

# Process Mining and Performance Business Rules

Ella Roubtsova and Yoeri Berk  
Open University of the Netherlands



# Research question

- Process Mining uses event logs to build a business process model, which potentially can be used to better understand the business process **performance**.
- However, the understanding of **performance** is different from business to business.

What kind of research method should accompany Process Mining to make it suitable for performance analysis of the logged business?

# Two sorts of performance business rules:

- **Effectiveness** is “delivering desired outputs, and even outcomes”. (Ghalem et al., 2016, page 7).

**“A Candidate Proposed by the Agency is accepted for the Client”**

- **Efficiency:** How have the outcomes been achieved? How have the available knowledge and resources been used? How has the shortest(cheapest) process path of the business process being chosen?

***“CV Received” comes before “Candidate Proposed”***

*This rule is about the execution order of the process. “CV Received” and “Candidate Proposed” are two events on the business process.*

# If the performance business rules are known

- the effectiveness can be seen as **reachability of desired events** in the process;
- the efficiency, can be seen as **desired sub-sequences of events or orders of events**;

Both sorts of rules can be presented a process mining filters, however, the effectiveness and efficiency are differently formulated from business to business and they have to be formulated in terms of logs.

**Process Mining should be accompanied with a method of business rules engineering directed with the knowledge about filters of process mining tools.**

# We propose a performance-business-rules-oriented semi-structured interview directed with the knowledge about filters of process mining tools

First, the interviewer is asking an interviewee to recognize some last handled process cases in the log of the organization for agreeing on the terminology.

Second, the interview questions are used.

**Effectiveness:** (a) What is the goal of a process (a set of cases)? (b) What is the goal of each process case?

(c) How can you determine whether the goal is achieved?

(d) Are there examples where the internal goal of company deviates from the external goal of the process of clients?

**Efficiency:** (e) Are there events(activities) that should follow one another? What is the relation of these events(activities)?

(f) Are there mandatory events(activities) in each case? Why are they mandatory?

**Effectiveness:** (g) When can the case be ended? What is the desired outcome of a case?

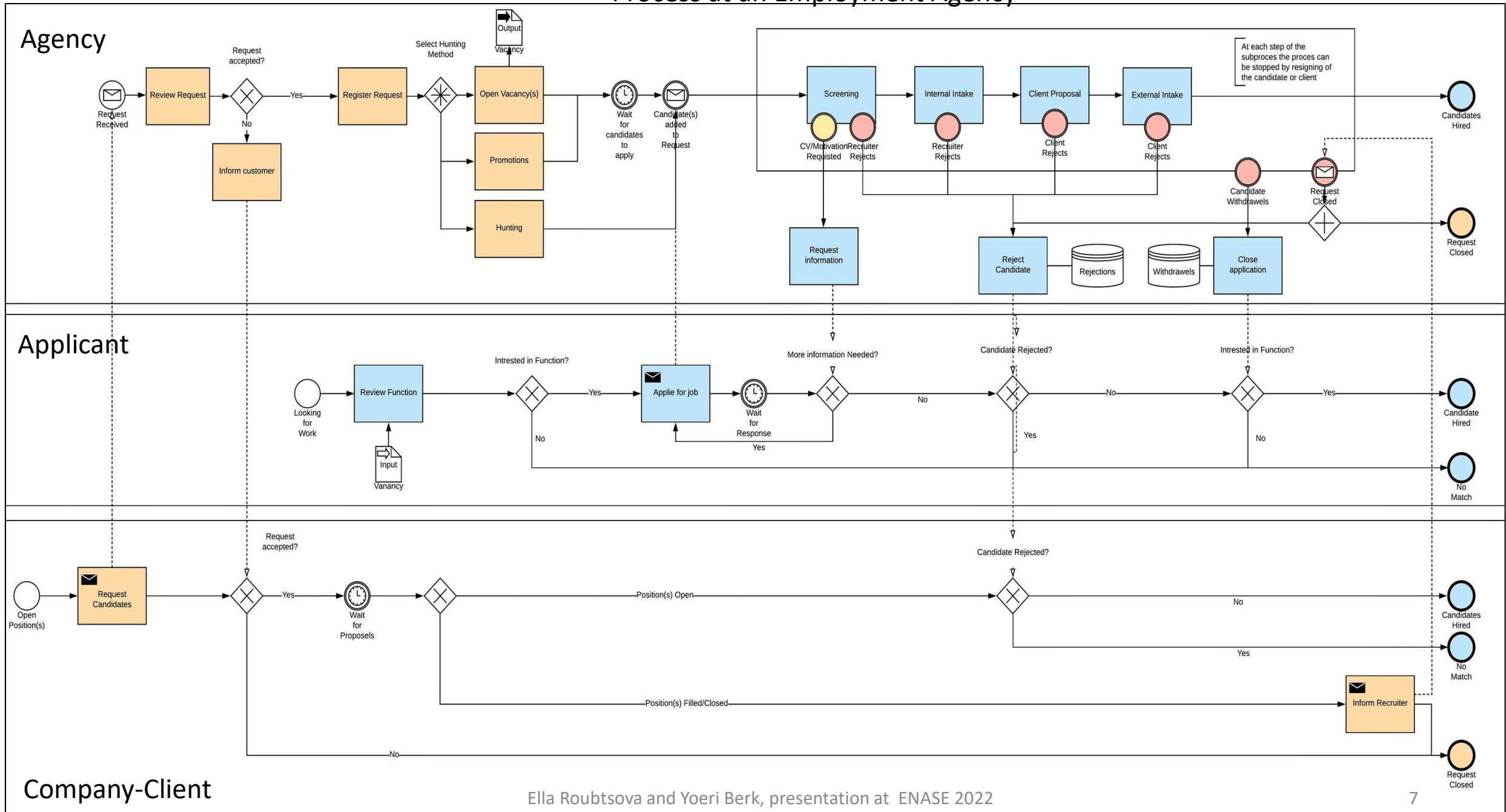
**Efficiency:** (h) How is defined who executes a process or a case? (i) Are there cost-benefit considerations in the choice of an event(activity)? (j) Are there any obligations about time duration of a case of a business process?

