

Analysis templates for identifying improvement opportunities using Apromore

Supplementary Material A
Evaluation Study Protocol

Study goals:

- Assessment of the usefulness of the templates for identifying improvement opportunities using Apromore
- Assessment of the understandability (ease of use) of templates the templates for identifying improvement opportunities using Apromore
- Determination of possible improvements of the templates

Study participants: 12 participants for the study. All participants have different experience levels in business process management (BPM) and with process mining tools. They can be divided in the following way:

- 6 people have basic knowledge of BPM and elementary Apromore skills (students of “Business Process Management” course at the University of Tartu, and/or students with less than 1 year experience with BPM and Apromore);
- 6 people have good knowledge of BPM and intermediate Apromore skills (students of “Business Process Mining” course at the University of Tartu, and/or students with more than 1 year experience with BPM and Apromore).

Materials:

- A printed version of the Evaluation Study Protocol
- A printed consent form ([Link](#))
- Empty sheet(s) of paper
- Pen
- A quiet place
- Zoom / MS Teams meeting
- Analysis templates for identifying improvement opportunities using Apromore ([Link](#))
- Apromore instance ([Link](#))
- Event logs ([Link](#))
- Link to the survey: [Link](#)

Overall procedure:

1. *Before the study:*
 - Send Apromore login information, link to Templates, event log, and the consent form to the participant
 - Ask the participant to check if s/he can access the interview materials and to notify if s/he experiences any issues
 - Ask the participant to upload event log to his/her Apromore instance
 - Negotiate the time for the interview and preferable video conferencing medium (e.g., Zoom, MS Teams, Skype)
 - Schedule video meeting
 - Send a link to the meeting to the participant
2. Check if all the materials are ready (see Materials section above)
3. Greet the participant
4. Describe the study (see Introduction section below) and introduce the consent form
 - Comment that the aim of the interview is to verify usefulness and understandability of the templates. The performance of the participant will not be evaluated, and s/he is welcome to ask any questions during the interview
5. Ask for verbal consent to the terms of the study and ask the participant to send the signed consent form back after the study
6. Ask participant if s/he has any questions about the study
7. Emphasize that participant needs to “think aloud” during the interview; s/he is welcome to ask any questions and propose ideas
8. Ask the participant to share the screen and start video recording
9. Conduct the study according to the study procedure (see Study procedure section below)
 - From time to time, remind the participant to ask questions and help her/him if s/he has any difficulties following the template

- Write down questions to the participant arise during the study
- Note down relevant observations
- 10. Conduct post-interview (see Post-interview section below)
 - Ask questions that emerged during the study
 - Outline key findings and ask the participant for clarifications or additional feedback
- 11. Stop video recording
- 12. Conduct post-survey (see Post-survey section below)
- 13. Thank the participant
- 14. *Directly after the study:*
 - Write down initial findings from observation (remove potential abbreviations you might have used during the study) and interviews
 - Store the recording and the survey results in a separate folder for each participant. Name the folder according to the participant ID in the study

Introduction: You were invited to take part in this study because you have experience with business process management and process mining tools. This study is a part of a research project at the University of Tartu, Estonia. The current study aims to evaluate the usefulness, and understandability of the *Analysis templates for identifying improvement opportunities using Apromore*.

During the study, templates will be introduced, and you will be asked to find three types of improvement opportunities based on the guidelines in the templates and using the event log provided. You are required to find several improvement opportunities per each template (for example, reworks). After the study, several follow-up questions will be asked, and you will need to fill in a short survey. The results of the study will be used to verify the *Analysis templates for identifying improvement opportunities using Apromore* and improve them.

Our session will be recorded. The data gathered will be used within this research only.

Templates overview (*present based on “Small activities” template*): There are 21 templates created that allow identifying different types of improvement opportunities using Apromore. All templates have the same structure: type of improvement opportunity, definition, minimum data needed to define improvement opportunity, guideline on how to define improvement opportunity, list of redesign possibilities, and references (examples from academic literature and for some templates there are additionally references to BPIC submissions).

Guideline section starts with expected output subsection that explains what the output of certain steps should be. The next subsection is description of steps, where are step-by-step instructions, Apromore screenshots and column with additional explanations and expected results of each step. The last subsection is the output of the template.

