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# The Process of Process Modeling

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# Joint work with...

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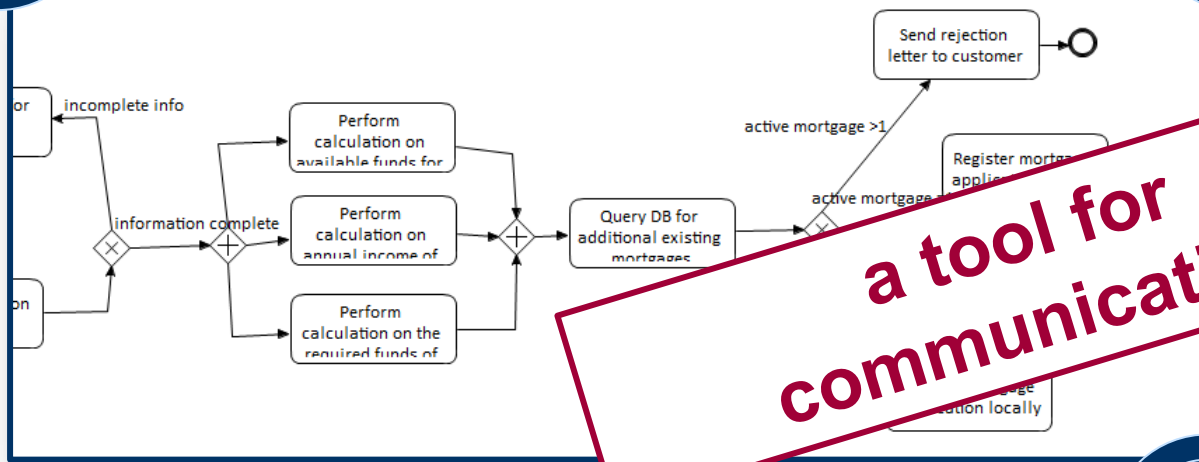
# Process Models in BPM



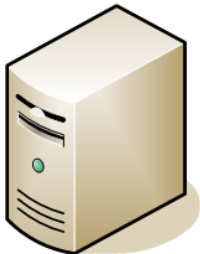
common understanding



identify problems in the business process



**a tool for communication**



execute

discover opportunities for improvement



# Quality Problems

- Error rates between 10% and 50% in industrial process model collections  
(Mendling 2009, Fahland et al. 2009, Mendling et al. 2008)
- impedes **comprehensibility** and **maintainability** of process models  
(Mendling 2008, Weber & Reichert 2008, Weber et al. 2011)
  - Non intention-revealing or inconsistent naming  
(Mendling et al. 2010)
  - Redundant process fragments (Hallerbach et al. 2010)
  - Large and unnecessarily complex process models  
(Soto et al. 2008)

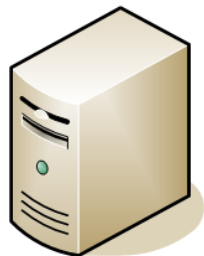
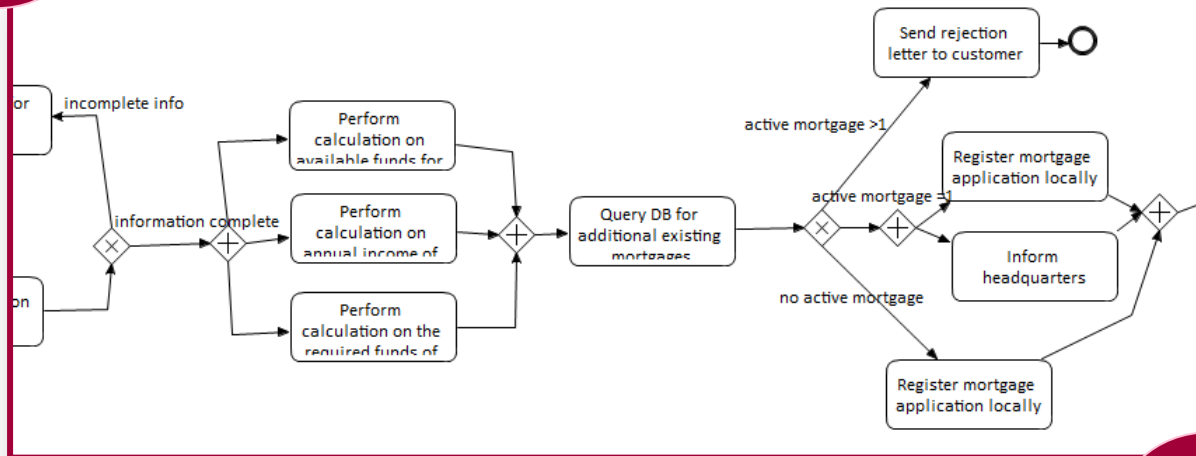
# Source of Quality Problems



common understanding



identify problems in the business process



execute

discover opportunities for improvement



# Process Model Development Lifecycle

Elicitation



Formalization



# Challenges

**Good communication  
between stakeholders  
and effective  
negotiation processes**

**Elicitation**



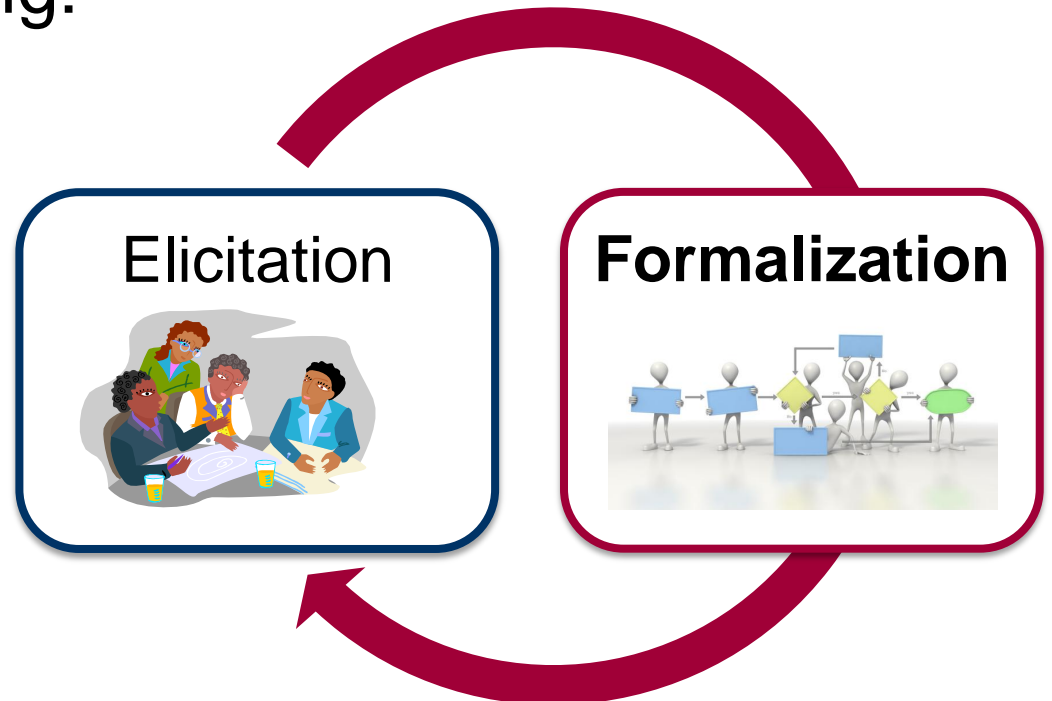
**significant process  
modeling skills**

