

Port Economics FEM11051

Case Study Ever Given – Supply Chain

Teaching Notes: Questions and Answers

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Case Study Ever Given – Supply Chain

How one ship can disrupt the world's economy

Introduction

The case study is about the grounding of the Ever Given in the Suez Canal. The exercise focuses on the effects of the disruptive event on the supply chain from the perspective of the Port of Rotterdam. As a student, you are participating in the Harbour Master's team and you have to inform and advice Roger van Duin, the Harbour Master of the Port of Rotterdam, about the disruptive event. Initially, you are going to read a short introduction about your superior Roger van Duin and the department of the Harbour Master that you are part of. Then you are going through the narrative and answer the questions to provide the Harbour Master with information and recommendations.



Photographed by Bart Kuipers

Harbour Master of the Port of Rotterdam – Roger van Duin

As Harbour Master of the Port of Rotterdam, Roger van Duin wants to be the leader in efficiency while maintaining highest standards of safety. Ship turnaround time is of great importance to attract shipping lines and the corresponding trading volumes. Therefore, the department of the Harbour Master is responsible for keeping the risk of delays to shipping to a minimum. The coordination of the shipping schedules can be advanced when the whole maritime chain contributes to the improvement of the information exchange between all the maritime parties. This means that all the maritime parties, such as container terminal operators, inland terminal operators, barge and rail operators and freight forwarders, must share information with each other and with the Port of Rotterdam.

Narrative

March 23 around 7:00 am Roger van Duin, Harbour Master of the port of Rotterdam, received an urgent call about the *Ever Given* one of the largest vessels in the world. He immediately checked his dashboard for the voyage planning of the *Ever Given* and noted the ship was supposed to arrive one week from now in the Port of Rotterdam. The container handling company ECT and the Port of Rotterdam were already prepared for her arrival. However, this time the voyage planning of the *Ever Given* did not seem to go as planned...

His officers on watch told in the Harbour Coordination Centre the Harbour Master that morning that the 20.000+ TEU ship ran aground in the Suez Canal. The Harbour Master department started to reschedule the *Ever Given*. Nonetheless, the next morning it became clear that there was no prospect of when the ship would refloat again. This meant that the arrival of the *Ever Given* would inevitably be delayed, but also the arrival of other ships sailing through the Suez Canal would be delayed.

Besides this disruptive event, the international container logistics chain got already disrupted due to the COVID-19 outbreak and subsequent worldwide pandemic in the first months of 2020. The regular shipping schedule has been out of balance for months. The day before the grounding of the *Ever Given*, it seemed the tasks of planning for vessel arrival could not get any harder due to COVID-19 pandemic. Van Duin and its department had been working for months on planning and scheduling for optimal vessel arrivals considering the circumstances related to the pandemic. On top of that the Suez Canal, one of the most important transit canals in the world, was now blocked.

After three days the *Ever Given* was still not released and so the blockage in the Suez Canal remained. As a consequence, a traffic jam of vessels started to form on both sides of the Suez Canal. Roger van Duin started picturing a 'tsunami of containers' in his mind. As long as the blockage was not resolved, these ships were piling up, but once resolved would set sail and arrive in Port of Rotterdam in approximately 10 days all at the same time. The Dutch salvage company Smit Salvage/Boskalis came to the rescue and worked with the local authorities to release the ship. After six days and moving approximately 30,000 cubic meters of sand, the *Ever Given* was back afloat on 29 March 03:05 pm local time.

On the 6th of April the first ship that had been stuck behind the *Ever Given* reached the port of Rotterdam and from that moment the port of Rotterdam was expecting 8 more vessels per day to arrive on top of the regular 80 ships per day. Roger van Duin got his team together for a meeting to deliberate on how to mitigate the emerging port congestion.

Questions

Imagine yourself participating in the Harbour Master's team meeting and ask yourself the following questions.

Question 1: Effect on the Port of Rotterdam and related maritime parties.

