DATA-DRIVEN TECHNOLOGY ON THE WHEEL
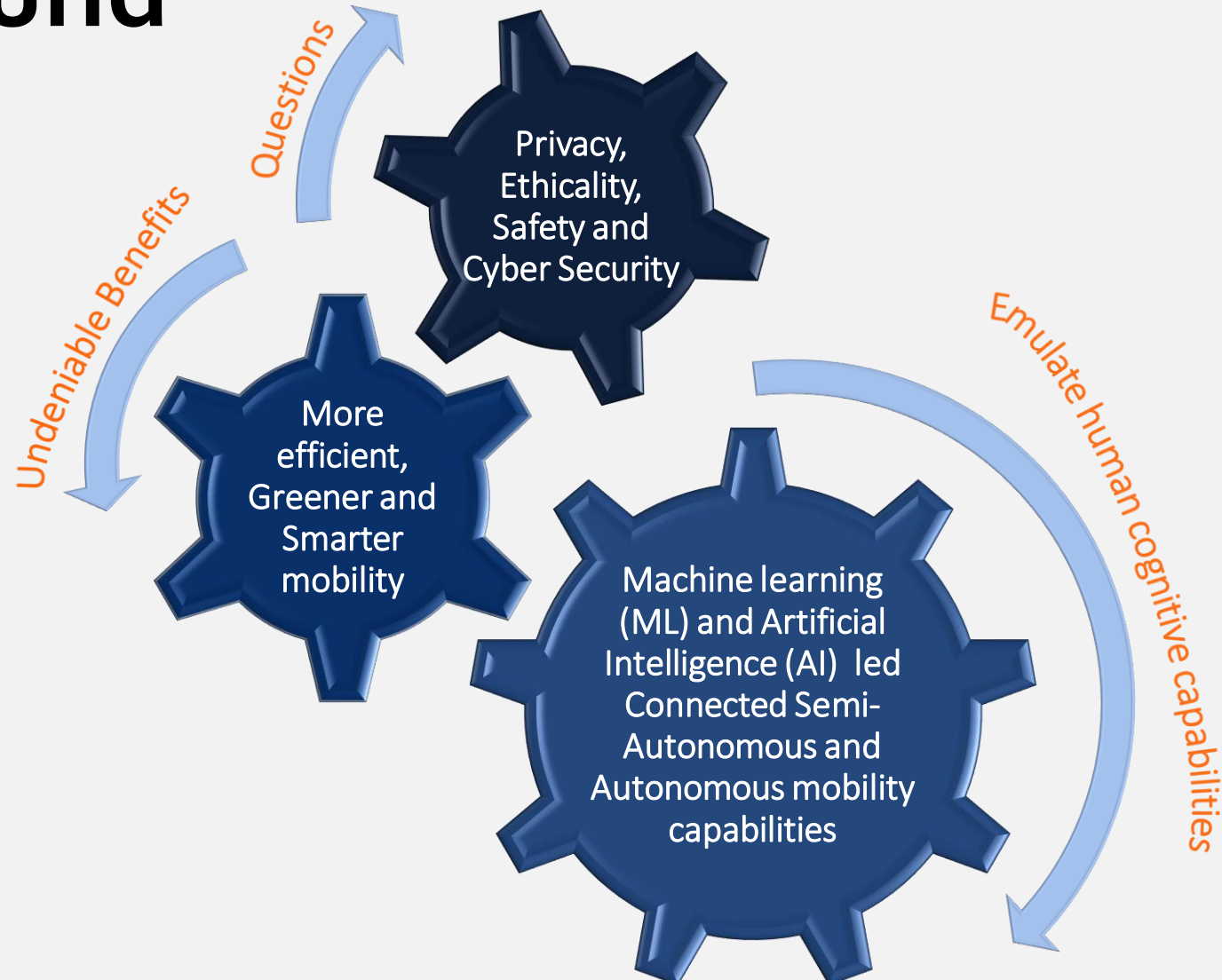
IN

DENMARK

Cyber Security and Ethical Perspectives

through Society's Lenses

Background

(European Union Agency for Network and Information Security, 2015; Rios-Torres & Malikopoulos, 2016; Clements & Kockelman, 2017; Fu et al., 2020; Liu et al., 2020; European Union Agency for Cybersecurity, 2021; Sun et al., 2021)
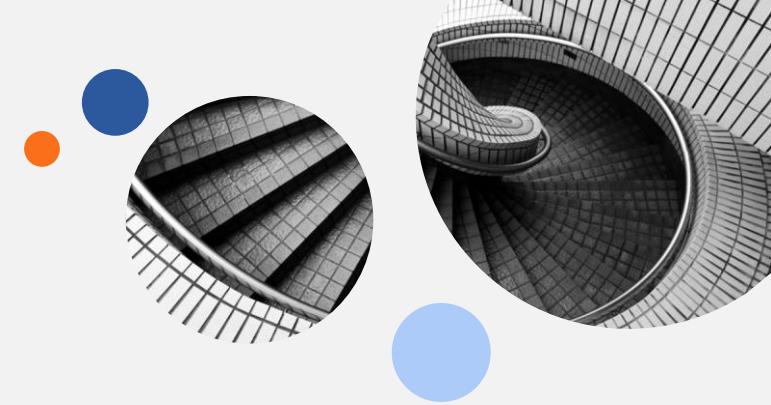
Problem Definition and Motivation

- Denmark is at the forefront of combining intelligent autonomous transport technology. (Ho et al., 2018; Ministry for Transport, Building, and Housing, 2018; Railway Technology, 2018; EU Commission, 2020; Connectedautomateddriving.eu, 2020; Zhao et al., 2021)

- Implementing new technologies has implications for society, while social factors influence technology decisions. (Baccarella et al., 2021; Chehri & Mouftah, 2019)

- Place the user at the heart of an integrated mobility system. (Government Office for Science, 2019)

- Vehicle-to-vehicle and vehicle-to-infrastructure communication raised concerns over privacy, regulations and cyber security.

- Importance of maintaining high confidence in the government through the public and political perspective alignment. (Nash et al., 2017; Council of Europe, 2020; Pangbourne et al., 2020)

Recent Related Works

Authors, year	Methods	Factors and results
Chinen et al., 2020	A series of two surveys involving 146 prospective passengers of emerging mobility service.	Willingness to use emerging mobility services after a sample riding experience is higher than before having a sample riding experience.
Le Rutte et al., 2021	Survey-based study	Many participants expect AVs should be programmed to handle challenging road infrastructure. However, only a few respondents consider AVs to be safe currently.
Thomas et al., 2020	Survey-based study with 229 respondents using a 46-item online questionnaire	Respondents are most concerned about crashing/malfunctioning, purchase price, and liability for incidents. Gender, age, education level and employment status had varied relationships with the perceived concerns
