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A methodology and a tool to support the sustainable design of interactive systems (poster)

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CONTEXT

In HCI, research efforts regarding sustainability have initially been focused on energy efficiency, life-cycle optimization and persuasive design.

Within the HCI community, some voices have recognized that this approach is insufficient, and that the community needs to develop tools and methods to face this systemic problem [1, 3, 4].

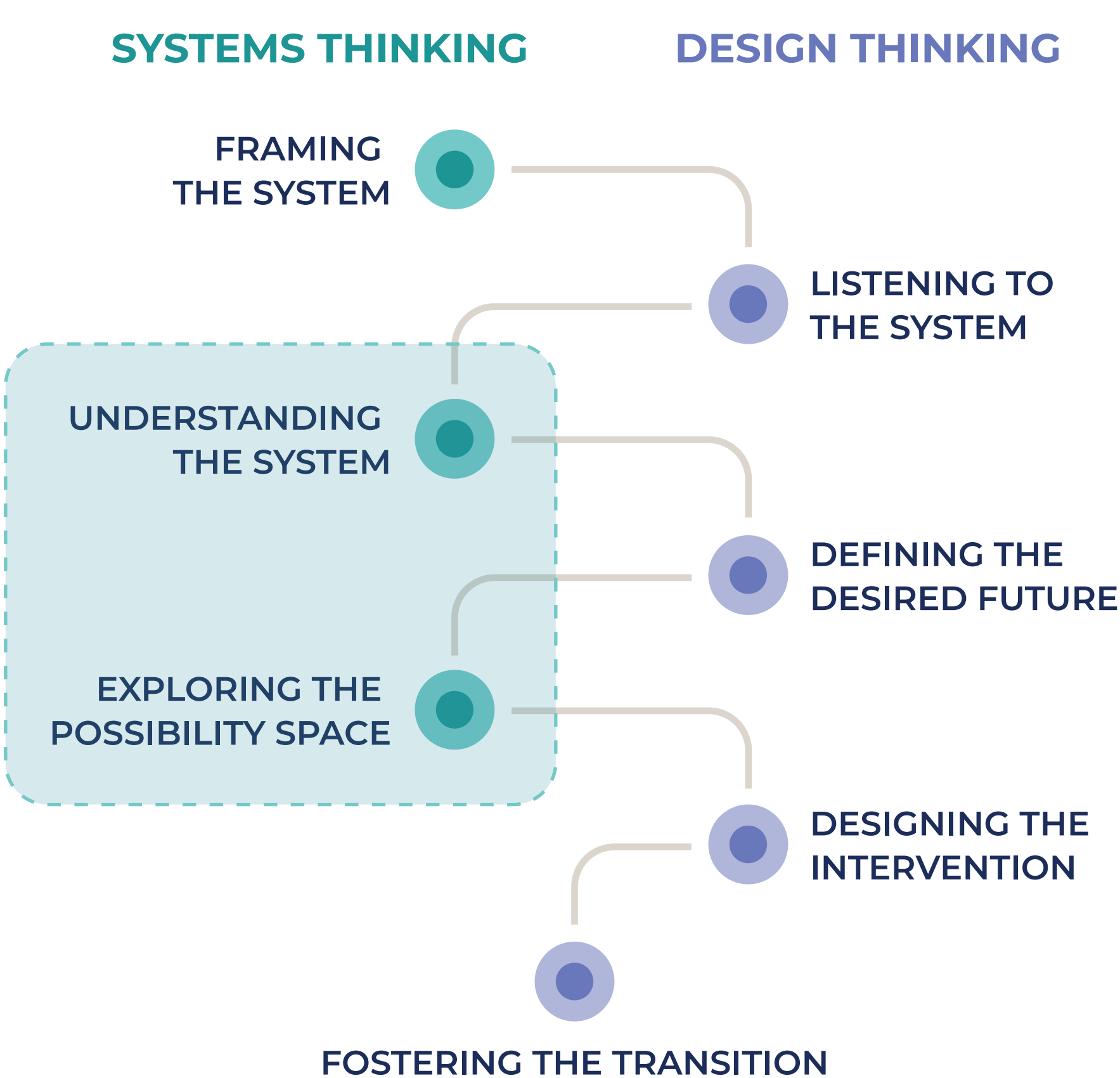
PROBLEMATIC

Designers can no longer set objectives at the product level (focusing on technical performances), nor even at the user level (focusing on their experience): they must consider broader scales, such as the socio-technical system, social systems, and ecosystems...

When designing an interactive system, how can we anticipate and target our results to create impact on different scales and temporalities?

