

# Business Processes Modelling

## MPB (6 cfu, 295AA)

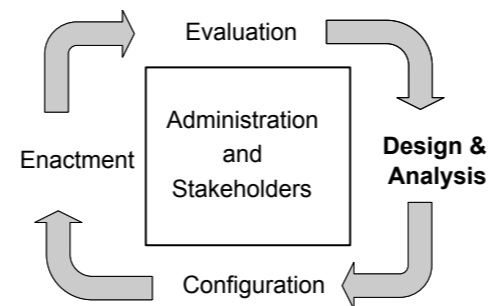
Roberto Bruni

<http://www.di.unipi.it/~bruni>

05 - BP Lifecycle



# Object



Overview the business process lifecycle

Sect.1.2 of Business Process Management: Concepts, Languages, Architectures

# Lifecycle

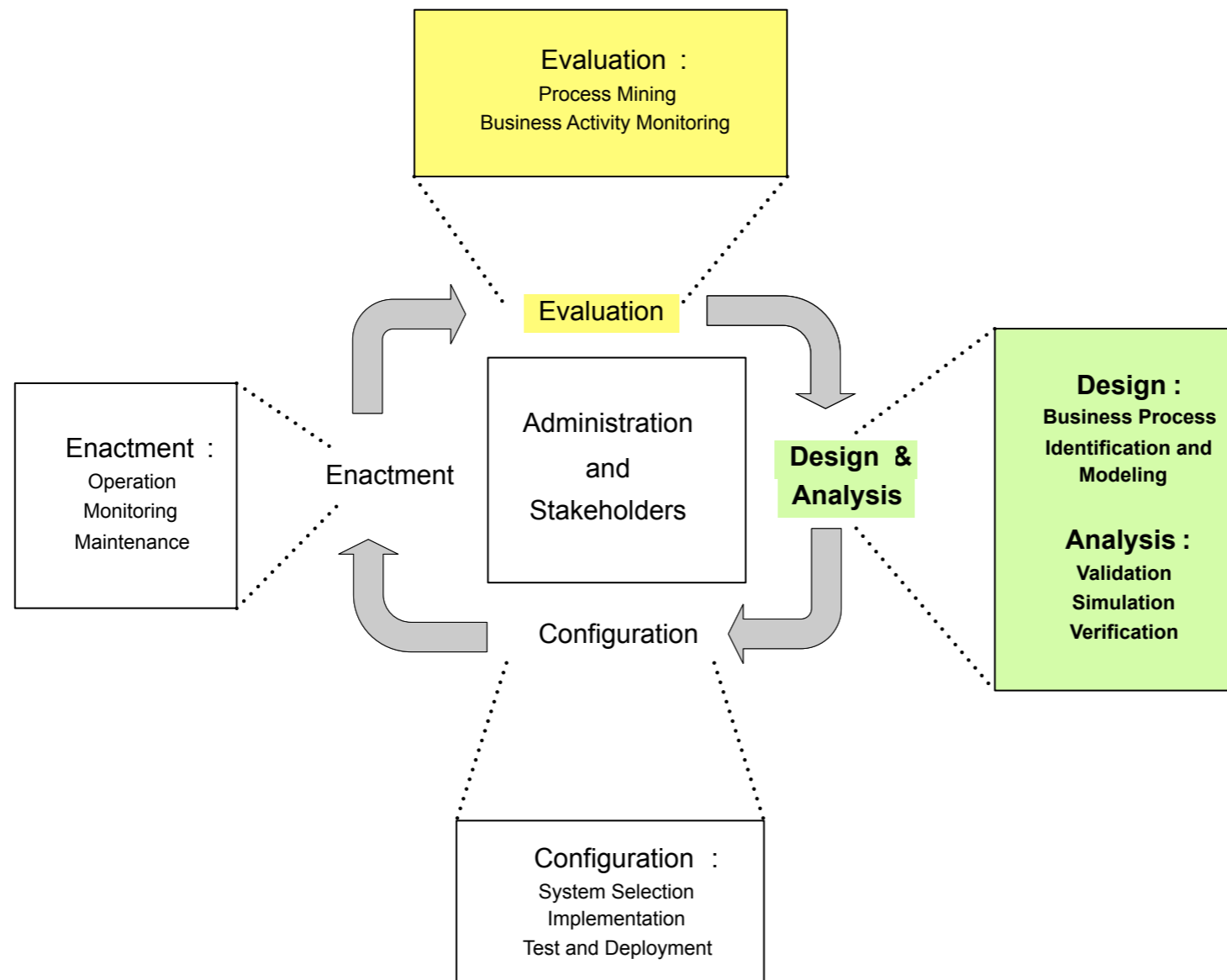
A lifecycle model is a conceptual description of the steps that are involved in building a product

The steps in which the model is broken are called **phases** (logically consistent, easier to understand)

The number of phases can vary from model to model (typically ranging from four to eight)

