

# Business Process Management

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DIPARTIMENTO  
DI INFORMATICA



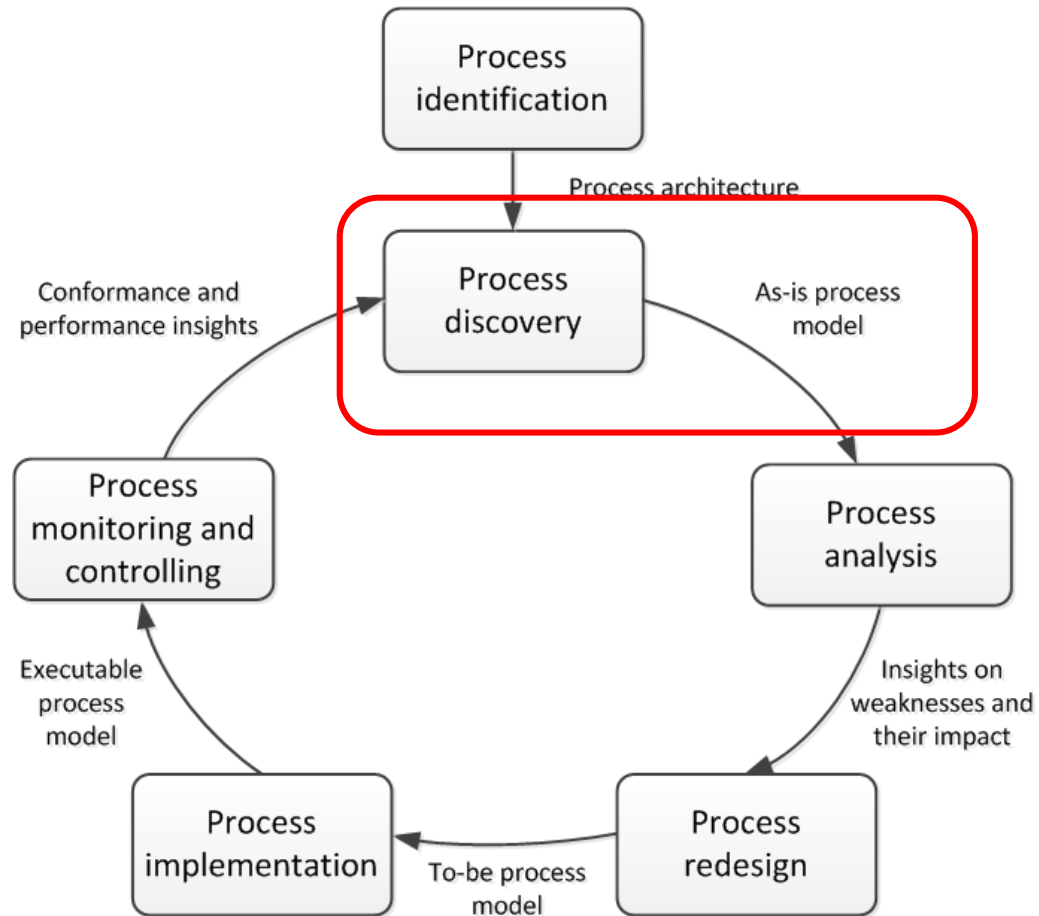
SAPIENZA  
UNIVERSITÀ DI ROMA

## Lecture 4: Process Discovery

Adapted from the slides for the book :  
Dumas, La Rosa, Mendling & Reijers: Fundamentals of Business Process Management, Springer 2013

<http://fundamentals-of-bpm.org/wp-content/uploads/2013/02/ProSA-4-Discovery.pptx>

# BPM Lifecycle



# Process Discovery

1. Defining the setting: Assemble a team in a company that will be responsible for working on the process.
2. Gathering information: Build an understanding of the process. Use different discovery methods to acquire information on a process.
3. Conducting the modeling task: Organise the creation of the process model. The modeling method gives guidance for mapping out the process in a systematic way.
4. Assuring process model quality: Guarantee that the resulting process models meet different quality criteria. Aimed at establishing trust in the process model.

