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Port of Rotterdam: Booking.com for Container Transport

MULTI-SIDED PLATFORMS IN EUROPE'S

LOGISTICS SECTOR (Case 4)

RSM - a force for positive change

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Introduction

In 2016, the European Commission launched the EU Horizon2020 Project SELIS (Towards a Shared European Logistics Intelligent Information Space) to accelerate digitalization of the logistics sector in Europe. Eight SELIS Living Labs (LLs) took place in different geographical settings all over Europe, including the Netherlands, Belgium, Greece, etc. During the project, supply chain visibility was one of the key strategies targeted by the LLs, also strongly related to other strategies like data reliability and quality. The overall aim of all the SELIS LLs was to contribute to the adoption of innovative business models by logistics communities and enabling the participation in a green, agile and collaborative European logistics and transportation system. In summer 2019, the project came to an end and it was time for the actors participating in the LLs to scale the multi-sided platforms launched within the project in a pilot base and implement them in their actual day-to-day business activities. How would the use of a multi-sided platform transform their business? What challenges would they encounter when implementing it? And how to improve the platform in order to make it most effective and maximize its long-term value?

Multi-sided Platforms

Multi-sided platforms (MSP) are "technologies, products or services, that create value primarily by enabling direct interactions between two or more distinct customer or participant groups"[1]. Platforms as such have existed for years; a shopping mall for example, works a platform, connecting consumers and traders. The difference of this era, which is dominated by the growth of information technology (IT), is that the need to own physical infrastructure and assets has been substantially reduced. Because of the use of IT, developing and scaling up platforms has become way simpler and less expensive, as the smooth and almost seamless participation is made possible, and thus network effects are enhanced. This way, an enormous amount of data can be captured, analyzed and exchanged, and the platform's value grows for all interested parties. Platform businesses like Uber and Airbnb, have grown tremendously, disrupting and revolutionizing their industries[2].

A digital platform matches supply and demand of physical goods, services and/or information provision. The position of the platform is in between the two markets as an independent player; the platform host is the "matchmaker". What the platform sells to its users is access. The role of the platform host can differ in intensity (**Exhibit 1**); they could just offer a platform for exchange or retain more control over the interactions and have an integrated payment system and customer service.

Platforms can vary a lot, but they all have an ecosystem with common structure and four main categories of players involved: owners, providers, producers and consumers (**Exhibit 2**). The platform owners have control over their intellectual property and they are responsible for the governance of the platform. The providers act as the platforms' interface with the users. The producers make offerings to be used by the consumers.

Many digital platforms create economies of scale, as costs of enabling a transaction decline when the number of transactions increases. This scalability is a reason why digital platforms can cause a disruption to existing market; they can potentially grow fast. Multi-sided platforms are characterized by network effects (**Exhibit 3**) which should be considered when shaping the applicable market.[3] Network effects can be either positive (value-enhancing) or negative (value-diminishing)[4].