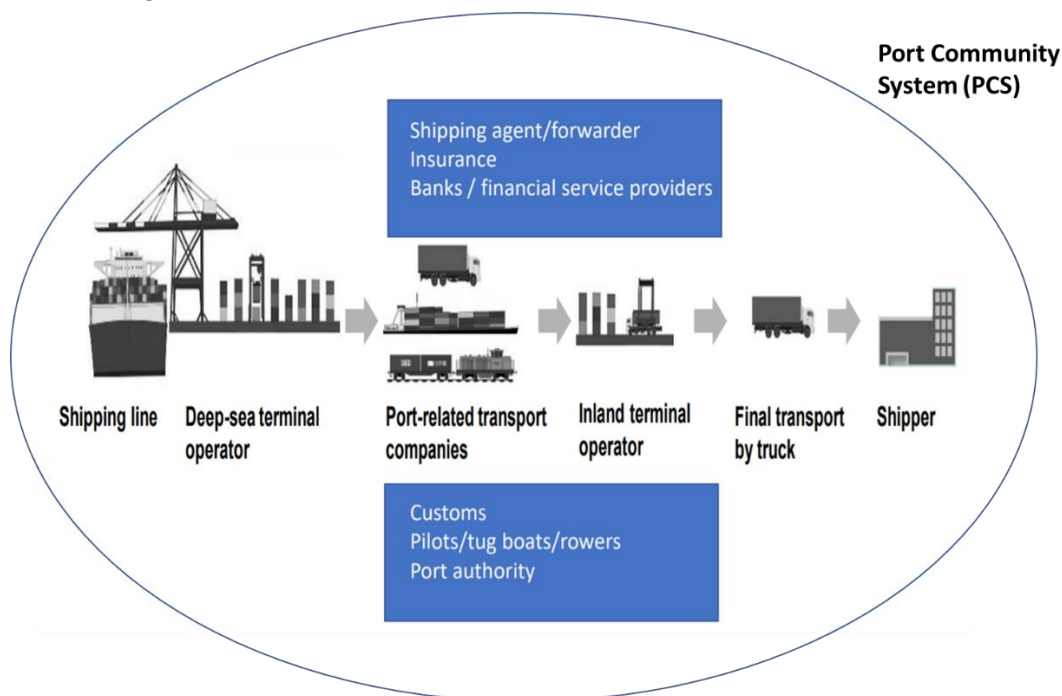
- A.** What are the possible effects of the blockage on the Suez Canal on the Port of Rotterdam?
- B.** Who would you involve from outside the Harbour Master's department to discuss?

Answer A)

Immediately after the grounding: Less container vessels are arriving in the port of Rotterdam after the grounding of the Ever Given. The port of Rotterdam has to reschedule the shipping arrivals. Not only the Port of Rotterdam, but also other parties (such as barge and rail operators) have to reschedule while freight forwarders have to inform their consignees on latest status of their shipments.

After refloating of the vessel: When the traffic jam is resolved, a tsunami of containers is expected in 10 to 12 days. The port of Rotterdam had to prepare itself for the sudden peak volumes of arriving vessels.

Answer B)



Source: Erasmus UPT

Question 2: Prepare yourself for the tsunami of containers

- How can the port of Rotterdam and other maritime parties prepare itself when the ‘tsunami of containers’ is coming? Answer the question through filling in the table. The first column will be given. Then you can fill in the main task of the party and the measures that a party can take to prevent container traffic congestion.

Answer

Parties	General main task	Action (in relation to disruptive event)
Port Authority	Vessel traffic management	Coordinate and convince parties for joint effort
Deepsea terminal	Loading/unloading containers	Free up capacity on yard, by repositioning (stack management)
Shipping lines	Container carrier of import/export flows	Limiting the handling facilities on the export flows.
Barge operator	Inland transport provider	Move containers from deep sea to inland terminals (e.g. city terminal)
Port Community System	Platform for collecting and sharing port logistics data	Build a monitoring dashboard to provide transparency of vessel arrival schedules
Inland terminals	Loading/unloading containers	Extend opening hours to receive more containers
Shipper	Cargo owner, importer, or exporter of products	Call off containers, to free up yard capacity on terminal.
Pilots/tugs/rowers	Nautical services provider	Exchange planning data for ship arrival/departure process. Have extra capacity available for nautical services.
Customs	Inspection, control of imports and export flows, incl. collection of import duties	Extra capacity available for customs inspections
Supply chain as a whole	Efficient logistics process for moving containers from A to B	Exchange timely information on container status

Teaching Note

Explain the importance of addressing this as a collaborative action problem, which means that actors in the port logistics chain, including the nautical services. This problem cannot be solved by actors individually, therefore a cooperative mindset is required. Van der Horst and De Langen (2008) state that coordination between different parties in the supply chain is difficult, due to free-riding problems, lack of incentives or contractual relationships and information asymmetry. They suggest that improvements in the coordination can be made by introducing incentives, creating interfirm alliances and collective action.

