

# System Innovation for Sustainability at Product Development Level: A Scenario Method and a Workshop Process



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# Introduction

A sustainable human presence on this world requires **transformation of the entire socio-technical system** which is referred to as system innovation.

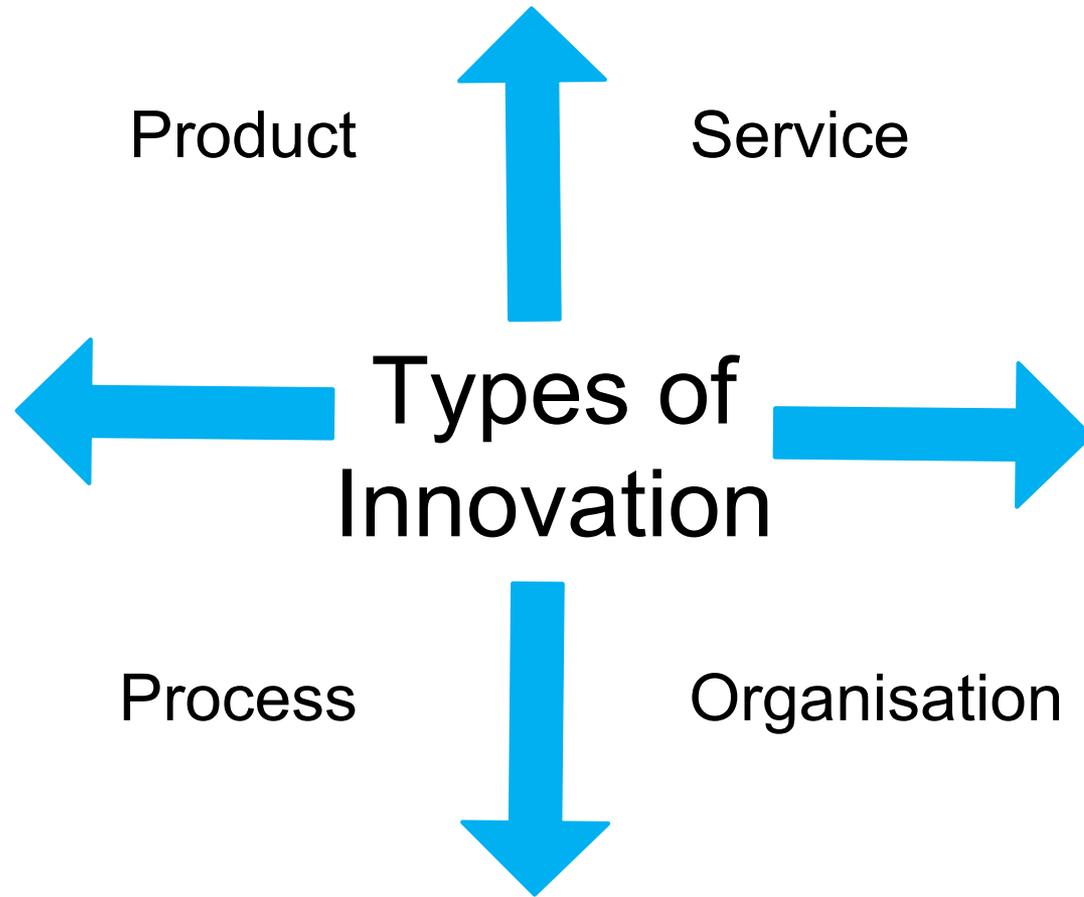
System innovation requires **structural changes to take place within the society**. These structural changes cannot happen without the support of stakeholders of the assumed/proposed changes.

