



34th Annual **INCOSE**
international symposium

hybrid event

Dublin, Ireland
July 2 - 6, 2024



Raquel Hoffmann, Fabio Silva & Hidekazu Nishimura

Evaluating the Eco-Efficiency of Urban Air Mobility: Understanding Environmental and Social Impacts for Informed Passenger Choices

Inspiration



Think Like an Ecosystem: Transitioning Waste Streams to Value Streams

Lewark, R., Lyle, A., Carroll, K. and Medina, C. (2023), Think Like an Ecosystem: Transitioning Waste Streams to Value Streams. INCOSE International Symposium, 33: 768-784. <https://doi.org/10.1002/iis2.13051>

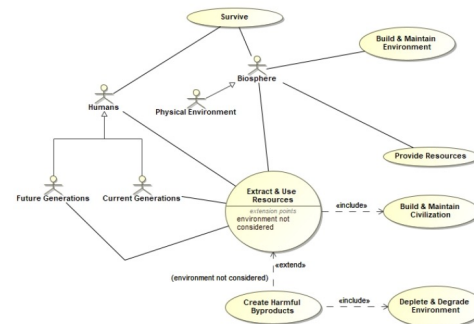
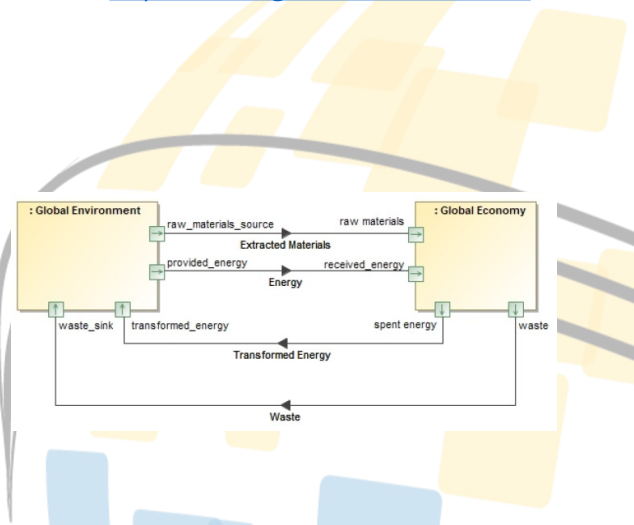


Figure 9. Use cases and stakeholders in association to resource extraction and use.