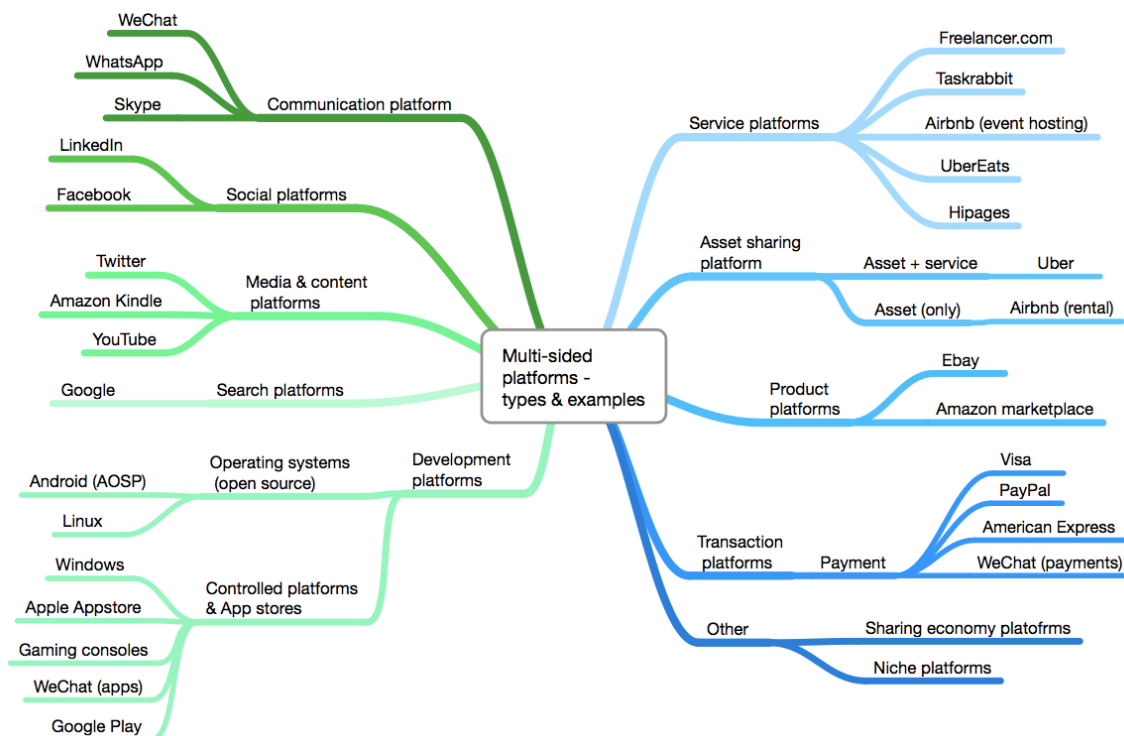**Exhibit 1**. Types and examples of platform businesses[5]
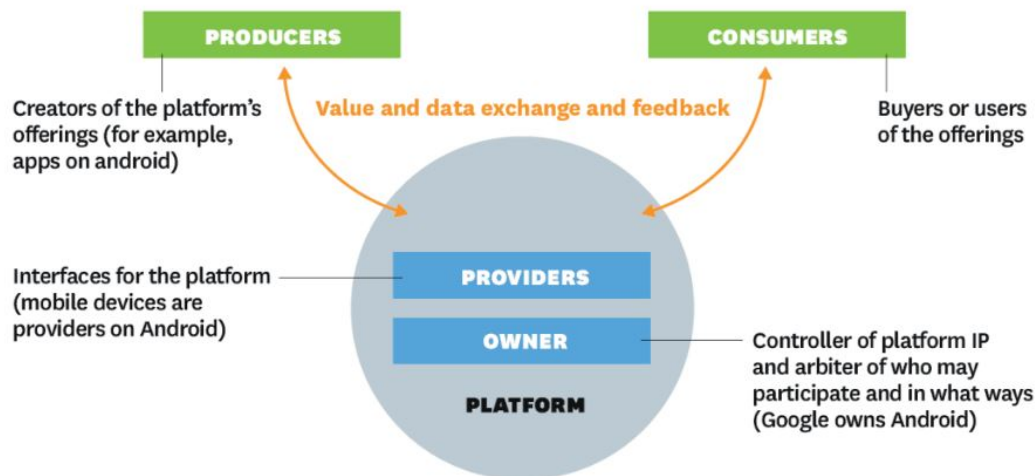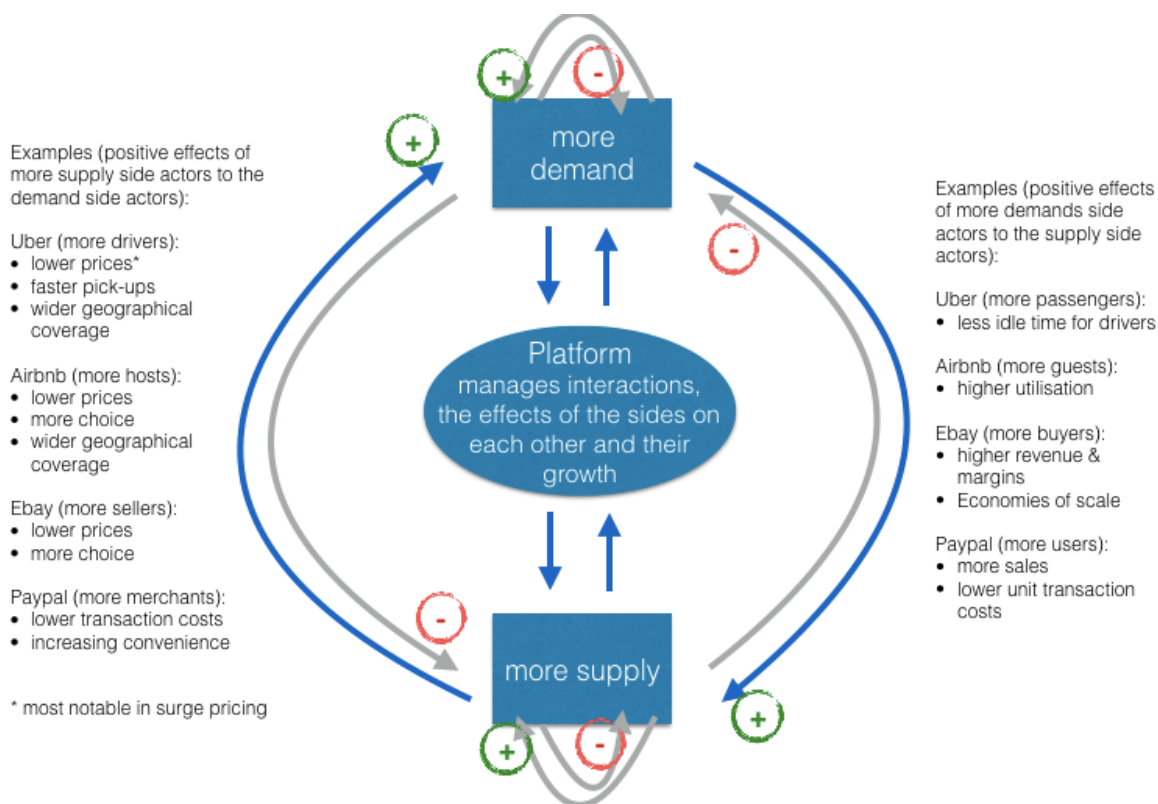
Exhibit 2. The players in a platform ecosystem[6]