**This research focused on industry as one of these major stakeholders in system innovation.**

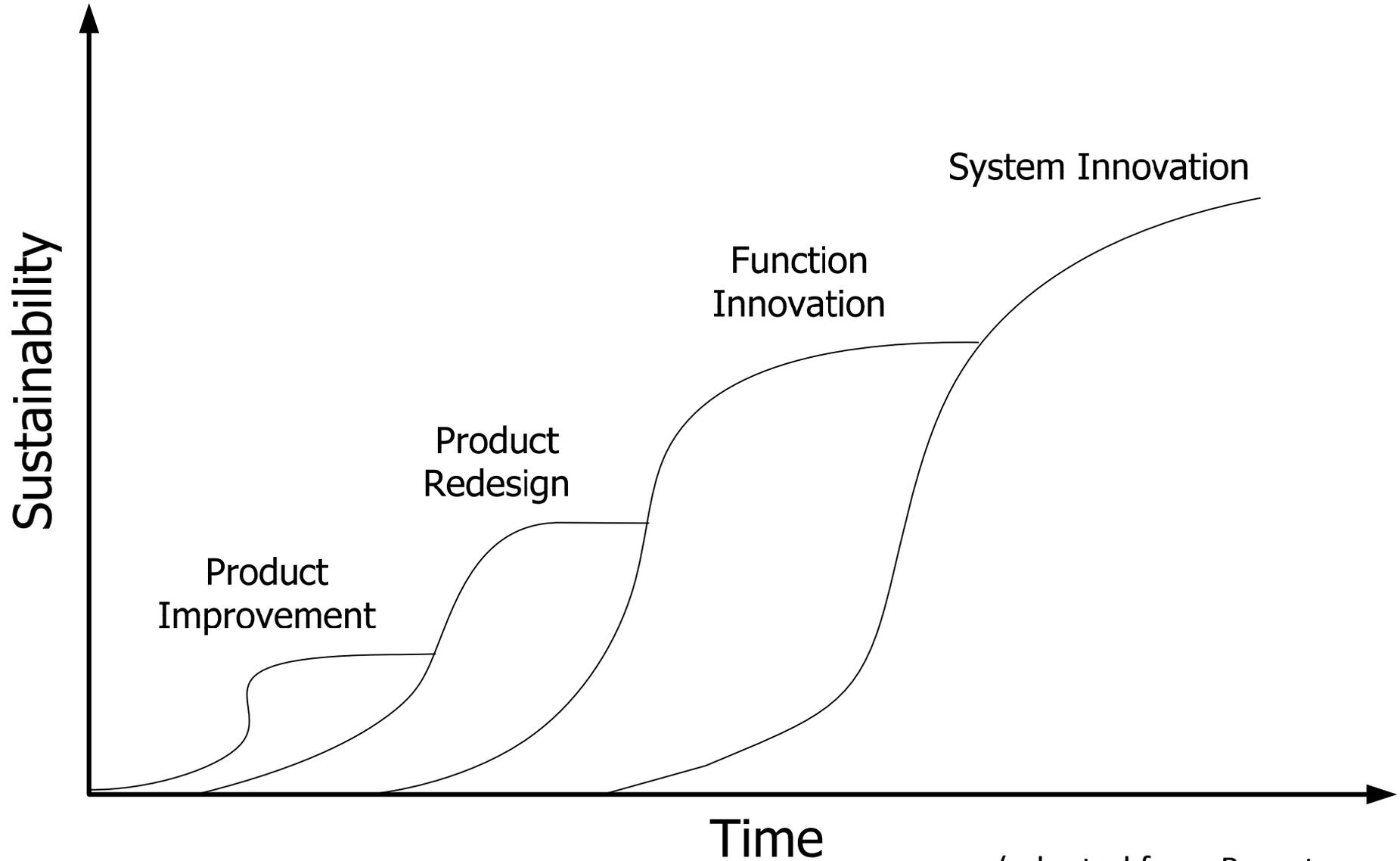
# Research Question

How can we **link** actions (short-term) and strategic decisions (medium-term) of product development teams (**micro-level innovation**) to the massive societal transformation (long-term) that needs to take place for us to achieve sustainability (**macro-level innovation**)?

