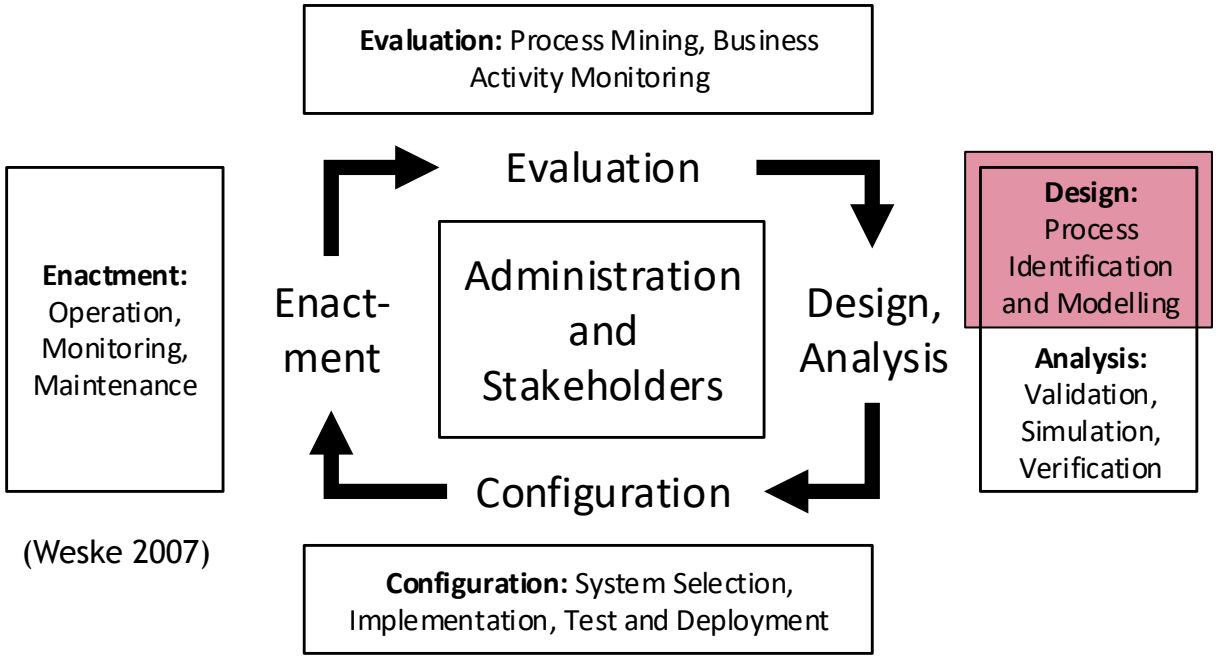
UNIVERSITÄT KOBLENZ · LANDAU

IWVI

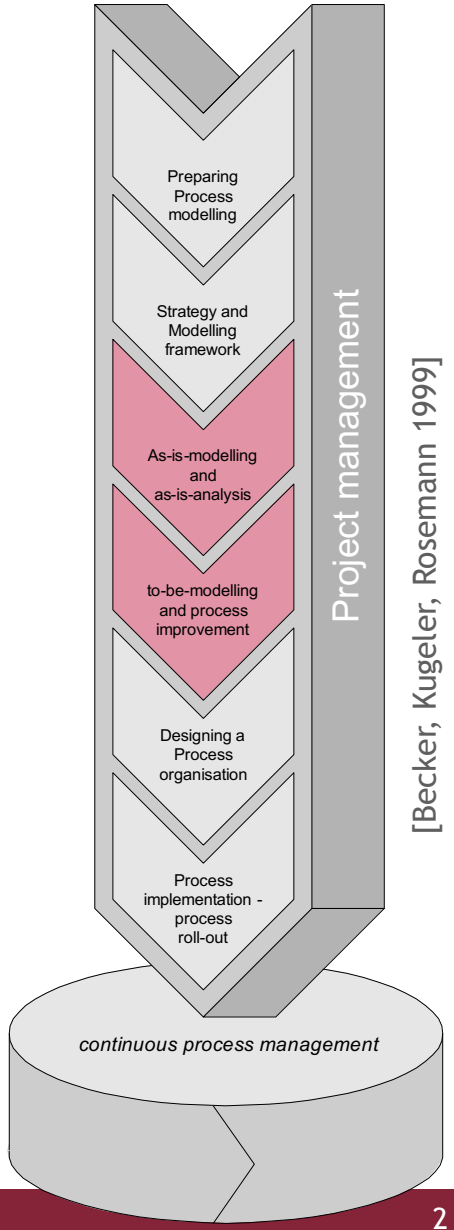
BUSINESS PROCESS MANAGEMENT

BUSINESS PROCESS MODELING AND TOOLS

BUSINESS PROCESS MODELING IN BPM



(Weske 2007)



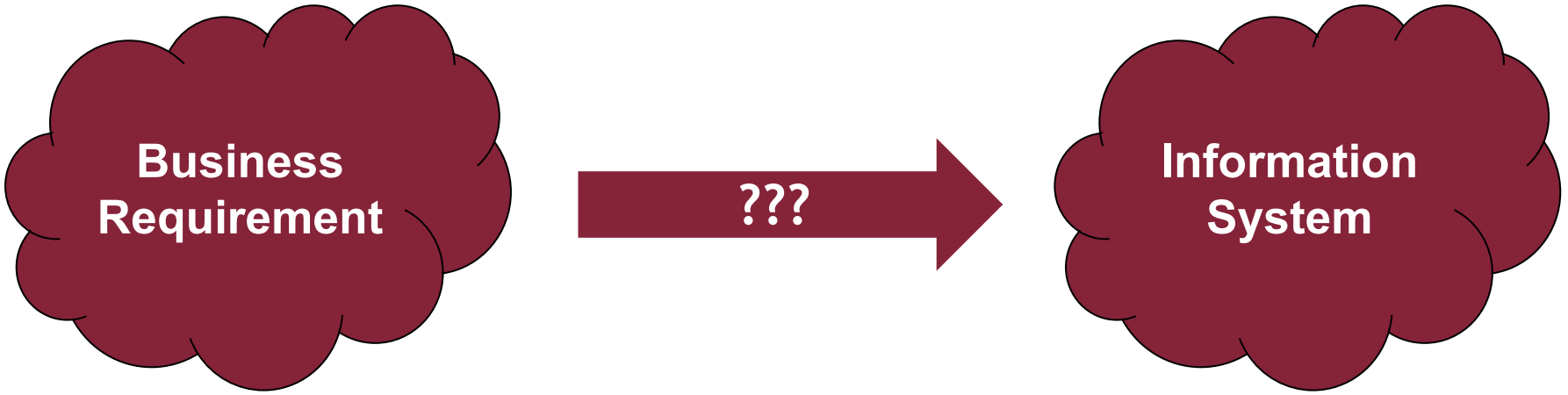
[Becker, Kugeler, Rosemann 1999]

AGENDA

- Basics of Business Process Modeling
- Event-driven Process Chains (EPC)
- Business Process Model and Notation (BPMN)
- BPM Tools (Overview)

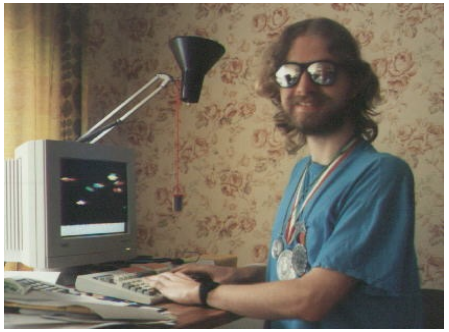
WHY MODELS?
WHERE DO THEY COME FROM?

- How can we realize a business requirement with an information system best – i.e., adequately?



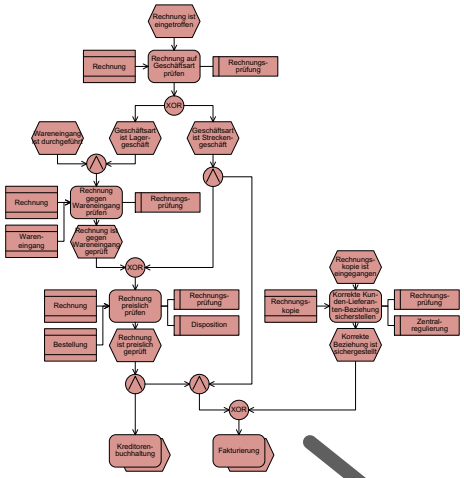
A COMMON PROBLEM OF INFORMATION SYSTEMS DESIGN

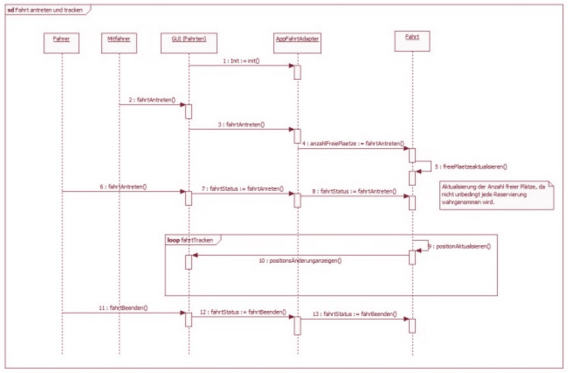
- Different worlds of expertise
- Different worlds of terminology



- Concept needed to make them understand each other!

