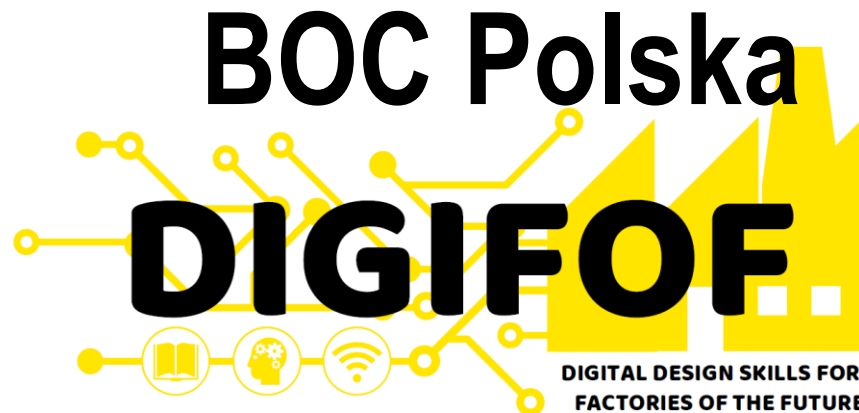
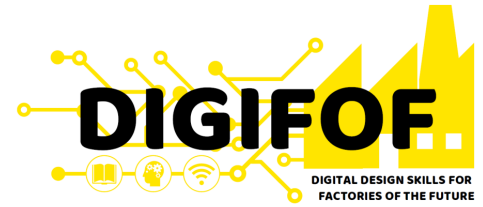


Process-oriented topic: Process improvement using simulation



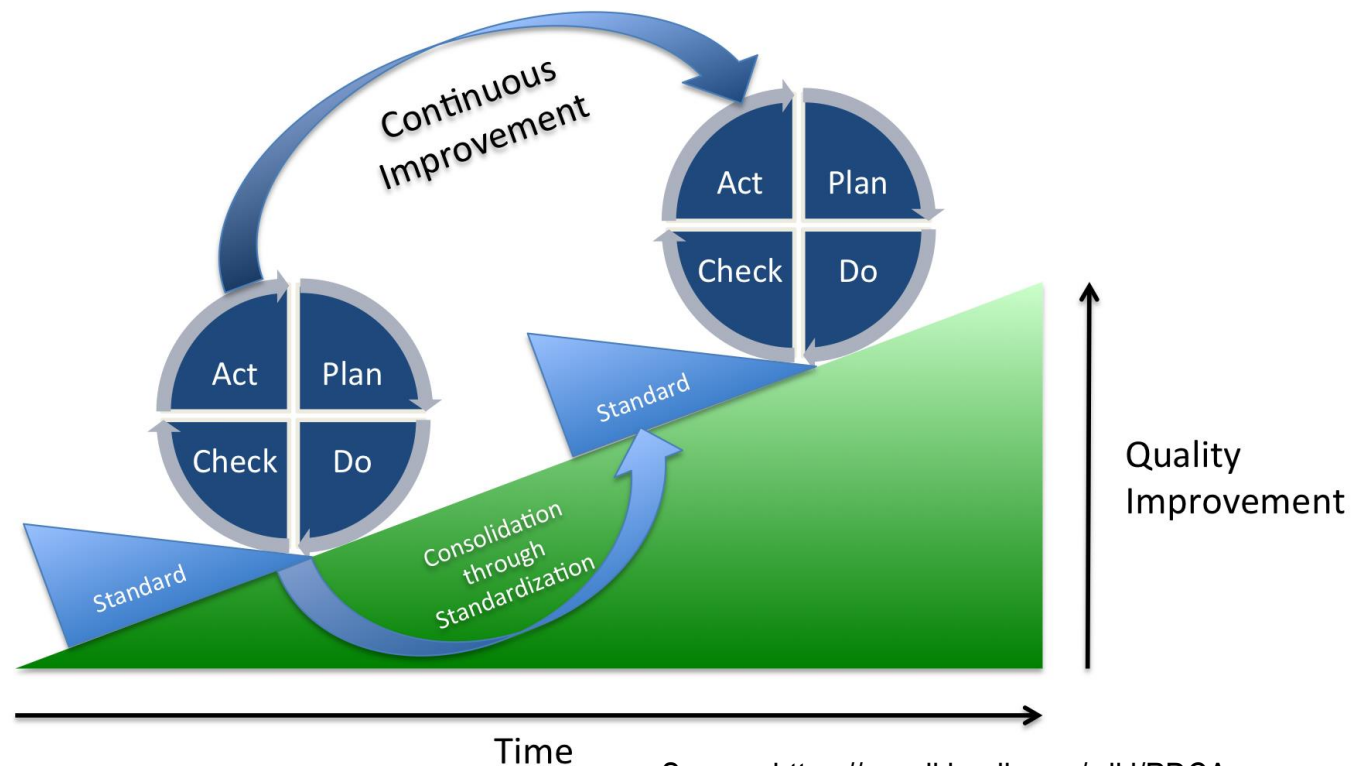
Agenda



- ▶ **Process management life-cycle**
- ▶ Change management and proces improvement
- ▶ Process simulation

