

# Remote Group Model Building (rGMB) to support the planning of carsharing for Bangkok, Thailand

4th Workshop (Webinar) on System Dynamics in Transportation Thursday 15th April 2021

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## OUTLINE

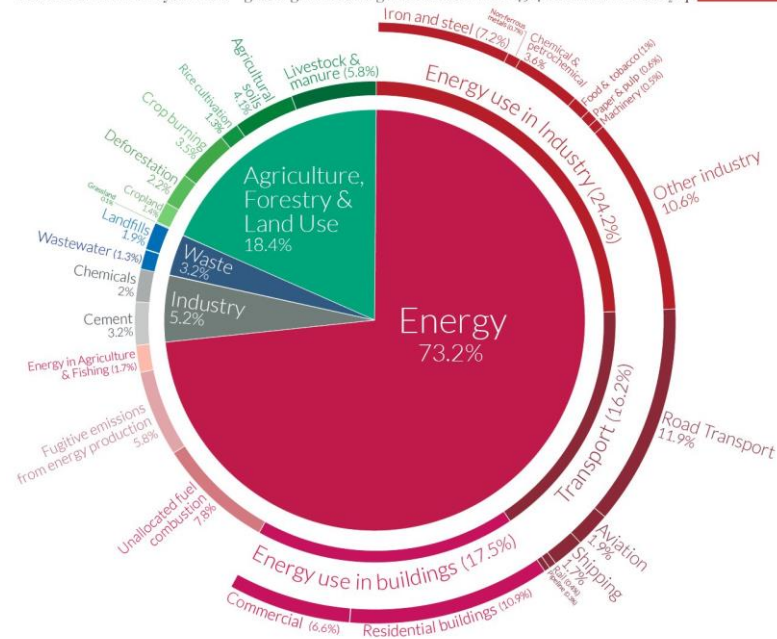
- Motivation and Objectives
- Methodology
- Results
- Discussion and Conclusion

# Motivation

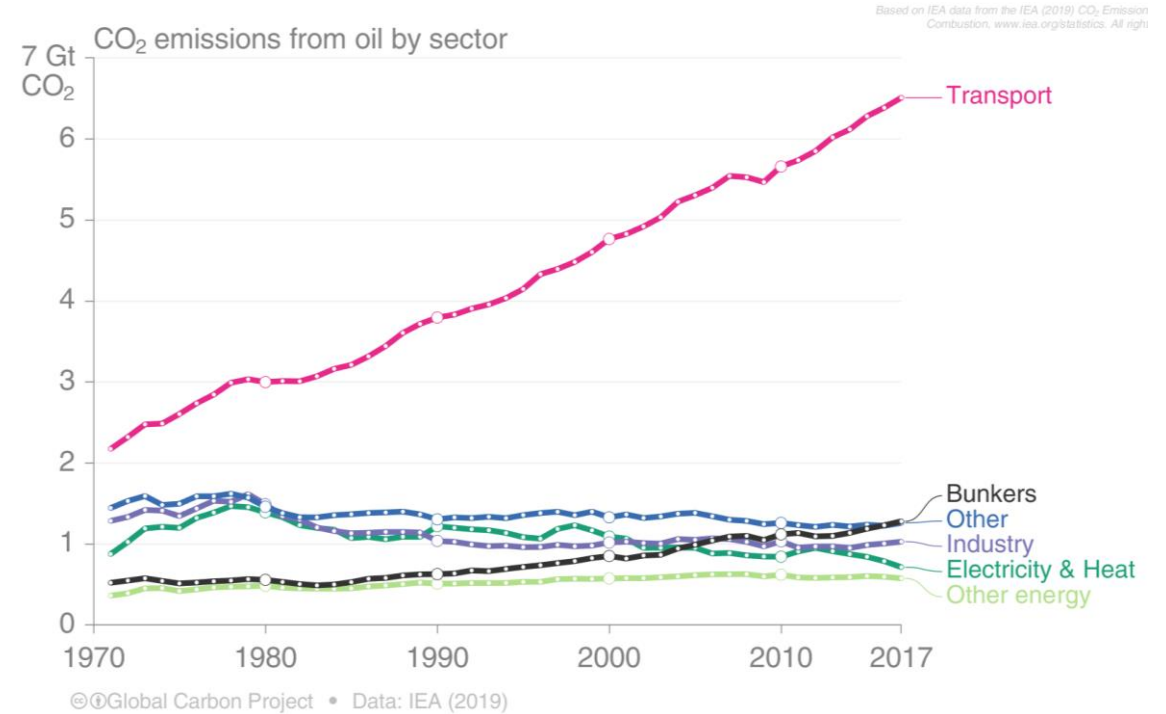
## Transport sector consumes high energy and produces GHG emission

