Case Study – Cargo transport by IWW, rail, road and multimodal solutions

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1. OVERVIEW

Target Group:	Undergraduate and graduate students (focus logistics/ business administration)
Nr. of participants:	8 – 28 students
Subject:	cargo transport solutions

The case study “Manual Cargo transport by IWW, rail, road and multimodal solutions” was first implemented within a course of the master programme “Supply Chain Management” at the FH OÖ (University of Applied Sciences Upper Austria) in the winter semester 2013/2014. Afterwards the structure of the course is presented to enable you to integrate them also into your classes.

2. LEARNING OBJECTIVES

2.1 Content knowledge:

- know differences between the three transport modes (rail / road / inland waterway), e.g. applicability on business fields, products and geography, timing, reliability, costs, environmental impacts, available/necessary means & infrastructure
- know current statistic data of all transport modes at a glance
- understand relevant key legal rules
- know actual & future trends and predictions
- formulate a well-organized transport strategy for a specific supply chain

2.2 Skills:

- apply knowledge and strategy on a real life-case basis
- project management skills
- communication-, team-, conflict- and problem-solving skills
- presentation skills

3. DIDACTIC CONCEPT

Within the master programme „Supply Chain Management“ at the FH OÖ (University of Applied Sciences Upper Austria) a special course concept was developed to effectively prepare the students for their future working environment.

The so called **KEU-Leadership concept** stands for **K**reativität = creativity, **E**ntscheidung = decision and **U**msetzung = implementation and combines theoretical expert knowledge and practical implementation. The students thereby have to work on real projects or have to solve challenging practical case studies.

For that matter every course within the master programme “Supply Chain Management” is structured into three **attendance phases**.

Before and between these attendance phases there is a **self-learning phase** of around 4 weeks.

4. COURSE STRUCTURE

Before the first self-learning phase starts, the students were divided into four groups. One group ideally comprises 3 to 5 students but groups of 2, 6 or 7 students are possible as well. Each group receives one of the topics road, railway, inland waterway and measurement of traffic's environmental impact. Within the different attendance phases the groups have to change the topic after each task so that they got to know all modes of transport and to work on different transport cases.

Group 1	Road
Group 2	Rail
Group 3	Inland waterway
Group 4	Measurement of traffic's environmental impact

4.1 Self-learning phase 1:

Duration: 4 weeks

Tasks for Group 1, 2 & 3:

- desktop research on **transport mode issues** in terms of applicability on business fields, products and geography, timing, reliability, costs, legal rules, environmental impacts, means & infrastructure
- expected output to be brougt into the attendance phase 1: gathered raw material, structured/organised and understood (no ready PPT or DOC yet)

Tasks for Group 4:

- desktop research for the possibilities to **measure traffic's environmental impact**
- expected output to be brougt into attendence phase 1: gathered raw material, structured/organised and understood (no ready PPT or DOC yet)

4.2 Attendance phase 1:

Total Duration: 1,5 days

- about 1 hour: introduction by the lecturer, theoretical input
- about 2 hours:
    - Group 1, 2 and 3 together : work out a reasonable structure as well as a consolidated presentation of **„transport mode issues“**
    - Group 4: work out a reasonable structure as well as a consolidated presentation of the topic **“measure traffic´s environmental impact”**
- about 1 hour: presentation by the lecturer (template, requirements, scope,…)
- about 4 hours: to make a PowerPoint presentation by using the structure, worked out before, as well as the gathered raw material (length about 30 minutes/group)
- about 2,5h to present the results; goal: transmitting of knowledge, so that the other students can use it for their further tasks

4.3 Self-learning phase 2:

Duration: 4 weeks

- adapt and correct the presentations

4.4 Attendance phase 2:

Total Duration: 1,5 days

- about 1 hour: 4 transport cases were presented and allocated to the groups by the lecturer
- about 6 hours: to prepare a presentation including the following issues:
  - identify the “optimal” transport mode or mix of modes for the case study
  - apply creativity methods
  - evaluate and argue the solution
  - describe the transport strategy of the company
- about 2 hours: external lecture (representatives from the industry or logistics service providers) focussing on one of the modes of transport with following discussion
- about 2,5 hours: students present their results (30min/group) with subsequent discussion

4.5 Self-learning phase 3:

Individual work: every student has to critically examine one external lecture (free choice) and write an essay about it (around 2.000 words)

4.6 Attendance phase 3:

- about 6 hours: to develop a transport-specific solution by taking the factors time, costs and environmental impacts into consideration and create a decision-oriented management presentation
- about 2 hours: external lecture (representatives from the industry or logistics service providers) focussing on one of the modes of transport with following discussion
- about 2,5 hours: students present their results (30min/group) with subsequent discussion
- Peer review, feedback & wrap-up

5. CASES

5.1 Case 1 – Food Industries:

Industry	Food products
Product	Fresh organic strawberries
Quantity	100 tones a week
Seasonality	September to April
Delivery cycle to the end customer	To constant shelf availability
Transport Services	From the South of Spain (Almonte) to Austria, Hofer central warehouse Loosdorf

Ecologically responsible cultivated food has become more and more indispensable in today's supermarket shelves.