# BP lifecycle

Five phases with logical dependencies,  
organized along a cyclic structure



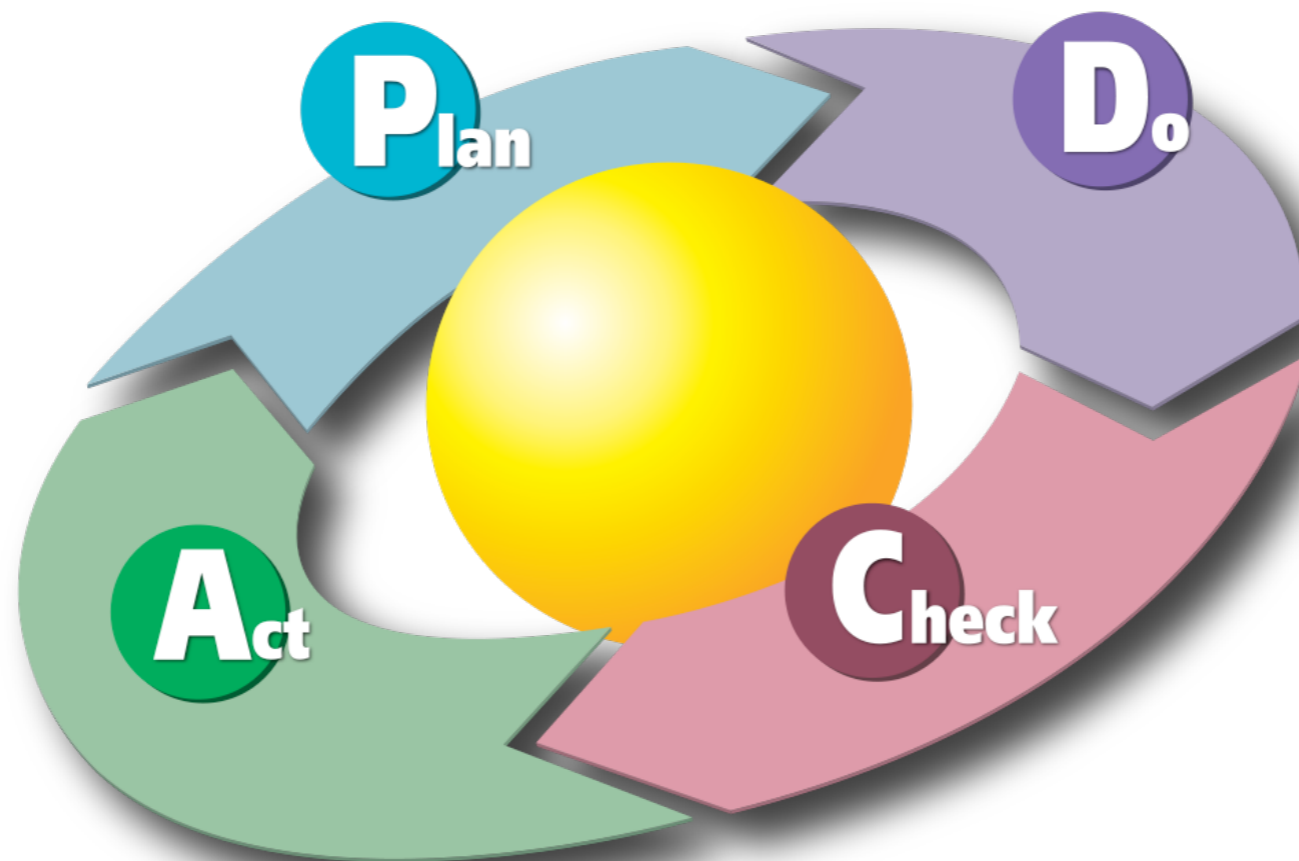
# BP lifecycle

The logical dependencies between different phases  
**do not imply a strict temporal ordering**  
of their execution

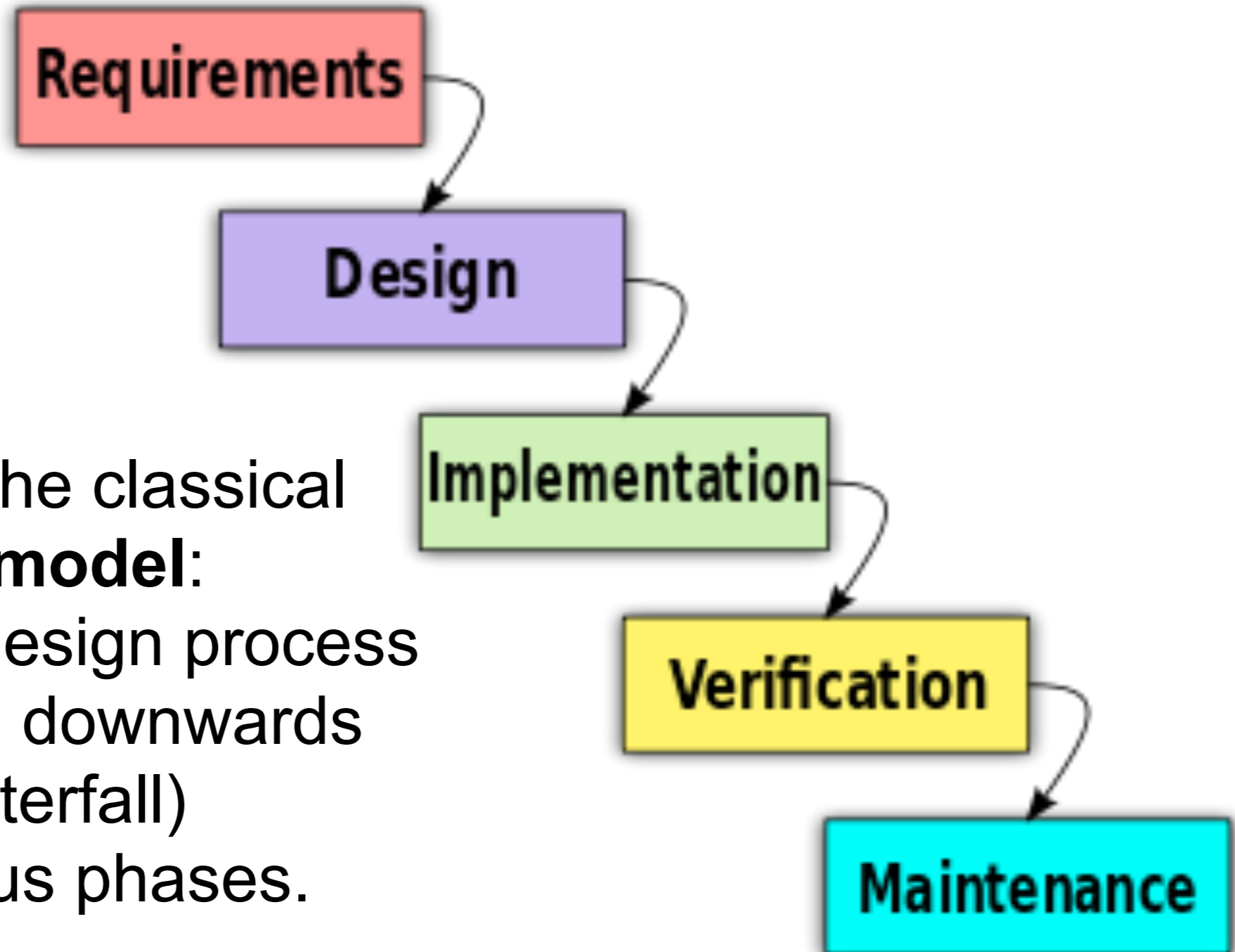
Incremental and evolutionary approaches  
involving concurrent activities in multiple phases  
are frequently used

# BP lifecycle

Similar to the **PDCA** scheme  
(you may have heard of):  
a management method for the control and  
continuous improvement of products



# BP lifecycle vs waterfall



Different from the classical **waterfall model**:

a sequential sw design process seen as flowing downwards (like a waterfall) through various phases.