**Formalization**



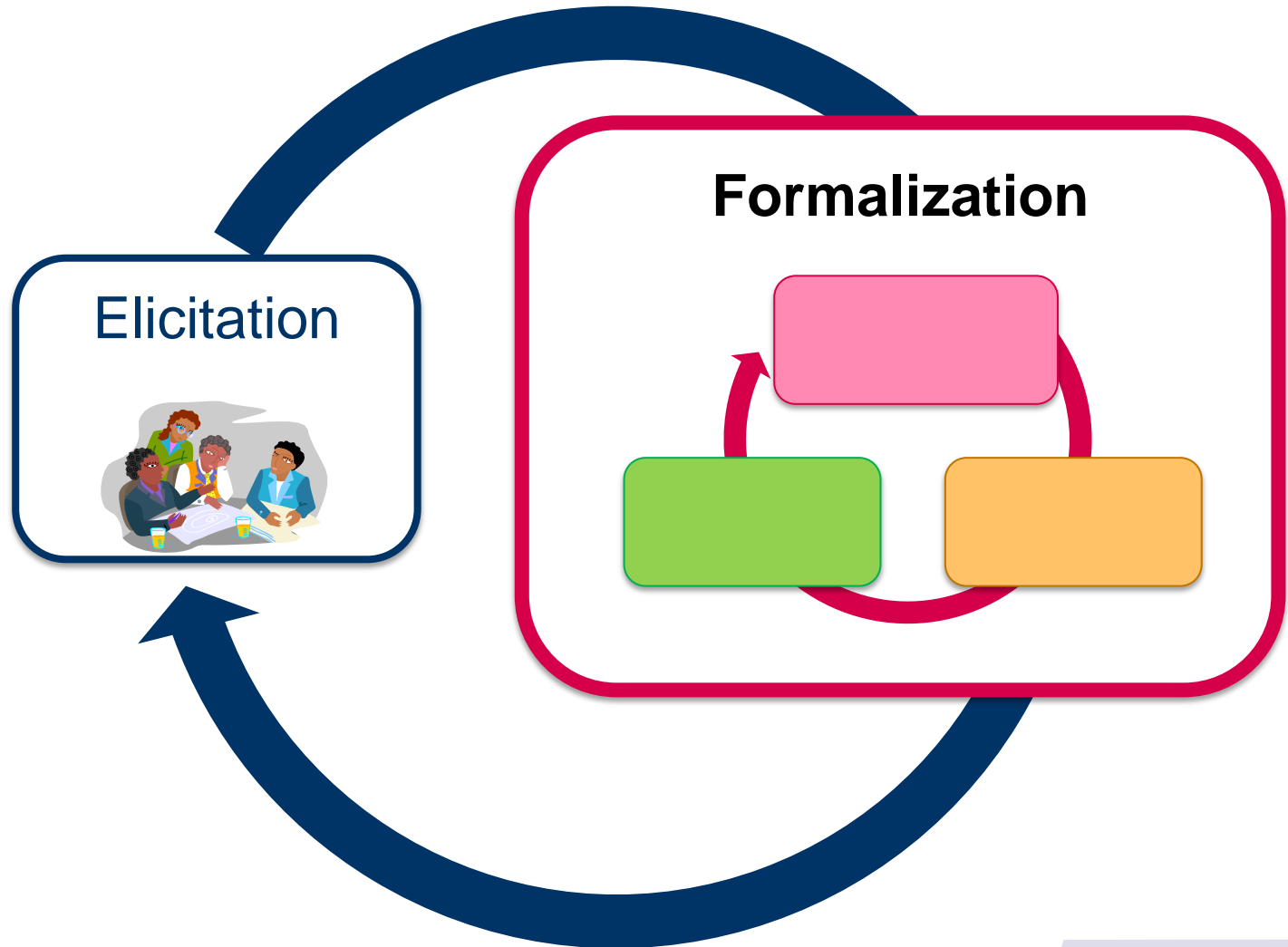
# Goals: Improve Formalization

1. Learn from experienced process modelers
2. Analyze how people model
3. Investigate tool impact on modeling
4. Supporting modeling:
  - methodology
  - notation
  - tools





# Analyze Formalization as a Process

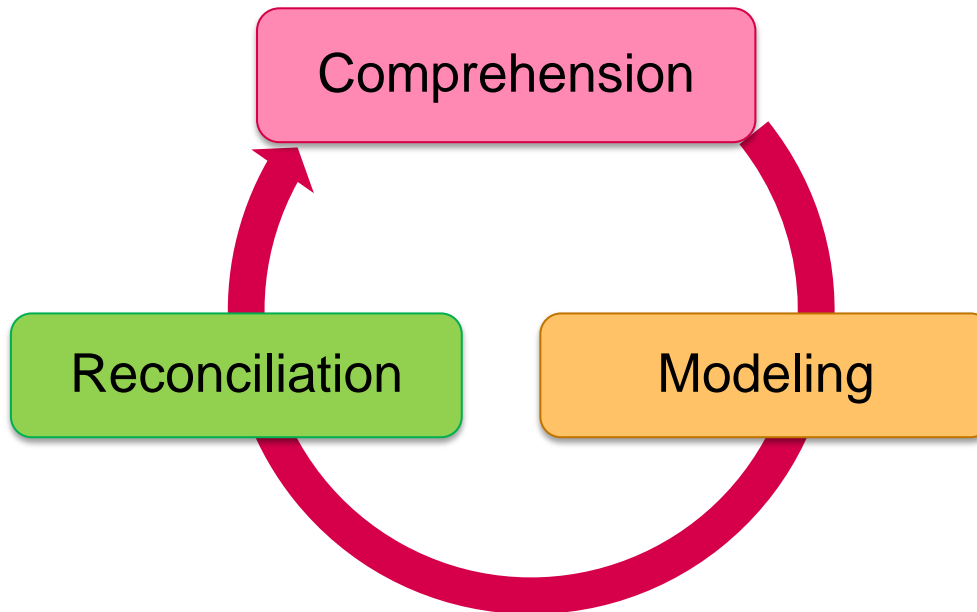


# Outline

- modeling = elicitation + formalization
- **the process of modeling**
  - conceptual idea
  - how does it look like
- first insights
  - modeling styles
  - relation to modeling outcome
  - how did you do?

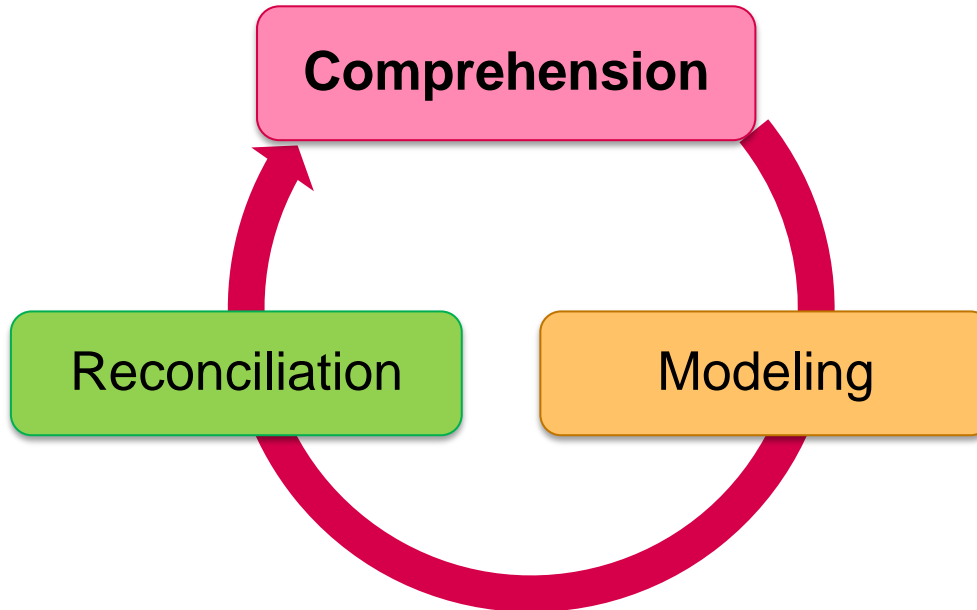
# Process of Process Modeling (PPM)