Winter et al., 2019	Survey involving 282 respondents from the Netherlands and German	Self-driving buses are preferred for short trips, with decreased interest when human-steward is present. Respondents with strong interest in technology perceive self-driving buses better.
Yuen et al., 2020	Survey involving 526 residents in Seoul, Korea	Cumulative effect (in decreasing order) of attitude, influence, behavioural control, relative advantage, subjective norms, compatibility affect public acceptance of autonomous vehicles.
Goldbach et al., 2022	A survey-based study with 611 students of the Rhine-Waal University.	Importance of paying sufficient attention to qualitative psychological factors, next to classic instrumental attributes like travel time and costs, before and during the implementation of public AVs

Research Gaps in the existing literature

- Existing reports in Denmark have focused only on threat assessment and implementation of effective cybersecurity policies and practices in public transportation management.
  (Center for Cyber Security, 2021a; Center for Cyber Security, 2021b).

- Who should have final governance on AI ethics?

- Will AI lead to questioning the human decision-making process in the long run, and how will it impact society as a whole?

- Limited understanding of the public perception from different demographic segments of the society. Understanding the reasons for such deviations is instrumental .

- A holistic perspective on semi-autonomous and autonomous mobility technology and it effect on shaping future society norms is lacking in Denmark.

Purpose and Objectives

Purpose

Society's point of view on the impact of connected and autonomous technology in transportation on Danish society

Objectives

✓ To understand if and under what conditions people intend to use connected and autonomous transportation.

✓ To identify society's perception on rules and ethics governing connected and autonomous technology and its implication for shaping the norms of future society and technology.

