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Business Process Redesign

Management of Data Science and Business Workflows

Fall 2022

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Introduction

1.1 Business Process Redesign

Business process redesign[1] is a broad term that refer to the variety changes made in a process to improve some aspects of it. As the number of possible changes is virtually infinite, it is useful to distinguish small and simple changes from complex changes or big changes in a process. Dumas et al focus only in the latter types of changes, in which processes suffer severe changes and which can lead to improvements in a variety of levels.

To exemplify this, assume we are working on the improvement of a request-to-resolution process. A **minor change** would be hiring more workers to some department to reduce waiting times or to change the location of this department inside the building of the company. On the other hand, a **more complex change** that could be encapsulated into process redesign could be implementing a digitized form to make the request instead of using paper forms. The first changes would not be considered as process redesign by the authors, but the latter would.

As process analysis, process redesign is both an art and a science. Even though general guidelines and use cases are known to work in a variety of scenarios, there is no 'one fits all' solution, and it is a task of the process engineer to study thoroughly the case at hand, using the general tools that are already known, the analysis performed of the process, the business knowledge of the specific case and his wit and experience.

Generally speaking, process redesign methods are classified into two categories:

- **Transformational redesign**: puts into question the fundamental assumptions and principles of the existing process structure, aiming to achieve breakthrough innovation. This means that we try to change our understanding of the process objectives and techniques, in order to completely change how we are doing things and leading to deep improvements.

- **Transactional redesign**: does not put into question the current process structure, but rather tries to identify problems and solve them incrementally, improving performance metrics of the process.

As we said before, there are techniques or heuristics developed to redesign processes and thought to

[1] Refer to [Dum+18].

work in a variety of scenarios. We are going to name them according to Appendix A in [Dum+18][2]:

1. Customer heuristics:
   (a) **Control relocation**: move controls towards the customer.
   (b) **Contact reduction**[3](PL): reduce the number of contacts with customer and third parties.
   (c) **Integration**: consider the integration with a business process of the customer or a supplier.
2. Business process operation heuristics:
   (a) **Case types**: determine whether activities are related to the same type of case and distinguish new business processes.
   (b) **Activity elimination**(TL): eliminate unnecessary activities from a business process.
   (c) **Case-based work**: remove batch-processing and periodic activities.
   (d) **Triage**(TL): split an activity into alternative versions.
   (e) **Activity composition**(TL): combine small activities into composite activities.
3. Business process behavior heuristics:
   (a) **Resequencing**(FL): more activities to their appropriate place.
   (b) **Parallelism**(FL): put activities in parallel.
   (c) **Knock-out**: order knock-outs in an increasing order of effort and in a decreasing order of termination probability.
   (d) **Exception**: design business processes for typical cases and isolate exceptional cases from the normal flow.
4. Organization heuristics:
   (a) **Case assignment**: let participants perform as many steps as possible.
   (b) **Flexible assignment**: keep generic participants free for as long as possible.
   (c) **Centralization**: let geographically dispersed participants act as if they are centralized.
   (d) **Split responsibilities**: avoid shared responsibilities for tasks by people from different functional units.
   (e) **Customer teams**: consider composing work teams of people from different departments that will take care of the complete handling of specific sorts of cases.
   (f) **Numerical involvement**: minimize the number of departments, groups and persons involved in a business process.

[2] For those which we have seen in class, we are adding a label, indicating if the heuristic is task-level (TL), flow-level (FL) or process-level (PL).

[3] This heuristic is not in the book, but we have seen it in the lectures with the name of communication optimization.

(g) **Case manager**: appoint one person to be responsible for the handling of each type of case.

(h) **Extra resources**: if capacity is insufficient, increase the available number of resources.

(i) **Specialize**(PL): consider deepening the skills of participants.

(j) **Standardize**[4](PL): identify similar task and generalize them.

(k) **Empower**: give workers decision-making authority instead of relying on middle management.

(l) **Resource optimization**[5](PL): this refers to improve the use of resources. It is not explicitly mentioned in the reference book, but there are some other heuristics that aim in the same direction, as 4.(a), 4.(b), 4.(c), 4.(d), 4.(e), 4.(f), 4.(g).

5. Information heuristics:

   (a) **Control addition**: check the completeness and correctness of incoming materials and checks the output before it is sent to customers.

   (b) **Buffering**: instead of requesting information from an external source, buffer it and subscribe to updates.

6. Technology heuristics:

   (a) **Activity automation**(PL): consider automating activities.

   (b) **Integral technology**: elevate physical constraint in a business process by applying new technology.

7. External environment heuristics:

   (a) **Trusted party**: use the insights of a trusted party.

