

# Decision-making Process for Product Planning of Product-Service Systems

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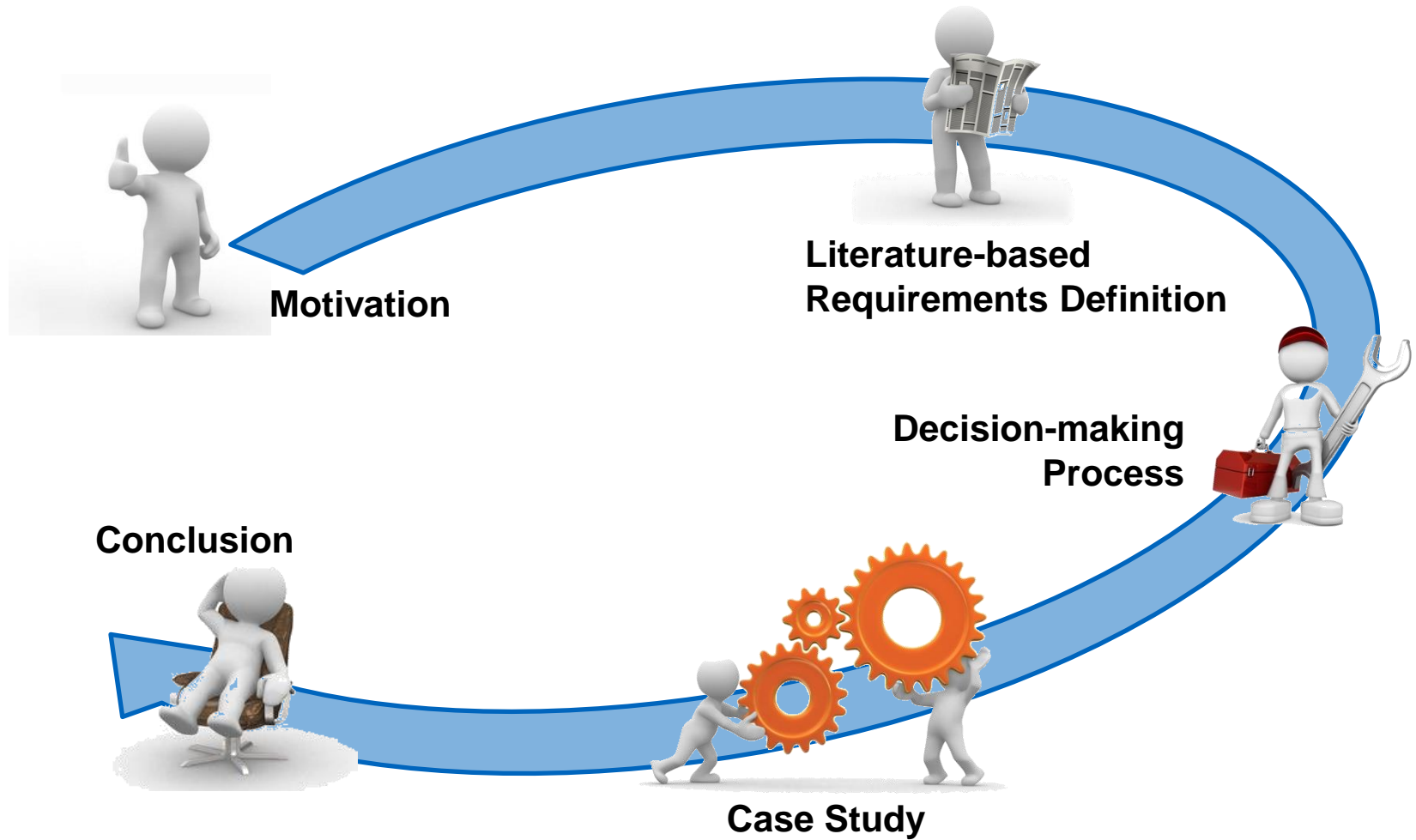
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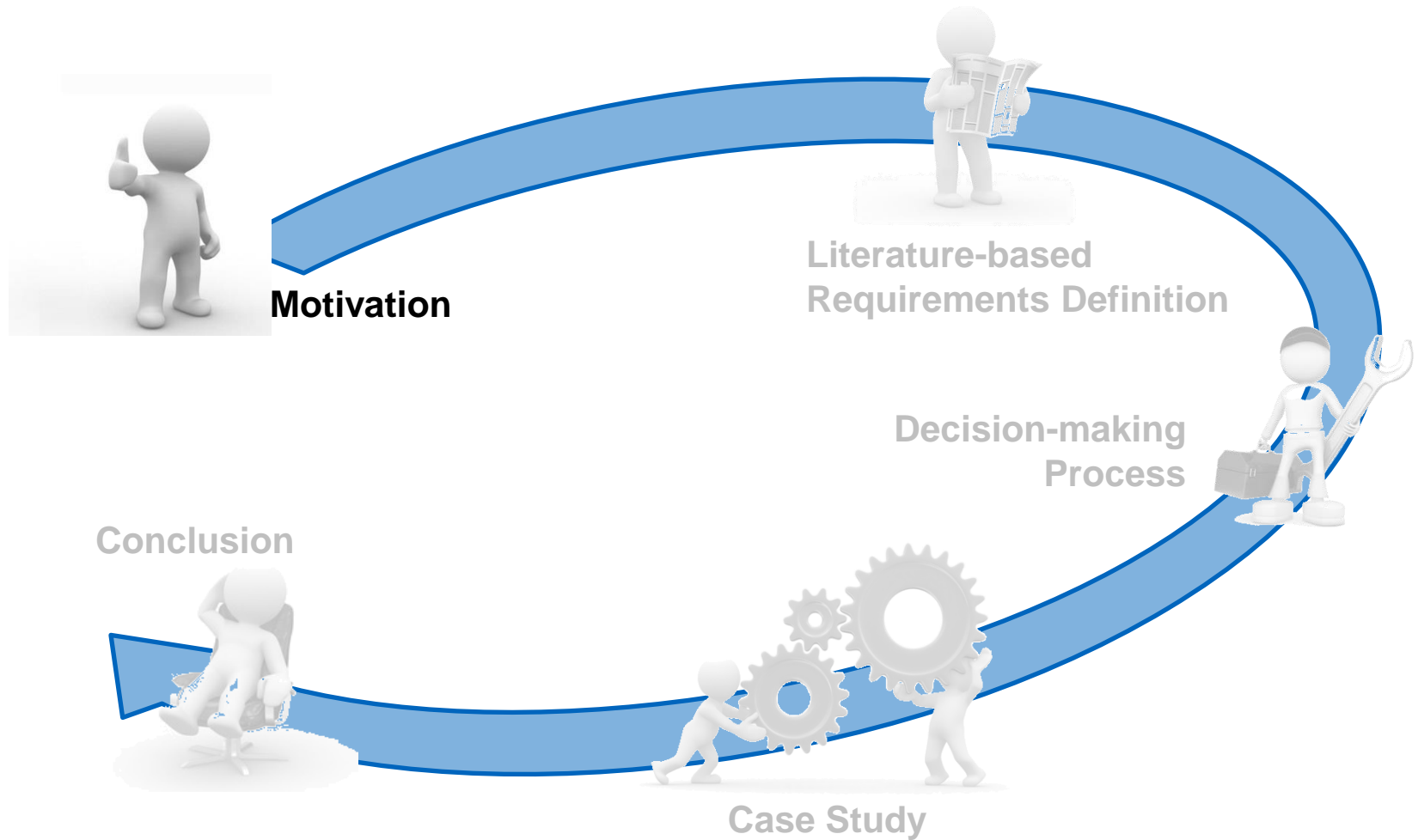
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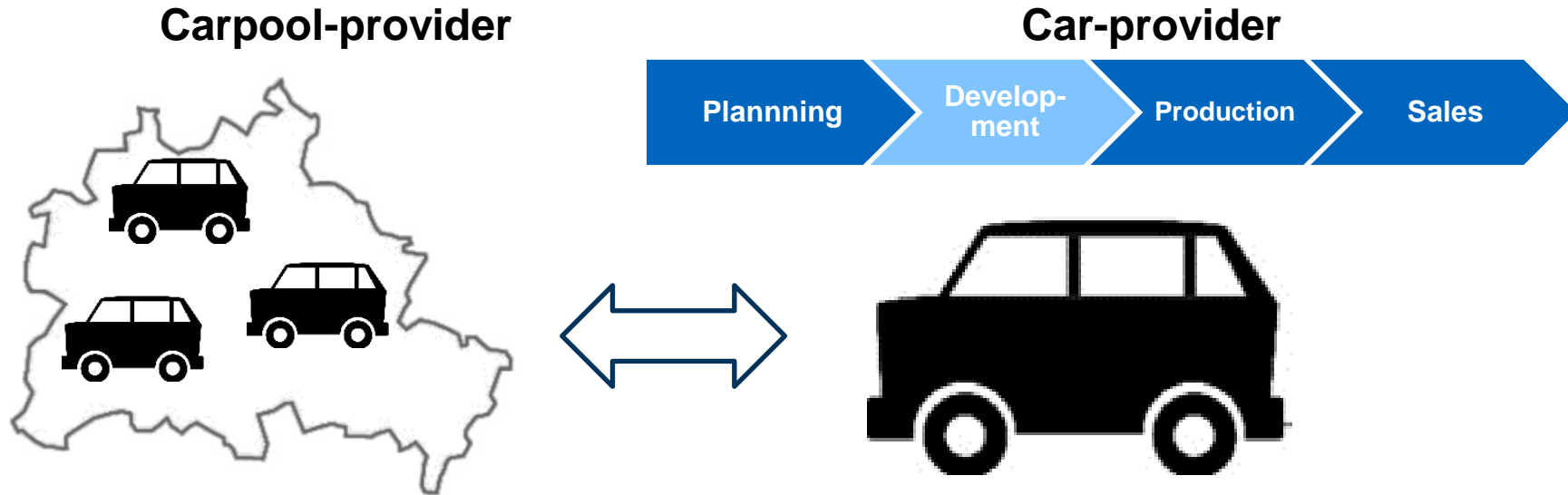
# Agenda



