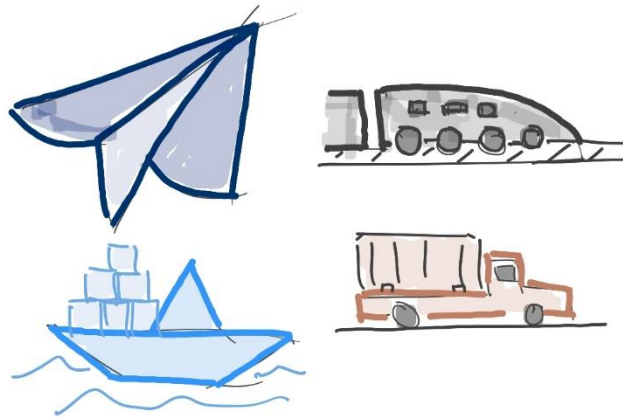


# MULTILOGS-2025

INTERNATIONAL CONFERENCE



Dec 11-12, 2025

Universidad del Mar, Puerto Escondido  
MEXICO

## Scenario Simulations for EU Airline Decarbonisation: An AZERO Phase III Prototype with System Dynamics



Luis **Martín-Domingo**<sup>1, 2</sup>; Miguel **Mújica-Mota**<sup>3</sup>; and Marina **Efthymiou**<sup>1</sup>

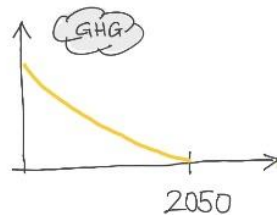
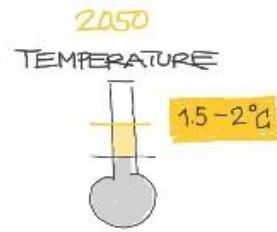
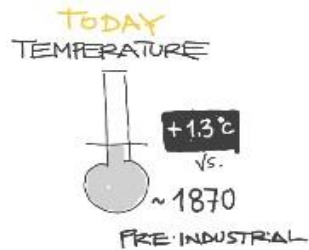
<sup>1</sup> Dublin City University; <sup>2</sup> Ozyegin University; <sup>3</sup> Amsterdam University of Applied Sciences



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This project has received funding from the European Union's HORIZON-MSCA-2023-PF-01 research programme under the Marie Skłodowska-Curie (MSCA)  
[Grant Project: 101151804 — AZERO](#)

# Context



**Temperature increase** and suggested ceiling by science

**Paris Agreement EU Green Deal** leading to **Net Zero 2050**

**Air Transport commitment** to Net Zero 2050, but **what about researchers?**

# Impact of aviation emissions on the climate

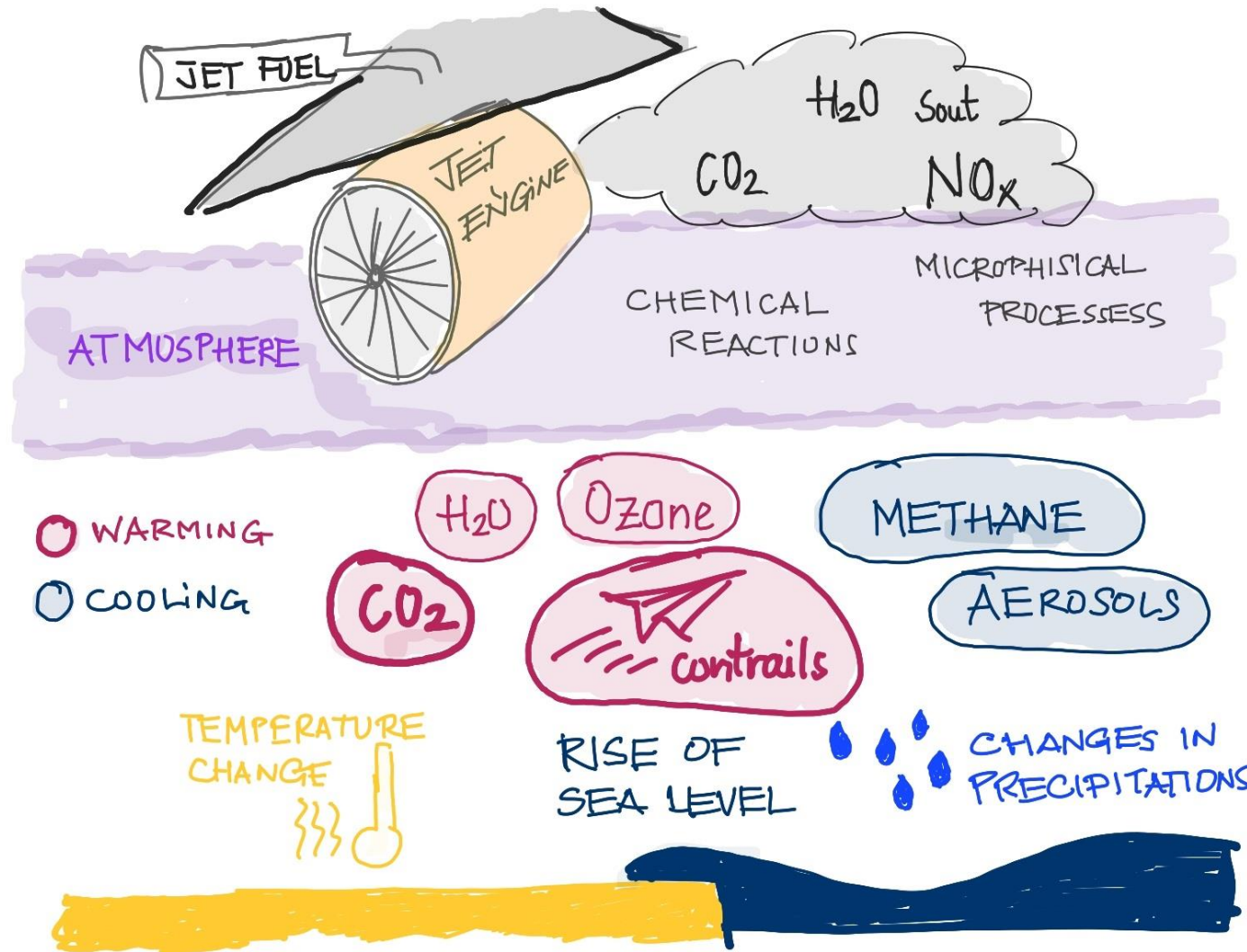


Figure 1: Impact of aviation emissions on the climate (Martín-Domingo, L. 2024 – based on German Environmental Agency (2023))

Global sea level rise

1900

The sea-level rise resulting from 2°C global warming would place 100 airports below sea level  
(Yesudian & Dawson 2021)

# One Tweet, Network, and Perseverance



Prof. Marina **Efthymiou**  
Dublin City University;



Assoc. Prof. Miguel **Mújica-Mota**  
Amsterdam University of Applied Sciences



Marina Efthymiou  
@EfthymiouMarina

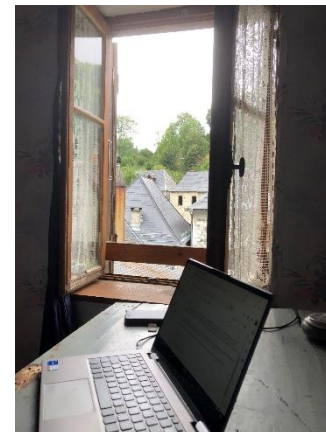
...