# Mainstream Innovation Theory

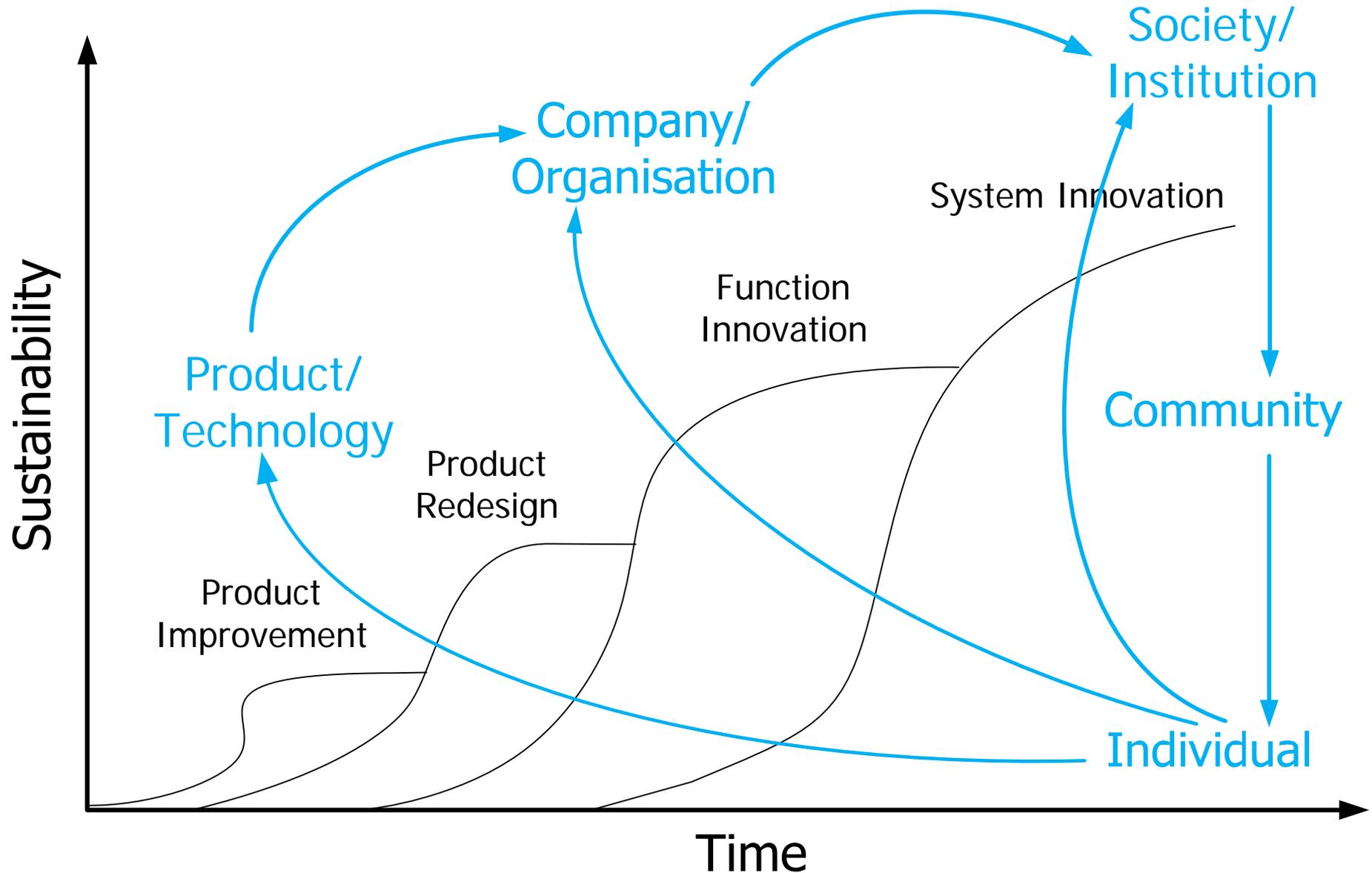


# Levels of Innovation for Sustainability

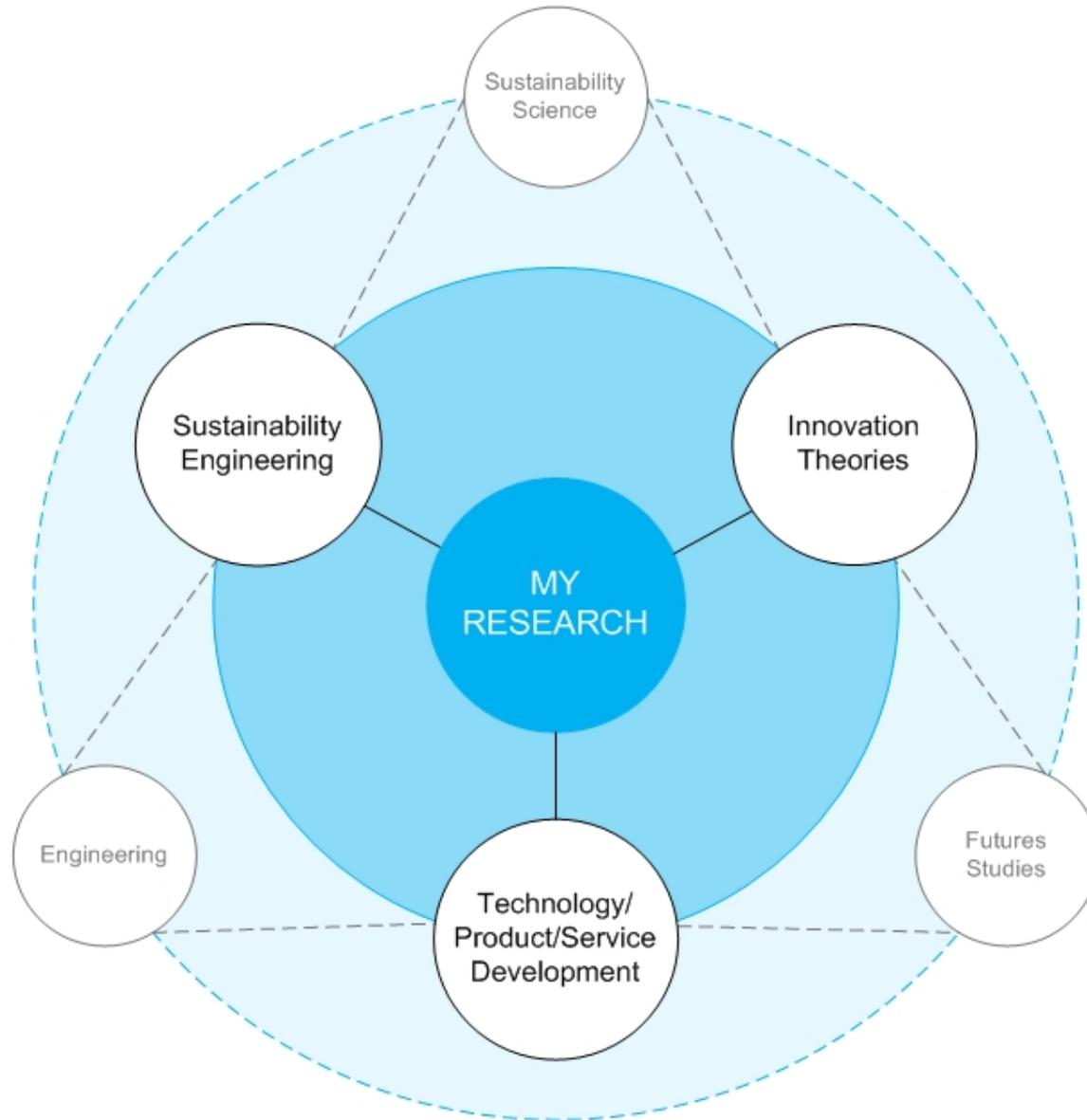


