

Is Synchromodal Transport Leading to More Sustainable Freight Transport:

-- A Review along the 5A's of Sustainable Logistics

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**MOBILITY, LOGISTICS &
AUTOMOTIVE TECHNOLOGY
RESEARCH CENTRE**

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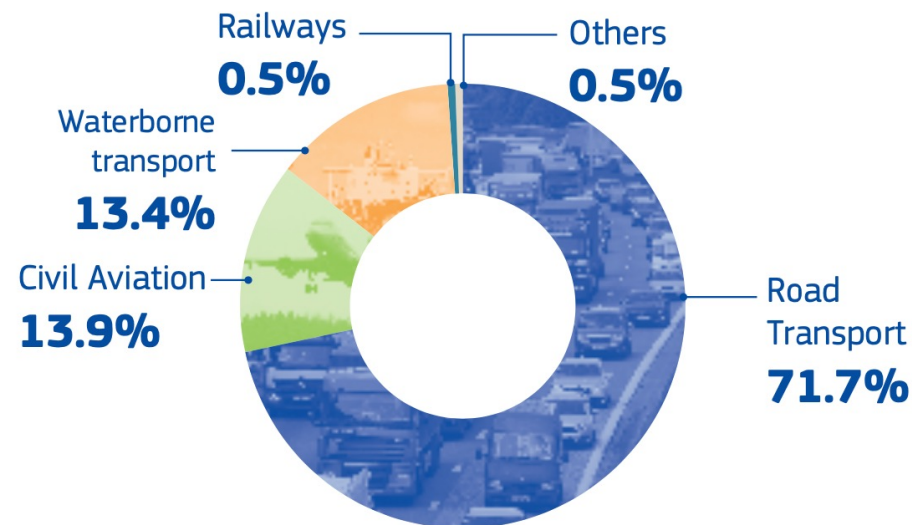
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1. Introduction



Source: The European Green Deal: Sustainable mobility, 2019

Share of Greenhouse Gas Emissions
by Mode of Transport (2017)



Source: Statistical pocketbook 2019

- ❖ Sustainability problem of freight transport -- road freight transportation
- ❖ How can freight transport be more sustainable?
- ❖ What is synchromodal transport?

1. Introduction

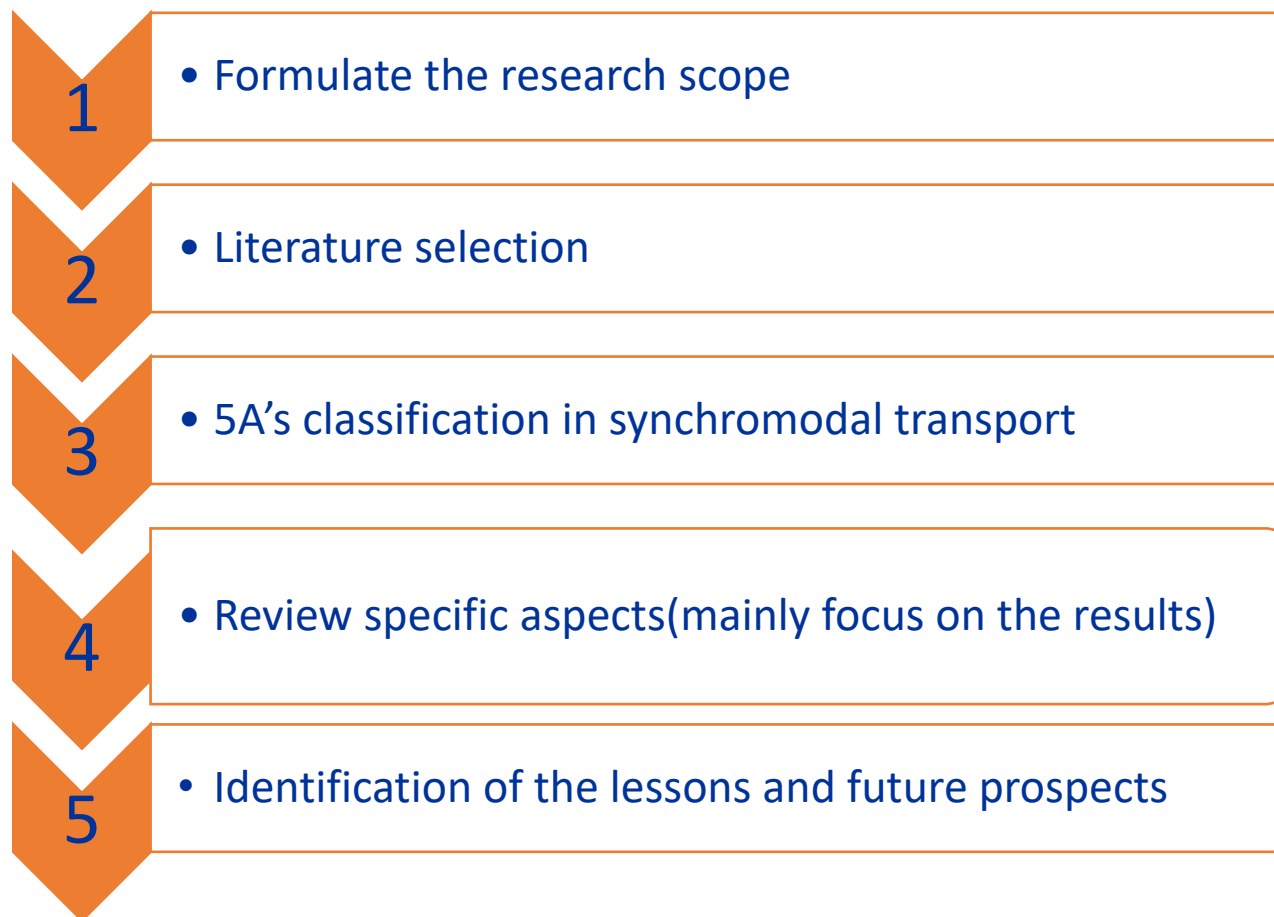
❖ Previous literature reviews: research gap

