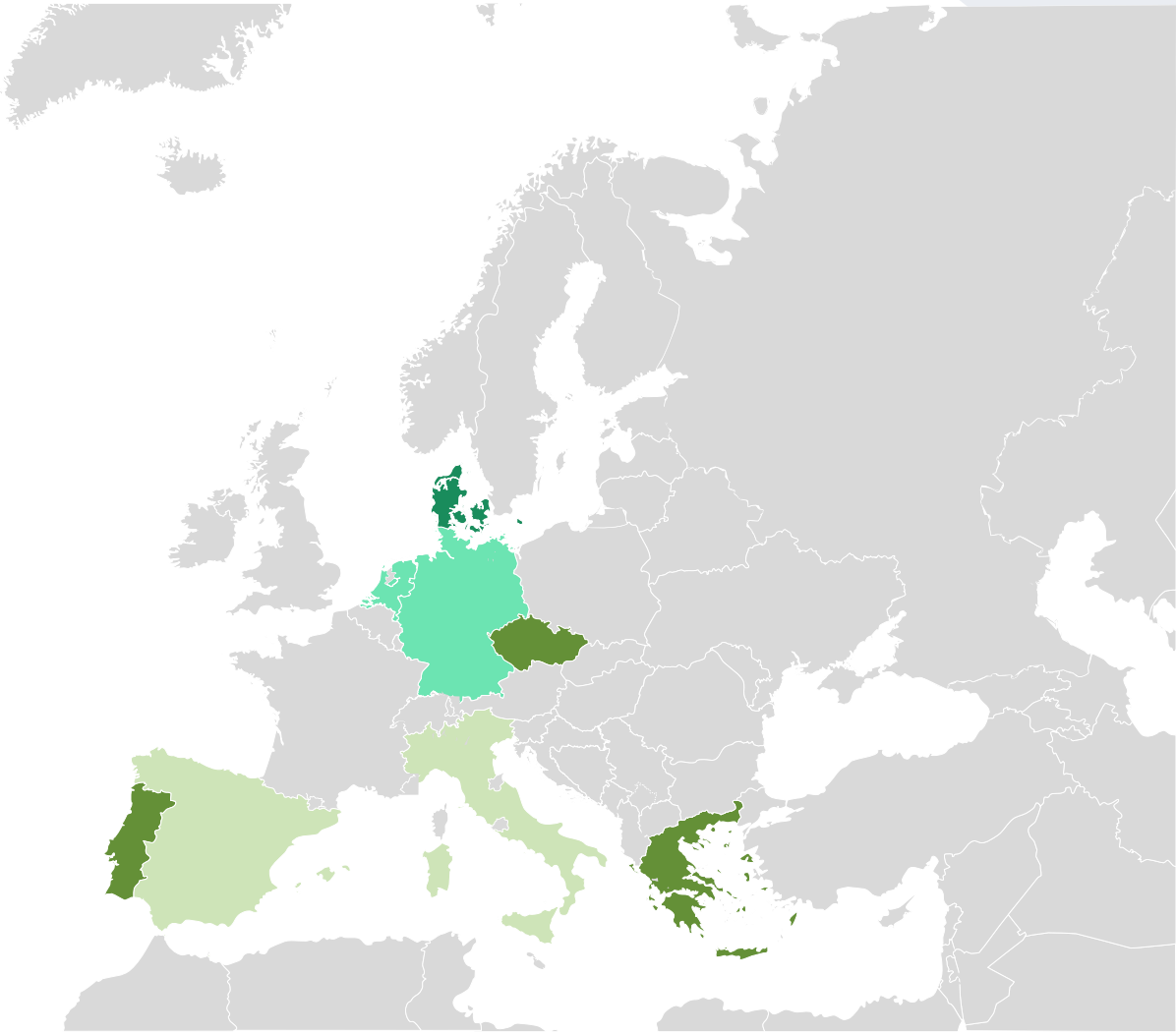
- Germany
- The Netherlands

South:

- Spain
- Italy

Widening countries:

- **North**: Czech Republic
- **West**: Portugal
- **South**: Greece



Who are we?