# Who is involved?

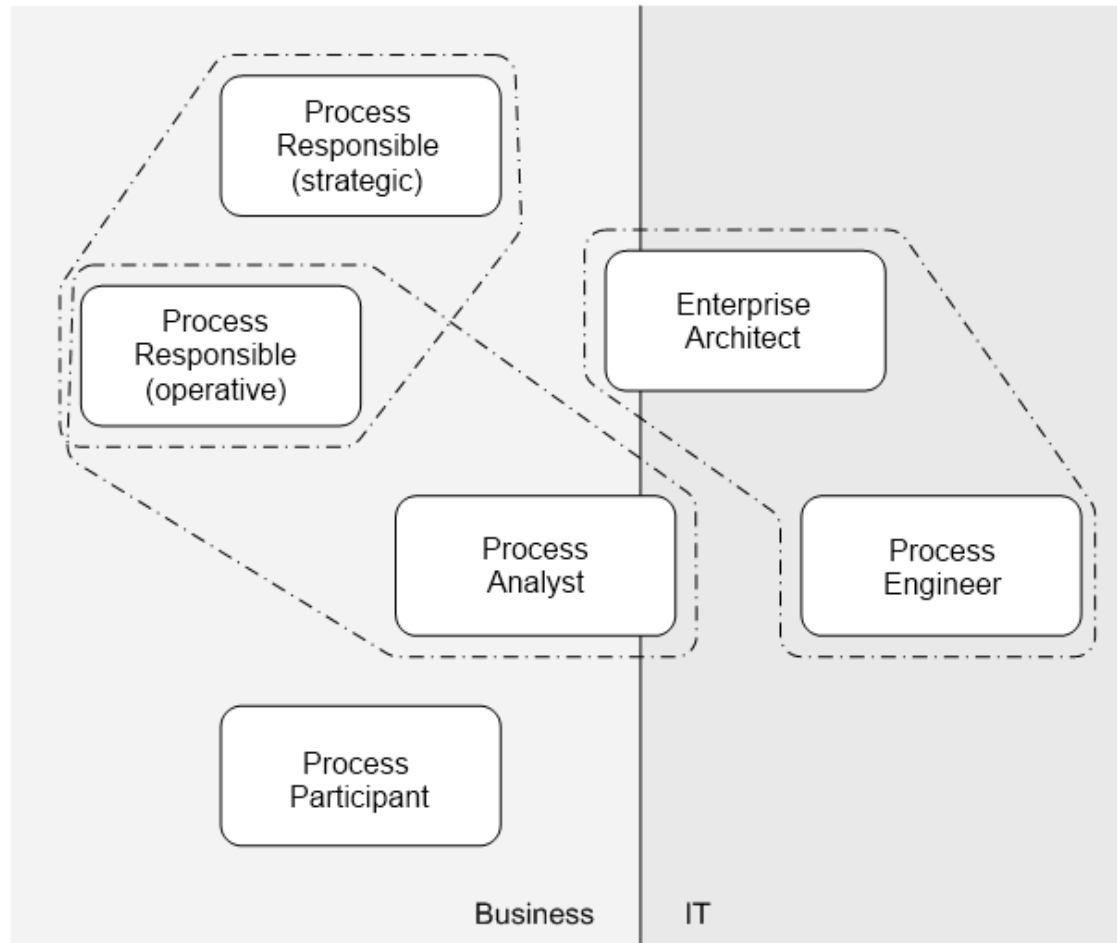


Domain Expert



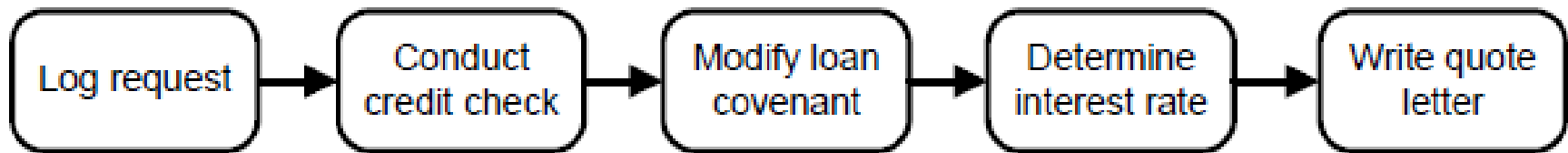
Process Analyst

# Stakeholders in Detail



# Challenge 1: Fragmented Process Knowledge

I make a photocopy before handing over the application



Why can't I directly provide cash after approval?



We bundle refinancing to get better interest rates.



# Challenge 2: Domain Experts think on Instance Level

Welcome - Already a member? [ [Sign In](#) ] [My Itinerary](#)

Home Vacation Packages Hotels Cars Flights Cruises Things to Do DEALS

### PLAN YOUR TRIP ON EXPEDIA

- Flight
- Hotel
- Car
- Activities
- Cruise
- Flight + Hotel
- Flight + Car
- Flight + Hotel + Car
- Hotel + Car

**Book FLIGHT + HOTEL at the same time SAVE UP TO \$525\***

#### Flight

Roundtrip  One way  Multiple Destinations

My dates are flexible (popular routes only)

Leaving from:  Departing:  Time:

Going to:  Returning:  Time:

Adult (18-64)  Seniors (65+)  Children (0-17)

Show Additional Options

**BEST PRICE GUARANTEE**

[SEARCH FOR FLIGHTS](#)

[SEARCH FOR FLIGHT+HOTEL](#)

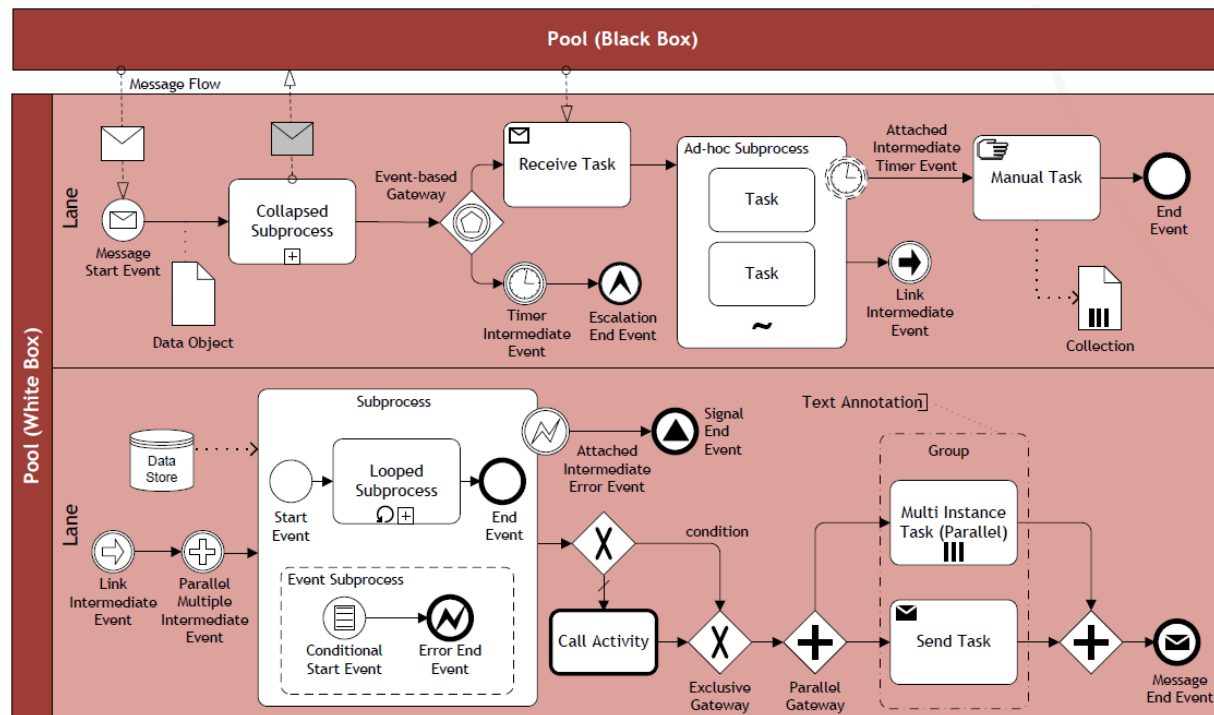
“Every trip is different.”

“You cannot really compare. Our customers go to different places in different seasons using different modes of transportation.”

“We can never do anything exactly in the same way. There are so many special conditions.”

# Challenge 3: Knowledge about Process Modelling is rare

”Could you please tell me, whether this diagram correctly shows your process?”





# Expertise of Process Analysts

## Problem understanding

- Episodic knowledge available to get to root of problem
- Knowledge organisation helps to structure problem

## Problem solving

- Trigger identification (problem-related cues)
- Hypothesis management (formulation and testing of hypotheses)
- Goal setting (what needs to be achieved next)
- Top-down strategy driven by analysis goals

## Modelling skills

- Well-structured and laid out
- Systematically labelled
- Explicit start and end points of a process
- Appropriate granularity and decomposition

# Process Discovery Techniques

## Evidence-based

- Document analysis
- Observation
- Process mining

## Interview-based

## Workshop-based

# Document Analysis

Documents point to existing roles, activities and business objects

Formal documentation in terms of

- Organization chart
- Employment plan
- Quality certificate report
- Internal policies
- Glossaries and handbooks

