FINAL EXAM

OPERATIONS MANAGEMENT

Date: May 2014
Time: 4 hours
Number of pages: 7 pages
Lecturer: Prof.dr. Jan de Vries

Remarks

- This exam is a *closed* book exam (It is allowed to use a dictionary however)
- **Please take care of your handwriting**; answers showing unreadable text won't be corrected!
- Please be very specific where the answers to all the questions asked below can be found
- It is noticed here that sometimes one question will exist of several subquestions. *Explain all your answers*
- write down your name on each sheet of paper!!
- Try to answer the questions in a well-structured way(!).
- Please……. Think before start writing as a madman!!

WISHING YOU A LOT OF SUCCESS !!

"Only fools know the answer to every question" (Voltaire)

FINAL EXAM

Operations Management

1) In their book, Slack e.a. take the concept of Operations Strategy as a starting point for their analysis of a company.

   a) Please, explain what the essential elements of Operations strategy are. Additionally, please explain the concept of reconciliation and make clear what is included in this concept. In doing so, please illustrate your answer with an example whenever you consider this necessary (*10 points*).

2) Clearly, performance objectives play an important role in the area of Operations Management.

   a) Please explain briefly, the five performance objectives adressed by Slack e.a.. Additionally, please make clear what Slack e.a. mean by the internal and external effects of performance objectives. Explain your answer by giving examples of these internal and external effects for three performance objectives in a service setting *(5 points)*

3) Below are five statements. Specify for each statement whether you agree with the statement or not (Yes/No). Underpin your choice with arguments based on theory and the literature you studied! Please note that your (theoretically-based) arguments are crucial for assessing the correctness of your answer!

   Statement 1
   The Operations Management framework explained during the lectures assumes that the horziontal, the vertical and the organisational structure are not directly influenced by the external environment of a companyt *(2 points)*

   Statement 2
   The decoupling point is directly linked to the question whether the product being produced, is a customized product or not *(2 points)*

   Statement 3
   The control rationality of inventory driven production systems is based on the assumption that all the different production processes should be planned and controlled by an overall integrated production plan *(2 point)*

   Statement 4
   Amongst other things, the vertical structure of a company encompasses the allocation of authorities and responsibilities regarding the planning decisions to be made *(2 points)*

   Statement 5
   The complexity elements addressed during the lectures are all directly related to the characteristics of the service delivery process or production process itself *(2 points)*

4) It is easy to become confused when trying to understand what MRP is. Originally, MRP refers to MRP-I (Materials Requirements planning). More recently MRP refers to MRP-II (Manufacturing Resource planning).

A company manufactures tables. One table is made up of four legs and one top unit. At this moment, the company has 120 legs, 25 top units, and 40 tables in stock. It is required to make 15 tables in week 3, 80 tables in week 4, and 55 tables in week 5. The lead time for tables is one week, the lead time for legs and the top units is two weeks. Tables are produces in series (lot-size) of 20, legs are produces in series of 25. In week 3, 35 tables are scheduled to be finished by the production department, in week 2, 65 legs are scheduled to be finished.

a) Construct a net materials requirements plan for tables. Calculate, when orders for tables have to be released (use a 'table' as presented below for tables) *(5 points)*
b) Construct a net materials requirements plan for legs. Calculate, when orders for legs have to be released (use a table as presented below for legs) *(5 points)*

Week	VP	1	2	3	4	5
Gross requirements						
Scheduled receipts						
Inventory on hand						
Net requirements						
Planned order releases						

c) Please explain the underlying planning and control rationale of the MRP-philosophy *(10 points)*

Table 1 activities to be performed for customer-tailed courses

Activity	Description	Immediate predecessor	Estimated duration
A	Choosing books		2 weeks
B	Writing course material		1 weeks
C	Developing class-room material		3 weeks
D	Correcting course material	A	2 weeks
E	Making slides, presentations etc.	A	3 weeks
F	Ordering books	B,D	3 weeks
G	Printing course material	B,D	2 weeks
H	Making exercises and additional material	B,D	1 weeks
I	Finalising all additional course material	E,F	3 weeks
J	Contacting editor about additional material	G,C	4 weeks

5) Table 1 describes ten important activities to be performed by a company when developing customer-tailed courses. Clearly, the managing director of the company, Jan de Vries, is an optimistic guy. For this reason, he has accepted an order for developing a customer tailored course which needs to be developed within 11 weeks. Not convinced about the Operations Management skills of the managing director, you decide to:

   a) prepare a network diagram based on the figures and information of table 1 *(6 points)*
   b) calculate the scheduling times and total slack for each activity *(6 points)*
   c) judge the decision of your former classmate about accepting the order to develop the course within 11 weeks *(3 points)*

