31st Annual INCOSE international symposium

virtual event

July 17 - 22, 2021

Systems Engineering

Developing domain-specific AI-based tools to boost cross-enterprise knowledge reuse and improve quality

www.incose.org/symp2021

Agenda

- Topics
- Motivation
- Case study: MHWIRTH
- Results from the research
- AI-based knowledge reuse model
- Summary

Topics

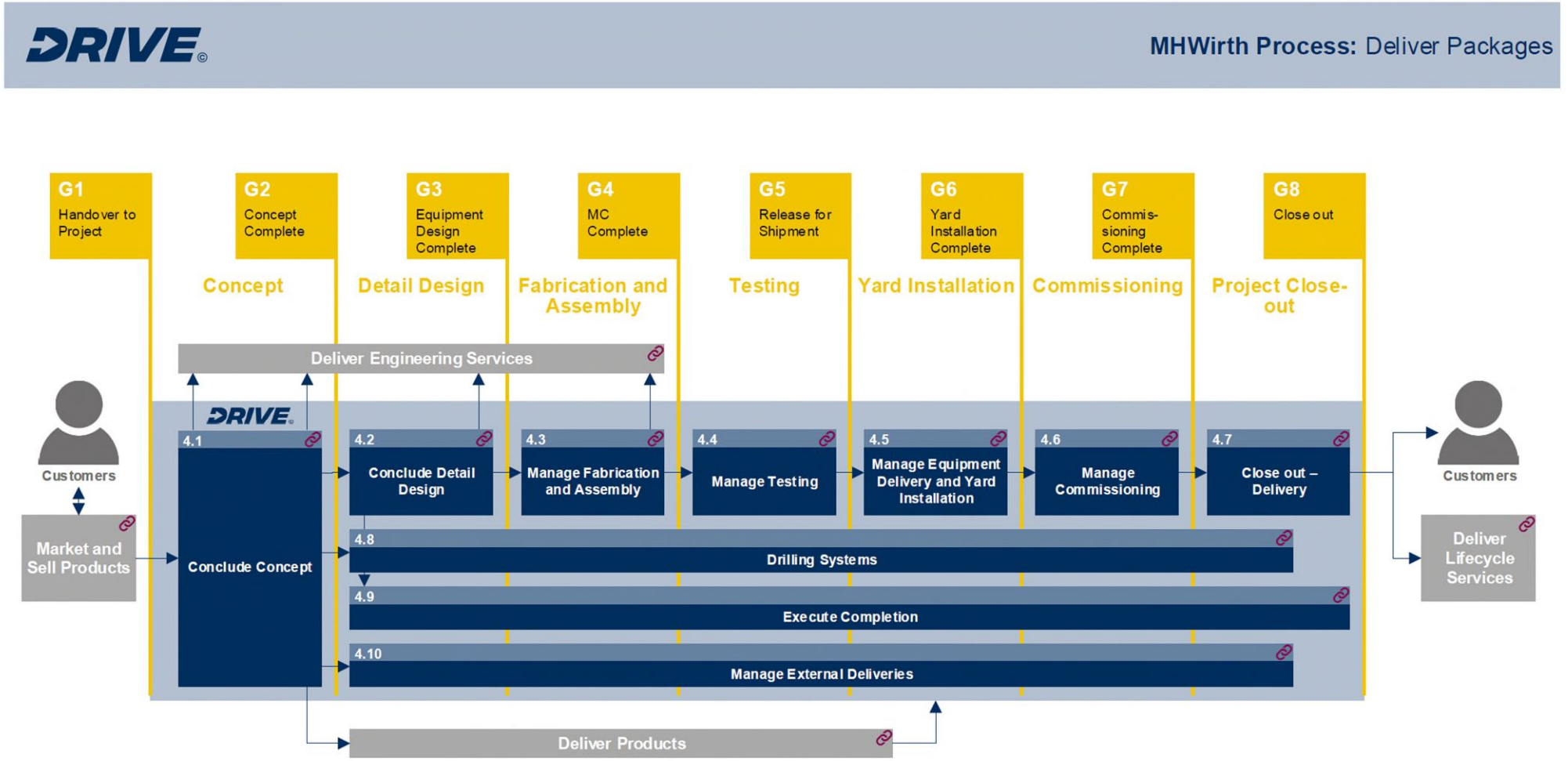
Motivation

- Personal field experience
- Improve quality
- Importance of organizational knowledge
- Improve cross-enterprise knowledge sharing and reuse

