University of Tartu – Institute of Computer Science

MTAT.03.231 – Business Process Management

Homework 2: Analysis of Pharmacy Prescription Fulfilment Process

To be completed individually or in teams of 2 members

This homework refers to the case study "Pharmacy Service Improvement at CVS" by Andrew McAfee distributed during the lecture. If you did not receive a copy of this case study, please drop an e-mail to the lecturer.

Task 1

Conduct the following analyses of the prescription fulfilment process:

1. Value-added analysis: Identify and classify the steps of the process in terms of their value. Provide the output of this analysis in the form of a table.
2. Waste analysis: Identify sources of waste in this process using the seven sources of waste. For each identified source of waste: (i) give a brief explanation of the waste; (ii) indicate what type of waste it is.
3. Build up an issue register using the data provided in the case study. In case of missing data, you can make your own assumptions and write down any assumptions in the issue register. You only need to analyse issues that affect the customer.
4. Select the main issue you identified (the one with the highest impact) and analyze its root causes using a why-why diagram

Task 2

Analyze quantitatively the "as is" prescription fulfilment process. You can use one or multiple of the techniques introduced in the lectures: flow analysis (specifically to calculate TCT); queuing analysis; simulation. You may use different techniques to analyse different aspects of the scenario.

In addition to the data provided in the case study, use the following data for the "as is" case:

- A typical store handles on average 220 prescriptions in a given workday, out of which 100 are dropped off between 8am and 9am, and 144 prescriptions are picked up between 5pm and 7pm. The remaining prescriptions are dropped off and picked up more or less uniformly throughout the day.
- A typical store is open from 8am to 8pm and is staffed by three technicians and one pharmacist at any given point in time.
- A manual insurance check is required in 17% of cases.
- The mean processing times are as follows: drop-off takes 90 seconds; pick-up 150 seconds; data entry 150 seconds; collection of drugs from the shelves 180 seconds; quality check 60 seconds (in 5% of cases the collection of drugs and the quality check need to be repeated due to issues detected by the pharmacist); manual resolution of a problem arising during automated insurance check 300 seconds; manual resolution of a DUR hard stop is 120 seconds when the pharmacist can resolve it without involving the prescribing doctor, and 10 minutes when involvement from the doctor is required. Automated tasks (e.g. auto-DUR check can be considered to take no time). For tasks where you assume a normal distribution of cycle times, you can use a standard deviation of 10% of the mean cycle time.

- You can assume (if you wish) that prescriptions are entered, produced and quality-checked in FIFO mode throughout the day (as opposed to being left in the boxes and only processed one hour before the customer arrives to pick them up). Hint: This assumption might be very helpful for simulation purposes.

Task 3

Analyze quantitatively the following "to be" scenarios (one single to-be scenario integrating both changes):

- An automated dispenser machine is introduced in order to partially automate the collection of drugs. This reduces the amount of time for drug collection from 3 minutes to 1 minute on average and it reduces the percentage of errors after quality check from 5% to 1%
- An improved system for insurance checks is introduced, which reduced the amount of cases requiring manual insurance checks from 17% to 8%
- An improved system for DUR checks is introduced, which reduces the percentage of DUR hard stops from 20% to 10% (without creating false negatives).

What to Submit

You should submit a zip file containing a report in PDF, Word, Excel or OpenOffice format, and the .bpmn files containing the simulation scenarios required to reproduce your simulations (if any).