- Basically no reviewing papers focusing on the results of implementing synchromodal transport and examining whether synchromodal transport can really lead to better bundling, modal shift, etc., and eventually facilitate sustainability objectives.

❖ Following research questions

- Classification of the current research on synchromodal transport according to 5As of sustainable logistics
- To which of the 5As, do the results of reviewed papers on synchromodal transport meet?
- What are the key elements for the realization of sustainability in synchromodal transportation?

2. Methodology



3. 5A's Classification

-- for sustainable synchromodal transport

❖ **Classification:** **5A** for sustainable logistics → **5A** in sustainable synchromodal transport

- Awareness
- Avoidance
- Act & shifting
- Anticipation
- Actor involvement

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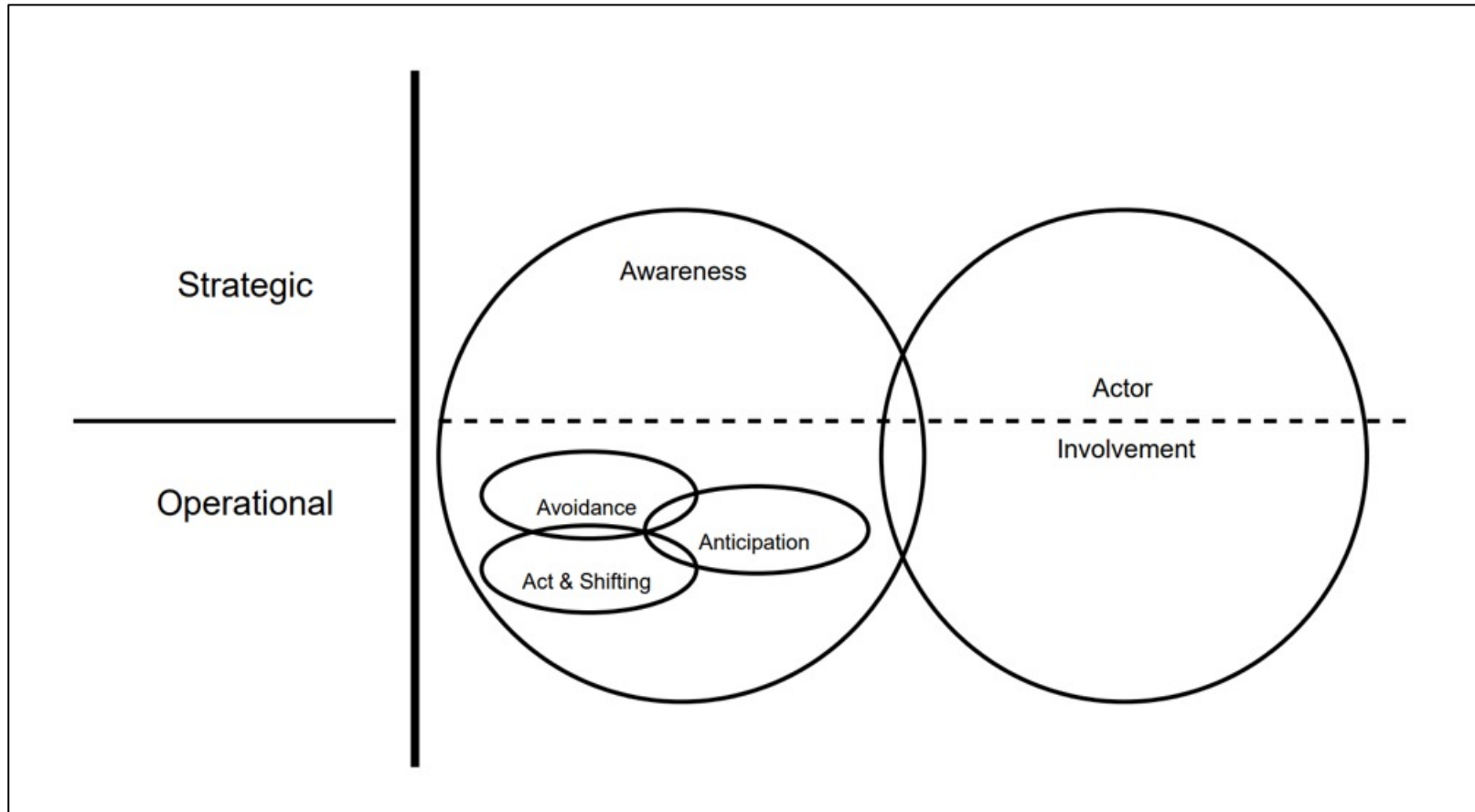
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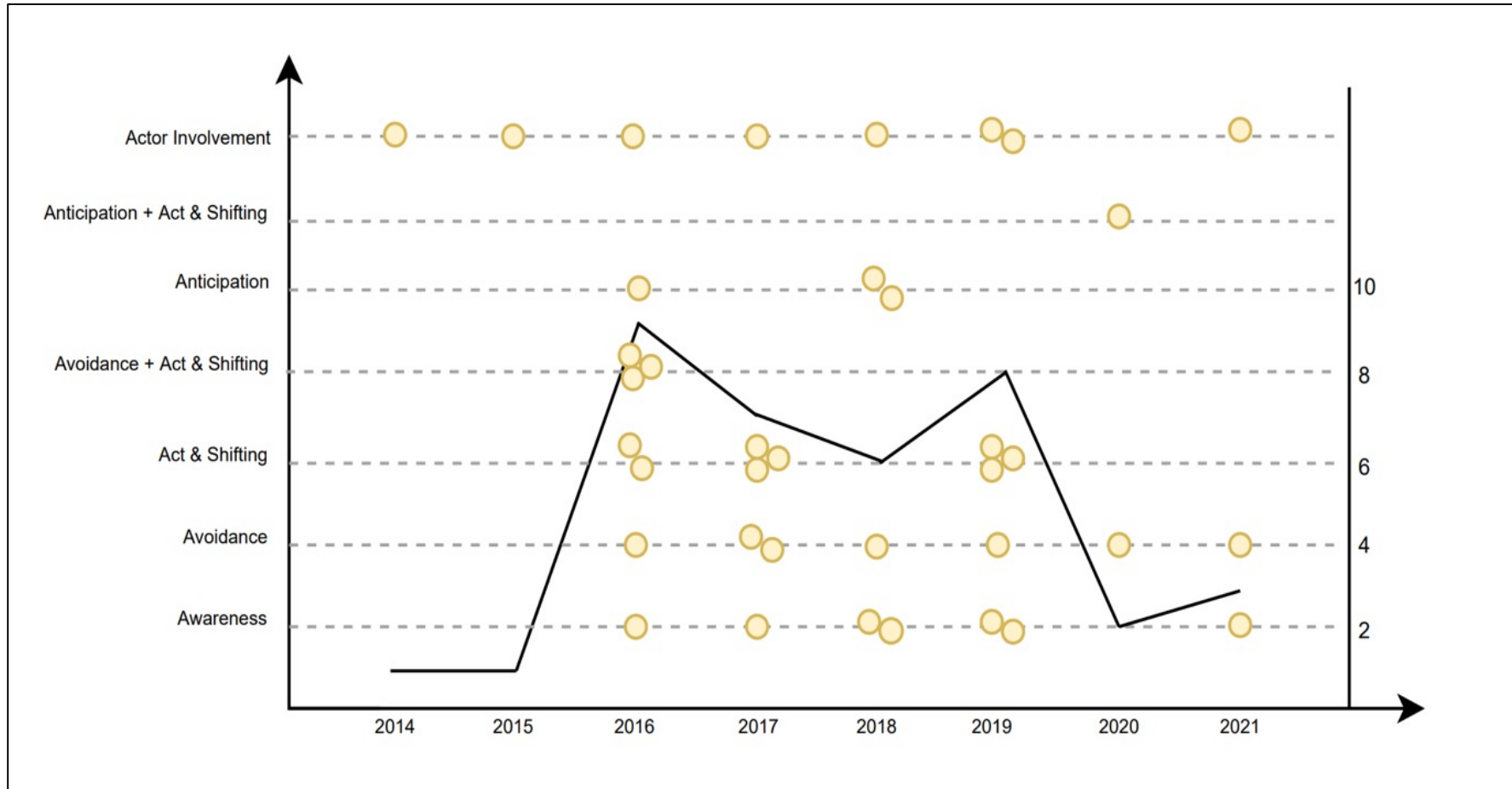
4. Results & Discussion