MHWirth

- Advanced drilling systems and lifecycle s
- 125 years
- 12 countries
- Over 500 vessels

MHWirth



Revision date: August 8, 2019

Research questions

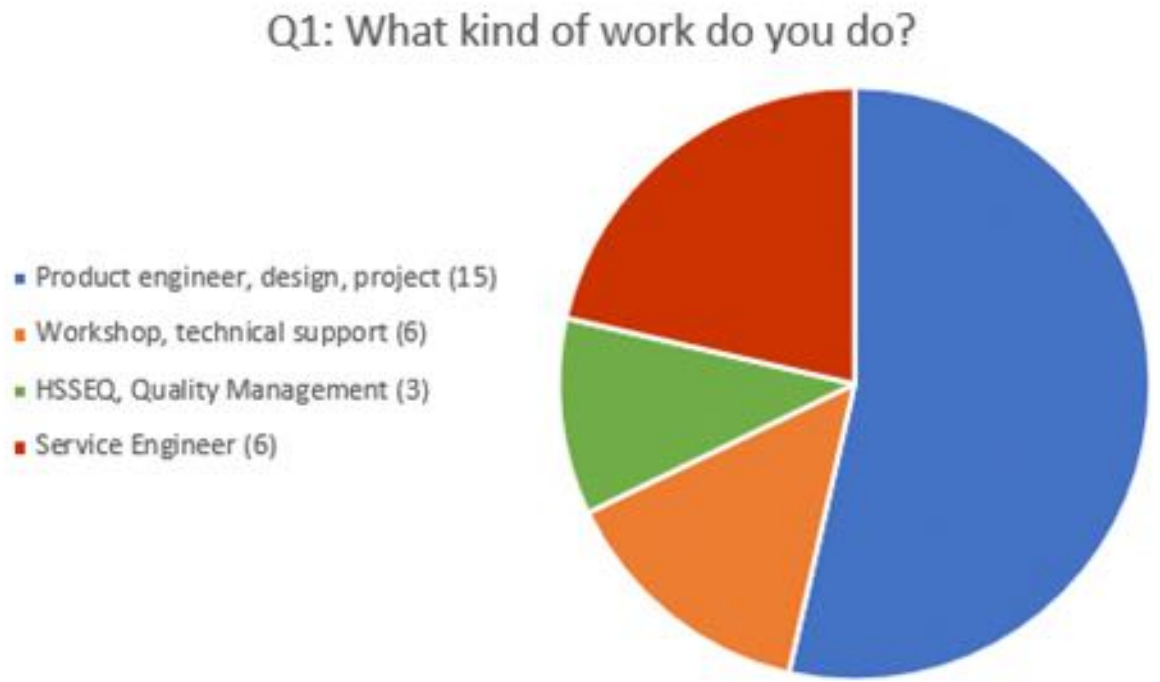
- RQ1: Can quality issues discovered during the commissioning phase be linked to poor knowledge management?
- RQ2: How can cognitive search boost knowledge reuse and improve communication across different departments?
- RQ3: How can DRIVE© model benefit from cognitive search and sentimental analyses?

Research design

- Mixed methods
- Quantitative method: online survey
- Qualitative method: in-depth interviews
- Literature review
- AI platform review
- Limitations