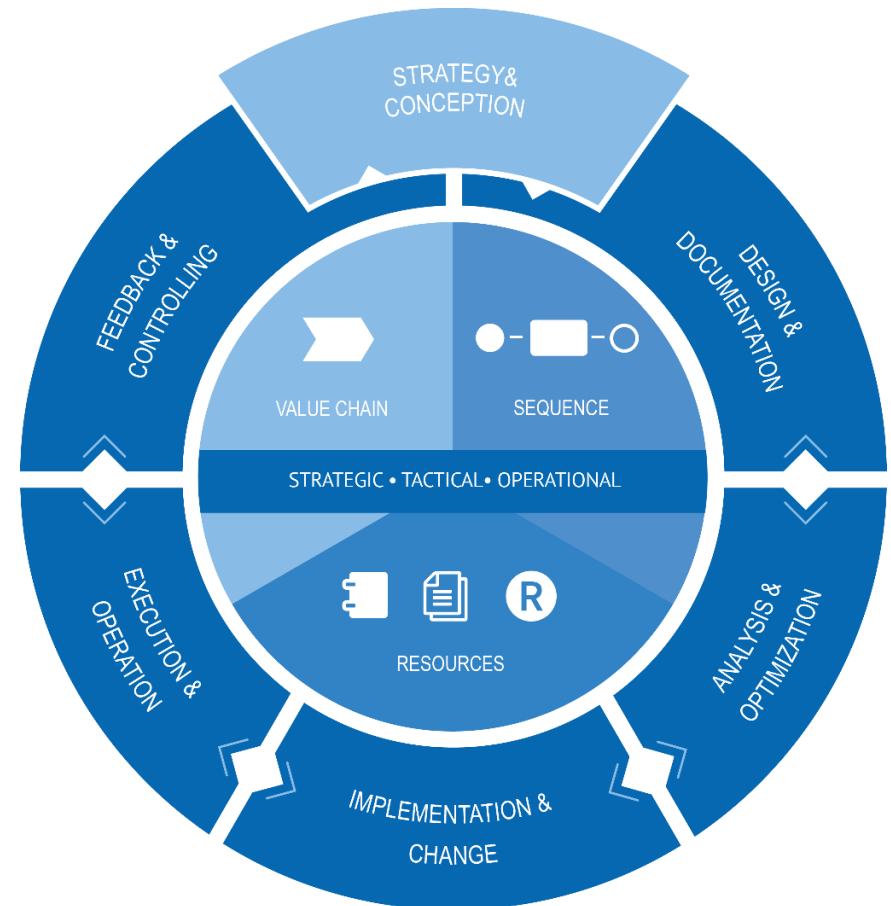
Process management life cycle

- ▶ Managing and improving processes is not a one-off activity.
- ▶ According to the PDCA/PDSA (Shewhart) cycle popularised W. Edwards Deming there should be a loop which guarantees continuous improvement



Process management life cycle

- ▶ Graphic shows example process management life cycle (PMLC*)
- ▶ * More information about PMLC can be found in:
<https://www.springer.com/de/book/9783642369940>



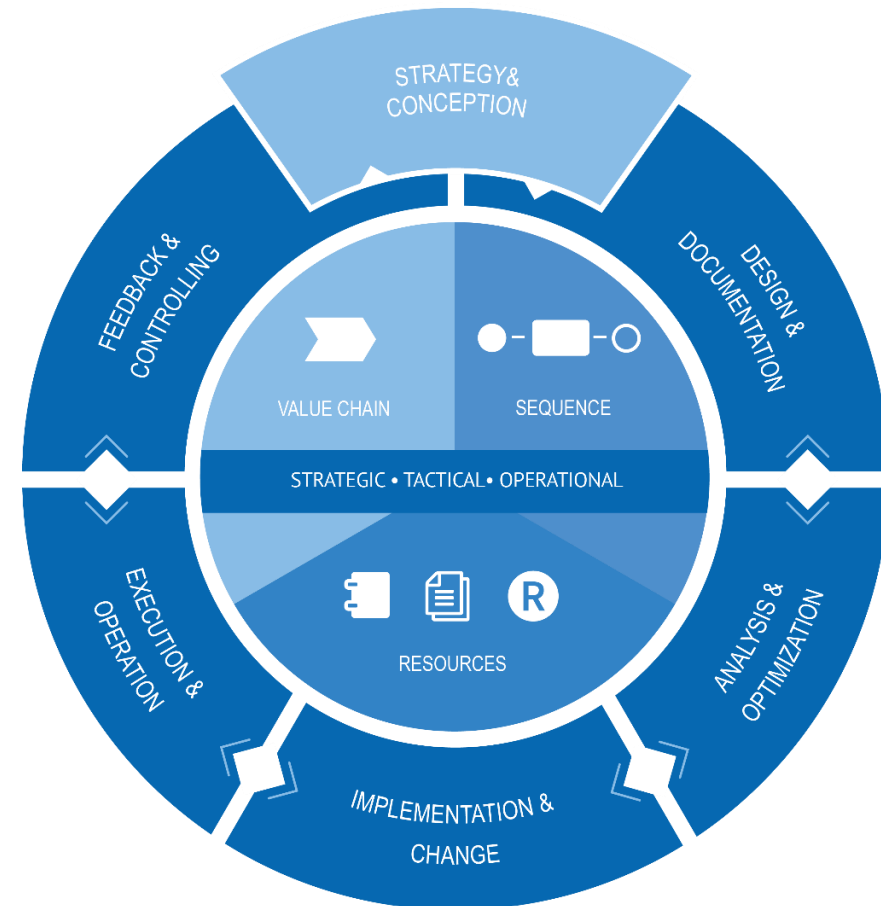
Agenda



- ▶ Process management life-cycle
- ▶ **Change management and process improvement**
- ▶ Process simulation