Patricia Lago - Vrije Universiteit Amsterdam

Roberto Verdecchia - University of Florence

Marco Aiello - University of Stuttgart

Apostolos Ampatzoglou - University of Macedonia

Vasilios Andrikopoulos - University of Groningen

Steffen Becker - University of Stuttgart

Fernando Brito e Abreu - ISCTE University de Lisboa

Antonio Brogi - University of Pisa

Tomas Bures - Charles University

Rafael Capilla - Rey Juan Carlos University

Alexandros Chatzigeorgiou - University of Macedonia

Lidia Fuentes - University of Málaga

Ilche Georgievski - University of Stuttgart

Petr Hnetynka - Charles University

Brian Keegan - Technological University Dublin

Mikkel Baun Kjærgaard - University of Southern Denmark

Ana Moreira - NOVA University of Lisbon

Kim Stuber - University of Stuttgart

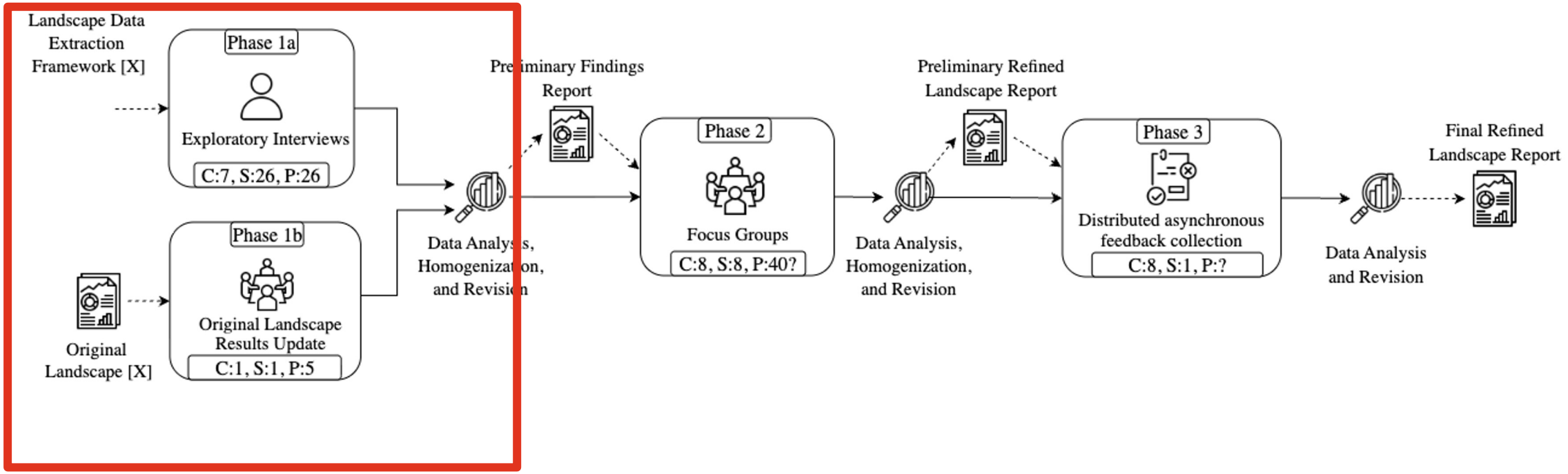
Mahyar T. Moghaddam - University of Southern Denmark

Tina Vartziotis - TWT GmbH Science & Innovation

Monica Vitali - Politecnico di Milano

Sebastian Werner - Technische Universität Berlin

European Study Process



- Finished first phase
- Currently working towards the **Preliminary Findings Report**
- Next Phase starting in November

Preliminary Results
before Harmonization / Deduplication / Analysis

Overview

- 31 participants
- 8 planned focus groups

Extracted Insights:

- 215 solutions
- 143 impediments
- 99 adoption factors
- 86 open problems

Discussed Solutions

energy efficient computing, sustainable data infrastructure, energy management, reusable infrastructure, automation, AI, data sovereignty, Risk-aware marketing, fair competition, energy-aware solutions, edge computing, demand management, maximize device utilization, technical capabilities

based on **semantic text embeddings**, **unsupervised clustering**, and **keyword extraction.**

Discussed Impediments

vendor lock-in, necessary education, opposed business model, Personal and cost intensive, sustainable platform management, actually scale with demand, customer education, adapting systems

based on **semantic text embeddings**, **unsupervised clustering**, and **keyword extraction.**

Discussed Adoption Factors

metrics, tools, measuring tools, design, awareness, regulation, legislation, fair competition, positive standards, sustainability consideration, environmental regulations, efficiency thinking, rethrinking data center proposition, mindset shift

based on **semantic text embeddings**, **unsupervised clustering**, and **keyword extraction.**

Discussed Open Problems

technology obsolescence, upskilling of people, cloud provider emissions, measurement data transparency, Fairness, cost of sustainable data centers, artificial intelligence, sustainable ai

based on **semantic text embeddings**, **unsupervised clustering**, and **keyword extraction.**

Questions?

Thank you

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previous study

https://doi.org/10.1016/j.suscom.2022.100767