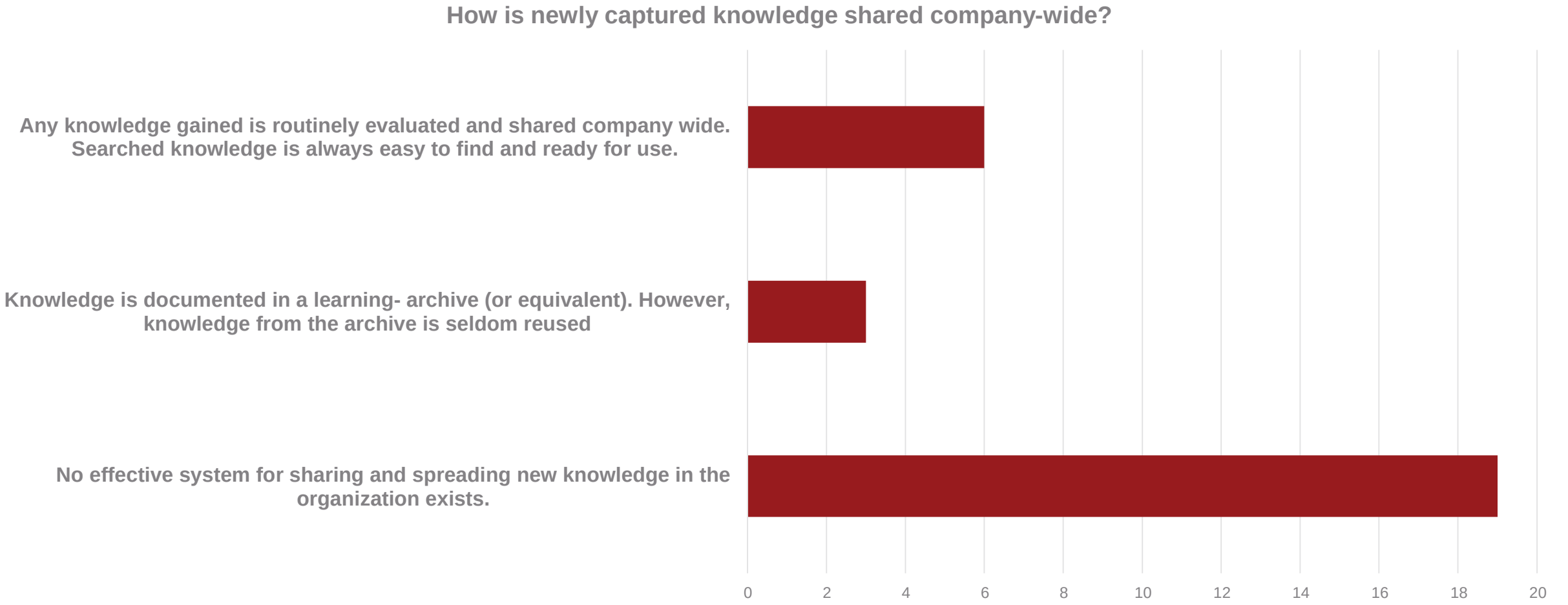
Quantitative method: Online survey

- 20 questions
- Customer focus and continues improvement (QM and KM)