- CO<sub>2</sub> emissions in the sector are dominated by national transport with almost linear growth over five decades.
- Road transport contributes ~75% of the transport sector emission.

Global greenhouse gas emissions by sector Our World in Data  
 This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO<sub>2</sub>eq.



OurWorldinData.org – Research and data to make progress against the world's largest problems.  
 Source: Climate Watch, the World Resources Institute (2020). Licensed under CC-BY by the author Hannah Ritchie (2020).



**New mobility concepts have prospects to resolve urban transport challenges, but...**

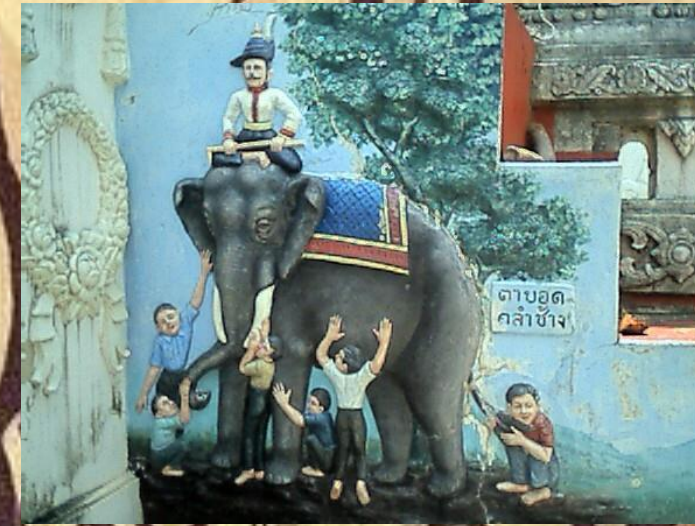
**..there are challenges and unknowns surrounding these innovative concepts.**



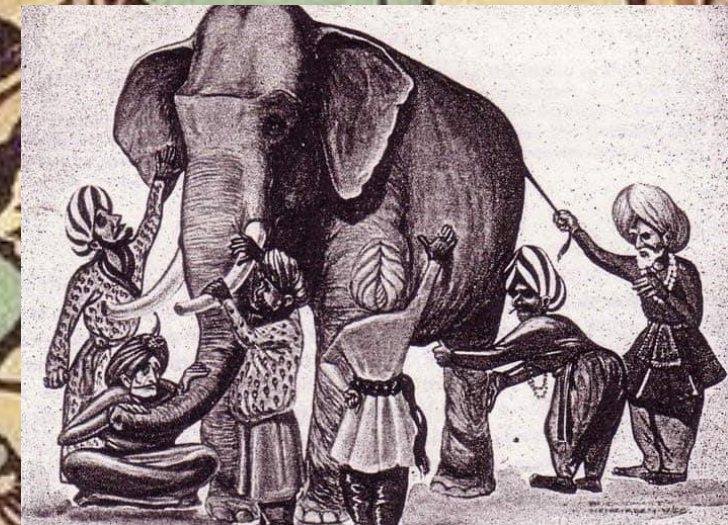
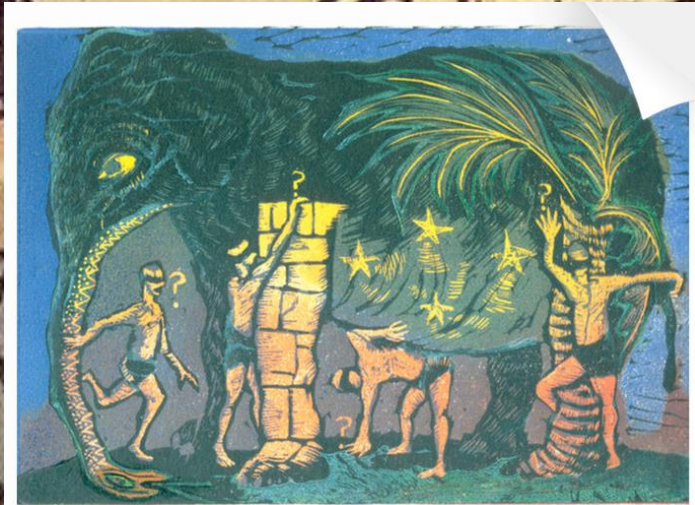
- Unclear or contested definitions and how the service works
- Unknown and unproven real-world effects, particularly in developing countries
- Unclear Governance and regulations, and how it will fit with current regime?
- Uncertain operational aspects