- Iterative, highly flexible process
- depends on individual modeler
- 3 successive phases



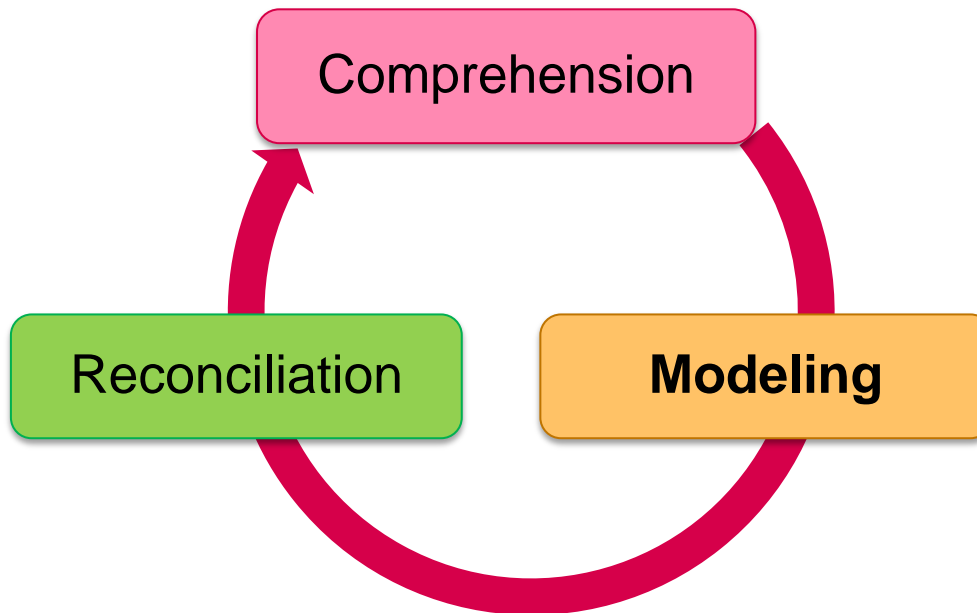
# PPM - Comprehension

- understand requirements
- understand existing process model
- chunking (Cant et al. 1995)
  - 7 +/- 2 slots in short term memory (Miller 1956)
  - understanding in chunks (group information)



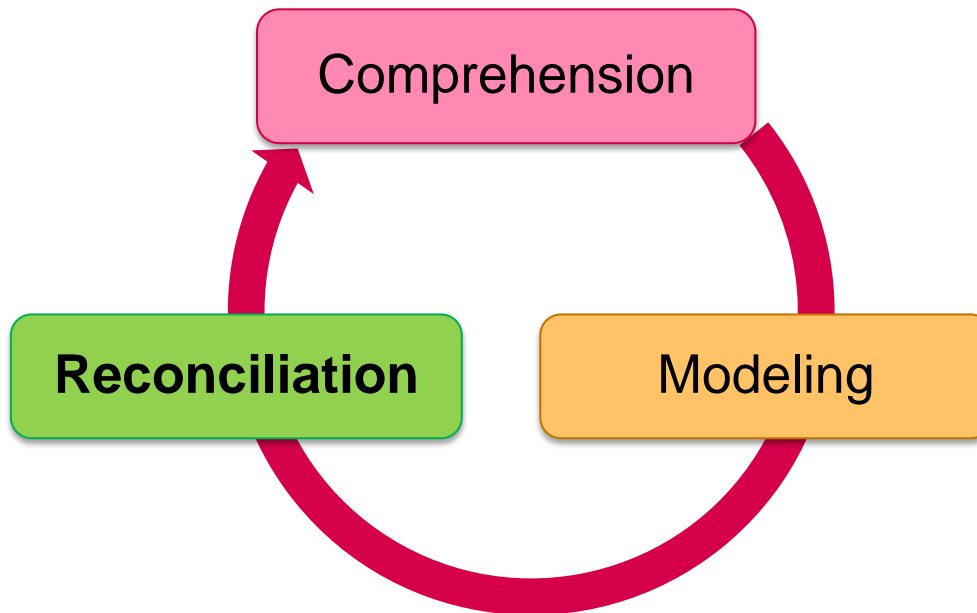
# PPM - Modeling

- comprehended chunks
  - formalize in process model
  - create new model elements
- varying number of modeling steps



# PPM - Reconciliation

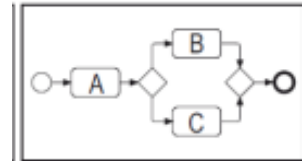
- improve understandability
  - reorganize model (refactor)
  - utilize secondary notation, typographic cues
- facilitate next comprehension phase



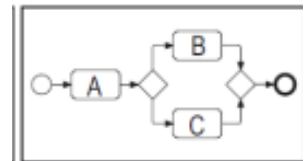
# What does the PPM look like?

- same product (process model)