# Agenda



# Introduction



## Aim:

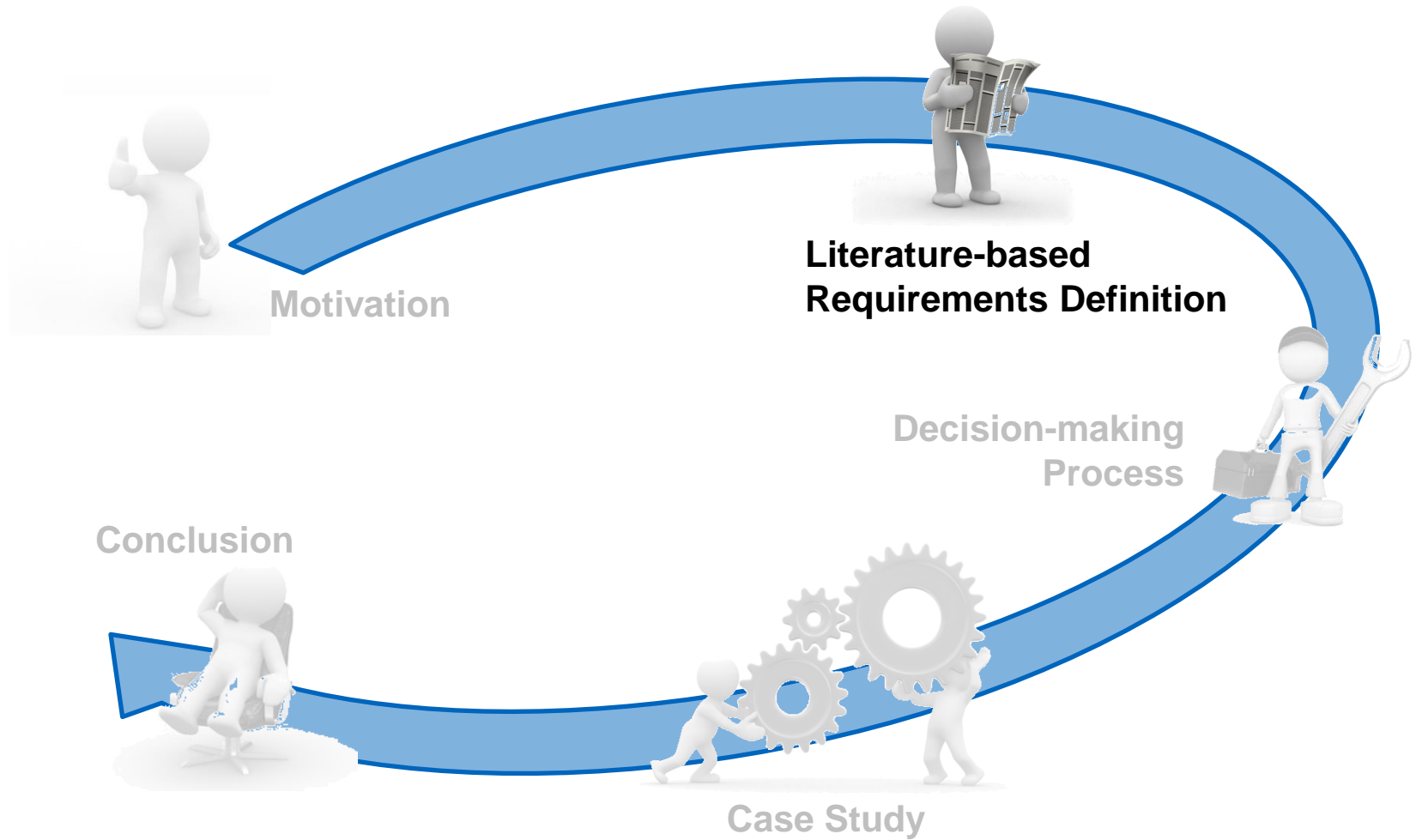
- Offering a special car-model in their carpool