For RQ1: The general relationship between 5A's in Synchromodal Transport



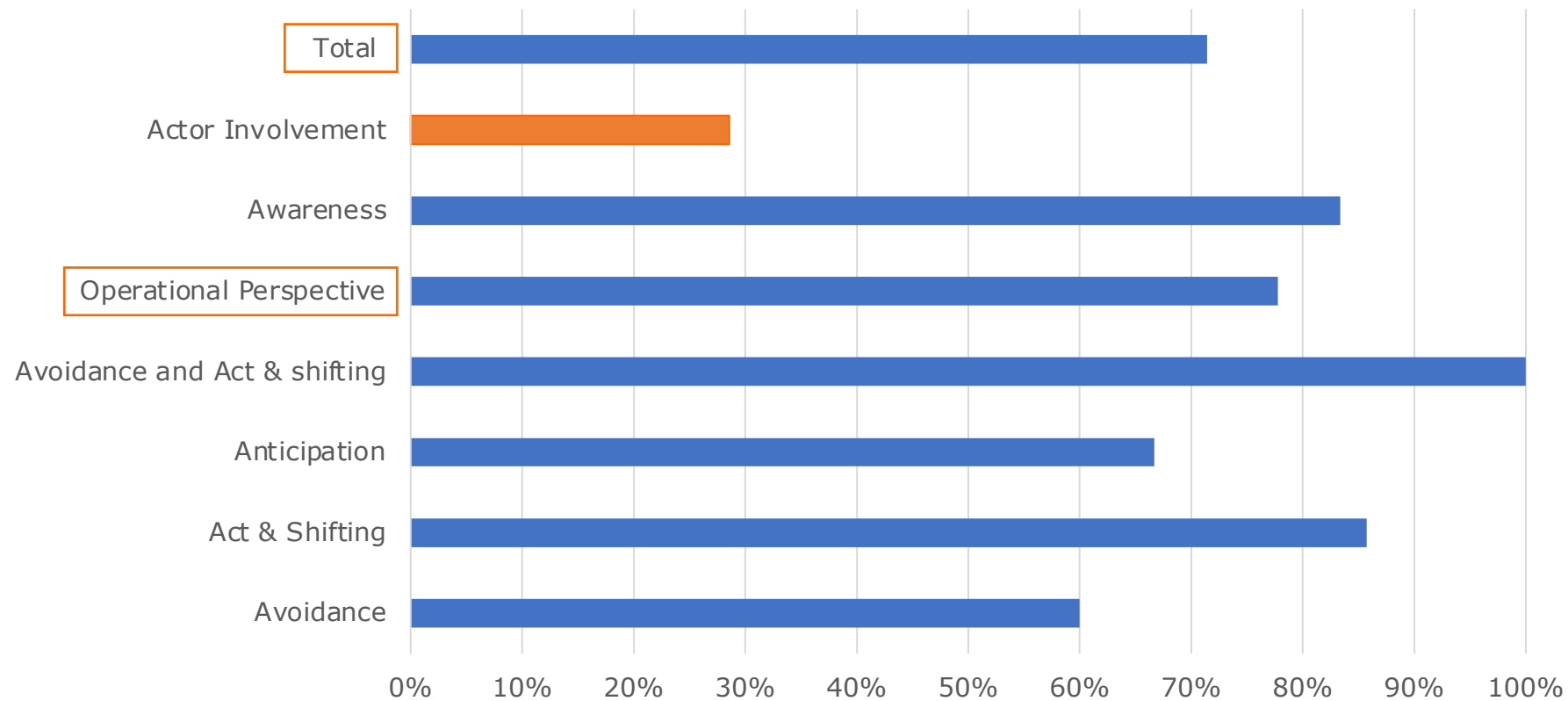
4. Results & Discussion

For RQ1: The distribution of different A in diverse years from 2014 to 2021



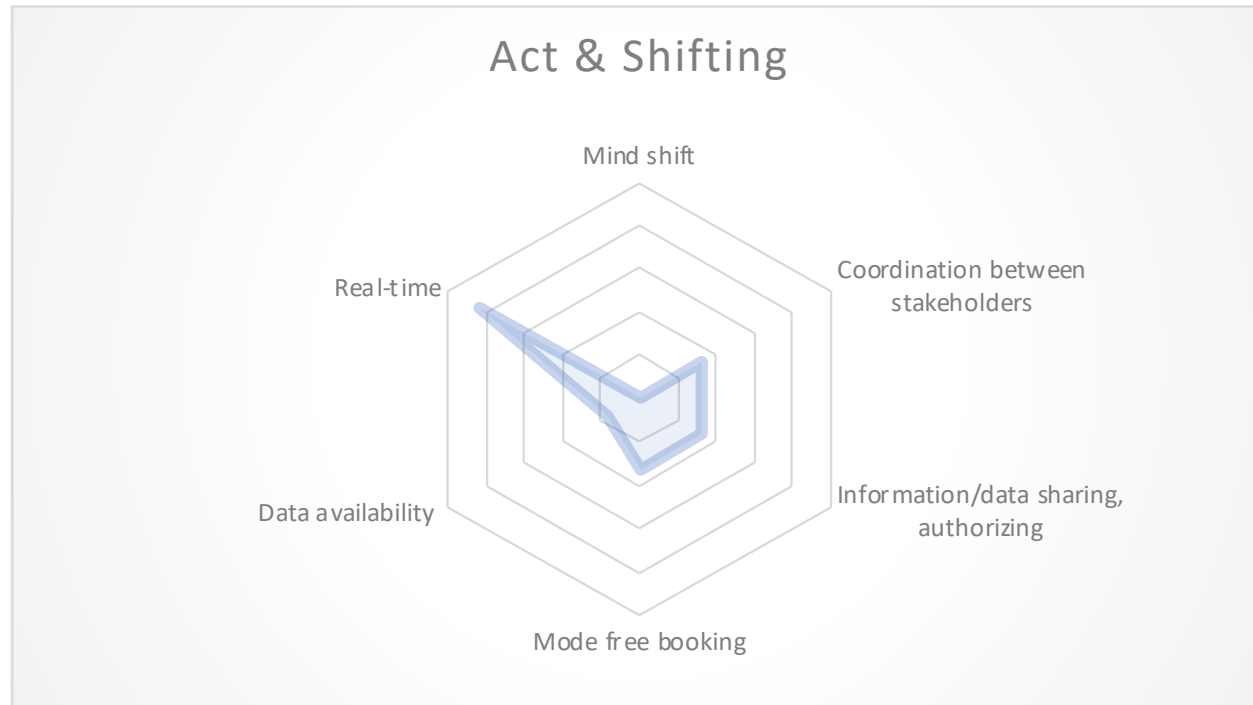
4. Results & Discussion

