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# Evaluation of Visual ConOps in Early Solution Validation in a Small and Medium-Sized Enterprise

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Problem Statement

# Introduction

## 1. Symptoms

- Low Market Demand
  - New Technology Resistance
  - Pricing Level

## 2. Problem Statement

Challenges in various stakeholders need elicitation and early-stage validation

**Resource Constraints**

## 4. Goals

Exploring the potential contribution of informal tools, specifically the visualization in the early-stage validation

## 3. Rationale

The primary goal of Systems Engineering is to develop a solution that meets stakeholder needs (Faisandier, 2022). Early validation is crucial for achieving this goal.

## 5. Solution

Visual ConOps

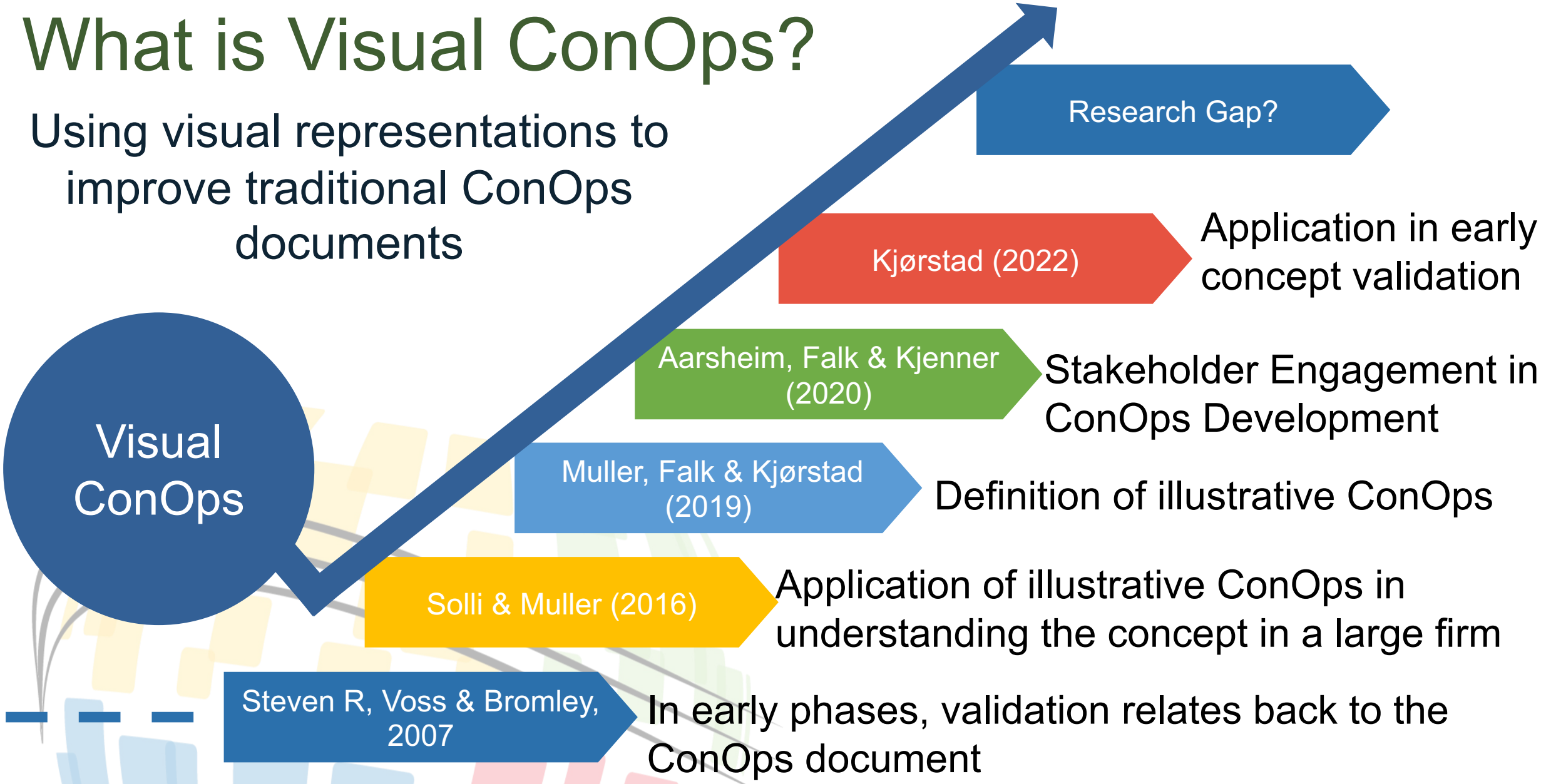
(Muller, Falk & Kjørstad, 2019)