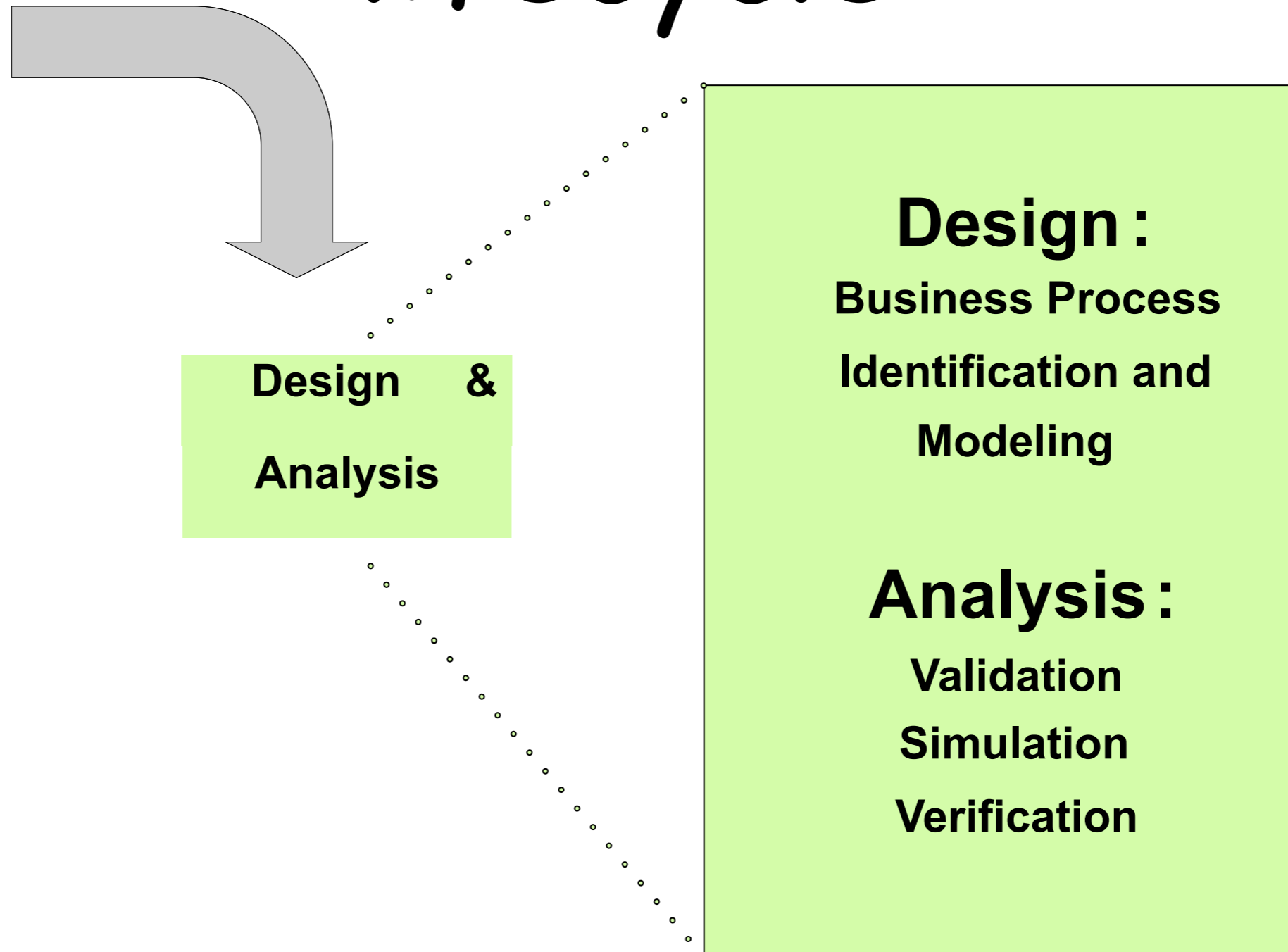
# BP lifecycle vs XP

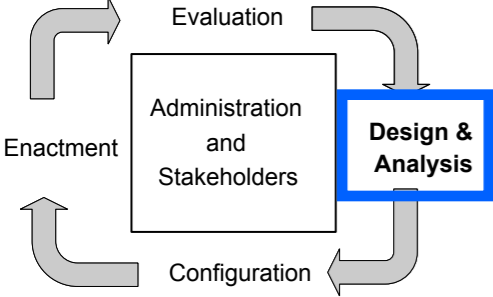
Better structured than **extreme programming** methodology: intended to improve productivity and responsiveness to changing requirements, advocates frequent releases, adding features when needed and a flat management structure