LAYERS OF INFORMATION SYSTEMS DEVELOPMENT



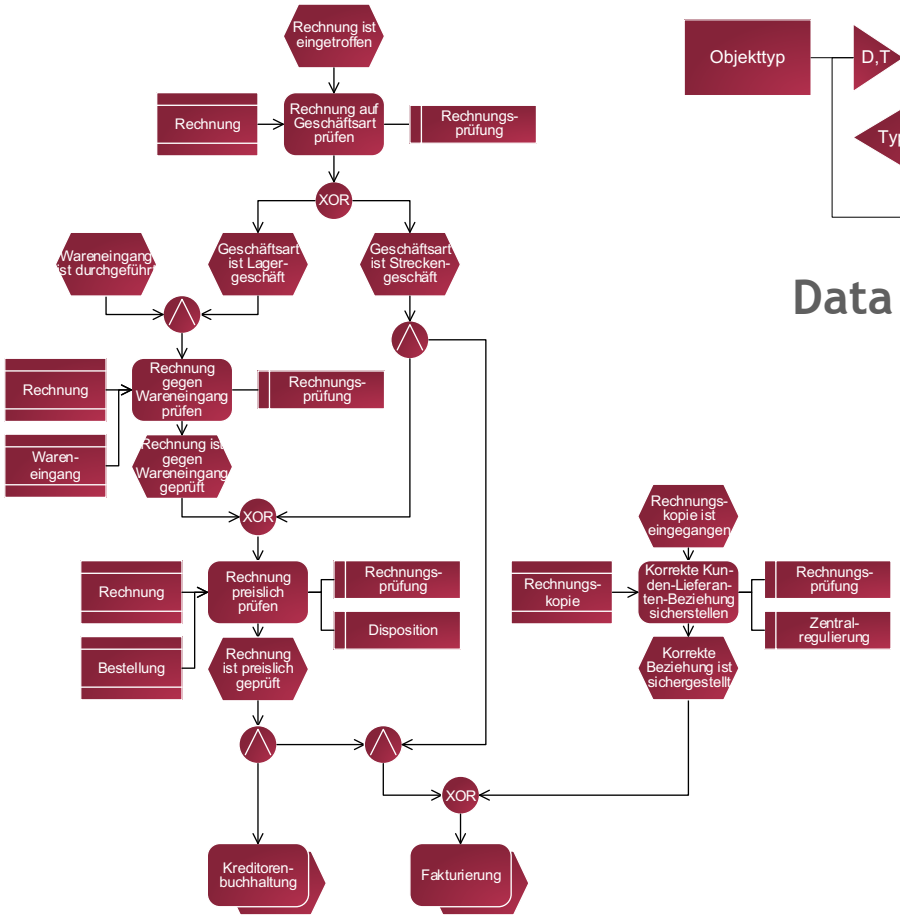


```
public static bool Connect(string address, string userName, string password)
    {
      if (_session != null)
        return true;
      try
      {
        bool isConnected =  SessionService.ConnectToDatabase(address);
        if (isConnected)
        {
          _session = SessionWcfService.Login(userName, password);
          EmConnect._address = address;
        }
        return _session != null;
      }
      catch (ConnectionFailedException) { /** TODO: Fehlerbehandlung **/ }
      catch (SecurityException) { /** TODO: Fehlerbehandlung **/ }
      catch (Exception) { /** TODO: Fehlerbehandlung **/ }
      return false;
    }
```

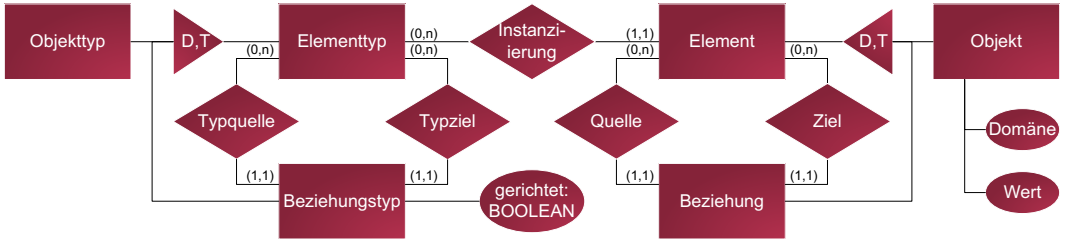
Business Requirement → **Con-ceptual Model** → **Design Specifi-cation** → **Imple-menta-tion** → **Information System**

[Scheer 1992]

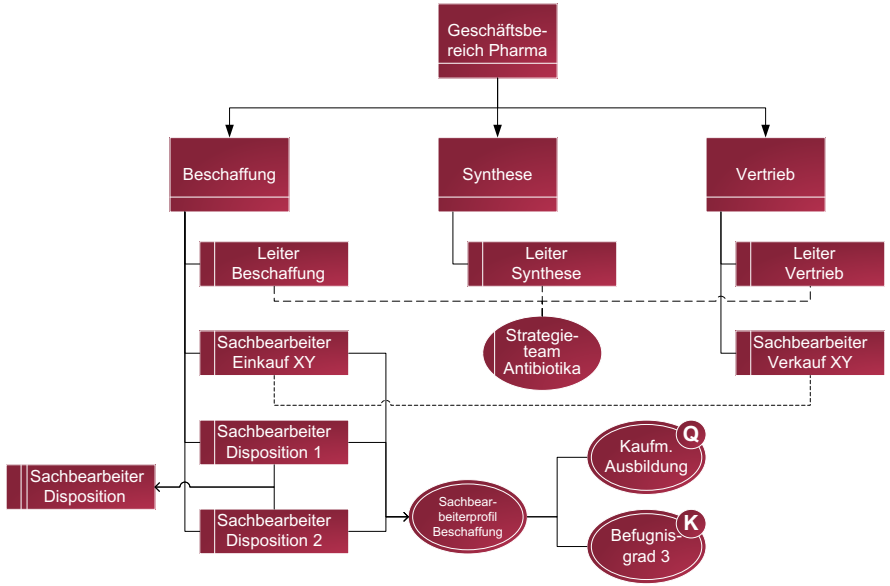
TYPES OF MODELS



Process Model



Data Model



Organizational Chart

SOME DEFINITIONS

- There is no common sense about what a model is!
- Some definitions:
  - "A model is the abstract representation of a business issue" (Becker et al.)
  - "A model is a mental construction of a person" (Schütte et al.)
  - "A model is a mapping of reality" (Stachowiak et al.)

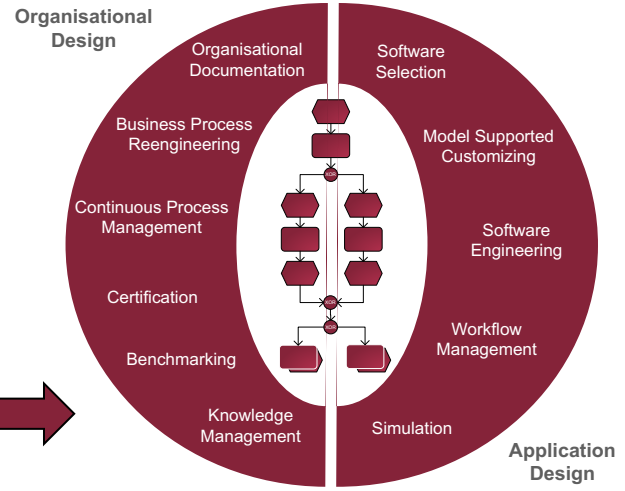
- An operationalized definition: A model in our sense is an attributed graph that represents a business issue
- Consequently, a process model is an attributed graph that represents a business process

AGENDA

- Basics of Business Process Modeling
- Event-driven Process Chains (EPC)
- Business Process Model and Notation (BPMN)
- BPM Tools (Overview)

EVENT-DRIVEN PROCESS CHAIN (EPC)

- "event-driven": Events cause functions
- "process chain": Events and functions follow each other in an alternating sequence
- Graphic modeling language to represent business processes
- Developed 1992 by the research group of A.-W. Scheer
- Component of the ARIS concept
- EPC basic model contains
  - Events
  - Functions
  - Logical operators
  - Linking lines / arrows
- Application Areas



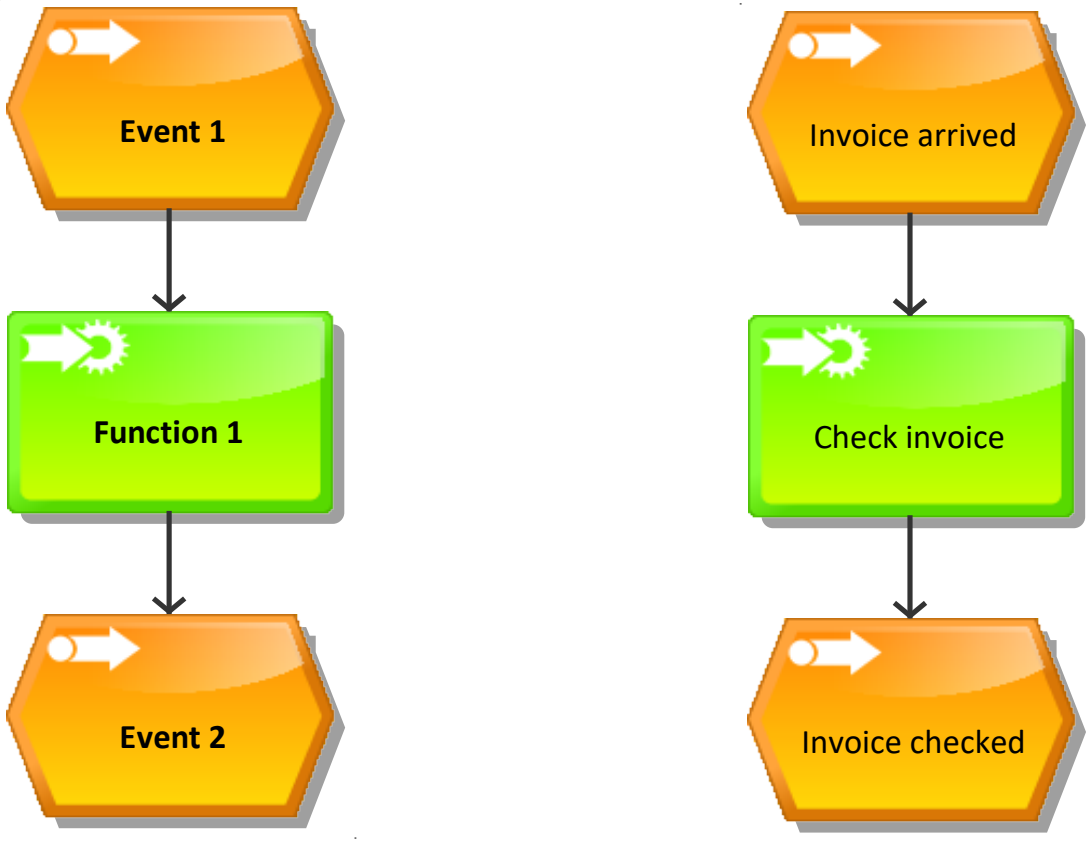
EVENT-DRIVEN PROCESS CHAIN (EPC)