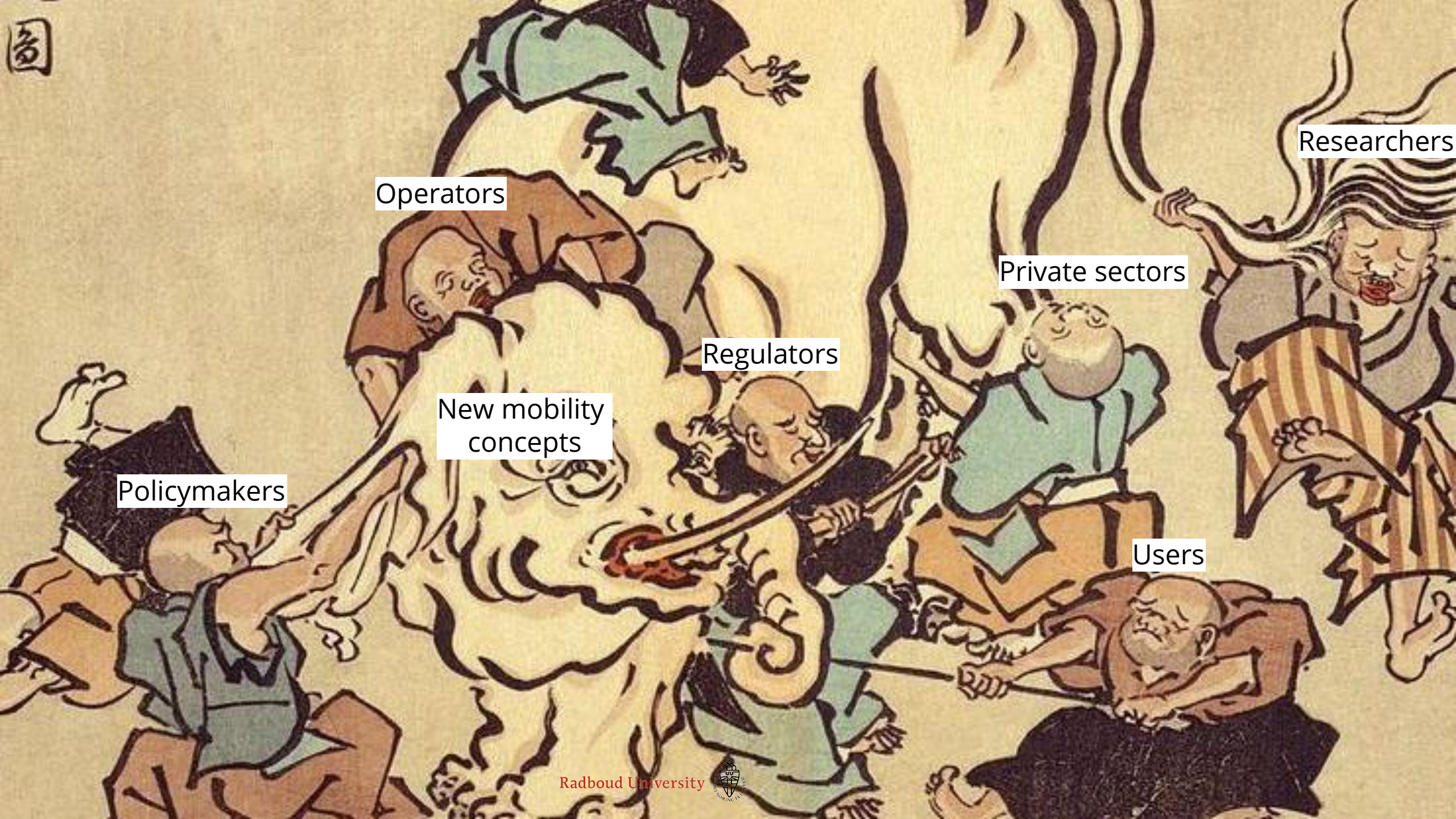
**DEEP UNCERTAINTY**

These factors, particularly the lack of shared understanding of the concept among key stakeholders can slow down or hinder their wider implementations.



# Multi-perspectives of truth





Researchers

Operators

Private sectors

Regulators

New mobility concepts

Policymakers

Users



# A Focus on carsharing services



- **Urban Carsharing (CS) is a sustainable mobility solution**
  - delay vehicle purchase and car ownership; Lower car use and increase PT usage
  - lower energy consumption and GHG emission per HH
- **In Thailand, CS is still in its infancy**
  - First service in 2016; 4,000 veh in service
  - But promising future – recognized as a potential TDM measure for BKK
- **Scientific publication on CS has also been growing, but...**
  - Most focus on users' behavior; adoption; and operation and are based in developed countries; A lack of study that take a system perspective

## Research Question and Aims

### Research Question:

- How to establish a shared understanding on the dynamics of carsharing system?

### Aim:

- to gain a system perspective of the CS system through the involvement of CS stakeholders
- to identify key policies and measures that would promote and ensure positive societal contributions by CS.