The demand for **organic products and non-genetically modified food** is visibly rising. People became more and more aware of biological aspects again.

Exactly this **growth** however is a challenging task for the logistical planning as strict regulations on these products have to be observed.

Particularly within the last years the organic food industry in Austria is booming, so that the demand cannot always be satisfied. As a result there is a need to constantly extend the offer on organic food as well as to build up an **efficient and reliable supply chain**.

How can logistic be sustainably improved, to meet the increasing demand caused by the **continuous market growth** as well as the **high quality requirements**?

Holistically networked thinking and closed logistical cycles, wherever possible, combined with a diversified structure are the basic and indispensable condition for a successful organic agriculture as well as for a successful, sustainable logistic solution.

5.2 Case 2 – Automotive Industries:

The **Automotive Industry** owes its success since always to the **people's desire of mobility**. With the rising demand on mobility and the automotive industry the logistic requirements increase as well.

Starting with the sourcing, to the production and the delivery, ending with the automotive aftermarket – a perfect working logistic chain is a key factor for being globally competitive in the automotive industry.

The OEMs requirements continue to increase. Suppliers have to ensure a **100 percent guaranteed supply chain** with as **minimized stocks** as possible and additionally optimize **quality and costs**.

Industry	Automotive industry
Product	Car steering systems
Quantity	Daily production 1000 vehicles at OEM
Seasonality	no (except of plant holidays)
Delivery cycle to the end customer	JIS
Transport Services	from Hungary (Eger) to Germany (Regensburg)

Considering the constantly growing complexity and the immense diversity of models and vehicle types, **complex network relations** arise, whose coordination is an increasing challenge. Unorganized an instable supply chain processes lead to incorrect deliveries, quality problems and interruptions in the supply chain. To avoid these problems it is important to plan and over all to implement, in addition to the day-to-day business, a sustainable process validation.

5.3 Case 3 – Wood Industries:

Pellets — a modern form of densified biomass offers **huge opportunities** for the increased use of renewable energy in Europe.

Industry	Wood
Product	Pellets
Quantity	Yearly production capacity 95.000 to
Seasonality	Summer / Autumn
Delivery cycle to the end customer	1 -2 times a year to households
Transport Services	Romania (Sebes) to Austria (Vienna)

Today pellets are fully **competitive with fossil fuels**, particularly oil. European companies have undisputed technology leadership both for domestic pellet heating appliances, for commercial and industrial boilers and for large plants turning pellets into electricity and heat.

Europe is also a **global leader** in pelletizing machinery, pellet logistics know how and in terms of production volume.

AEBIOM estimates that by 2020 up to 80 million tons of pellets could be used in the EU — this corresponds to 33 million tons oil equivalent.

Nevertheless problems may occur in terms of **supply security**, as well as other supplier countries to start to promote the use of pellets like the Czech Republic - the traditional supplier for the Austrian market –increasingly covering his own use and also winning Italy as a key customer, who is willing to pay relatively high prices.

5.4 Case 4 – Recycling Industries:

Industry	Recycling
Product	Aluminium scrap
Quantity	Yearly production capacity 45.000 to
Seasonality	None
Delivery cycle to the end customer	continuous
Transport Services	From Turkey (Istanbul) to Hungary (Budapest)

Aluminium recycling is the process by which **aluminium scrap** can be reused in products after its initial production.

The process involves simply re-melting the metal, which is **far less expensive and energy intensive** than creating new aluminium through the electrolysis of aluminium oxide (Al_2O_3), which must first be mined from bauxite.

Recycling scrap aluminium requires only 5% of the energy used to make new aluminium.

Aluminium recyclers compact and sort the scrap aluminium before delivery to the recycling site. Scrap aluminium is then classified so the processing path can be determined. Un-coated aluminium is loaded directly into a large furnace and heated at high temperatures and turned into molten form. Coated aluminium is processed to remove any coatings and then transferred to the smelter. Alloys are added to suit the end purpose of the aluminium then cast and rolled into sheets.

Used beverage containers are the largest component of processed aluminium scrap, with most scrap manufactured back into aluminium cans.