6) Within the field of operations management, the product-process matrix is an important concept. Although developed by Hayes and Wheelwright, Slack and Lewis heavily rely on the concept of the product-process matrix when relating technology characteristics to market requirements.

   a) Please explain the basic idea behind the product-process matrix. Address the main dimensions of the product-process matrix and explain why the concept of 'natural fit' is such a crucial element in the process-product matrix. Please comment on this 'natural fit' idea by giving an example illustrating that a 'natural fit' not always is necessary *(10 points)*

7) Please study the case Garden B.V. carefully (see below) and answer the questions. (Hint: read the questions before studying the case). Please underpin all your answers with arguments!!

   a) Give a description and characterization of the production process of Garden B.V. Apply the literature you studied and explain your characterization. *(Hints: start with giving the basic form, try to categorize the production process by using one of the typologies of Slack) (10 points)*

Garden B.V. plans to locate the Customer Decoupling Point of both the chairs and tables to the stockpoint of semi-finished products (just before the secondary process).

   b) Discuss the plan of Garden B.V.. Give an outline of both the advantages and disadvantages of this plan. What will be the possible consequences for the planning and control of the production process when the decoupling point is moved? (Be as specific as possible for the situation of Garden B.V. so please it's no use to come with some general remarks!) in doing so, please include the complexity dimensions which have been addressed during the lecturers in your answer. Would you advice to move the decoupling point or not? (please underpin your advice with arguments *(20 points)*

Garden B.V.

Garden B.V. is a manufacturer of plastic garden chairs and tables (including all the different colors and shapes more than 350 different types). The main goal of Garden B.V. is to achieve a substantial market share on the West-European market for plastic garden furniture. Key words for Garden B.V are quality, reliability and flexibility.

Plastic chairs and tables are made from synthetic plates and delivered in several colours and shapes. The plates are supplied by an international oriented chemical company. The delivery time of the plates ranges from two to three months. Plates are ordered in a specific size and in a specific colour. The purchase department of Garden B.V can make a choice between several (standard) sizes when ordering the plates. After arrival the plates are stored in a warehouse.
The planning department of Garden B.V. decides which chairs and tables ought to be made for the upcoming month. For chairs this is done by taking existing stock levels (finished products) of chairs as a starting point (including the colour and type of chair). From this it is estimated whether these stock levels are sufficient to fulfill customer demand for the upcoming month. Tables on the other hand, are to a certain extent produced to order (see below).

When a specific series of chairs or tables needs to be produced, the sawmill department receives a production order to saw a series of plates of a specific size out of the standard plates. Any possible remainder of the material is stored in the warehouse again. The sawed plates are than moved to the shaping department where the shape of the chair and/or table is moulded. Garden B.V uses expensive moulds/templates to mould the plates. Set-up times in the moulding department relate to the changing of the moulds which is rather time consuming and during which no production (moulding) can take place. During the moulding, only the shape of the chair or table is of importance: for producing a chair/table of another colour it is not necessary to change the moulds.

After the shaping of the plates, the chairs are stored on the shop floor to undergo a secondary operation. The 'tables' on the other hand are put in stock and only when orders for tables arrive, the secondary process for tables takes place.
For the chairs the secondary operation exists of hardening, drying and packaging. The secondary process for the tables exist of hardening, drying, assembling and packaging. For the tables, different machines are used in the secondary process compared to the chairs. The drying machine however, is used for both the chairs and tables. The drying machine in other words can be considered as a shared resource. For both the chairs and tables small carts are used on which the chairs or tables are clasped. Each type of chair or table requires a different cart. In the drying-room more carts can be stored than there are available of a specific type of chair or table. As a consequence, in the drying process different types of chairs and tables are in progress. After packaging, the chairs and tables are moved to the warehouse for delivery to individual (private) customers or wholesalers. Usually delivery of chairs and tables takes place in very small amounts. In many cases, customers order a set consisting of several (similar) chairs and a table of the same colour. As mentioned above, the chairs are produced to stock. For the tables however, the secondary process is order driven.

Garden B.V strongly focuses on short delivery times and high delivery reliability. To achieve this, the company is prepared to interrupt production runs during the shaping of the chairs for making chairs which are running out of stock. Since a year Garden B.V is confronted with some capacity problems in the warehouse and in the shaping department. The company furthermore faces a large amount of unsalable chairs which still are in stock and an increasing number of rush orders for the shaping department.