

How to assess the societal impact of automated ride-pooling

A multi-stakeholder perspective

Introduction

Automated ride-pooling [ARP] promises to make mobility more efficient, sustainable, and inclusive, but could enhance challenges by inducing demand at low vehicle utilization. Given the high investments and risks, organizations planning to implement automated ride-pooling seek methods to pre-assess if its societal benefits outweigh the costs.

Indicator-based assessment methods across different dimensions have emerged as a promising approach, e.g., Nemoto et al. (2021).

However, they are often limited to narrow stakeholder perspectives, risking biased assessments.

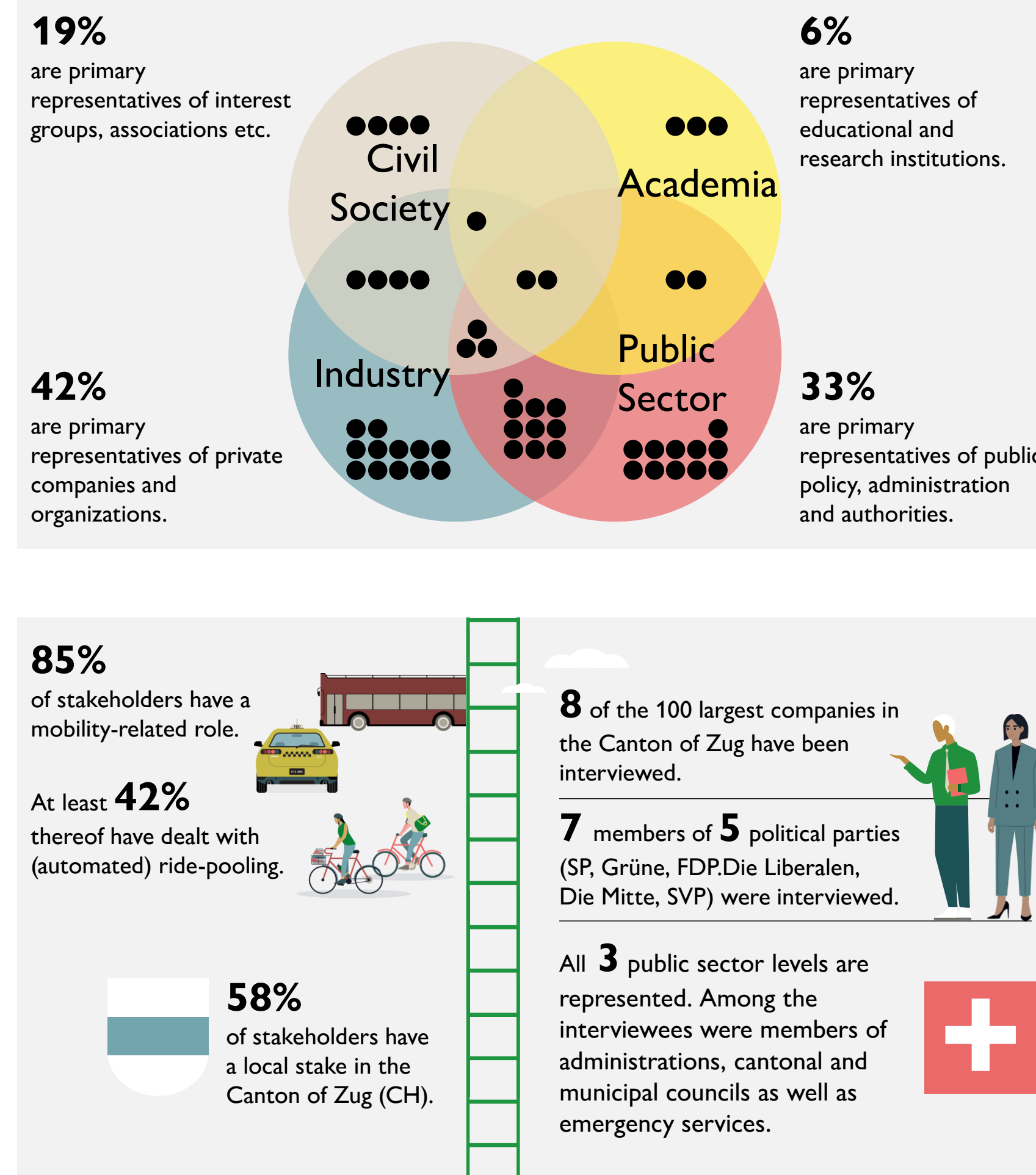
This study addresses these gaps with a multi-stakeholder-derived framework to assess the societal impact of ARP in the context of an ongoing Swiss initiative. It explores the following research questions:

Which dimensions could be considered in the societal impact assessment of automated ride-pooling?