For RQ2: The ratio of sustainability relevance according to the results of review articles with 5As classification



4. Results & Discussion

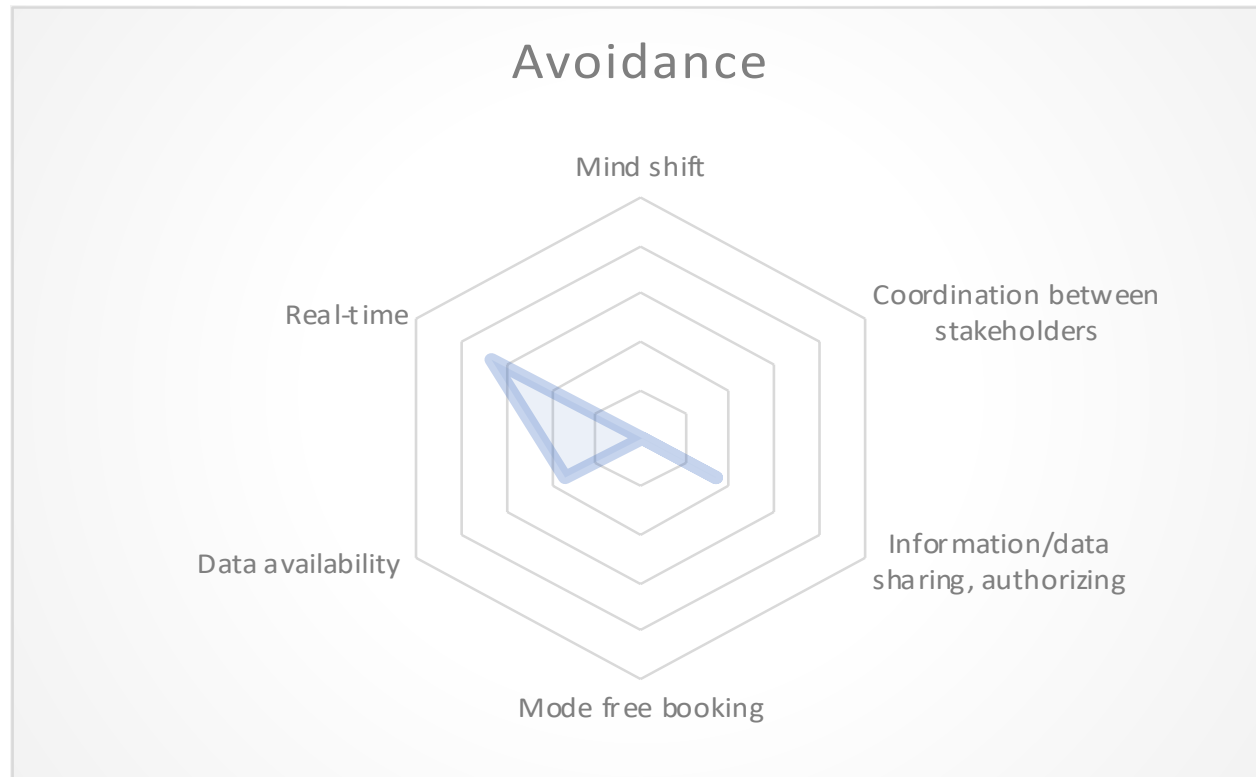
For RQ3: Key elements of Act & Shifting



- Mind Shift
- Real-time
- Data availability
- Mode free booking
- Coordination between stakeholders
- Information/data sharing, authorizing