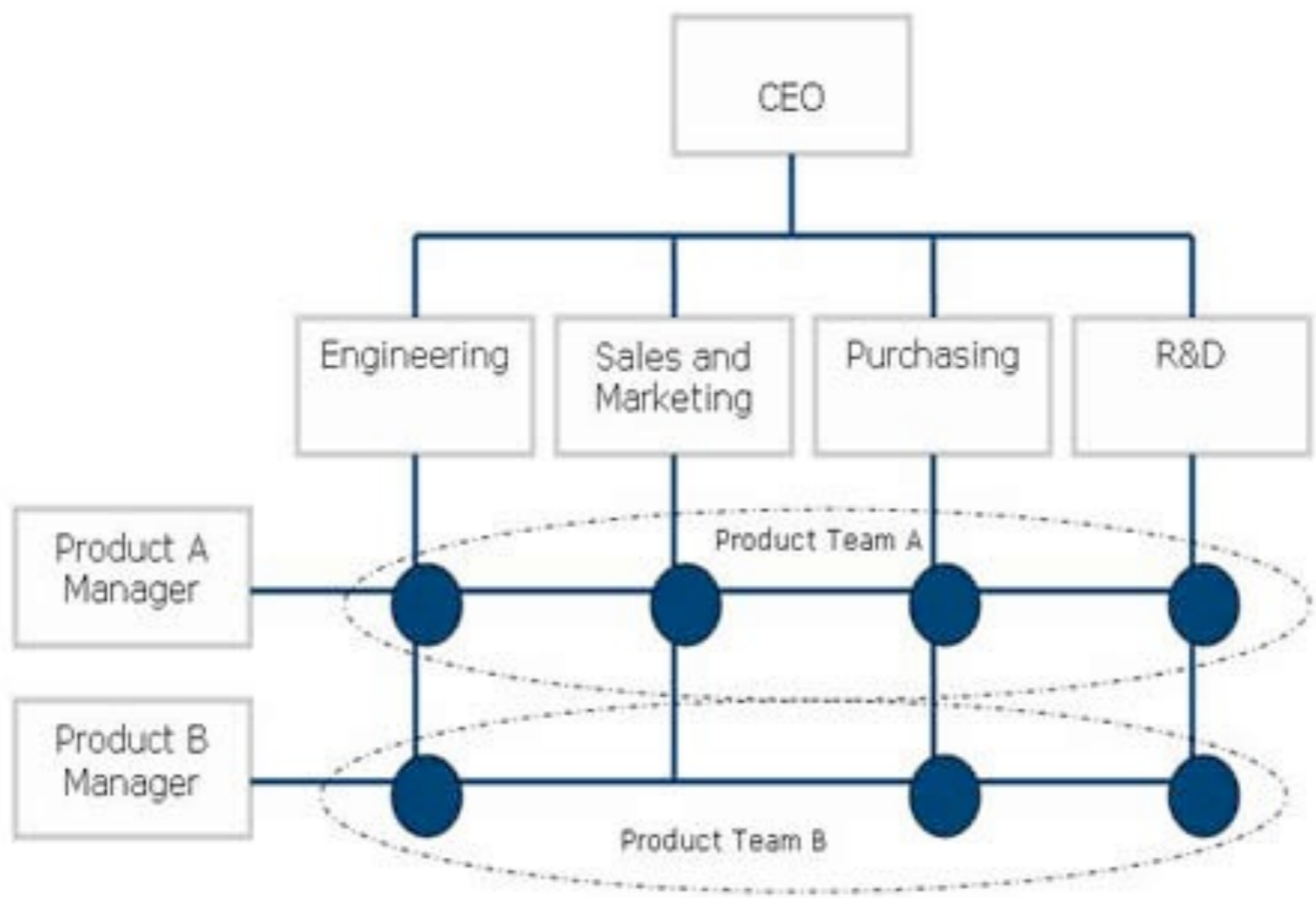
# Business process lifecycle

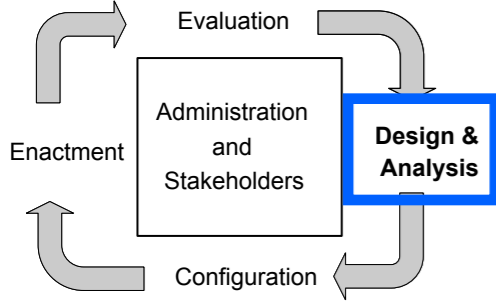




# Context

## Matrix organizational structure

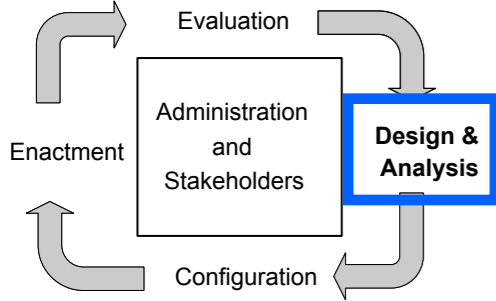




# Identification

Require **surveys** on:  
the business processes  
their organizational environment  
their technical environment

Based on these surveys, business processes are:  
identified  
reviewed  
validated  
**represented** (by business process models)



# Modeling

Core technical sub-phase:

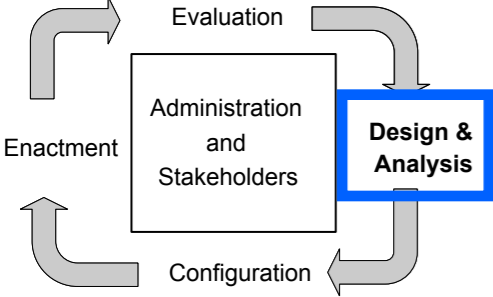
from informal descriptions  
to a particular business process modeling notation

Explicit business process models expressed in a graphical notation facilitate communication about these processes so that different stakeholders can:

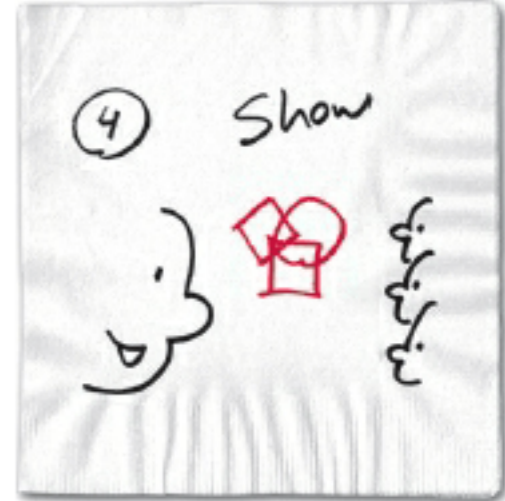
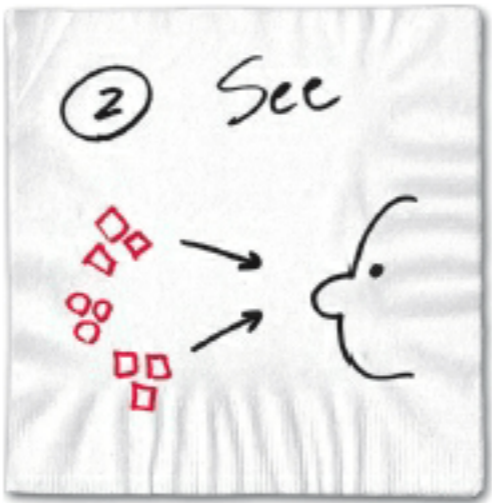
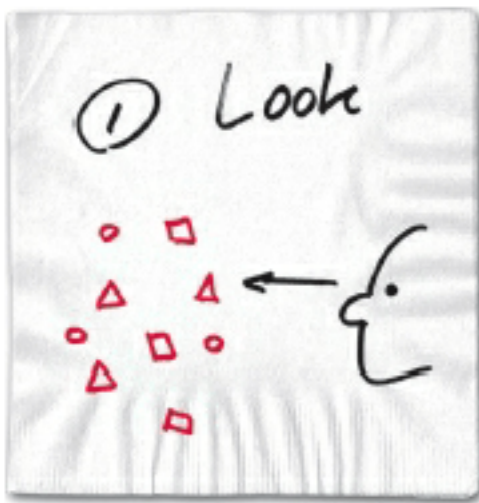
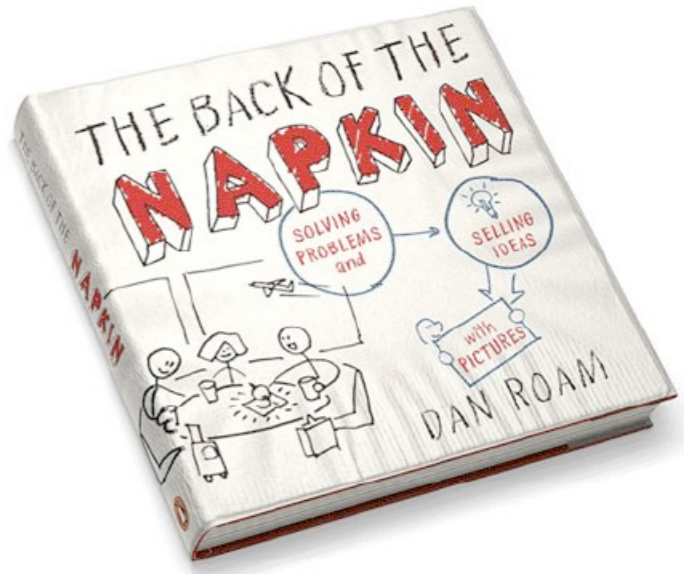
**communicate** efficiently