### Method: how to obtain system perspective?

- Group Model Building or GMB (Vennix, 1996)





Project started: April, 2020



The outbreak of COVID-19 from Feb. 2020 prevents face-to-face & on-site meeting

# Process of the Research (April – Dec 2020)

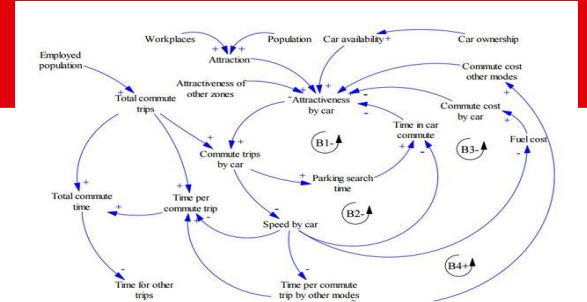
## Personal Interviews (mostly remotely)

- Define vision of a successful carsharing system
- Define KPIs, positive and negative attributes
- Propose Policy options
- Confirm transcript



## Workshops (all remotely)

- Workshop 1: Construct and combined shared mental map
- Workshop 2: Confirm mental map and identify policy causalities



## Post-Workshop (all remotely)

- Workshop reflections/feedbacks via online survey
- A follow-up seminar to disseminate and testing with policymakers



# Stakeholders involved (20+)



1. Policymakers & Public Sectors
2. Carsharing Users and Potential Users
3. Smart Mobility Community
4. Academics
5. Carsharing Providers
6. Private Organizations



# Results: selected Outputs from Interview Transcripts Analysis

## Visions

How does a successful carsharing look like?

- Services are convenient and easy to use
- Sufficient stations and coverage area
- High variety of vehicle types and models

## KPIs

How do you measure success of carsharing?