Van Der Horst, M., De Langen, P. (2008) *Coordination in Hinterland Transport Chains: A Major Challenge for the Seaport Community*. *Marit Econ Logist* 10, 108–129. <https://doi.org/10.1057/palgrave.mel.9100194>

Question 3: Effect on the entire supply chain

- What are the possible effects on the whole supply chain? Consider for your answer the shipping routes, the world economy, location of manufacturing suppliers and container freight rates (container prices).

Answer

- Ships are going to sail **alternative routes**. Instead of transiting the Suez Canal, ships sail around the Cape of Good Hope. The transportation days will be longer, and the corresponding costs are higher for the ship operators.
- **The world economy** can be affected. Approximately fifty ships per day transit the Suez Canal, which consist of 12% of global trade, including oil tankers and containerships. Consequently, this leads to shortage of supplies in Europe for factories, season-related goods cannot be delivered on time in retail shops, crude oil cannot be transported to refineries in Europe and other countries, food products may perish underway.
- When ships are sailing alternative routes, it takes more time to transport one container to the final destination and back. Ships which do not take alternative routes, have to wait when the traffic jam is resolved. In both cases the transportation time of one container is higher. In the meantime, the demand for container transport stays the same, because the consuming behavior does not change because of the disruptive event. *Demand for containers stays the same, offer of container lowers > **increase in container freight rates**.*
- **Supply chain reconfiguration:** Retailers source from nearby manufacturing suppliers, instead of supplier from the Far East. By shortening lead times from suppliers, companies' supply chains become less vulnerable and more robust, can therefore absorb sudden shocks. Eventually this may lead to less demand for long distance transport and therefore may lead to overcapacity in container shipping.

Teaching note

In the slide-deck of the presentation about the Ever Given are the possible effects explained.

Question 4: Digitalization

- How can digitalization of processes contribute to a more efficient port and a stronger competitive position? And how can digitalization contribute to handling disruptions in the supply chain more efficient, such as the Ever Given grounding?

Answer

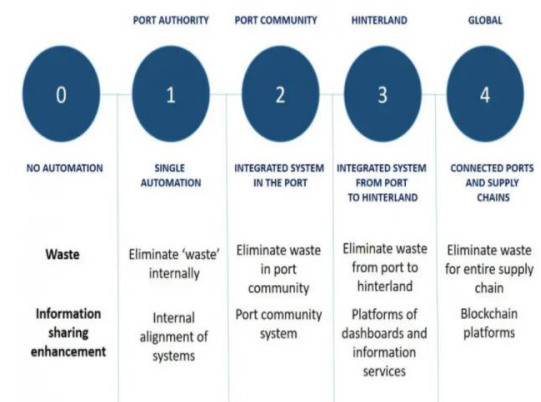
Digitalization contributes to making information exchange between different maritime parties more efficient. For instance, collected data can be shared faster, such as tidal movements, weather reports, the current of the water and movements of transportation. When the supply chain get disrupted, different parties can respond faster to the changing circumstances and adjust their transportation schedules.

Another reason why digitalization contributes to a more efficient port is when the quality of information increases, ports can become more time efficient and also time accurate. The reliability of transport services will increase, and this leads to the attraction of new customers. The competitive position of a port becomes stronger.

Teaching Note

Providing background information of the digitalization of ports. The digitization of ports is shown in four steps in figure 1, starting with single automation and ending with connected ports and supply chains. Blockchain and Digital twins are great examples of technologies that can be used for making the port more digitalized (Jansen, 2019). Blockchain technology makes it possible to make information exchange more efficient by data sharing technology while safety is guaranteed, because the users of the network have to validate the data (Weernink et. al., 2017). Digital twins can be used to perform simulations before the devices are used in practice and make performance forecasts (Jansen, 2019). Therefore, a digital twin can contribute to making the port smarter and more efficient.