If you have a topic in [#Aviation](#) and you feel you fit the [#M5CA](#) Postdoctoral Fellowships call requirements, let me know. More info: [lnkd.in/gN-gsBzB](https://lnkd.in/gN-gsBzB)  
[sPhDaviation](#) [#research](#) [#aviationresearch](#) WDCU

Summer 2022



10:55 AM- Jun 14, 2022



Morning  
Writing




Afternoon: 'Relaxing'

# MSCA Postdoctoral Fellowship – Your opportunity?

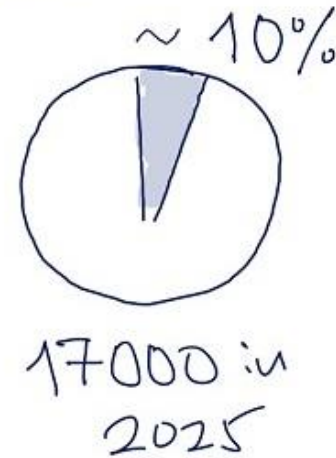
EUROPEAN  
PROGRAMME



- PhD REQUIRED 
- MAX 8 YEARS RESEARCH EXPERIENCE

- Living 
- mobility
- Overheads

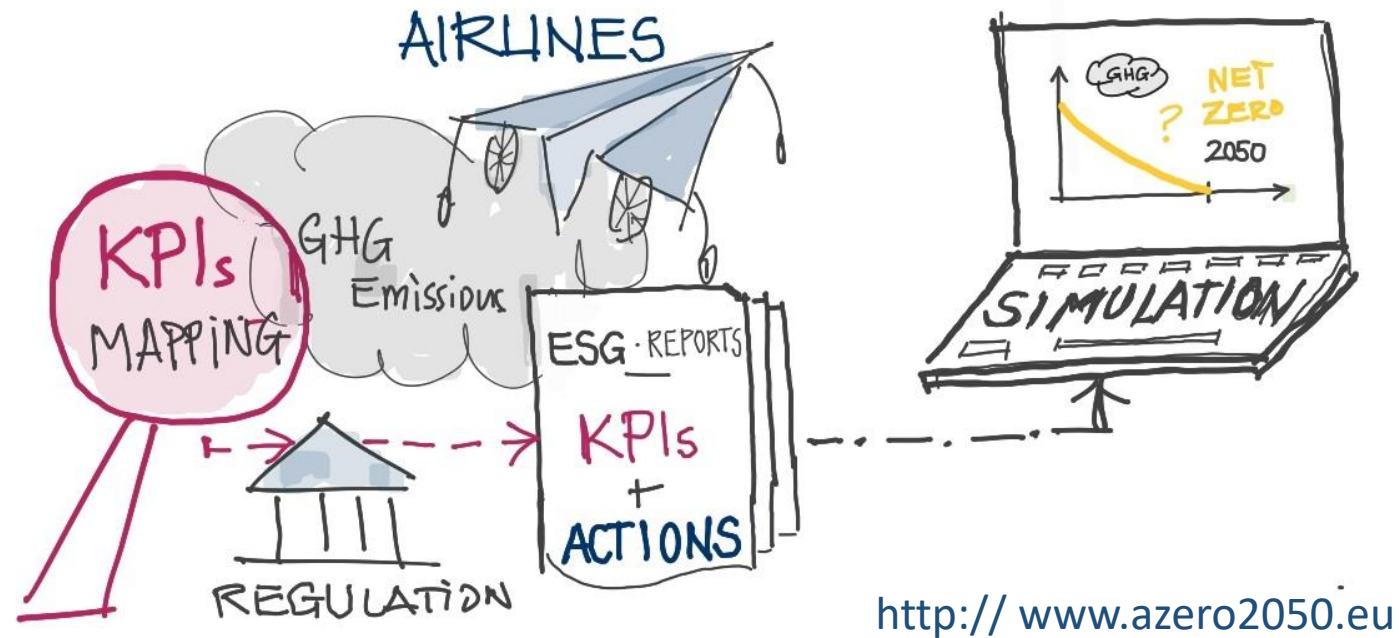
TIMELINE:



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# Aviation Zero Emissions 2050 (AZERO) Project



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This project has received funding from the European Union's HORIZON-MSCA-2023-PF-01 research programme under the Marie Skłodowska-Curie (MSCA) grant agreement No 101151804

# Research Output

Transport Policy 174 (2025) 103830

Contents lists available at ScienceDirect



Transport Policy

journal homepage: [www.elsevier.com/locate/tranpol](http://www.elsevier.com/locate/tranpol)



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

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Transportation Research Procedia 00 (2025) 000–000

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## From hero to zero: Barriers to achieving IATA's 2050 sustainability targets

Xiaoqian Sun<sup>a</sup>, Stefan Baumeister<sup>b</sup>, Luis Martin-Domingo<sup>c</sup>, Ian Douglas<sup>d</sup>,  
Marina Efthymiou<sup>e</sup>, Mark Hansen<sup>f</sup>, Julia Herget<sup>g</sup>, Katsuya Hihara<sup>h</sup>, Xibei Jia<sup>i</sup>, Ang Li<sup>j</sup>,  
Kam Hung Ng<sup>k</sup>, Mikio Takebayashi<sup>l</sup>, Yahua Zhang<sup>m</sup>, Sebastian Wandelt<sup>a,\*</sup>

<sup>a</sup> School of Electronic and Information Engineering, Beihang University, Beijing, China

<sup>b</sup> University of Jyväskylä, School of Business and Economics, Finland

<sup>c</sup> Faculty of Aviation and Aeronautical Sciences, Ozyegin University, Istanbul, Turkey

<sup>d</sup> School of Aviation, University of New South Wales, Sydney, 2052, NSW, Australia

<sup>e</sup> Dublin City University, Business School, Glasnevin, Dublin 9, Ireland

<sup>f</sup> Department of Civil and Environmental Engineering, University of California, Berkeley, United States

<sup>g</sup> Frankfurt University of Applied Sciences, Frankfurt, Germany

<sup>h</sup> Department of Tourism Science, Tokyo Metropolitan University, Hachioji-City, Tokyo, Japan

<sup>i</sup> Department of Transport and Regional Economics, University of Antwerp, 2000, Antwerpen, Belgium

<sup>j</sup> Department of Aeronautical and Aviation Engineering, Hong Kong Polytechnic University, Hong Kong, China

