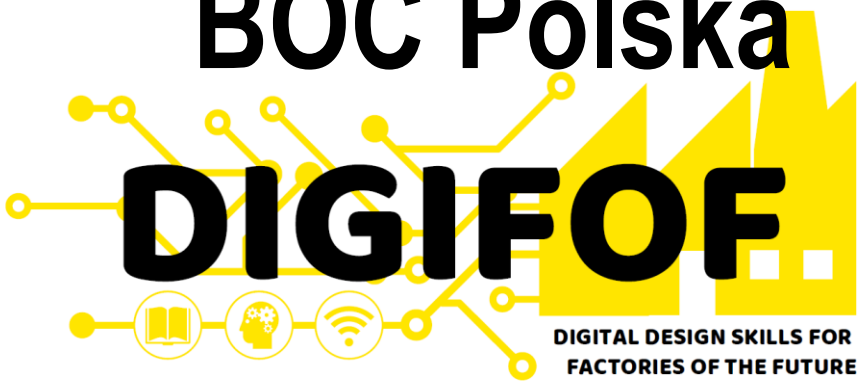
Process-oriented topic: Process improvement using simulation

BOC Polska

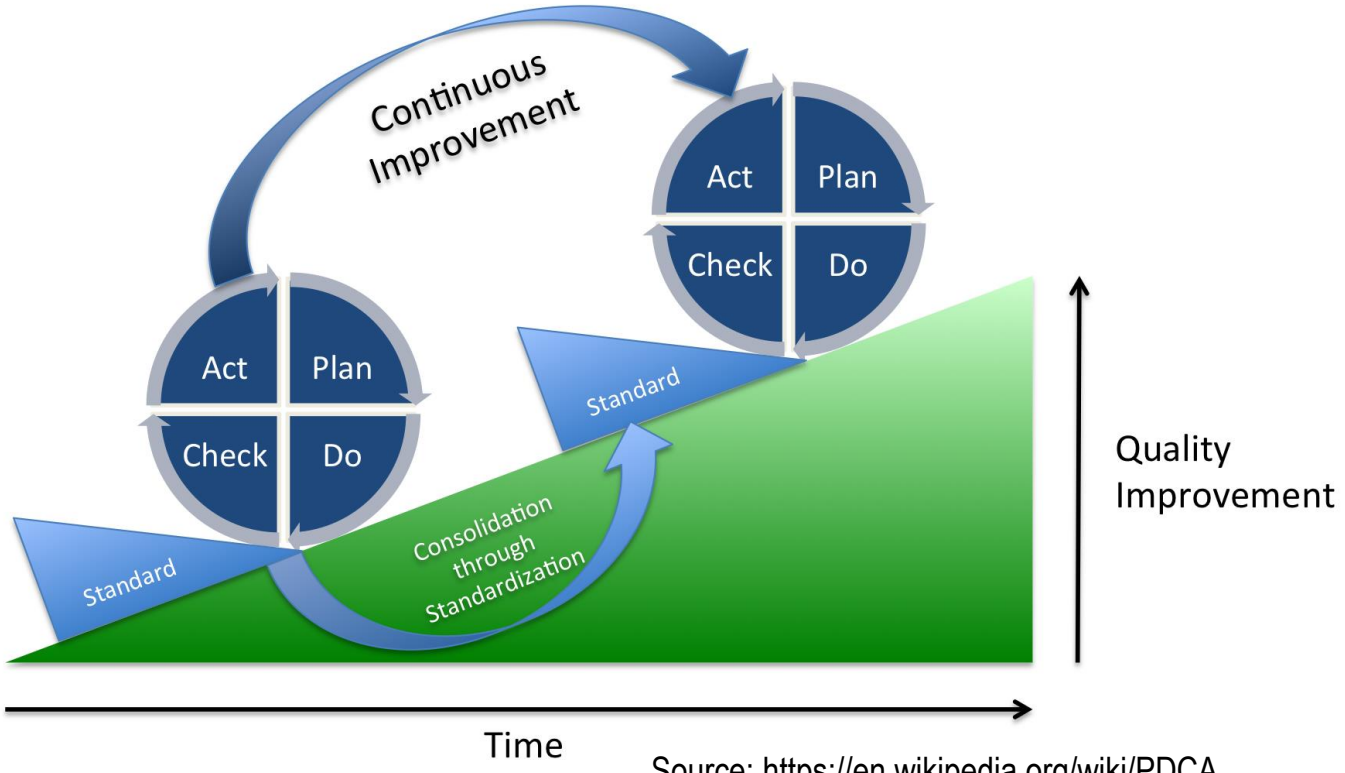


Agenda

- **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

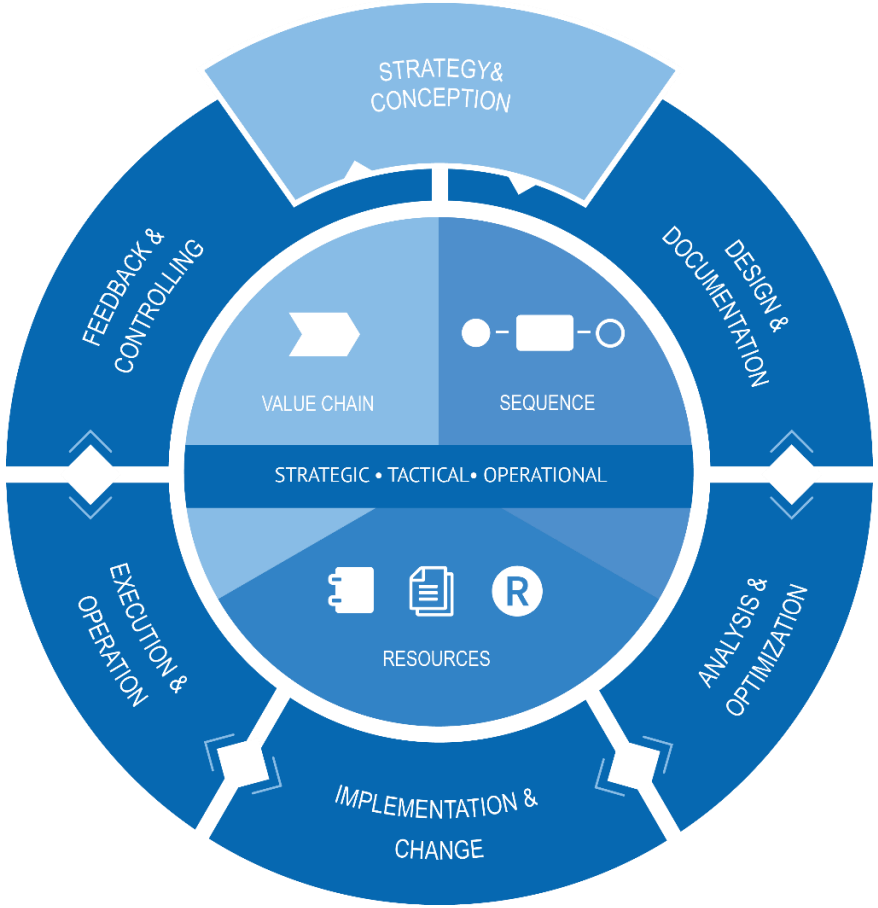


Source: https://en.wikipedia.org/wiki/PDCA