Exhibit 3. Potential network effects of multi-sided platforms[7]

Examples (positive effects of more supply side actors to the demand side actors):

Uber (more drivers):
- lower prices*
- faster pick-ups
- wider geographical coverage

Airbnb (more hosts):
- lower prices
- more choice
- wider geographical coverage

Ebay (more sellers):
- lower prices
- more choice

Paypal (more merchants):
- lower transaction costs
- increasing convenience

* most notable in surge pricing

Examples (positive effects of more demands side actors to the supply side actors):

Uber (more passengers):
- less idle time for drivers

Airbnb (more guests):
- higher utilisation

Ebay (more buyers):
- higher revenue & margins
- Economies of scale

Paypal (more users):
- more sales
- lower unit transaction costs

Port of Rotterdam

It was a warm afternoon of June 2019, and an important meeting was taking place at the premises of BargeSpot, a Rotterdam-based startup. Jan Baas, BargeSpot's founder and managing director, sounded a bit worried. Three years after the launch of their digital platform, which had the ambition of becoming the "Booking.com" of the Port of Rotterdam, there were still some challenges to overcome.

Baas said to the rest of the team: "This is a critical time for BargeSpot. All of us have to work together to further improve the platform with the inclusion of new attributes, as well as investigating new ways of persuading the actors involved, to change their mindset and actually systematically use the platform. But at the same time, aiming at a digital transformation of the container transport sector involves a high level of risk: What are the implications that such a transformation could bring in the future?"