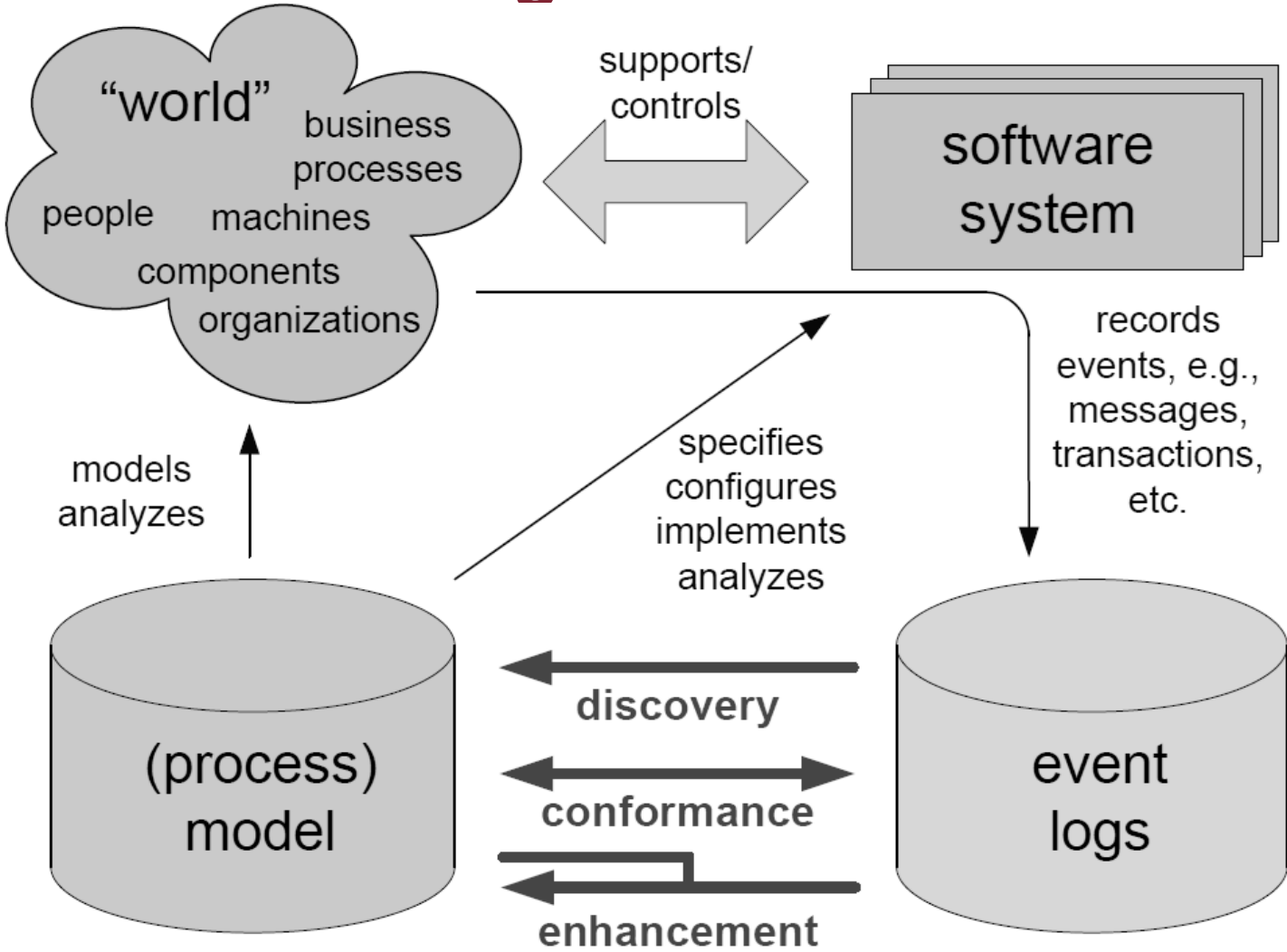
Forms

Work instructions

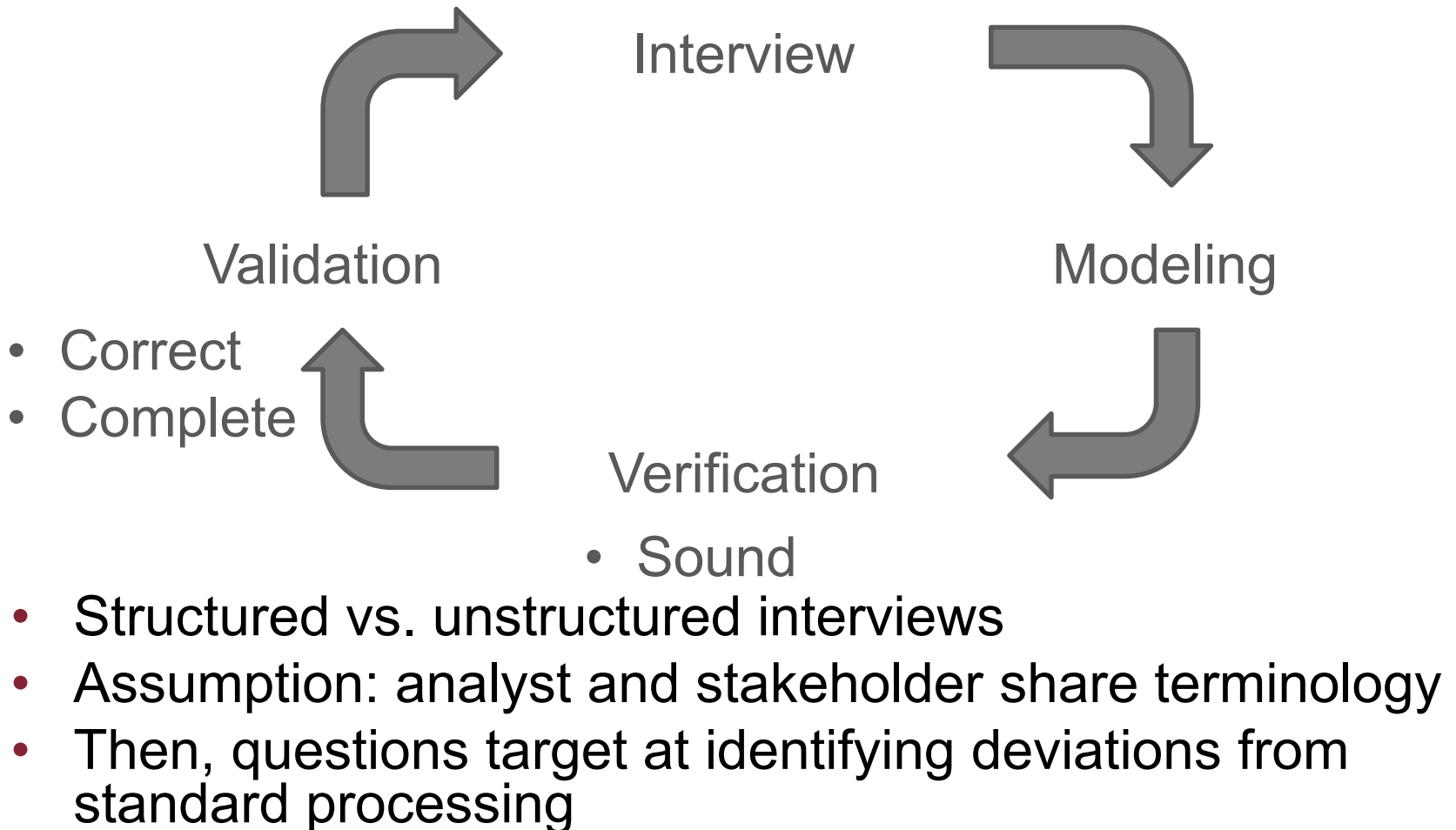
# Observation

- Observe what people do at their workplace
- Trace business objects in the course of their lifecycle
- Inspect the work environment

