# INDUSTRY STUDY MISSION ANTWERP ROTTERDAM

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28 Apr – 9 May 2015 Maritime Economics Concentration



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Known as the Gateways to Europe, Port of Antwerp and Port of Rotterdam are strategically situated along the northwestern coast of continental Europe. Together, they form part of the Hamburg -Le Havre range of ports, located within 600 kilometres of Europe's major cities and production centres. In 2014, Antwerp and Rotterdam collectively handled more than 650 million tonnes of throughput, servicing a hinterland of 350 million people along the "Blue Banana". Today, Port of Antwerp and Port of Rotterdam enjoy the status of being the top two ports in Europe. With major investments and developments underway, they are expected to consolidate their status in the coming years.

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### SMU INDUSTRY STUDY MISSION ANTWERP ROTTERDAM MAY 2015 REPORT

In April 2015, students from the Maritime Economics Concentration (MEC) embarked on a study mission to Antwerp, Belgium and Rotterdam in the Netherlands. Industry Study Missions (ISMs) contribute to meaningful and impactful learning for our MEC students. A twin gateway perspective helps them understand the European maritime model from which lessons can be applied to Singapore's maritime industry.

On this trip, the students also witnessed the signing of a Memorandum of Understanding between SMU's International Trading Institute and the SmartPort Institute. A collaborative powerhouse of Port of Rotterdam, Municipality of Rotterdam, Delft University of Technology, Erasmus University Rotterdam, and port businesses in Deltalings, SmartPort is a platform that nurtures port-related research for the benefit of the community.

We would like to specially thank APM Terminals, EMO Dry Bulk Terminal, Europe Container Terminals, FutureLand, Keppel Verolme, Maritime by Holland, Nederland Maritiem Land, Port Authority of Rotterdam, Port of Antwerp, Rotterdam Maritime University, SEAinvest, SmartPort Institute, University of Antwerp, and Wilmar International for their gracious support in making this ISM a success.

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### **Gateways to Europe**

Strategically situated along the western coast of continental Europe, Port of Antwerp and Port of Rotterdam serve as important gateways to Europe. Together, they form part of the Hamburg – Le Havre range of ports, located within 600 kilometres of Europe's major cities and production centres. In 2014, the ports of Antwerp and Rotterdam collectively handled more than 650 million tonnes of throughput, servicing a hinterland of 350 million people along the "Blue Banana". Today, Port of Antwerp and Port of Rotterdam enjoy the status of being the top two ports in Europe. With major investments and developments underway, the two ports are expected to maintain their status in the coming years.

### History

As with other major port cities in the world, Antwerp and Rotterdam have historically deep ties with their ports. Capitalising on their access to the Atlantic, there has been evidence of trade and commerce occurring at these ports from as early as the 12<sup>th</sup> century. While the port of Rotterdam grew under the management of the Dutch East India Company, the port of Antwerp developed under the ruling of the French.

When World War II struck, the two ports had diverging fates; while the port of Rotterdam was levelled by the Luftwaffe, the port of Antwerp was relatively spared. This gave the port of Antwerp a head start when the war ended, but provided the port of Rotterdam the opportunity to redevelop with newer port technology.

Reconstruction of Rotterdam proceeded at an unprecedented pace, and more cargoes bound for the German reconstruction effort entered via Rotterdam. When the German economy sparked a spectacular recovery, trading activities also picked up at the port of Rotterdam. This rapid expansion advanced the port of Rotterdam to become the largest port in Europe by 1952, and the largest in the world, 10 years later.

Similar to Rotterdam, Antwerp received post-war assistance under the Marshall Plan. With the aid rendered to Antwerp, its port eventually developed to become the leading chemicals cluster in Europe.

### **Role of the European Union**

With the creation of the European Union (EU) in 1993, the ports of Rotterdam and Antwerp grew significantly. For a start, EU policies ensured free movement of goods, services, and capital, made possible by abolishing passport controls across 1.6 million square miles. This made provision for direct access to capital markets like the London Stock Exchange (LSE) and the European Stock Exchange (ESE), making Rotterdam and Antwerp attractive destinations for commodity trade houses such as Wilmar. Its policies also called for seamless cross-border trucking and other inland logistics services, all of which promoted the use of Antwerp and Rotterdam as gateways. By combining a population of 500 million in 28 member states, the creation of the EU assured the ports of sizeable trade activities.

