On Track and Water: Eastern Europe's Sustainable Freight Path

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Dissemination Level: Public

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1 Introduction

Georgia has just started her internship at EcoTrans Logistics, a forward-thinking transport company committed to sustainable logistics. EcoTrans operates across Europe with an extensive intermodal network and is committed to aligning its operations with sustainability goals, based on increased awareness of environmental regulations and the EU's ambitious 2030 and 2050 climate targets.

The company has been particularly successful in recent years due to the growing importance of sustainable transport and the increasing demand from shippers for intermodal transport services. The company currently operates mainly in Western Europe but has a strong interest in entering the Eastern European market due to customer demand.

Georgia's first assignment involves a critical challenge: exploring the potential for intermodal transport between Austria and Romania, analysing road versus rail and inland waterway transport (IWT) on the Danube. The company's focus is on intermodal transport, but it knows that some shipments still need to be transported by road, due to strict customer transit times and lower costs. The company only shifts freight to rail or inland waterway if it is cheaper than conventional road transport.

Georgia meets her supervisor, Mr Schmidt, who explains:
"EcoTrans is looking for innovative ways to make freight transport more sustainable. We currently have an enquiry from a customer who has about 20 container shipments per day between Austria and Romania. The customer definitely wants to use rail or inland waterways if the transit time constraints are met and has stated that they would accept higher transport costs by using rail or inland waterways if they do not exceed €50 compared to road. However, we need a detailed insight into the costs and emissions of this modal shift".

Georgia and her fellow interns, Aria and Tim, are tasked with analysing the feasibility and impacts for the company of this shift, focusing on:

1. Cost comparisons between road vs rail and inland waterway transport.
2. Emissions analysis based on the GLEC Framework.
3. Drafting a business case for container transportation for the customer.

2 Current Situation

EcoTrans mainly uses 45ft high cube containers for intermodal transport. The relevant rail terminals for Eastern transports are Terminal Wels, Terminal Wien Freudenau, Bucharest Rail Freight Terminal (BIRFT) and Constanța South Container Terminal (CSCT). For the Danube, it's less straightforward to find ports, but initial research indicates that several Danube ports (Enns, Vienna, Ruse, Giurgiu, Constanța) can handle intermodal containers (45ft high cube containers), making inland waterway transport a viable option.

The team's aim is to calculate whether it is economically and environmentally advantageous to shift these 30 shipments to either rail or the Danube.

3 Analysis Tasks (provided in English by the students)

The case study is focused on two key areas of analysis:

3.1 Cost Analysis

Identify container shipments that can be shifted to the rail or inland waterways based on a positive cost-benefit outcome. Please use from the instructions sheet, the data provided to calculate the costs for the shipments.

Calculate transportation costs for road, rail and inland waterways, including:

1. Analyse whether the maximum transit time given by the customers can be met with transport by rail or by waterway
    - General **transit times on the Danube** are six days from port to port between Austria and Romania. The transit times on the Danube must be increased by at least one day for the first and last mile. This results in a minimum transit time of 8 days for shipments on the Danube. As a result, shipments with a "customer defined transit time" of less than 8 days can no longer be considered for modal shift to the Danube, as we cannot meet the customer's delivery deadline.
    - General **transit times by rail** are four days from terminal to terminal between Austria and Romania. The transit times by rail must be increased by at least one day for the first and last mile. This results in a minimum transit time of 6 days for shipments by rail. As a result, shipments with a "customer defined transit time" of less than 6 days can no longer be considered for modal shift to rail, as we cannot meet the customer's delivery deadline.
    - For shipments that cannot be shifted to IWT or rail due to transit time constraints, you can skip calculating the costs for these modes.
2. Calculate first the total cost by road | Select the loading ports and terminals from above based on the closest | Search the first and last mile km | Calculate the first and last mile costs based on the fixed and variable costs | Calculate the handling costs in ports | Calculate the costs by ship and rail
3. Compare the total costs of road-only versus multimodal transport

3.2 Emissions Analysis

Use the **GLEC Framework** to calculate emissions for all three transport modes (road, inland waterways, rail). Link: GLEC Framework - Use Chapter 3 | Module 2. You are encouraged to find the correct emission default values for road, rail and inland waterways. Please check the Excel file to find out which vehicles/ships/traction units are used by EcoTrans.