A vivid discussion on the topic ensued. While no one questioned the pivotal role the multisided platform could play for the future of The Port of Rotterdam, there seemed to be a unanimous agreement that shifting the mentality and initiating a bigger change in the transport and logistics field was the overarching challenge. What were the benefits of the online platform for the co-existing container ecosystem? How could it shape each of their future roles within the largest port in Europe? Was the transport and logistics community ready for such drastic changes?

Background

In 2019, the Port of Rotterdam was the largest container seaport in Europe and 12th in the world[8], having a huge scale of container transshipment and state-of-the-art container terminals. Maasvlakte 2, a very big extension project undertaken by the port was completed in 2013, expanding the port area by about 1000 hectares, of which 600 hectares used by container terminals. Located directly in the North Sea, Maasvlakte 2 proved to be ideal to accommodate the largest container ships. The total number of deep-sea vessels, inland vessels, containers and TEU[9] that were accommodated in the port in 2018 is presented in **Exhibit 4**.

The operation of Maasvlaakte 2 increased the volume of containers being transported through the Port of Rotterdam enormously. This, thus, created a need for a digitalized system, such as a digital platform that would gather all the required information for booking containers into one single place.

Approximately 70% of the containers handled had an origin or destination in the hinterland, while the remaining 30% were headed to sea-sea transshipment. Hinterland transport of containers could take place either by road (trucks), rail, inland waterways (barge vessels), or a combination of them. This was a result of Rotterdam's strategic

geographic location in the mouth of the river Rhine and the existence of good rail connections to the hinterland. Regardless, of this ideal location which favoured barge and rail, road transport by trucks had still a dominant position, with 46% of the modal split in 2015. The number of containers kept increasing, and at the same time the roads to, and from, the port were becoming more congested[10]. Domestic container transport by barge within the Netherlands was over 2.104.000 TEU in 2017[11] (CBS, 2019)

Exhibit 4. Facts and Figures, Port of Rotterdam, 2018[12]
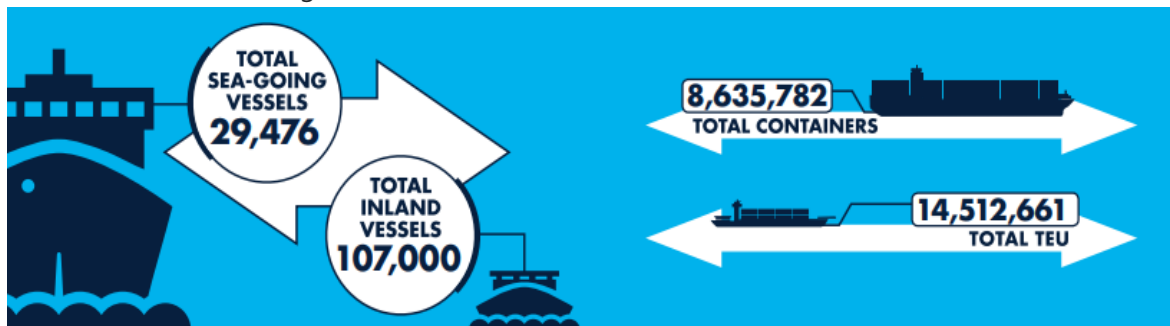
In 2011, Rotterdam Port Authority, in collaboration with various ministries, businesses and research institutes in the Netherlands, published a strategic development plan called 'Port Vision 2030', in which comprehensive strategies to handle the growing numbers of containers efficiently and in a sustainable way were presented. In this vision document, it was stated that by 2030 the aim would be to reduce drastically the road share of hinterland container transport, reaching 35%, so that the 65% of containers would be transported by barge or rail. The development of modal split between 2002 and 2015 in Maasvlakte area is presented in **Table 1**.