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### Capabilities

Today, both ports are capable of handling a wide range of cargoes, namely iron ore, liquefied natural gas (LNG), and containers, amongst others. These operations are carried out using state-of-the-art port-side facilities such as the Sea-invest, Europort, and Maasvlakte 2 terminals. The specialised nature of these facilities has enabled the ports of Antwerp and Rotterdam to maintain competitiveness, as more ports within the region and around the world start to emerge. Boasting a combined market share of 54% out of all the ports in the Hamburg – Le Havre region, Port of Antwerp and Port of Rotterdam have been successful in defending their market positions.



Cargo mix of Port of Rotterdam and Port of Antwerp

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#### Port of Antwerp and Port of Rotterdam

With more than 43,000 vessels calling at the ports of Antwerp and Rotterdam each year, significant hinterland infrastructure is required to ensure minimal congestion and timely delivery of cargoes. Today, a network of rails, roads, barges, and pipelines effectively and efficiently move cargoes to and from these ports. The adoption of a tri-modal system has also helped to relieve pressure on congested roads, allowing these ports to distribute cargo effectively, whilst reducing environmental impact.

With megaships becoming increasingly commonplace, the ports of Rotterdam and Antwerp are coerced to respond to the changing market. In Antwerp, for instance, the Deurganck dock lock would be the port's answer to handling the increased scale of ships. Due for completion in 2016, it will be the largest lock in the world, measuring 500 metres. Requiring an investment of  $\in$  382 million, the lock will facilitate entry of megaships into Port of Antwerp.

Likewise, Rotterdam has implemented measures to cope with megaships calling at its port. Maasvlakte 2, a new terminal that opened in 2015, looks to improve productivity by automating terminal operations. Utilising a fleet of unmanned automated guided vehicles (AGVs) and automated rail-mounted gantry cranes (ARMGs), the terminal aims to increase operational efficiency by 40%, improve safety, and reduce carbon emissions.

### **Maritime Ecosystem**

In addition to these world-class port facilities, Antwerp and Rotterdam have developed an ecosystem of maritime-related companies and organisations to provide an added competitive edge. This ecosystem has grown to include services like offshore engineering, ship financing, shipbuilding, inland shipping, and dredging, amongst others. Both the Belgian and Dutch governments have also adopted favourable tax policies to promote further growth of their maritime industries. The holistic nature of the ecosystem makes it attractive for maritime companies and trading houses to invest in Antwerp and Rotterdam.

Apart from boosting business capabilities of the maritime sector, much effort has been placed into developing the industry's talent pipeline. Academic institutions such as Erasmus University Rotterdam, University of Antwerp, Delft University of Technology, and Antwerp Maritime Academy have developed specialised courses and programmes to ensure a steady stream of skilled labour. These reputable logistics and maritime schools have also forged close partnerships with private companies in the maritime ecosystem, through an initiative like SmartPort, aimed to bring academic and commercial parties together to develop innovative sustainable solutions for the industry. At the same time, organisations such as Dutch Arbitration Association (DAA) and Rotterdam Maritime Service Committee (RMSC) are exploring ways to develop auxiliary legal and financial services.

### Competition

As with leaders in other markets and industries, the ports of Antwerp and Rotterdam face competition from its counterparts. Their fiercest competition, however, comes from each other. Owing to their geographical proximity, Port of Antwerp and Port of Rotterdam service the same European hinterland, and compete for the same gateway cargo. This competition has intensified in recent years, as megaships make their entry into Far East – Europe services. In order to obtain a competitive edge over the other, both ports have had to leverage on their unique advantages

### Port of Antwerp and Port of Rotterdam

Situated upstream of the Scheldt river, Antwerp has a strategic geographical advantage over Rotterdam as it is nearer to Europe's consumption centres. This translates to lower land transport costs incurred by companies and manufacturers—a component that is usually the most expensive in the supply chain.

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The following table shows the distance of ports that serve the hinterland of north-western Europe from production centres in the region. Figures in bold highlight the closest proximity from port to production centre. From the table, it is apparent that Antwerp enjoys a geographical advantage over rival port cities.