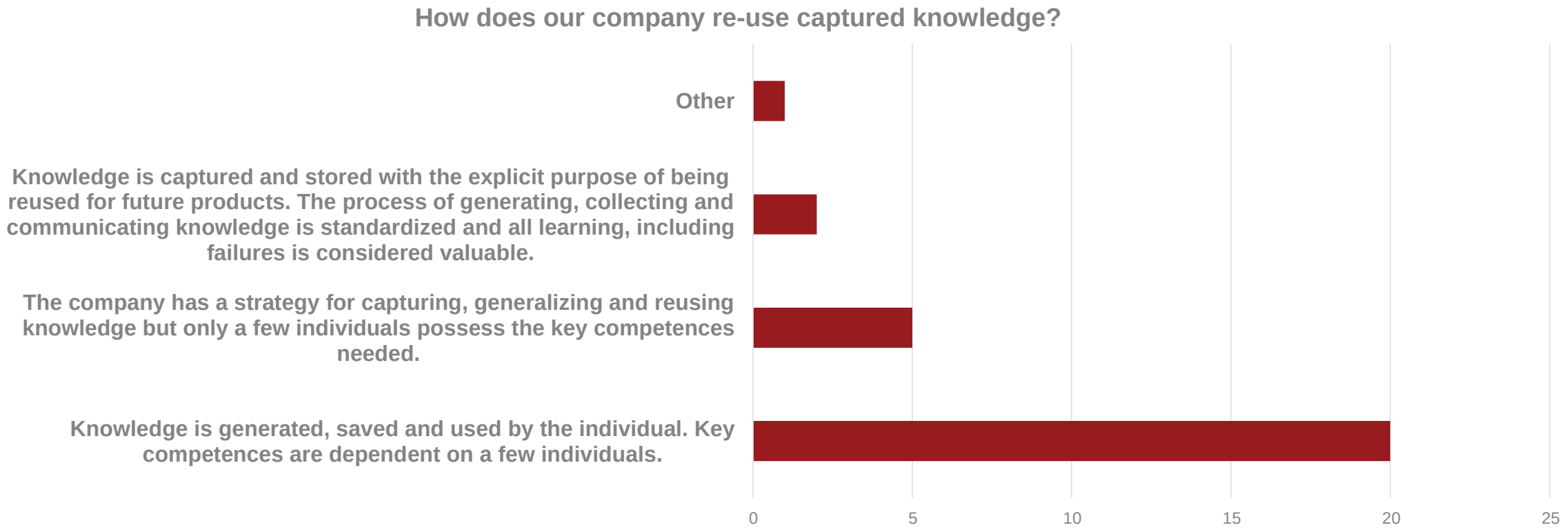
Question 8

No effective system for knowledge sharing



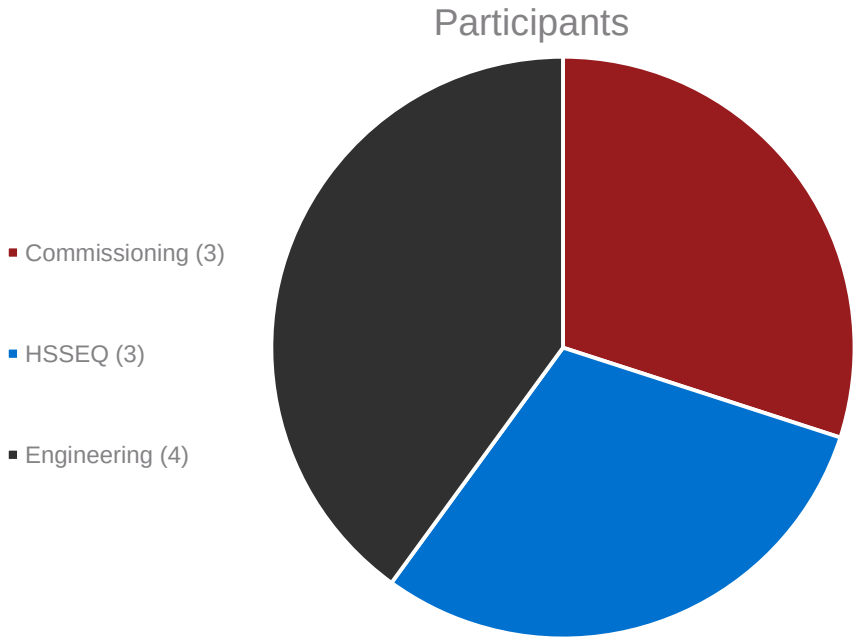
Online survey: Question 9

Knowledge silos

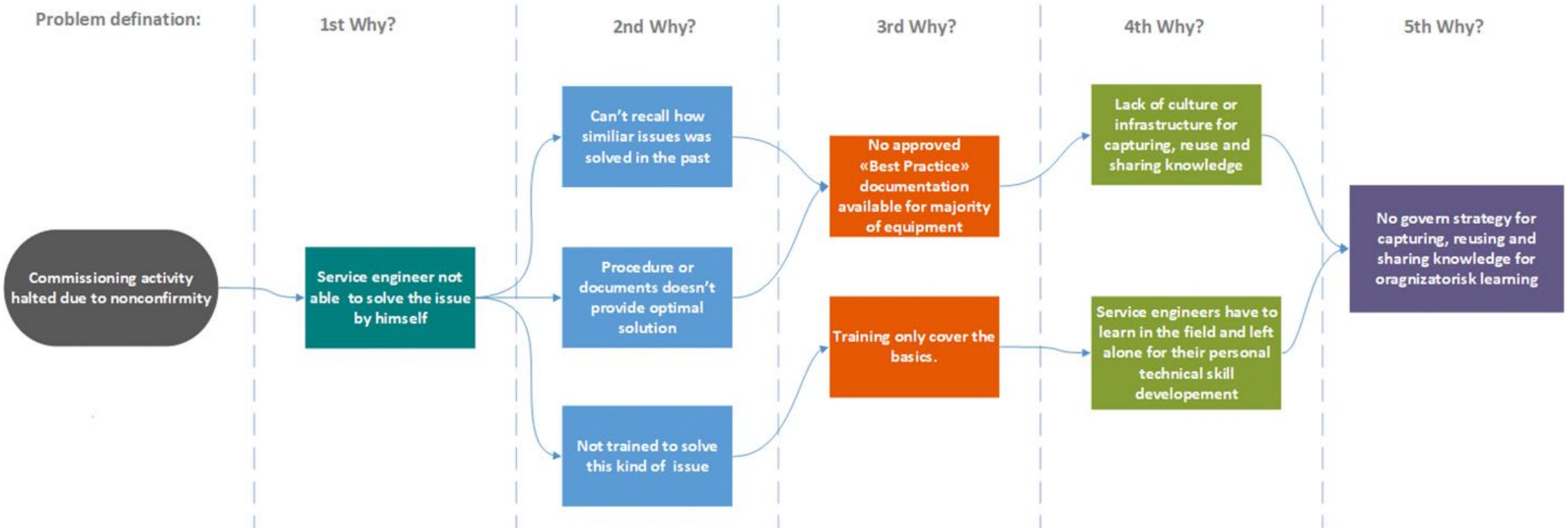


