Answers

3.1 Soundness check

The model is sound:

Regardless of which decision is taken at the XOR gateways or whether the boundary exceptions events occur or not, the process will reach end event o, when it reaches o no further activities are executed, and each activity participates in at least one trace:

The long Happy Path iABDEFGHo (and variations with different order of DEFG) reaches o without further activity.

The shorter Happy Path iACDEFGHo (and variations) also reaches o without further activity.

Exception paths iAIJo, iABIJo and iABCIJo reach o without any further activity and include the only two activities not included in the long Happy Path.

There is no path not reaching o.

3.2 Multi-Instance-Analysis

What is the total cost of the analyzed scenario?

Total cost is about 13000 Euro, meaning 13 Euro average process instance cost (results vary by run).

Is there any bottleneck in this process?

The logistics group is a bottleneck: The activities of this group (check order, obtain medicines, box medicines, ship parcel) create hours of average waiting time (about 5 to 6 hours each), while the other activities have only seconds of average waiting time.

Recommendations to improve the process

Allocate more employees for the logistics group

Allocating only one more employee to the logistics group will reduce the average waiting times to at maximum minutes, drastically reducing average cycle times (from about 4 days including off-timetable hours / about 23 hours excluding off-timetable hours to less than 2 hours including off-timetable hours / about 22 minutes excluding off-timetable hours).

Save on pharmacists

On the other hand, the pharmacists are a bit over-staffed for smooth operation of the process: With only one pharmacists and three employees in the logistics group, the process runs nearly as well as with two pharmacists and three employees in the logistics

group (about 2 hours including off-timetable hours / about 30 minutes including off-timetable hours).

According to BIMP the costs do not really change by allocating more or less personnel, but provided the employees cannot do anything while waiting in this process and provided they get paid while they are waiting, having only one pharmacist and three employees in the logistics group would mean less costs than two pharmacists and two employees in the logistics group – at better throughput.

Support obtaining medicines by an information system

Having the obtaining of the medicines from the warehouse supported by an information system, should reduce the time for the activity and thus process costs. Also, the reduced time for the activity can alleviate the logistics group bottleneck.

Assuming with support by an information system the activity can be performed instead of in 6 minutes with a standard deviation of 3 minutes then in only 4 minutes with a standard deviation of 2 minute , total cost would reduce to about 12000 Euro, meaning about 12 Euro average process instance cost. Also, with still 2 employees in the logistics group and 2 pharmacists, the average cycle times would drop to about 1 day including off-timetable hours / about 6 hours excluding off-timetable hours.

(Combining this with allocating 3 employees for the logistics group and only 1 pharmacist, average cycle time would drop to 1.5 hours including off-timetable hours / about 25 minutes including off-timetable hours, so somewhat better than without an information system but drastically so.)