Distance from port to production centres (kilometres)						
Production centres	Antwerp	Hamburg	Le Havre	Rotterdam		
Duisburg	179	378	615	223		
Cologne	222	413	576	282		
Ludwigshafen	424	570	729	502		
Frankfurt	413	489	771	475		
Munich	780	769	1,008	842		
Valenciennes	168	687	297	274		
Lille	132	670	286	248		
Paris	362	902	196	455		
Strasbourg	491	701	683	593		
Venlo	151	409	544	191		
Geleen	128	468	501	212		
Amsterdam	160	468	604	77		
Basel	623	811	693	725		

Distance from ports to European production centres

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#### Port of Antwerp and Port of Rotterdam

Rotterdam, however, is located at the estuary of the Rhine, where its advantage is greater nautical accessibility. This gives Rotterdam an upper hand, as vessels calling Antwerp require another 10 hours, coupled with favourable tidal conditions to navigate upstream. Moreover, the naturally deeper draft of Rotterdam allows it to accommodate larger ships without additional dredging.

On an intra-port level, the ports of Antwerp and Rotterdam adopt contrasting competition policies. In 2002, PSA International (formerly known as Port of Singapore Authority) obtained 80% stake in Port of Antwerp when it acquired Hessenatie Logistics and Noord Natie Terminals; DP World held the remaining 20% stake in the port. This catapulted PSA International into the position of market leader for some years. By contrast, more than 10 parties have stakes in the three largest terminals in Rotterdam.

The differing policies illustrate the many strategies that port authorities adopt in a bid to attract shipping lines as stronger alliances form. With Port of Antwerp and Port of Rotterdam adopting the monopolistic and competitive models respectively, it is up to the discretion of shipping lines to decide on a model that bears characteristics most befitting of their needs. To date, shipping lines such as Maersk (through APM Terminal), MSC, CMA CGM (through Terminal Link and CMA Terminals), COSCO, and APL have invested in Antwerp and Rotterdam individually, or as part of a consortium.

Beyond intra-port and regional competition, the ports of Antwerp and Rotterdam also face competition on a global scale. To attain the status of International Maritime Centres (IMCs), Antwerp and Rotterdam have been developing their maritime service sectors to compete with those of London, Shanghai, and Singapore. These services include maritime law and insurance, and maritime finance.

### **Future Developments**

Moving forward, Port of Antwerp and Port of Rotterdam look to build upon their current successes. Not resting on their laurels, the port authorities of Antwerp and Rotterdam have devised plans in preparation for future challenges. In the coming years, the emergence of new megaships, alliances, technologies, and sustainability trends and developments would alter the landscape of the maritime industry significantly. Antwerp and Rotterdam have to rely on innovation, as well as public-private partnerships and cooperation to tackle the challenges ahead.

# Visit Summary

One of the objectives of the Industry Study Mission (ISM) is better understanding of Europe's maritime industry. To meet this objective, the students were presented with the rare opportunity to visit Keppel Verolme–a subsidiary of Keppel Offshore & Marine under Keppel Corporation's offshore and marine business arm.

During the visit, the students went on a shipbuilding yard tour and learnt of the many highlights of the shipyard. Accompanying the students was a business development manager who shared on operations carried out by Keppel Verolme. The students learnt that apart from shipbuilding, the shipyard provides an extended suite of services such as repair and maintenance, modification, conversion, and construction of various vessel types.



### Background

Keppel Verolme operates a comprehensive yard in Rotterdam, within close proximity to the oil and gas fields of the Norwegian Continental Shelf (NCS) and the UK Continental Shelf (UKCS). Due to its geographical location, the yard enjoys direct access to the North Sea. It is also one of the largest in Europe. These components make Keppel Verolme the yard of choice for seagoing vessels and floating offshore units in the region.

One of the company's key assets is a mammoth dry dock. Originally built to carry out maintenance of large crude oil carriers, the dry dock is used for dry-docking large offshore units and vessels today. Measuring 405 metres in length, 90 metres in width, and a water depth of 1,106 metres, the dock can accommodate up to three offshore units simultaneously. In addition, an intermediate wall in the dry dock can be positioned at two different locations to provide the yard the flexibility to undertake short- and long-term projects at the same time.

Keppel Verolme's operations are supported by a pool of versatile and highly skilled workforce, capable of undertaking complex dry-docking operations, repair and maintenance, as well as the modification, conversion, and construction of various vessel types. Leveraging Keppel Offshore & Marine's core competencies in technology and project execution, Keppel Verolme possesses institutional capabilities that allow it to respond to the offshore industry's demand for new products and services with swift, innovative, and cost-efficient solutions.

Harnessing its synergy with Keppel Offshore & Marine's network of 20 global yards, Keppel Verolme is making its presence felt in the emerging European offshore wind energy sector by providing a wide spectrum of services and solutions.