Table 1. Development of modal split in Maasvlakte area, 2017-2018[8]

	2002	2006	2010	2012	2013	2015[a]	2030 Ambition
Barge	41.1	38.3	39.9	42.9	42.3	41.6	65
Rail	12.5	13.2	12.9	12.8	12.4	12.2	
Truck	46.4	48.5	47.2	44.3	45.3	46.2	35
Total	100.0	100.0	100.0	100.0	100		

Nevertheless, until 2018 the Port Authority had not succeeded in improving the modal shift in container transport. The ratio between the share of containers leaving the Maasvlakte via road or via other modalities (rail and inland shipping) has deteriorated. The share of container road traffic on the Maasvlakte increased from 50.4% in 2017 to 51.9% in 2018. This was almost entirely at the expense of the inland shipping share. A congestion problem experienced by container inland shipping in 2018 contributed to this.[13]

Actors and Relations in the Container Transport Chain

The ecosystem of transport and logistics is one with a large number of interconnected actors, being highly dynamic, which makes it a so-called complex socio-technical system. There are multiple actors involved in the container supply chain from a sea port to the hinterland and vice-versa. They can be divided in 5 main categories, according to the role they play[14]:

- the primary customers: Shippers
- the organizing group: Freight forwarders, shipping agents, customs brokers
- the physical transport group: Ocean carriers, barge operators, rail operators, road carriers, sea terminal operators, inland terminal operators, depot operators
- the authorising group: Port authorities, transport authorities, and
- the financial group: Banks and insurance companies

The relations among the different actors are presented in **Exhibit 5**. The shipping line is responsible for the transport of containers to the seaport, where they are then transferred into trucks, barges or trains. Responsible for this transfer is the deep-sea terminal operator. In the case of barges and trains, the containers travel first through an inland terminal, and the last-mile transportation usually takes place by truck. The primary customers are the shippers, as they are the group that generates the demand, initiating this way the whole supply chain.

Exhibit 5. Actors and relations in the container supply chain[15]
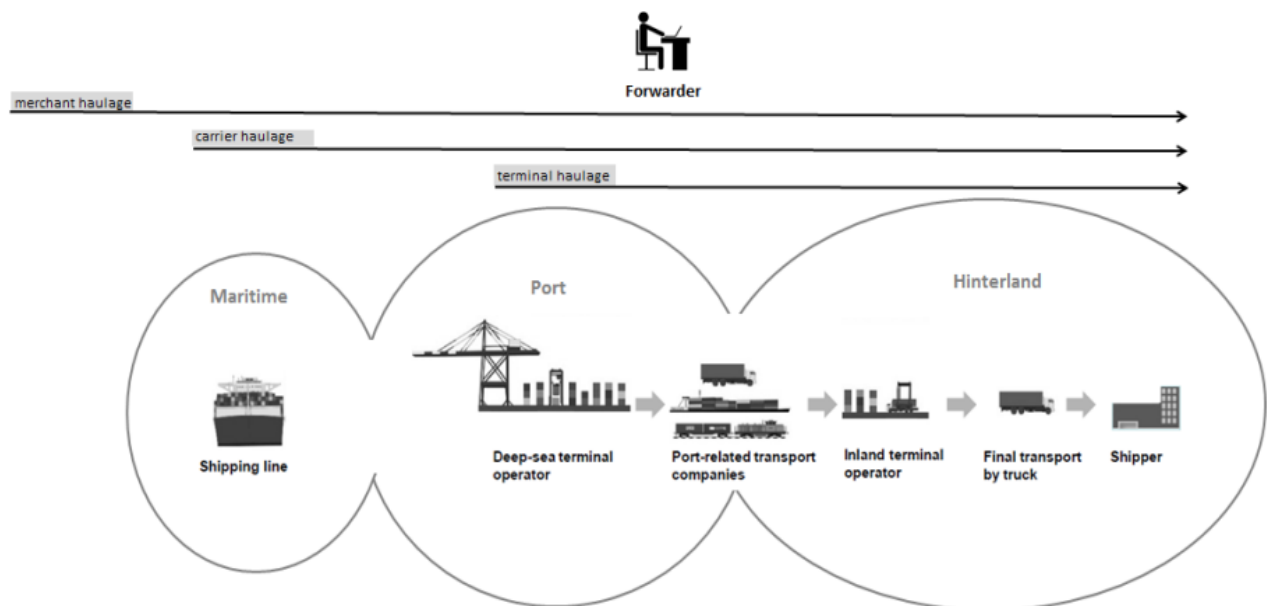
As it is shown in **Exhibit 5**, the organizing group is placed above the physical supply chain, but boundaries can be a bit blurred among the groups, in particular between the organizing and the physical transport group, as transport operators sometimes take on the role of port-to-door logistics providers. Customs brokers, belonging to the organizing group, have a very important role in the supply chain. The existence of customs makes the process of freight transport much more complex than the one of passenger transport. The goods transferred in the containers have to be checked, therefore complex paperwork is needed and it is a more time-consuming activity than for instance the passport control involved in passenger transport. The authorizing and the financial group have an overview of the process and a supporting role[12].