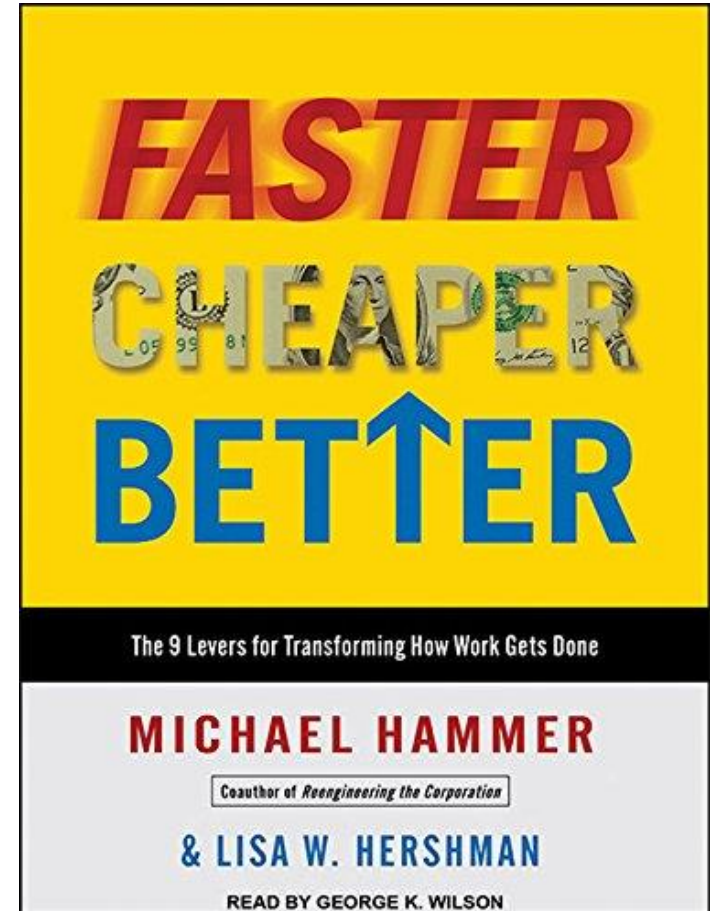
Change management

- ▶ Usually process management initiatives begin by designing existing, current state processes
- ▶ They are commonly named „AS-IS”
- ▶ If the current state of the process is not acceptable for the organization, new proposed version of the process needs to be designed during the analysis and optimization phase
- ▶ Those future state processes are called „TO-BE”



Process improvement techniques

- ▶ There are many approaches to process improvement.
- ▶ Usually their goal is to reduce process cycle time, improve quality and reduce costs (as it was summed up in a famous book about BPM by Michael Hammer), but also additional goals are possible.



Process improvement techniques (continued)



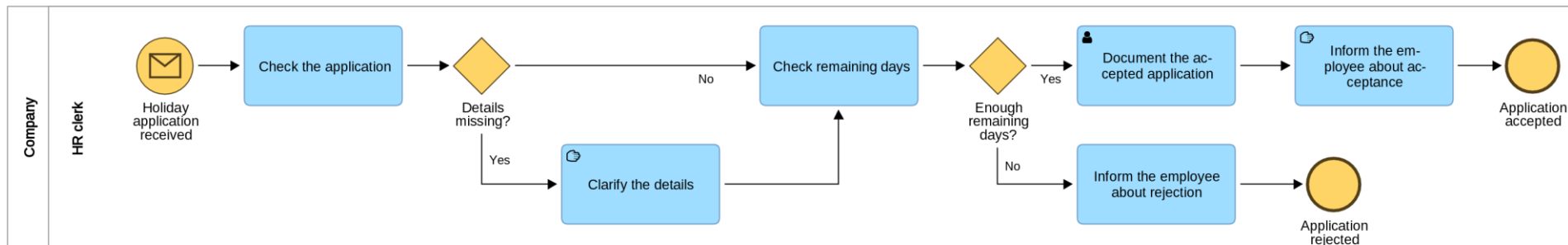
- ▶ According to authors of "Fundamentals of Business Process Management" (Marlon Dumas, Marcello La Rosa, Jan Mendling, and Hajo A. Reijers) process analysis and improvement techniques can be categorised as:
 - ▶ **Qualitative** or
 - ▶ **Quantitative**

Qualitative technique – Value Added Analysis

- One of the easiest to understand qualitative techniques is Value added analysis
- To use this approach analyse each step of the process and see whether it serves the process goal or not.
- Following categories are available:
 - Value Adding (VA) – those are the process steps which create value from the customer point of view. This is a work done right right away (no rework, fixes etc.). Customer would be willing to pay for those steps.
 - Value Enabling/Business Value Adding (VE/BVA) – those are the things which are not important for a customer, but are needed from a business point of view or due to regulations. They allow value creation.
 - Non Value Adding (NVA) – those steps do not support value creation by process

Exercise

- Use the holiday application process created during BPMN training and perform Value Added Analysis (e.g. using Text Annotations or Groups)