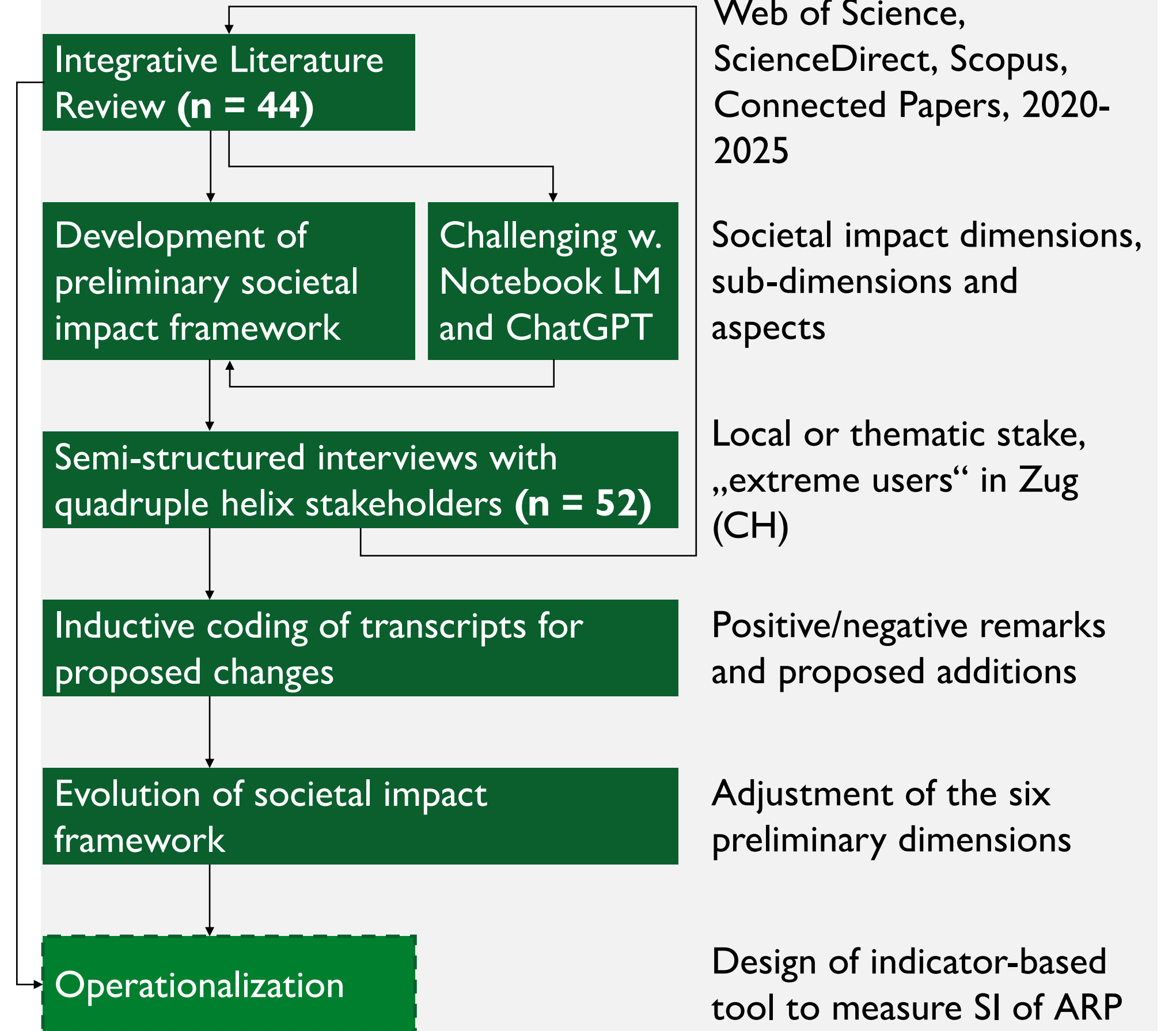
How can a decision-support tool be designed to evaluate the ex-ante societal impact of automated ride-pooling solutions?

What is the ex-ante societal impact of automated ride-pooling?

The resulting framework aims to provide initiators of ARP with a practical pre-assessment tool.



Research Design



Social Impacts

Social Equity is concerned with inclusion of social groups. One example of an indicator is the number of activities that are accessible within 30 minutes (e.g., for rural dwellers or non-motorists).

Quality of Life, Safety & Security, on the other hand, is concerned with holistic social issues such as public health. Possible indicators include public health expenditures, number of fatal accidents (prevented) or crime rates.