(adapted from Brezet,  
1997)

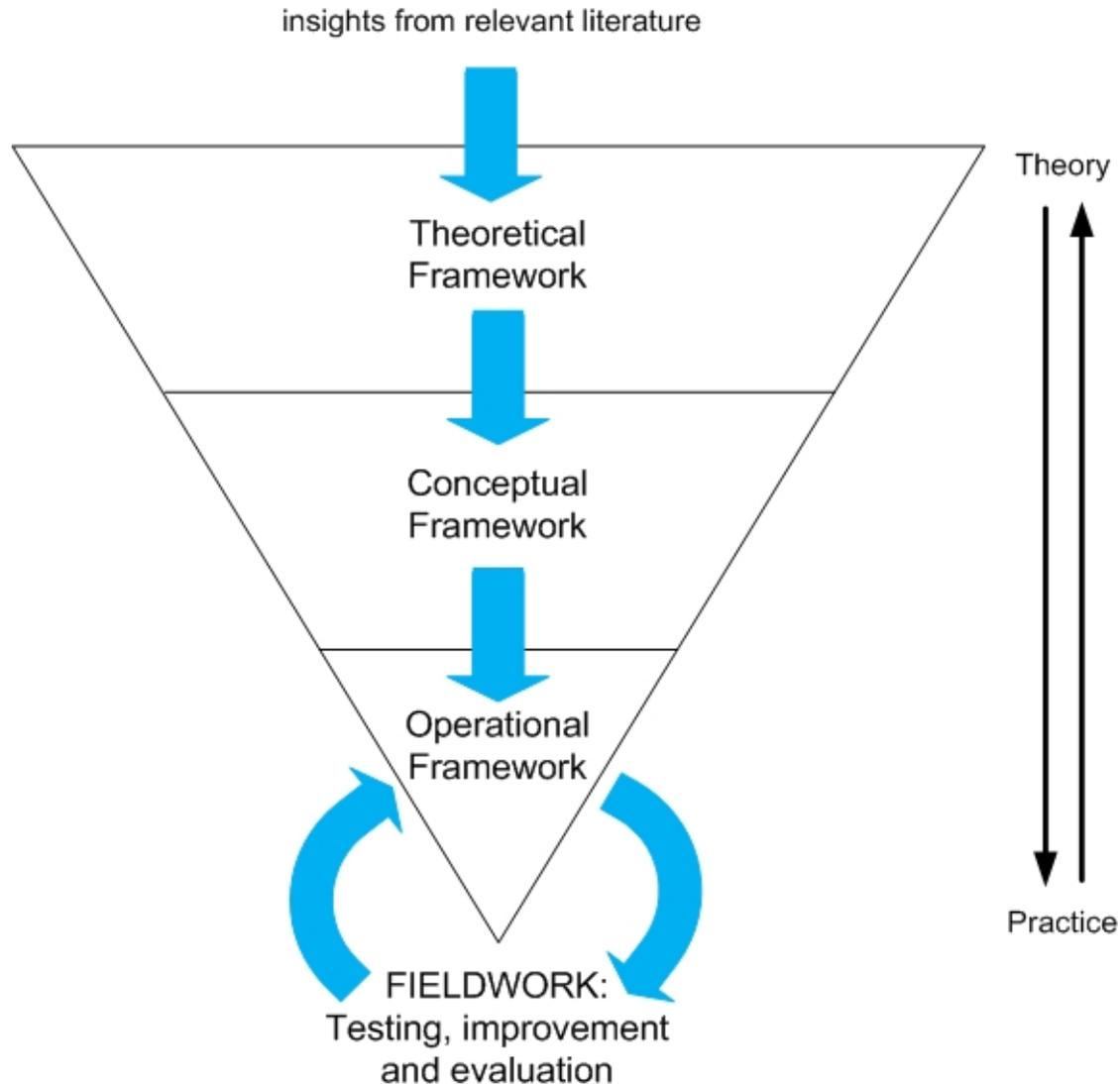
# Levels of Innovation for Sustainability