<sup>k</sup> Graduate School of Maritime Sciences, Kobe University, Higashi-nada, Kobe 658-0022, Japan

<sup>l</sup> UniSA STEM, University of South Australia, Adelaide, Australia

### ARTICLE INFO

#### Keywords:

Air transport  
Sustainability  
IATA  
Net zero  
Survey

### ABSTRACT

Sustainable operations have become essential for mitigating the environmental impact of air transport and ensuring the long-term viability of the industry. Accordingly, achieving existing sustainability goals is crucial for reducing carbon emissions within the sector. This study presents an evaluation of the International Air Transport Association's (IATA) ambitious sustainability goals for 2050, focusing on the potential challenges and barriers that may impede their successful realization. Through a comprehensive survey circulated among carefully selected air transport sustainability researchers attending the Air Transport Research Society (ATRS) World Conference 2025, our study gathers independent academic expert perspectives on feasibility of IATA's commitments. The survey, structured around six categories, namely estimation of goal completion, economic barriers, technological challenges, policy issues, industry resistance, and public factors — elicits expert opinions on the likelihood of achieving the stated sustainability targets. The survey reveals significant skepticism about achieving net-zero carbon emissions by 2050, with economic barriers, technological challenges, and regulatory issues being major hurdles. High costs, slow tech adoption, and lack of global regulatory frameworks are other concerns. By leveraging the expertise of air transport researchers, this study offers a unique and authoritative perspective on the challenges facing the aviation industry's sustainability efforts.

## TRPRO\_14th International Conference on Air Transport – INAIR 2025: Fly High, Learn Far Aviation Decarbonisation: A Bibliometric Analysis of Productivity and Research Trends, and Gaps

Marina Efthymiou<sup>a,\*</sup>, Luis Martín-Domingo<sup>a, b</sup>, Miguel Mujica Mota<sup>c</sup>

<sup>a</sup> Dublin City University Business School, Dublin, Ireland

<sup>b</sup> Ozyegin University, Faculty of Aviation, Istanbul, Turkey

<sup>c</sup> Aviation Academy, Amsterdam University of Applied Sciences, Amsterdam, The Netherlands

### Abstract

Decarbonising aviation is a growing priority in global climate mitigation, yet research in this domain remains fragmented across disciplines and themes. This study offers the first comprehensive bibliometric analysis of aviation decarbonisation research over the past 25 years, using the Bibliometrix R-package and Scopus data. Beyond mapping publication trends, authorship networks, geographical distribution, and keyword evolution, the study reveals how the field has shifted from emissions quantification and biofuels to system-level innovations such as sustainable aviation fuels (SAFs), hydrogen, and electric propulsion. Our analysis uncovers three dominant intellectual clusters—technological innovation, policy and market instruments, and operational strategies—while highlighting persistent blind spots, including demand-side measures, behavioural change, and equity considerations. A key contribution of this research lies in exposing the technology-centric and Global North–dominated orientation of the field, thereby identifying overlooked perspectives crucial for achieving a just transition. By providing a structured overview of knowledge trajectories and emergent themes, this study establishes a research agenda that integrates technical, policy, and societal dimensions, supporting more coherent and interdisciplinary approaches to aviation decarbonisation.

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Peer review under the responsibility of the 14th International Conference on Air Transport – INAIR 2025: Fly High, Learn Far.

*Keywords:* Aviation decarbonisation; sustainable aviation fuels; emissions reduction; aviation; air transport; bibliometric analysis.



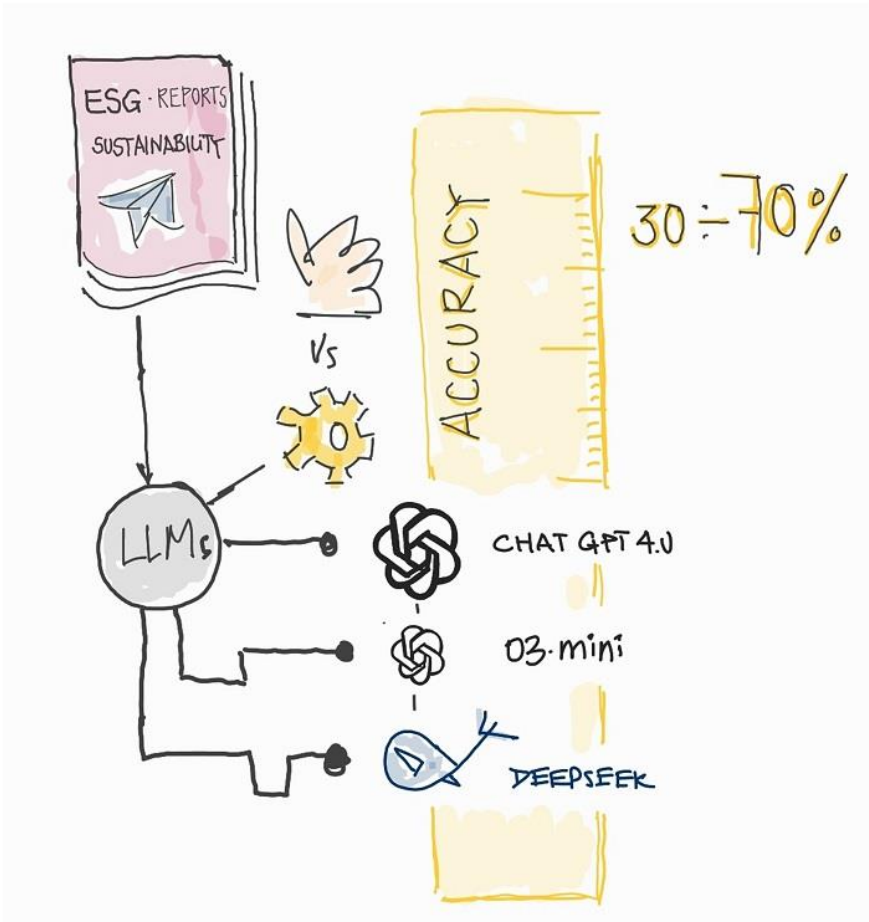
### Extracting airline emission KPIs from sustainability reports using large language models (LLMs)

Luis Martín-Domingo<sup>a,b,\*</sup>, Jaime B. Fernandez<sup>c</sup>, Marina Efthymiou<sup>a</sup>, Muhammad Intizar Ali<sup>c</sup>