Process management life cycle

- Graphic shows example proces management life cycle (PMLC*)

- * More information about PMLC can be found in: https://www.springer.com/de/book/9783642369940



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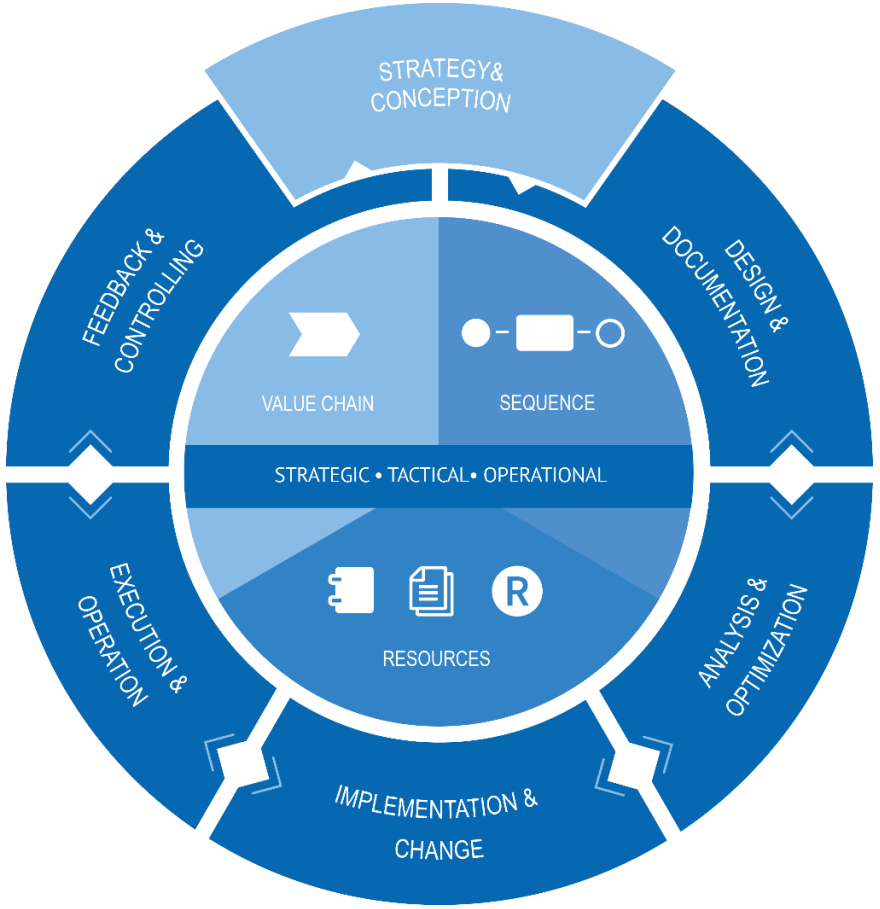
Change management