### **Group Structure**

Keppel Offshore & Marine is a subsidiary under Keppel Corporation's offshore and marine business arm. Corporatised in 1968 (as Keppel Shipyard (Pte) Ltd), Keppel Corporation first started out as a shipyard. Today, the Keppel Group of Companies includes Keppel Offshore & Marine, Keppel Infrastructure, Keppel Telecommunications & Transportation (Keppel T&T), and Keppel Land, amongst others. The following is a breakdown of the Group's structure:

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Keppel Corporation's Group structure

Under the Group's offshore and marine arm, Keppel Offshore & Marine is the leader in offshore rig design, construction and repair, ship repair and conversion, and specialised shipbuilding. Its "Near Market, Near Customer" strategy is bolstered by a global network of 20 yards and offices in the Asia Pacific, Gulf of Mexico, Brazil, the Caspian Sea, the Middle East, and the North Sea regions.



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# **Significant Milestones**

The history of Keppel Verolme can be traced to several decades back, when it first started out as Verolme Dock and Shipbuilding Company NV. The following denotes the yard's significant milestones over the years, before being acquired by Keppel Corporation:

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Keppel Verolme's significant milestones (1957-2002)

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# **Capabilities**

Equipped with technology innovation and competent design and engineering capabilities, Keppel Verolme offers viable, cost effective, and highly adaptable solutions for new builds and upgraded offshore units. Key areas of expertise include:

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- Design and construction of jack-up rigs, semi-submersible rigs, floating production systems, and other advanced vessels such as drill ships;
- Repair, upgrade, and conversion of offshore rigs;
- Design and development of critical rig equipment; and
- Fabrication of offshore structures and rig components.

However, Keppel Verolme's capabilities extend beyond conventional offshore solutions for the industry. In 2012, Keppel Verolme delivered the world's first largest multi-purpose offshore wind turbine installer. This vessel can operate in harsh environments of up to 65 metres in water depth (the deepest for such vessels), and carry a wide variety of foundations and turbines.





### **Critical Success Factors**

#### The "Keppel" Advantage

The North Sea is an area where assets built by Keppel Corporation are being deployed, and where clients moving their assets from the US, Europe, or the Far East pass through Rotterdam and access its shipyard. Keppel Verolme can tap on Keppel Corporation's combined resources when global expertise is required.

#### Safety Culture

Health, Safety, Security, and Environment (HSSE) is fundamental to operations in the maritime industry. Keppel Verolme continually invests in upholding the company's excellent safety track record, so as to distinguish itself from competitors. Beyond reducing accidents and liability costs incurred, good HSSE practices and records demonstrate Keppel Verolme's commitment as a corporate partner.

#### In-House Training and Education

Since the 1960s, Keppel Verolme has its own education centre to train metal workers and mechanics. Every year, 10 to 15 junior staff would be selected to undergo training for career development. The company understands the importance of a quality workforce, and through the training centre, it can better address fundamental manpower requirements. By furthering the skills and competencies of Keppel Verolme's workforce, the company endeavours to provide its clients with better solutions.

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### Background

The Port of Rotterdam, a member of the northern range ports, is also Europe's largest seaport. One of the most important industries to the Netherlands, the Dutch maritime cluster contributes about 7.3% of the country's gross domestic product (GDP), and provides employment to 440,000 people. Of the total maritime cluster in the Netherlands, 60% of the business community is based in Rotterdam, signifying the importance of the port.

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The Rotterdam Maritime Service Committee (RMSC) is an organisation representing the interest of maritime companies based in Rotterdam. The objective of the RMSC is fostering cooperation between member companies for the strengthening of Rotterdam as a maritime business centre.

### Initiatives

Rotterdam, as a maritime centre, aims to be internationally established as a world leader for maritime services, similar to being the equivalent of Lloyd's of London in the insurance scene.

In pursuing this objective, several initiatives have been implemented. RMSC, being one of these initiatives created, serves to strengthen Rotterdam's international image and generate more maritime business for the port city. On the capability development front, RMSC also partners with SmartPort, Erasmus University Rotterdam, and the Shipping and Transport College (STC) Group, to jointly develop world-class knowledge infrastructure and education.

RMSC connects members to its network of businesses, government bodies, and research institutions to provide knowledge and development for members' business interests.

### Competition

The main competitors for maritime services are: London in the area of insurance services; the Le Havre Range for port activities; and Athens for ship-owning and shipping companies' location.