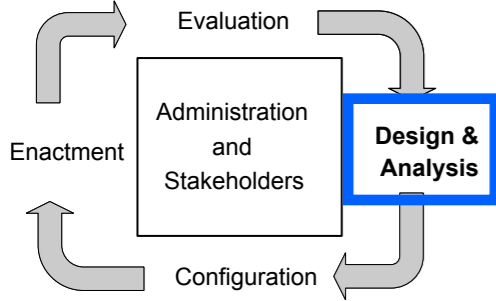
**refine** them

**improve** them



# Look, see, imagine, show

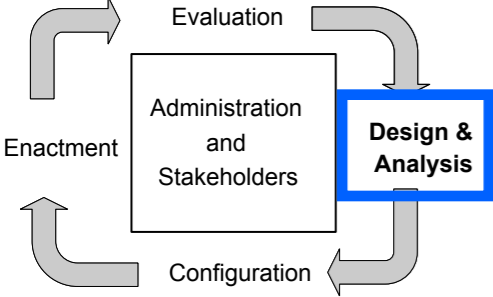




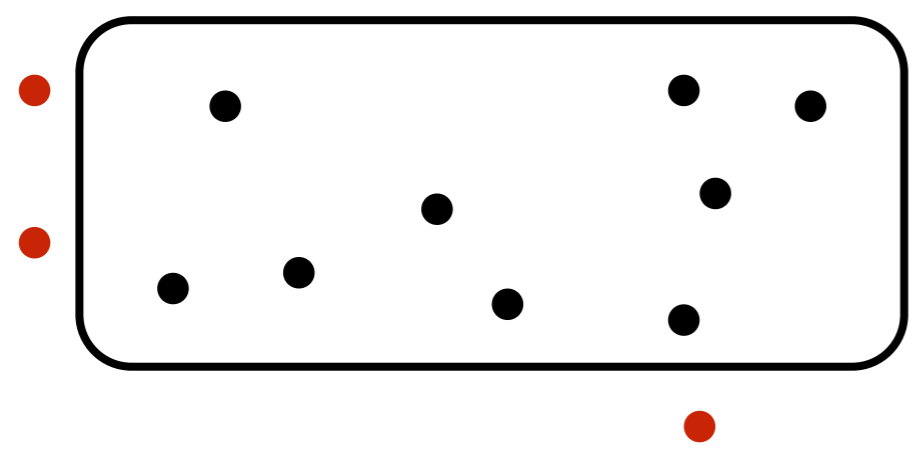
# Validation

The initial design must be validated by checking that **all valid process instances are reflected** by the business process model

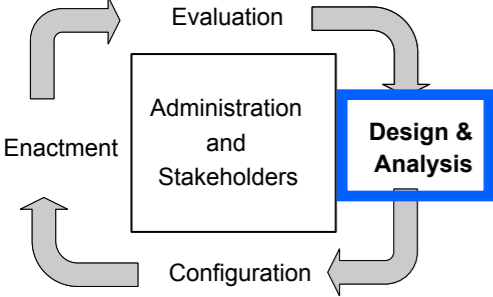
Useful instrument: a **workshop** where the persons involved can discuss the business process model



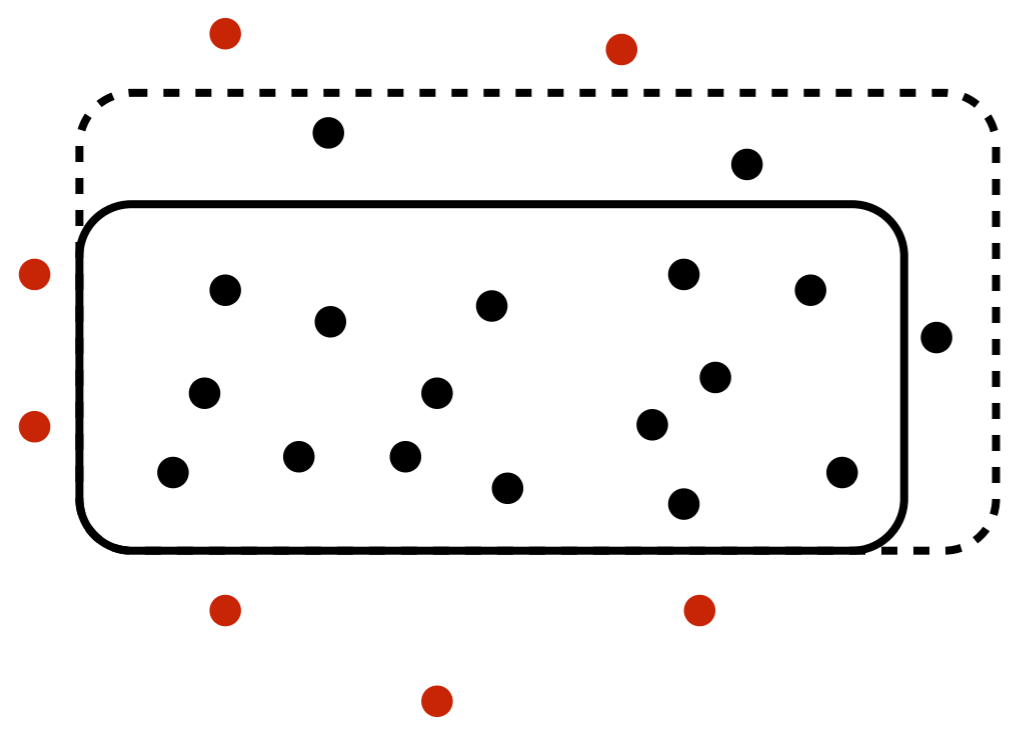
# Validation



- desired instances
- undesired instances
- ▭ proposed process

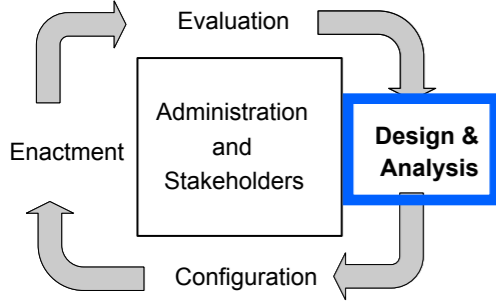


# Validation



- desired instances
- **undesired instances**
- ▭ proposed process
- ▭ desired process





# Simulation

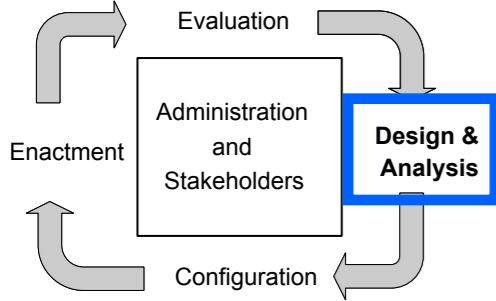
Simulation techniques can support validation

Stakeholders can walk through the process in a step-by-step manner

Check whether processes expose all desired behaviour

Estimate performance measures  
(e.g., time, cost,...)