# Process Mining

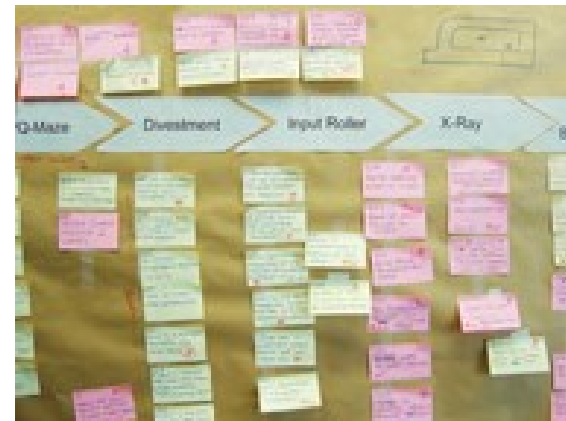


# Interviews



# Workshops

- Gather all key stakeholders together
- One process analyst, multiple domain experts
- Participants interact to create shared understanding
- Often: software-supported, a model is directly created during the workshop (separate role)
- Model is reference point for discussions
- Alternative: brown-paper workshops



# Strengths and Weaknesses

Technique	Strength	Weakness
Document Analysis	<ul style="list-style-type: none"><li>• Structured information</li><li>• Independent from availability of stakeholders</li></ul>	<ul style="list-style-type: none"><li>• Outdated material</li><li>• Wrong level of abstraction</li></ul>
Observation	<ul style="list-style-type: none"><li>• Context-rich insight into process</li></ul>	<ul style="list-style-type: none"><li>• Potentially intrusive</li><li>• Stakeholders likely to behave differently</li><li>• Only few cases</li></ul>
Automatic Discovery	<ul style="list-style-type: none"><li>• Extensive set of cases</li><li>• Objective data</li></ul>	<ul style="list-style-type: none"><li>• Potential issue with data quality</li></ul>
Interview	<ul style="list-style-type: none"><li>• Detailed inquiry into process</li></ul>	<ul style="list-style-type: none"><li>• Requires sparse time of process stakeholders</li><li>• Several iterations required before sign-off</li></ul>
Workshop	<ul style="list-style-type: none"><li>• Direct resolution of conflicting views</li></ul>	<ul style="list-style-type: none"><li>• Synchronous availability of several stakeholders</li></ul>



# Effort of Process Discovery

Consider that the order process of your favorite online book retailer has ten major activities that are conducted by different persons. How much time do you need approximately for creating a process model that is validated and approved by the process owner? Make appropriate assumptions.

# Process Discovery Effort

This process contains ten major activities that are executed by different persons. We can assume that there will be a kickoff meeting with the process owner and some important domain experts on day one. One day might be required to study available documentation. An interview with one domain expert can take from two to three hours, such that we would be able to meet two persons per day, and document the interview results at night time. Let us assume that we meet some persons only once while we seek feedback from important domain experts in two additional interviews. Then, there would be a final approval from the process owner. This adds up to one day for the kickoff, one for document study, five days for the first iteration interviews, and further five days if we assume that we meet five experts three times. Then, we need one day for preparing the meeting for final approval with the process owner, which would be on the following day. If there are no delays and scheduling problems, this yields  $2 + 5 + 5 + 2 = 14$  work days as a minimum.

# Any Difference in Discovery?

- Consider the following two companies.
- Company A is young, founded three years ago, and has grown rapidly to a current toll of one hundred employees.
- Company B is owned by the state and operates in a domain with extensive health and security regulations.
- How might these different characteristics influence a workshop-based discovery approach?



# Discovery and Culture

Before starting with process discovery, it is important to understand the culture and the sentiment of an organization.

There are companies that preach and practice an open culture in which all employees are encouraged to utter their ideas and their criticism. Such organizations can benefit a lot from workshops as participants are likely to present their ideas freely.

In strictly hierarchical organizations, it is necessary to take special care that every participant gets an equal share of parole in a workshop and that ideas and critique are not held back.

It might be the case that the young dynamic company has a more open culture than the company with extensive health and security regulations. This has to be taken into account when organizing a workshop.

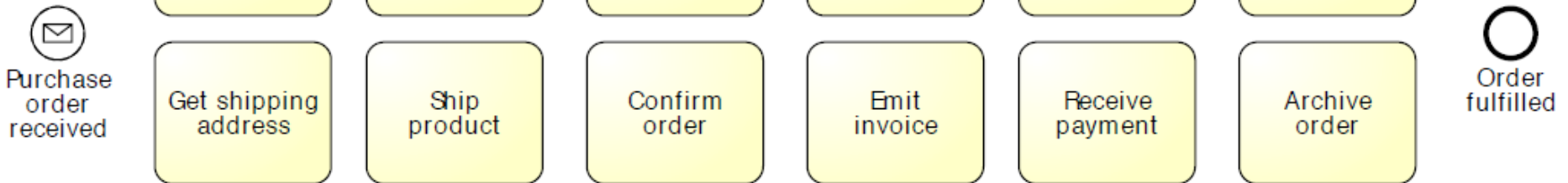
# Organizing the Gathered Material

1. Identify the process boundaries
2. Identify activities and events
3. Identify resources and their handovers
4. Identify the control flow
5. Identify additional elements.