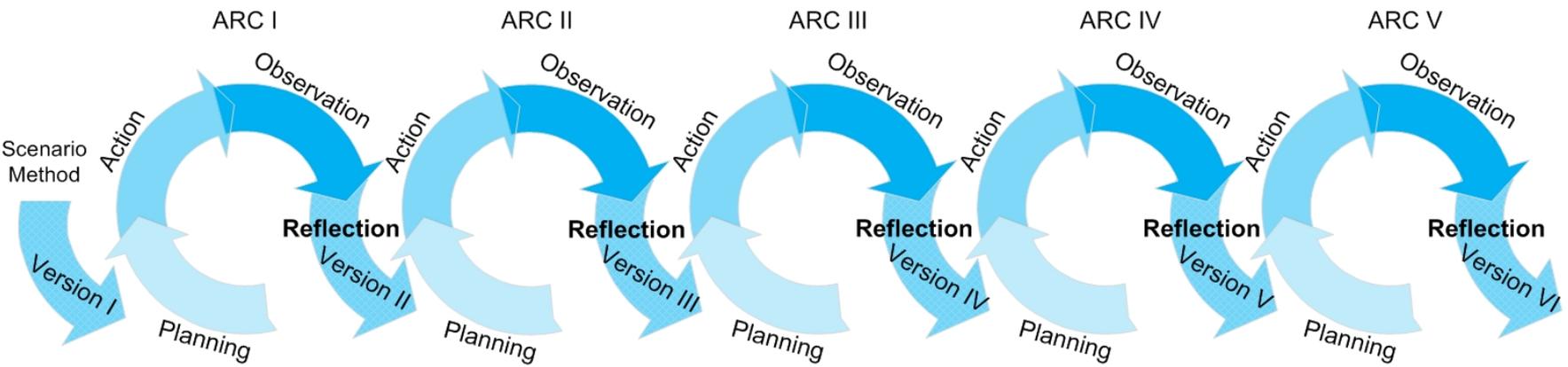
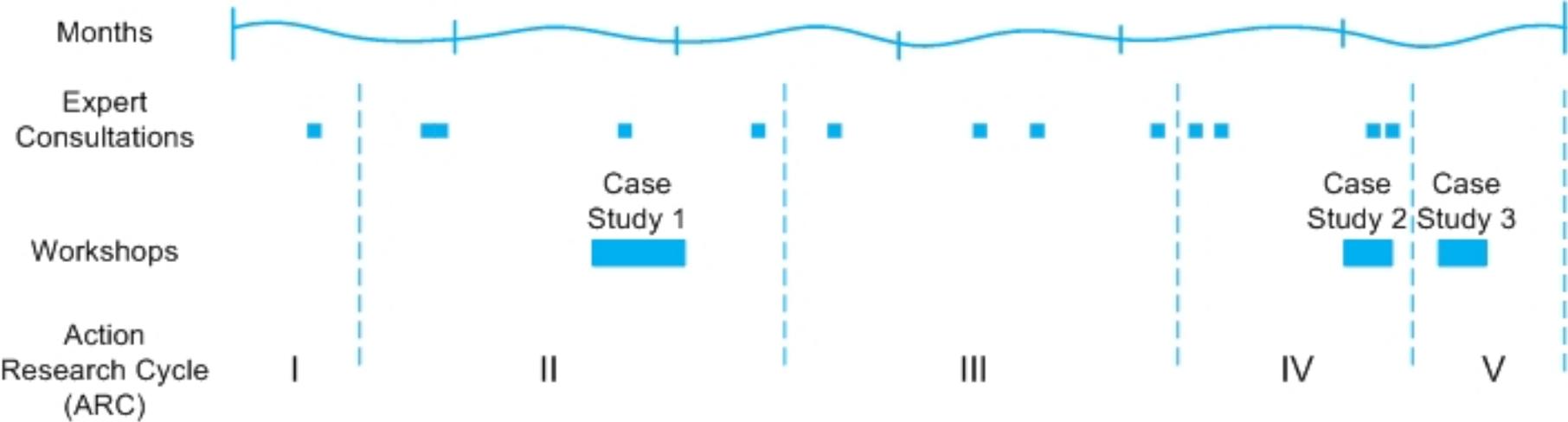
# Research Positioning