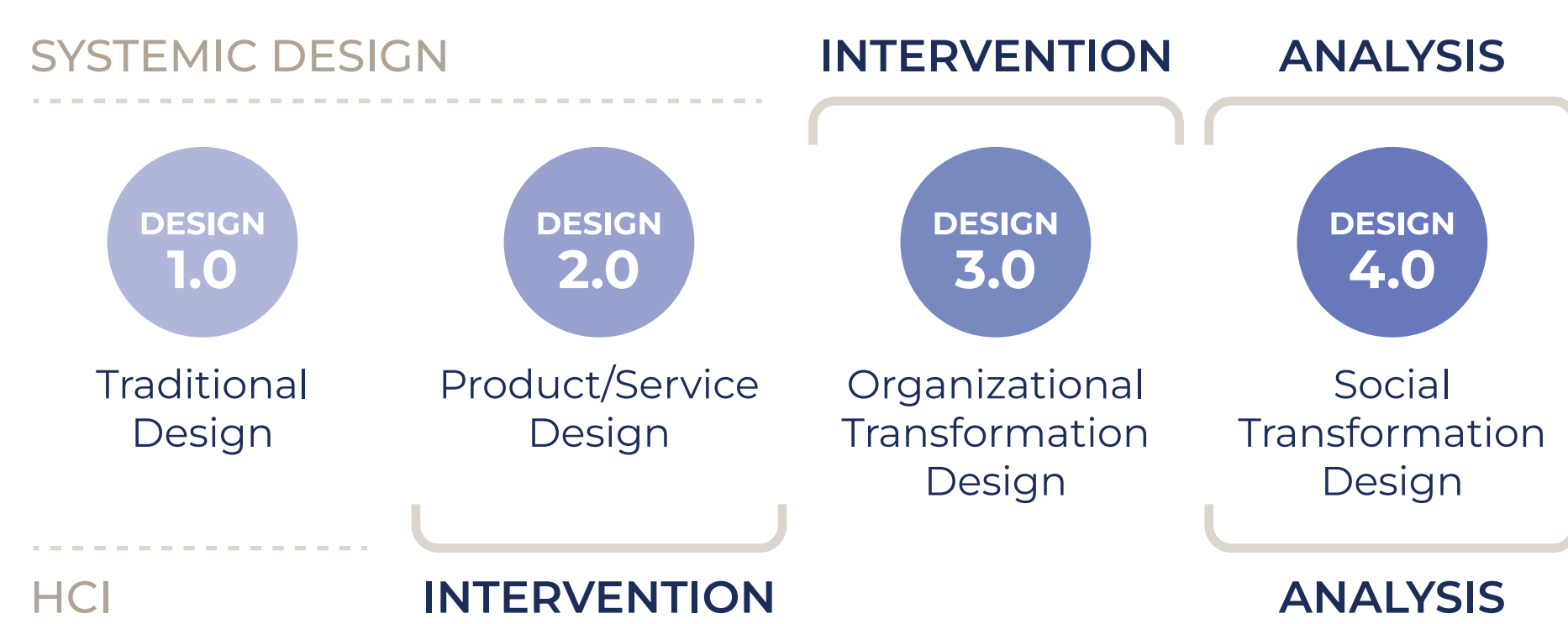
ADAPTING SYSTEMIC DESIGN METHODS

We rely on systemic design, a new branch of research at the crossroads of design and systems thinking. Systemic design provides methods and tools to analyze a problem and target an impact at the level of a sociotechnical or social system.



Adapted from the Systemic design toolkit [5]

Systemic designers do not operate at the same scale as interactive systems designers. For this reason, we think that we need to adapt systemic design methods to the needs of HCI (especially the steps highlighted above).



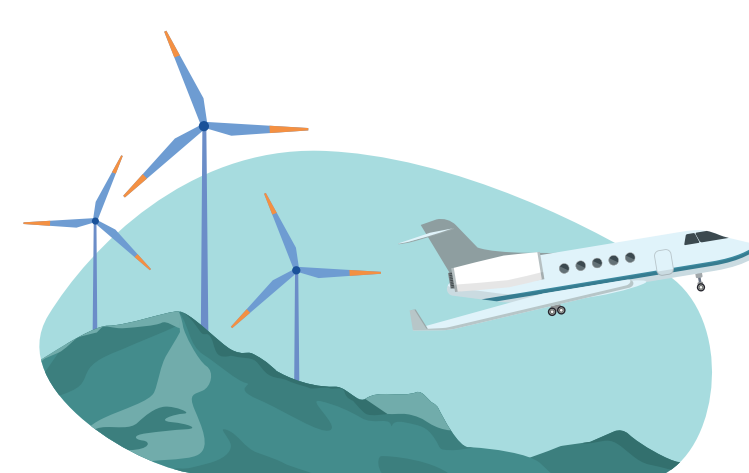
Adapted from Mapping design process to challenge complexity [2]

CASE STUDIES

We work iteratively on the design of the tool, method and the models through different case studies.