Background & Research Objective

# Introduction

# What is Visual ConOps?

Using visual representations to improve traditional ConOps documents




- **Develop Visual ConOps (no earlier experience)**
- **Apply the developed Visual ConOps in need elicitation and early validation in an SME**


- **Theoretical Contribution**
  Potential contribution of Visual ConOps as an informal tool in early-stage validation process in a small company by involving external stakeholders
- **Practical Implications**
  Assist SMEs in conducting early validation

Case Study and Research Question

# Introduction

# Case Study

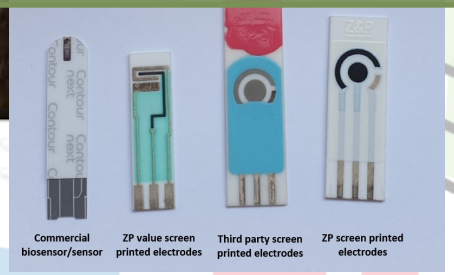
## Zimmer & Peacock AS

- SME
- 40 employee
- 9 years of experience
- Innovative ideas

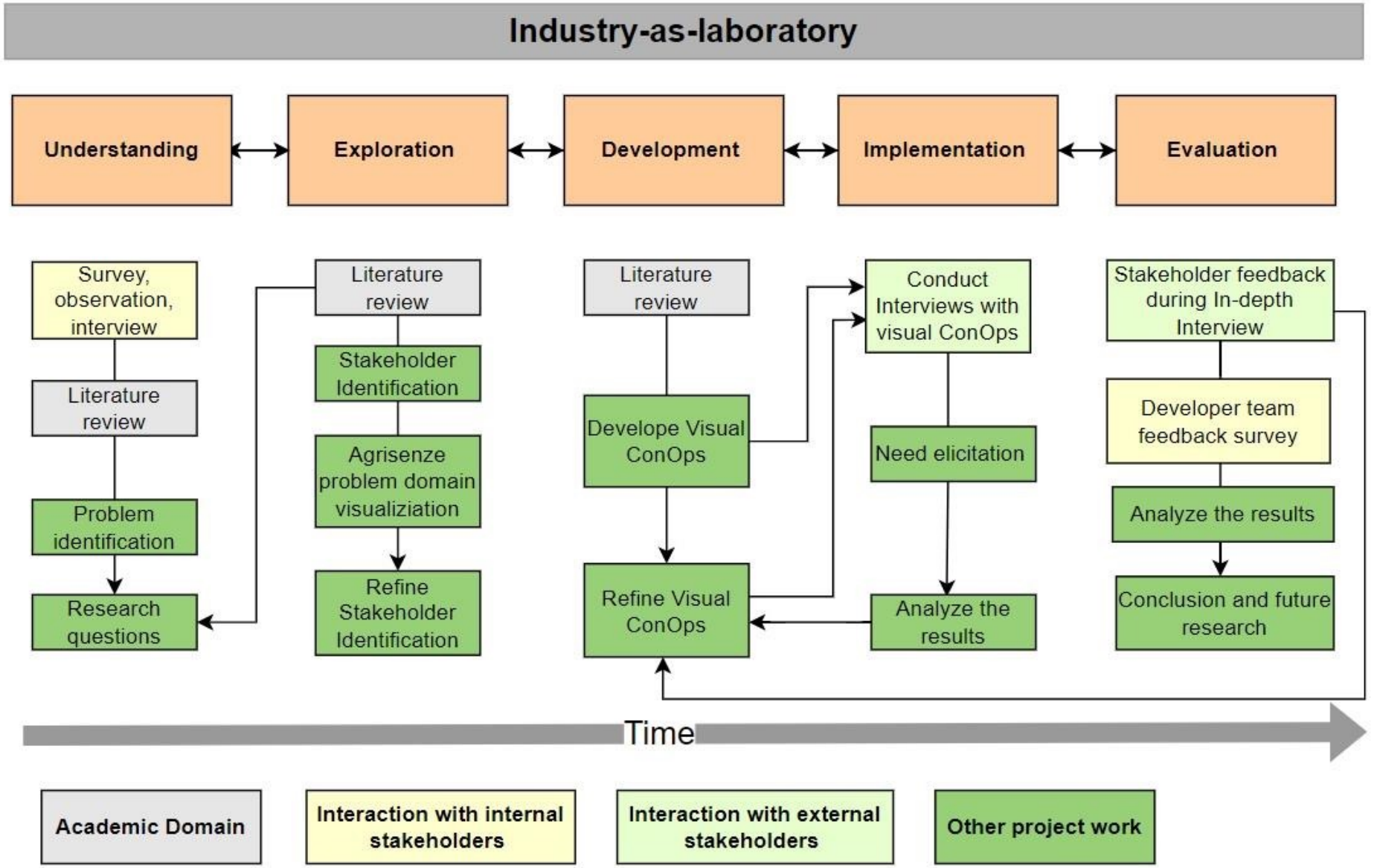
## Agrisenze Project

- Development of a [illegible] monitoring system to measure the nitrogen contents in the soil.

How does the application of the Visual Concept of Operations (ConOps) contribute to early validation in the context of the Agrisenze project?


# Methodology




Research Methodology Used in this Study

# Results

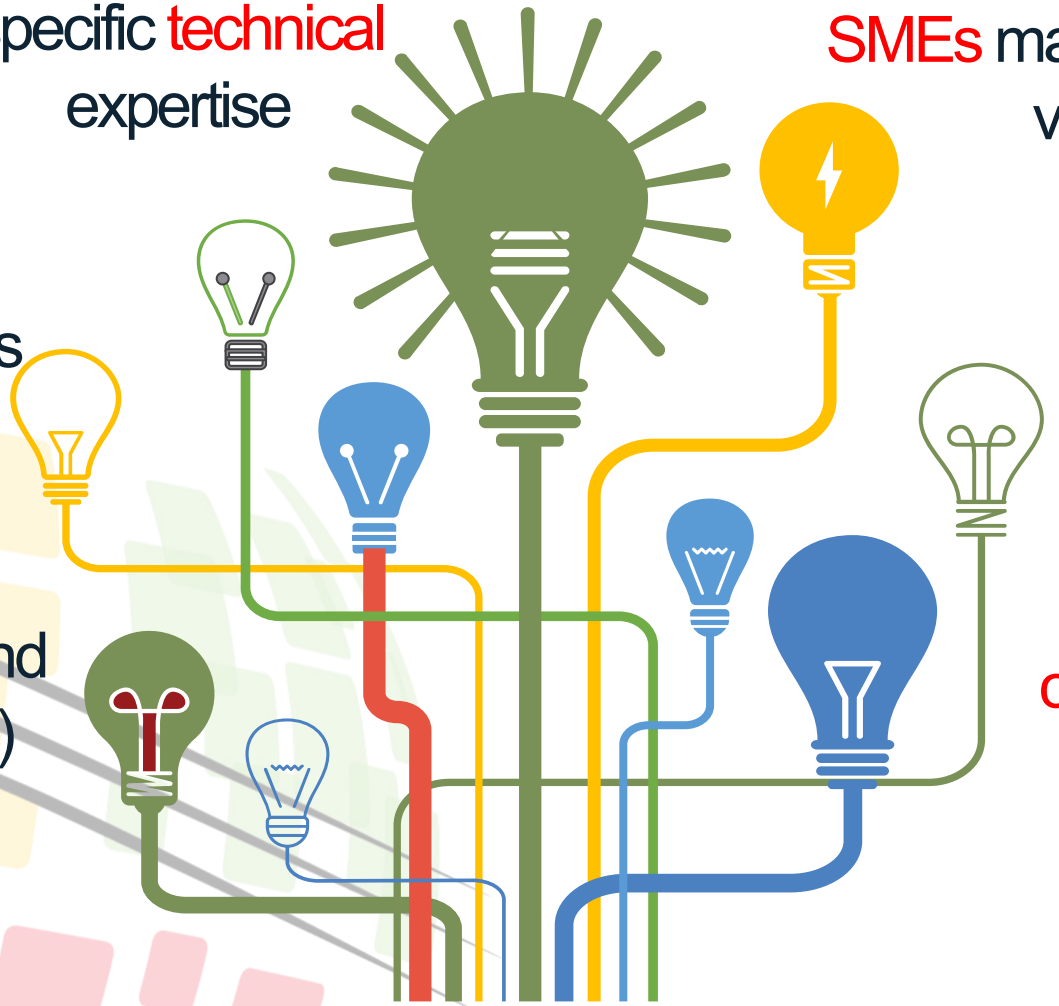
# Results from observation, informal interviews and literature review