4. Results & Discussion

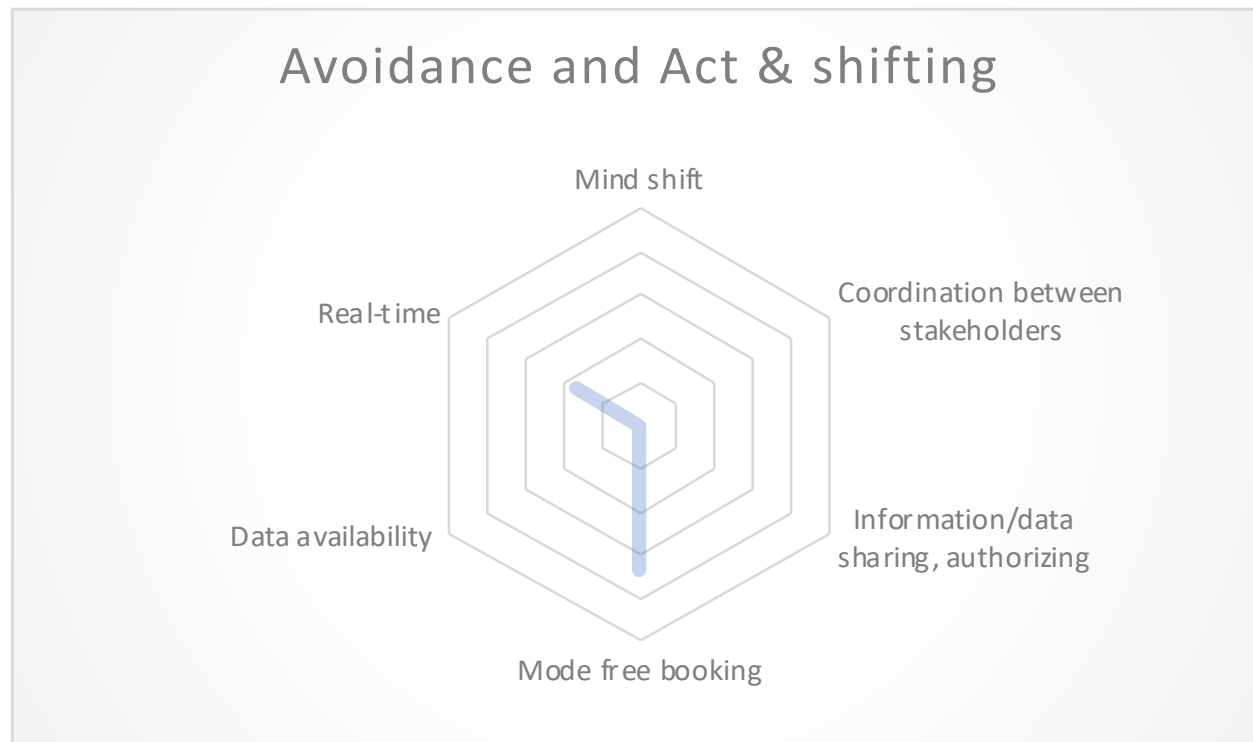
For RQ3: Key elements of Avoidance



- Mind Shift
- Real-time
- Data availability
- Mode free booking
- Coordination between stakeholders
- Information/data sharing, authorizing