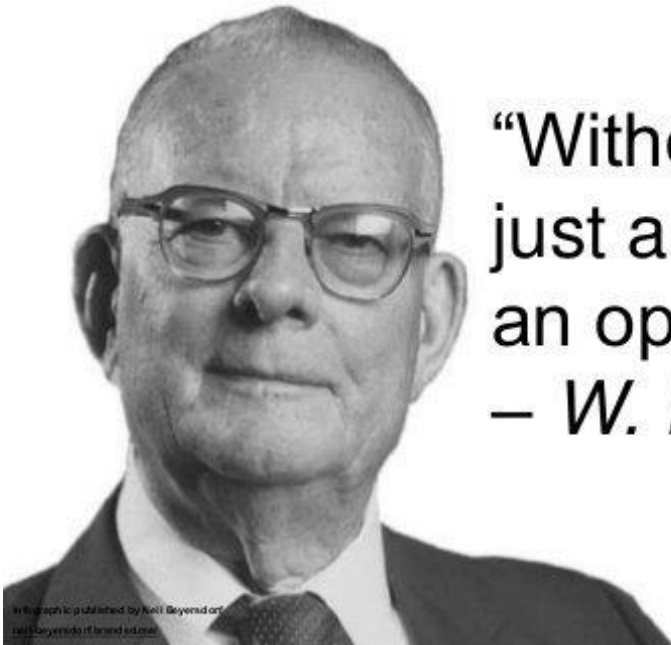


Qualitative technique – Waste Analysis

- Additional useful qualitative technique is waste analysis. It is commonly used by Lean practitioners.
- To facilitate analysis of steps which are wasteful and should be eliminated from a process TIMWOODS acronym is often used:
 - *Transport - Unnecessarily moving things, forms, furniture, resources and materials from one location to another.*
 - *Inventory - Making more than customer demand, building up unnecessary stocks e.g. of printed materials, reports.*
 - *Motion - Unnecessary movement; people walking to get things, which should be located closer to the point of use.*
 - *Waiting - Delays between operations because parts are missing. Stopped work: waiting for information, approval, other processes, or people.*
 - *Over-production - Making too much or too many. Completing a task before it is needed. Developing outputs that the customer hasn't requested.*
 - *Over-processing - Duplicate or redundant operations, performing wasteful steps that are not required. Often because “we always do it this way”.*
 - *Defects - Failing to produce a quality output the first time generating rework or scrap. Not delivering the service “right the first time”.*
 - *Skills - Failing to use skills and capabilities of staff. Not listening to people, using their knowledge or learning from past mistakes/issues.*

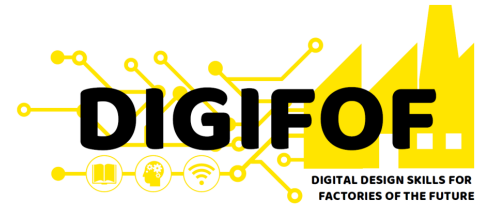
Quantitative methods

- While qualitative methods are very useful, sometimes process improvement requires more strict and data-based methods, which reduce risk of subjective decisions.
- One of such methods is process simulation



“Without data you’re
just another person with
an opinion.”
– *W. Edwards Deming*

Agenda



- ▶ Process management life-cycle
- ▶ Change management and process improvement
- ▶ **Process simulation**

Why process simulation?

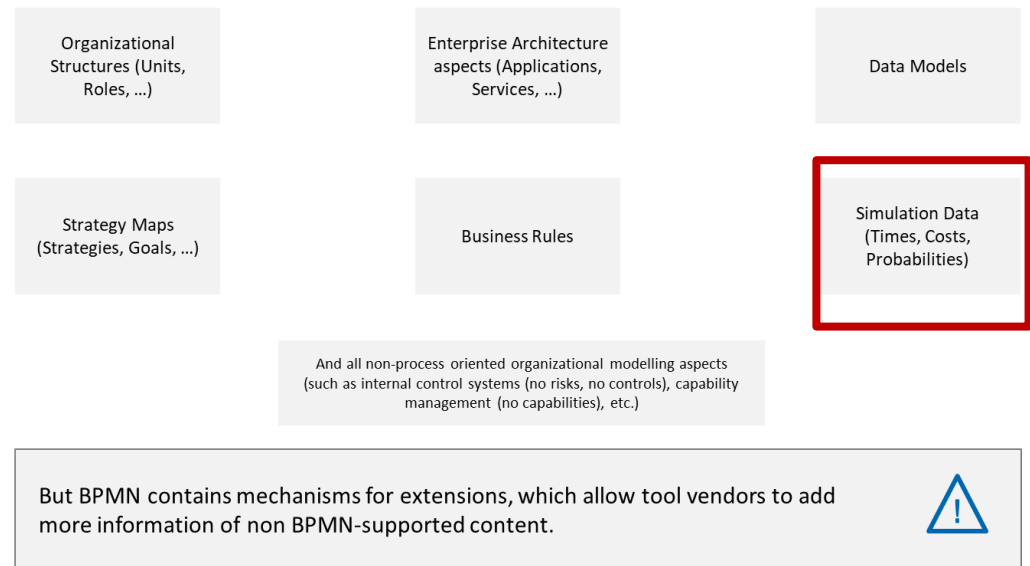


- Process simulation extends process diagrams with quantitative data about times and costs of the process steps, process frequency, probabilities of process paths and more.
- This allows creation of various simulation scenarios which help compare the AS-IS and TO-BE processes in order to decide about planned changes
- This allows safe experiments without disrupting normal work
- Simulation also helps in establishing bottlenecks

BPMN and simulation

- As it was mentioned in BPMN training, BPMN specification does not include elements needed for simulation such as Times and costs
- However BPMN diagrams can be extended with vendor extensions

What BPMN does not cover



How to gather information for simulation?