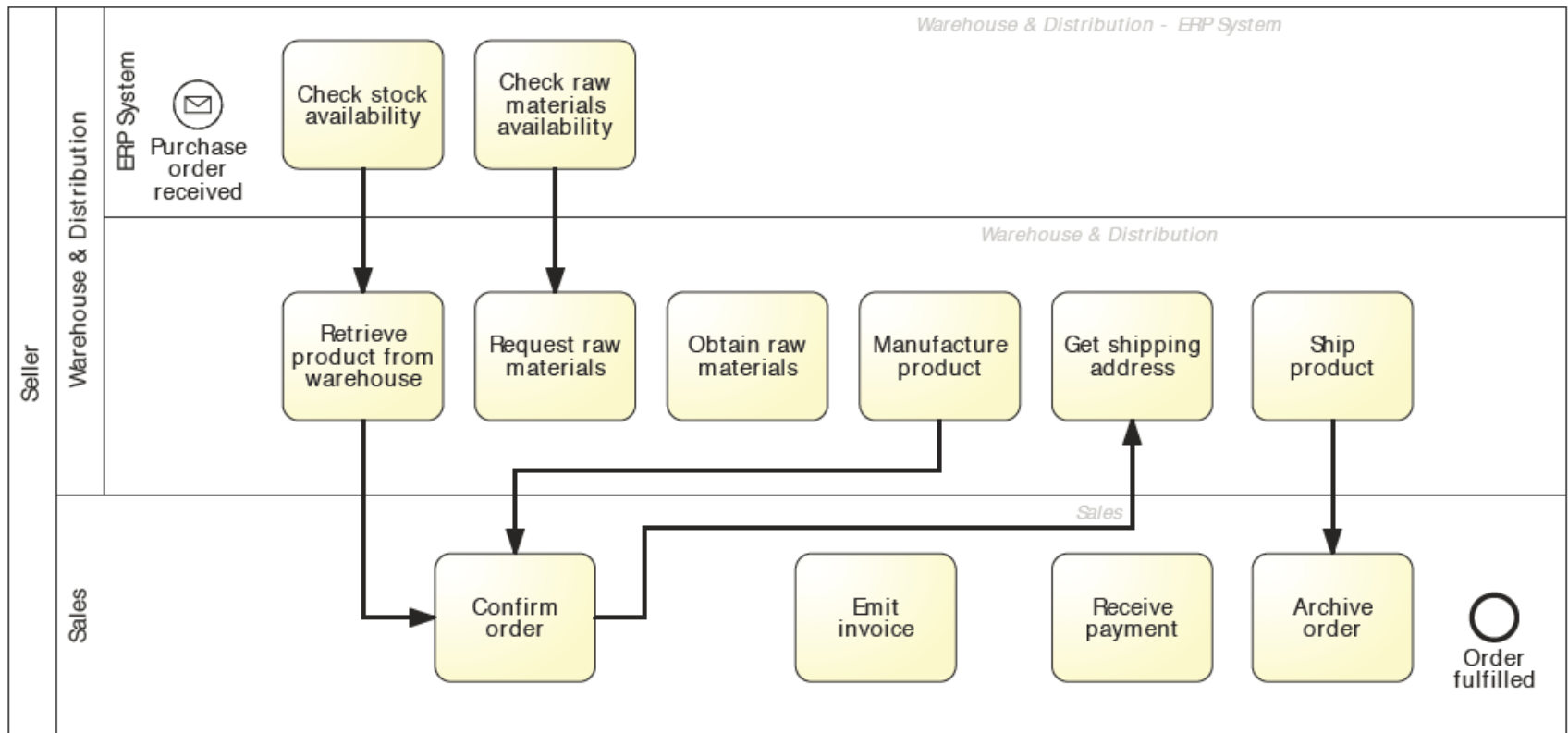
# Process Boundaries

- Under which condition does the process start?
- With which result does it end?
- Which perspective do you assume?