4. Results & Discussion

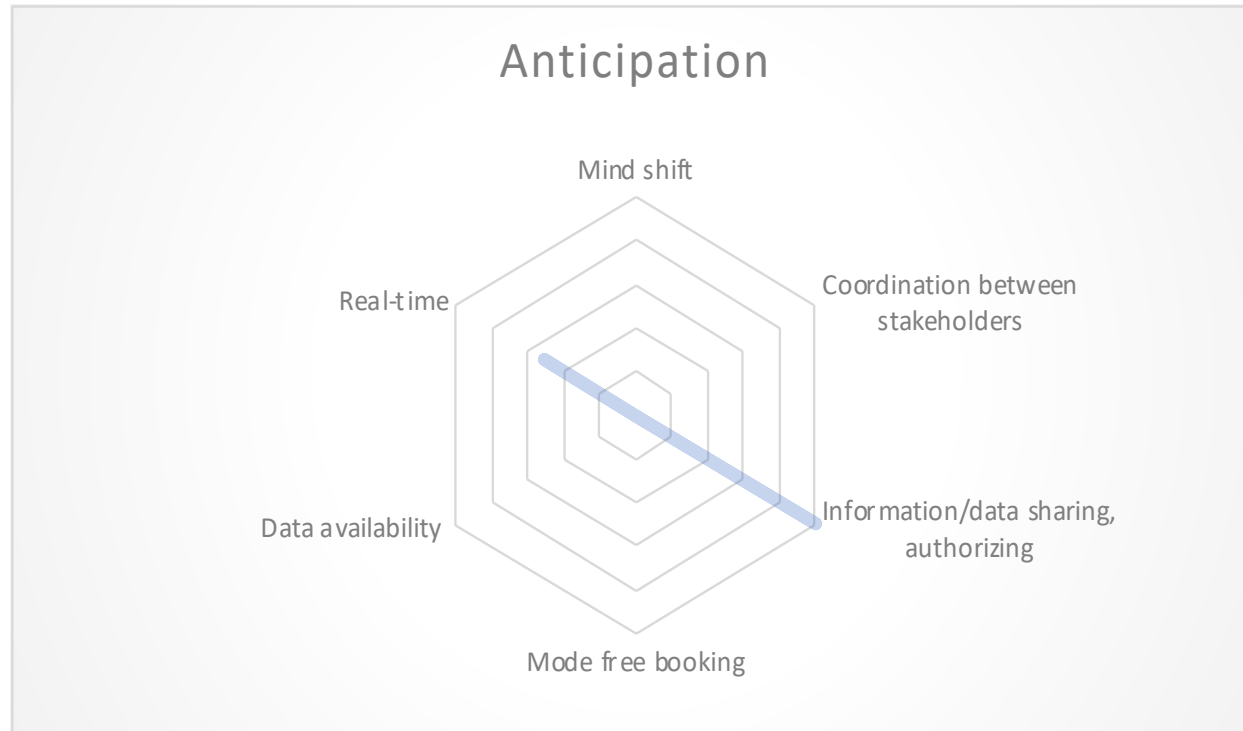
For RQ3: Key elements of Avoidance and Act & shifting



- Mind Shift
- Real-time
- Data availability
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4. Results & Discussion