Study procedure:

- Introduce the aim of the study (see Introduction before)
- Ask the participant about her/his experience with business process management:
 - How many years of experience do you have in business process management?
 - What process mining tools have you worked with, and how do you evaluate your skills with each of the mentioned tools (elementary, intermediate, advanced)?
 - Did you analyze processes to identify improvement opportunities?
- Introduce the *Analysis templates for identifying improvement opportunities using Apromore* (see Templates overview before)
- Conduct study tasks (see Study tasks section)
 - Ask the participant to open the *Analysis templates for identifying improvement opportunities using Apromore*
 - Ask the participant to open the Apromore instance (the required event log should be uploaded there beforehand)
 - Follow study tasks (see Study tasks section)

Study tasks:

1. Introduce the task

- There are templates for identifying 21 improvement opportunities; as a part of this study, you will be asked to use 2-3 of them. For each of the offered templates:
 - i. Read all the sections, and make sure everything is clear. Please ask questions, if needed
 - ii. Follow section 5 of the template (Guideline on how to define this IO) to identify improvement opportunities
 - iii. Note down the found improvement opportunities (based on the Output at the end of section 5)
- 2. Give the participant around 10-15 minutes per each template to familiarize her/himself, ask clarifying questions and identify improvement opportunities
- 3. After the participant finishes with the given template, ask questions:
 - Were you able to find improvement opportunities using the template?
 - Name the opportunities found using the template. Explain why you decided that these are improvement opportunities.

Post-interview:

- What section or aspect of Templates did you like (find helpful, insightful)?
- Did you find any section or aspect of Templates redundant? If yes, which one and why?
- What section or aspect of Templates needs to be improved?
- Is there any additional information that would have helped you understand the types of improvement opportunities, their definitions, what should be done to identify this improvement opportunity, and the redesign possibilities?
- Do you have any additional comments, suggestions, or ideas?

Post-survey: [Link](#)

Survey scales: Please rate your level of agreement with each statement on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Perceived Usefulness (PU)

Please recall your experience identifying improvement opportunities using *Analysis templates for identifying improvement opportunities using Apromore* during the study and rate your level of agreement with each statement about your perception of templates' USEFULNESS.

Please rate your level of agreement with each statement related to the *overall structure* of the templates.

Table 1: Perceived Usefulness PU1-8

PU1	Using Templates would enable me to identify types of improvement opportunities more quickly
PU2	Using Templates would make it easier to understand the meaning of improvement opportunities (based on definition and examples sections)
PU3	Using Templates would enable me to define what data I need to identify improvement opportunities more quickly
PU4	Using Templates would enable me to identify improvement opportunities more quickly

PU5	Using Templates would enhance my effectiveness in identifying improvement opportunities
PU6	Using Templates would enhance my effectiveness in identifying relevant redesign possibility for each improvement opportunity
PU7	Using Templates would enable me to find relevant academic papers for each opportunity more quickly
PU8	I would find Templates overall useful

Perceived Ease of Use (PEOU)

Please recall your experience identifying improvement opportunities using *Analysis templates for identifying improvement opportunities using Apromore* during the study and rate your level of agreement with each statement about your perception of templates' EASE OF USE.

Please rate your level of agreement with each statement related to the *overall structure* of the templates.

Table 2: Perceived Ease of Use PEOU1-5

PEOU1	Learning how to use Templates would be easy for me
PEOU2	I would find it easy to use Templates to identify improvement opportunities and redesigns
PEOU3	Structure of Templates is clear and understandable
PEOU4	It would be easy for me to become skillful at using Templates
PEOU5	I would find Templates easy to use

Codes:

Table 3: Codes, themes and evaluation goals for affinity diagram

Codes	Themes	Evaluation goals
<ul style="list-style-type: none"> Overall templates Table of contents Type of IO section Definition section Examples section Minimum data needed section Guideline section Redesign possibilities section References section 	Content	EG1: assess usefulness of the templates
<ul style="list-style-type: none"> Usefulness Not useful Incompleteness of information 	Usefulness	
<ul style="list-style-type: none"> Understandability of the content Understandability of the structure Issue with understandability 	Understandability	EG2: assess ease of use of the templates
<ul style="list-style-type: none"> Ease of use 	Ease of use	

<ul style="list-style-type: none"> • Issue during use 		
<ul style="list-style-type: none"> • Content improvement • Structure improvement • Screenshots improvement • Adding additional section 	Improvement	EG3: determine possible improvements of the templates