Qualitative method: In-depth interviews

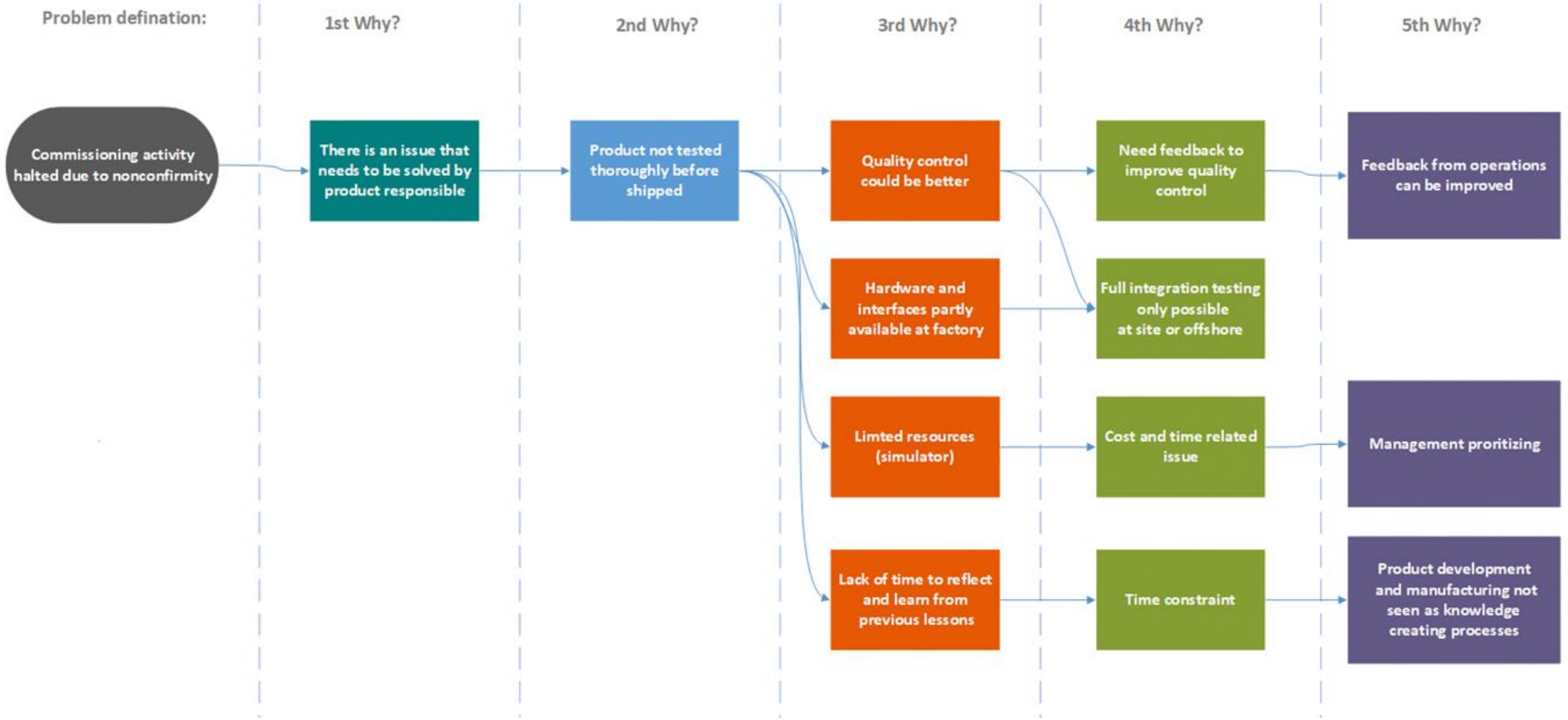
- 10 participants
  - Various background
  - Key competence
  - Long experience
- Retrospective view
- 5 Whys?