# Overall Methodology



# Fieldwork



# The Scenario Method

## Develop Understanding of the System

- Analyse the interdependencies between the environment, society and economy and build a model of the world based on this analysis
- Analyse the interactions between the organisation and the environment, society and economy and build a model based on this analysis and referenced to the world model

## Identify Risks

- Identify sustainability risks
- Identify risks to business
- Identify mitigation/adaptation measures
- Prepare a risk map showing how risks influence each other

## Identify the Social Function

- Identify the social function being met by the organisation's products/services
- Analyse how this social function is currently being met
- Identify main and enabling technologies jointly fulfilling the social function currently

PREPARATION



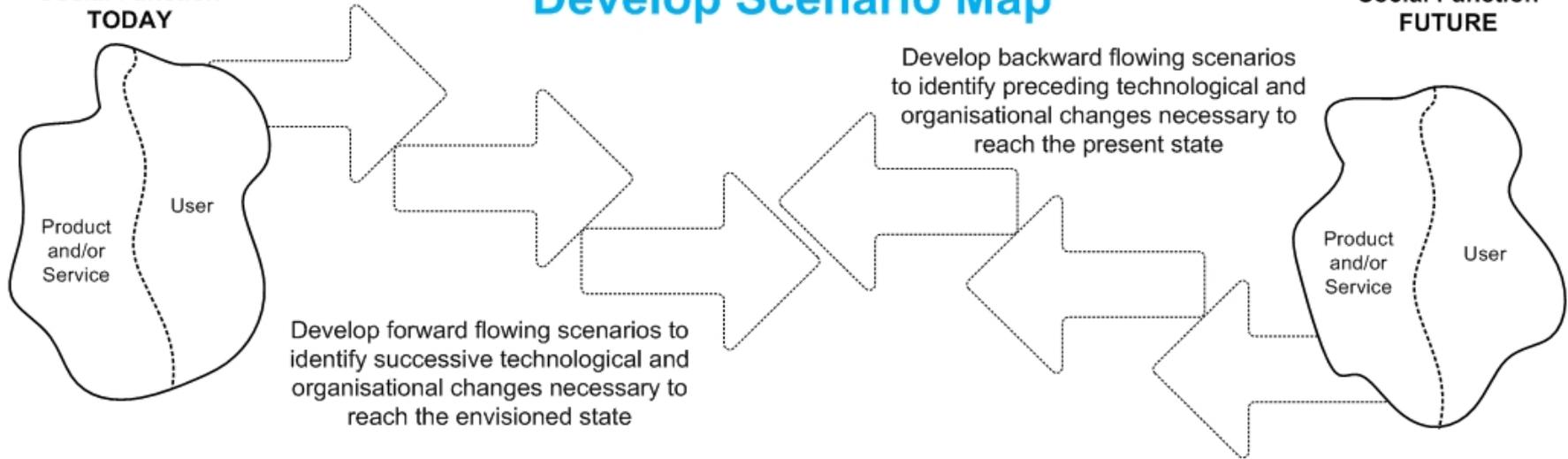
# Develop Vision

- Develop a sustainable society vision within which the sustainability risks are mitigated/managed/adapted to thinking changes which needs to take place at institutional, social/cultural, organisational and technological levels
- Develop a vision articulating how the social function is being met in this society and the role of the organisation in fulfilling the social function in this society

**Social Function TODAY**

# Develop Scenario Map

**Social Function FUTURE**



## Stakeholders

- Identify present and future stakeholders
- Place them on the scenario map where they can be of high influence

## Products/Services

- Identify products/services and combinations which enable the identified social function to be met
- Place them on the scenario map where they can be introduced if that particular state is reached in the future