Developer team has specific technical expertise

New Product Development in SMEs may influence early validation

Lack of understanding actual stakeholder needs

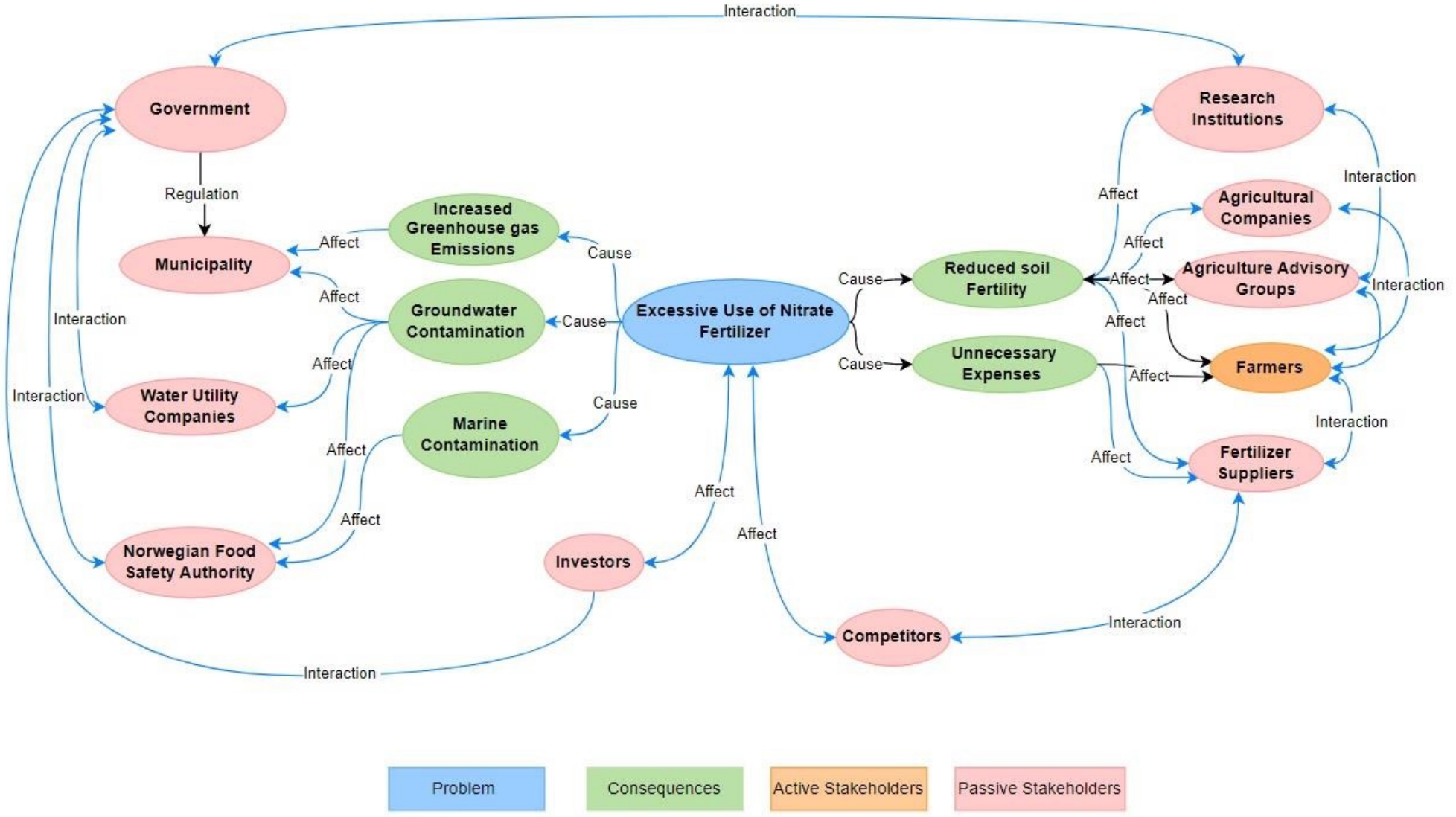
Different understanding of the product development lifecycle