Economic & Transport Impacts

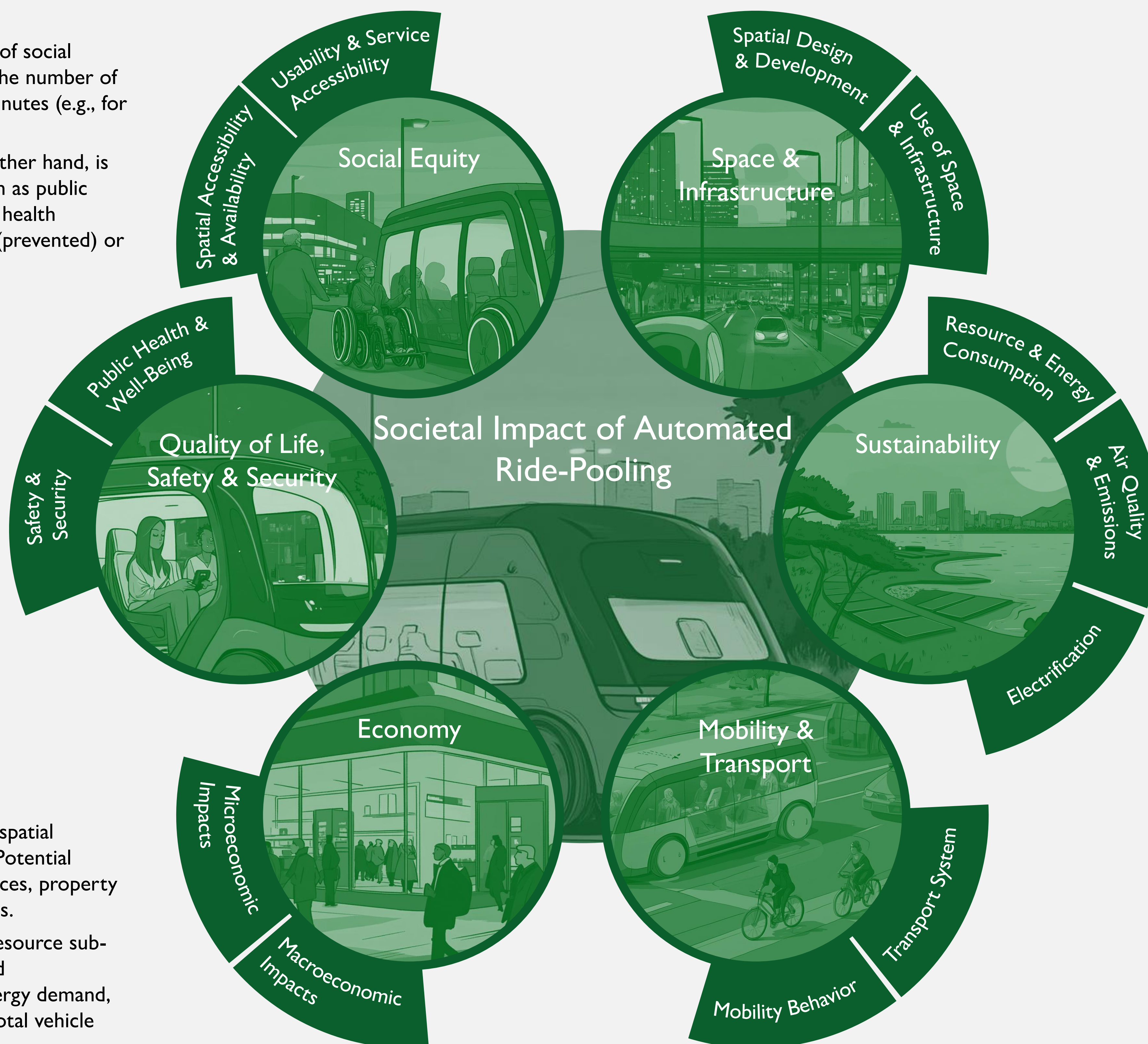
Economy is concerned with impacts on industry. On the macroeconomic level, net impacts on employment could be assessed. On the microeconomic level, the vehicle fleet size is a possible KPI.

The dimension of **Mobility & Transport** is concerned with travel behaviors and transport system. It could be assessed through indicators such as modal split/shift, vehicle/passenger km or congestion.

Space & Sustainability Impacts

Space & Infrastructure is concerned with spatial implications of automated ride-pooling. Potential indicators include number of parking spaces, property value or infrastructure maintenance costs.

The **Sustainability** dimension includes a resource sub-dimension, air quality and emissions, and electrification. Potential KPIs include energy demand, local emissions and share of EVs in the total vehicle fleet.