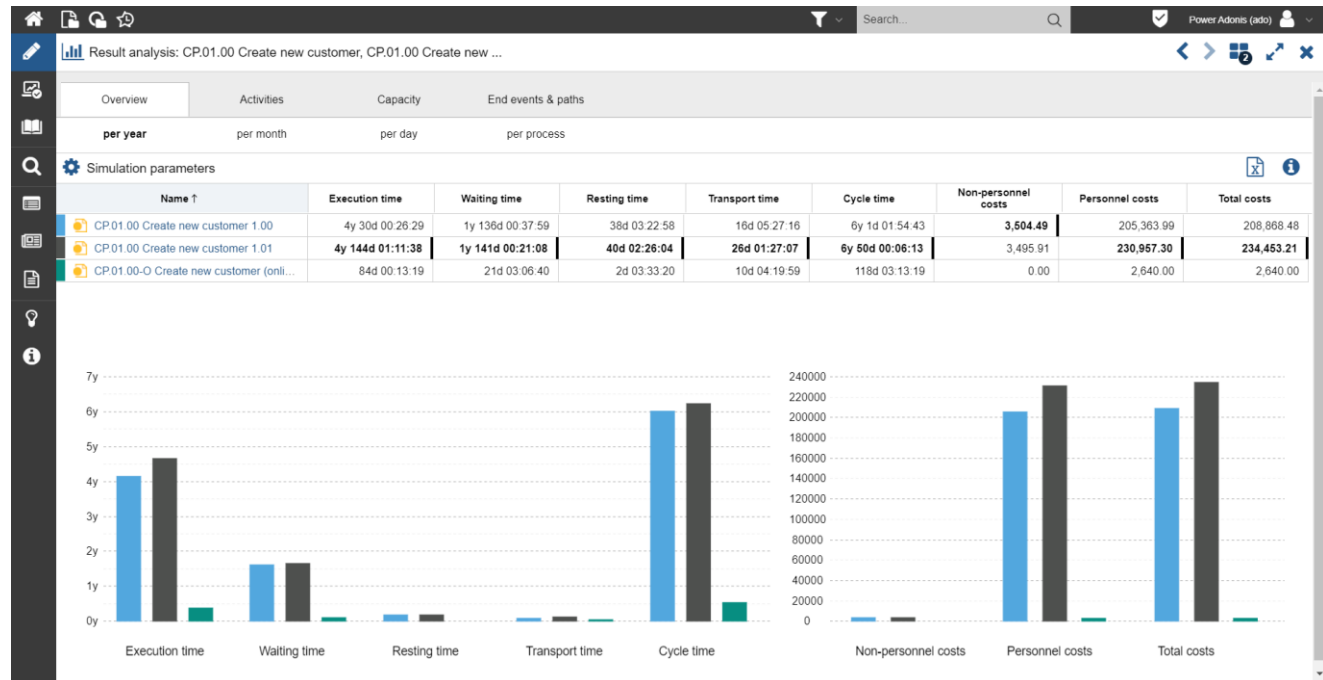


- Modelling sessions
- Modelling workshops
- Process time study
- Estimations by employees
- Analysis of logs/Process mining

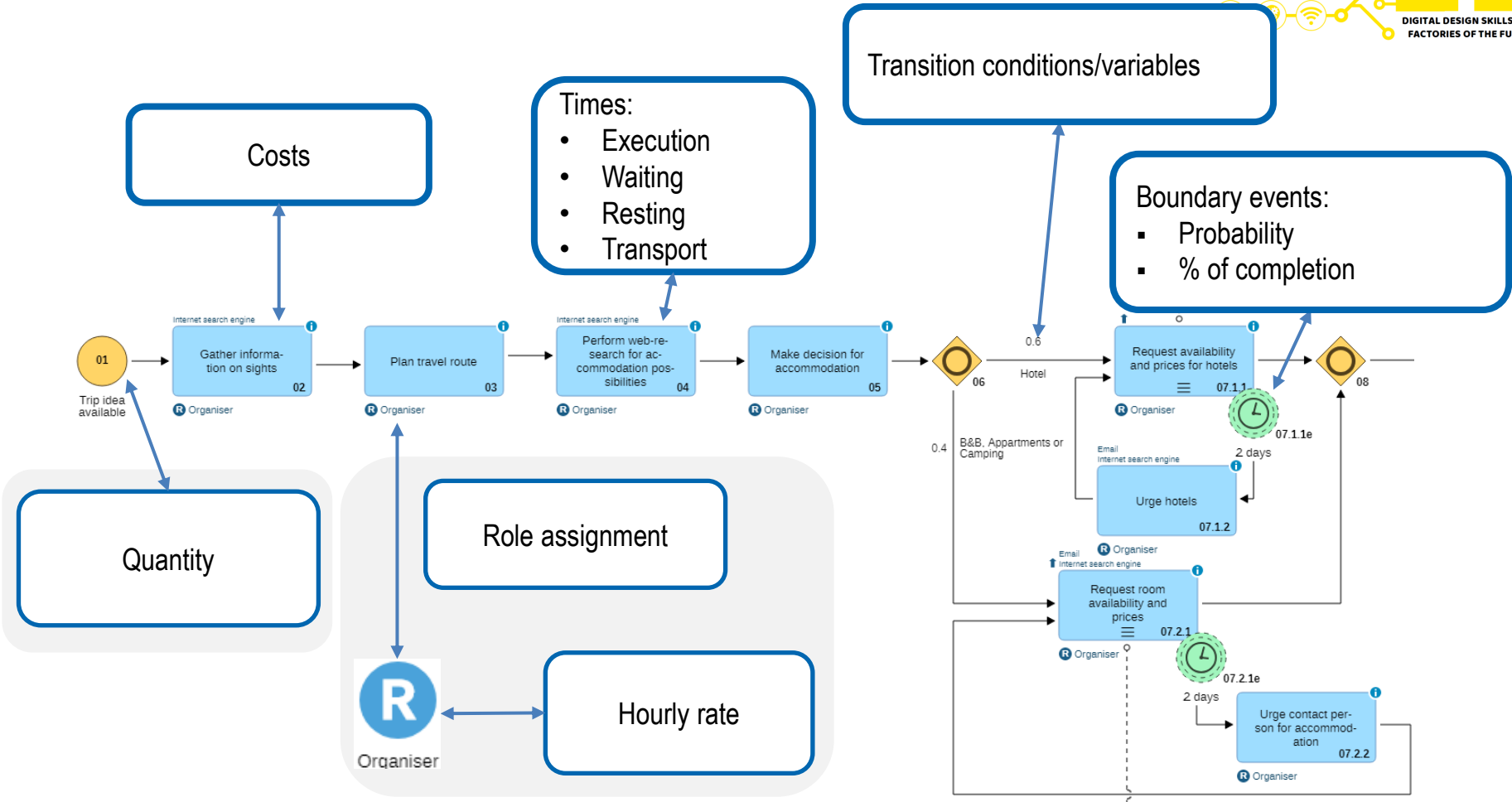
What are the possible results of simulation