SYMBOLS AND THEIR MEANING

Symbol	Name	Meaning
	Event	State of an information object, that occurs before or after a function, passive component
	Function	Action or task/ activity, which precedes/ succeedes an event, active component
Connectors		Split and join multiple process branches
	AND Connector	Represents a logical AND in process splits/joins
	OR Connector	Represents a logical OR in process splits/joins
	Exclusive OR Connector	Represents a logical XOR in process splits/joins
	Control Flow	Shows the execution order of the process

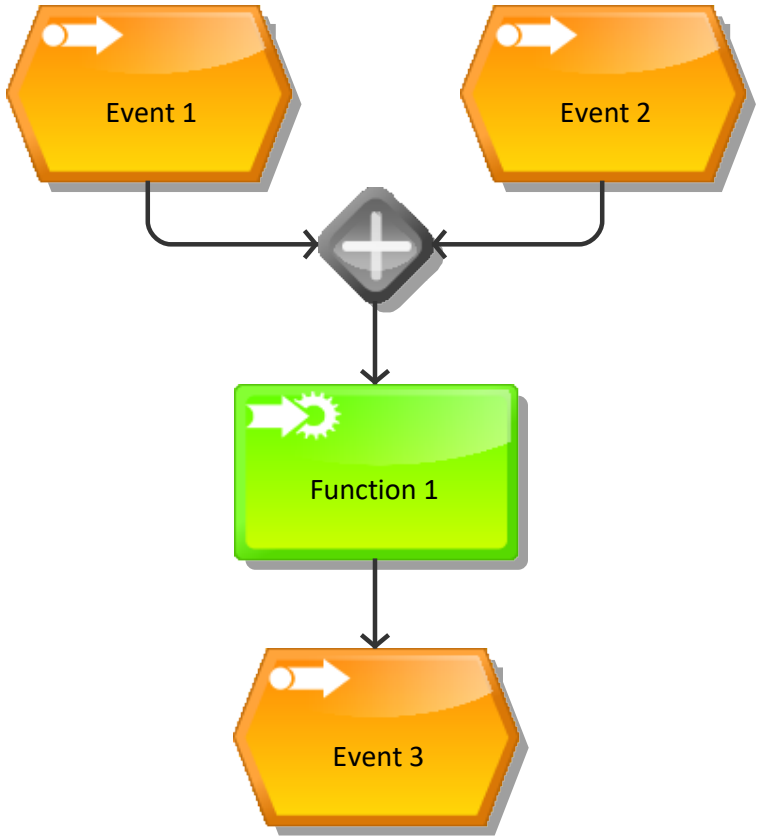
EVENT-DRIVEN PROCESS CHAIN (EPC)

ALTERNATING SEQUENCE OF EVENTS AND FUNCTIONS



EVENT-DRIVEN PROCESS CHAIN (EPC)

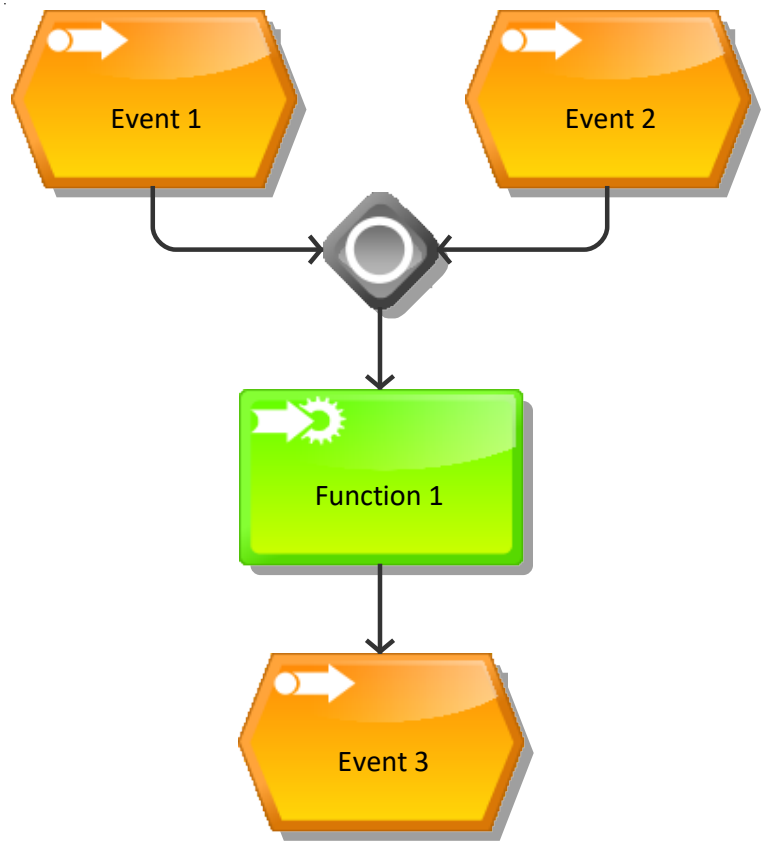
LOGIC CONNECTIONS EXAMPLE: AND (+)



- After events 1 and 2 occurred, function 1 will start

EVENT-DRIVEN PROCESS CHAIN (EPC)

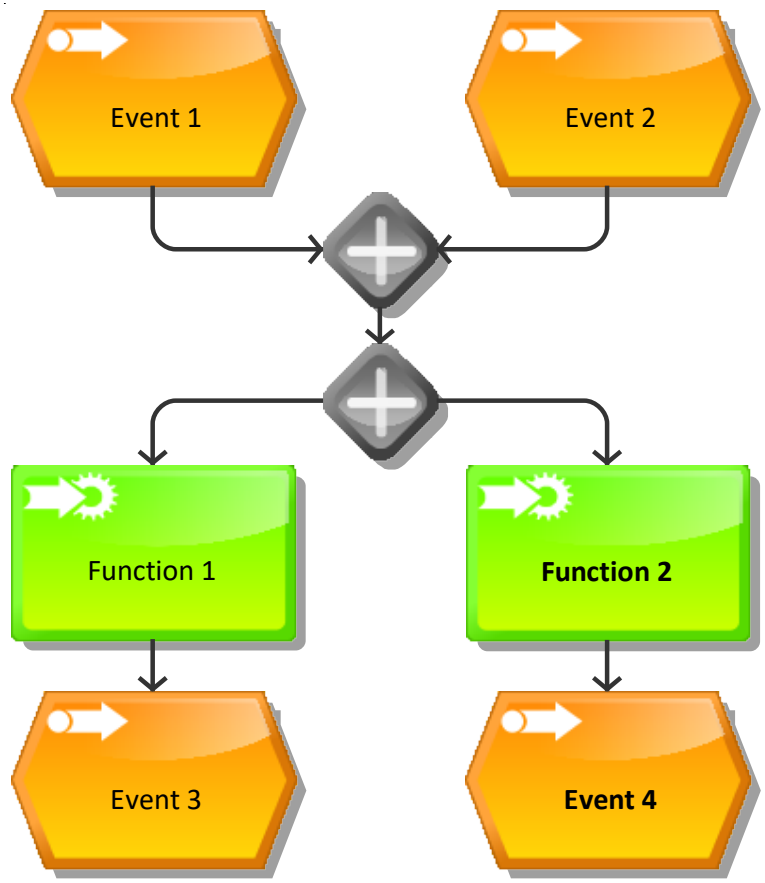
LOGIC CONNECTIONS EXAMPLE: INCLUSIVE OR (O)



- After events 1 or 2 occurred, function 1 will start

EVENT-DRIVEN PROCESS CHAIN (EPC)

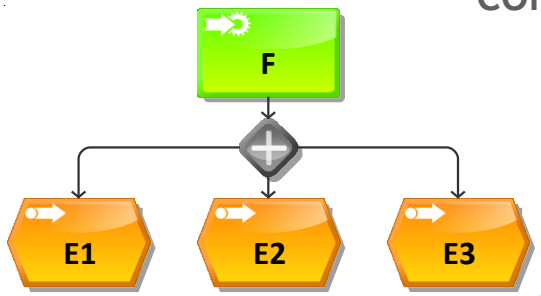
LOGIC CONNECTIONS EXAMPLE: AND COMBINATION (+)



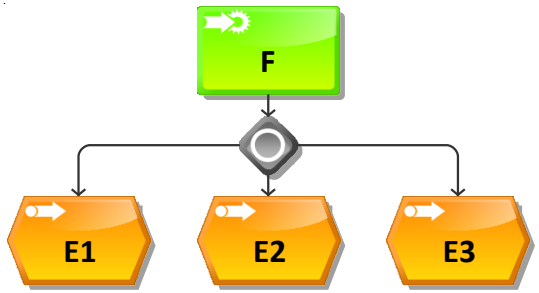
- After events 1 and 2 occurred, functions 1 and 2 will start

EVENT-DRIVEN PROCESS CHAIN (EPC)

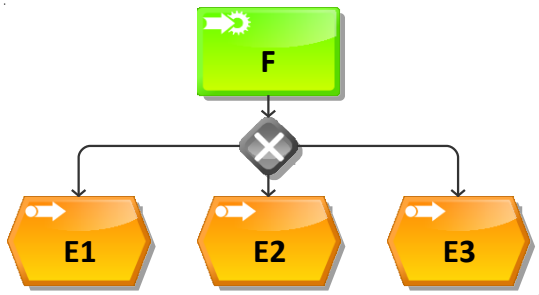
CONNECTION OF SEVERAL RESULTING EVENTS



- After execution of the function, all events will occur



- After execution of the function, at least 1 event will occur

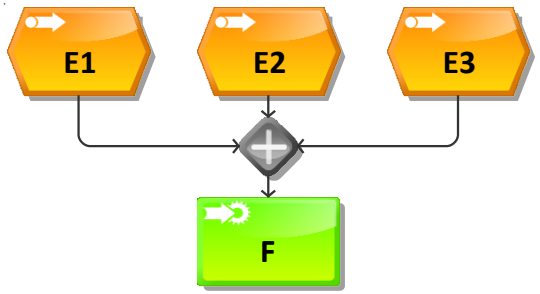


- After execution of the function, exactly 1 event will occur

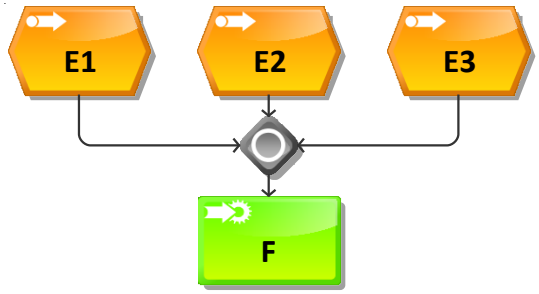
[Scheer 199])