All parties generally try to enhance their position by gaining more control over the supply chain. In Exhibit 5, three different types of haulage (transport of goods) are presented: merchant, carrier and terminal haulage. Originally the carriers and terminal operators performed just their primary role and the freight forwarders or shipping agents arranged the transport; this is called merchant haulage. Carrier haulage means that shipping lines offer port-to-door services next to port-to-port services to their customers. The deep sea terminals also started offering terminal-to-door services, leading to terminal haulage[12].

Therefore, hinterland transport can be arranged by different parties and using different transport modes. Multimodal transport has gained a lot of attention in the recent years; it is an umbrella term, which means transportation of goods by a sequence of at least two different modes of transport. Intermodal transport falls within it, in reference to transporting goods by two modes by the same transportation unit without handling it (such as in the case of containers). Synchromodality is an innovative concept that refers to booking a transport service with the only commitment that the goods will be delivered from point A to point B on time, without agreeing on any more details regarding how exactly they are going to be transported. This gives the transport service providers the freedom to select their preferable way of realizing the service (e.g. with which mode, which exact route to follow, what time to depart etc.), allowing thus for the maximization of efficiency and the decrease of the environmental impact of transport. The flexibility provided though, requires the development of new collaboration strategies among actors in supply chains. [16]

The barge transport ecosystem is made up of the shippers, which generate the demand; and then the freight forwarders and carriers who are responsible for arranging the transport for the shippers. On the supply side there are the vessel owners (shipping lines) and also the inland terminal operators and barge operators. The inland terminal operators and the barge operators are the organizing parties, but sometimes they also own some vessels. Barge operators organize the barge transport while the inland terminal organizes the terminal operations. However, it is also possible that the inland terminal operator acts as a barge operator or the barge operator exploits an inland terminal. The inland terminal

often arranges the last mile transportation of goods. Last mile delivery is the process of moving goods from a transportation hub to the final delivery destination/end user.

Market Structure of Container Transport

The largest group of actors in the container transport chain are the shippers, as there are many small and medium enterprises (SMEs). There are some that only ship 1 or 2 containers per month, but there are also shippers that ship many containers and are therefore big players in the market. Shippers are a powerful group in the chain as they create demand; all other actors in the chain depend on this. Small shippers virtually join forces by employing a forwarder who has considerable market share. The freight forwarding market is less scattered in comparison to the shippers, and there are a few players that dominate the market.[17] These big freight forwarders have power when booking transport and can negotiate discounts.

When looking at the physical transport operators, there is a big difference between all of them. The truckers have a lot of SME's, many players only have a limited amount of trucks. This is the case because there are many family-owned businesses. This also means that there is a lot of competition between the trucking companies. The truckers are also in competition with other modes of transport such as barge and rail. When the other modes experience problems, the trucker companies are in a more comfortable position.