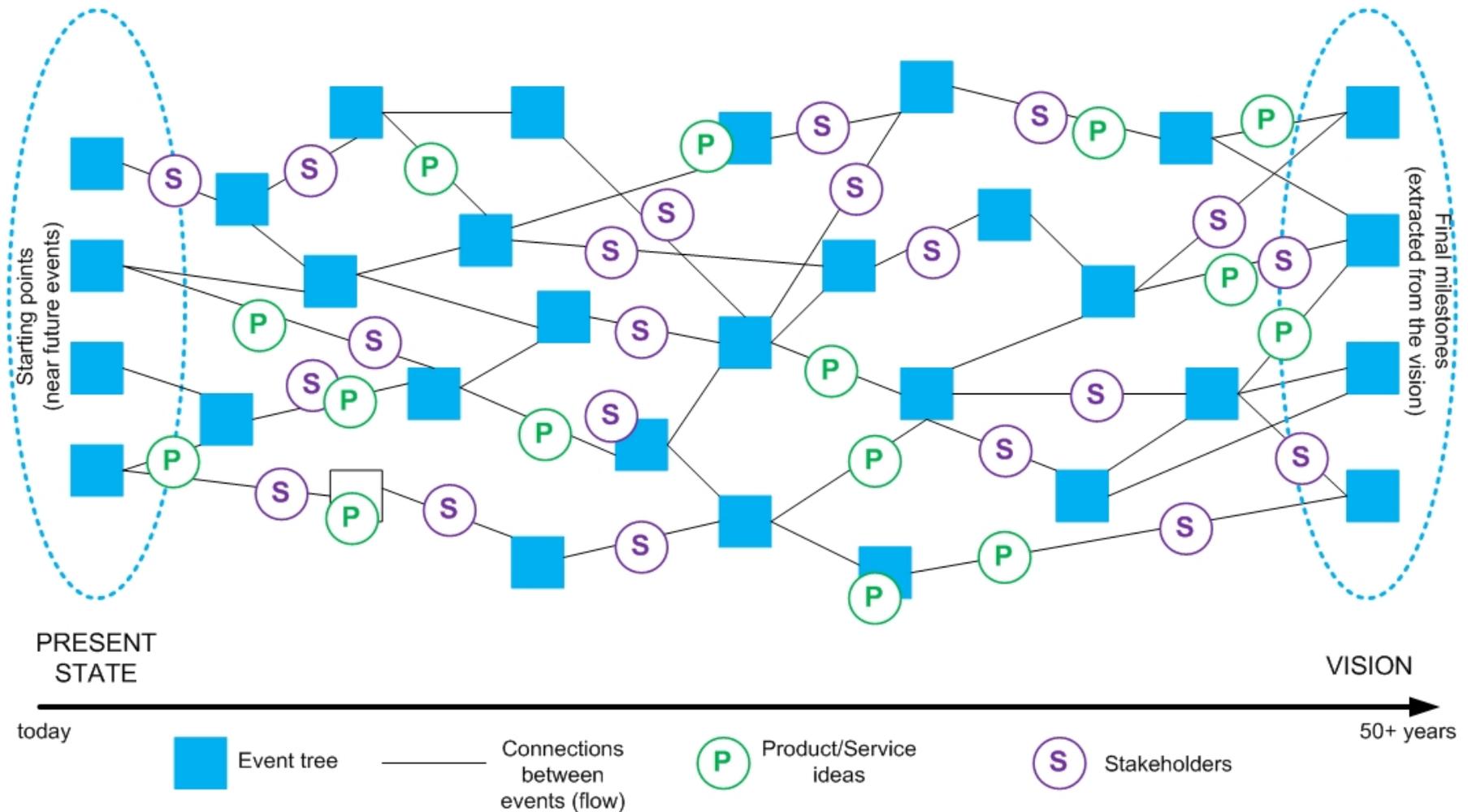
# The Scenario Method

## Action Plan/Strategy

- Develop an action plan or strategy identifying the steps to be taken starting immediately and the people responsible to carry out the tasks and the people responsible to follow-up

COMPLETION

# The Generic Structure of Scenario Maps



# The Scenario Maps



# Evaluation Results

The results of the evaluation of the scenario method by the research participants provided evidence that the research participants, who are also potential users/facilitators of the scenario method, found the scenario method to be:

1. An effective way to aid product development teams to incorporate sustainability issues into their decision making;
2. Able to influence the business transformation which needs to take place as part of the societal transformation to achieve sustainability, and;
3. A worthwhile activity for their respective companies.