EVENT-DRIVEN PROCESS CHAIN (EPC)

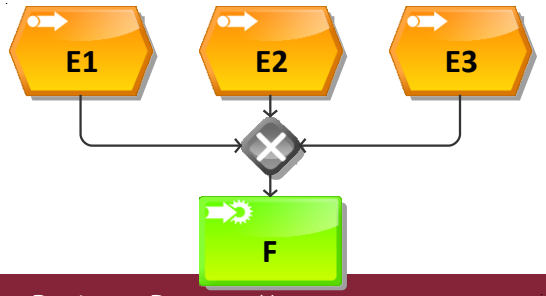
CONNECTION OF SEVERAL TRIGGERING EVENTS



- After all events occurred, the function will be executed



- After at least 1 event occurred, the function will be executed

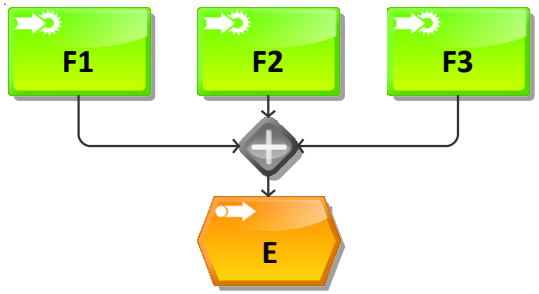


- After exactly 1 event occurred, the function will be executed

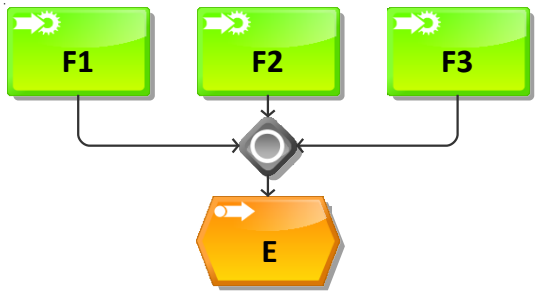
[Scheer 199])

EVENT-DRIVEN PROCESS CHAIN (EPC)

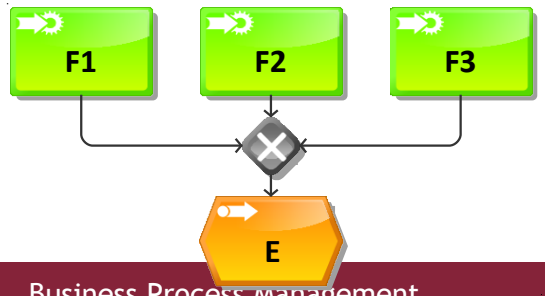
CONNECTION OF SEVERAL EXECUTED FUNCTIONS



- After all functions were executed the event will occur



- After at least 1 function was executed the event will occur

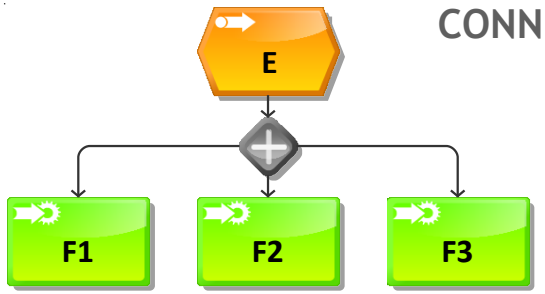


- After exactly 1 function was executed the event will occur

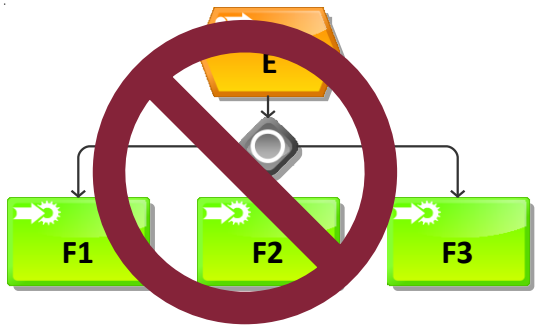
[Scheer 199])

EVENT-DRIVEN PROCESS CHAIN (EPC)

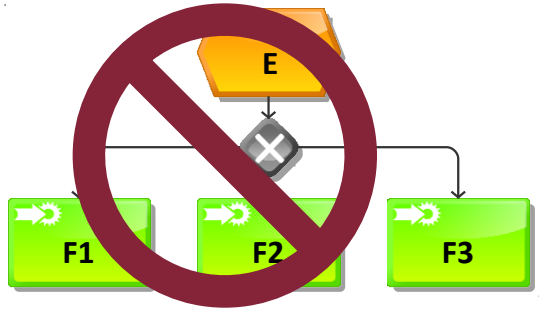
CONNECTION OF SEVERAL FUNCTIONS TO BE EXECUTED



- After an event occurred, all functions will be executed



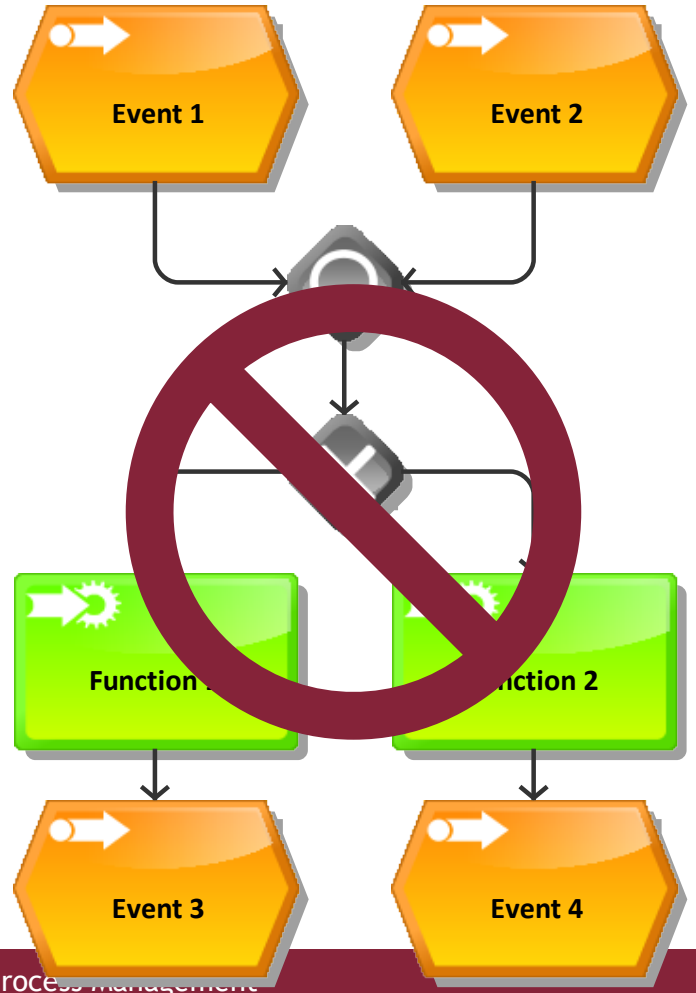
- Events are passive elements, they cannot decide actively (or) → it remains unclear, when and why F1, F2 or F3 are executed!



- Events are passive elements, they cannot decide actively (XOR) → it remains unclear, when and why F1, F2 or F3 are executed!

EVENT-DRIVEN PROCESS CHAIN (EPC)

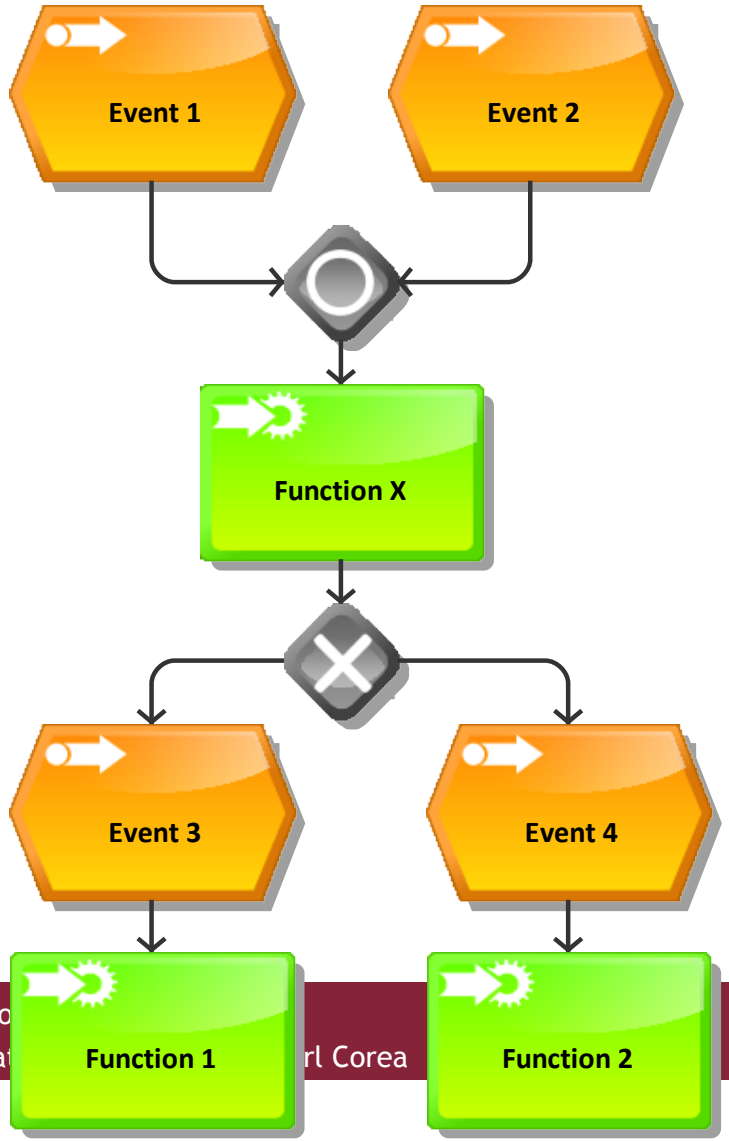
LOGIC CONNECTIONS: EXKLUSIVE-OR COMBINATION (XOR)



