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 pharmacy prescription fulfilment process that you were asked to model in homework #1.

Task 1

Conduct the following analyses of the prescription fulfilment process:

a. Value-added analysis: Identify and classify the steps of the process into VA, BVA and NVA. Provide the output of this analysis in the form of a table.

b. 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.

c. Write an issue register using the data provided in the case study. Consider the following issues.

- Sometimes, a prescription cannot be filled because one or more drugs in the prescription are not in stock. Customers only learn this when they come to pick up their prescription.
- Oftentimes, when customers arrive to pick up the drugs, they find out that they have to pay more than what they expected because their insurance policy does not cover the drugs in the prescription, or because the insurance company covers only a small percentage of the cost of the drugs.
- In a very small number of cases, the prescription cannot be filled because there is a potentially dangerous interaction between one of the drugs in the prescription and other drugs that the customer has been given in the past. Customers only find out about this issue when they arrive to pick up the prescription.
- Some prescriptions can be filled multiple times. This is called a “refill”. Each prescription explicitly states whether a refill is allowed and if so how many refills are allowed. Sometimes, a prescription cannot be filled because the number of allowed refills has been reached. The pharmacist then tries to call the doctor who issued the prescription to check if the doctor would allow an additional refill. Sometimes, however, the doctor is unreachable or the doctor does not authorize the refill. The prescription is then left unfilled and customers will only find out when they arrive to pick-up the prescription.
- Oftentimes, especially during peak time, customers have to wait for more than 10 min to pick up their prescription due to queues. Customers find this annoying because they find that having to come twice to the pharmacy (once for dropoff and once for pick-up) should allow the pharmacy ample time to avoid such queues at pick-up.
- Sometimes, the customer arrives at the scheduled time, but the prescription is not yet filled due to delays in the prescription fulfillment process.
When making assumptions to analyze these issues, you may choose to equate “oftentimes” with “20% of prescriptions”, “sometimes” with “5% of prescriptions” and “very small number of cases” with “1% of prescriptions”. You may also assume that the entire chain of pharmacies consists of 200 pharmacies that serve 4 million prescriptions a year and that the annual revenue of the pharmacy chain attributable to prescriptions is € 200 million. You may also assume that every time a customer is dissatisfied when picking up a prescription, the probability that this customer will not come back after this experience is 20%. You may also assume that on average a customer requires 5 prescriptions per year.

d. Analyze the root cause(s) of the following issue using a why-why diagram: *Sometimes, the customer arrives at the scheduled time, but the prescription is not yet filled due to delays in the prescription fulfillment process.*

**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 240 prescriptions per workday, out of which 90 are submitted online and 50 are dropped off between 8am and 9am. On average, 140 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 20% 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 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 20% 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).