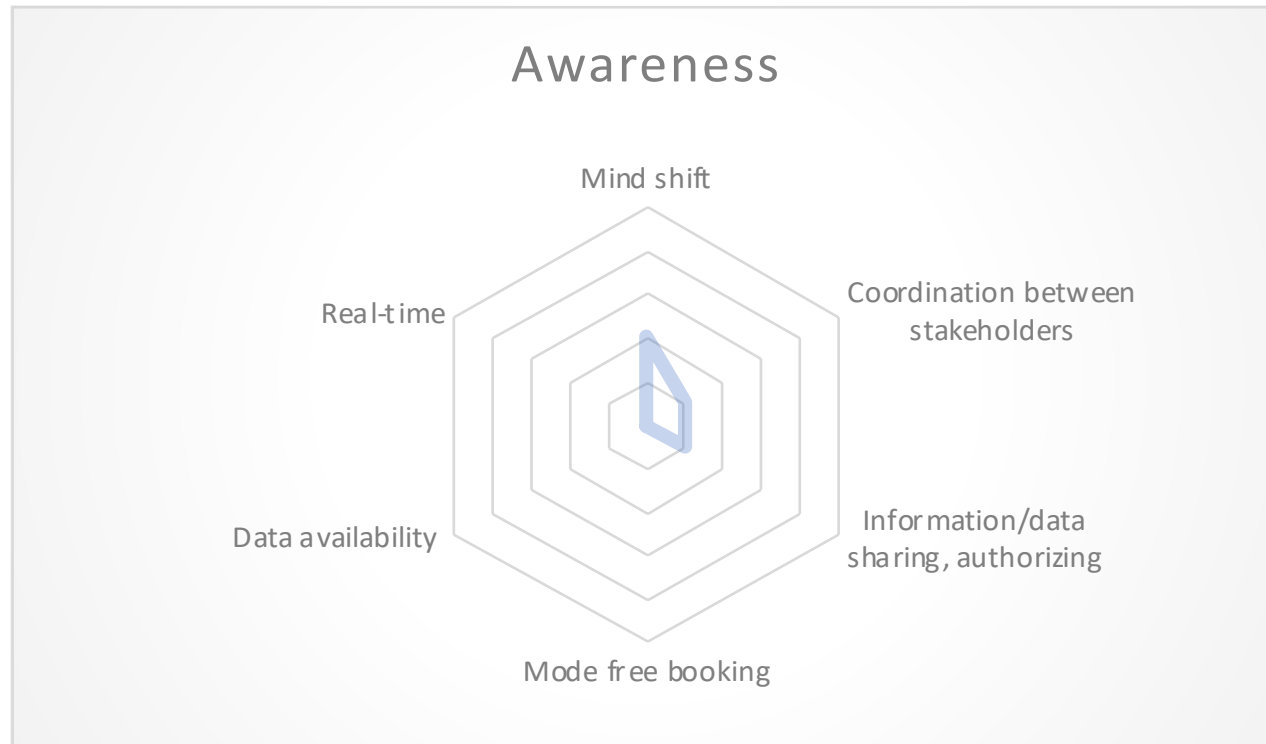
For RQ3: Key elements of Anticipation



- Mind Shift
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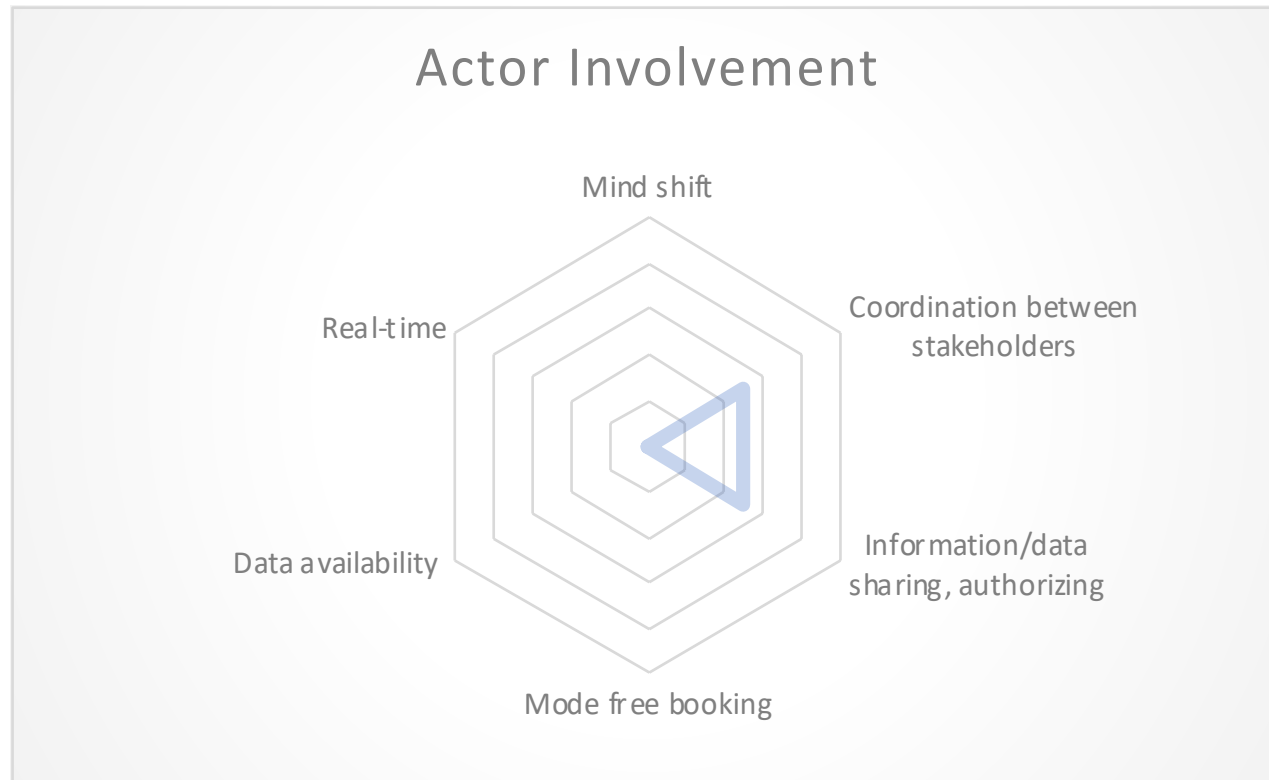
For RQ3: Key elements of Awareness



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- Data availability
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- Information/data sharing, authorizing

4. Results & Discussion

For RQ3: Key elements of Actor involvement



- Mind Shift
- Real-time
- Data availability
- Mode free booking
- Coordination between stakeholders
- Information/data sharing, authorizing

4. Results & Discussion

For RQ3: Key elements of Actor involvement

Operational Perspective:

- Real-time
- Mode free booking
- Information/data sharing, authorizing

Strategic Perspective:

- Mind shift
- Information/data sharing, authorizing
- Coordination between stakeholders

5. Conclusion

- ❖ The relationship between different A in synchromodal transport: interaction with others.
 - Further research: check what kinds of impacts or interactions they have on each other, whether they are positive or negative, etc.
 - The relationship of those effects & sustainability in synchromodal transport
- ❖ Almost 70% of studies achieve the objectives about sustainability facilitation aligning with the 5As' classification.
- ❖ Key elements for the realization of sustainability in synchromodal transportation.
 - Operational perspective: Real-time, information sharing and data authorizing, and mode free booking
 - Strategic perspective: Mind shift, information sharing and data authorizing, and coordination between stakeholders
- ❖ Future research:
 - Dealing with uncertainties and disturbances in the dynamic synchromodal
 - It is always worth checking the main question about whether the synchromodal transport can lead to more sustainability when more projects making further progress.

Thank You for Your Attention!

Questions?