- After event 1 or 2 occurred, either function 1 or 2 will start

EVENT-DRIVEN PROCESS CHAIN (EPC)

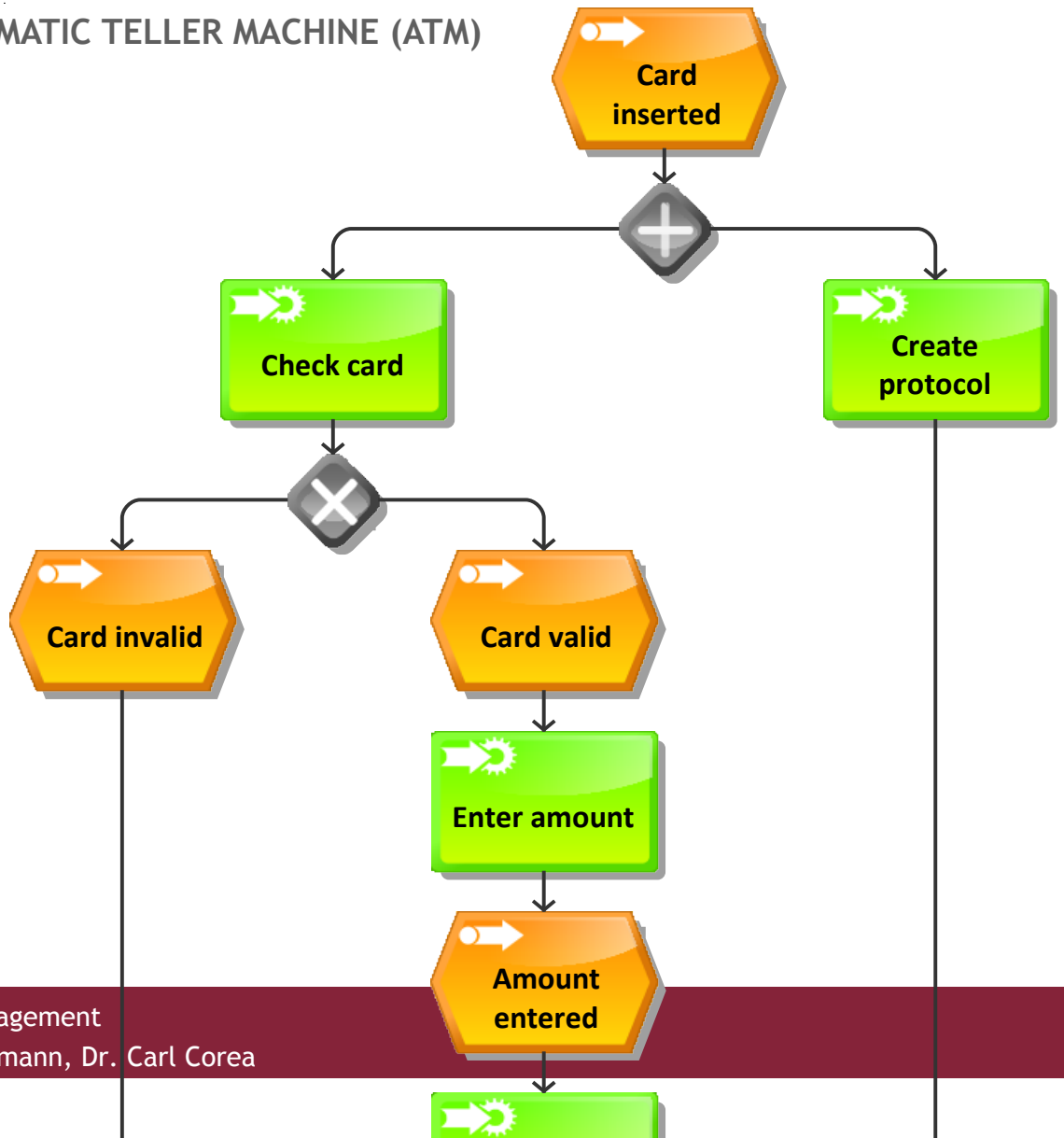
LOGIC CONNECTIONS: DECISION FUNCTION



- After event 1 or 2 occurred, the decision function will start to decide whether either event 3 or event 4 will occur

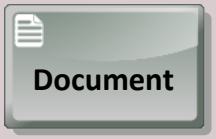
EVENT-DRIVEN PROCESS CHAIN (EPC)

EXAMPLE: AUTOMATIC TELLER MACHINE (ATM)



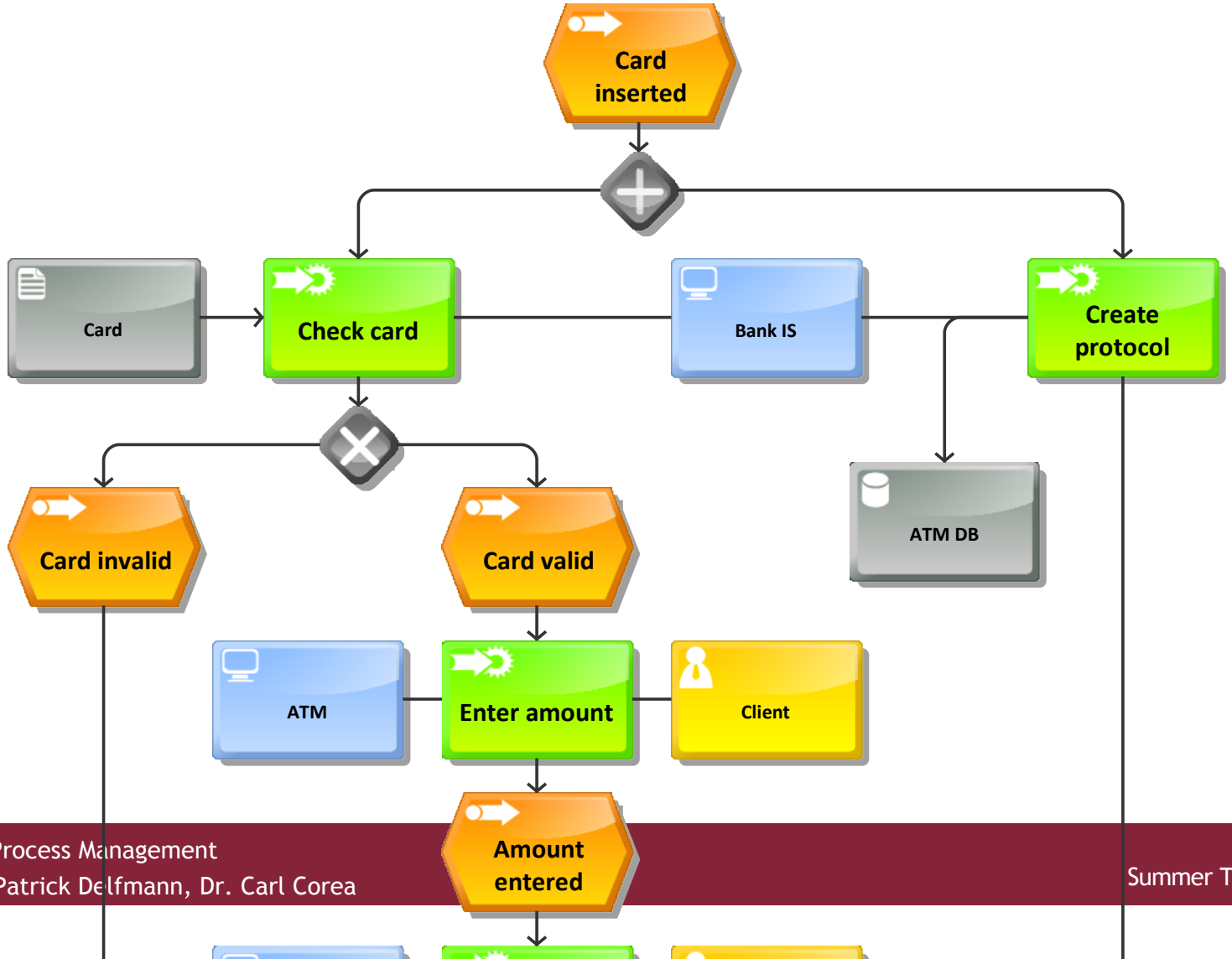
EVENT-DRIVEN PROCESS CHAIN (EPC)

FURTHER SYMBOLS AND THEIR MEANING (SELECTION)

Symbol	Name	Meaning
	Organiza-tional Unit	People, department, branch, responsible for process execution
	Person	Single person, responsible for process execution
	Document	Document, necessary for process execution
	Data Base	Data base, containing information necessary for process execution
	IT System	IT system supporting process execution
	Product	Outcome of a process

EVENT-DRIVEN PROCESS CHAIN (EPC)

EXAMPLE: AUTOMATIC TELLER MACHINE (ATM)