- **For IWT transport please choose the correct vessel**
- **For rail transport, emissions must account for the mix of energy sources:**
    - 70% electric traction between Austria and Romania.
    - 30% diesel traction on the same route.
    - Calculate the tonne-kilometres separately for electric and diesel traction, applying the corresponding GLEC default values for each energy source.
- **Use WTW Emissions:**
    - Always define and use Well-to-Wheel (WTW) or total emission values in your calculations. This ensures the most comprehensive emission analysis.
- **Quantify CO_2 Savings - Calculate the potential CO_2 savings from shifting shipments:**
    - Compare emissions for road-only transport versus inland waterway and rail options.

3.3 Draft the Business Case:

Your team will present the findings to **Mr. Schmidt**, the boss of Georgia, Aria, and Tim, who oversees the expansion strategy into the Eastern European market. The goal of this presentation is to showcase a convincing and data-driven business case that Mr. Schmidt can confidently present to potential customers.

1. **Combine All Findings:**
    - Use the results from the cost analysis and emissions analysis to create a cohesive narrative.
    - Highlight cost savings, potential shipments on rail and IWT, and the emissions reductions achieved by modal shifts.
2. **Visualize Data for Customers:**
    - Develop clear and professional data visualizations through statistics.
    - Include charts, graphs, and visuals that make the financial and environmental benefits easy for customers to understand.
    - Having creative statistics or using tools like PowerBI, Tableau, or Jamovi are recommended, resulting in bonus points
3. **Key Content for the Business Case Presentation:**
    - Cost Savings: Show a side-by-side comparison of costs for road, rail, and IWT, emphasizing where savings are achieved.
    - Emissions Reduction: Highlight the CO_2 savings and make comparisons. Highlight, why you use WTW emission values.
    - Potential Shipments: Specify which shipments can be shifted to rail or IWT, considering customer delivery constraints.
    - Actionable Strategies: Provide concrete recommendations for EcoTrans to implement these intermodal connections, such as partnerships with rail and shipping operators or targeted customer pitches.
4. **SWOT Analysis Slide (Only for Mr. Schmidt):**
    - Create a dedicated slide chapter presenting a SWOT analysis to help Mr. Schmidt understand the broader business context. Focus on:
        - Strengths: e.g. cost or environmental benefits
        - Weaknesses: e.g. longer transit times
        - Opportunities: e.g. competitive advantage from sustainable practices
        - Threats: e.g. uncertainties in Danube water levels

PoweerPoint Presentation Tips

- Be concise but thorough—focus on the data and how it supports your recommendations.
- Tailor the customer-facing part of the presentation to emphasize the benefits for the customers (cost savings, reliability, sustainability).
- For the SWOT analysis, ensure clarity and relevance to the business case.

Mr. Schmidt will evaluate your presentation on how well it addresses customer needs, its strategic insights for EcoTrans, and its potential to drive the company's expansion into Eastern Europe. Make it count!

4 Recommended Links

General Background on Inland Waterways and Rail Transport

- **Danube Logistics: Tools and Insights**
  - Travel Time Calculator and Transport Planner
    https://www.danube-logistics.info/
- **Teaching materials for IWT and Rail**
  - www.Rewway.at
  - www.Retrans.at
  - www.Reecotrans.at
- **European Inland Waterway Statistics and Policies**
  - Access data on transport volumes, emissions, and policy initiatives related to inland waterways.
    https://ec.europa.eu/transport/modes/inland_en
- **viadonau: Danube Logistics Information**
  - Information on Danube port capacities and initiatives for intermodal freight.
    https://www.viadonau.org/
- **ERA Rail Freight Fact Sheets**
  - Data on rail transport trends, emissions, and European market challenges.
    ERA Railway Factsheets | European Union Agency for Railways
- **Travel time and Transport Planner**
  - Travel Time Calculator (danube-logistics.info)
  - Transport Planner (danube-logistics.info)

CO2 Emission Analysis

- **Smart Freight Centre – GLEC Framework**
- Emission calculation framework for road, rail, and waterway transport.
  GLEC Framework

Visualization Tools

- **Tableau Public**
  - Free platform for creating professional data visualizations.
    https://public.tableau.com/
- **PowerBI**
  - Microsoft's analytics tool for building dashboards and visualizations.
    https://powerbi.microsoft.com/
- **Jamovi**
  - Open-source statistical tool for presenting quantitative insights.
    https://www.jamovi.org/