Discover undesired execution sequences to show deficits in the process model



# Verification

The business process model must be analyzed and improved to make sure:

all tasks can be used in some instance

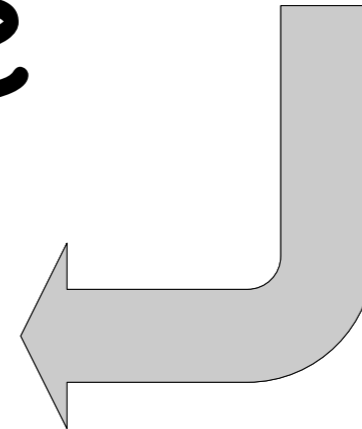
it can always come to an end  
(e.g., absence of deadlock)

it actually includes all desired instances  
it does not allow any undesired instance

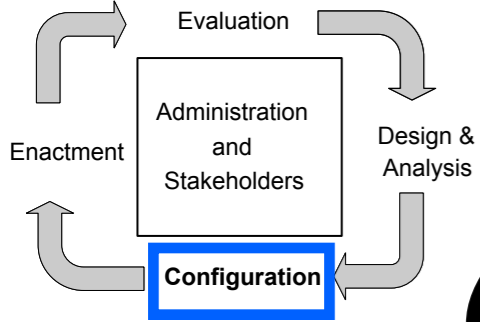
Error-prone activities, to be repeated several times,  
for which automatic tools are necessary

# Business process lifecycle

Configuration



**Configuration :**  
System Selection  
Implementation  
Test and Deployment

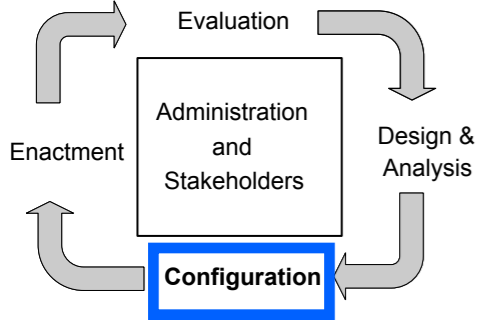


# Configuration phase

From (verified) business process models to **implementation as**

a set of policies, guidelines and procedures  
(to be followed by employees)

a dedicated software system  
(over a chosen implementation platform: a  
business process management system)

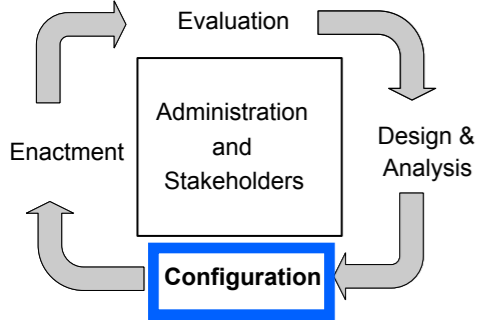


# Enhanced models

Software systems usually require additional **technical information**

The model must be decorated with such data, to be exploited for configuring the system

Examples: interactions of the employees with the system, integration of existing systems, wrapping of legacy software



# Testing

When the system is configured,  
it must be tested before deployment

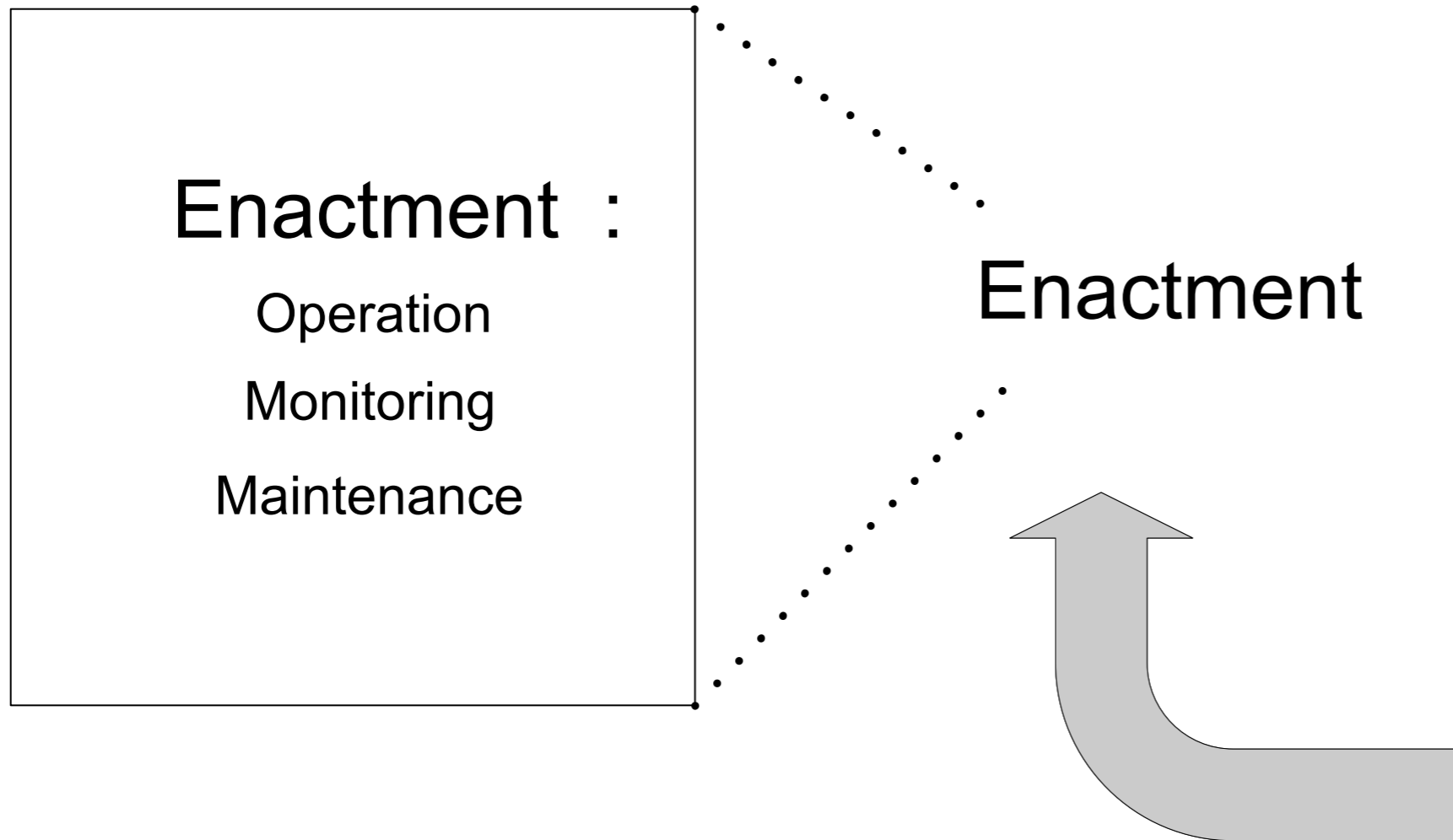
Usual testing techniques from sw engineering