MODELING GUIDELINES – EPC

- Each EPC has at least 1 start and end event

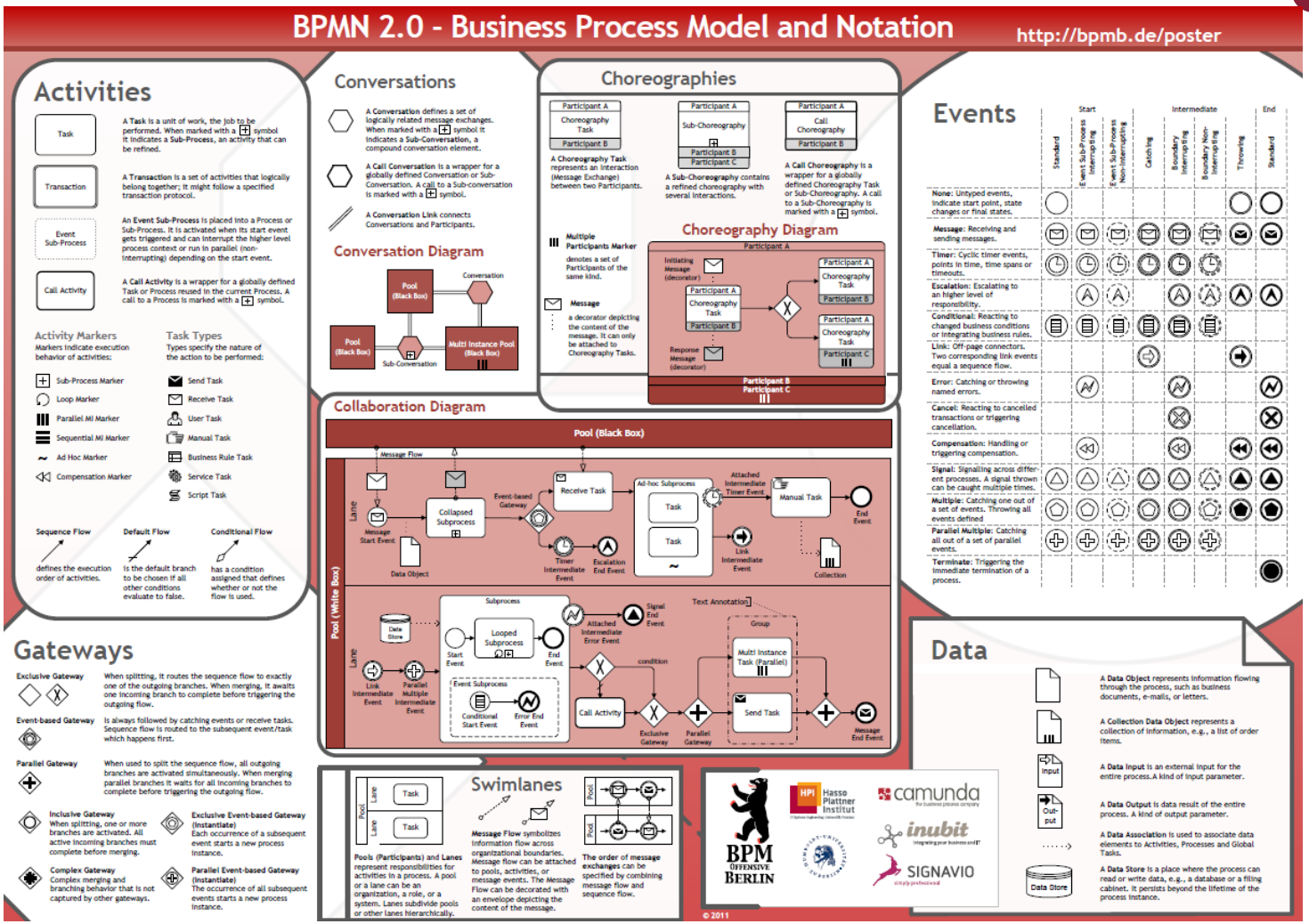
- From left to right
  - Design of the model horizontal and from left to right
  - When loops, repetitions etc. occur the repetition at an earlier point of the process is made clear by a control flow

- From top to bottom
  - Design of the model vertically from top to bottom
  - When loops, repetitions etc. occur the repetition at an earlier point of the process is made clear by a control flow

AGENDA

- Basics of Business Process Modeling
- Event-driven Process Chains (EPC)
- Business Process Model and Notation (BPMN)
- BPM Tools (Overview)

BPMN OVERVIEW ("BPMN POSTER")

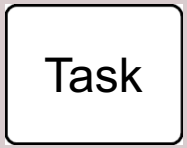


[http://bpmb.de/images/BPMN2_0_Poster_EN.pdf]

BPMN

BASIC ELEMENTS

- Elements necessary for a simple process

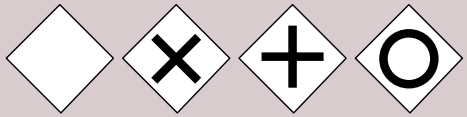
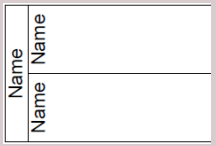
Element	Name	Short description
	Start	Event at the beginning of a process
	Sequence Flow	Standard (uncontrolled) flow between activities
	Task	Atomic activity
	End	Event at the end of a process

See http://www.omg.org/spec/BPMN/2.0/PDF for all BPMN elements in the following

BPMN

BASIC ELEMENTS

- Other basic elements

Element	Name	Short description
	Gateway	Branching or merging of paths
	Message Flow	Flow of messages between participants
	Association	Linking of artifacts like a text annotation to other elements (with direction where appropriate)
	Pool	A participant in a collaboration, i.e. an entitiy or a role; may be a “black box”
	Lane	Organisation of activities within pools, e.g. using roles; lanes can be nested

BPMN

BASIC ELEMENTS

- DEMO

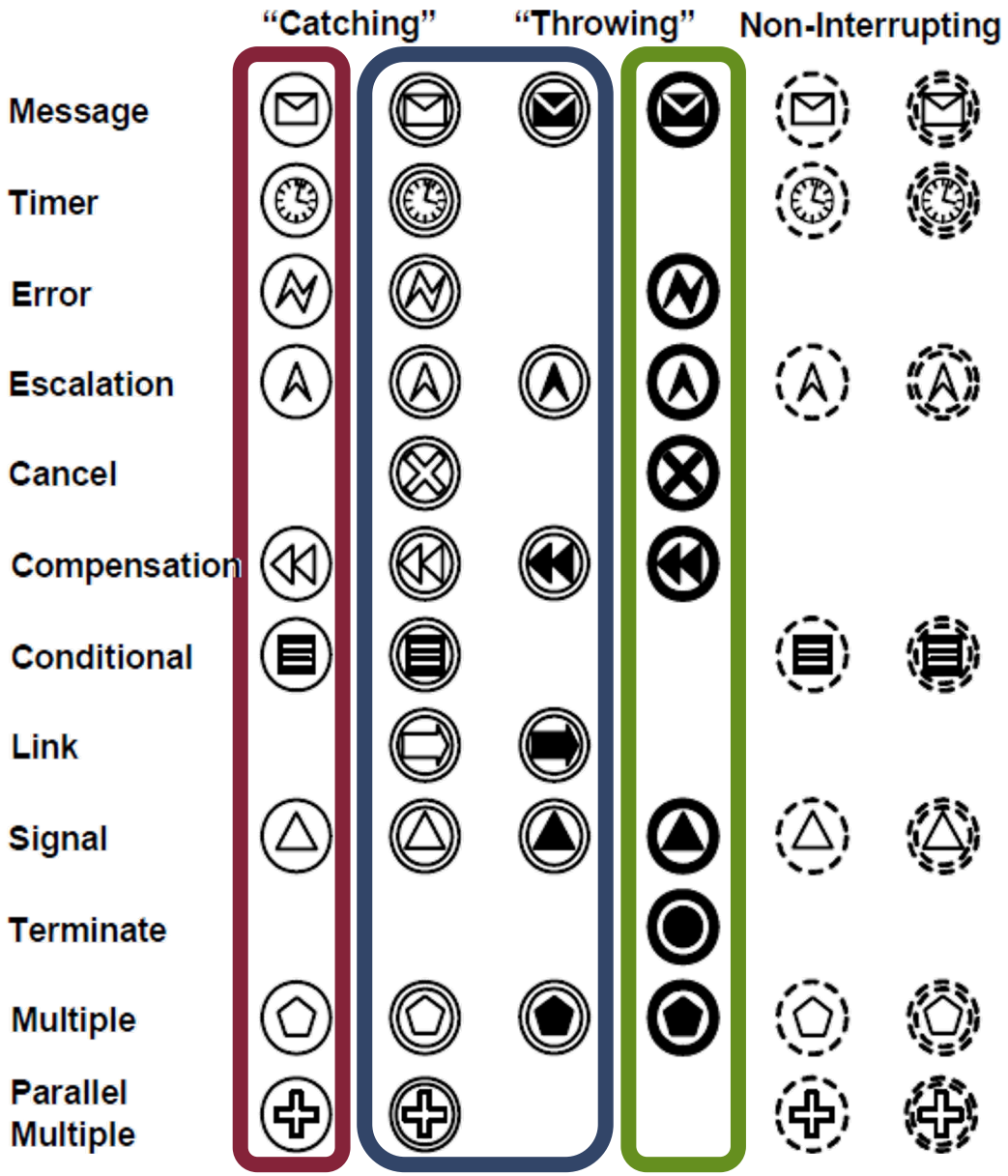
BPMN

EXTENDED ELEMENTS: ALL EVENTS

Start

Intermediate

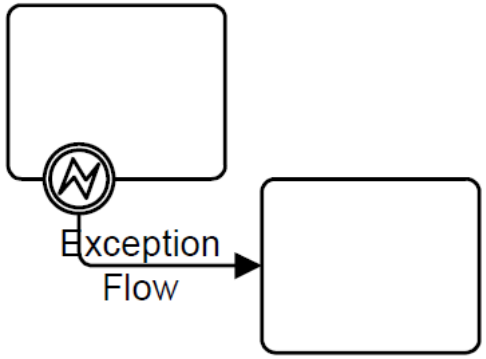
End



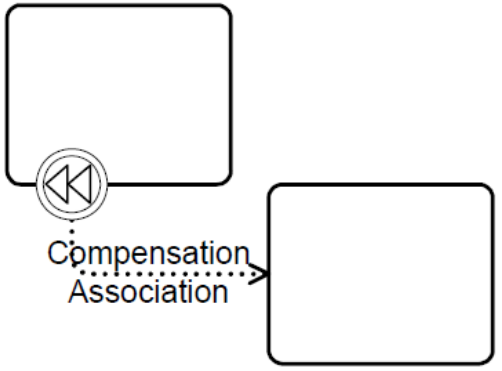
[OMG 2012,p. 32]

EXTENSIONS OF ACTITIVITES CONTD.