Low market demand (previous product)

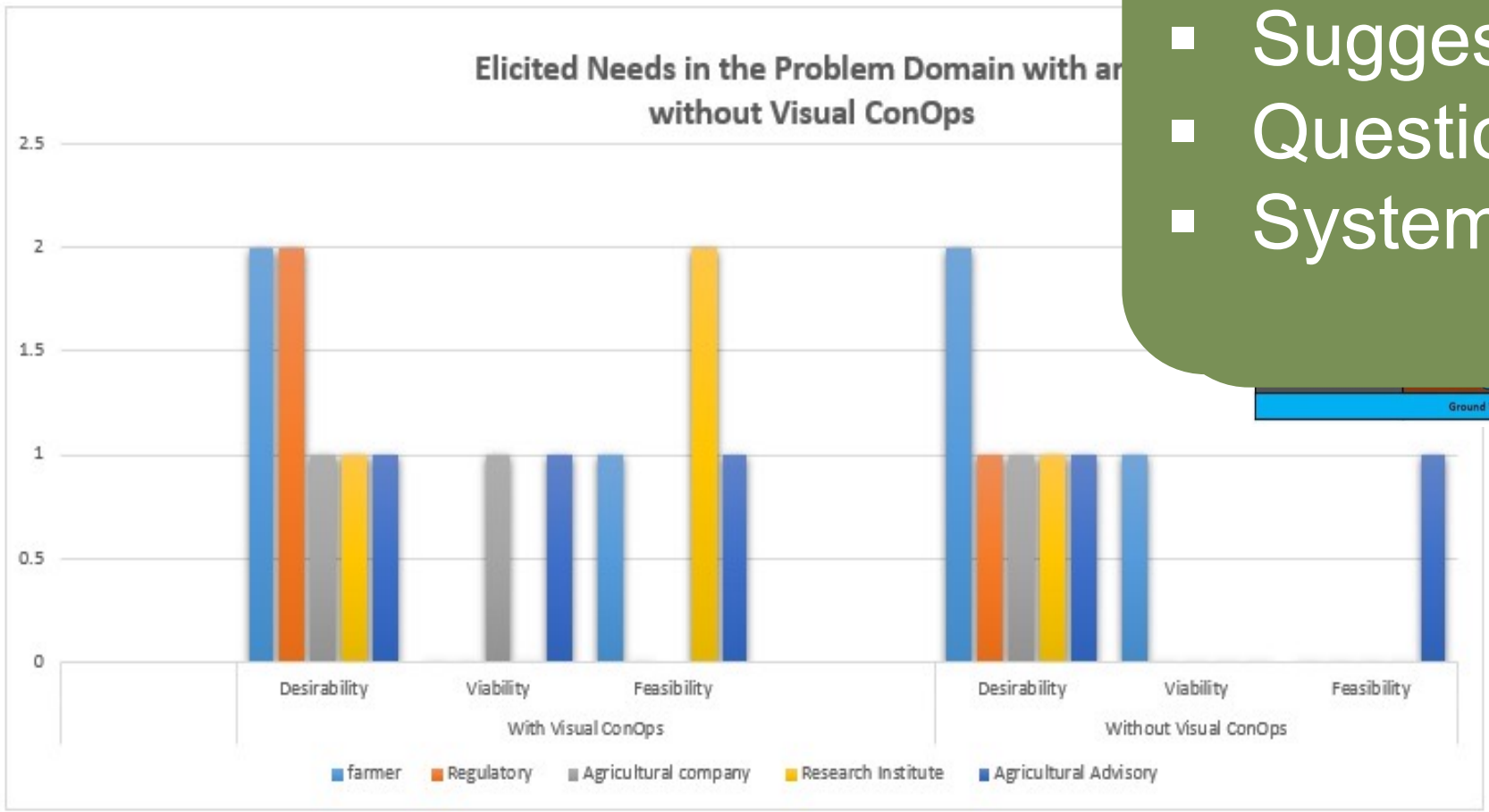
Not effective communication channels

# External Stakeholder Identification & Analysis



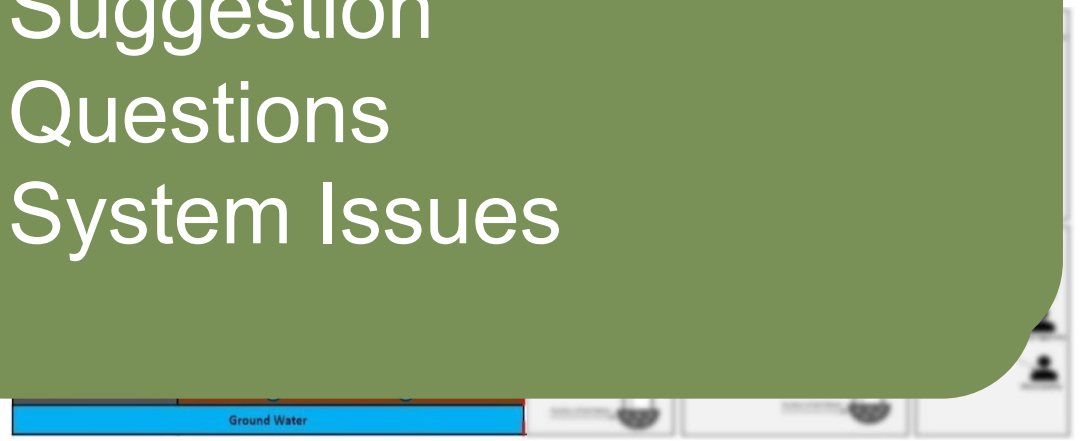

Results from the problem domain in the industry case (stakeholder analysis)