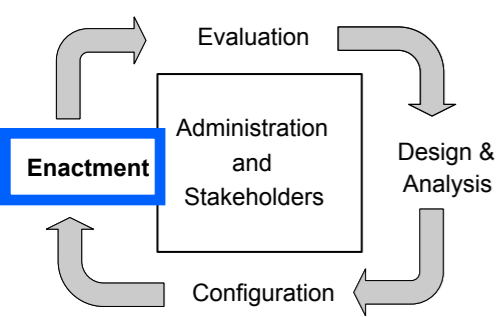
Integration tests

Performance tests

Other possible activities:  
training of personnel,  
migration of application data

# Business process lifecycle





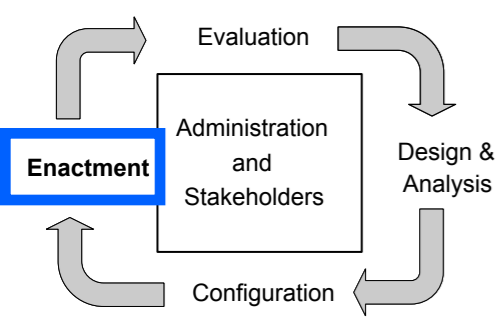
# Enactment phase

When the system is deployed,  
business process instances can be **enacted**

Typically, each process instance is initiated after  
an **event** occurs  
(e.g., the receipt of an order)

The system must control and monitor the  
execution of all instances according to the model  
to guarantee a correct process **orchestration**  
(e.g., respecting dependencies)



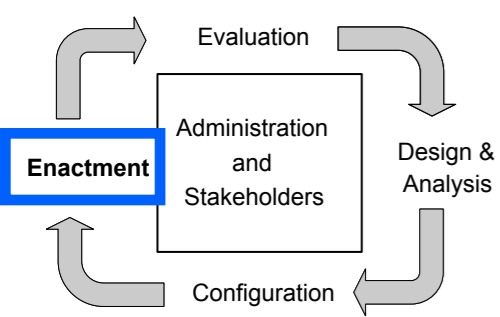


# Enactment

Activities can be performed by employees **manually** or by the help of information systems

Other activities can be enacted **automatically** by information systems

Some activities can **trigger** or **inhibit** other activities



# Monitoring

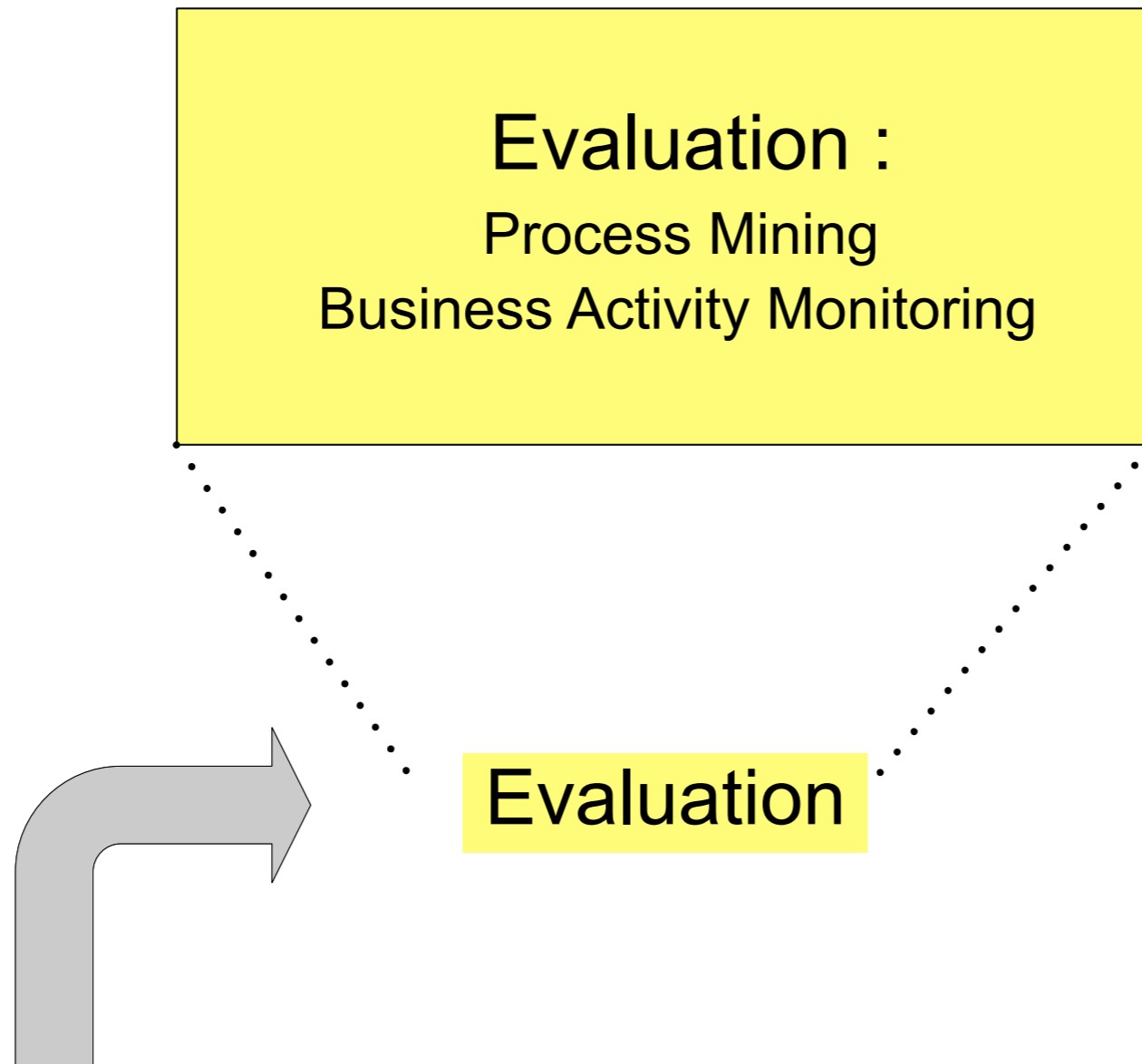
At each moment in time, the current **status** of any instance must be **known** (and **logged**) by the system as accurately as possible

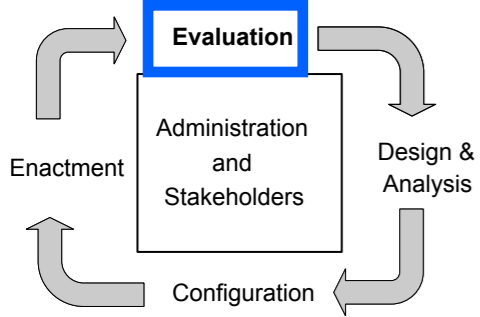
Both for process instances and activity instances

Fancy visualization techniques are usually provided by business process management systems (e.g., coloured activities)

Such information is highly valuable for customers (e.g., tracking of orders)