## Problem:

- Integrating the module for booking into the car
- Development process has just started

→ Include services and interfaces to services into product planning

# Agenda



# Literature Review

## Criteria for literature analysis

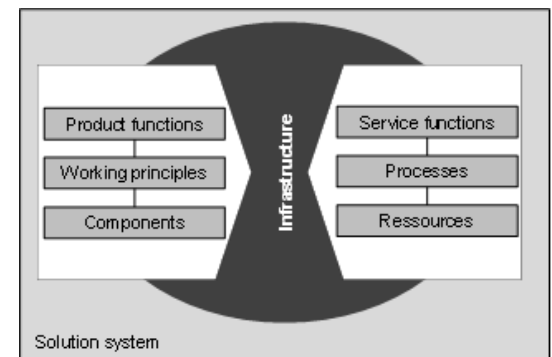
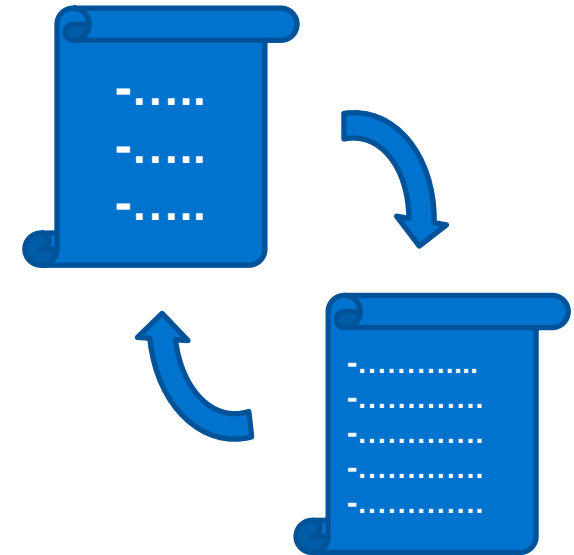
- Planning PSS
- Planning physical products
- Planning services
- Consider infrastructure
- Early integration of Customer Requirements
- Customer integration
- Market analysis

	Planning PSS	Planning physical products	Planning services	Infrastructure considered	Customer requirements before planning	Customer integration	Market analysis
VDI 2220 [8]		X			X		X
Gausemeier et al. [10]		X					X
Orawski et al. [11]		X			X		X
Van de Kar [12]			X	X	X	X	X
Aurich et al. [13]	X	X	X			X	X
Morelli [14]	X	X	X				X
Yang et al. [5]	X		X		X		X
Tonelli et al. [16]	X		X		X	X	X
Maussang et al. [17]	X	X	X	X	X		X
Geum & Park [18]	X	X	X	X	X	X	

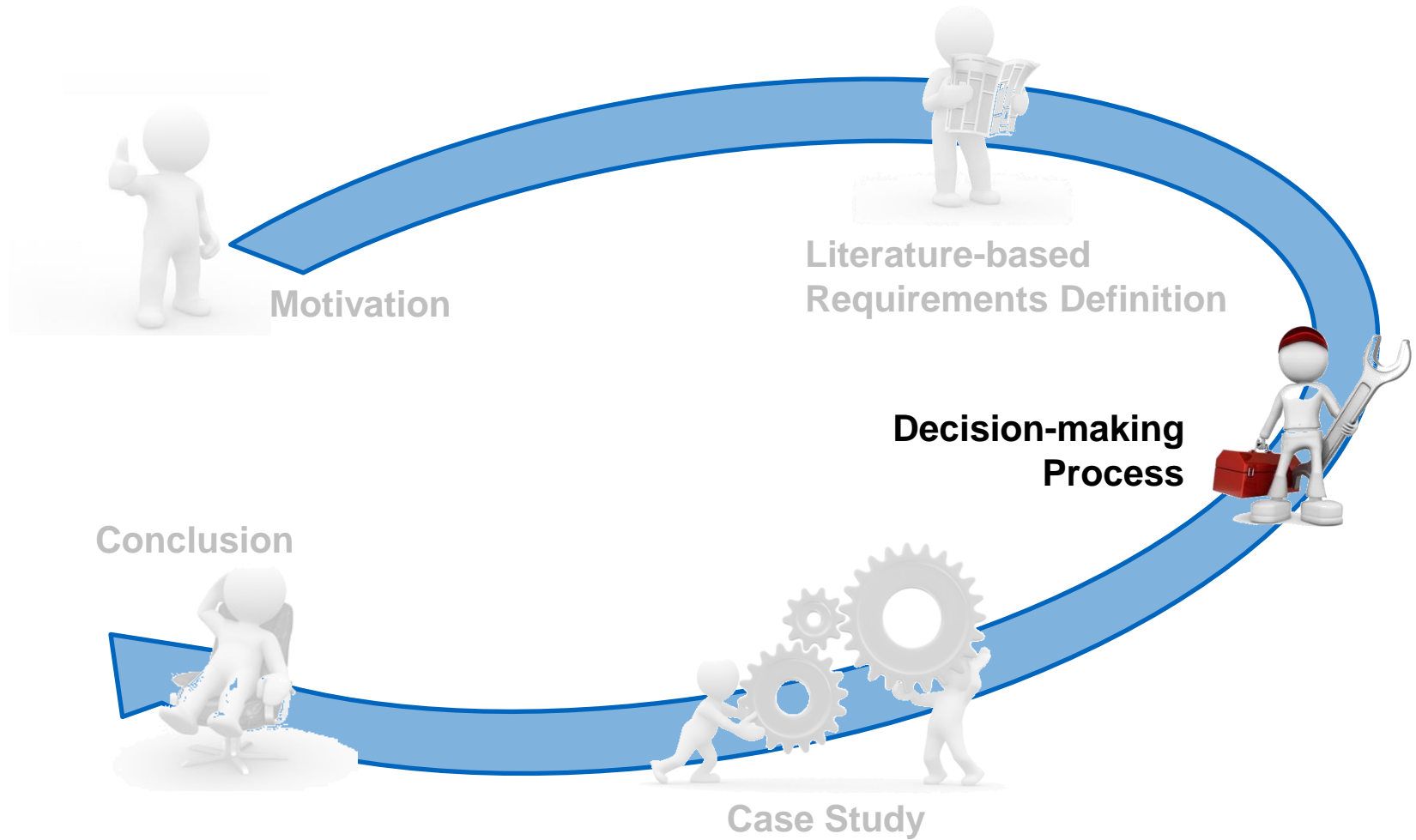


# Identified requirements from literature

- **Uninterrupted documentation**
- Strong contact to the customer
- Customer integration
- Identification of customer requirements for planning
- **Adaptable requirements list**
- Considering results from a market analysis
- Support for the selection of principal elements
- **Considering tangible product and service elements**
- Support for concept definition
- Evaluation of identified concepts
- Consideration of services associated to the product
- **Planning PSS-infrastructure**
- Consideration of scenarios and strategy
- **Deployment of a complete PSS-concept**
- Support for selection of the best suitable PSS-concept
- **Easy understandable for product planners**