# Results from Applying Visual ConOps in Need Elicitation Process



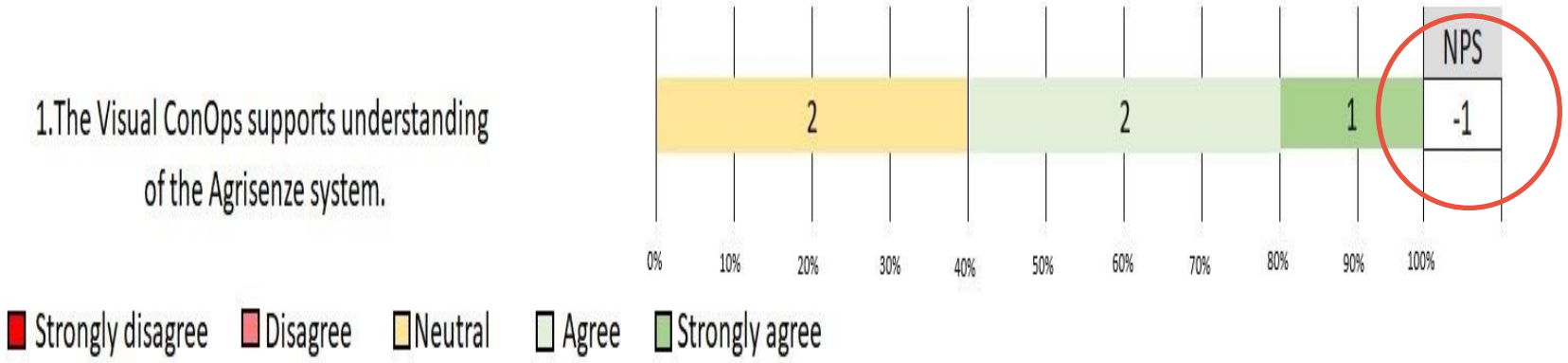

Elicited Needs with and without Visual ConOps

- Suggestion
- Questions
- System Issues




Developed Visual ConOps (blurred on the right side for patent confidentiality)