A Social Enterprise Approach for Parenting in the Japanese Society

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Introduction



eVTOL-based UAM
Transportation



IATA's Fly Net Zero
by 2050



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Sustainable
Lifecycle

Goal of the Study



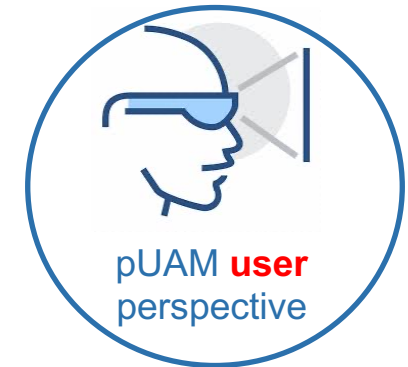
Environmental
Aspects



Social
Aspects

**How eco-efficient
is UAM for
Passenger
Transportation
(pUAM)?**

Key Questions

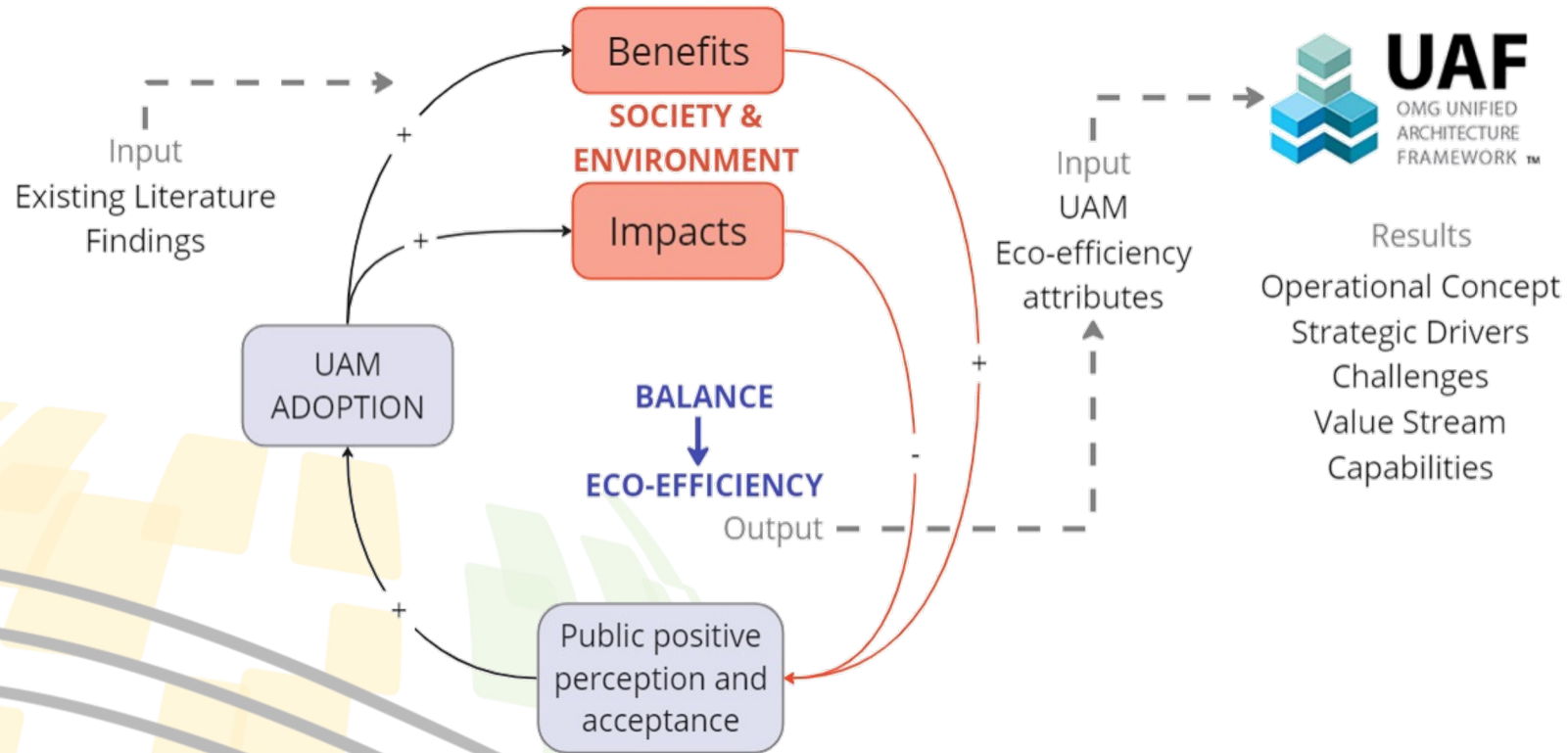


How to sustain UAM operation with efficiency, acceptance, and responsibility?

How to plan an inclusive, accessible and sustainable transportation for the residents?

How can I better use my resources for the society and the planet?