Modeler 1



Modeler 2



# What does the PPM look like?

- record modeling steps

Modeler 1



Modeler 2

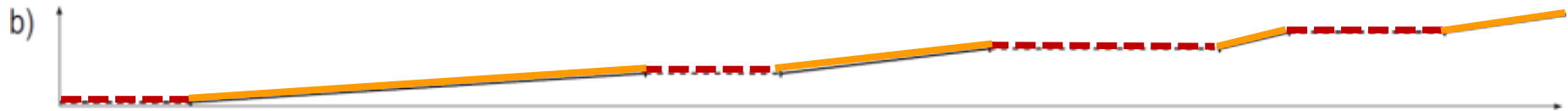




# What does the PPM look like?

- record modeling steps
- accumulate in **Modeling Phase Diagrams (PPMs)**

Modeler 1



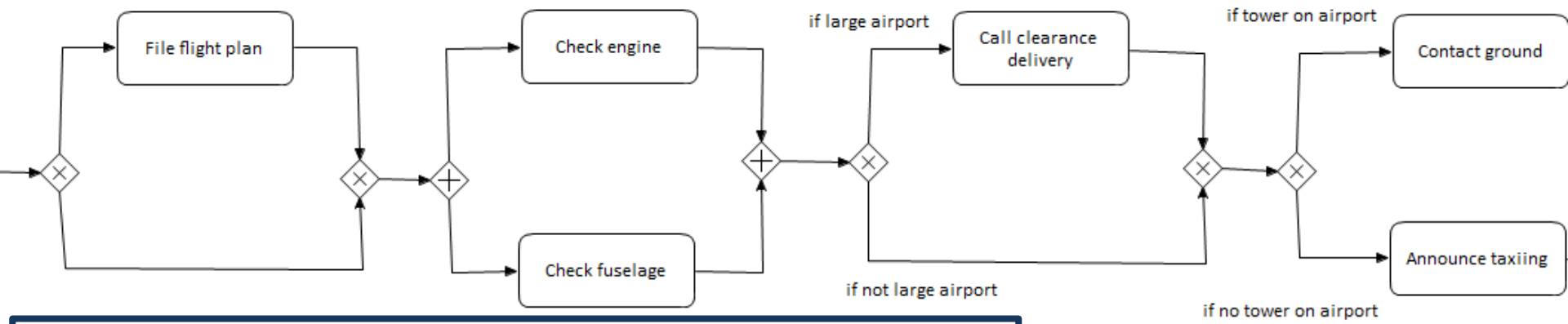
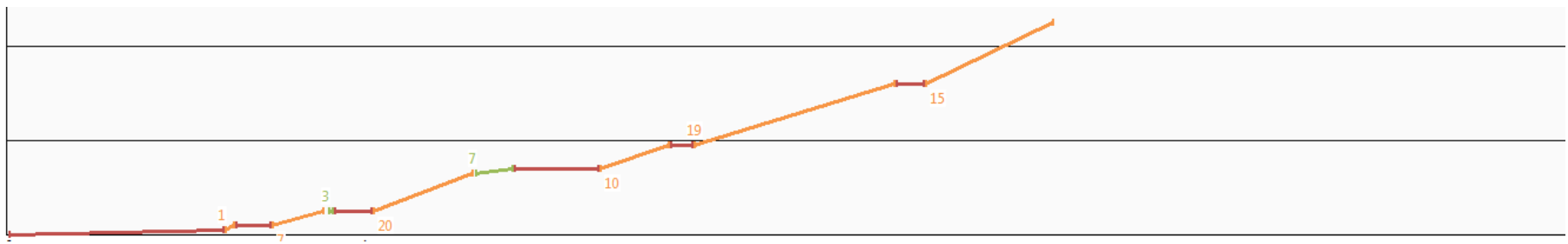
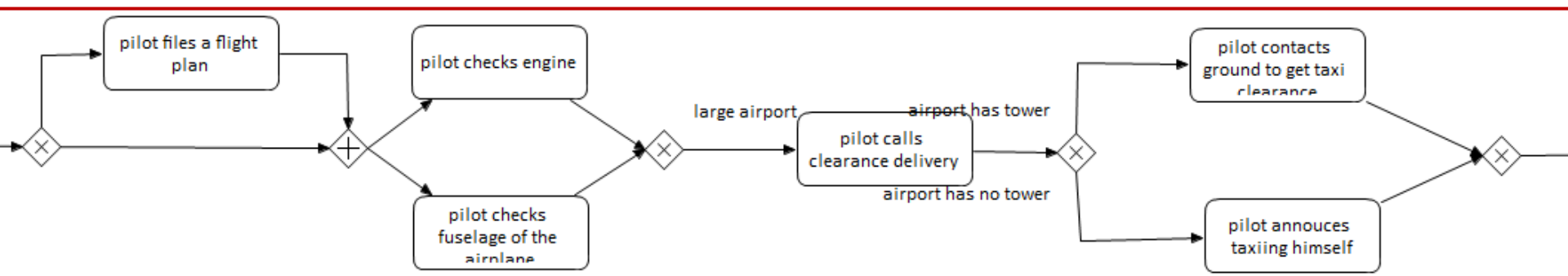
Modeler 2



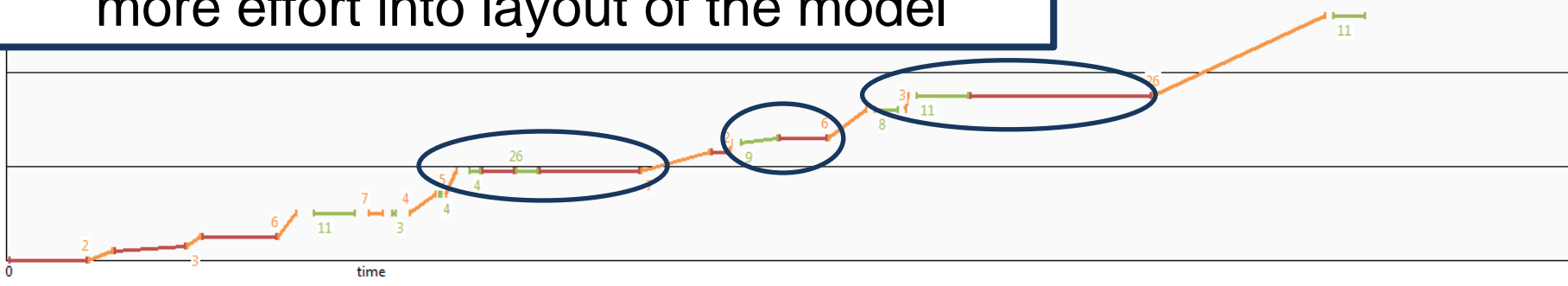
--- process comprehension (no modeling actions)    — modeling

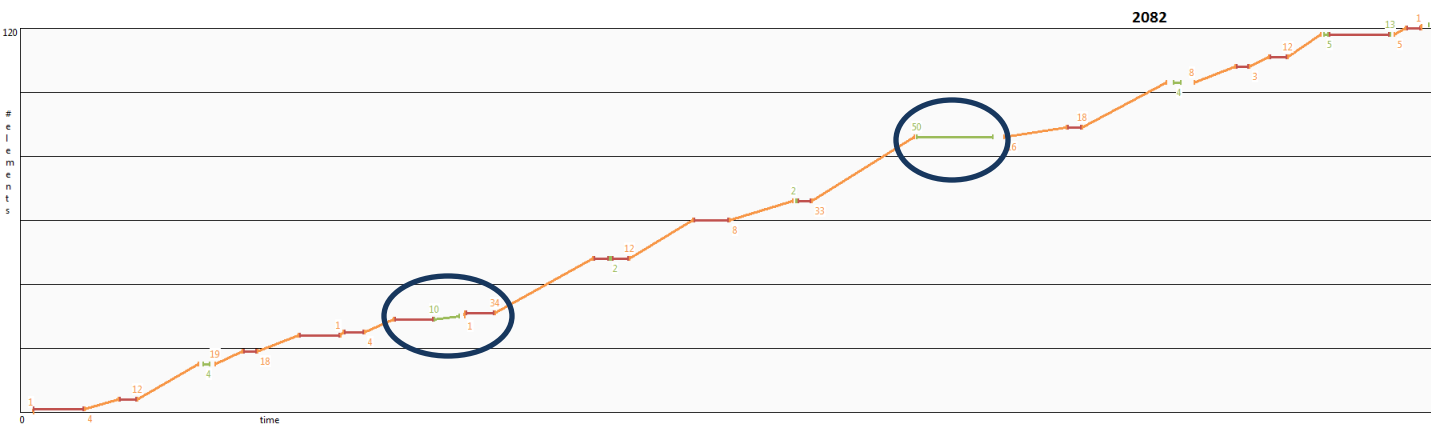
# Outline

- modeling = elicitation + formalization
- PPM - process of process modeling
  - conceptual idea
  - how does it look like
- **first insights**
  - modeling styles
  - relation of PPM to modeling outcome
  - how did you do?

