

Concept Check #1: Operations Strategy, Process Analysis and Little's Law

Part I – Financial Services

Question 1. (9 points)

List **three** inputs, **three** operations transformation processes, and **three** outputs specific to a consumer retail banking operation.

Inputs: People: tellers, managers, cleaners, auditors, etc.

Facilities: Banks,

Equipment: Technology: Banking software, Vaults/safes, Communications systems, Money counting machinery, ATMs

Materials: Cash, ATM cards, Credit cards, Stationary

Services: Cleaning, Cash replenishment, etc.

Land: Sites for Banks and Headquarters, and Training facilities

Energy: Electricity, Heating

Information: Deposit Rates, etc.

Capital: Loans and other sources of funds

Transformation Processes:

Deposits, Loans, Card services, Transfers

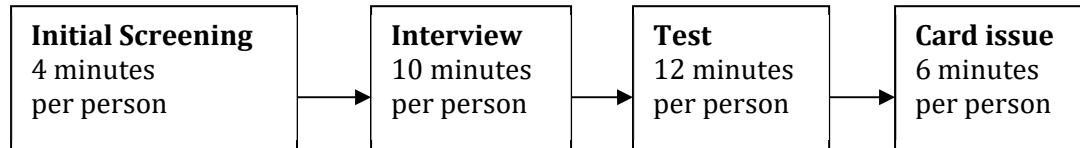
Outputs:

Cards, Accounts, Certificates of Deposits, Cash, Security (of Safety Deposits),

Note: there is a specific context for this question, and hence the answers should be for the specific context. Also note that I would just count the first 3 items (as only 3 were asked for)

Question 2. (25 points)

Consider the following four-task process at a financial services firm, with one staff member employed on each task for each shift, and assuming no uncertainty in task times:



- (a) What is the minimum throughput time (i.e., the fastest a rush order for one unit can go through the process) in minutes? (3 points)

32 minutes (the sum)

- (b) What is the minimum cycle time for the whole system in minutes? (3 points)

12 minutes (the bottleneck dictates the system cycle time)

- (c) What is the maximum process output in persons per hour? (3 points)

The task with the lowest capacity is the Test (12 minutes per person). That is the capacity of the system. 12 minutes per person is 5 persons per hour

$$\frac{60 \frac{\text{minutes}}{\text{hour}}}{12 \frac{\text{minutes}}{\text{person}}} = 5 \frac{\text{person}}{\text{hour}}$$

- (d) At the maximum process output what is the average labor utilization (in %)? (4 points)

The person undertaking the testing will be busy all the time at the maximum process output, i.e., they will be operating at a utilization of 1 (or 100%). However, the other staff will not be operating at 100% utilization. The first person will be operating at 4/12, the second at 10/12, and the fourth at 6/12 utilization. The average of the four numbers (4/12+10/12+12/12+6/12) is (32/12)/4 or 32/48 or 2/3 or 66.7%

I would also accept (for 2 points) an alternate answer assuming that infinite queues form in front of the bottleneck, in which case the average would be (12/12+12/12+12/12+6/12)/4=21/24=87.5%

- (e) The manager of the process has been asked to prepare for a substantial increase in volume, but can only increase staffing costs by 25%. Describe **two** initiatives they could pursue. (8 points)

A 25% increase in payroll would allow the employment of one FTE worker. If it were one full-time employee they could be placed at the bottleneck, either working closer together with the existing employee there or having two testing units in parallel. This would render the testing station no longer the bottleneck (the interview process would become the bottleneck), with the processing rate increasing to 6 per hour. This increase of only 20% increase won't be sufficient – the volume is “substantial”, and the phrase “only increase staffing costs by 25%” suggests it's more than 25%. Thus, this solution (like the idea of using overtime) isn't a very good one.

Better solutions with the up to 25% payroll increase would be to:

- **If possible, hire two part-time people – for testing and interviewing**
- **Hire someone to do process improvement (e.g., via training or technology), especially at the task(s) with least capacity.**
- **Combine initial screening and card issue as a single station with a cross-trained person there, with the fourth person at testing, or floating between other stations to help out as needed. The additional hiring could be used anywhere, or float.**
- **Train (if necessary) the screening or card issue person to help at the testing and/or interviewing steps to lift their capacity. The additional hiring could be used anywhere, or as “float”.**

Other ideas – ensure the best matching of people to tasks, automation, self-service, on-line processing, change policy to consider “exiting” people from the system if they “fail” earlier steps (e.g., not issue any card at all to some people), or doing some screening on-line beforehand

- (f) Considering firm *profitability*, does it ever make sense to invest in improving **non-bottleneck** tasks? Provide justification for your answer. (4 points)

Invest to reduce labor content (cheaper), yields (less waste/more output), throughput time (for fresher), and product quality (more attractive – higher demand)

Another (not quite so good answer) is that a non-bottleneck may become a bottleneck

Part II – Operations Strategy

Question 3. (10 points)

Professor Wickham Skinner (formerly of Harvard Business School) once stated that 95% of companies he visited/studied exhibited conflict between their strategic competitive situation (“performance objectives”) and their operations policies (“management levers”). Describe **ONE** reason why this is a concern, and **ONE** way to address/fix it.

This (lack of FIT) will create operations problems (such as wasting resources, and lower productivity of “confused” staff) and tensions, as well as conflict between functions (such as operations and marketing).

The OW/OQ matrix (or perhaps an activity-system map) could assist in providing better fit/alignment. One needs to get agreement (between functions and levels (via great communications). Other methods may reduce waste but they’re unlikely to directly address the larger strategy mismatch here.

Part III – Real Estate

Question 4. (6 points)

A real estate agent in California has \$1 billion of property on its books, with 80% of that comprised of commercial property (average list price \$10 million), and 20% of it comprised of residential property (average list price \$2 million). Average weekly sales for commercial properties are 4 and for residential properties are 25. What are the “average days to sell” for (i) commercial property and (ii) residential property?

The agent has \$800 million (80% of \$1 billion), or 80 ($=800/10$) commercial properties, and \$200 million (20% of \$1 billion), or 100 ($=200/2$) residential properties on its books. By Little’s Law

inventory = flow rate \times flow time

or flow time=inventory/(flow rate)

Thus, the average days to sell for commercial property is $80/4 = 20$ weeks = 140 days, and for residential property is $100/25 = 4$ weeks = 28 days.

Shortly after you finish this Concept Check, you should work through at least a subset of questions 1 to 2 in Part I, and questions 1 to 10 in Part II of *Practice Problems for Part I and II of the Course*, which is on bCourses. The exams will include questions that are more difficult than those in the keep-up-with-the-main-ideas Concept Checks. You should anticipate that at least some exam questions will be on par with the more challenging practice problems that are provided.