- Usually process management initiatives begin by designing existing, current state processes
- They are commonly named „AS-IS”

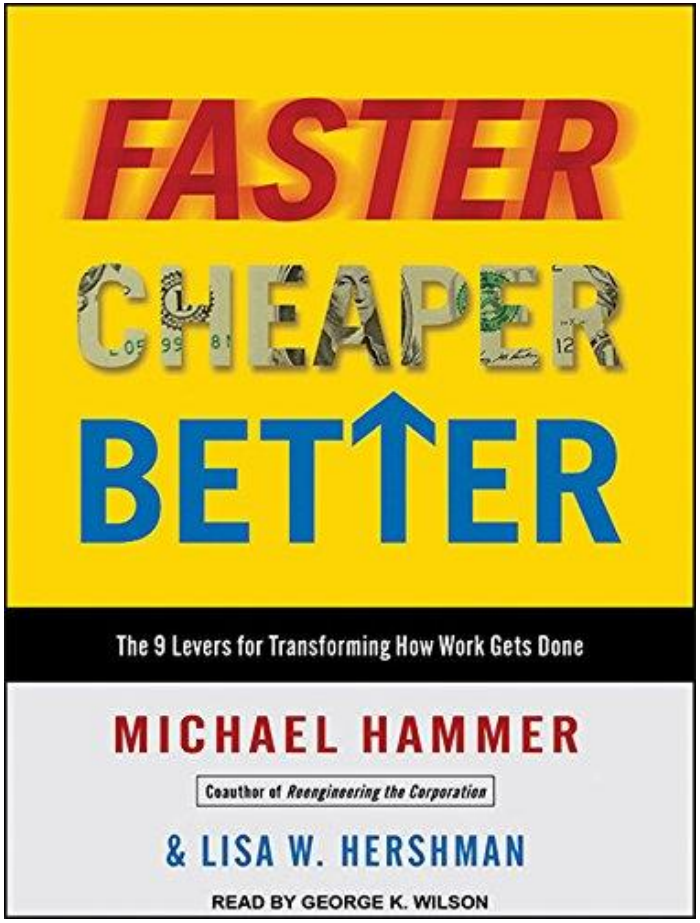
- If the current state of the process is not acceptable for the organization, new proposed version of the process needs to be designed during the analysis and optimization phase
- Those future state processes are called „TO-BE”



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
- **Quantivative**

Qualitative technique – Value Added Analysis

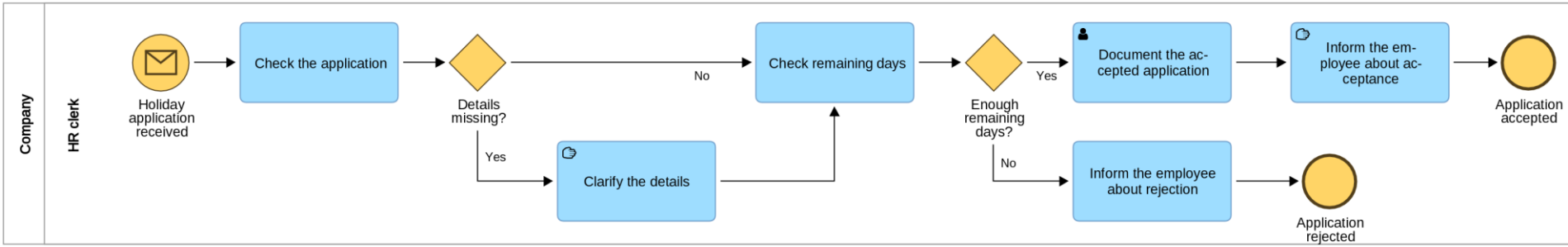
- One of the easiest to understand qualitative techniques is Value added analysis