(k) Is the time between events (activities) decisive for the success of the process? If yes, between which events(activities)?

# Case study: Process mining for performance analysis at an employment agency

- An employment agency determines a candidate-pool for a Company-Client, looking for employees. We can see how the agencies have switched their business model from looking for a job for a candidate, to looking for a pool for a Company-Client.
- The speed of delivery of the candidate pool (performance effectiveness and efficiency) influences the added value, reputation of the employment agency and the next requests of clients.
- The scope of the log extraction was limited to all requests received by an Employment Agency and finished during the period from 01-10-2020 to 31-12-2020.

# Process at an Employment Agency



# Transformation of the interview answers to performance business rules

Question:

**a) What is the goal of the process?**

Answer:

**“You want that the person you propose to be accepted.”**

Business rule (effectiveness)

- ***If a case has event [Proposed] and “in future” event [Accepted], it contributes to the goal achievement.***
- If a case contains [Proposed] and gets “in future” event [Rejected], this case is filtered as a case violating the business rule.



# An Example of a business rule check with visualization

**Question:** c) How can you determine whether the goal is achieved?

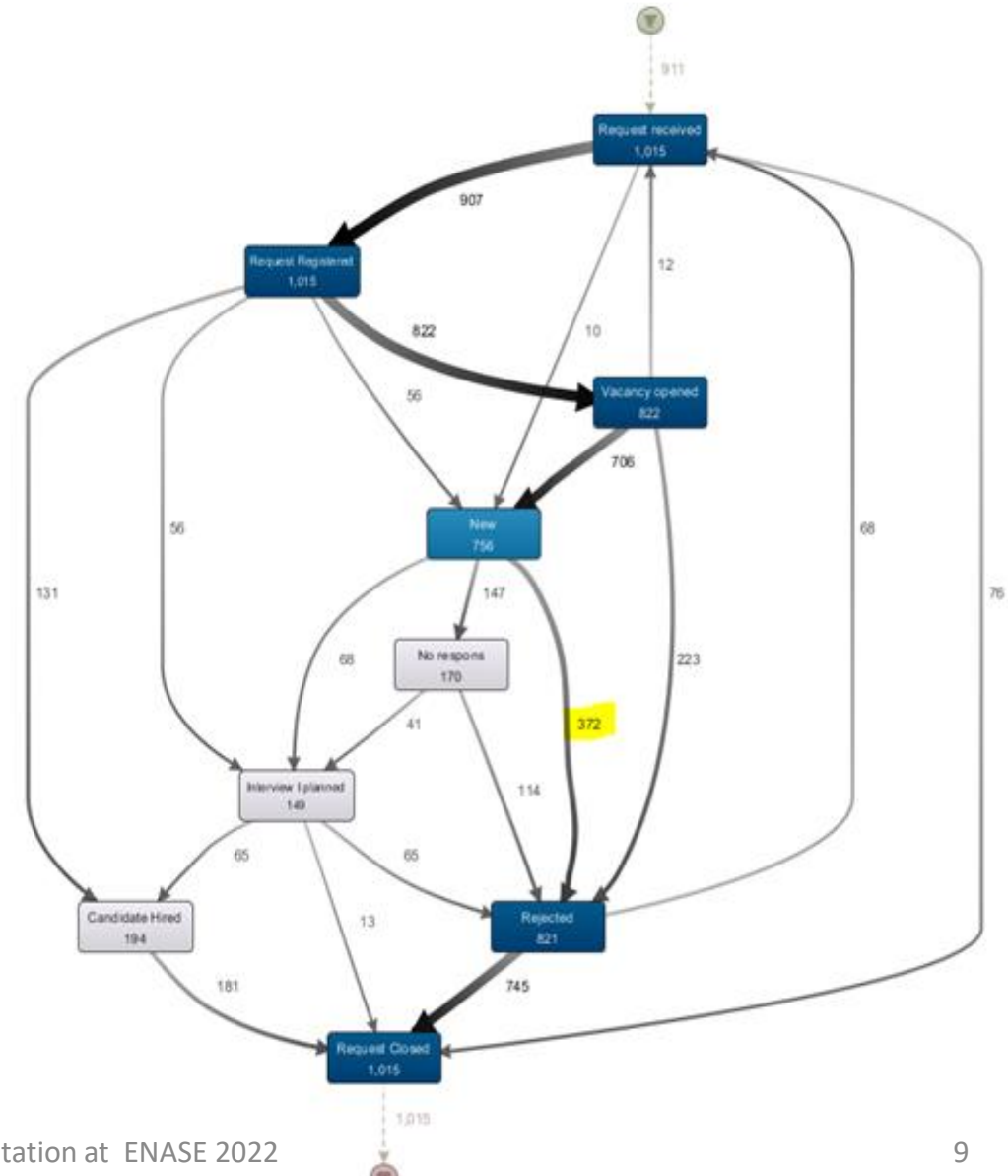