- Overall time and costs of a process
- Detailed info
- What-if analysis
- Resource usage
- ...



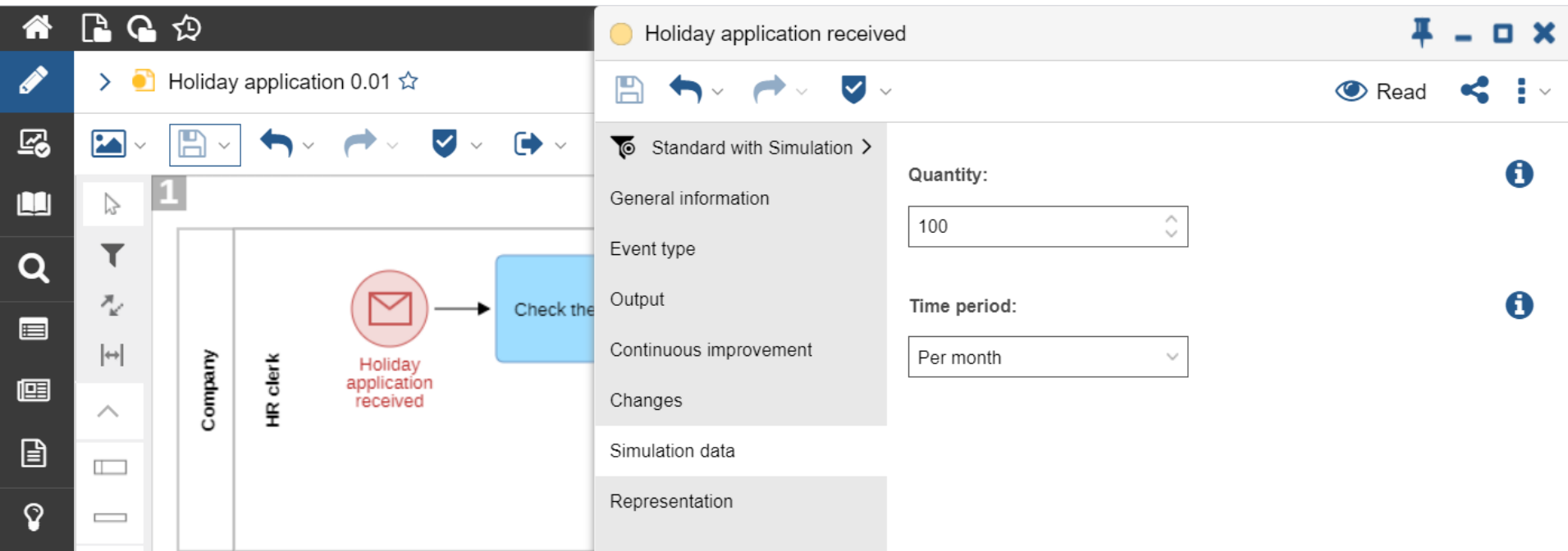
Extending BPMN with simulation data



Model needs to be valid too!