- People's awareness of carsharing service
- Number of users, reservations/days, Utilization rate
- Reduction of transport system externalities (pollution, accidents, and energy consumption)

## Influencing attributes

Factors that can accelerate or prevent visions to be reached

- Stakeholder collaboration
- People's awareness of carsharing service
- Confidence in carsharing service (reliability)

## Policy interventions

What are the causes that driven this change?

- Road pricing, e.g., toll fees
- Tax incentives
- Vehicle ownership control policies

# GMB Workshops

## Objective:

- Create Causal Loop Diagram for Bangkok's Urban carsharing system; identify policies & measures

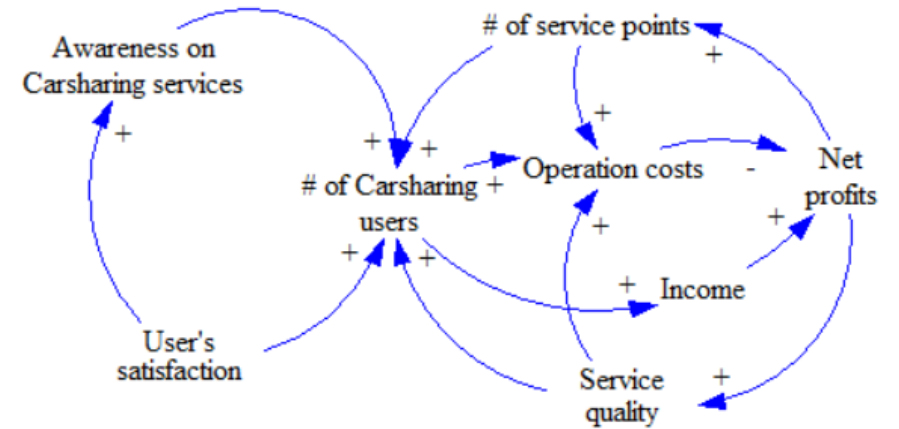
**Process: 2 workshops – 2hr each 3 weeks apart**

## Workshop 1

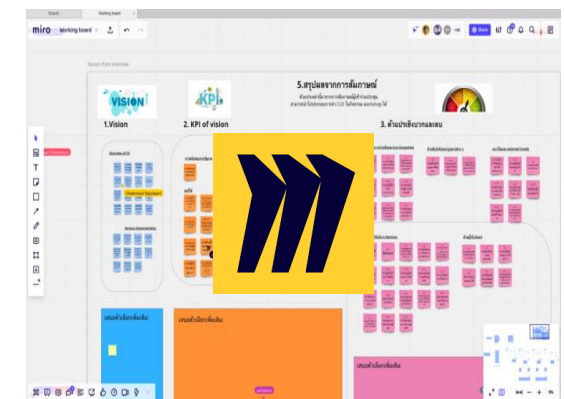
- Briefing, divided into four groups, each with a facilitator
  - Provide an initial CLD
  - Two rounds - (4 CLDs → 2 CLDs)
- Facilitators works on the model off-line ---