Figure 1: Digitisation of ports in four steps



Source: Port of Rotterdam Authority, edited by Maurice Jansen

Sources:

Jansen, M. (2019) *The digital Port is coming*. SWZ Maritme. URL: <https://swzmaritime.nl/news/2019/08/26/the-digital-port-is-coming/>

Weernink, M. O., Van Den Engh, W., Francisconi, M. & Thorborg, F. (2017) *The Blockchain Potential for Port Logistics*. URL: <https://smartport.nl/wp-content/uploads/2017/10/White-Paper-Blockchain.pdf>

Question 5: Empty container problem

- The Ever Given unloaded the containers in the port of Rotterdam and eventually sailed to a ship repair yard in China without any cargo. In what way did this return voyage add to the already existing imbalance of empty containers?

Answer

On its voyage from the Far East to Europe, the vessel was fully loaded (approx. 18,300 laden containers). The effect has to do with the lower turnover of container equipment between Far East and Europe. Because of the delay, the cycle time of containers goes down, which creates scarcity in available empty containers, and theoretically higher freight rates. Some 422 ships were jammed in both directions. 28% of all ships passing through the Suez Canal are container ships, 27% are tankers and 22% are bulk ships. 64 container ships were on its way to Rotterdam. According to the Port of Rotterdam, the first ship arrived on 6th of April. On May 7th, 54 ships were handled, 3 ships were cancelled, 2 were being discharged, 4 were still underway, including the Ever Given itself.

The second effect has to do with the containers on the Ever Given. As the ship was damaged, it received a permit to discharge containers in Rotterdam. Cargo owners were instructed to pick up containers in Rotterdam. Most of them eventually did. the total amount of containers in Europe is increased with 20.000 containers. The consequence is that the availability of the containers in Asia has decreased with 20.000 containers. The supply of the containers in Asia decreased and therefore the price of containers can increase and influences the container market.

Teaching Note

Insights were provided by an interview with ECT.

Teaching Note

Lecture plan example study case

Time	Teacher role	Student role
13:00-13:05	<p><i>Explaining</i></p> <p>Providing the learning aim and the set-up of the two-hour session.</p> <p>Learning aim: Understanding the effect of disruptive events on the supply chain and the consequences on the container market from the perspective of the Port of Rotterdam.</p> <p>Set-up:</p> <ol style="list-style-type: none"> 1. Lecturing about the Ever Given 2. Making a study case regarding the Ever Given. 3. Discussion and providing answers of the case study. 	<p><i>Listening and asking questions</i></p>
13:05-13:30	<p><i>Lecturing</i></p> <p>Providing background information about the Ever-Given Study Case.</p> <p>Needed: Powerpoint slides</p>	<p><i>Listening and asking questions</i></p>
13:30-13:40	<p><i>Providing instructions Study case</i></p> <p>Instructions: Start with reading the document and answering Q1. For Q2 we inform you which parties you have to consider for the table. If you are done with Q1 continue with Q3 in the meantime.</p> <p>Needed: Printed Study cases</p>	<p><i>Reading the introduction and narrative and answer Q1</i></p>
13:40-13:50	<p><i>Discussing Q1 & Q2 and filling in the first two columns of table Q2</i></p> <p>Q1A: Provide answers Q2 Asking students the important maritime parties Q2: Give first column and ask the main tasks</p>	<p><i>Participating by providing maritime parties for Q1B</i></p> <p><i>Participating by providing the main tasks of the parties for Q2</i></p>
13:50-14:00	<p><i>Break</i></p>	<p><i>Break</i></p>
14:00-14:10	<p><i>Instructions for column 2</i></p> <p>Students can discuss with each other what possible actions the maritime parties can undertake to be prepared for the tsunami of containers</p>	<p><i>Discussing the actions for Q2 with fellow students</i></p>

Case study – Ever Given

Supply chain

14:10-14:15	<i>Discuss answers with the students Q2</i>	<i>Students provide answers for Q2</i>
14:15-14:30	<i>Students work on their own Q3, Q4, Q5</i>	<i>Students work on Q3, Q4, Q5</i>
14:30-14:45	<i>Going through answers slides by first asking what the students have come up with.</i>	<i>Students participating by providing answers and asking questions while the teacher goes through the lecture slides.</i>

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Colophon

The study materials are made in July-October by:

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