Influencing Factors



Societal Perception & Acceptance



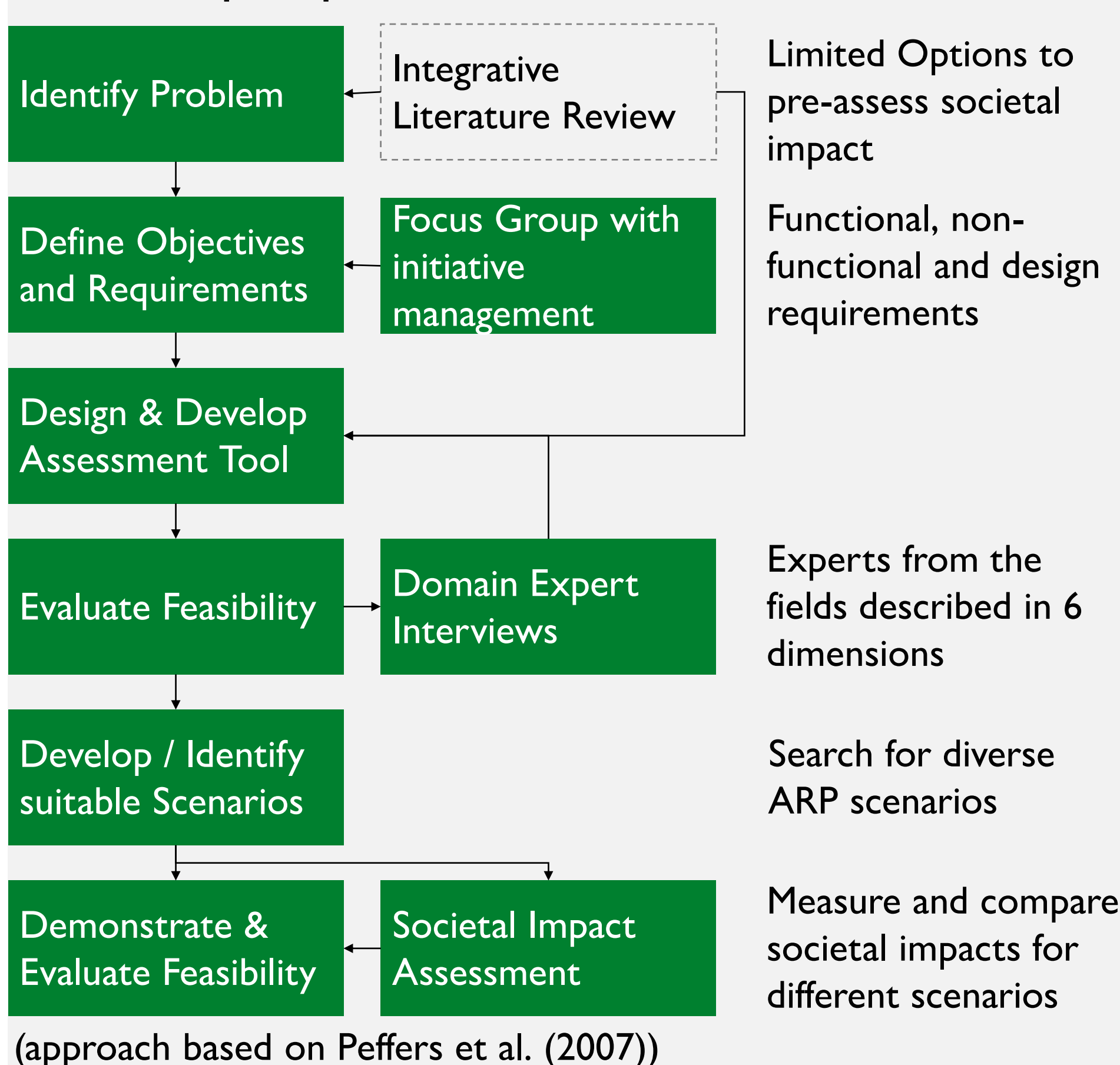
Business Model



Policy & Regulation

(preliminary framework)

Next Step: Operationalization



Conclusion

This study aims to provide initiators of ARP with a useful tool to assess the societal impact of ARP. It does so by, first, defining relevant dimensions of societal impact, as perceived by societal stakeholders of ARP in an ongoing initiative in the canton of Zug (CH). It thereby ensures that relevant dimensions and aspects are considered for the societal impact.

In a second step, the six derived dimensions will provide a frame to develop a practical assessment tool for the societal impact of ARP prior to implementation, following a design science research methodology.

The goal is to involve initiative managers in the construction of the artefact to ensure applicability and usefulness in practice, while also considering the multiple dimensions of societal impact. Domain experts are to be involved per dimension to further validate that the proposed indicators and metrics per dimension are useful.

Finally, diverse scenarios of ARP are to be defined to test the developed ex-ante societal impact assessment tool in practice and to compare different implementation scenarios of ARP based on their expected societal impact.



References

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Illustrations: University of St.Gallen

Framework Illustrations: Created with Midjourney



From insight to impact.