   (b) **Outsourcing**: consider outsourcing a business process completely or parts of it.

   (c) **Interfacing**: consider a standardized interface with customers and partners.

[4] This heuristic is not in the book, but we have seen it in the lectures.

[5] This heuristic is not in the book, but we have seen it in the lectures.

Chapter 2

Solutions

2.1 Question 1

2.1.1 Overview

We are asked to identify issues in this process, organise them in an issue register, and analyse them.

2.1.2 Solution

Name	Explanation	Data / Hypotheses	Qualitative impact	Quantitative impact
Requests are moved between levels.	Employees at level-1 move the request for level-2 employees in case the issue is unknown.	- 2 requests are made per hour. - 80% of the cases are unknown and need to be forwarded to level-2 employees. - Level-1 request costs 6.67€ per request. - Cycle time is 1.16H and the processing time is 0.16H for this check by level-1.	- Request takes longer time (1 extra hour) to process due to "double" checked by 2 different levels of employees. - The company's reputation suffers due to the higher delivery times. - Possible negligence by level-1 engineers passing to level-2 requests whose solution they know, to reduce their workload.	- $6.67 \cdot (2 \cdot 0.8) = 10.672$€ is wasted on level-1 to forward the request to level-2 employees. - 1 extra hour of cycle time in 80% of cases.
Resolution needs to be sent by level-1.	Level-2 employees forward the resolution to Level-1 employees after fixing the issue.	- 1 resolution is forwarded to level-1 employees per hour. - Cycle time is 20.33H. - Processing time is 0.33H for this check by level-1. - Level-1 send cost is 13.34€ per request.	- Resolution takes a longer time (extra 20H) to reach the client due to waiting time on level-1 to send the resolution to the client. - The company's reputation suffers due to the higher delivery times.	- $13.34 \cdot 1 = 13.34$€ paid to level-1 to forward the email to the client. - 20 extra hours of cycle time per solution developed by level-2 engineers.

Non-approved solutions are forwarded to level-2 through level-1.	Level-1 employees forward client response to Level-2 employees if it's not approved.	- 2 requests are made forwarded to level-2 per hour. - The processing time is 0.03H. - 20% of the resolutions are not accepted by the client. - Level-1 forwarding cost is 1.33 per non-accepted resolution.	- Level-1 engineers performing this task might feel underestimated. - This kind of forwarding activity can interrupt the normal workflow of a level-1 engineer if they received a non-approved resolution while they are working in another request.	- $1.33\cdot(2\cdot0.2) = 0.532$€ is wasted as overproduction for level-1 employees.
Requests are evaluated multiple times.	Requests are evaluated by Level-1 employees and Level-2 in case of unknown issues.	- 2 requests are made per hour. - Level-2 request evaluation is 20€. - Cycle time is 2.33H and the processing time is 0.33H for this check by level-2. - Level-2 assessing cost is 20€ per request to be assessed. - 80% of the request are unknown before and need to be forwarded to level-2 employees and reevaluated-by level-2 employees.	- Level-2 employees spends time to evaluate a request that's already evaluated by level-1 employees. - Conflicts between engineers of different levels may arise if their assesments are different.	- $20 \cdot (2 \cdot 0.8) = 10.56$€ is wasted on level-2 to re-assess the requests.

Table 2.1: Issue register

2.2 Question 2

2.2.1 Overview

For the second question, we have to propose a set of changes to improve this process and for each change, identify the Redesign Heuristics used, giving a justification for the change.

2.2.2 Solution

We will based our solution in the heuristics mentioned in Chapter 1.1:

- Customer heuristics:
  - If we develop a FAQ resource where the customer can search for commonly solved issues, we could avoid some frequent easy requests (Heuristic 1.(a)).
  - If we asked the customer for a set of test cases with which the solution should work, we could reduce the amount of times the solutions are rejected (Heuristic 1.(b)).
- Business process operation heuristics:
  - We can eliminate the need for sending resolutions by level-1 employees, so level-2 employees can make this themselves (Heuristic 2.(b)).
  - We can eliminate the activities 'Receive response' and 'Forward response to level-2' from level-1, so level-2 employees can receive the response directly (Heuristic 2.(b)).
  - We could compose the activities 'Receive response' and 'Forward response to level-2' from level-1 into a single task (Heuristic 2.(e)).
  - We could compose the activities 'Solve request' and 'Write resolution' from level-2 into one single activity (Heuristic 2.(e)).
- Business process behavior heuristics:
  - We could perform 'Evaluate request' by level-2 before 'Check request' by level-1, avoiding double assessments (Heuristic 3.(a) + 2.(b)).
  - We could parallelize the activities 'Check request' and 'Evaluate request' to check if the issue is already known and prioritize the request at the same time (Heuristic 3.(b)).
  - As most cases are not known, we could focus on the process of level-2, and treat known cases as exceptions (Heuristic 3.(d)).
- Organization heuristics:
  - If level-2 employees perform the first assessment, most cases would be completely held by the same employee (Heuristic 4.(a)).
  - As the level-1 tasks can be done by the level-2 engineers, these could participate in activities of both departments, depending on their availability and the backlog (Heuristic 4.(b) + 4.(f)).
  - Double assessment should be avoided because diverging opinions could cause efficiency losses (Heuristic 4.(d)).
  - One employee could be specialized in request assessment, so the requests could be assigned faster and more accurately to each level (Heuristic 4.(g) and 4.(i)).
  - Activities 'Check request' and 'Evaluate request' could be done by a level-2 employee, generalizing both of them to an 'Check and evaluate' task (Heuristic 4.(j)).
- Information heuristics:
  - If we develop a request form in which test cases needs to be included by the client, we could reduce the non-acceptance ratio of resolutions and increase the understanding of the requests from the beginning (Heuristic 5.(a)).