## Workshop 2

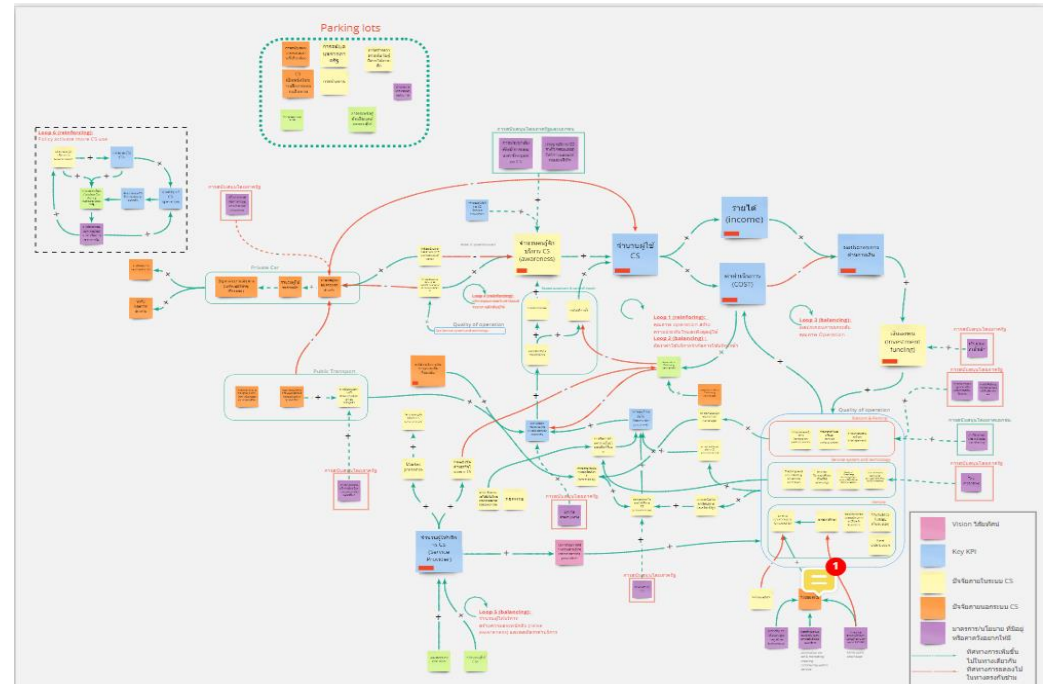
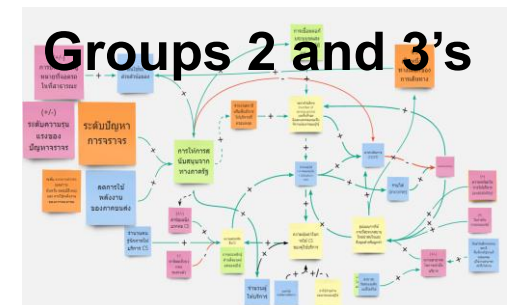
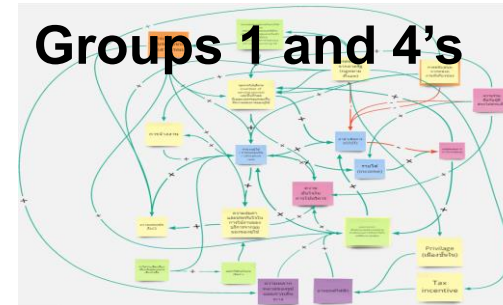
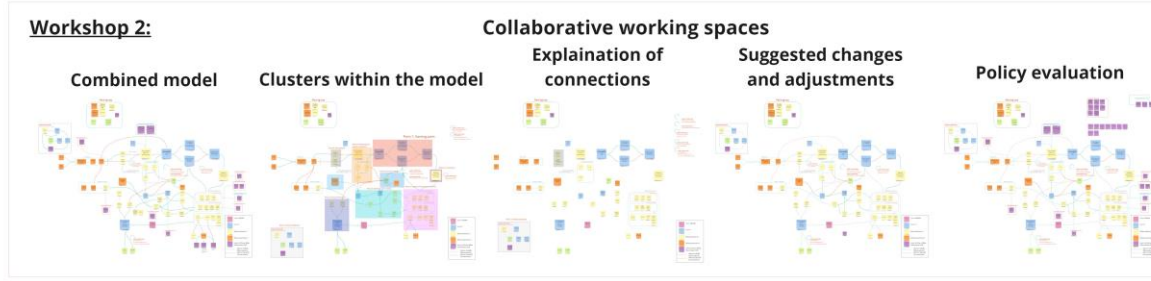
- Assess and evaluate the combined model in Workshop 2
- Discussion on possible policy & intervention