# Identify Activities and Events

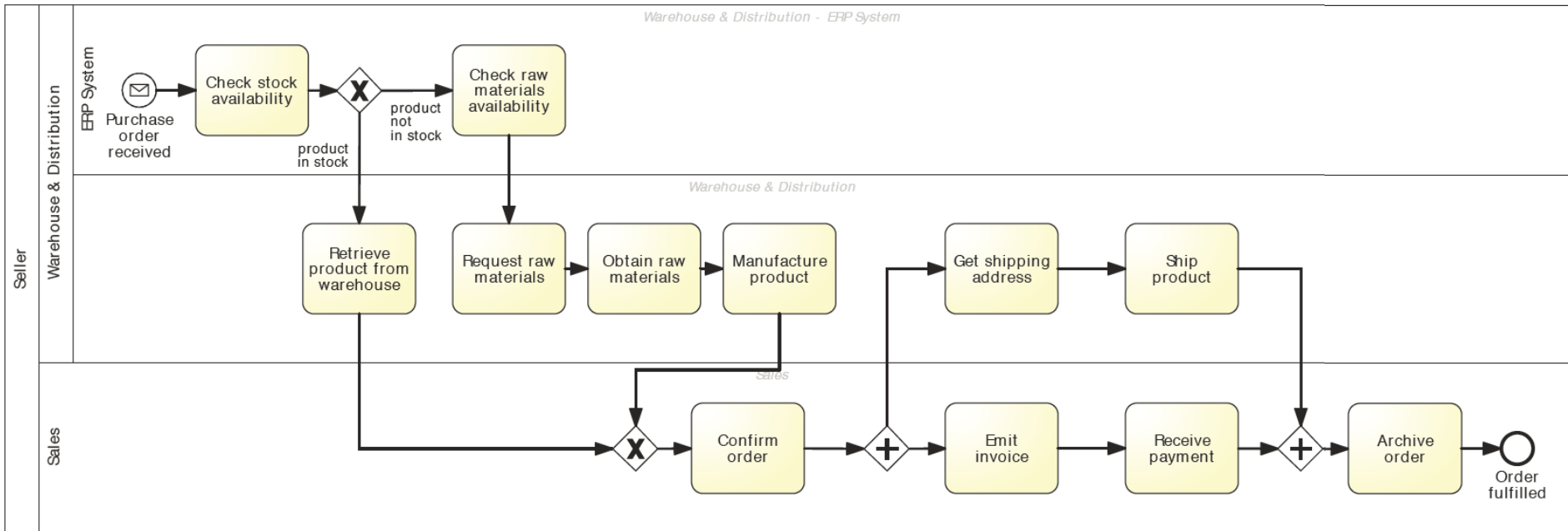


# Identify Resources and Handovers





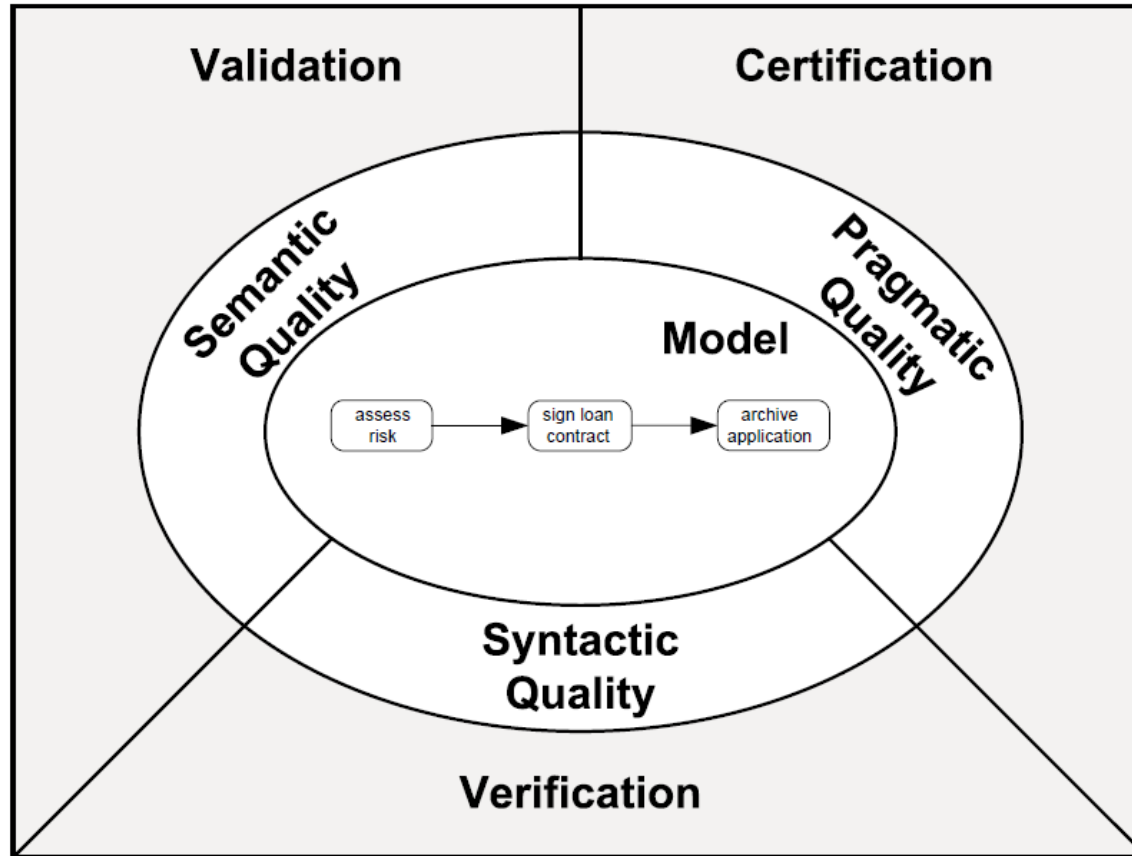
# Identify Control Flow



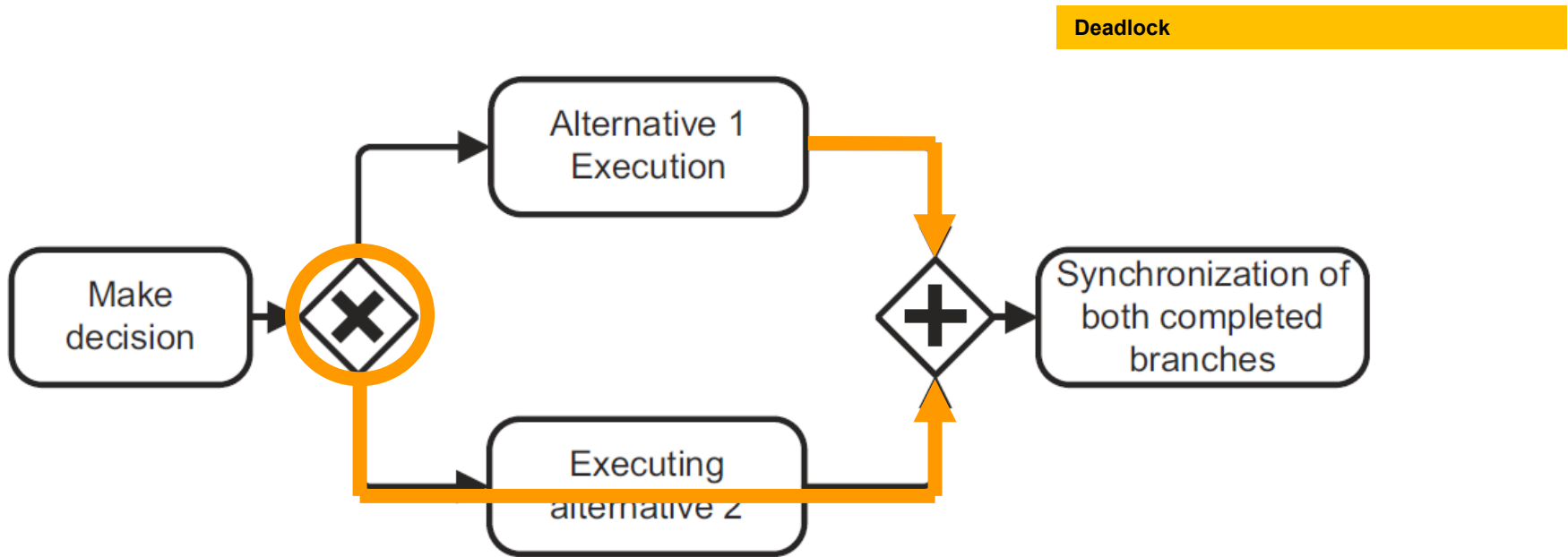
# Your modeling project

- For your modeling project, capture
  - Control flow
    - Activities
    - Gateways
    - Conditions
    - Events
  - Resources
  - Describe the process in such a way that it can be used to trace in which state an instance of it is and who is conducting which steps of processing.