Summary of the post-survey results:

- Usefulness

1. Please rate your level of agreement with each statement related to the *overall structure* of the templates. (0 point)

[More Details](#)

■ Strongly disagree
 ■ Disagree
 ■ Neutral
 ■ Agree
 ■ Strongly agree

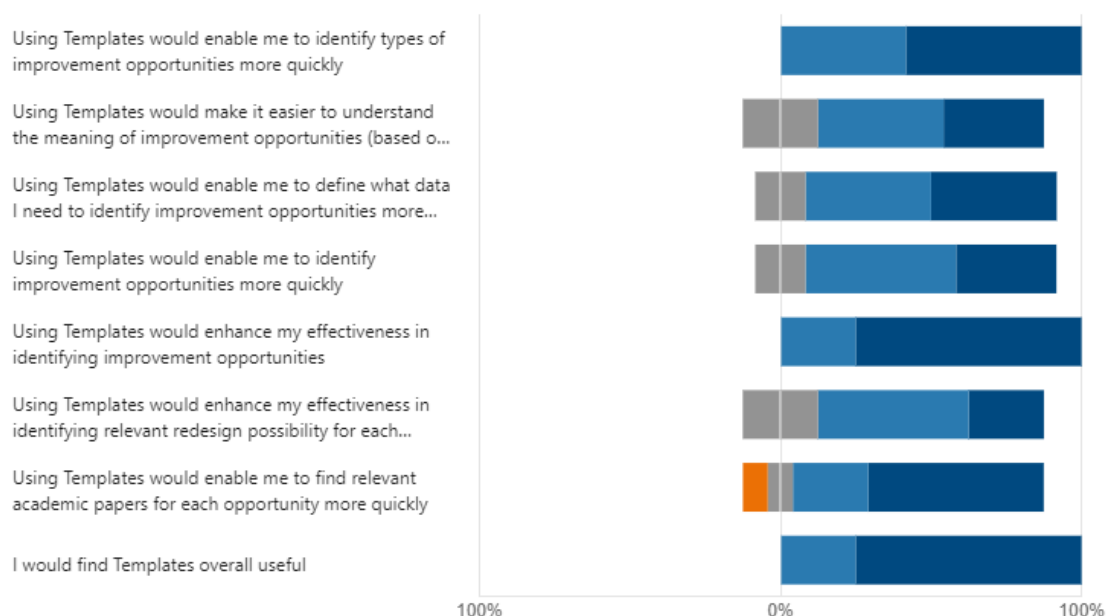


Figure 1: Summary of the results for Perceived Usefulness PU1-8

- Ease of use

2. Please rate your level of agreement with each statement related to the *overall structure* of the templates. (0 point)

[More Details](#)

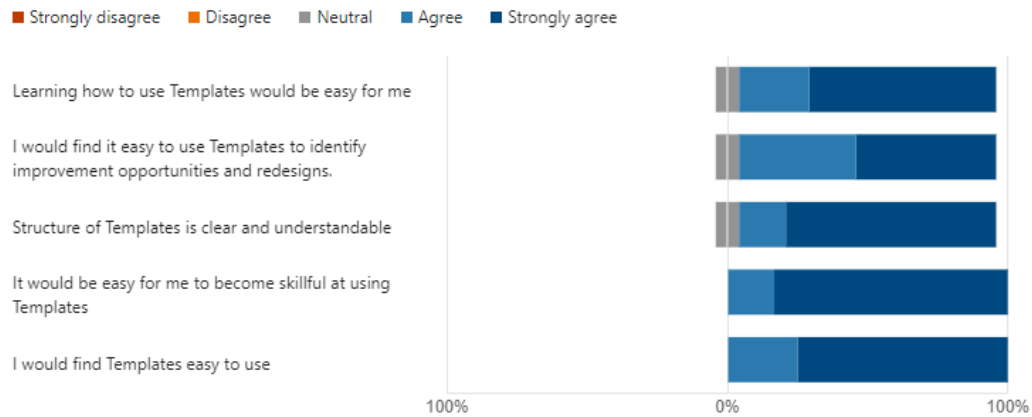


Figure 2: Summary of the results for Perceived Ease of Use PEOU1-5

- Demographics

4. Please indicate your gender: (0 point)

[More Details](#)

[Insights](#)