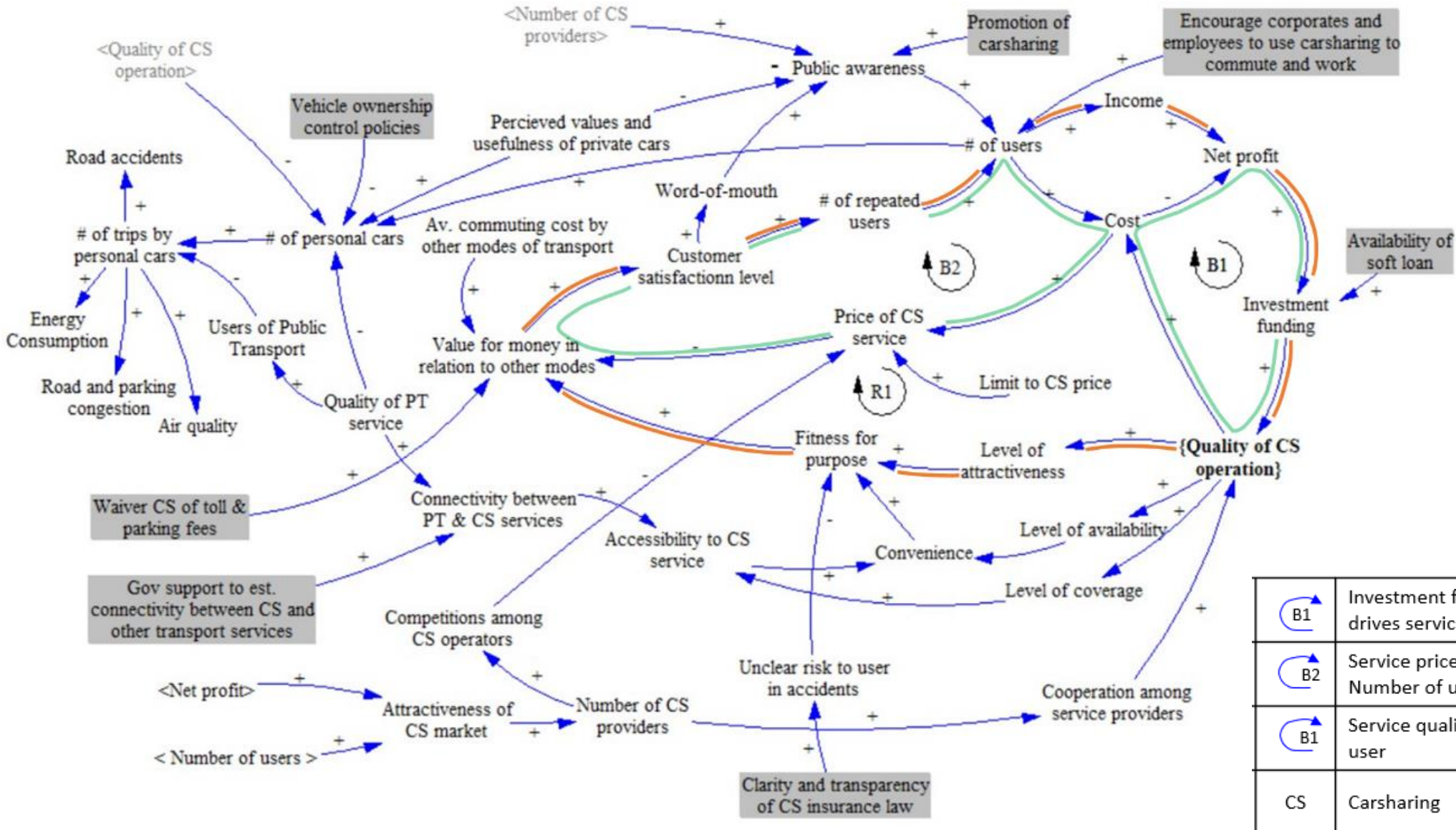
Initial Causal Loop Diagram



# WORKING BOARD AND WORKSHOP RESULTS

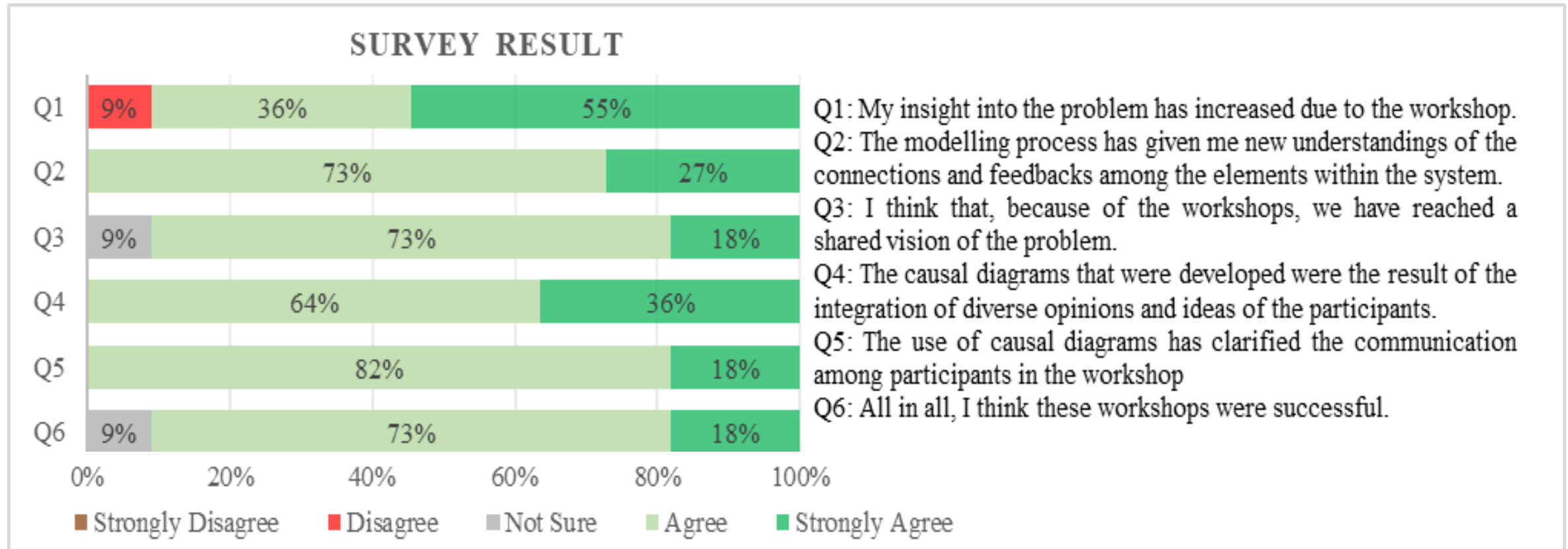


# WORKSHOP RESULTS



B1	Investment funding drives service quality	PT	Public transport
B2	Service price controls Number of users	—	Balancing loop
B1	Service quality attracts user	—	Reinforce loop
CS	Carsharing		

# Selected outcome from post-workshop survey



# Outcomes

## Project Results

- Formulated a shared mental model of Bangkok's carsharing system (multi-stakeholder perspectives)
- Results can be used as a basis for qualitative policy analysis model and quantitative models (system dynamics) List of planning elements (Vision, Goals, KPI)
- Took stakeholders on a learning journey to understand the concept and related complexity
- Built trust and connections between the stakeholders involved.

## Development of New Methodology

- Developed a protocol for remote Group Model Building (minimize cost/time & Covid-19 risk)
- Employ Group Model Building to support planning of an innovative transport concept

## Limitation of GMB

- Only capsulated the mental models of those who attended ); How to deal with no-show participants
- Required support from participatory (time and efforts); online engagement is challenging
- Several methodology assumptions e.g., no conflict of interest, normalization of power

**Lessons Learnt:** Online Interaction; gate keepers; communication dynamics;

# Next steps

Updating CLD with emphatical data and use it to induce learning

- How Car sharing user behavior changes in the Covid-19 period? What are possible interventions (e.g. policies and service redesign)?
- Follow up workshop with policymakers

## Other related Project

- Apply GMB to support adaptive planning for transition toward sustainable transport ([www.onthemoveproject.nl](http://www.onthemoveproject.nl))

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