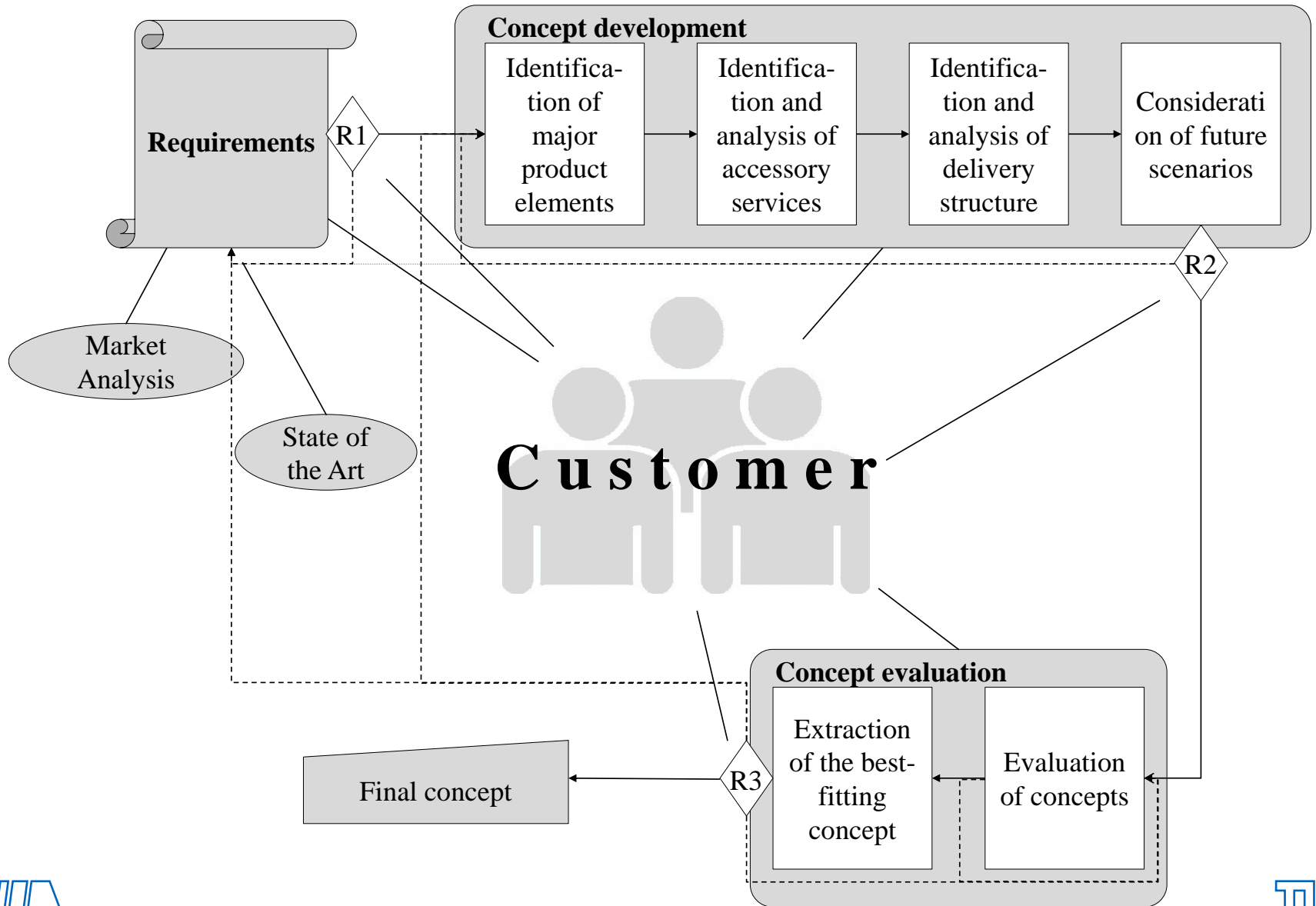


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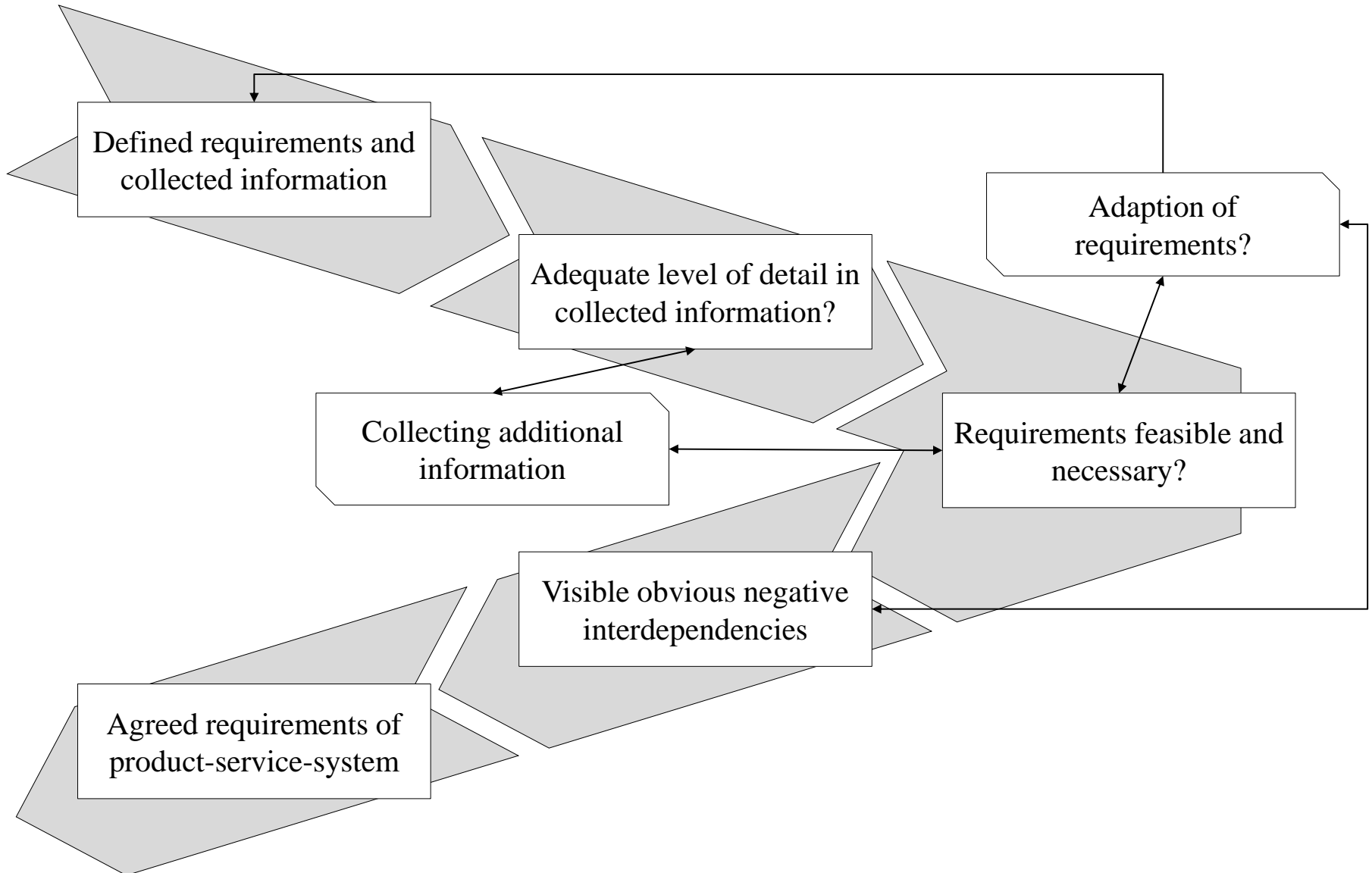