- 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

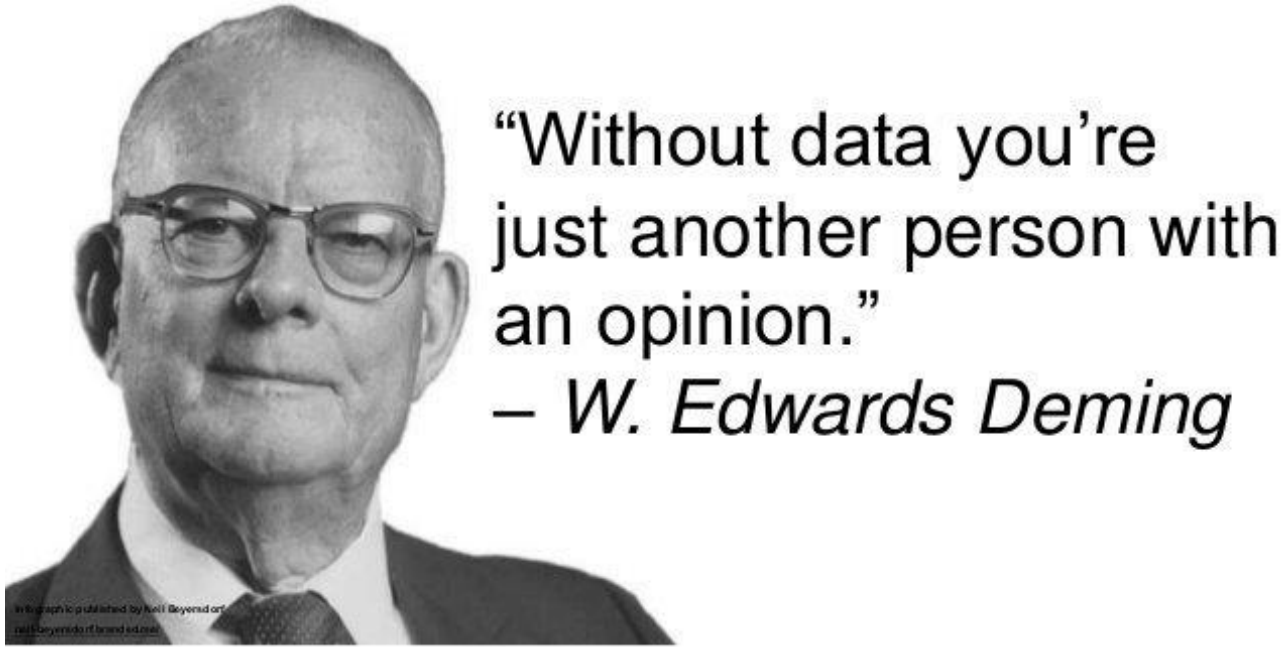
- Additional useful qualitative technique is waste analysis. It is commonly used by Lean practitioners.

- 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.*

Source: http://worksmartertogether.ucd.ie/who-is-tim-woods/

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



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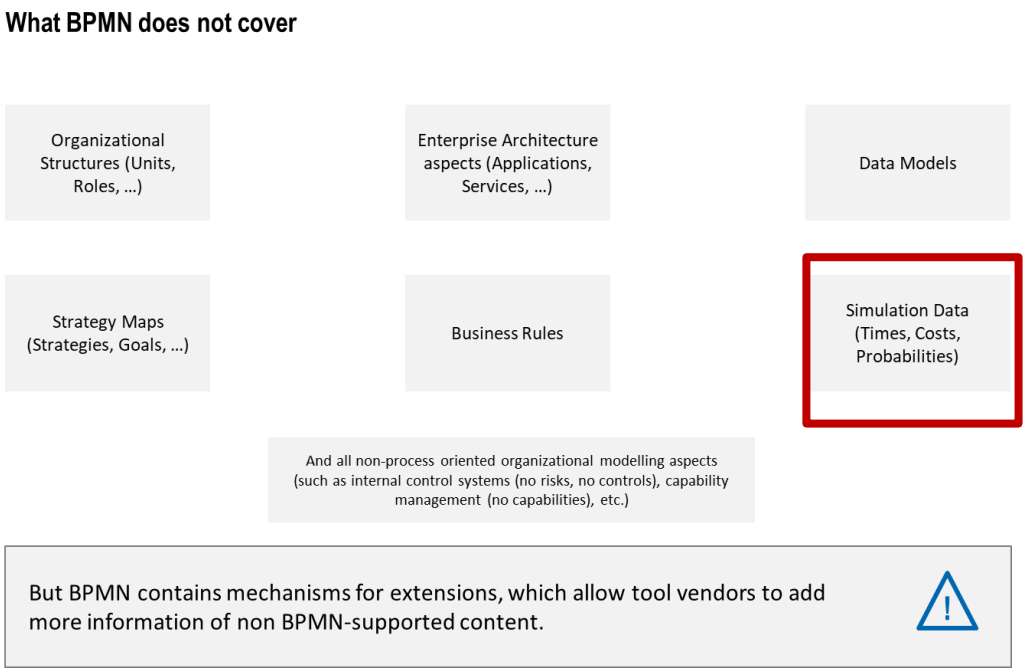
- **Process simulation**