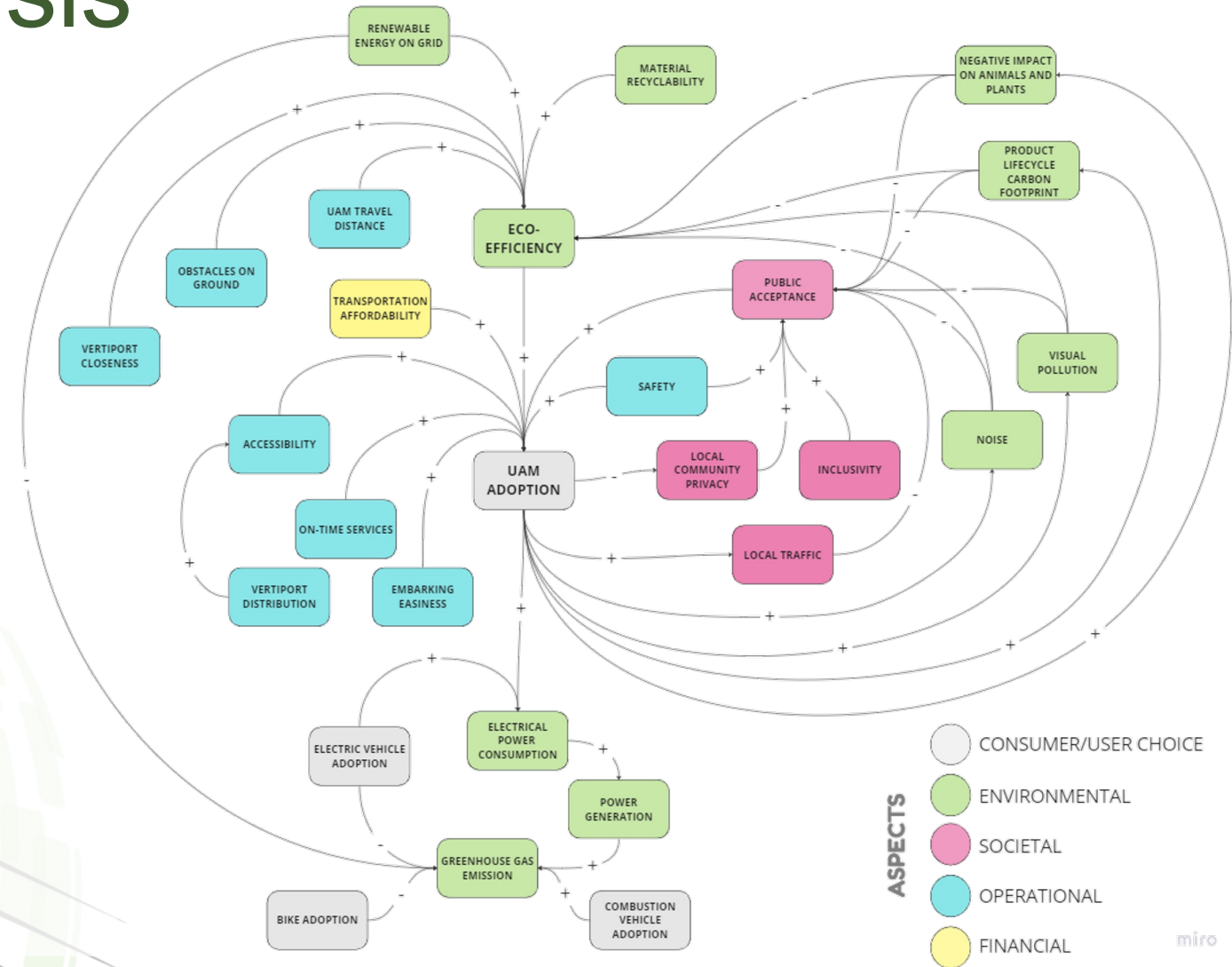
Method



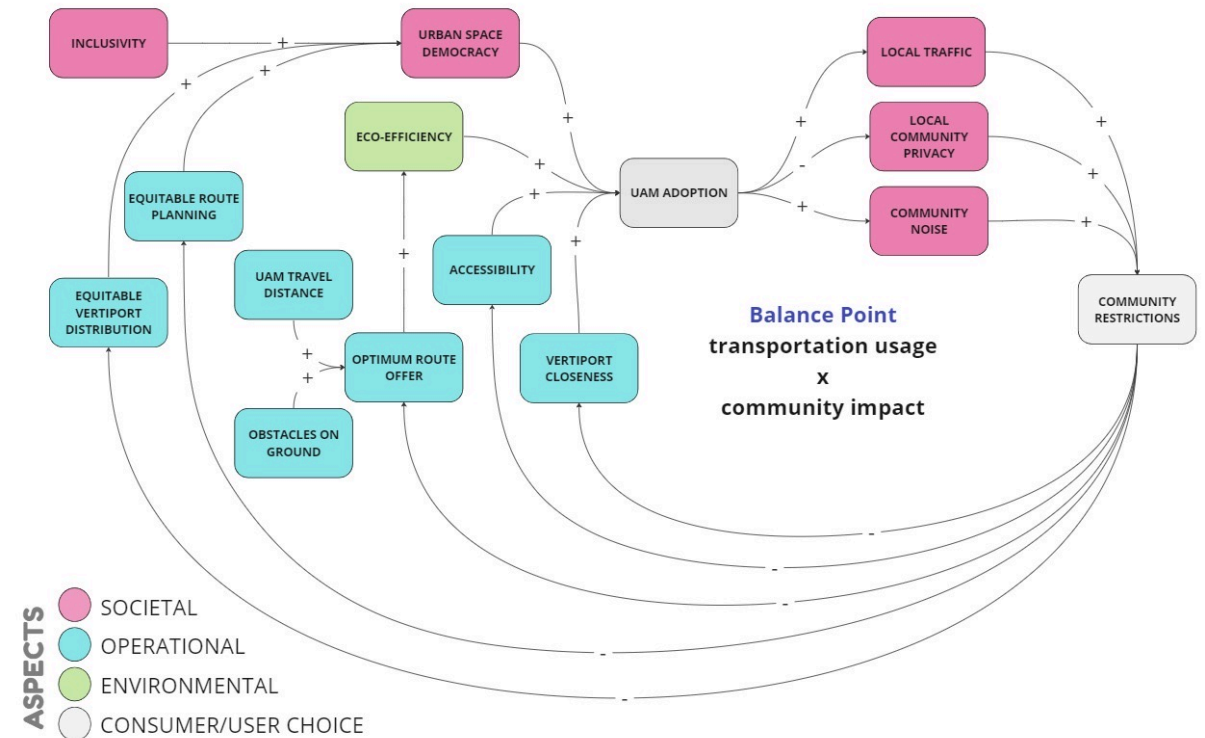