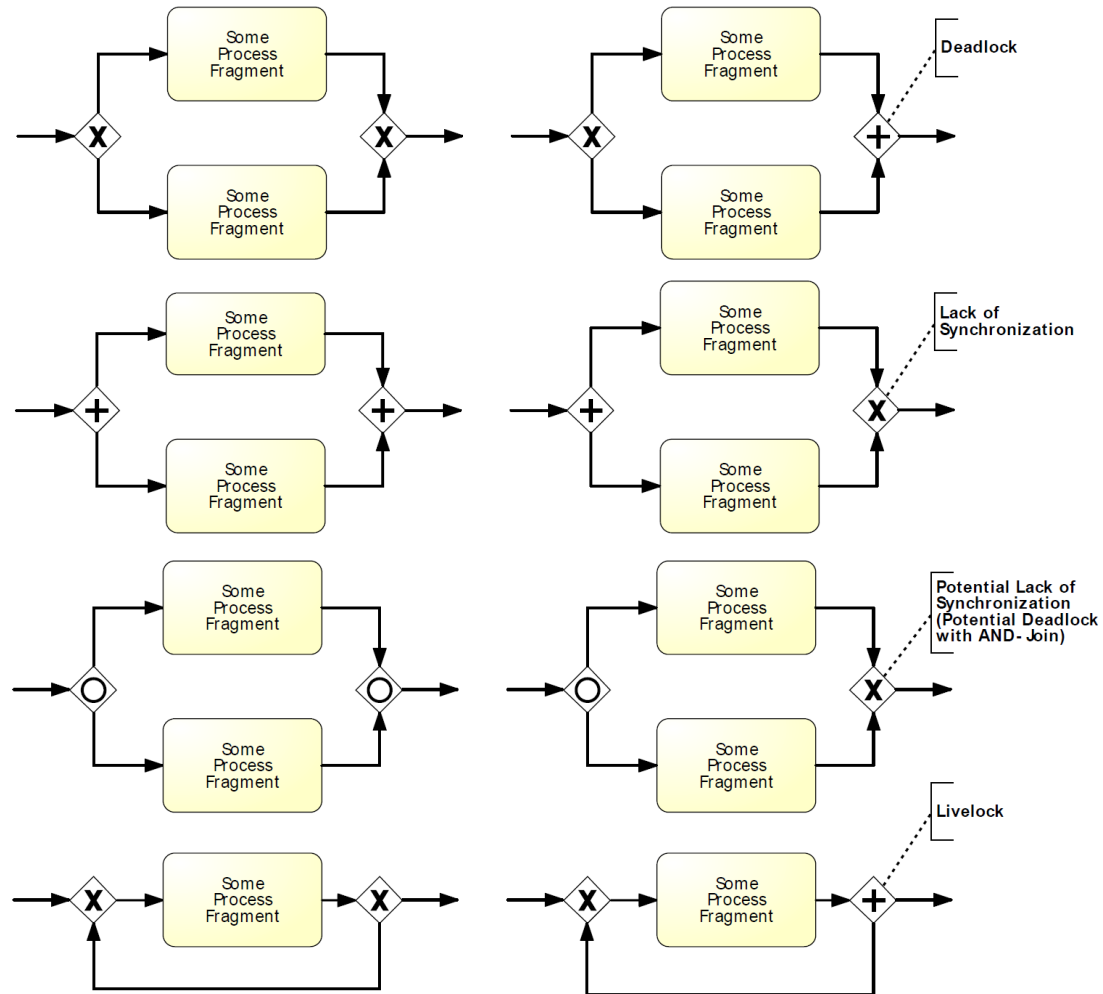
# Quality Assurance



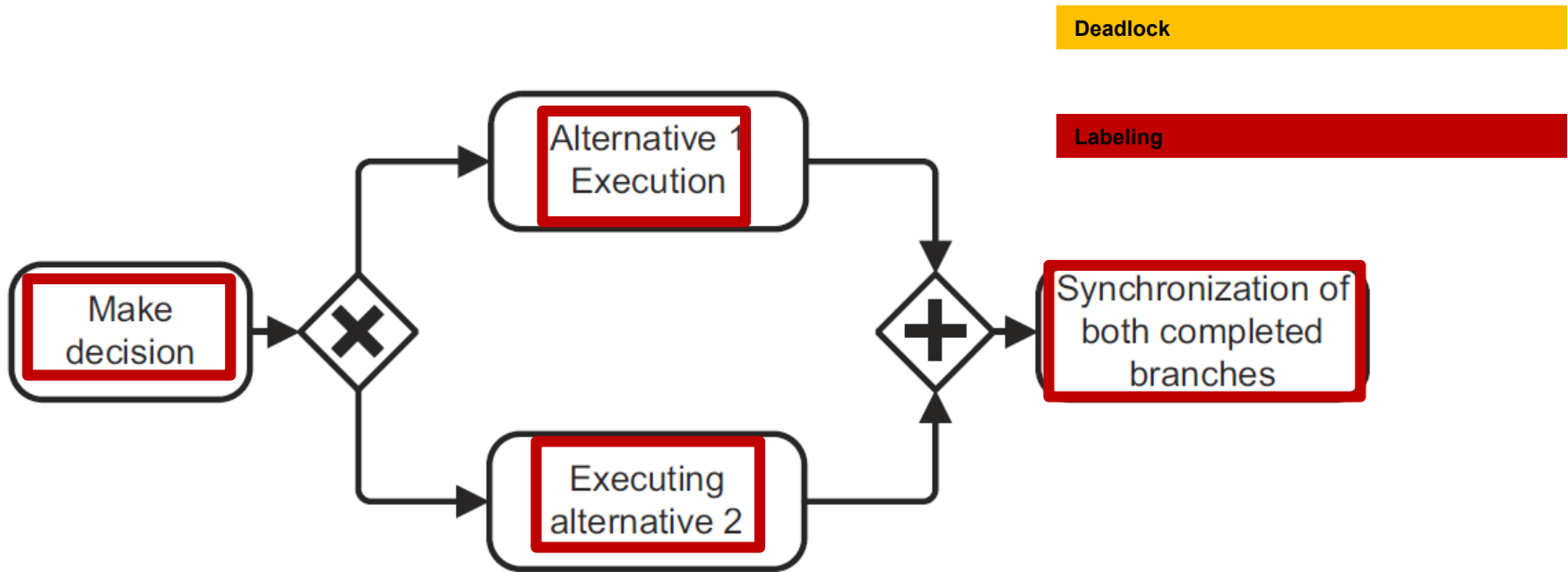
# Is this process model of good quality?



# Syntactic Quality: Verification



# Is this process model of good quality?



# Formulate Labels Adequately

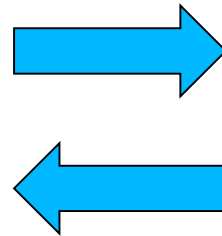
- Activities as Verb-Object
- Events as Object-Passive-Participle
- Conditions with reference to Object

