Modulprüfung Wertschöpfungsprozesse in Organisationen - Value-adding processes in organizations

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Hinweis: Please write your name on every answer sheet.
Please do not use a pencil (Bleistift) for your answers (execpt for graphs, drawings etc.).

Utilities: Calculator

Time: 90 Minutes

Name:

Matriculation number:

Registration number (Studienkennzahl):

Exercise 1 (30 Min.): Short theoretical issues

a) Companies usually want to obtain short flow times and high capacity utilization simultaneously. To what extent are these goals in conflict? How relevant is variability here?

b) What type of queueing models is applicable if the impact of variability of interarrival times and/or service times is to be assessed? (+ reasoning)

c) What are setup times? How important are setup times if flow times are to be reduced? Please sketch the reasons.

d) In factory design for a make-to-order manufacturer, "tradeoff curves", defined as the functional relationship between quoted lead time (to the customer) and % orders delivered within the quoted lead time, are an important decision support. How can these "tradeoff curves" be estimated?

e) What is the Bullwhip-Effect and how can it be mitigated?

f) A key issue in production management is *sales and operations planning*. How is it defined and what are the linkages to other functional areas in the company?

Exercise 2 (20 Min.)

We consider a two-stage material flow with stage 1: production and stage 2: regional distribution center [regionales Verteilzentrum; dezentrales Lager]. The products are produced (stage 1), then shipped to the regional distribution center and stored there. From the regional distribution center the products are shipped to the customers.

The production orders and their production dates are determined by an **echelon stock system**. What is the logic of this system and what are the information requirements? What are the resulting requirements for the logistics information system?

Exercise 3 (20 Min.)

We consider a two-stage manufacturing system with stage 1: component production and stage 2: assembly. The company faces seasonal demand variations and uses an assemble-to-order strategy (due to substantial lead times at the component production stage and short delivery times to the customers).

What is the idealized structure of the master production scheduling system in this case and what is the use of the output data of the decision levels?

<u>Remark</u>: We refer to the dual control loop concept ("duales Regelkreiskonzept").

Exercise 4 (20 Min.)

Consider the following proposition:

"Reducing the inventory in a company (both work-in-process and final products) enforces improvements in the manufacturing system and in the business processes. Hence the inventory turnover ($demand/inventory$) is a good indicator for the quality or the "maturity" of a company: Companies with inventory turnover that increases over time are doing well. If inventory turnover decreases over time, then probably there is something wrong."

Questions:

    a) "Factory Physics" as proposed by Hopp and Spearman aims at providing a scientific basis for manufacturing management. What are the basic ideas?

    b) Is the argumentation given above "scientific"? What can be said in favor of / against the arguments? (Remark: your arguments are important, not the opinion with respect to whether or not the statement is scientific)