# Evaluation Results

The results of the evaluation of the scenario method provided evidence that the scenario method effectively assists product development teams in:

1. Understanding the hierarchical irreversible relationships between the environment, society and economy and between their organisation and these three sub-systems;

2. Understanding the issues threatening the sustainability of the society (i.e. risks to sustainability of the society), the dynamic relationships among these issues and the implications of these on the business or their organisation;

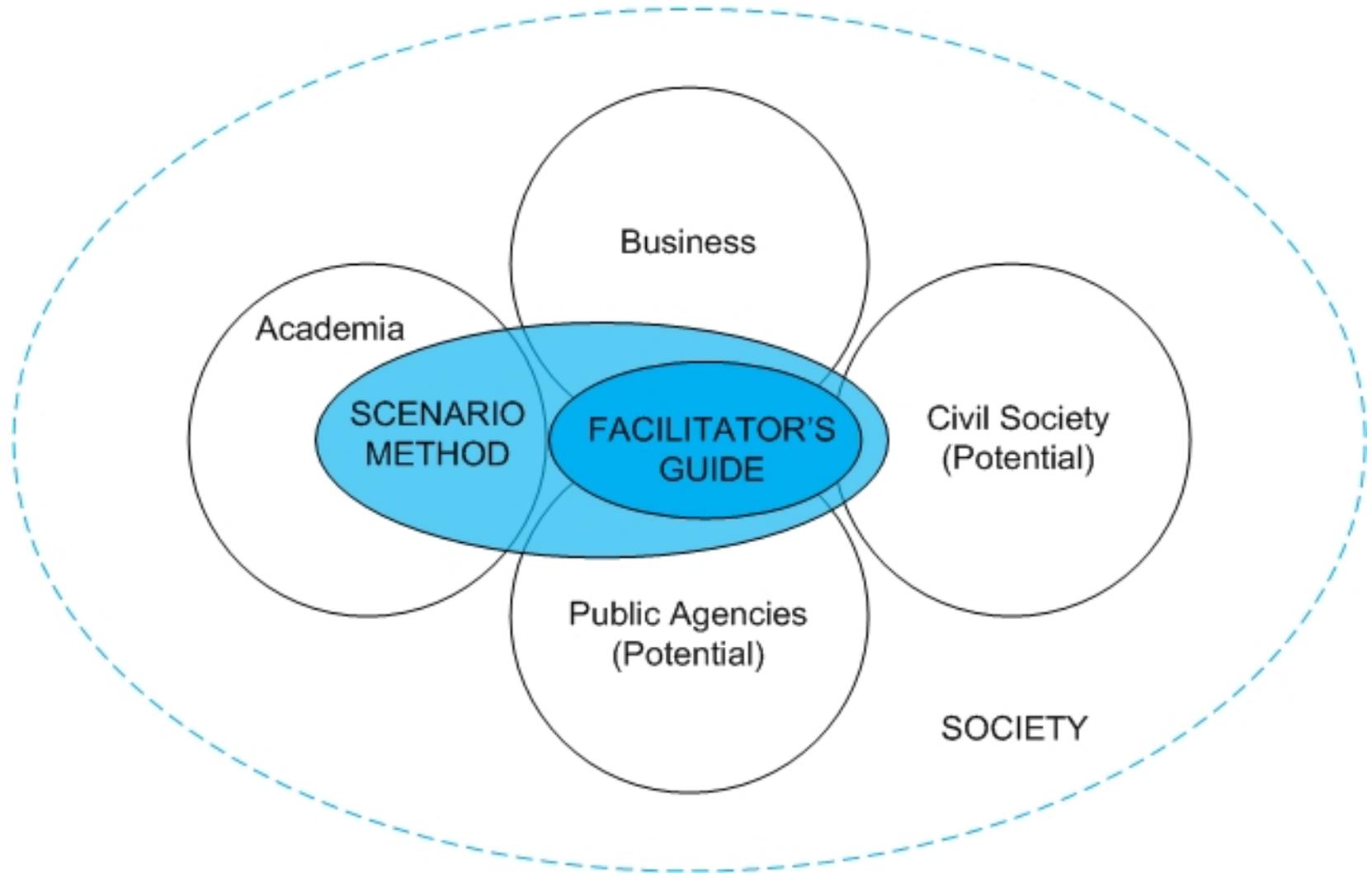
# Evaluation Results

The results of the evaluation of the scenario method provided evidence that the scenario method effectively assists product development teams in:

**3. Generating normative long-term societal visions** within which the risks to sustainability were mitigated/managed/adapted to by the society through a combination of institutional, social/cultural, organisational and technological changes, and;

**4. Developing scenario maps to link present to the long-term future visions of a sustainable society** they developed enabling alternative innovation paths to be identified.

# Contributions of the Research



“Now I have studied philosophy, medicine and the law, and unfortunately, theology, wearily sweating, yet I stand now, poor fool, no wiser than I was before; I am called Master, even Doctor, and for these last ten years have led my students by the nose--up, down, crosswise and crooked. Now I see that we know nothing, finally.”

Faust  
J. W. von Goethe

# Thank you!

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