

# CHALMERS

## Exam of Management of Physical Distribution, TEK620

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Date: 20 August 2020

Time: Morning

Location:

Credits: 6 main questions with a total of 63 points.

Examiner: Dan Andersson

All the answers should be in English

Read each question carefully before answering

All your answers should contain references showing what your answer is based on

You are not allowed to collaborate with anyone else

- You should write and submit your answer in a text document, i.e. Word.
  - Create one text document for each of the six exam questions.
  - Name your text document Question\_YY. *Example:* Question\_01.doc
  - Submit your answers by uploading the text documents (with your name at the top of each document) via Canvas before the due time.
- Exam problem solutions involving calculations, figures, diagrams etc. could be included in the word document or written by hand on paper as in a normal exam, in the latter case follow these instructions.
  - Make sure that each paper is clearly marked with your name, exam question number and page number.
  - Scan or photograph your solutions.
  - Name your image files Question\_YY\_Page\_XX. *Example:* Question\_01\_Page\_02.jpg.
  - If you want, you can combine images for the same problem into a single document (e.g. Word) named Question\_YY.
  - Submit your solutions by uploading the image files or documents via Canvas before the due time.

### Question 1 Purchasing of distribution services

8 points

The manufacturing company Bengtsson and Gustafsson (BG) has initiated a procurement process for their European distribution system, which is described below. A consult has helped them with the initial preparations and mappings. But it is many years since the company actually performed a formal tendering process, and those involved has been retired, therefore they now need some additional help.

You have been asked by the managing director of the company BG to advise the company regarding the most suitable service package to be purchased (if it is possible to point out one solution, there might be several) and how to perform the purchasing of physical distribution services

- a) First you should give them some advice regarding what they should aim for related to what to buy, e.g. type of service concept, number of service providers, type of relationship with the providers. (3p)
- b) Thereafter you are supposed to explain to them how to find one or several suitable services providers, including both how to actually perform this work (i.e. both how to do it and what to focus on) and if there is something in particular they should be careful about (5p)

#### Case description

The company is distributing their products to a large number of customers in Europe. Currently BG is using many different service providers for their distribution. There are transport providers taking care of transports from their production units in Sweden to terminals in countries in different parts of Europe, others are performing local transport and there are also other distribution services. BG's production units are manufacturing to order and there are often last-minute changes in the distribution since their customers are working in an unpredictable environment with minimal stock levels and limited facility capacity. This has resulted in a large need for coordination of the transport flows all the way to the final unloading of vehicles.

The company BG use a large number of service providers for the main transport from the production units to distribution centres in Europe. From there they use many local transport firms for the short distance transport. In the Nordic countries the six most important service providers transport 80% of the total volume and in the rest of Europe 20 providers transport 80% of the volume. In addition to the actual transport service there are other companies providing BG several services such as: freight forwarding, customs services, basic storage services (moving goods in/out and space for storage), pick and pack, kitting, and light assembly services.

### Question 2 Pricing

9 points

- a) The haulier, X-Transport AB provides distribution services in southern Sweden, where they are meeting fierce competition from three other companies that together totally dominate the market. The company expect that the demand for transport services in general will increase next year and then their capacity will probably not be sufficient. Based on a market study the demand for XTAB's services is expected to increase to 70 000 shipments annually if the price is not changed, and the demand is expected to grow further in the future. The question is if they should make an investment to increase the capacity or not. The current utilization of the company's capacity is 63% and this is equivalent to 38 000 shipments annually. The average price of a shipment is 1 100 SEK and at this price X-transport generates an annual profit of 700 000 SEK. The marginal cost for a shipment is 300 SEK. It is assumed that the current demand can be depicted as a linear demand (DA) curve, where the demand stops if the price reaches 2200 SEK per shipment. Based on a market survey the company has managed to get some basic facts about the future demand. The new estimated linear demand curve (DB) shows that the demand is 1 000 shipments per year if the price reaches 2200 SEK per shipment. The fixed cost for the capacity increase is estimated to 22 million SEK annually and the marginal cost is assumed to be the same as for the original capacity.