<sup>a</sup> Business School, Dublin City University, Dublin 9, Ireland

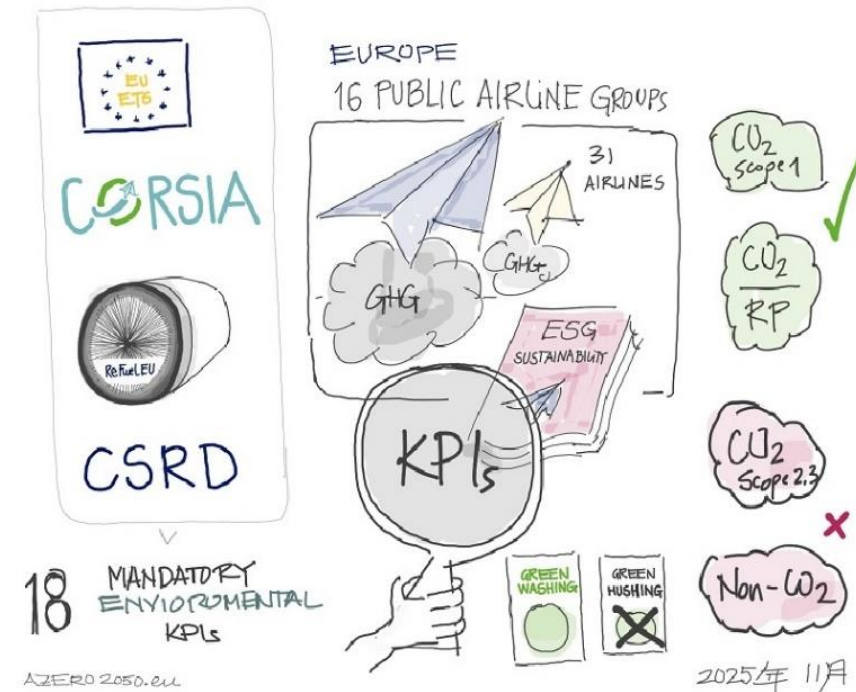
<sup>b</sup> Faculty of Aviation, Ozyegin University, Istanbul, Turkey

<sup>c</sup> Insight Research Ireland Centre for Data Analytics, Dublin City University, Dublin 9, Ireland

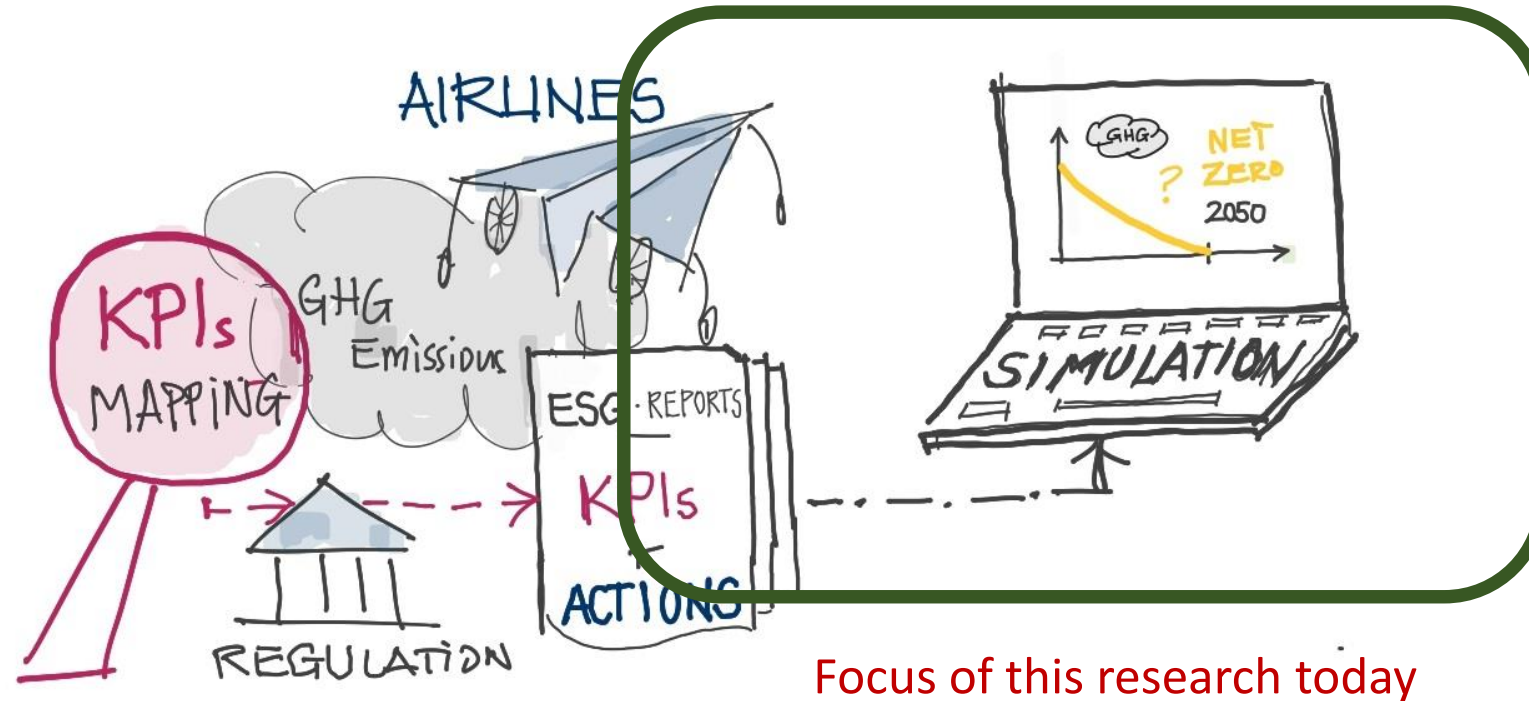


### Airline sustainability reporting in Europe: Progress, compliance and challenges

Luis Martín-Domingo<sup>a,b</sup>, Marina Efthymiou<sup>a</sup>, Miguel Mujica Mota<sup>c</sup> ✉



# Objective: Simulation of GHG emissions 2030-40-50



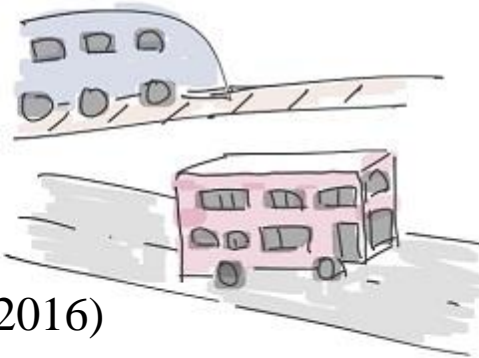
Funded by  
the European Union

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# Literature Review

SD: Predicts - COMPLEX SYSTEM - Trends of data over time  
(SYSTEM DYNAMICS)

PUBLIC TRANSPORT



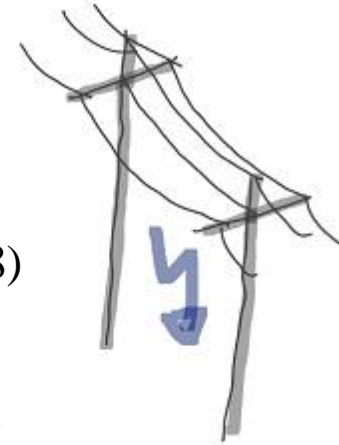
(Ercan et al., 2016)

CEMENT INDUSTRY



(Jokar & Mokhtar, 2018)

ELECTRICITY GENERATION



(Saysel & Hekimoğlu, 2013)