In the barge industry, the number of vessels owned by the skippers themselves is in decline. The predominantly family-owned businesses cannot cope with the growing investments and shorter economic lifecycles of the vessels. This also explains the consolidation in the market in which barge operators and inland terminals operate: For example, inland container operator BCTN owns 7 terminals, and barge operator Danser works its own fleet and with about 60 charter vessels.

Sea ports often host only limited number of deep-sea terminals. The global port terminal market is dominated by a limited number of players.[18] The sea shipping lines have also progressively consolidated into alliances. In 2019, three alliances dominate the market: 2M, The alliance and Ocean Alliance.

Although there are several large inland terminals operators, it seems that their power relationship with forwarders and shippers is not necessarily favorable, as they compete with alternative routes on which possibly other modes of transport are deployed. This is particularly the case with the ports in the Hamburg – Le Havre range, but this may be different in other geographical settings.

BargeSpot

BargeSpot is an independent online booking platform for container transport that was launched in November 2016. The platform facilitates inter-terminal container transport in the Port of Rotterdam Maasvlakte area on three modalities. It provides a synchromodal solution where deep sea-carriers and terminal companies can book inter-terminal services in the Maasvlakte on existing barge, rail and truck movements. The platform was founded by Jan Baas; he saw there was a market yet unserved. There was not yet one platform, where deep-sea carriers and terminal operating companies could book all modalities from different inland-transport companies at one place. The platform brings ease as deep-sea carriers and terminal operating companies do not have to call and e-mail (or even sometimes fax) all different individual inland-transport companies.

Finding the right transport operator fast was further required as inter-terminal transportation were increasing in the port of Rotterdam. BargeSpot allowed booking with all three modalities per shipment, by presenting what the best option was. Each modality had its own advantages:

- The barge had suited for movements with little urgency and structural demand; it has the potential to be cheaper and more environmentally friendly.
- The train is fast with no congestion, but capacity was limited and there was a fixed loop.
- The truck was flexible but more expensive and with a larger impact on the environment.

BargeSpot wished to change the modal split of containers to, and from, the Maasvlakte by making the booking process for barge transport easier and by promoting it to the smaller shippers. BargeSpot acted as the "man in the middle" between the booker (the company that wants to transport containers) and the operator (the company that transports the containers). The BargeSpot 's ambition was to become the container logistics equivalent to Booking.com.

The BargeSpot platform started its operation within the Port of Rotterdam (inter-terminal transportation) and then expanded it for the Dutch hinterland, with the vision to broaden the scope in the future to transport to, and from, the European hinterland. This would provide the platform the opportunity to reach more target groups, including shippers and forwarders who still used old booking methods. These parties often lacked the time to complete information to make a detailed assessment of all transport options. Therefore, applying concepts like BargeSpot may contribute to a shift of freight transport to inland navigation or rail transport.

The architecture of the digital platform of BargeSpot is presented below in **Exhibit 6**.

Exhibit 6. BargeSpot platform architecture[19]
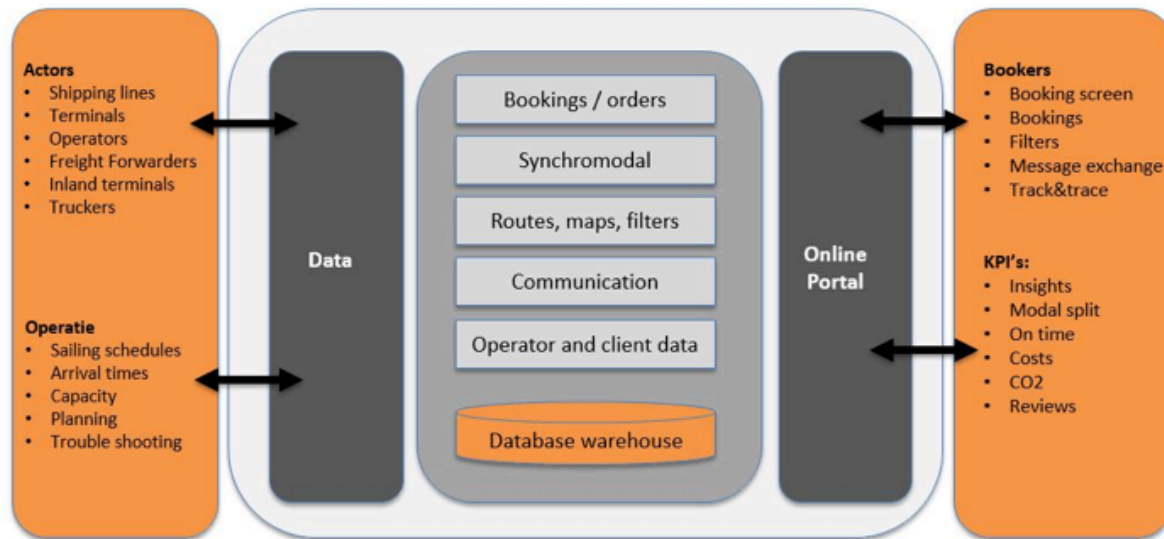
The Way Forward – Remaining Challenges for BargeSpot