- Exception Flow
  - Used to describe situations where common process execution is no longer possible (e.g., in case of an unfunded bank account)



- Compensation Association
  - Used to describe an action that rollbacks other actions in case of a failure (e.g., money transfer → money retransfer)



BPMN

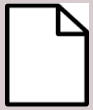
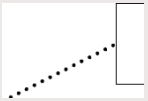
BASIC ELEMENTS

- DEMO

BPMN

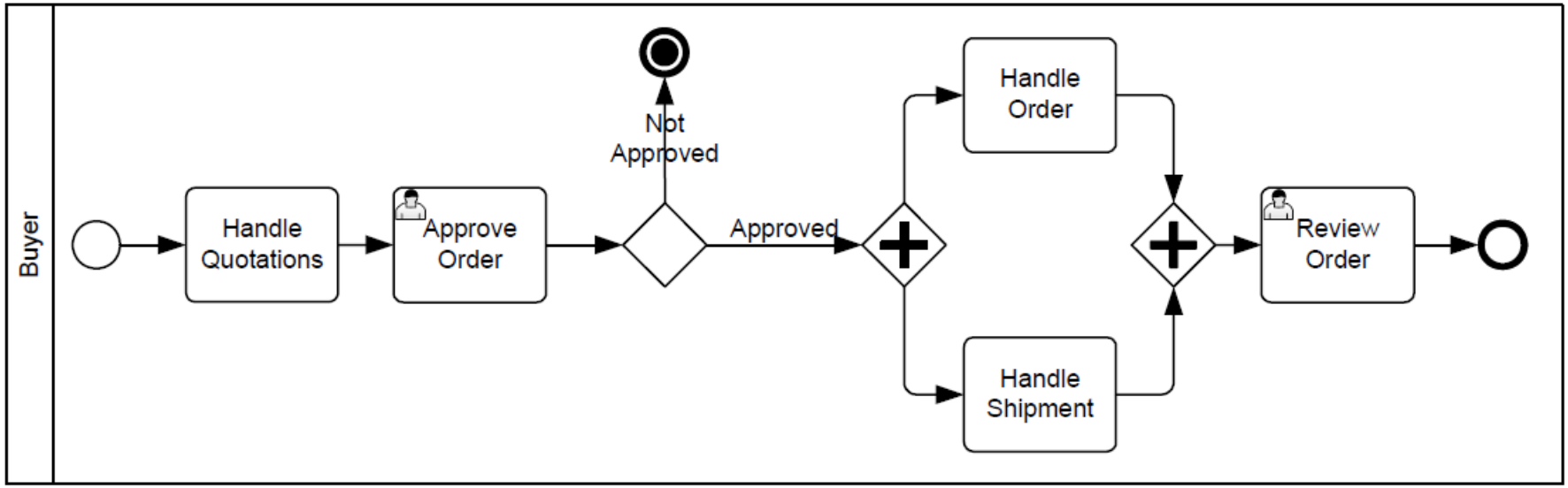
BASIC ELEMENTS

- Other basic elements

Element	Name	Short description
	Data Object	Single object or collection of objects required by an activity or produced by it
	Message	Contents of communication between participants
	Group	Semantic group used for documentation or analysis without effect on the flow
	Text Annotation	Descriptive text to aid the reader; without effect on the flow

BPMN

EXAMPLE MODEL



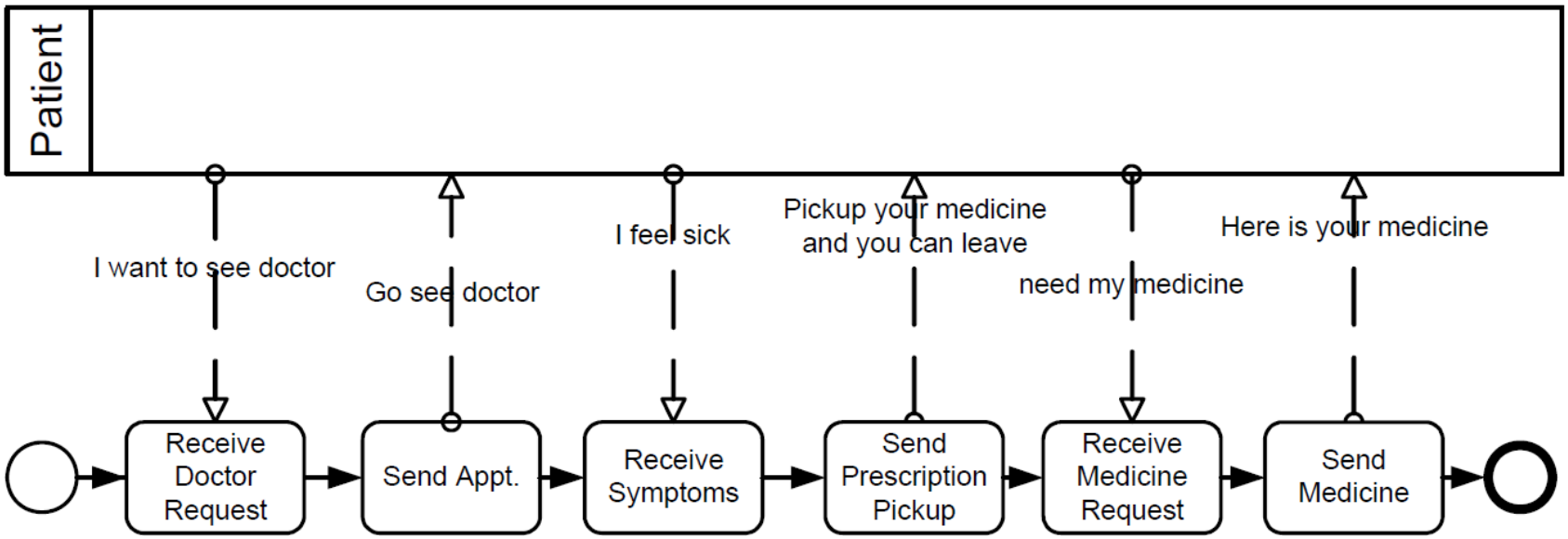
[OMG 2011, p. 170]

- Substantially higher complexity than EPC because of the higher amount of model elements
- More technical focus than EPC
- Basic modeling rules similar to EPC

BPMN

BASIC TYPES OF MODELS

- Processes
  - Private business processes (executable or non-executable): represent internal processes of an entity
  - Black Box business processes: processes that interact with private processes, but only activities that interact with the private process are modeled

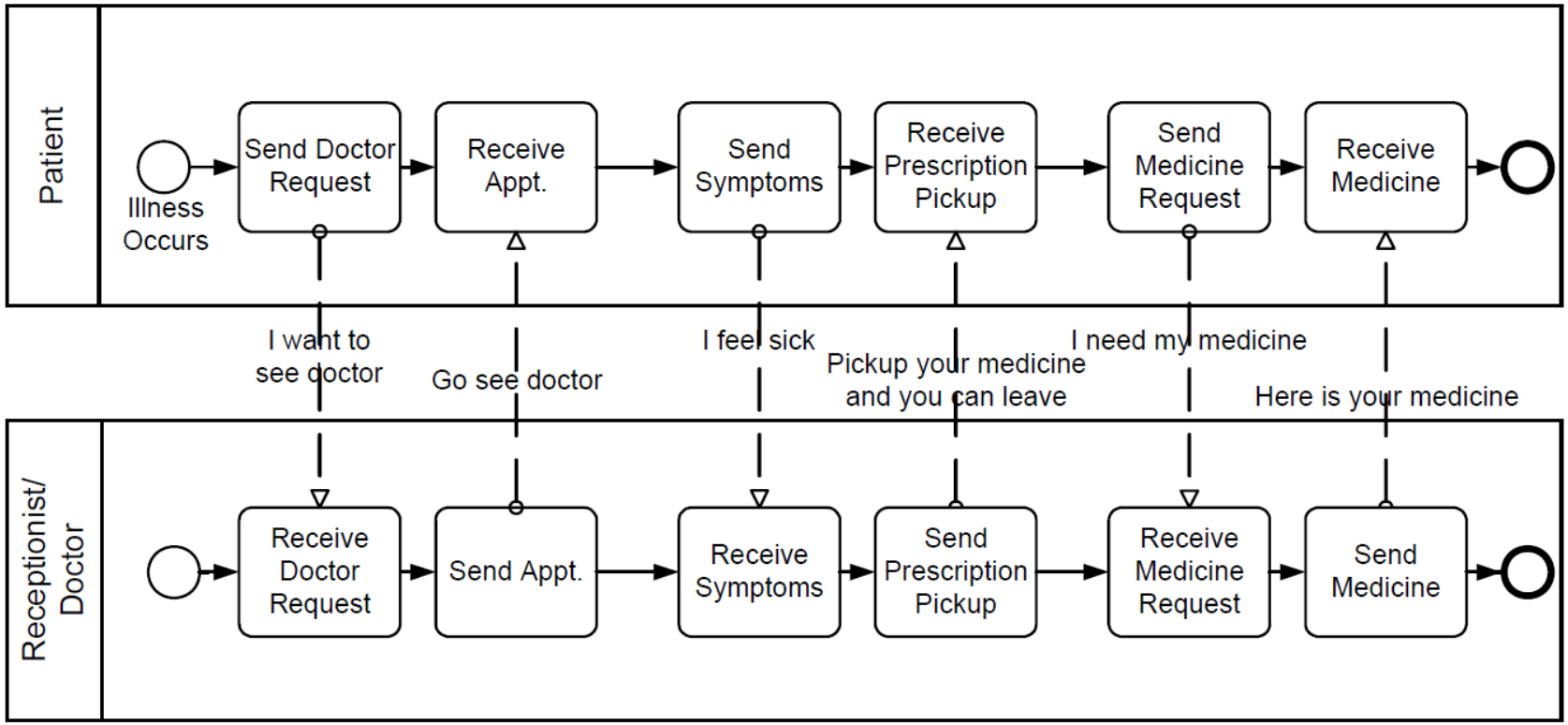


[OMG 2011, p. 24]