AVIATION

(Tan & Yap, 2015)

Small geographical scale

# Methodology I

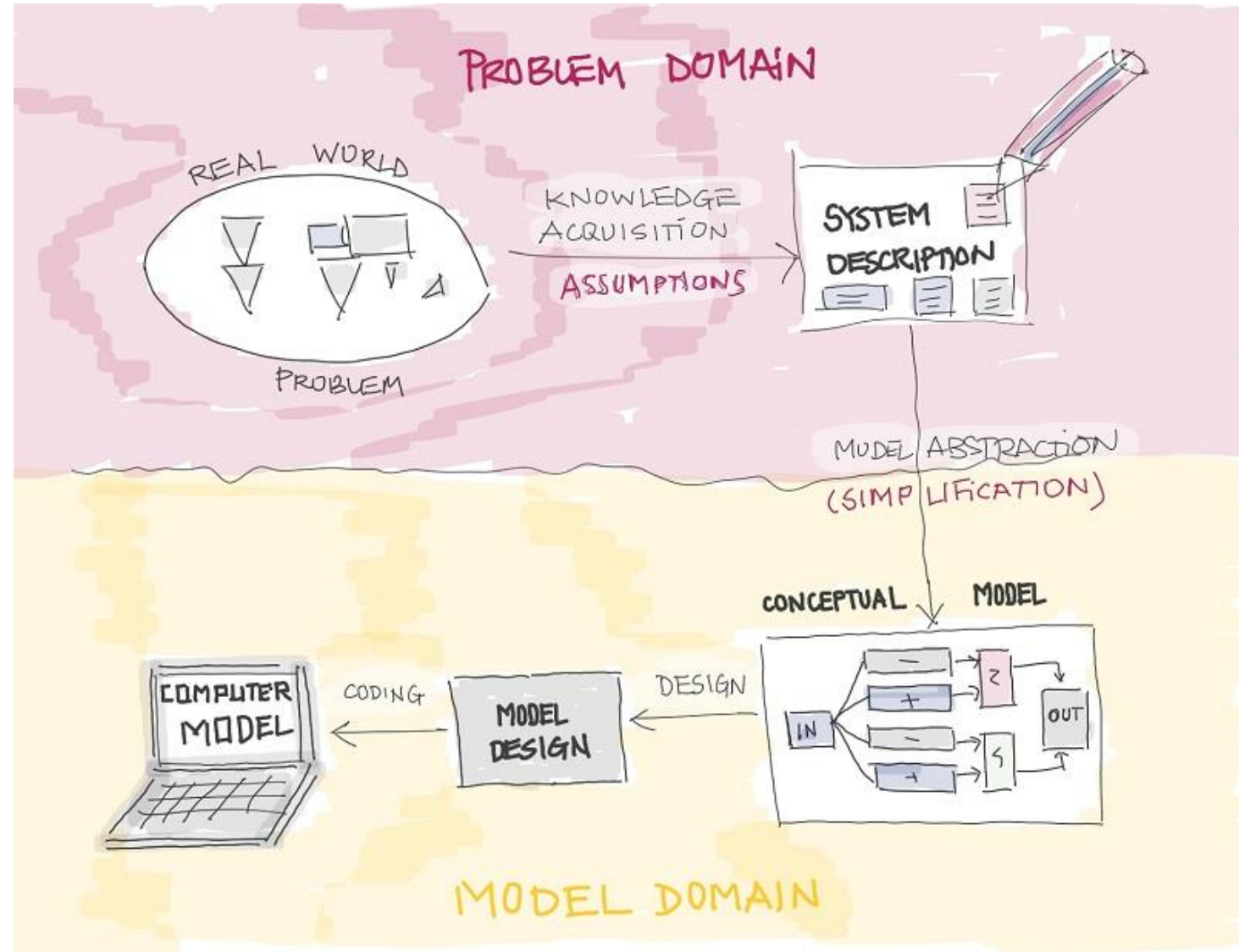
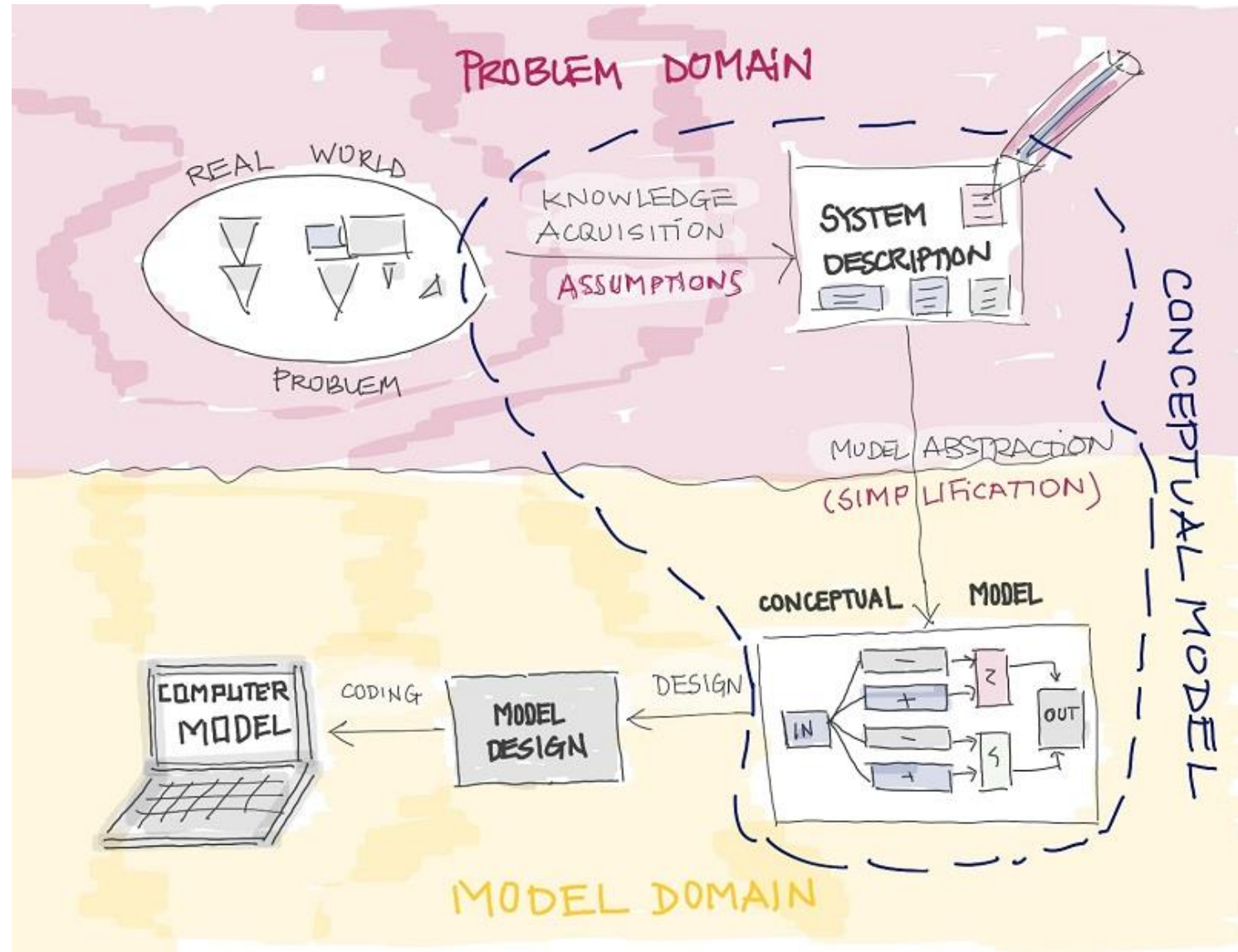