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



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

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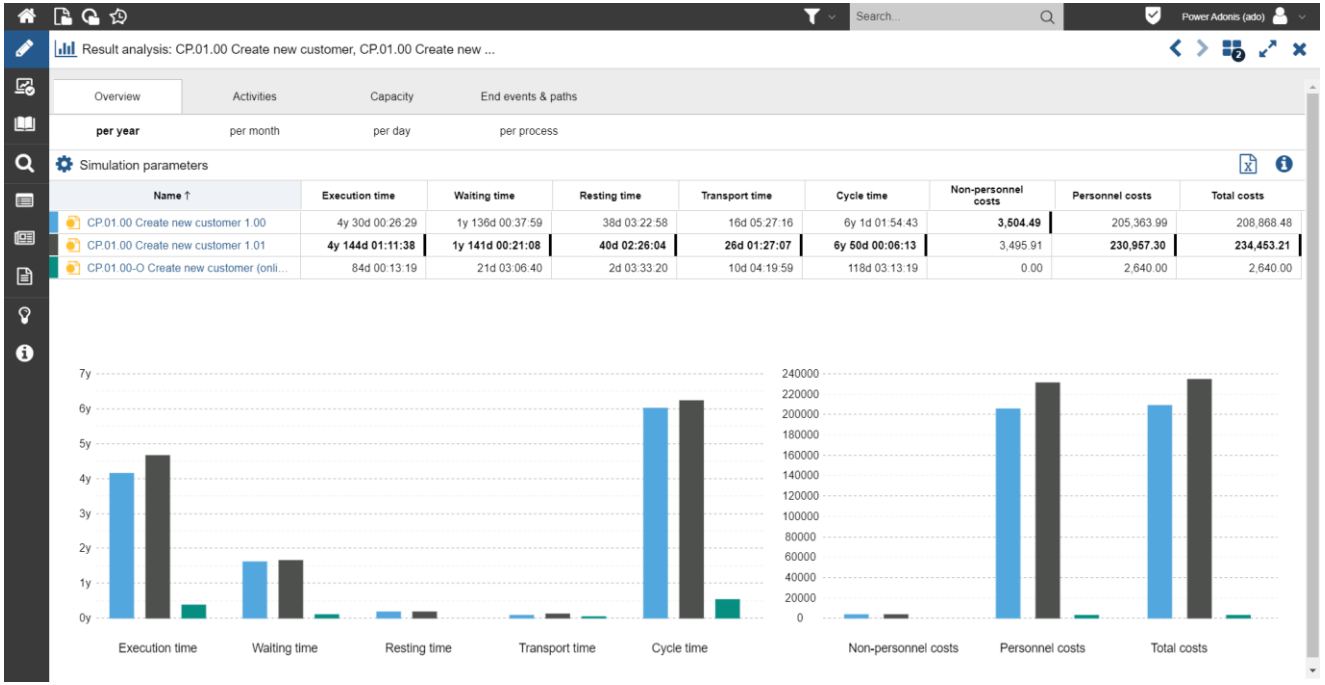
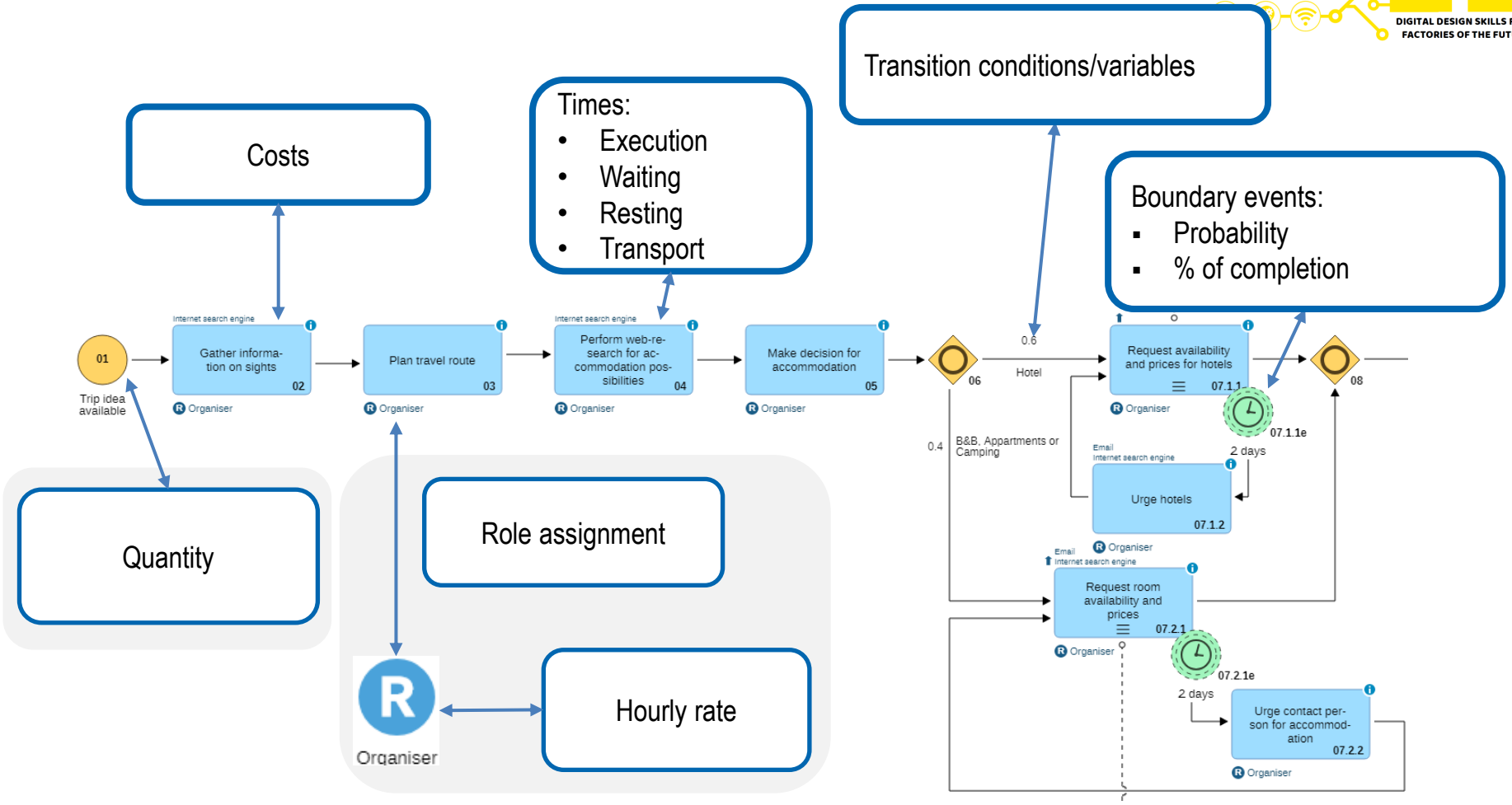
- Overall time and costs of a process
- Detailed info
- What-if analysis
- Resource usage
- …