Even though Singapore, Shanghai, and Dubai are major global port players, they are not perceived to be Rotterdam's competitors, as their ports are situated along the Asia-Europe trade routes.

### **Future Developments**

Despite being the largest port city in Europe, Rotterdam reports GDP per capita, growth rates, and employments rates that are below national averages. This is characteristic of port cities that started off with low-skilled labour and an emphasis on cluster centric development.

As Rotterdam shifts its maritime industry from a manufacturing-intensive to service-centric one, the transformation is expected to trigger an influx of new maritime services and supporting commercial businesses into the city. Through the synergy brought about by the new suite of maritime-related services, increased business activities would likely boost economic indicators, and shed the city of its old port image.

# Background

Port of Rotterdam Authority is the port manager, operator, and developer of the Port of Rotterdam, and is mainly responsible for the safety of ships handled at its port, and the lease of land in the industrial area. This organisation functions as the primary engine driving the Port of Rotterdam.

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The Municipality of Rotterdam and the Dutch State has 70% and 30% stakes in the Port of Rotterdam Authority respectively, making the Port of Rotterdam Authority a public company. With revenues and investments amounting to approximately  $\notin$ 700 million and  $\notin$ 250 million respectively, the Port of Rotterdam Authority, which has about 1,100 staff, oversees the development, construction, and management of the port and industrial area. It also provides efficient, safe, and secure vessel traffic management for over 32,000 seagoing vessels annually. As a public company, the Port of Rotterdam Authority has been able to strike a balance between its role as an authority, and its role as a company, by constantly working and communicating with various ministries and businesses.



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# **Managing the Dutch Port**

A gateway for European trade, the Port of Rotterdam is the largest port in Europe, serving a total of about 350 million consumers in Europe. Boasting a port area of 12,603 hectares, and stretched across 42 kilometres, the Port of Rotterdam accounts for about 20% of Rotterdam's economy. As of June 2014, the port created an estimated 87,000 jobs.

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Since the 1400s, the port area has been developed progressively downstream from the earliest port location close to the centre of Rotterdam. The most recent project, named Maasvlakte 2, commenced in 2008 to create an extension of the port through land reclamation. The expansion was necessary to meet the growing demand for goods to be handled in Rotterdam.

Even though Maasvlakte, an earlier expansion project carried out in 1970, had forecast 30 years ahead to take into consideration the demand in 2008, it had not been able to catch up with the actual speed of growth. To avoid another oversight, the scope of Maasvlakte 2 was continually reviewed and evaluated during the planning and construction stages, to ensure that all parameters were made based on the latest information available then.





One of the challenges that the port faces is the simultaneous renewal of old infrastructure and the development of the new port area. This results from the port authority's effort to help existing businesses develop, while attracting new investors at the same time. Despite the limitations encountered, the Port of Rotterdam ranked the eighth largest port in the world in 2014. This can be attributed to the establishing of greenfield port areas like Maasvlakte 1, Botlek, Europort, and Maasvlakte 2 to meet the needs of its various stakeholders.

# Strategies and Plans

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Like most organisations, the Port of Rotterdam Authority looks ahead and develops forward plans from present day to 2030. The management makes regular five-year reviews to take stock of progress, and plans forward to achieve the vision of a better and more competitive port.

The Port of Rotterdam Authority has also identified 10 success factors that it would focus on to achieve its goals. These goals are: attracting high investment trades from private companies; fostering optimal use of the land; ensuring ease of accessibility (i.e., increased use of railways and barges, and reduced trucking); and becoming the world leader in shipping sustainability and safety.

To attract high investment trades from private companies, the Port of Rotterdam Authority has been channelling much effort to the formation of business clusters in the industrial area of the port, through strategic plans to integrate downstream and upstream businesses together. This is to improve information flow along the supply chain to facilitate efficient business transactions.

Apart from devising plans to attract new investments, analysts at the Port of Rotterdam Authority also attempt to sift out global market trends to anticipate clients' needs, so as to raise Rotterdam's competitiveness in the market. But such effort is inadequate in designing a good port development strategy—analysts also need to look into competitors' strategies to explore room for possible collaboration or first mover advantage to be leveraged upon.

To achieve optimised land use, continuous learning has been undertaken to upgrade the business community's ability to manage uncertainties and compete effectively in the global logistics industry. To address sustainability concerns, shore power facilities have been developed, so that ships reduce their carbon emissions, and the collective effort contributes towards a greener Rotterdam city for its people.