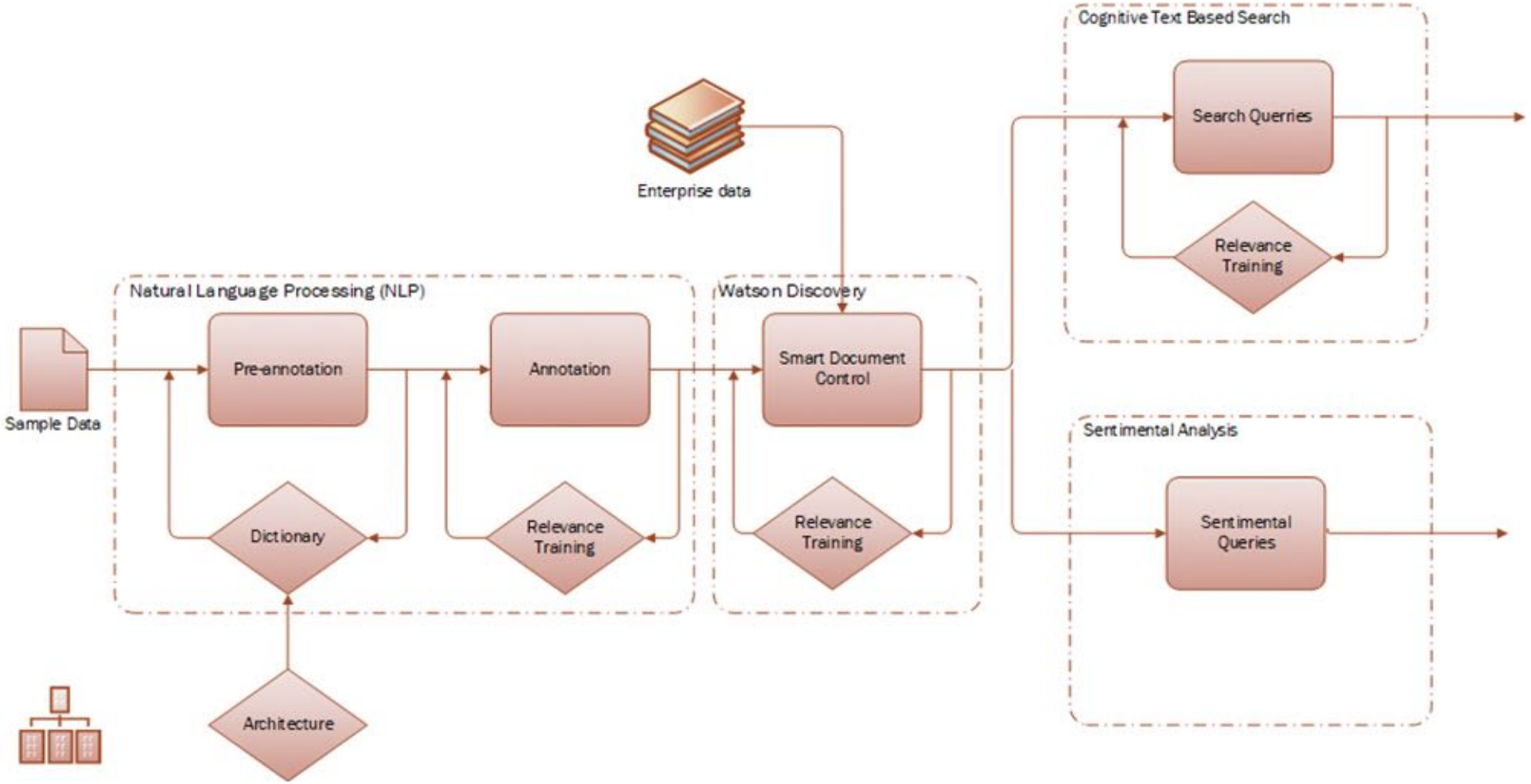
In-depth interviews: Root cause 1



In-depth interviews: Root cause 2



AI Based Tools



AI Based Tools

- Cognitive search

AI Based Tools

- Sentimental analysis
- Trend analysis

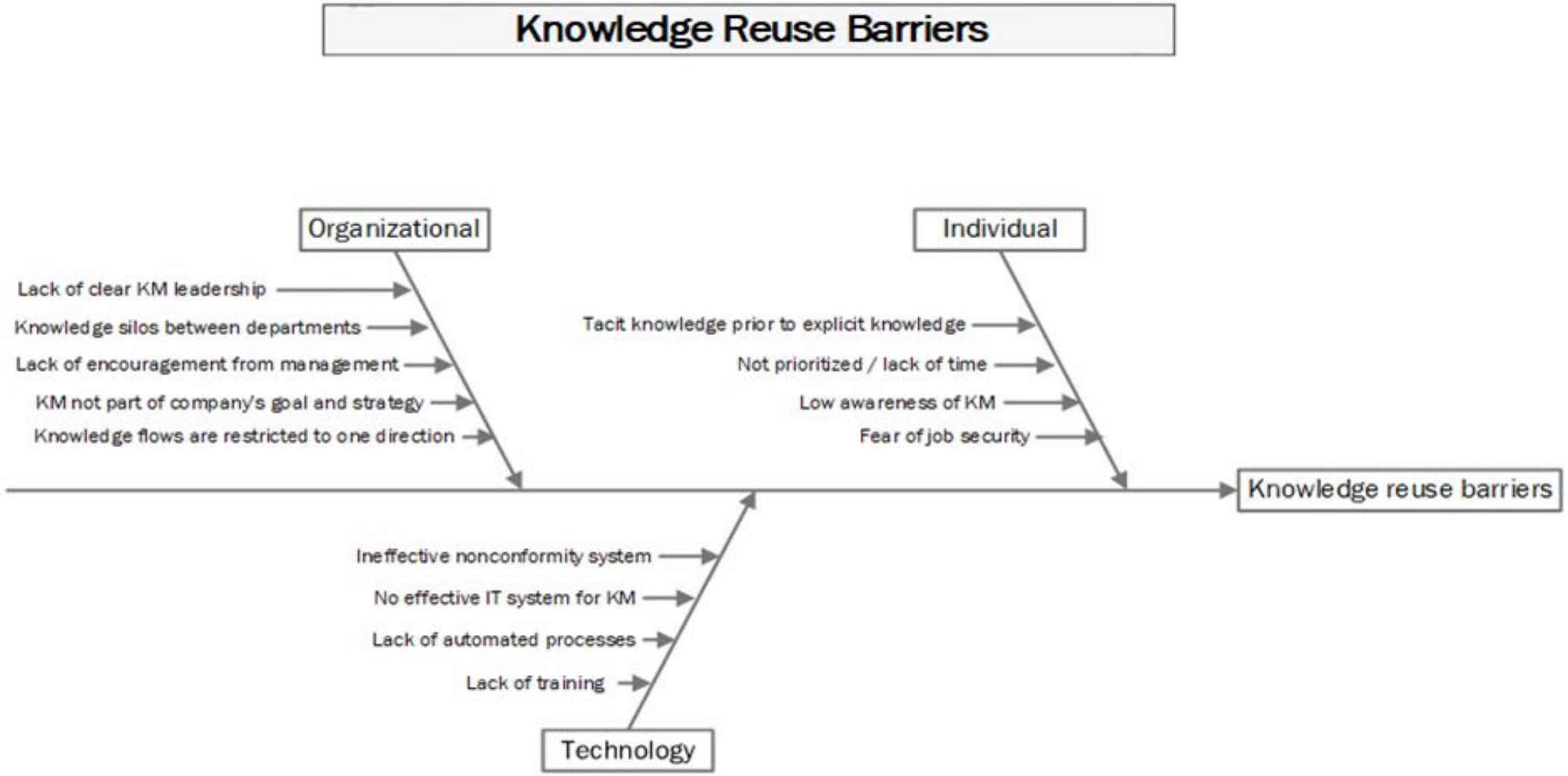
Research question 1

Can quality issues discovered during the commissioning phase be linked to poor knowledge management?

With better KM

- Service engineers could improve performance
- Product engineers improve products