# Business process lifecycle



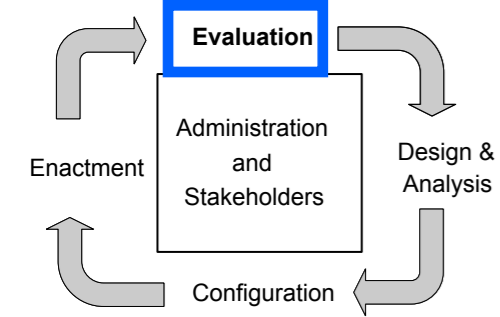


# Evaluation phase

Execution **logs** are of fundamental importance

The information collected during instances enactment can be used to evaluate and improve business process models

Business **activity monitoring** and **process mining** techniques aim at identifying the quality of the model and the adequacy of the environment

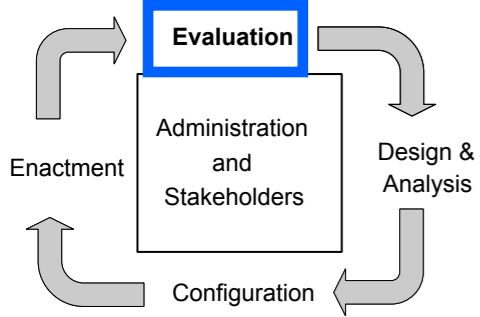


# BA monitoring

Log files typically include information such as the start / end timestamps of activity instances

Activity monitoring serve to identify that certain activities take too long or need more resources

The same information can be also exploited in the simulation sub-phase of the design and analysis phase



# Mining

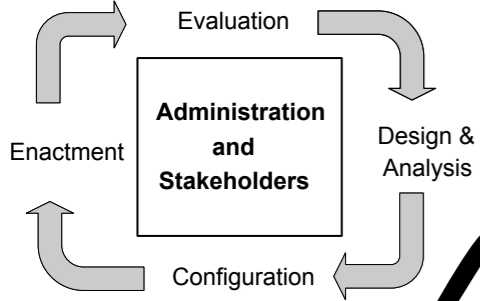
Process mining has recently turned into an active field of research

Thanks to mining techniques, execution logs can be used for the automatic generation of business process models in the design and analysis phase

They can also be used to assess and compare different models to see which fits best the enacted instances

# Business process lifecycle

Administration  
and  
Stakeholders



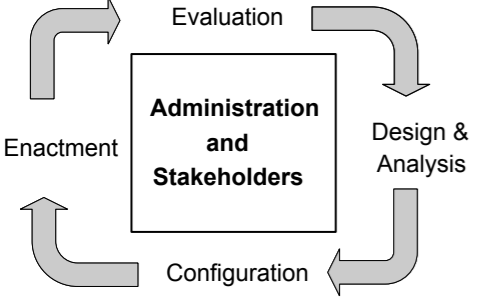
# Administration phase

Business process management involves numerous artifacts at different levels of abstraction

Such artifacts need to be organized and managed (storage, retrieval, disposal)

A well-structured repository is needed, with powerful query mechanisms





# Stakeholders

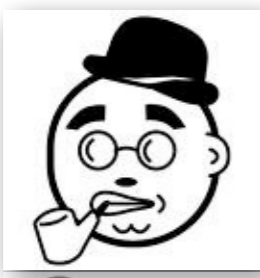
Several types of stakeholders co-exist in the process domain

They have different kind of educational background, knowledge, expertise, experience

Roughly, they can be classified into a few roles



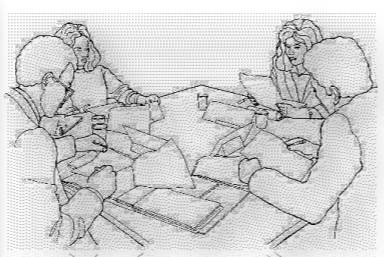
CPO



BE



PD



PP



KW



PR



SA



Dev

# Chief process officer

Top level management  
(CPO reports directly to CEO / board of directors)

Responsible for defining **rules, policies and guidelines** and establishing control mechanisms

Responsible for standardizing and harmonizing business processes in the enterprise

Responsible of business process evolution in the presence of changing market requirements



# Business engineer

Business domain expert

Responsible for defining **strategic goals** of the company and **organizational business processes**

Often equipped with non-technical educational background (mostly economics)

It is preferred to communicate with these stakeholders by means of simple-to-use process modeling notation



# Process designer



Responsible for **modeling business processes** by communicating with business domain experts and other stakeholders

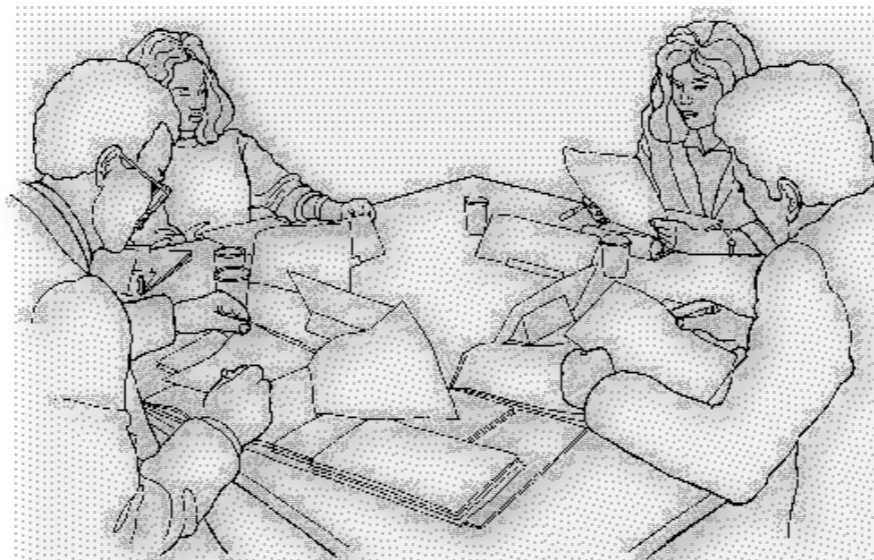
Must be equipped with good analytical capabilities and **excellent communication skills**

# Process participants

Conduct the actual **operational work**  
during the enactment of processes

They are knowledgeable about the activities conducted,  
fundamental information for the modeling phase

Their information must be assembled by the designer to  
compose an overall picture in the process model



# Knowledge worker

Process participants who use software systems to **perform activities** in a business process, often autonomously



# Process responsible

An individual who is held responsible for the correct and efficient execution of all instances of a business process model

Responsible for **detecting inefficiencies** and **improving** the process model

Close collaboration with process participants and the process designer is needed



# System architect

Responsible for developing and **configuring** business process management systems on the information system infrastructure at hand





# Developers

Information technology professionals

Responsible for creating the **software artifacts** required to implement business processes

Implementation of interfaces is a relevant part of the work done by developers