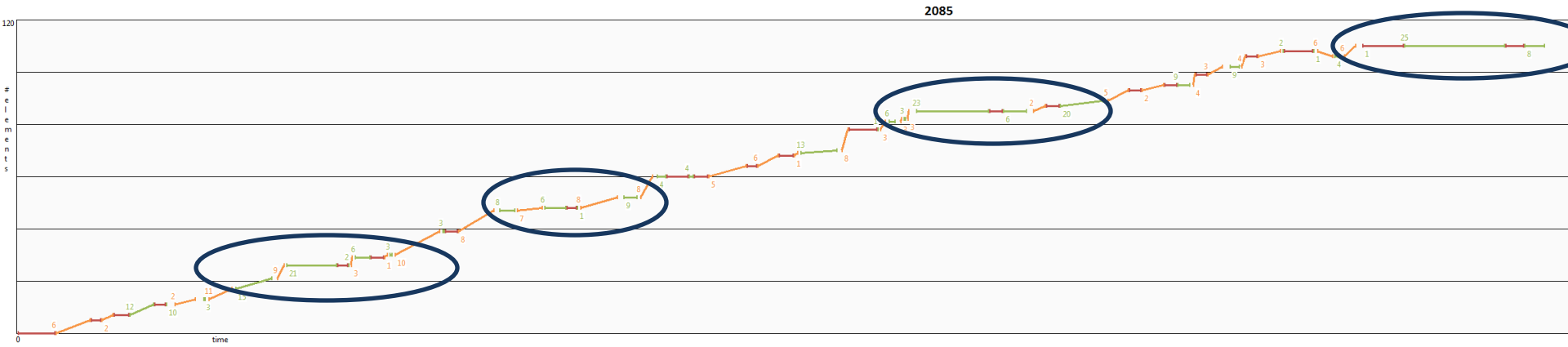


more effort into layout of the model

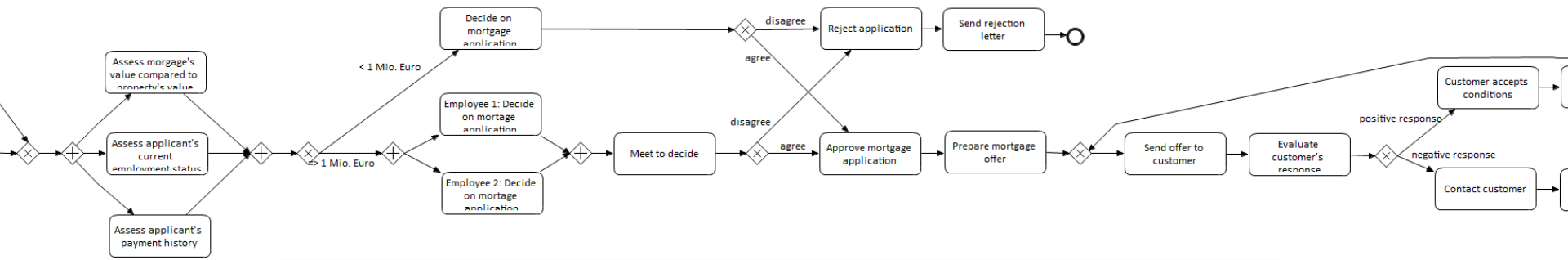




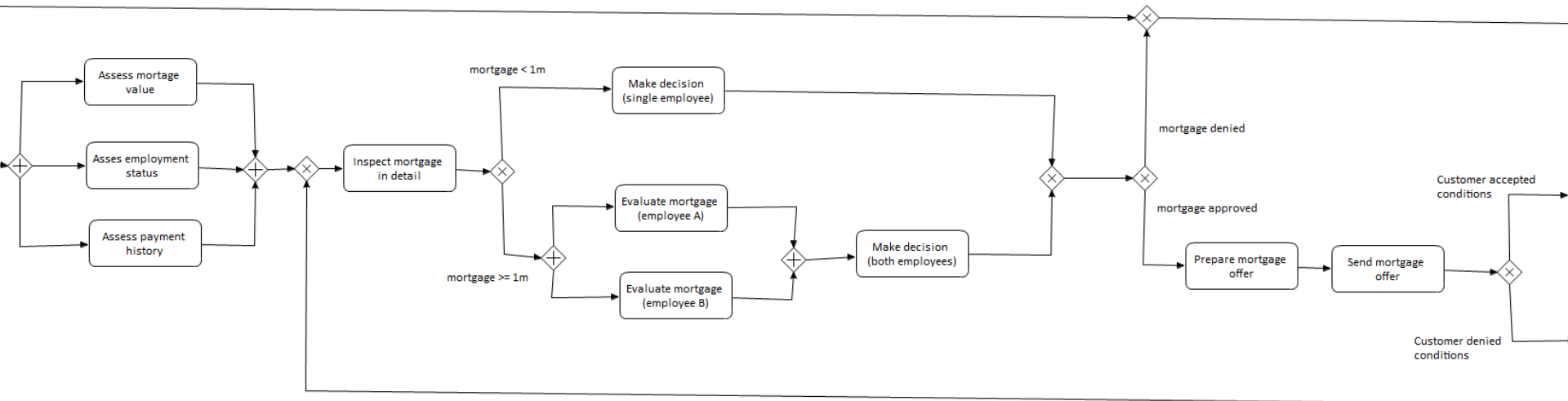
effort put into layout of the model



modeling style: **continuous rework**  
 modeling followed by  
 plateau of comprehension + reconciliation



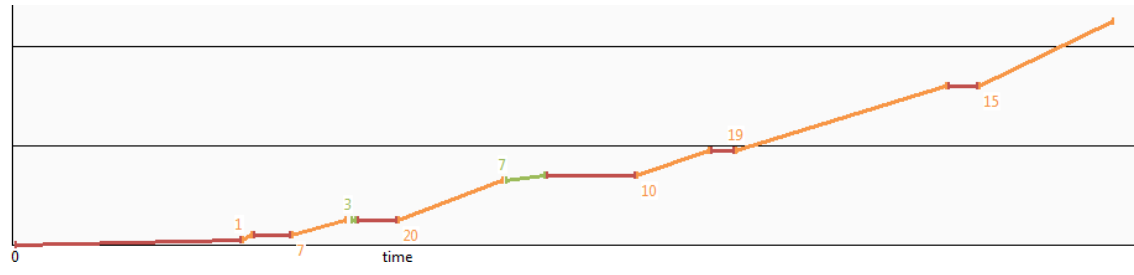
layout effort → understandability



# Modeling styles

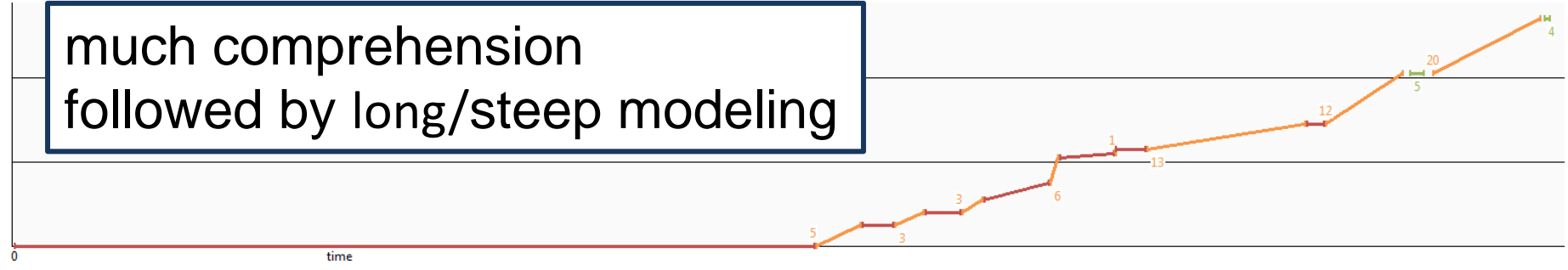
## 1. continuous rework

- phases of (reconciliation+comprehension) repeatedly
- after some modeling much effort into layout
- result: high understandability