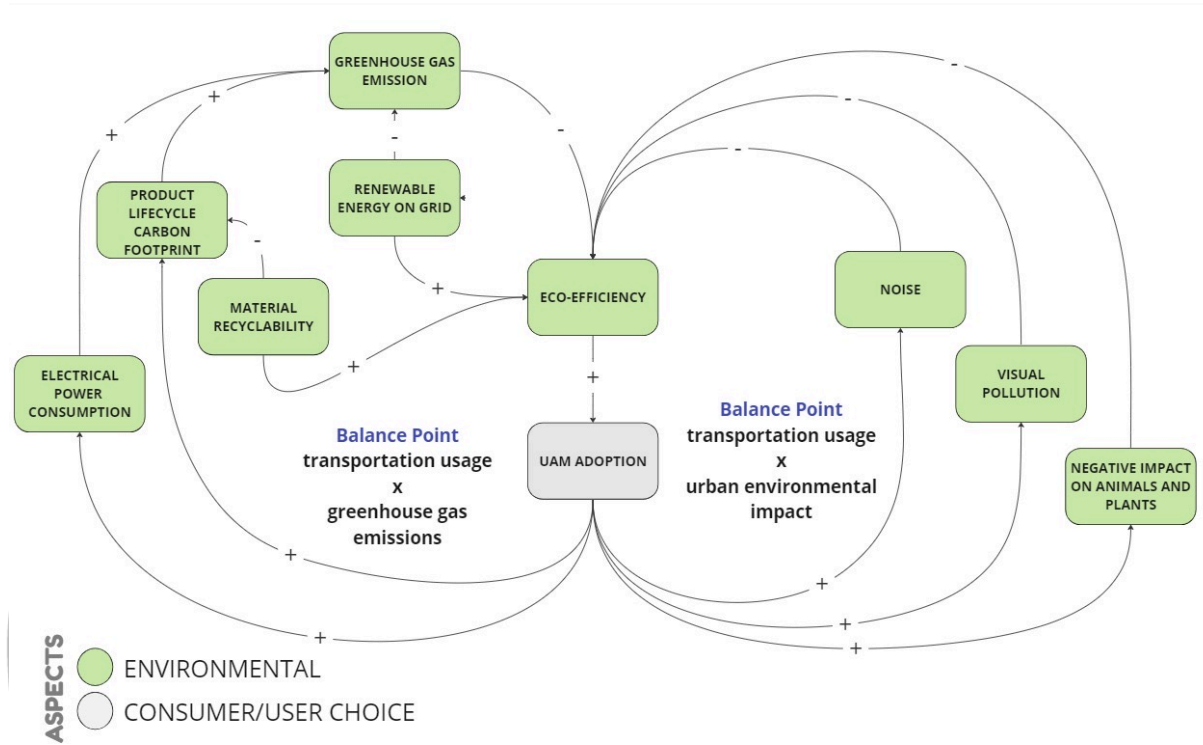
Causal Loop Analysis + UAF Modeling