- Technology heuristics:
  - It might be possible to developed a module able to detect if the request is among those that are already solved and provide an automatic resolution that could be checked for correctness by the client (Heuristic 6.(a)).
- External environment heuristics:
  - Again, the request form asking for the information of the request, including test cases could be interesting (Heuristic 7.(c)).

2.3 Question 3

2.3.1 Overview

In the last question, we have to use these changes or a subset thereof to draw a possible “to be” process model as shown in figure 2.1.

2.3.2 Solution

To create the To-BE process, we have used those ideas in the previous question whose Heuristic is blue colored. The final diagram can be seen in Figure 2.1.

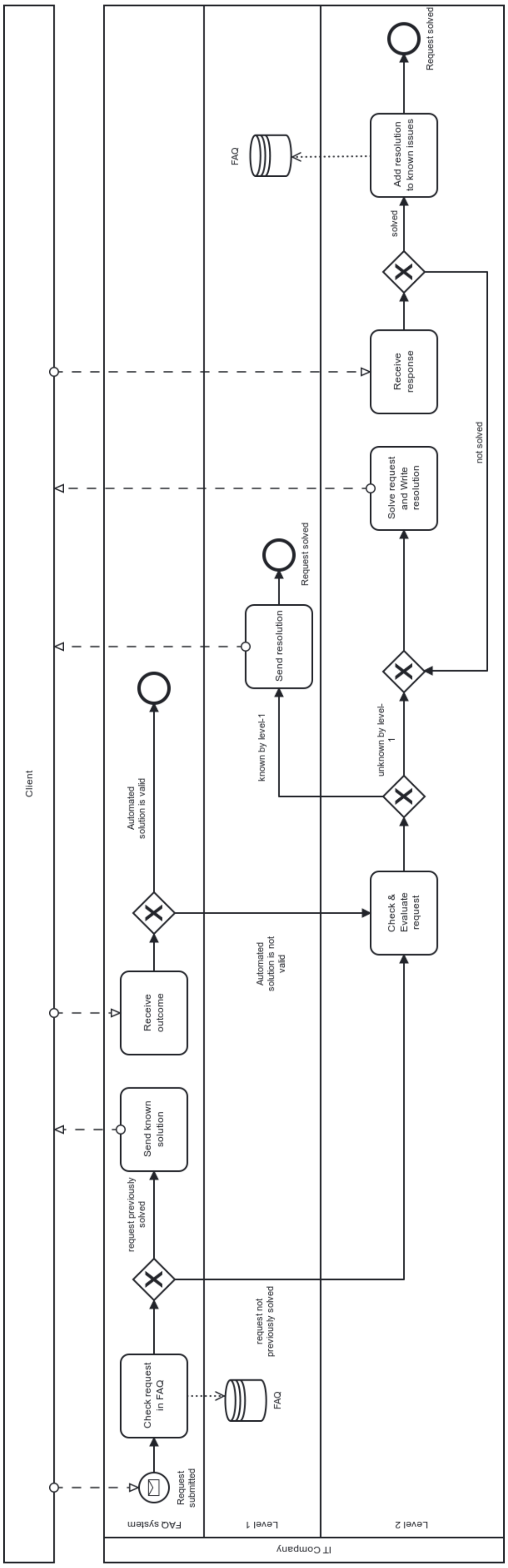

Figure 2.1: "TO BE" process.

Bibliography

[Dum+18] Marlon Dumas et al. *Fundamentals of Business Process Management*. Springer Berlin Heidelberg, 2018. DOI: 10.1007/978-3-662-56509-4.