✓ To understand society's perception on privacy and cyber security around connected and autonomous technology. How the society perceive its implication in shaping the norms of future society and technology.
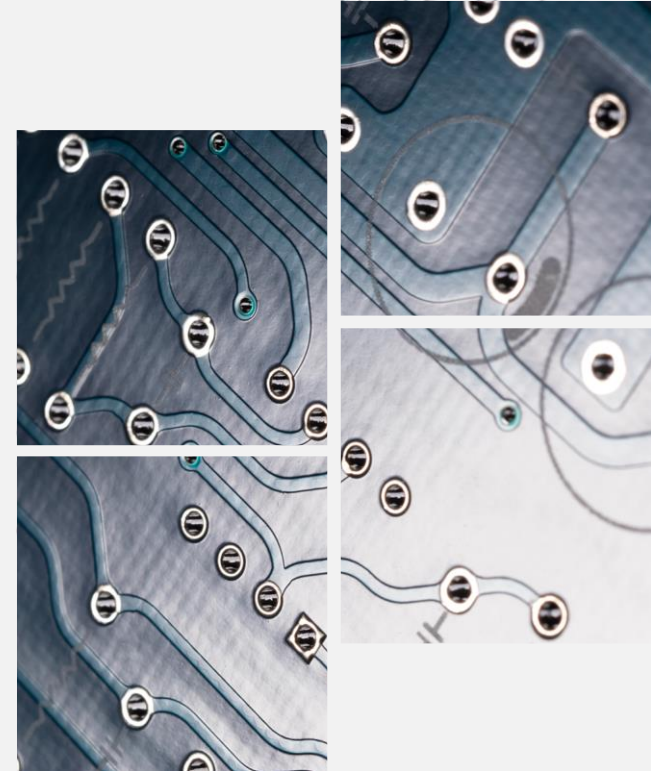
Research Questions

What are the most concerning facts around connected and autonomous technology in roads and railways?

Based on the finding from the first question, in the context of Danish society, how do demographic aspects such as gender, age, prior technological experiences, social-economic status, and education level affect attitudes and intentions towards connected and autonomous technology in transportation?
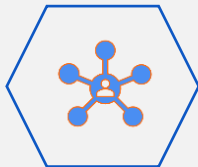
How does society perceive the implication of connected and autonomous technology on shaping the norms of future society and technology?

Methodology

Literature Study

- Inductive Research

- Essential theories and basic concepts

- Identify the most concerning facts on connected and autonomous technology in road and railway transportation.

- Social perception about connected and autonomous technology.

- The outcome of the literature research serves as the basis for qualitative survey.

Questionnaire

- Combination of close questioners with open questioners.

- Intended use of open questioners is to elaborate intentions and intuitions. (Barrett, 2018; McLeod, 2018; SAGE, 2018)

- To understand the perception of trust and security around connected and autonomous technology and its implication for shaping the norms of future society.
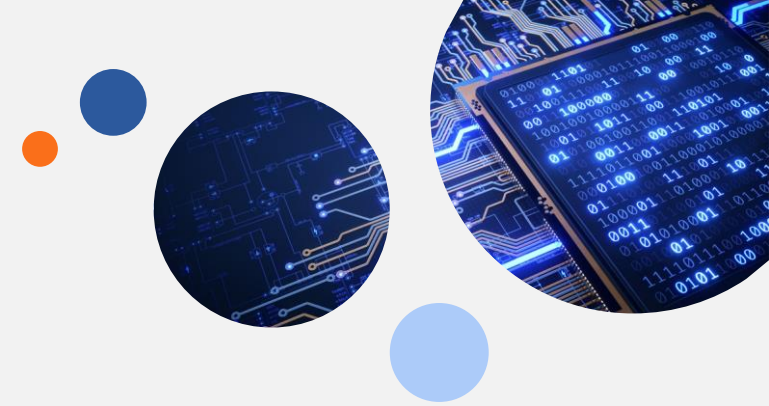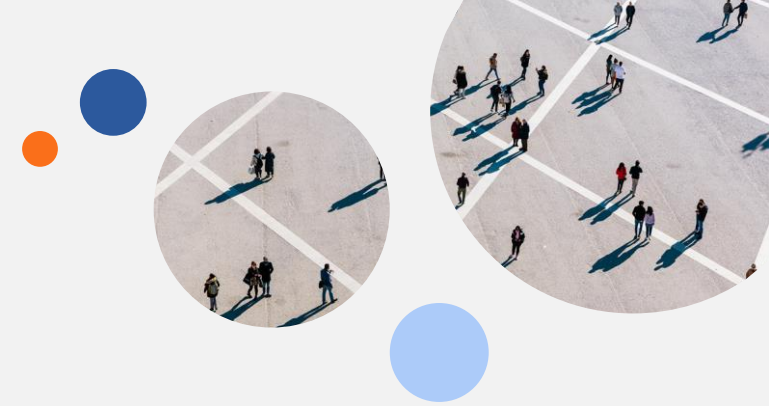
Ethical Consideration

Qualitative Study

- Written consent forms

- An information sheet

(Bailey, 2013: University of Essex, 2021)

Scope and Limitations

Literature Study

- The study mainly focuses on connected and autonomous technology in roads and railways which also form the basis for the questioners.