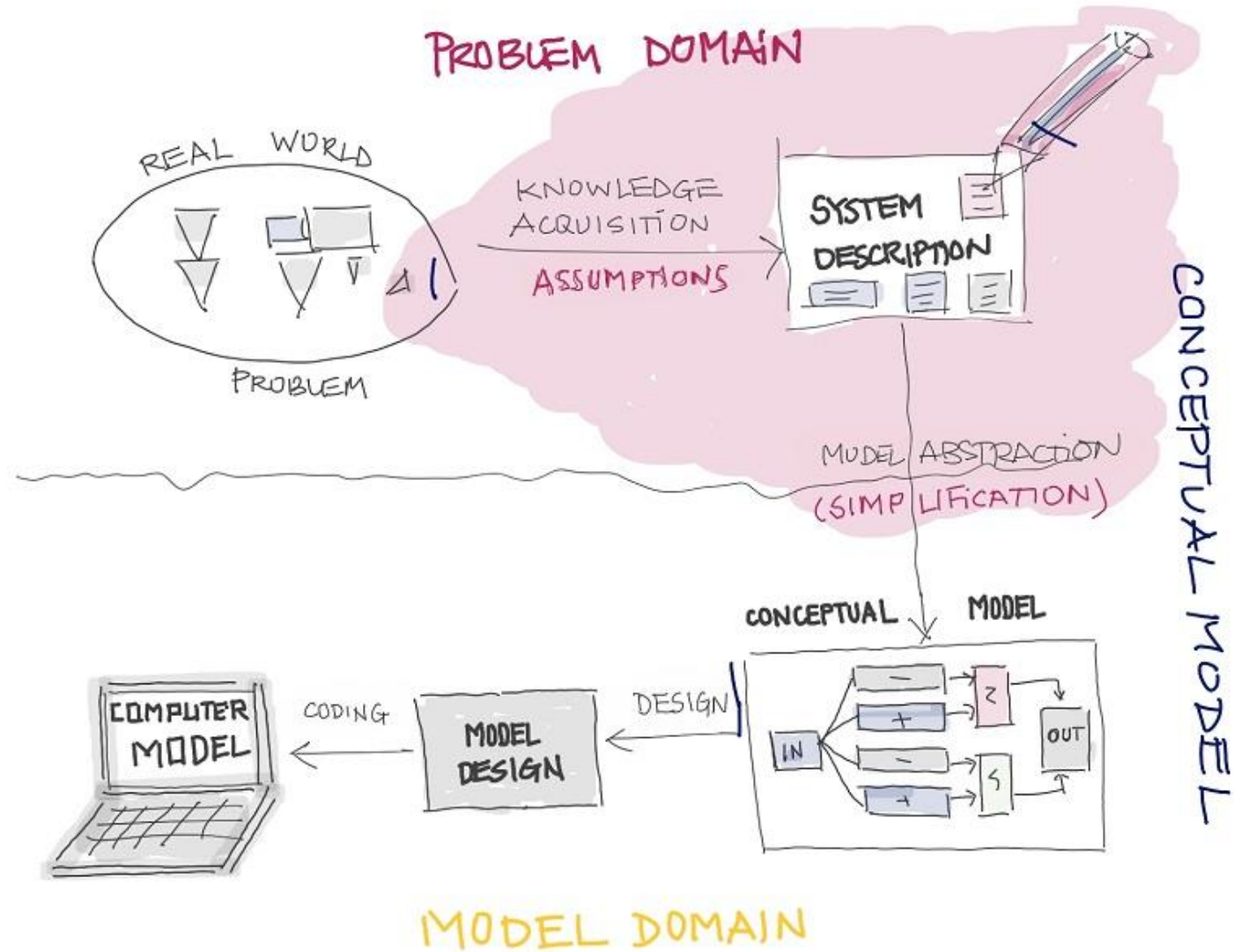
Figure1 : Problem and Model Domains. Robinson, S. (Robinson, 2013).

# Methodology II



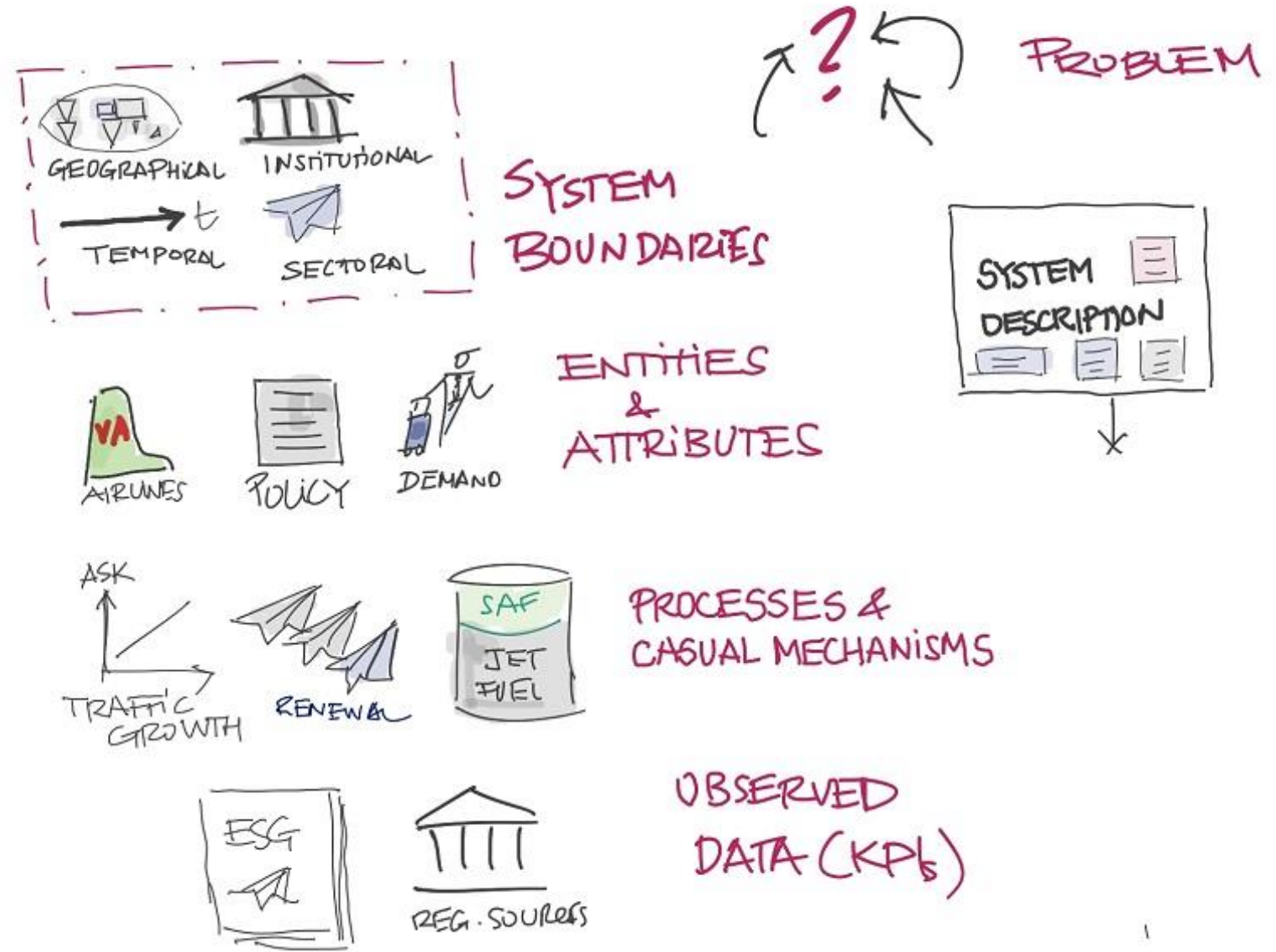
**Figure 2** : Conceptual modeling for simulation. Robinson, S. (Robinson, 2013).