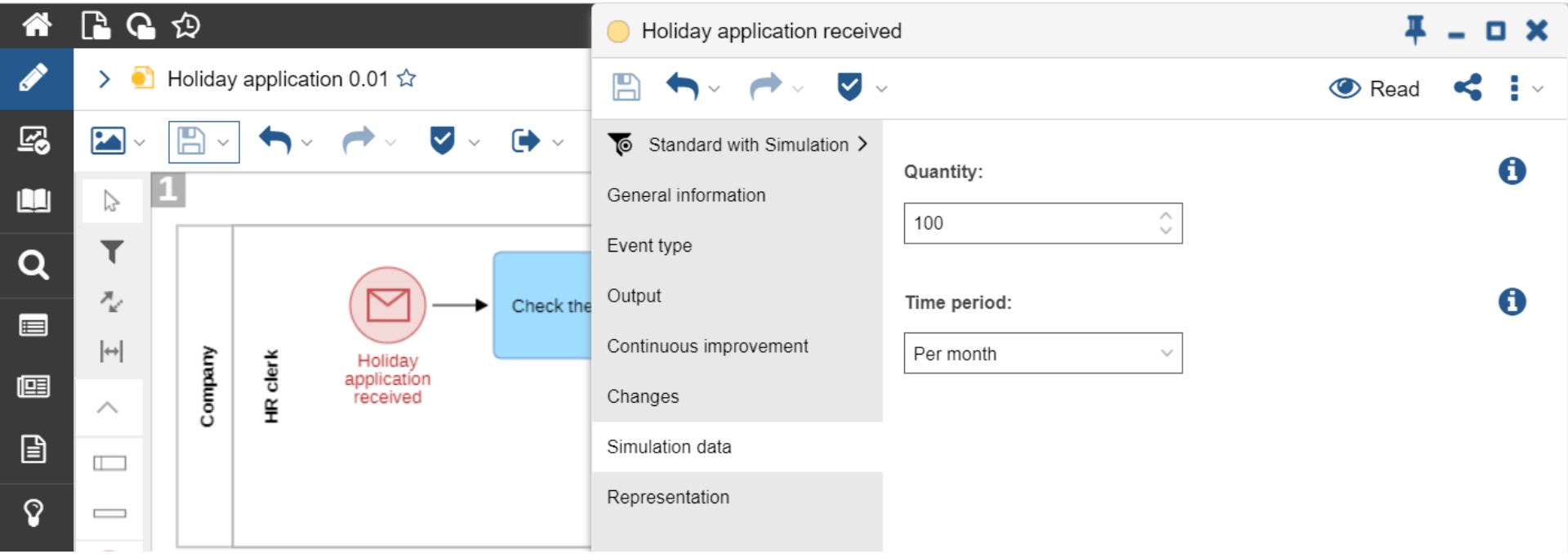
Extending BPMN with simulation data



Model needs to be valid too!