BPMN

BASIC TYPES OF MODELS

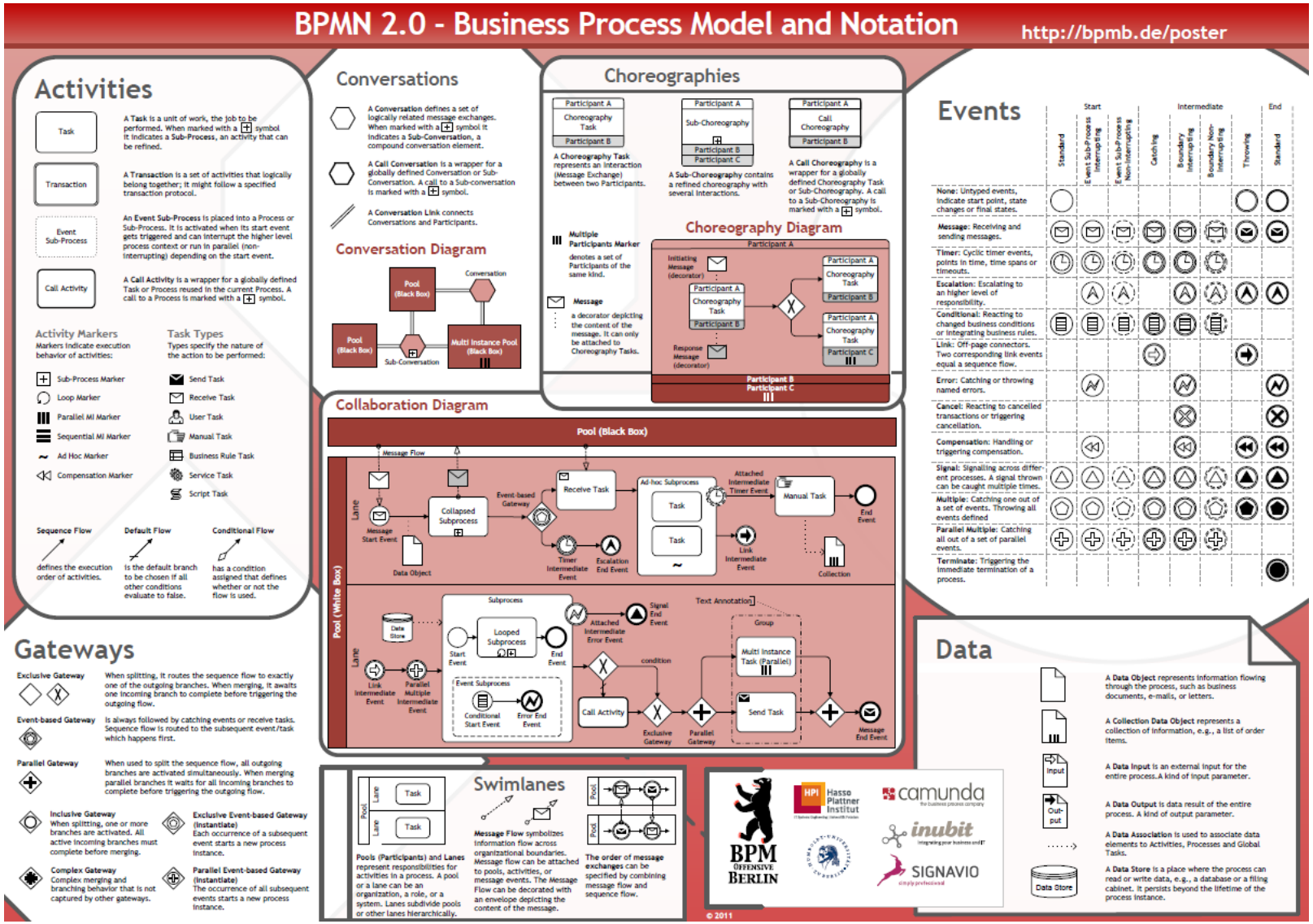
- Collaborations
  - Show interactions between business entities (pools)
  - Use public processes with message flows between them



[OMG 2011, p. 25]

BPMN

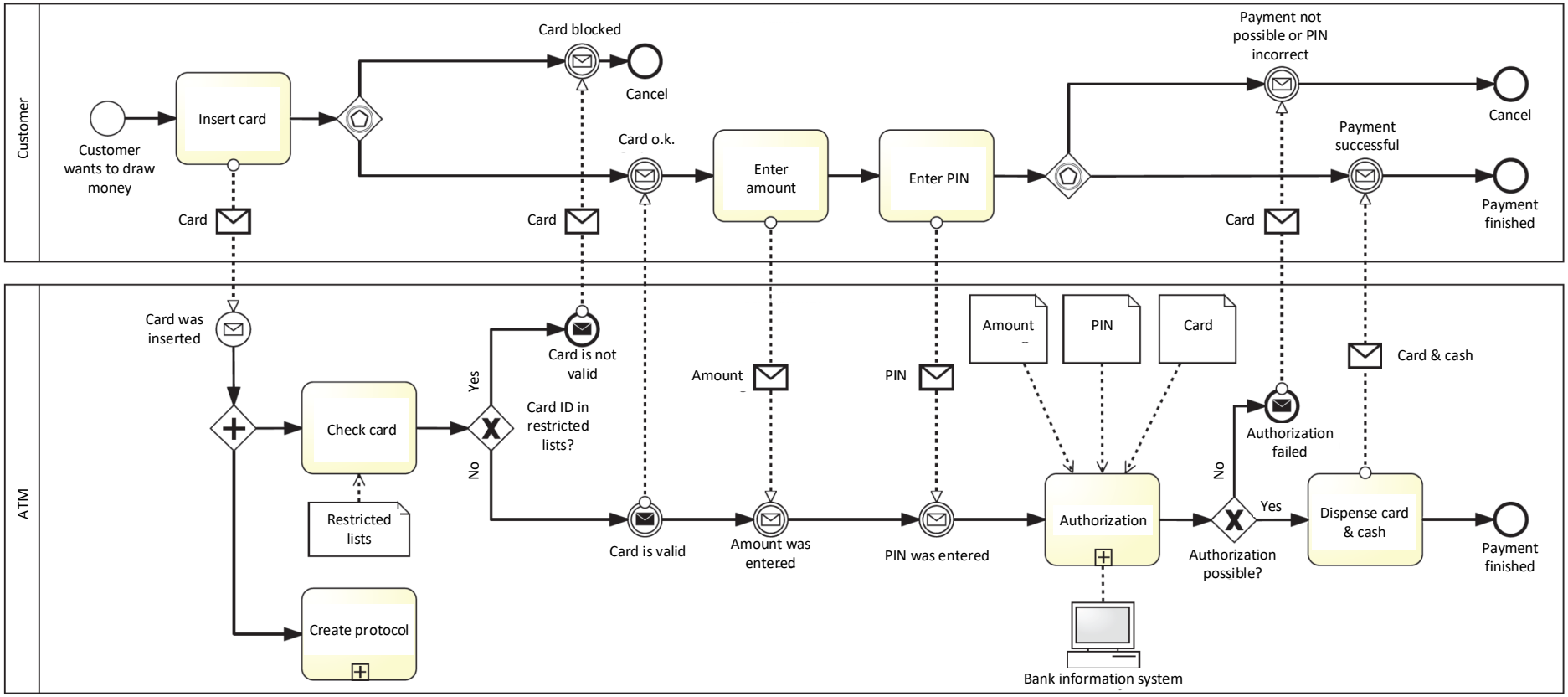
POSTER OF THE “BERLINER BPM-OFFENSIVE”



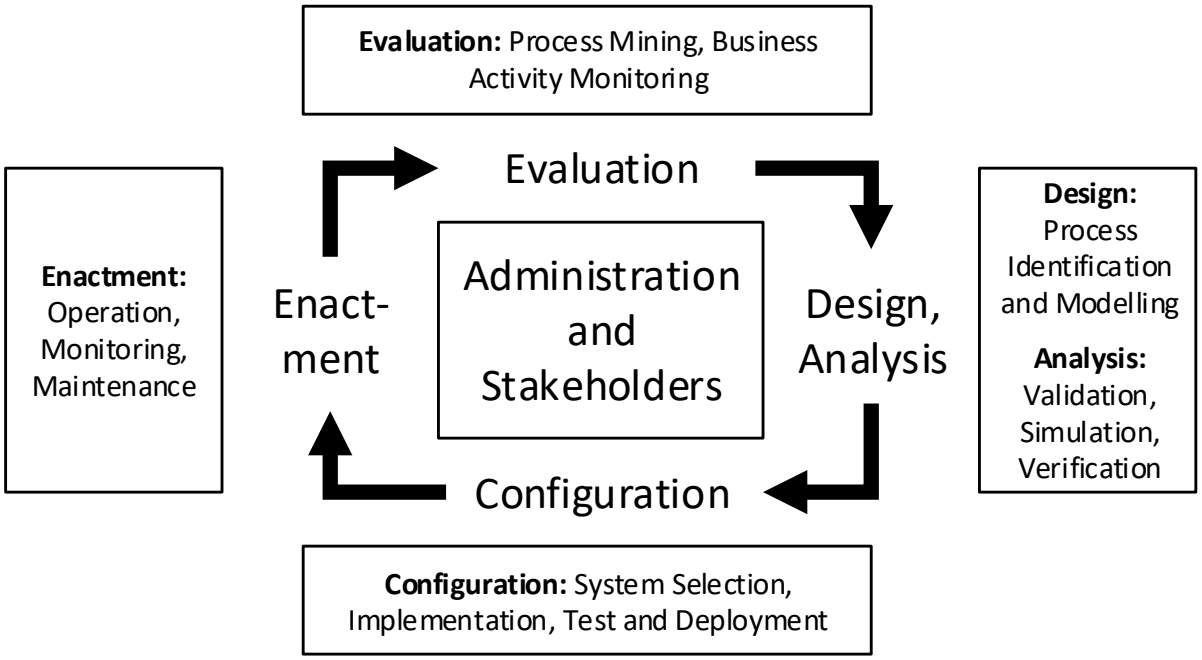
[http://bpmb.de/images/BPMN2_0_Poster_EN.pdf]

EXAMPLES

AUTOMATIC TELLER MACHINE (ATM)



TOOLS IN BPM


Evaluation: Process Mining, Business Activity Monitoring
Evaluation
Enactment: Operation, Monitoring, Maintenance
Enact-ment
Administration and Stakeholders
Design, Analysis
Design: Process Identification and Modelling
Analysis: Validation, Simulation, Verification
Configuration
Configuration: System Selection, Implementation, Test and Deployment

UNIVERSITÄT KOBLENZ · LANDAU

IWVI

BUSINESS PROCESS MANAGEMENT

BUSINESS PROCESS MODELING AND TOOLS

INSTITUTE FOR IS RESEARCH

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