# Semantic Quality: Validation

- Correctness and
- Completeness



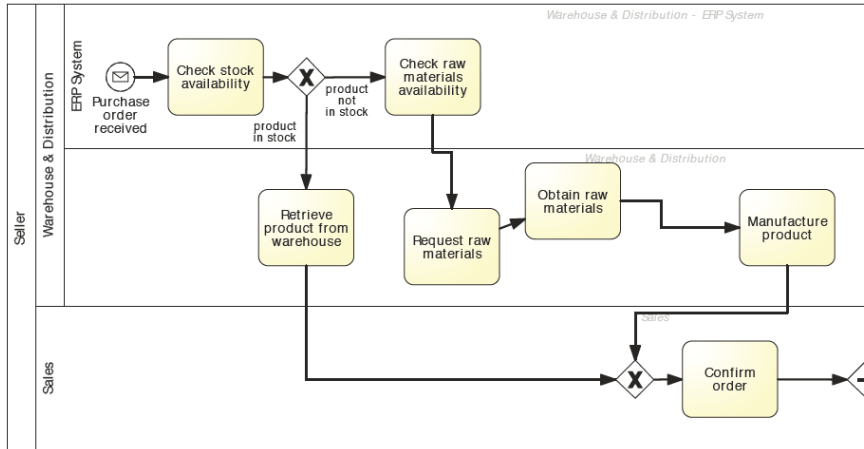
Domain Expert



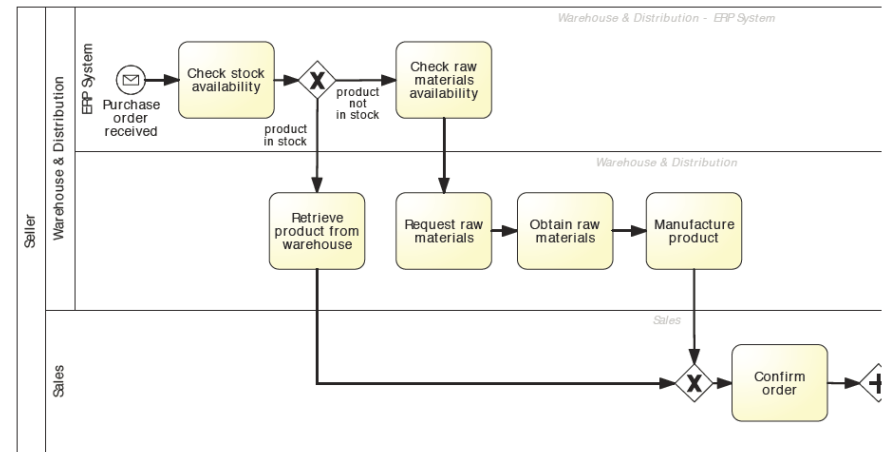
Process Analyst



# Pragmatic Quality: Layout



Models must look nice



# Seven Process Modeling Guidelines (7PMG)

G1 Use as few elements in the model as possible

G2 Minimize the routing paths per element

G3 Use one start and one end event

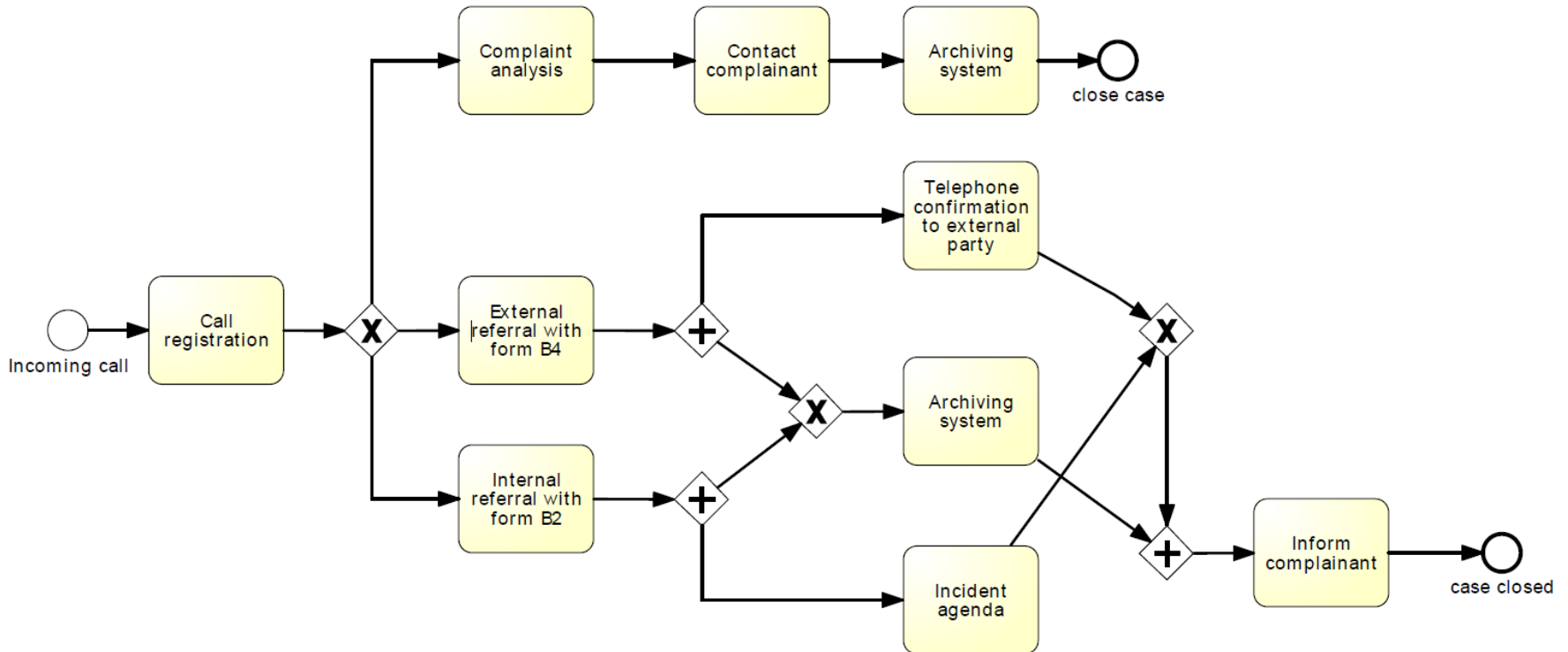
G4 Model as structured as possible

G5 Avoid OR routing elements

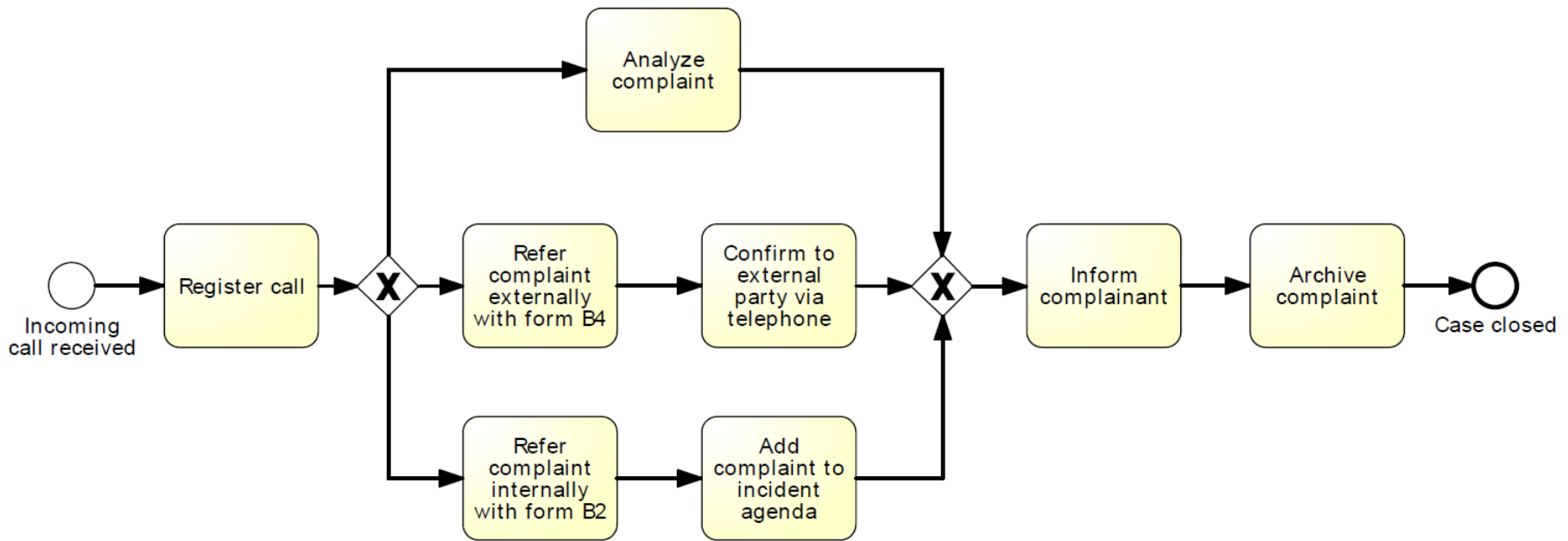
G6 Use verb-object activity labels

G7 Decompose a model with more than 50 elements

# Explain which 7PMG guidelines point to potential for improvement. Remodel the process based on your observations.



# The reworked process



# Summary

- Domain expert and process analyst have different strengths and limitations in process discovery
- There are various discovery methods
- Quality Assurance is important