An intellectual study of an energy self-sufficient airport in the south of France.



An industrial study into agricultural robotics, with mechanical weeding to limit the use of pesticides.

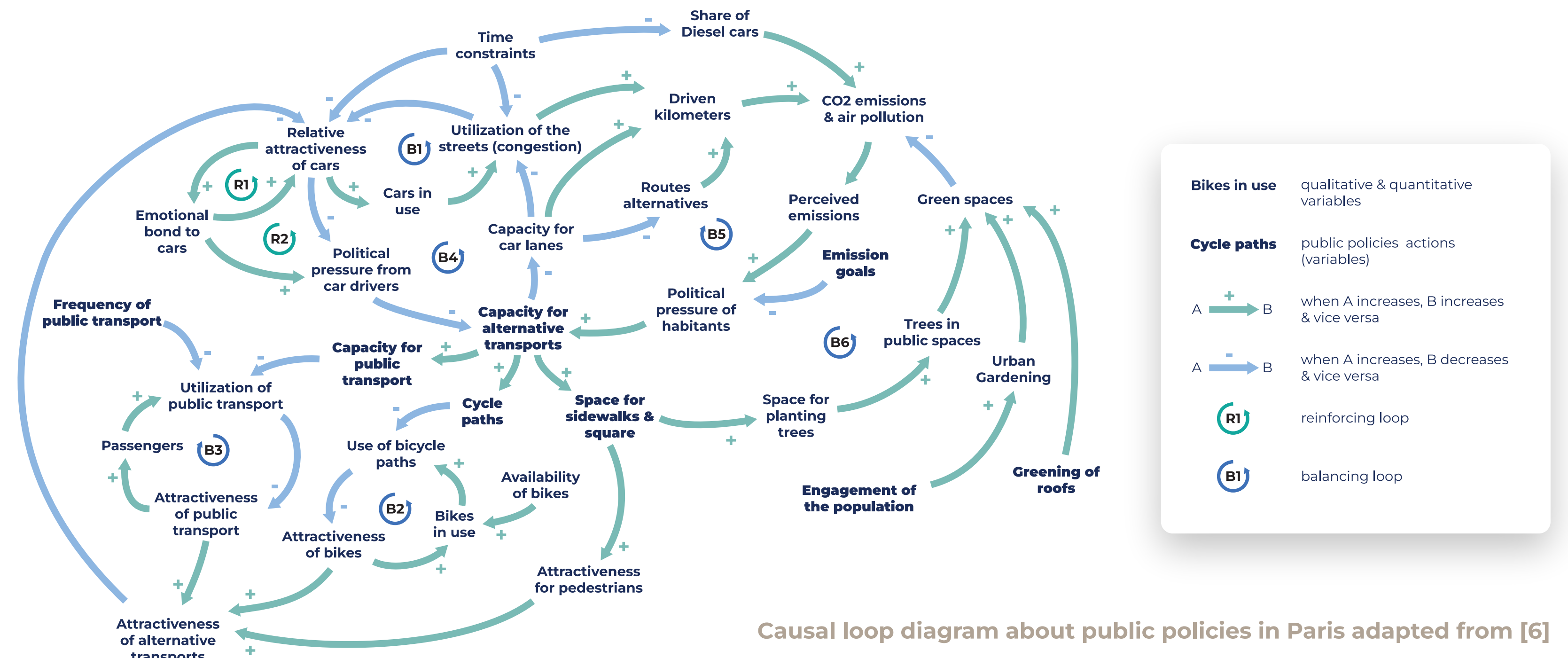


An institutional project of electric train to open up the countryside by exploiting abandoned rails.



A QUALI-QUANTITATIVE MODELING TOOL

We propose a quali-quantitative modeling tool, allowing a mix of qualitative data, and quantitative data, inspired from the causal loop diagrams used by systemic designers.



Causal loop diagram about public policies in Paris adapted from [6]

The modeling is not based on quantitative data sources, but on hypotheses resulting from field studies. The users of the model are those who built it: so they understand its limits. It is a prospective tool: the goal is not to predict the most probable future, but to facilitate the exploration of various scenarios.

Parameters of agricultural robots (e.g.: sale or rental, weight, battery capacity...)

Modeling of the impact of agricultural robots on the agricultural sector, based on hypotheses derived from qualitative data (e.g. interviews, observations, questionnaires, expert opinions...)

Simulation of prospective scenarios and relative comparison using qualitative (e.g. quality of life) and quantitative (e.g. carbon balance) indicators.