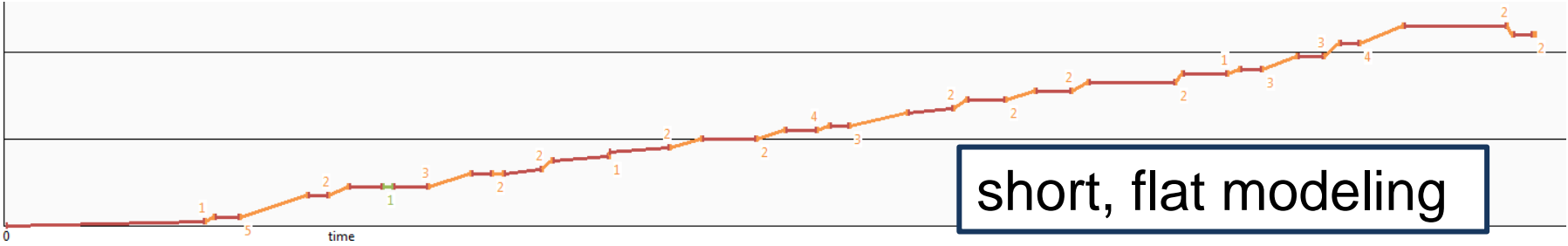


and

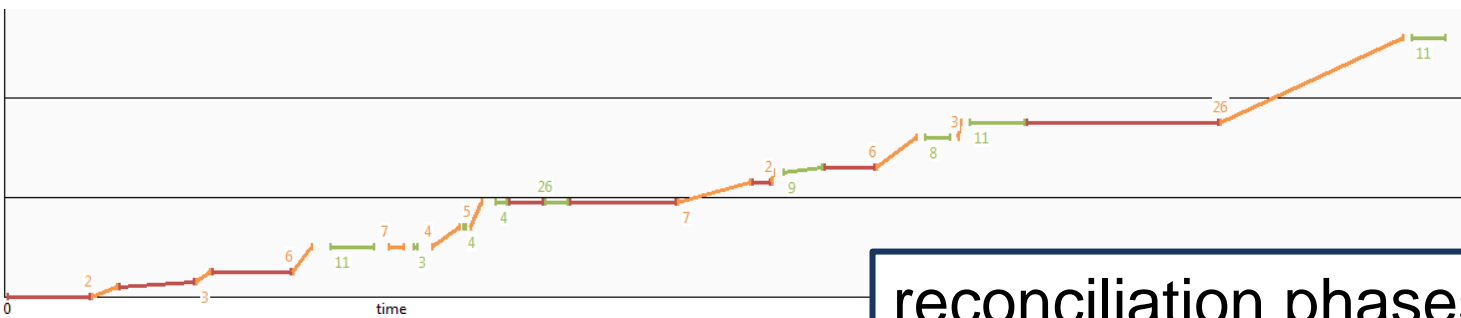
much comprehension followed by long/steep modeling



VS.

