

# CHALMERS

## Exam of Management of Physical Distribution, TEK620

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Date: 18 March 2020

Time: Afternoon

Location:

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

Examiner: Dan Andersson 031 772 1339

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

9 points

- a) The company AA (see below for description of the case) is planning to purchase all its physical distribution services in one “package”. You have been asked by the purchasing manager at AA to explain to him what is important for the company to consider in the different steps of their coming transport purchasing process. In addition to this you should also specifically explain of how they should perform their work in order to find and select a suitable service provider. (5p)
- b) The company AA is also aware that they will have to reduce their environmental impact, including that from their distribution. Explain how the transport purchasers at AA can contribute to the reduction of the environmental impact of transport. You should present explanation based on what transport purchasers at AA can do before as well as after the contract with the new service provider has been signed. (4p)

#### Case description

The manufacturing company Andersson and Anderson (AA) is trying to make its European distribution operations more efficient and part of this is a new organisation of the purchasing of the transport services.

The company is distributing their industrial products to a large number of businesses globally. Currently AA is using many different service providers for their European distribution operations. In table 1 below the transport providers taking care of transports from their production units in Sweden to terminals in countries in different parts of Europe are shown. In addition, there are also transports from these nodes to the final destinations as well as other distribution services performed by other firms.

Table 1 Number of service providers used for the main transport from the production units to different countries

Region	No. 1 provider's share of the total shipped weight	No. of providers that together transport > 73% of the weight	No. of providers that together transport > 95% of the weight
Scandinavia	23%	6	>15
West Europe	66%	2	14
East Europe	51%	2	8

The company AA would like to buy their entire distribution system for Europe from one service provider offering all required services in one package. The following services may be part of the package to be purchased: Traditional freight forwarding; 2nd tier management; Express- and airfreight forwarding; Distribution Centre facilities; Kitting and assembly services; Repair activities, incl. service centres/ reverse logistics; Customs brokerage; Logistics consulting. There are large differences between the various service providers when it comes to the degree of customisation of services offered, and special services may be provided by 2nd tier service providers.

### Question 2 Pricing

11 points

- a) The company AA (described in question 1), needs help with deciding what type of price model is suitable for them if they finalised the purchase outlined in question 1. Explain how they should reason when choosing one or several price models to be used for the package of distribution services being bought. (3p)
- b) The transport company AGS Transport AB provides a distribution service, i.e. local transports, to a large number of small and medium sized manufacturing companies in a region in southern Sweden. As result of price pressure from the few existing competitors in this market AGST has seen its margins been reduced to zero (but the company is not yet making a loss). The company now must figure out how to increase the profit otherwise it will not survive. There is an obvious need and possibility to reduce cost but this will require a lot of work and it will take time before it will result in cost reductions (and before this more money will be spent on analysis and implementation). Therefore, the company also need to contemplate price changes. Even if the competition is tough the transport manager believes that AGST could make a small increase their price if they are able to communicate their very high transport quality to their customers. The new marketing manager on the other hand believe that the best way forward is to offer some of the customers a lower price (and a lower service, not guaranteeing the lead time which will be 2 days) and other customers a higher service, guaranteed overnight deliveries. The current service offer is a standard price for delivery of a shipment within the region, which is priced at 300 SEK/shipment. When the company is providing their customers with 40 000 shipments/year this price covers the total costs without generating a profit. Since the company must generate a profit it has to change the price or reduce the cost. The transport and traffic manager suggests that in order to make a profit the company should increase the price to 320 SEK/shipment. However, the marketing manager argues that this will not maximise the revenues and instead she suggests market segmentation and the use of two different prices. One group of customers should be offered a price of 380 SEK/shipment (guaranteed overnight deliveries) and the other a price of 200 SEK/shipment (>2 days). In an analysis of their how the demand would vary with the price it was concluded that if the price was to be set to the marginal cost of 150 SEK the demand is expected to become 77 000/shipments per year (if a linear demand is assumed) and this volume can be handled with the existing resources.