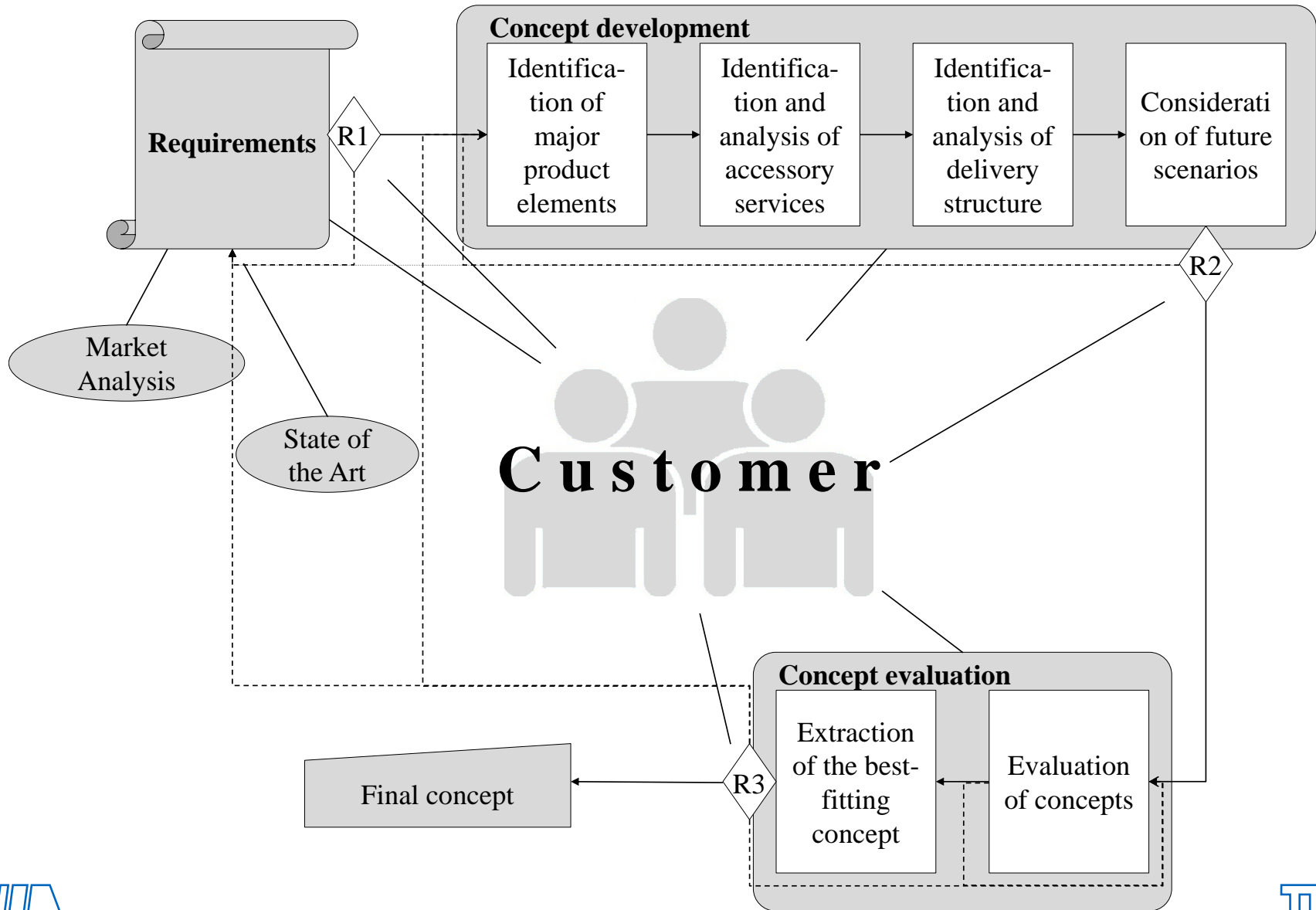
# Overview: Decision-Making Process



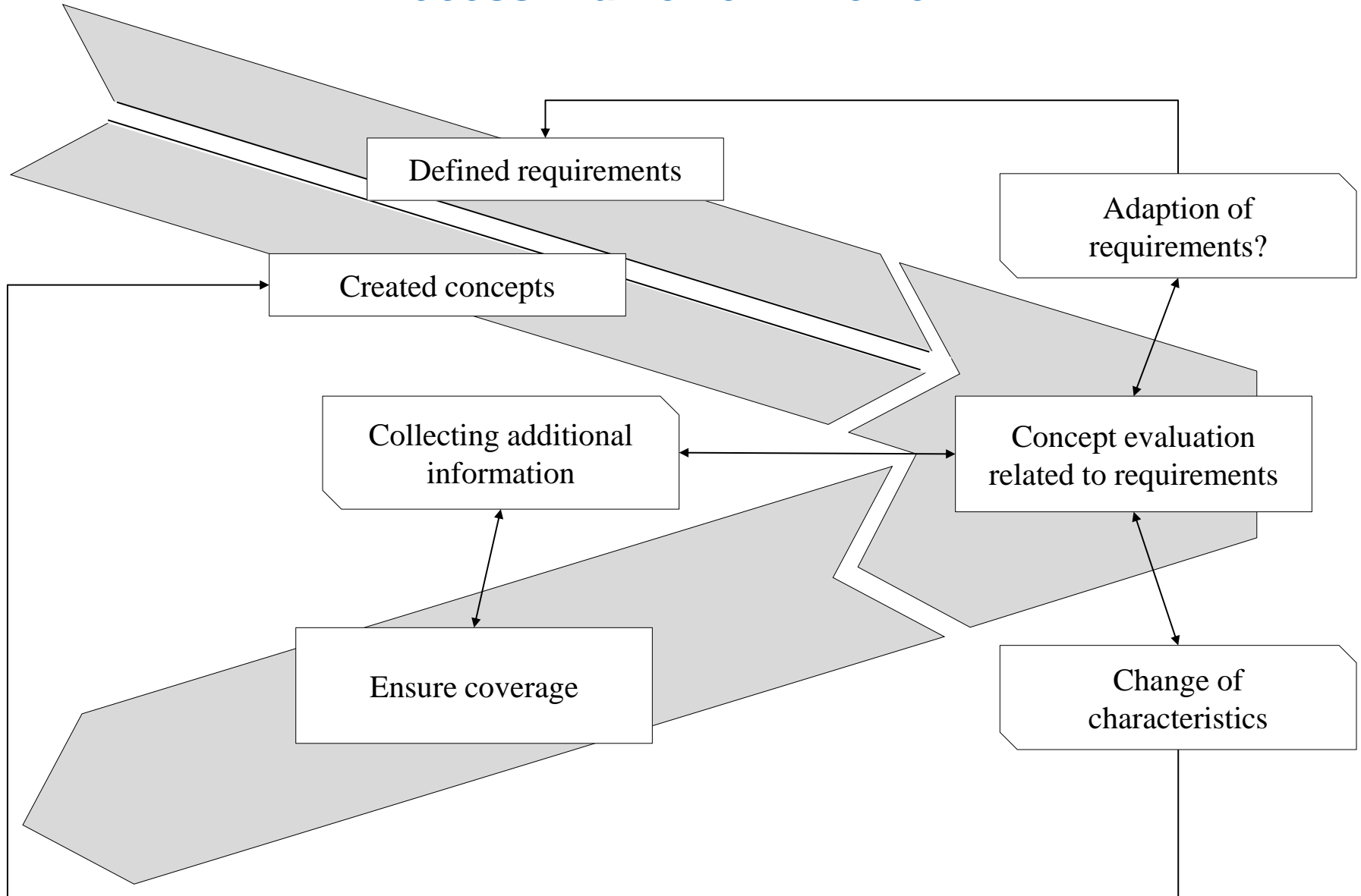
# Process Framework: Review 1



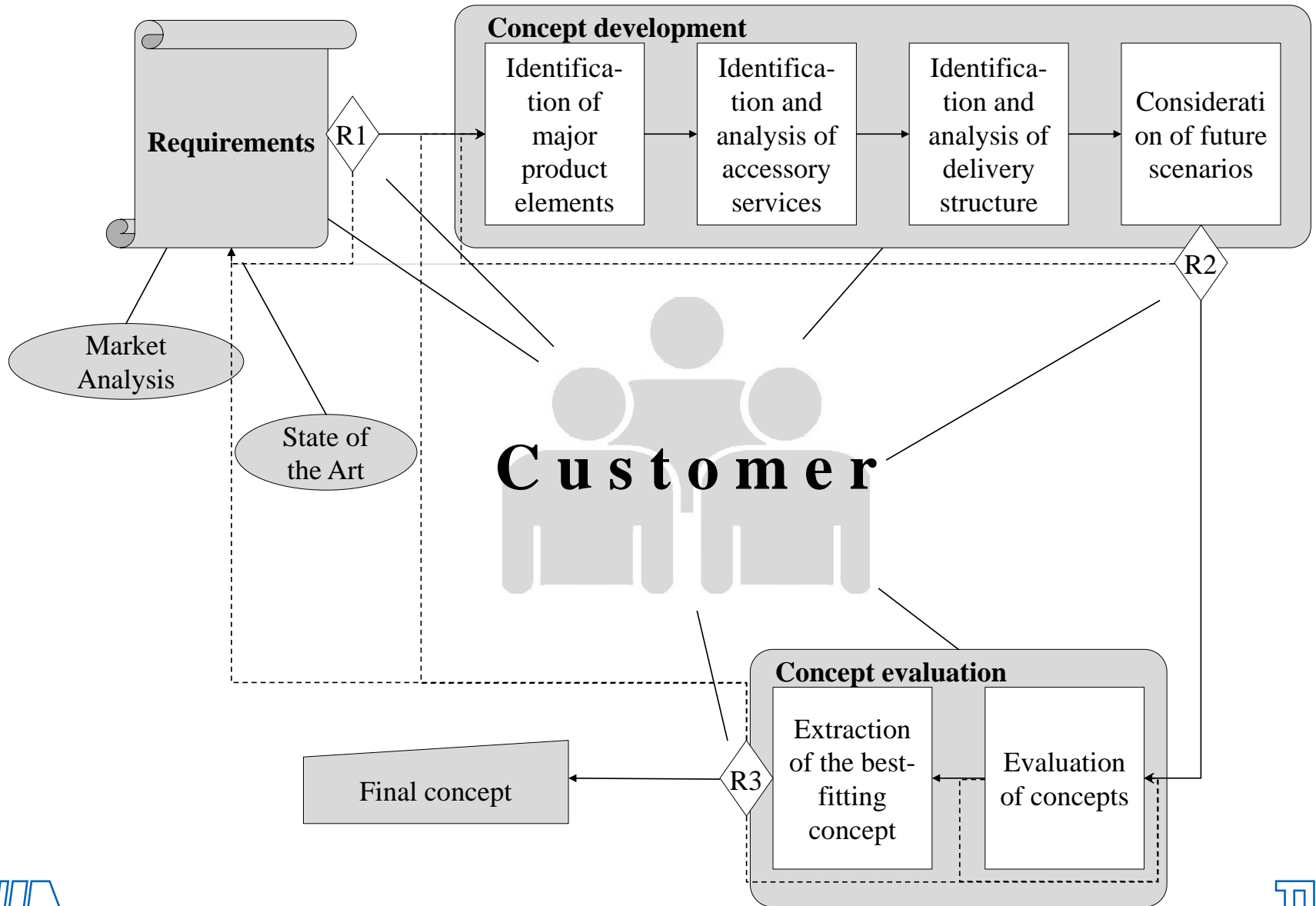
# Overview: Decision-Making Process



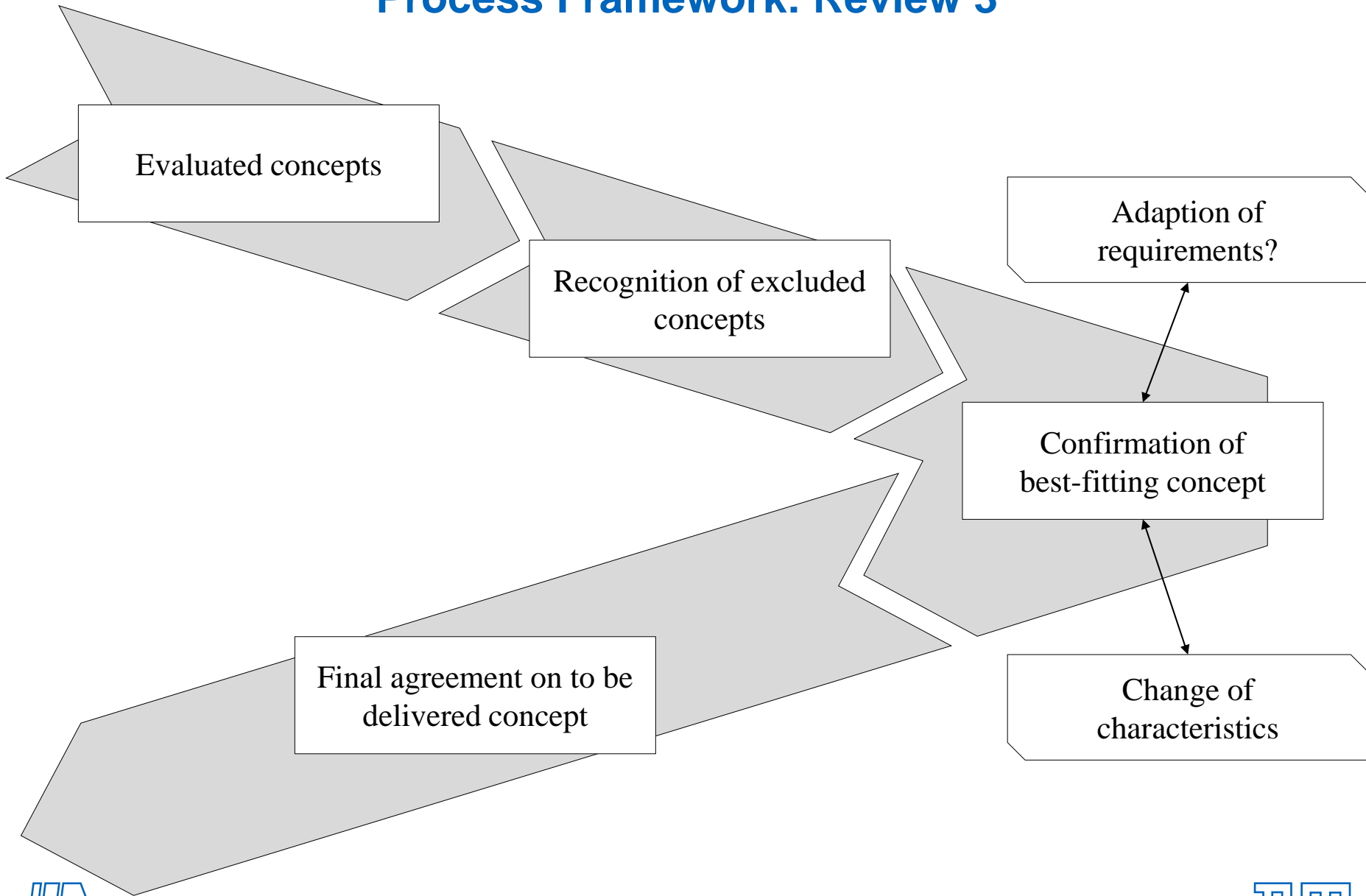
# Process Framework: Review 2



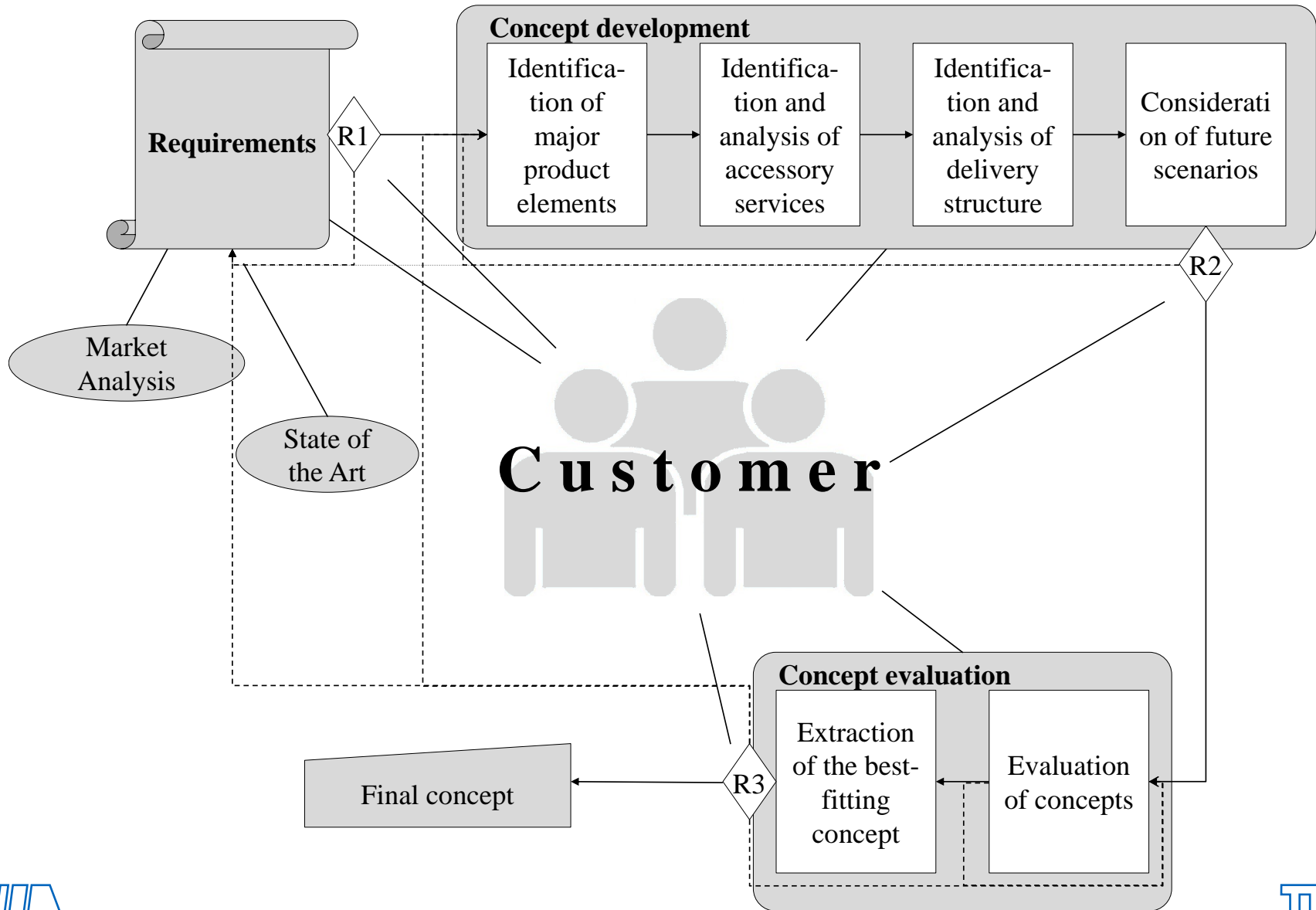
# Overview: Decision-Making Process



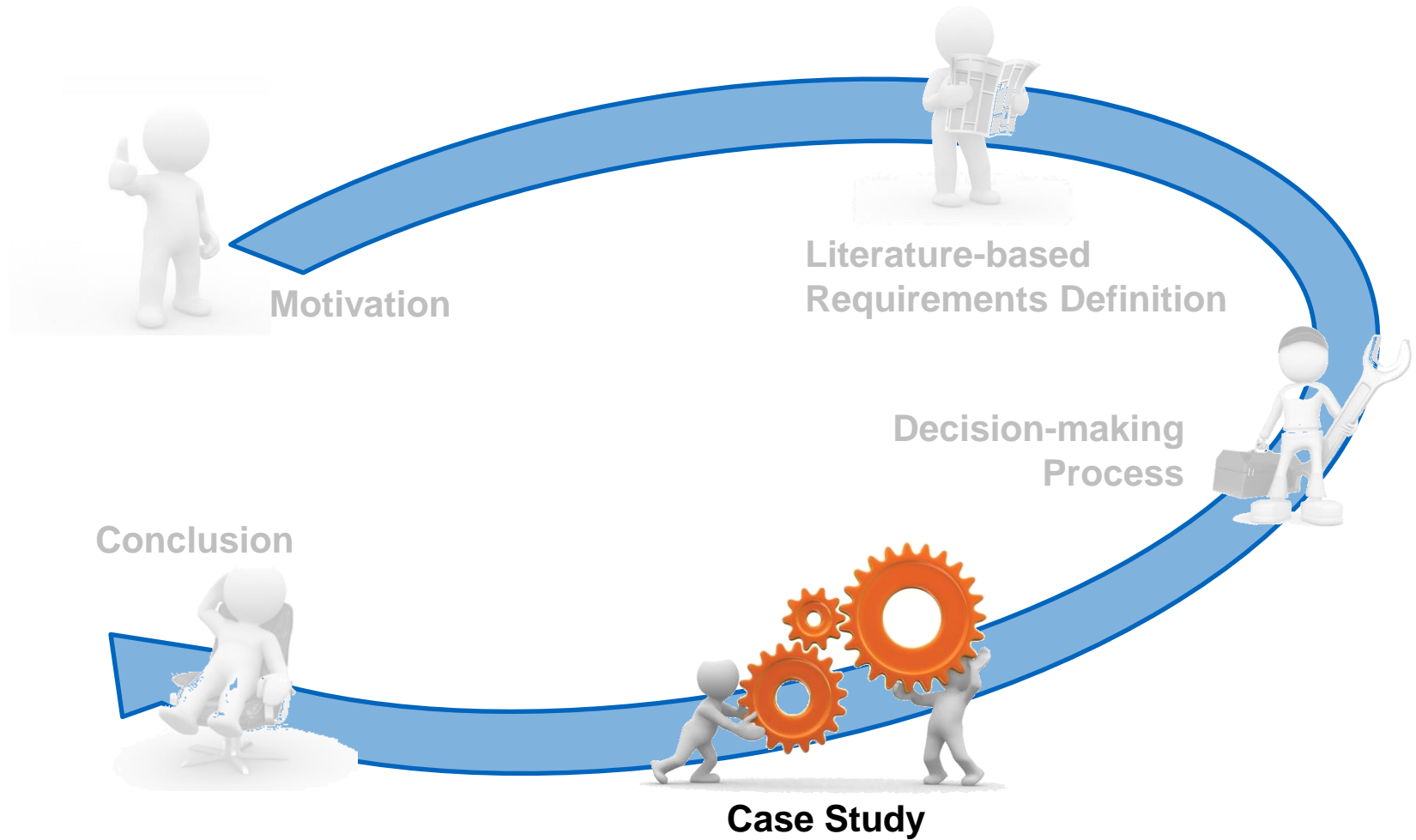
# Process Framework: Review 3



# Overview: Decision-Making Process



# Agenda





# Case Study

## PSSycle: Rentable pedelec for tourists (Focus: electrical energy supply)

### Adaptable requirements list of PSS-planning

- Lacking information for „charging a smartphone on the ride”
- The requirement “charging the on-board computer by riding the bike” was eliminated
- Interdependencies of requirements
- No changes in requirements list in R2- and R3-review

	Installation of charging system and battery	Mounting of the charging system to the pedelec	Protection against humidity and moisture	Cooling of the charging system	Connection between charging system and socket	...	Anti-theft protection	Lightweight design of the pedelec	Easy to use	Easy battery change
Installation of charging system and battery										
Mounting of the charging system to the pedelec			•				•	•		
Protection against humidity and moisture				•	•					•
Cooling of the charging system								•		
Connection between charging system and socket							•			
...										
Anti-theft protection									•	•



# Agenda



Motivation

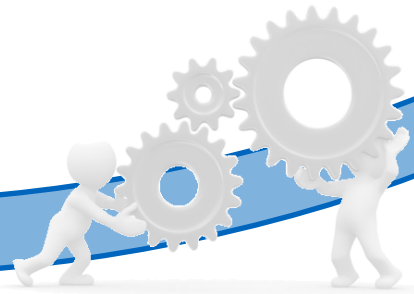


Literature-based  
Requirements Definition



Decision-making  
Process

Conclusion



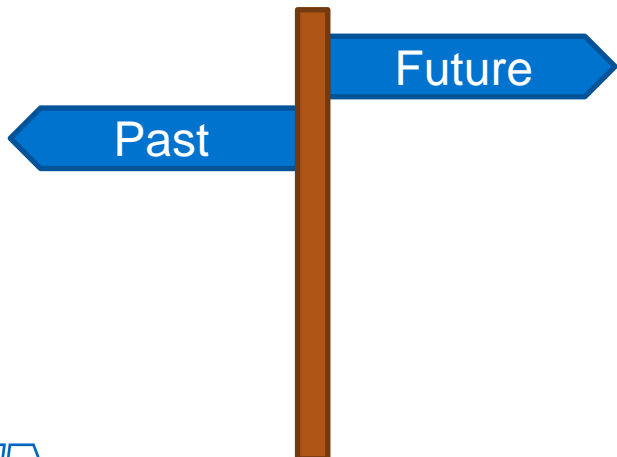
Case Study



# Conclusion

## Conclusion

- Focus of this framework: adaptability of requirements list
- Other case studies revealed:
  - Additional phase „lesson learned“
  - Sequence of R1-, R2-, R3-reviews not mandatory, depending on the application case
  - Easy understandable for industry
  - Relevant for SME



## Outlook

- Framework not sufficient for PSS-planning
- Need for methodical support, suitable for planning process

# Thank you for the attention!