Exercise

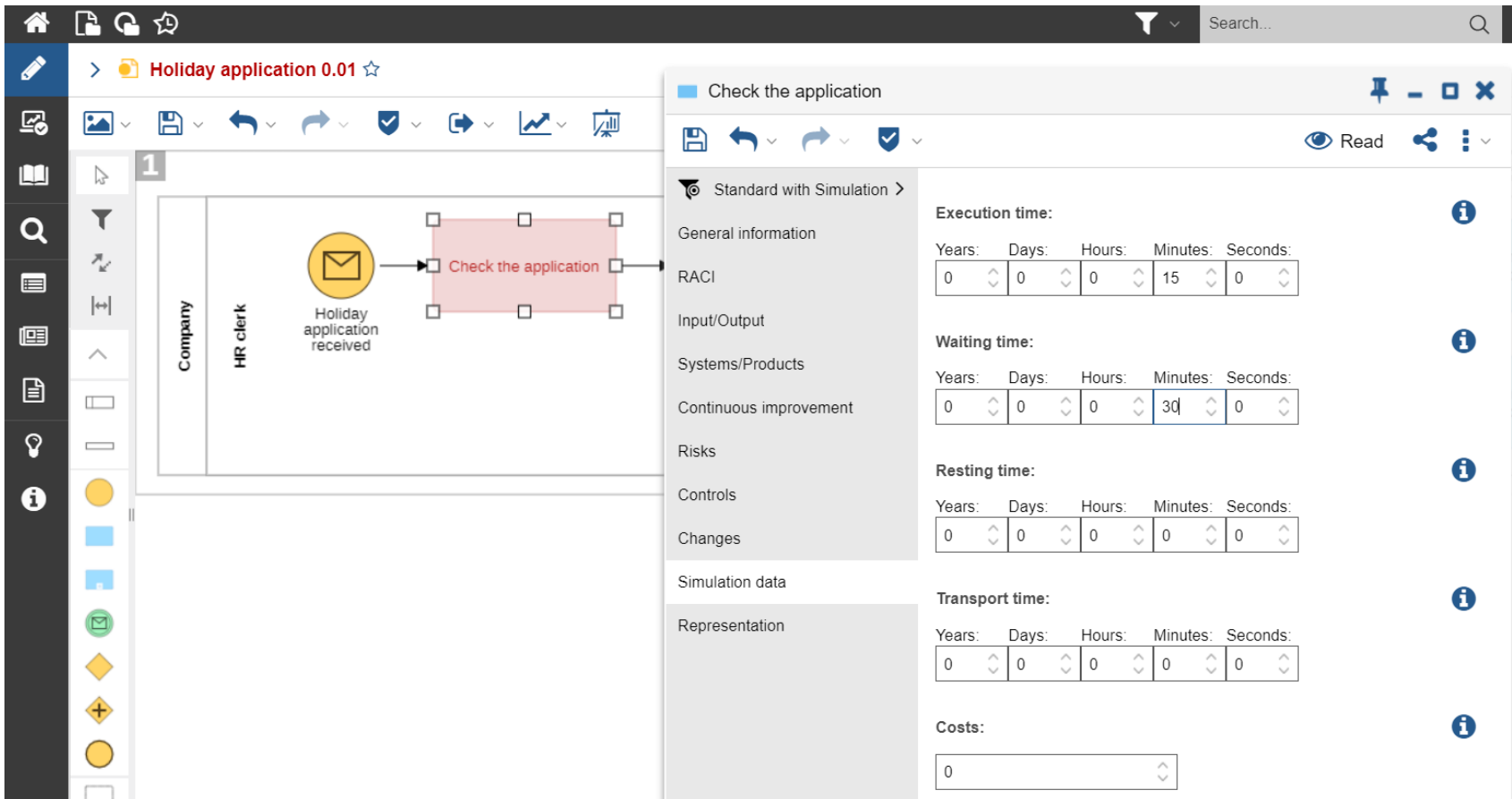
- Specify the process frequency as 100 per month



The screenshot displays a simulation software interface. On the left, a process flow diagram shows a 'Company' entity with an 'HR clerk' role. A red envelope icon labeled 'Holiday application received' is connected to a blue box labeled 'Check the...'. The top navigation bar includes icons for home, file, refresh, and star. The main toolbar contains icons for image, save, undo, redo, and checkmark. The configuration panel on the right is titled 'Holiday application received' and includes a 'Standard with Simulation' dropdown menu. The 'Quantity' is set to 100 and the 'Time period' is set to 'Per month'. Information icons are present next to the 'Quantity' and 'Time period' fields.

Exercise

- Specify the times and costs (non personal) of a process steps (Tasks) according to the table shown on a following slide



The screenshot shows a process simulation software interface. The main workspace displays a process flow diagram with a task named "Check the application" highlighted in red. The task is connected to a preceding event "Holiday application received" and a succeeding event. The task is assigned to the role "HR clerk" within the "Company" organization.

The configuration panel for the task "Check the application" is open, showing various settings:

- Execution time:** Years: 0, Days: 0, Hours: 0, Minutes: 15, Seconds: 0
- Waiting time:** Years: 0, Days: 0, Hours: 0, Minutes: 30, Seconds: 0
- Resting time:** Years: 0, Days: 0, Hours: 0, Minutes: 0, Seconds: 0
- Transport time:** Years: 0, Days: 0, Hours: 0, Minutes: 0, Seconds: 0
- Costs:** 0