# Results from Evaluation of Visual ConOps (Part I)

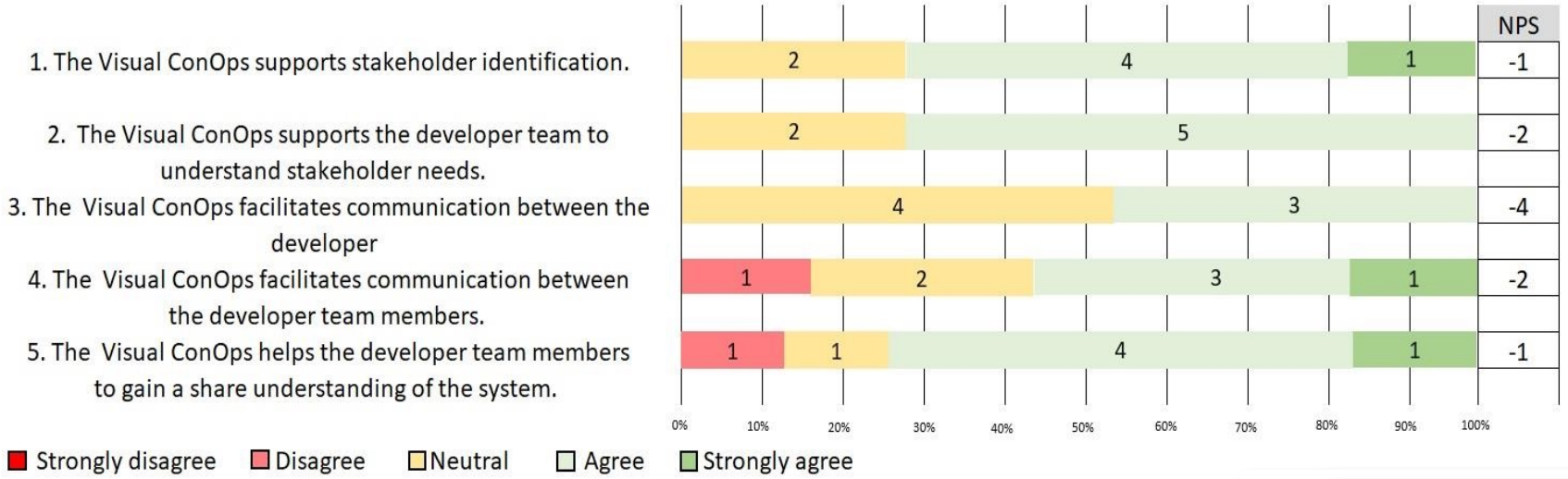



Overall Perception among the stakeholders is negative

Results from interviews with stakeholders to assess the effectiveness of the tool

- Limited Experience with System
- Concerns about the limitations
- Not well-designed or well-presented Visual ConOps
- Other factors…

# Results from Evaluation of Visual ConOps (Part II)




Results from the survey of developer team members

## Question 5

- Different expectations
- Different Role within the team

# Discussion

# How does visual ConOps contribute to early validation in the Agrisenze project?

Benefits | Visual ConOps | Limitations

- Uncover implicit needs
- Increase stakeholders understanding of the system and use-cases
- Provide Early feedback
- Speed up validation process
- Encourage Stakeholders to think deeply about the concept
- Identify more relevant stakeholders
- Support iterative development process
- Shift the developer team's view
- Used as a knowledge-sharing tool

- Company ability to develop and use ConOps (training)
- Uncertainty due to different perceptions (co-creation)
- Not adequate to attain effective communication

# Conclusion

## Research Limitation

- Shortages of systems engineering expertise
- Bias or inaccurate response due misinterpretation
- Small sample size
- Researcher limited technical knowledge

## Research Conclusion

use of visual ConOps can contribute to the systems engineering body of knowledge by enhancing requirement gathering and identifying potential design issues. Consequently, it may lead to more successful system development in practice

## Future Scope

Applying complementary approach such formal frameworks like CAFCR model (Muller, 2010)

Thank you!

# Q&A

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