Causal Loop Analysis

- Systems thinking to address interdependencies
- System Dynamics as a tool
- CLD to visualize feedback loops
- Qualitative, conceptual and preliminary approach



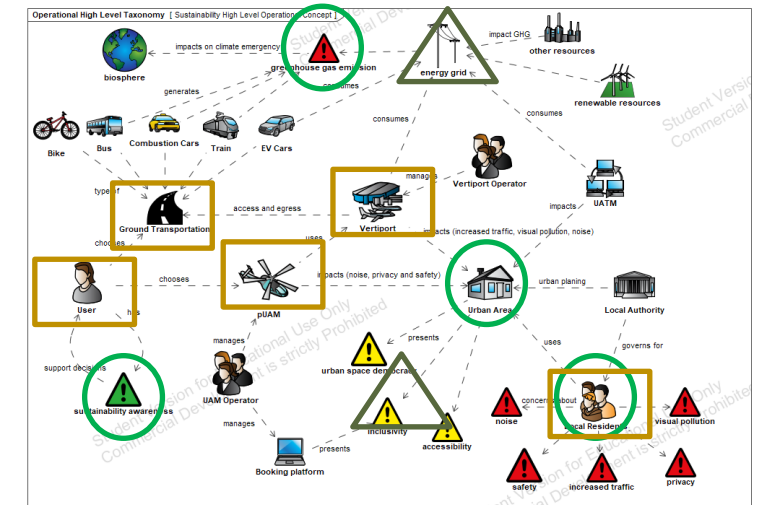
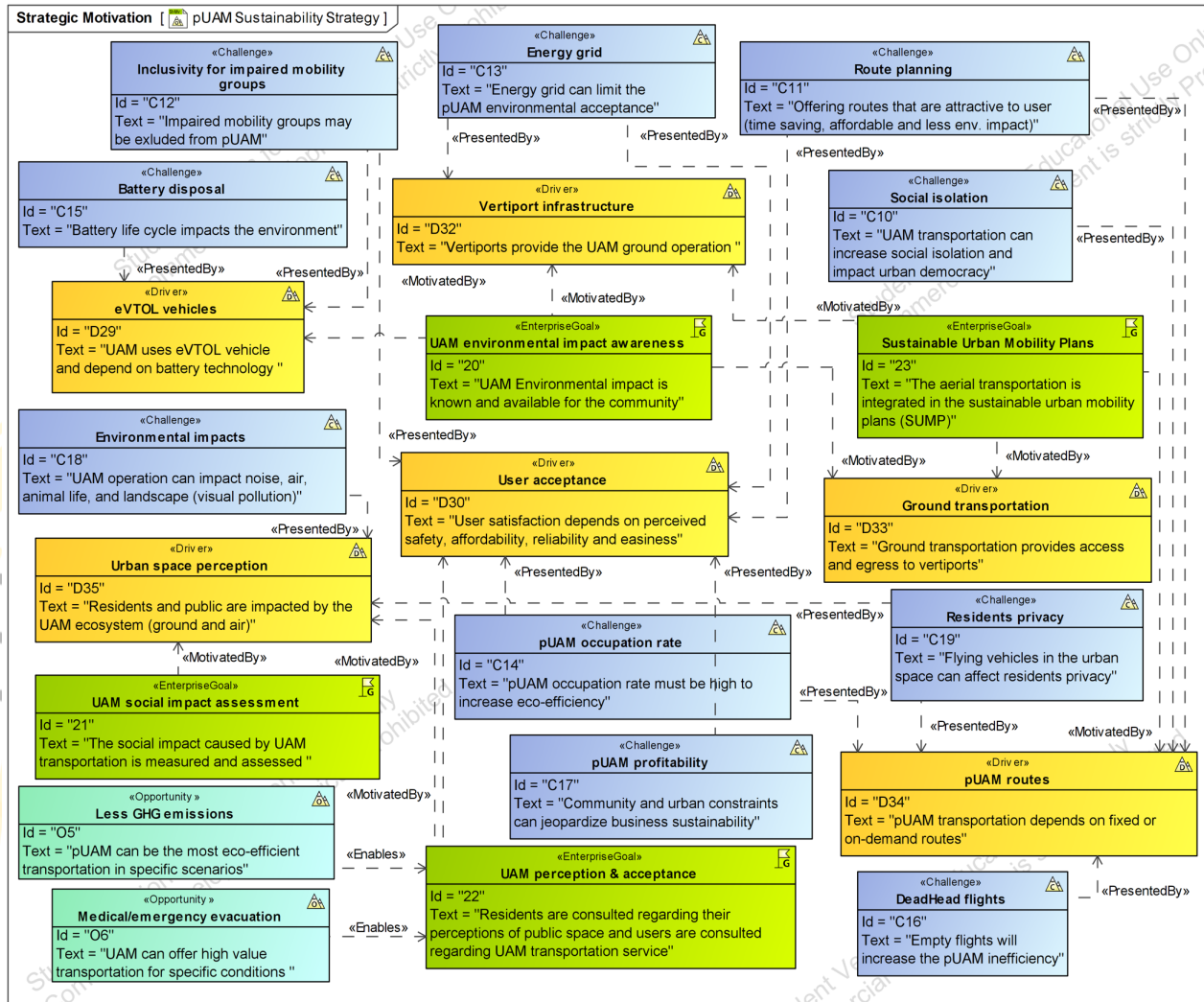
Environmental & Social Impacts