Exercise

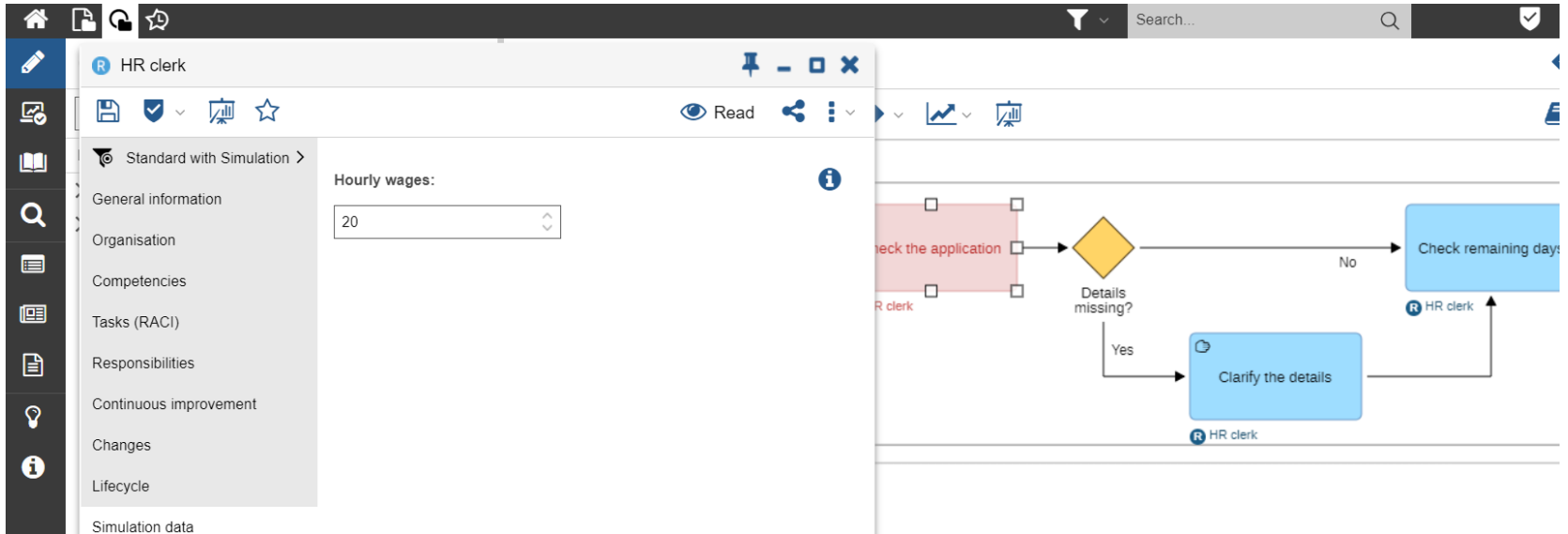


Values to add:

Task	Execution time	Waiting time	Costs
Check the application	15 minutes	30 minutes	0
Clarify the details	10 minutes	5 minutes	0
Check remaining days	20 minutes	2 minutes	0
Document the accepted application	5 minutes	5 minutes	0
Inform the employee about rejection	5 minutes	30 minutes	1
Inform the employee about acceptance	5 minutes	30 minutes	1

Exercise

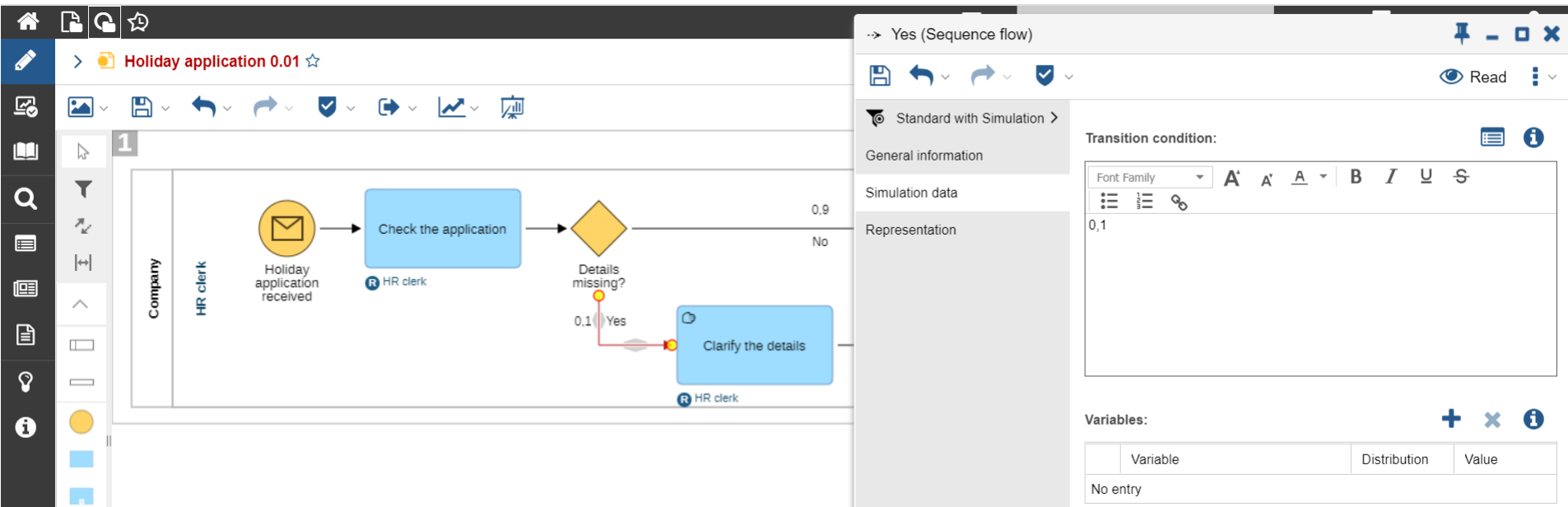
- Assign the „HR clerk” role to all Tasks and set the Hourly wage to 20



The screenshot displays a software interface for task configuration. On the left, a sidebar lists various categories: Standard with Simulation, General information, Organisation, Competencies, Tasks (RACI), Responsibilities, Continuous improvement, Changes, Lifecycle, and Simulation data. The 'Tasks (RACI)' category is selected, showing a configuration for the 'HR clerk' role. The 'Hourly wages' field is set to 20. On the right, a BPMN diagram illustrates a process flow. It starts with a task 'Check the application' (highlighted in red) assigned to the 'HR clerk' role. This leads to a decision diamond 'Details missing?'. If 'Yes', the flow goes to a task 'Clarify the details' (assigned to 'HR clerk'), which then loops back to 'Check remaining days' (assigned to 'HR clerk'). If 'No', the flow goes directly to 'Check remaining days'.

Exercise

- Assign the probabilities to process paths knowing that:
 - „Details missing?” gateway has Yes and No outgoing sequence flows with probabilities 0,1 and 0,9 accordingly
 - „Enough remaining days?” gateway also has Yes and No paths with probabilities 0,8 and 0,2



Exercise



- Run the simulation with default settings and establish
 - average process cycle time per process,
 - yearly total costs,
 - capacity of the HR Clerk role

Join DigiFoF network!

www.digifof.org