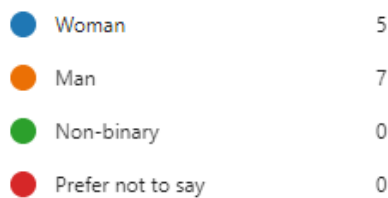


Figure 3: Summary of the results for Demographics (Gender)

5. Please select the category that includes your age: (0 point)

[More Details](#)

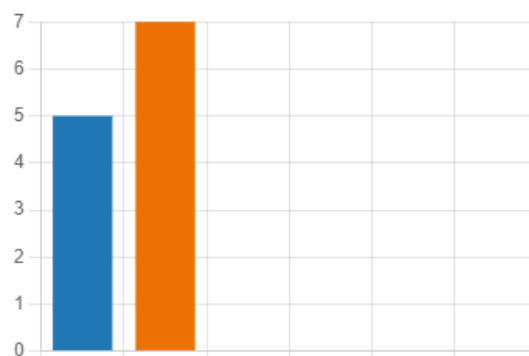
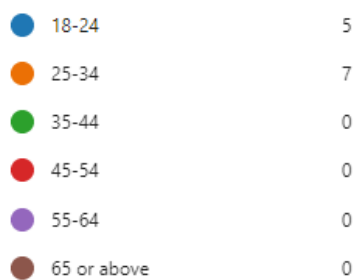


Figure 4: Summary of the results for Demographics (Age)

6. What is your experience with business process management? (0 point)

[More Details](#)



Figure 5: Summary of the results for Demographics (Courses completed)

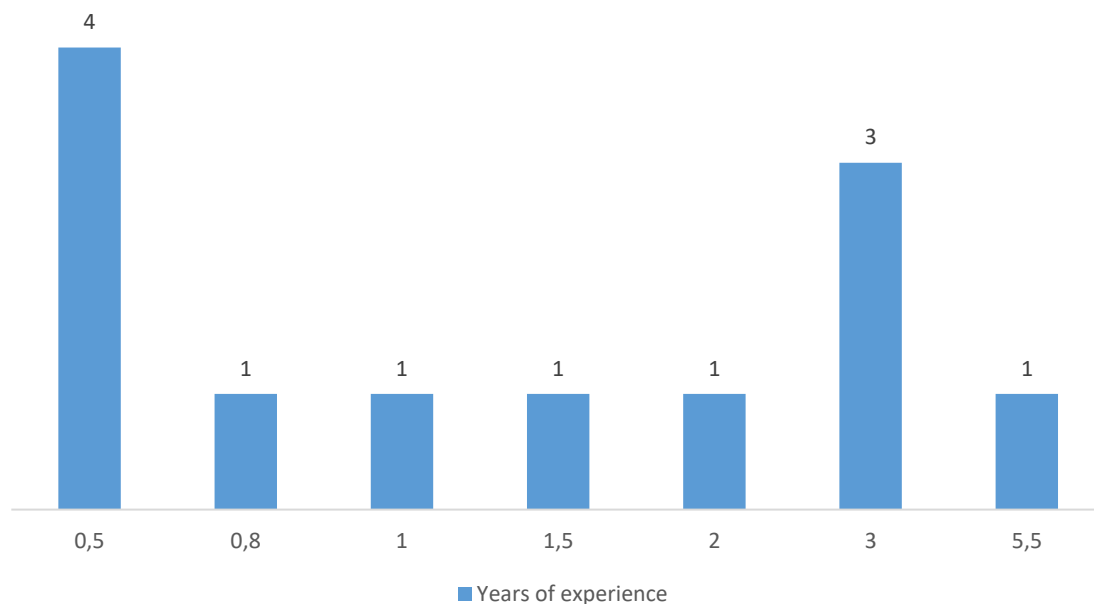


Figure 6: Summary of the results for Demographics (Years of experience with BPM)

8. What process mining tools you have experience working with? (0 point)

[More Details](#)



Figure 7: Summary of the results for Demographics (Process mining tools)

9. If you selected "other" in the previous question, please specify (0 point)

[More Details](#)

 Insights

5

Responses

Latest Responses

"BIMP"

"RuM"

1 respondents (20%) answered **Academic Research** for this question. ...

Academic Research **RuM**
BIMP PM4Py **Camunda**

Figure 8: Summary of the results for Demographics (Other process mining tools)