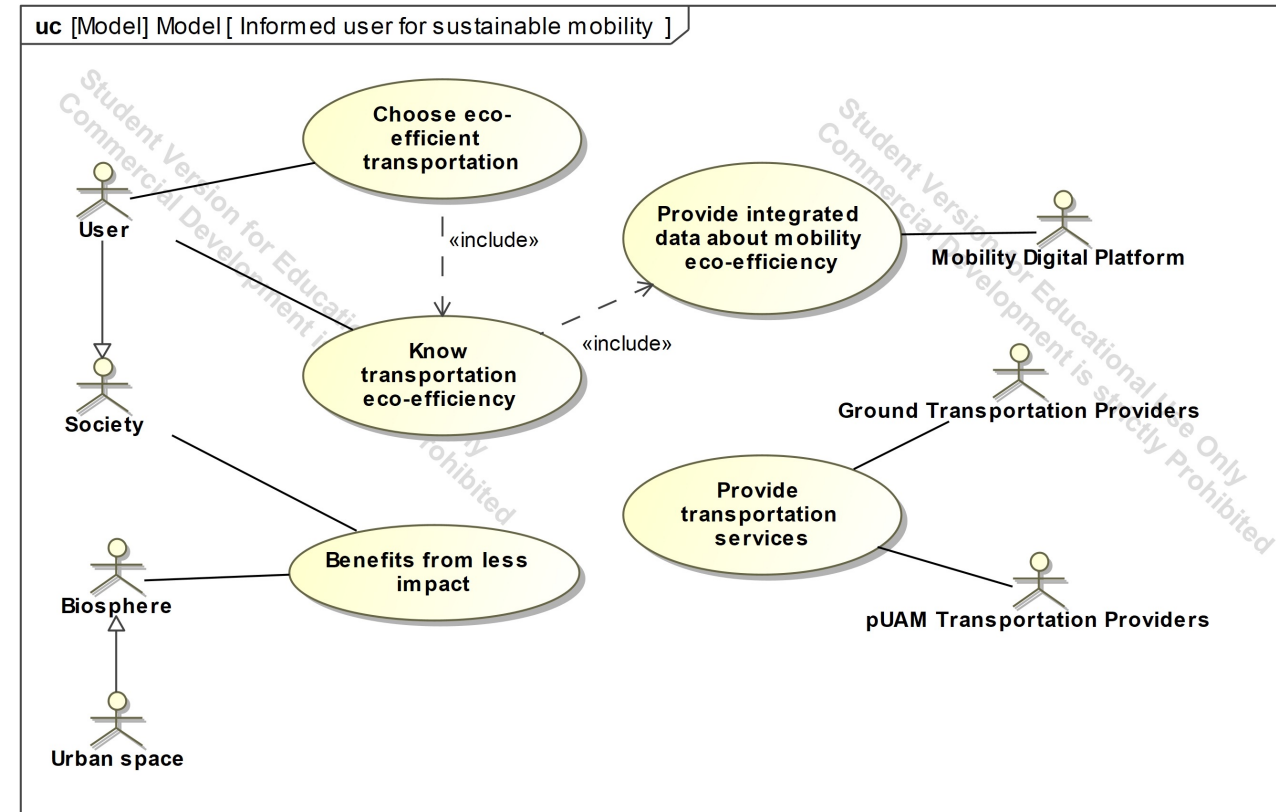
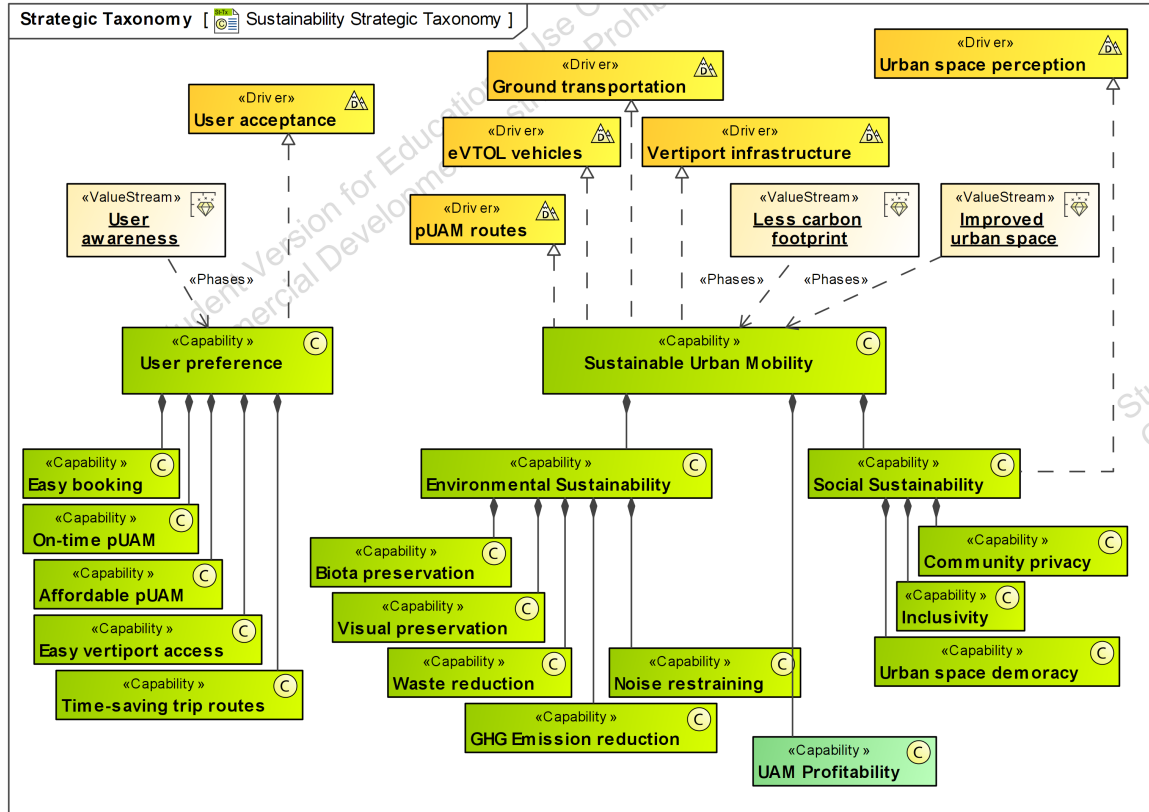
2-6 July 2024



Strategic Motivation & Taxonomy



Value Streams for Informed User



Takeaways and Recommendations

- Environmental impact of eVTOLs should be assessed considering the **full lifecycle**
- Social aspects impacting communities might influence adoption, and pUAM shall not affect **urban democracy**
- Nuanced and accurate evaluation is crucial to understand **when and under what circumstances** eVTOLs genuinely offer a sustainable transportation solution.
- Eco-efficiency to be used as an agent of **user awareness**
- Mobility-as-a-Service (MaaS) can **promote individual contribution** and sustainable transportation adoption



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www.incose.org/symp2024
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