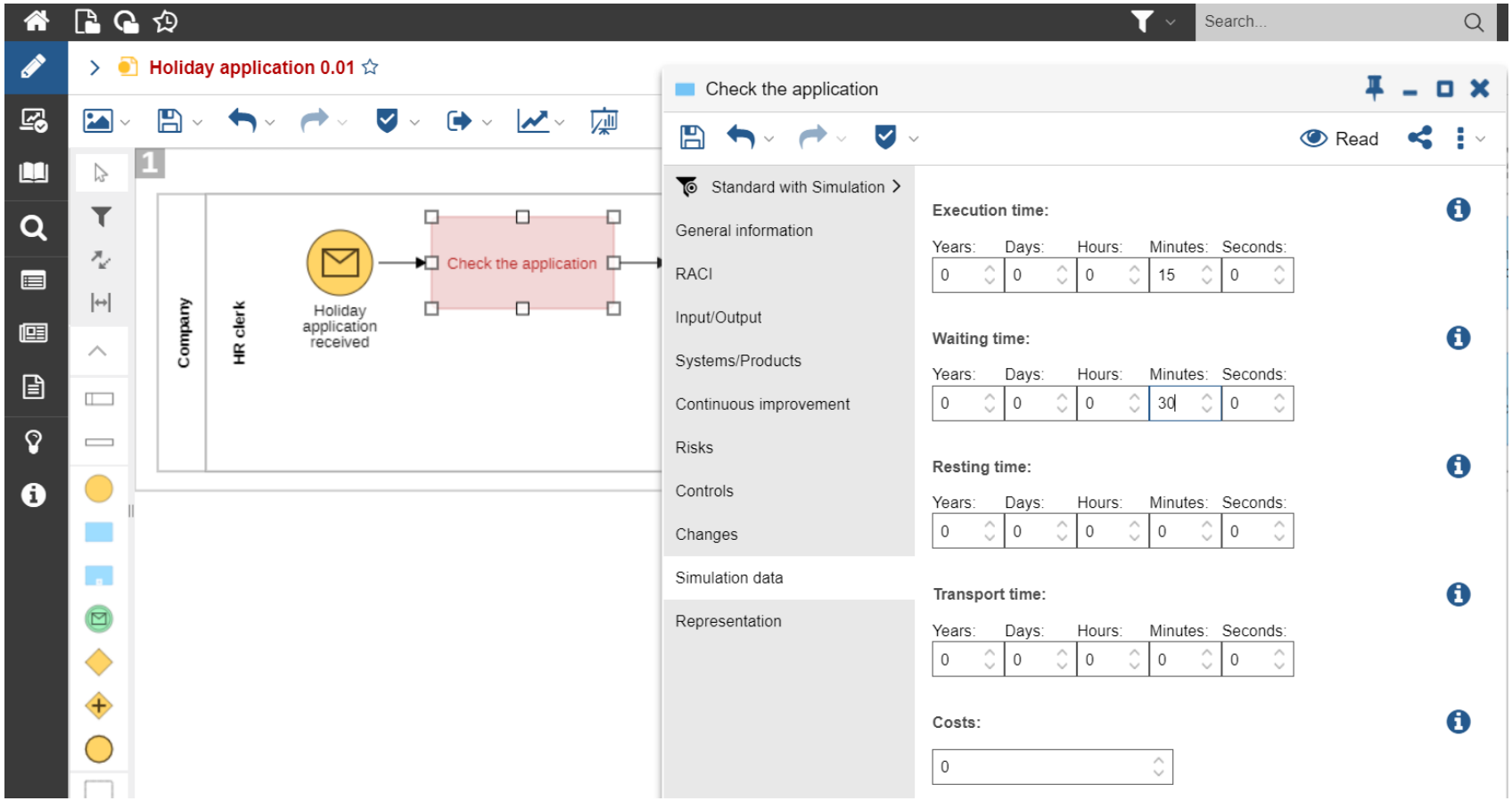
Exercise

- Specify the process frequency as 100 per month



Exercise

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



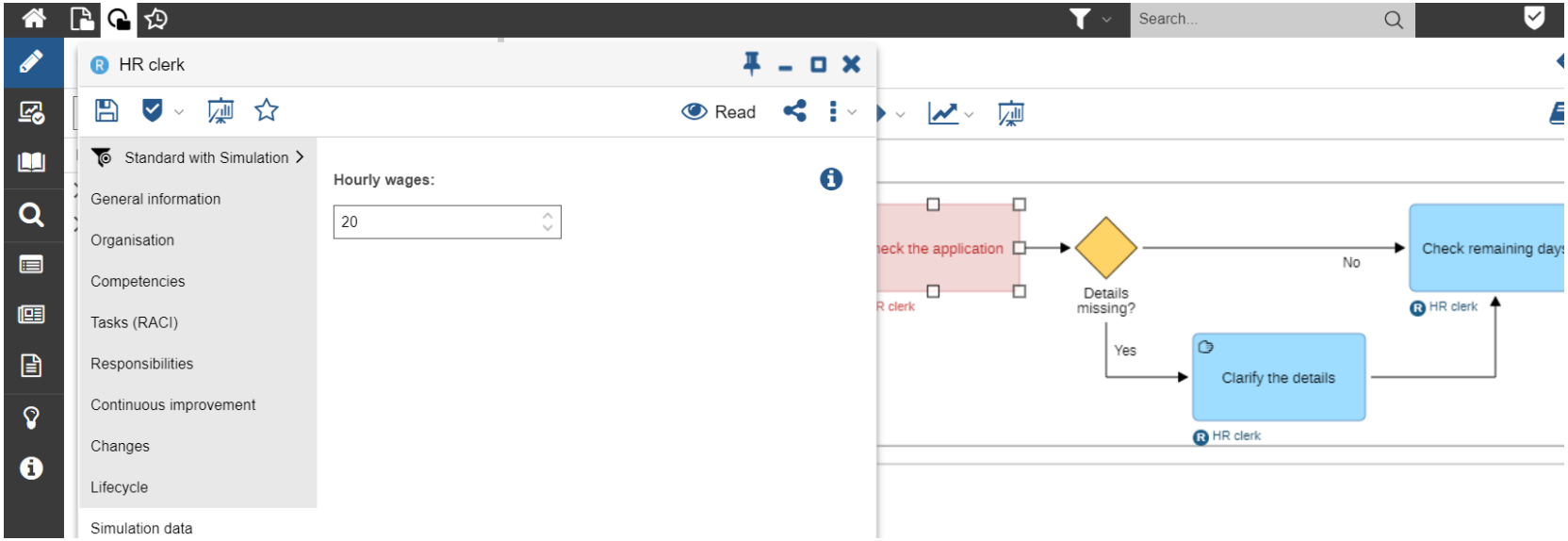
Exercise

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

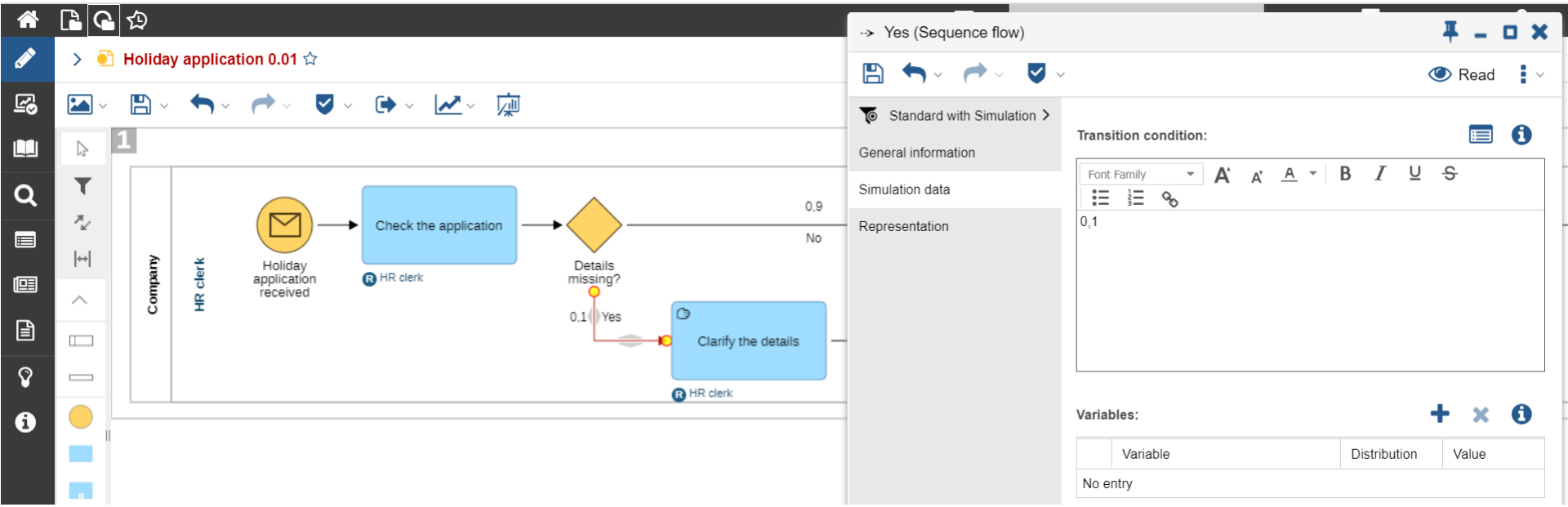
Exercise

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



Exercise

- Assign the probabilities to process paths knowing that:
  - „Details missing?" gateway has Yes and No outgoing sequence flows with probabilties 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

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