**Answer:** A vacancy should attract candidates who meet the demands requested by the client. There are hard requirements: availability, accessibility etc.

**Business rule :** Trace: [Vacancy opened, New, Rejected] and Source: Rejected reason = “hard requirements”, “availability” or “accessibility”.

**Process mining:** 372 from 1015 applicants go directly from New to Rejected.

**Possible decision:**

This means that “hard requirements’ have to be made clearer in the job announcement.



# Summarized results of the analysis of the business rules

N	Business Rule	% of	Agency
1	Each vacancy should attract candidates who meet the requested demands from the client	Total cases	27%
2	Each vacancy fully described the employment conditions	Total cases	1%
3	Each vacancy is directly opened after receiving a request	Total cases	15%
4	Each vacancy is closed in time to get a chance to every applied candidate	Total cases	44%
5	The number of cases with intake is limited	Cases with intake	38%
6	The recruiter reacts within 24 hours after receiving of each application.	Total cases	33%
7	Each candidate proposed to the client meets requested requirements	Cases with Proposed	47%
8	Proposed candidate had an internal intake	Cases with Proposed	49%
9	Candidate turns up at his appointment	Total cases	0%
10	Proposed candidate fits within the team of the client	Cases with Intake s	10%

The interviews that accompany process mining have increased the understanding of performance by the agency and made process mining useful. Our interview is reusable for other businesses and we invite to use it.