- Fairly new technology, and only limited information regards to user experiences.
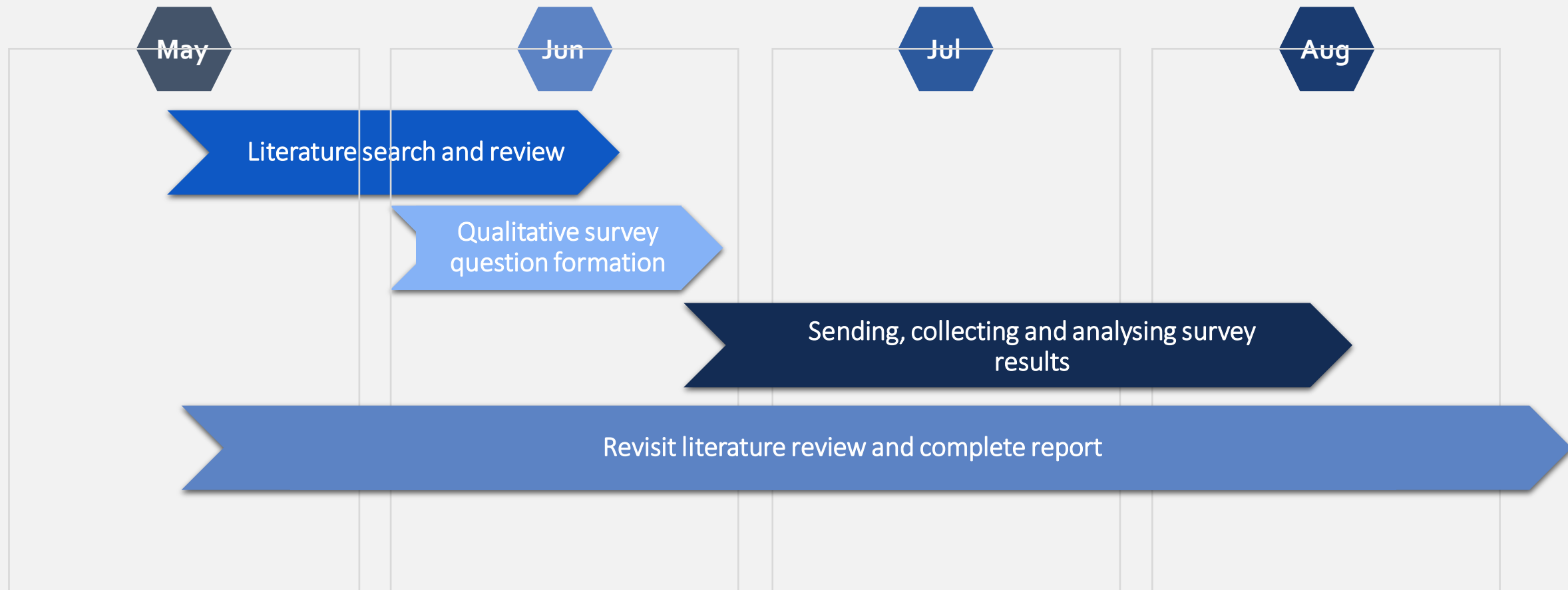 (Goldbach, 2022).

Questionnaire

- Focus mainly on attitudes and intentions of the local society.

- Respondents' bias toward giving the more socially acceptable answer.

- Lower response rate

- Open-ended questions could lead to different misinterpretations

- Language limitations

- Limited flexibility on using vocabulary appropriate to the respondents.

- Limited access to populations living off-grid of social media.

(Barrett, 2018; McLeod, 2018; SAGE, 2018)

Timelines

May   Jun   Jul   Aug

Literature search and review

Qualitative survey question formation

Sending, collecting and analysing survey results

Revisit literature review and complete report

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