# Methodology III

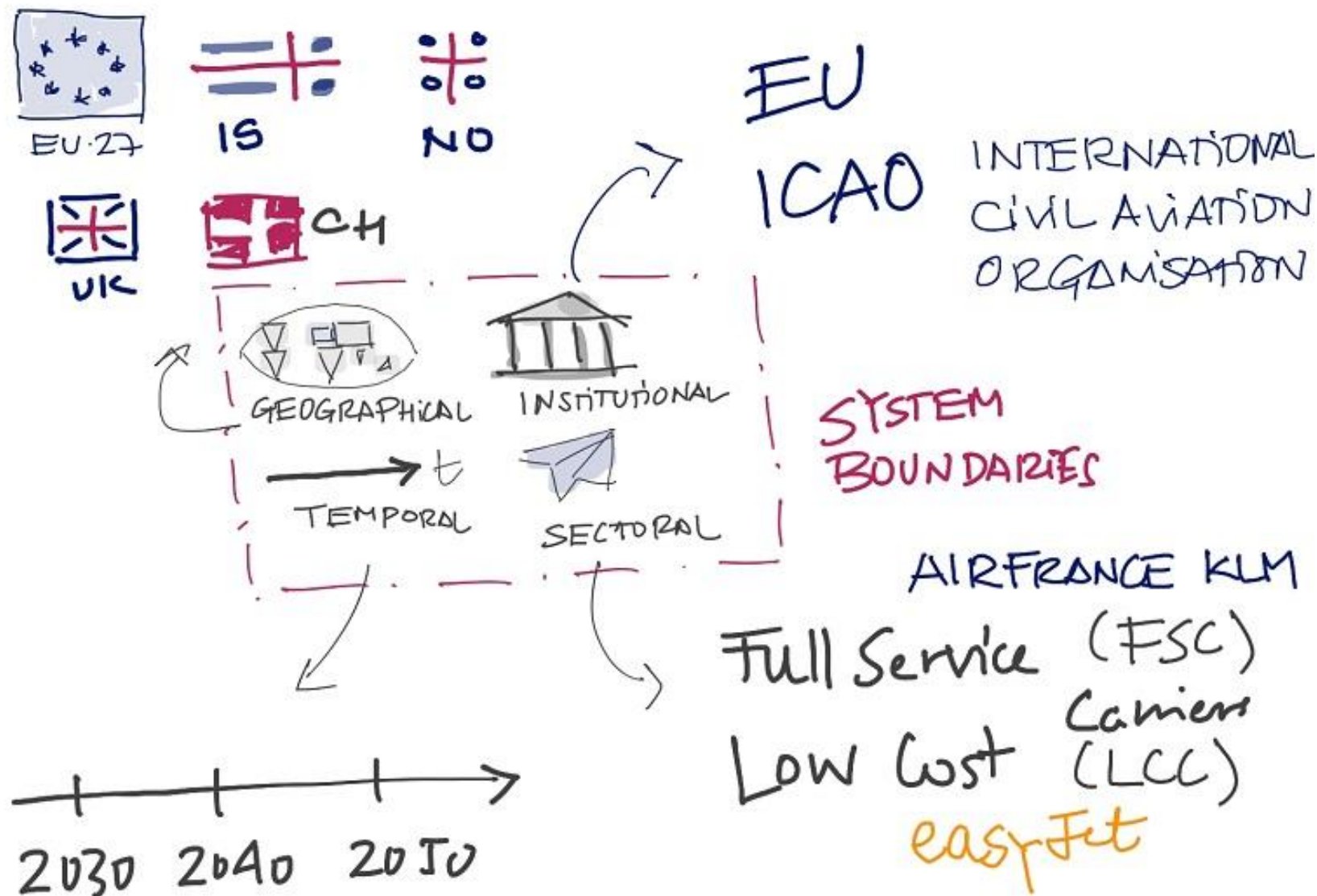


**Figure3** : Conceptual modeling for simulation. Robinson, S. (Robinson, 2013).

# Methodology -IV Structuring according to Rogers

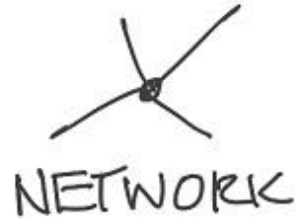


# Results I: System Boundaries



# Results II: Entities, Roles, and Attributes 1/2

## ENTITY



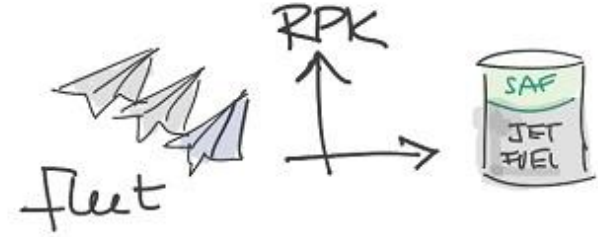
## ROLE

- strategy
- KPIs

- CO<sub>2</sub> emissions

- demand 
- Regulations

## ATTRIBUTES



- Age
- Renew rate

- RPK by region  
(e.g. EU / Inter)

# Results II: Entities, Roles, and Attributes 2/2

## ENTITY



POLICY



DEMAND

## ROLE

CO<sub>2</sub> emissions  
/ Kg.