A remaining major challenge for BargeSpot, when the meeting of the team took place in 2019, was seeking ways to encourage and persuade all parties involved in the container system to share data. By collaborating with each other, they could achieve a greater market impact than a group of actors (e.g. barge operators and inland terminal operators) could achieve individually. Moreover, additional benefits could be gained, e.g. an inland terminal could be more open to provide discounts to shippers and freight forwarders if an increased number of barge bookings was made. With regards to the case of barge operators and inland terminals, there was an additional issue - a paradox - they needed to face: they did want the barge share to increase so they could benefit for it, but on the other hand they were not willing at all to open the "black box" of barging and increase the transparency in their services. They considered this to mean the end of their flexibility and consequently, it could lead to a decrease of power of their group among the different actors.

Furthermore, BargeSpot had to deal with the fact that an overall mind shift in the industry was needed, mainly with regards to the benefits of digitalization. The new generation of actors was much more familiar with the new technologies and the concept of digital platforms. Therefore, they would be more willing to use the platform, but still, solutions had to be found concerning the previous generation of employees, who were used to call and speak on the phone to book their shipments, as they preferred personal communications to do their businesses. There were even companies that used fax to share shipping documents, having as a result time-consuming and more cost-demanding processes, vulnerable to potential human errors[20].

Another essential challenge BargeSpot needed to solve, was identifying and exploring ways on how the platform could be updated to an improved version of it; what other elements could be included (e.g. weather conditions at the Port, custom – state of the container, live-feed for congestion at the Port etc.) to maximize the user benefits, and hence increase the number of users of the platform.

Last but not least, they had to think of the general issue of digitalization of the sector. They needed to consider whether there should be any limits on it and if a really smart digital system could work without any human interaction in the future and the implications of such a transformation.

Conclusion

Going back to the offices of BargeSpot, Jan Baas emphasized, that the company should focus on the aforementioned challenges/questions to be addressed, in order to ensure the viability of their digital platform in the competitive environment of the Port of Rotterdam. He took a marker and started writing on the white board of the meeting room, summarizing the main remaining challenges:

1. Persuade all parties involved to share data
2. Convince barge operators to open the black box
3. Become the Booking.com of container industry
4. New features of Version 2.0 of the platform for the best user experience
5. Impacts of digitization of the sector? Implications?

Baas encouraged everyone to start working firstly, by envisioning the features of the Version 2.0 of their platform. Baas suggested that they should imagine the variety of the services provided by platforms in other fields, for instance booking.com or google flights. How could they apply their user-experience of such platforms to their own platform? How could they enhance its capabilities for a better user-experience? Was the transport and logistics community ready to implement the changes brought about by the digital platform?

Endnotes

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[17] See raking of freight forwarder market shares: https://www.3plogistics.com/3pl-market-info-resources/3pl-market-information/aas-top-25-global-freight-forwarders-list/

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