- HSSEQ evaluate companies performance and customer satisfaction

Research question 1



Research question 2

How can cognitive search boost knowledge reuse and improve communication across different departments?

- Increase availability of information
- Extract relevant information from various sources
- Informed decisions
- Increase productivity
- Technical support, product engineers, HSSEQ etc.

Research question 2

Quotes from interviews

- «Reinventing the wheel»
- «Not learning from past»

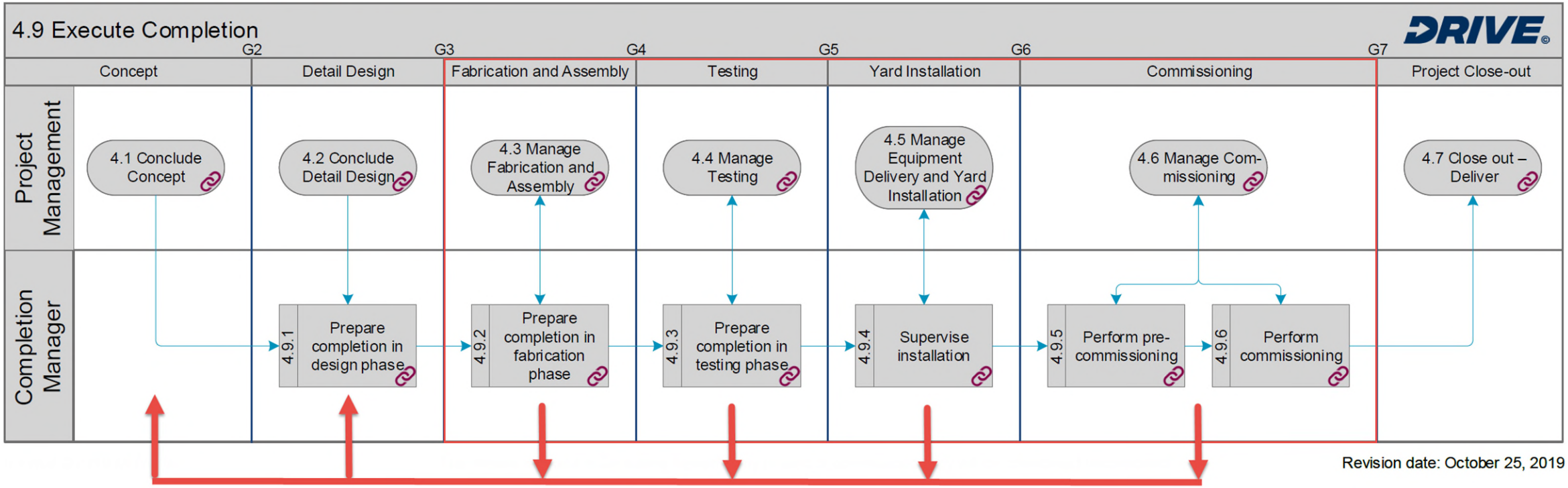
Research question 3

How can DRIVE© model benefit from cognitive search and sentimental analyses?

- Lack of formal feedback loops
- Cognitive search facilitates more informed decisions
- Sentimental analyses to analyse trends

Research question 3

MHWirth Process: Deliver Packages



Conclusion

- Current QM can benifit from increased focus on KM
- AI tool can boost knowledge reuse but requires human interaction
- Focus on eleminating knowledge reuse barriers