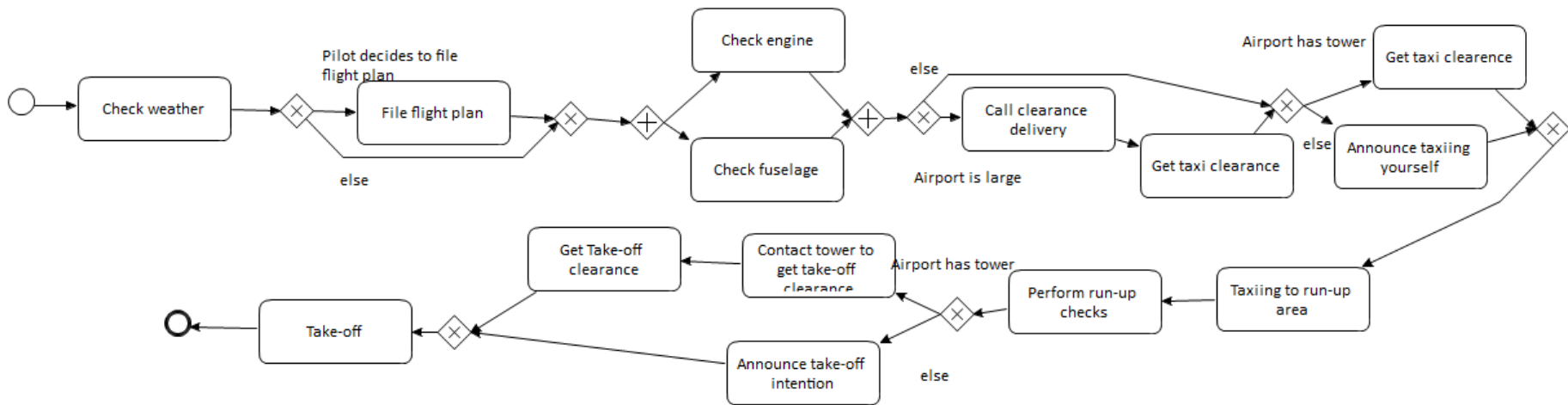


short, flat modeling

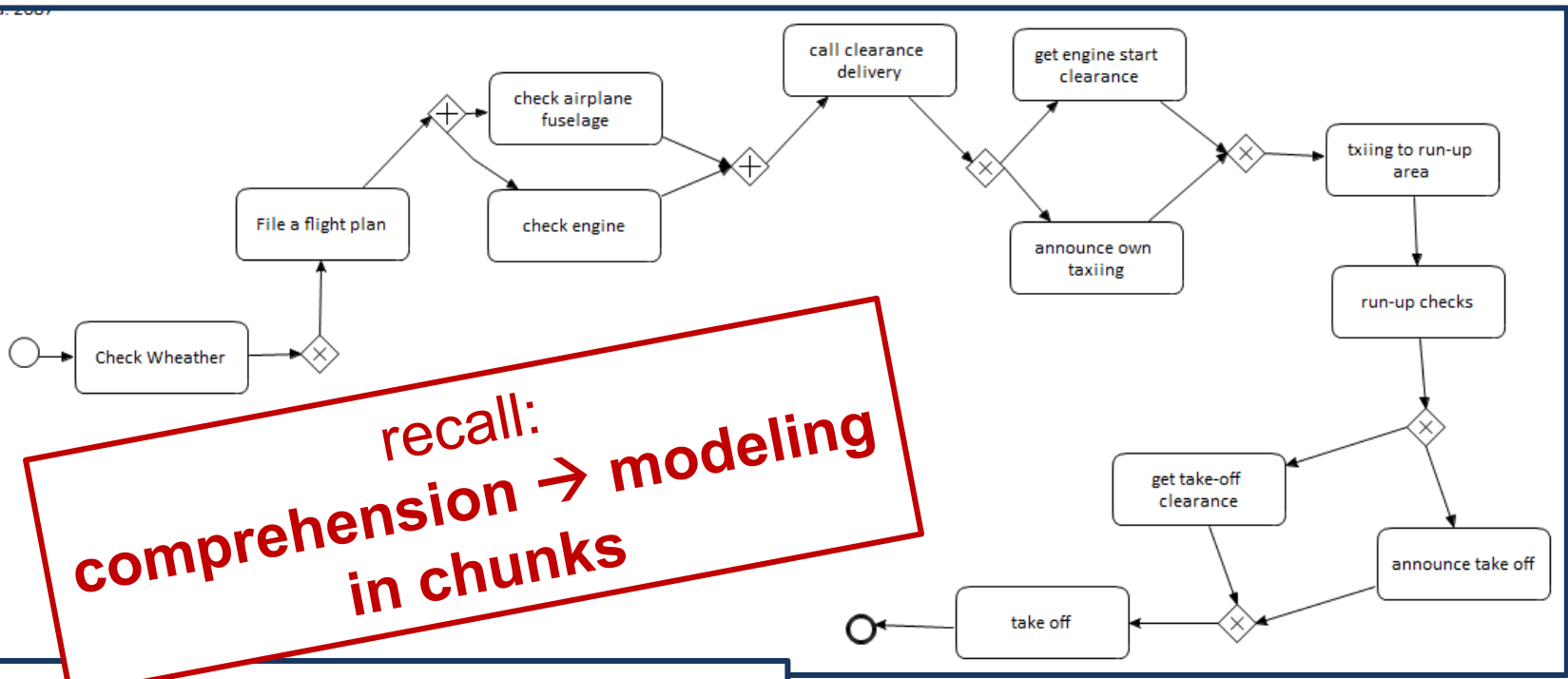


and

reconciliation phases



much comprehension followed by long/steep modeling



recall:  
comprehension → modeling  
in chunks

short, flat modeling phases



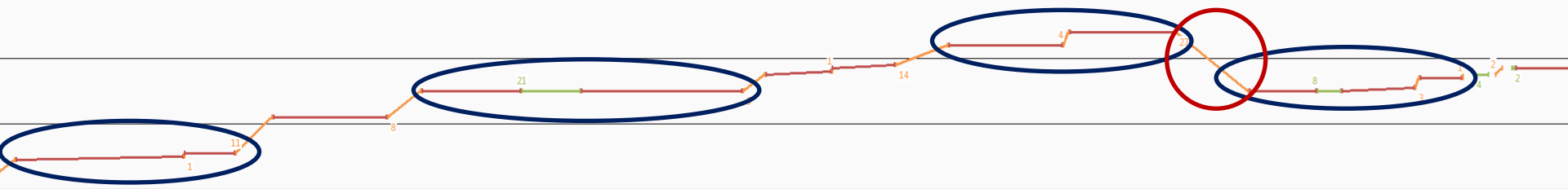
# Principle modeling styles

## 1. continuous rework

- phases of (reconciliation+comprehension) repeatedly
- after some modeling much effort into layout
- result: high understandability

## 2. **deliberate before you formalize**

- much comprehension followed by long/steep modeling
- little reconciliation
- result: high quality, often close to reference model



- long comprehension phases, little modeling
- remodeling: falling modeling phases
- little reconciliation

# Principle modeling styles

## 1. continuous rework

- phases of (reconciliation+comprehension) repeatedly
- after some modeling much effort into layout
- result: high understandability

## 2. deliberate before you formalize

- much comprehension followed by long/steep modeling
- little reconciliation
- result: high quality, often close to reference model

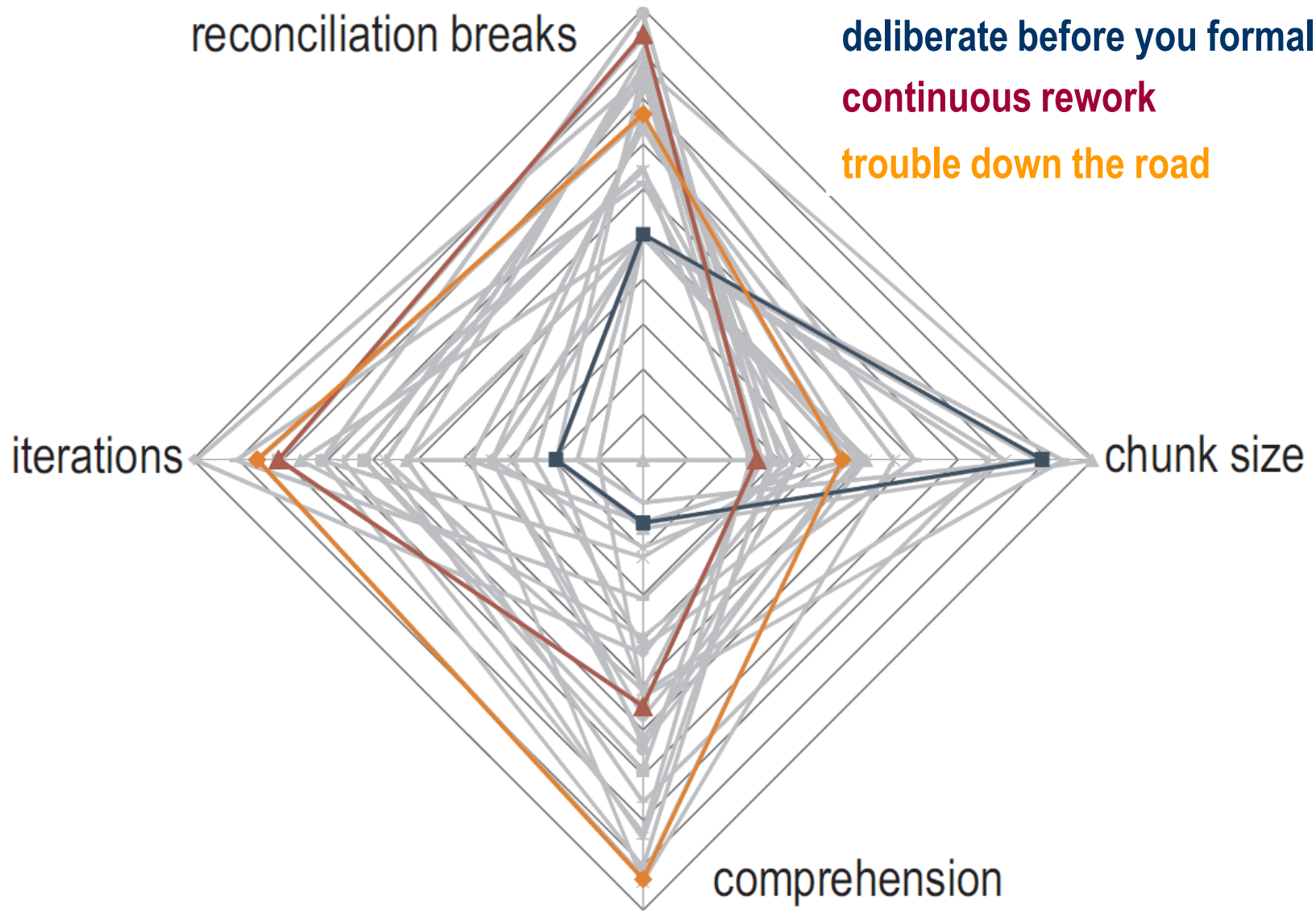
## 3. trouble down the road

- more comprehension than modeling, remodeling
- result: unpredictable, often quality problems