If it is possible to make any of the suggested changes would any of them result in an increased profit? If you consider all aspects that may be included as basis for a decision, what do you recommend AGST to do, and why? When making this recommendation you will use available information and make reasonable assumptions.(8p)

### **Question 3 Urban freight**

11 points

- c) In a medium sized European city (more than 500 000 inhabitants) different stakeholders are working together in a so-called freight partnership to create better conditions for urban logistics. This group has asked you to help them the evaluate different urban freight concepts for supplying small businesses in the city centre. They are interested in the concept off-peak (or off-hour) deliveries, but they would also like you to present an alternative transport solution that provides them with similar benefits. You have been asked to present your result in the form of a systematic evaluation of urban freight systems (an evaluation tool developed by Sönke Behrends, since the stakeholders are used to this after having used it in an earlier collaboration with this researcher).You are not only supposed to present a table you should also explain and motivate your evaluation. (6p)
- d) What can the public sector do to manage urban freight, what is it actually doing and what measures can be taken in order to implement the most beneficial actions? You should select a specific industry/business sector and assess 5 of the initiatives (presented by Ivan Sanchez-Diaz) that the public sector can use to manage urban freight. (5p)

### **Question 4 Evaluation of distribution systems, cost and capacity utilisation**

10 points

- a) Take the starting point in two different companies, one small/medium sized supplier to the automotive industry and one large food retailer and explain the different challenges these companies may face and how they may improve the balance between the required and available load capacity. (4p)
- b) Explain how to evaluate the important role of transport cost for a Swedish export company and how its revenues will be influenced by changes in the transport cost. (4p)
- c) In order to analyse a manufacturing company's physical distribution, one may have to internalize different intangible effects into a total cost. Give different examples of intangible effects that may need to be internalized if a total cost analysis should be performed and also how to perform this internalisation. (2p)

**Question 5 Distribution structures and Division of roles** 12 points

- a) Explain what threats and opportunities an increasing use of horizontal collaboration and crowd logistics respectively offer logistics service providers? Your answer should not only consider when providers are collaborating, but also how they are influenced by these general trends. (4p)
- b) The high-tech company ABC (see below) needs to improve their distribution system. Use the case description below and the course material to discuss how different solutions can be used by ABC to potentially improve their distribution system performance. You should specifically explain how they should structure and organise their distribution system from a cost and customer perspective considering their current situation and goals. (8p)

Case description

The global high-tech company ABC 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, too many hand-overs from the supply units to site of delivery, lack of information, duplication of resources etc. Due to these problems the company has a limited access to cost and performance data and thereby it is not fully known by the management how efficient and effective the current distribution system really is. However, a group of consultants has anticipated possible cost reductions between 10-20%. It should also be noted that the average cost level can be as much as 50% higher than best practice.

The total global distribution costs for ABC is dominated by warehouse and inventory costs and the transportation costs is a smaller share. This is a result of very high product values in combination with long lead times and excessive stock levels. It is clear that duplication of resources with a number of different distribution units working in parallel has resulted in difficulties to achieve economies of scale and scope.

The lead times are varying within each business unit (i.e. between different countries) as well as between business units and products. The delivery precision does also vary much between different countries but there are not the same significant differences between the different business units as shown for the lead times.

The requirements on the distribution system will increase in the future as the customer demands will increase. The company is using the principle assembly to order and the total order lead times are converging to a lead-time of 10 working days of which 4 will be allocated to physical distribution. In most of the cases a customer

order will consist of fairly few order lines, describing the products that are needed to be delivered to the same place (site) at the same time

The future products will be more of a “consumer goods character” and they will put other kinds of demands on the logistics system, in addition shorter lead times they also require a system that can accommodate rapid configuration of total solutions. There will also be higher demands on delivery precision. There are homogenous goals for the delivery precision but these high performance levels will demand very high service levels that must be achieved for the different parts of the chain more than 99% for each step if there is no buffer is present.

**Question 6 Information systems**

10 points

- a) The company ABC described in question 5 is in need of improved information that can support their physical distribution in a good way. The company ABC is now working on a new information system strategy and it needs your help to better understand the potential role smart transport management could have in this. Discuss both advantages and disadvantages of implementing the different parts of smart transport management in this company. (5p)
  
- b) The logistics manager of the company Apelsin has contacted you again and asked you to explain how the company (where you have been working as a consultant) should choose a suitable Transport Management System (TMS) based on the distribution solution you previously have suggested. What type of system do you recommend for Apelsin’s distribution and what are the advantages of using TMS for the company? (5p)