Should the company make the investment or not? Explain this based on calculations and assumptions made in the case as well as assumptions you may have to make (5p)

- b) X-transport AB in question a) above did for some reason not intend to change the price for their services. What could the arguments for not changing the price have been and may there be reasons for actually changing the price (you do not have to make any calculations in order to answer this and you do not have to have answered question a). (4p)

### Question 3 Urban freight

12 points

- a) The City of Gothenburg has contacted you for input to their new goods transport strategy. The person working on developing the strategy asks you to suggest two different types of initiatives and/or policies that will be suitable in Gothenburg and will contribute to the aim to reach a sustainable transport system that will benefit the municipality. You should not only mention what to do but also why it is a good idea and if there are any potential problems for the authorities in implementing the suggestions. (6p)
- b) You have also got a question from the company AC, see below, interested in new urban freight solutions to be implemented in different European cities. The company would like you to recommend two different distribution concepts that could be beneficial for the company. You should explain what benefits they can obtain and why these will occur and what additional information you may need to make a better estimation of the potential benefits (6p)

Case description

AC is a retailer that is selling clothes and accessories in 300 stores in 15 European countries. They are located in medium sized and large cities in which they have several rather large stores with partly different assortment. The company is also selling the product on-line and their e-commerce business is growing rapidly. Their assortment includes a large number of items in; women's wear, kids' wear, lingerie and cosmetics. AC's offering contains both basic clothing and fashion and the company focuses on great fit, high value and fashion sense, and the products should be made in a sustainable and responsible way. Their distribution strategy is focusing on short lead times and frequent deliveries to stores. They have one central distribution centre in Sweden and one in Germany.

**Question 4 Distribution structures and Division of roles** 12 points

- a) The company Gamma (see case description below) is considering a centralisation of their European distribution of products to manufacturing companies. However, they are not sure about what the effects of this might result in. Explain what effects they may expect from a future centralisation and why these will occur. (4p)
- b) The CEO of Gamma attended a conference where he realised that if they were going to centralise their European distribution system, they should also consider outsourcing it. Explain from a theoretical perspective (e.g. transaction cost economics) what the different positive cost effects of an outsourcing in this case are supposed to be and why these effects will occur. (4p)
- c) The managers at Gamma have heard about Horizontal collaboration but are not sure if this could be beneficial for their company. You should explain what may favour the establishment of a horizontal collaboration for this company and what barriers do they may have to overcome (4p)

Case description

Gamma is currently trying to solve a number of problems related to its physical distribution. Most of the perceived problems are related to the overall organisation of the logistics: e.g. no organisation taking the overall responsibility from supply units to final delivery, it is perceived to be too many hand-overs from the manufacturing units to the customers warehouse, and a lack of information, at the same time as there are duplication of resources etc. But they company also suffers from an extreme expansion, both in terms of sales volumes and new markets they enter.

The distribution costs for Gamma is dominated by warehouse and inventory costs and the transportation costs is a smaller share (but contains an increasing cost for express transport). This is a result of high product values, many SKUs (more than 10 000) excessive stock levels combined with frequent stock outs and high demands for short lead times. Gamma has currently 11 national warehouses, six regional warehouses, and three factory warehouses. In most of the cases a customer order will consist of rather few order lines.

The lead times are varying and the delivery precision does also vary much between different countries. The requirements on the distribution system will increase in the future as the customer demands will increase and at the same time the cost must be reduced.

**Question 5 Evaluation of distribution systems and its cost** 11 points

- a) Explain how each of the two companies X-Transport (see question 2) and Gamma (see question 4) in different ways can evaluate the load factor in an appropriate and structured way. (4p)
- b) What are the potential challenges when evaluating the total performance of the entire distribution system for company AC (see question 3) (3p)
- c) Why may a person assume the wrong costs for a transport and how may this influence decisions in the near future and in the distant future? Give some examples and discuss how these may influence decisions related to goods transport. (4p)

**Question 6 Information systems**

11 points

- a) What type of Transport Management System (TMS) would you recommend to company BG (described in question 1 above)? You should also discuss the implications of using this TMS regarding benefits and disadvantages (5p)
- b) Explain the main benefits the company BG (in question 1) and X-transport (in question 2), respectively would get from Smart Transportation Management (STM), including, but not limited to, the environmental impact (4p)
- c) Explain the main reasons why transport service providers are not able to effectively utilize information from tracking systems to support their operations? (2p)