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

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OUTLINE
• Motivation and Objectives
• Methodology
• Results
• Discussion and Conclusion
Motivation

Transport sector consumes high energy and produces GHG emission

- CO₂ 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.

Source: IEA 2019; Peters et al 2019; Global Carbon Budget 2019
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

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
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)

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

A Focus on carsharing services

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Group Model Building (GMB)

Invented in 1990s as part of System Dynamics modelling process

A method to share, process, and structure knowledge and understanding of a complex issue

GMB can
• improve understanding of the problem
• transforming insights
• broadening their perspectives
• enhance consensus, and
• commitment around the outcomes

Previously applied to complexed and contested problems e.g.
• Climate change
• Resource and environmental management (Limit to Growth)
• Company and organizational management

Our preliminary works
Analysis of CS users' behavior, a case study of Bangkok (IEEE 2020 submitted)
GMB student workshops with U of Tokyo (Feb 2020)
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
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
Selected outcome from post-workshop survey

Q1: My insight into the problem has increased due to the workshop.
Q2: The modelling process has given me new understandings of the connections and feedbacks among the elements within the system.
Q3: I think that, because of the workshops, we have reached a shared vision of the problem.
Q4: The causal diagrams that were developed were the result of the integration of diverse opinions and ideas of the participants.
Q5: The use of causal diagrams has clarified the communication among participants in the workshop.
Q6: All in all, I think these workshops were successful.
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)

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