- BEHAVIOUR
- INCENTIVE/COST

RPK

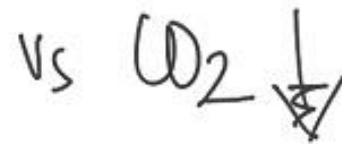
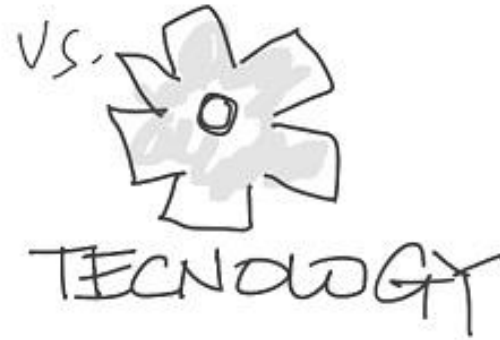
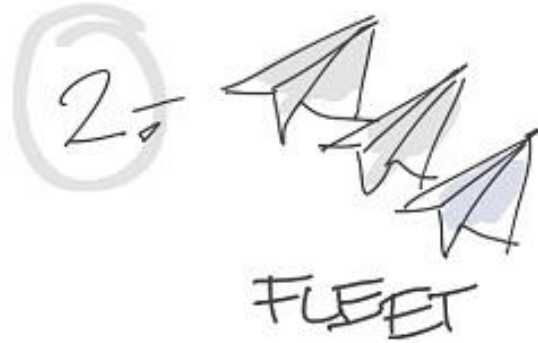
## ATTRIBUTES

-  share
- SAF PRICE

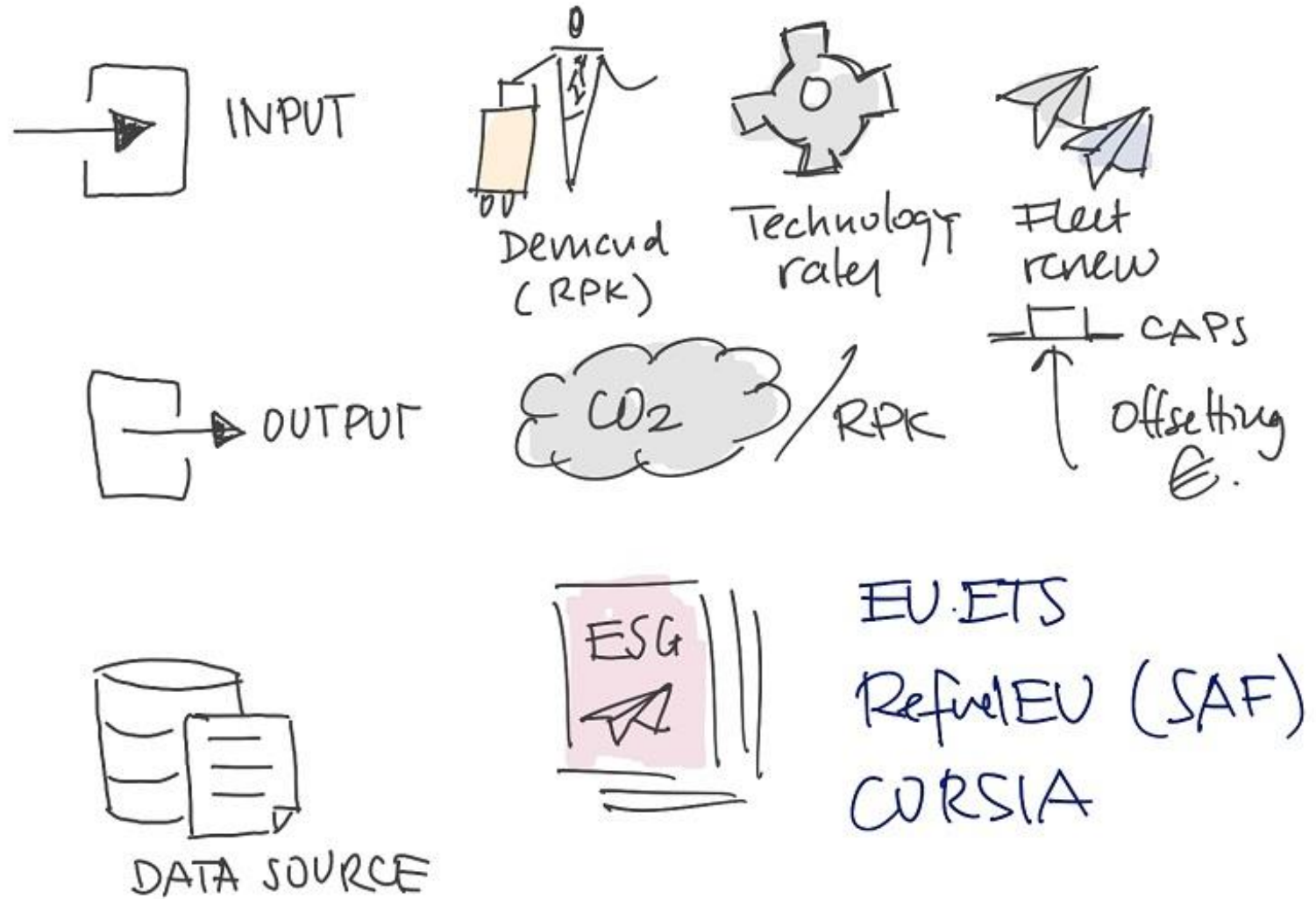
- COVERAGE
- PRICE
- ALLOWANCES

$\Delta$ RPK

# Results IV: Processes and Casual Mechanisms

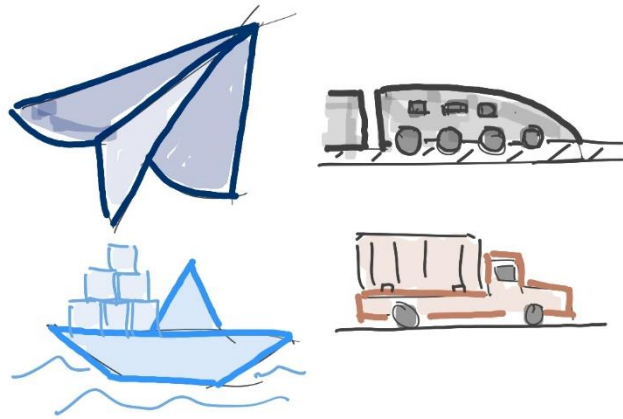


# Results V: Input, Output, and data sources



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**Gracias | Thank you!**



**Research Fellow Luis Martín-Domingo**



[Azero2050.eu](https://Azero2050.eu)



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[Grant Project: 101151804 — AZERO](https://101151804)

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Jokar, Z., & Mokhtar, A. (2018). Policy making in the cement industry for CO2 mitigation on the pathway of sustainable development- A system dynamics approach. *Journal of Cleaner Production*, 201, 142–155.  
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