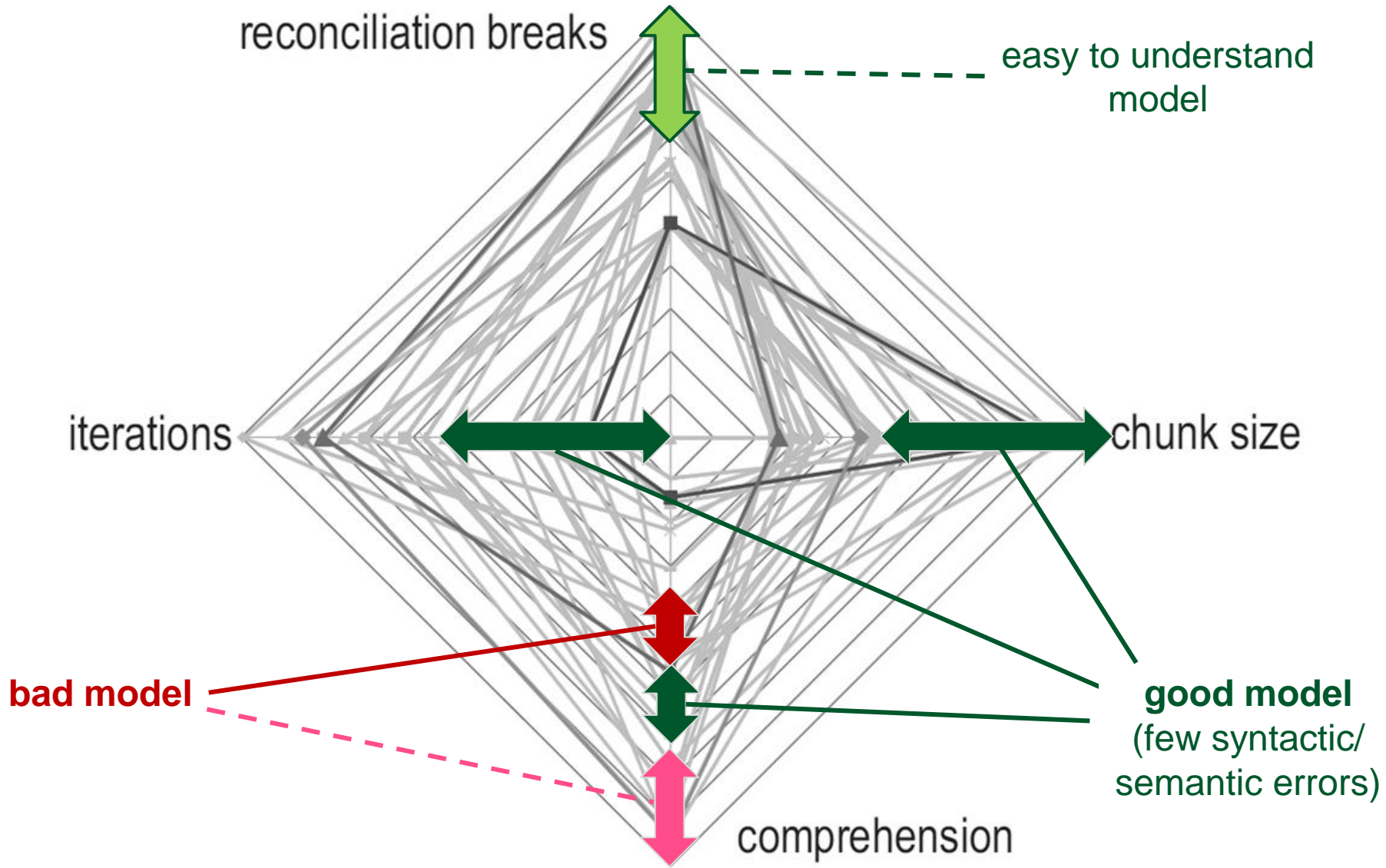
# Quantitative Analysis

- accumulate PPM data in 4 scales
  1. number of iterations
    - # of cycles: comprehend, model, reconcile
  2. chunk size
    - # of model elements added per modeling phase
  3. reconciliation breaks
    - # of iterations without modeling
  4. share of comprehension
    - time spent on comprehension vs. total time

# Scales vs. Modeling Style

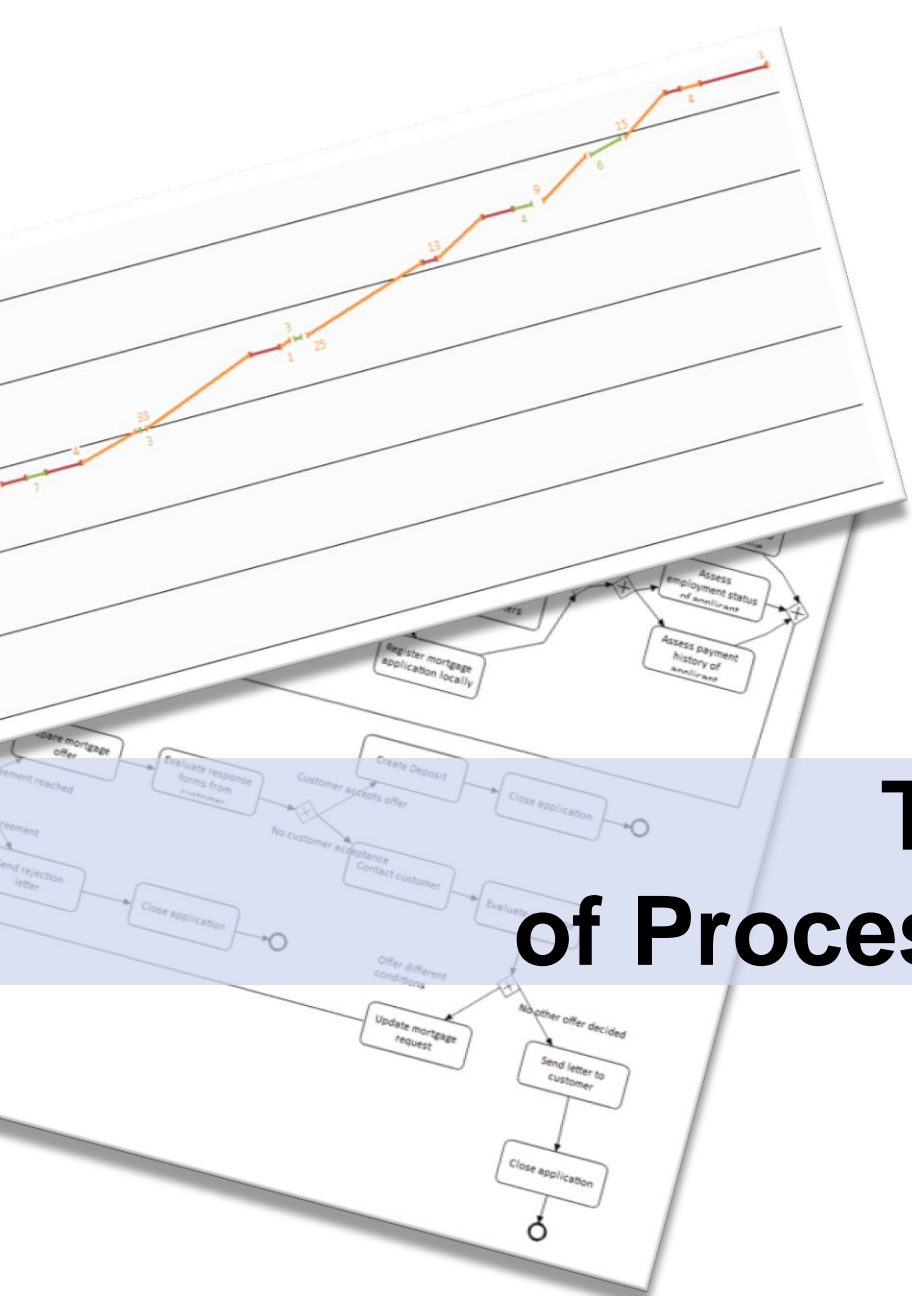


# Scales vs. Model Quality



# Take home points

- creating a formal model is a process in itself
- we record and **measure this process of modeling**
  
- 3 principle modeling styles, may occur mixed
- 4 scales to quantify process of modeling
- correlate to modeling outcome (quality)
  
- gain more insights into modeling styles and scales
- strengthen understanding of correlations
- propose techniques: teaching, methods, tools



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