Being the gateway to Europe, Asia cargo stands as an important component of the total cargo handled by the port, of which oil-related cargoes constitute a large portion. As an important link between Europe and the rest of the world, one of the key focuses of the port is creating better hinterland connections. This hinges upon the Port of Rotterdam Authority's partnership with the rail and barge operators in Rotterdam, with the aim of alleviating pressures on the roads used for trucking. This is fundamental to the port's operations, as there is a regulation for container terminal operators to send only 35% of its containers at any one time into the hinterland of Rotterdam, to prevent unnecessary congestion. Improvements to existing infrastructure have to be carried out to accommodate growing handling capacities, to make the area viable for business development.

Even though the port takes steps to grow its strength, the figures sometimes suggest a different scenario. For example, market share of the total cargo throughput dropped from 38% for all cargoes in and out of Europe in 2010, to almost 37% in 2014. This prompted the port to examine the portfolio of different types of cargoes handled, on top of assessing competition from other ports. For instance, the Port of Rotterdam might have had a 30% market share in container handling in Europe in 2014 when the container market was strong, but given the port's huge market share in Europe's crude oil shipment handling when the market was slowing down that year, the total cargo throughput was adversely affected.



Amid a competitive backdrop in the past five years, the Port of Rotterdam has been performing well in the container market, and gaining market share through crude oil ship handling, despite a slowing down market. However, the port did lose some of its market share to the Port of Antwerp, as Rotterdam's primary focus lies in the mineral oil products, containers, and crude oil markets.

Continued emphasis on the crude oil market is not unexpected, given that significant investments have been previously channelled into developing its infrastructure.

In the city's symbiosis design for its port and population, excess heat generated from the operation of crude oil terminals is used to generate power for the city. The energy efficient design has helped the city maintain its position as the world's largest oil cluster, with 10 refineries connected to Rotterdam.

But to maintain its position as a first port of call to Europe for imports, and last port of call for exports, Port of Rotterdam has been investing in other sectors like the LNG industry, petrochemical industry, and the offshore industry. Better integration of petrochemical companies, for instance, would lower the costs of related businesses. This would then increase the value of the port. Apart from looking at volume handled to judge the authority's competence, private investments directed to addressing the needs of businesses in the port area, is another important performance indicator of Port of Rotterdam Authority's efforts. In its twin role as both a regulator and business entity, however, the Port of Rotterdam Authority has to be careful when making investment decisions to minimise risks and prevent conflict of interest.



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### Port of Rotterdam's Performance

In the first quarter of 2015, goods throughput in Rotterdam was 7.2% up year-on-year. Even though dry bulk (particularly ores and coal) fell by 5.1%, container throughput increased substantially, by 5.1% in weight and 7.6% in TEU. Liquid bulk throughput (particularly crude oil and oil products) grew even more notably, by 14.7%.

From 2011 to 2015, investments totalling  $\in$ 15 billion were used to solidify the Port of Rotterdam's position. Of which, private investments amounting  $\in$ 13 billion were used to improve the terminal's flexibility and service levels, while the Port of Rotterdam Authority pooled another  $\in$ 2 billion to not only improve infrastructure like roads, rails, and pipelines, but also deepening the river and Botlek area.

Various transportation modes were used to ensure efficient flow of goods from the seaport to the hinterland. This proved to be important, as there have been both actual and potential increases in cargo throughput for the Port of Rotterdam.

# Oil and Liquid Bulk Development

Half of the investments from 2011 to 2015 involved liquid bulk, and in some ways related to large oil trading companies like Shell, ExxonMobil, and BP.

In the first quarter of 2015, liquid bulk throughput, which made up more than half of the port's business, increased by 14.7% to 56.5 million tonnes. This included a 6.9% increase in the volume of crude oil handled, resulting from hikes in refinery profit margins attributed by low oil prices. Handling of mineral oil products also saw an increase of about 27.6%, due to a rise in fuel oil throughput.

More fuel oil was available as a result of more oil being refined, especially in Russia to meet the demands of the Far East. At the same time, demand for fuel oil for bunkering ships in Northwest Europe declined slightly, owing to stringent standards applied to ship fuel used on the North Sea and Baltic Sea as of 1 January 2015. As a result, 26 large tankers (VLCCs and Suezmaxes) departed the area, fully laden with mainly Russian fuel oil, for the Far East.



Liquefied natural gas (LNG) fared comparatively better, recording an increase of 138%. This relatively new segment, however, accounted for 1% of the total liquid bulk. Other liquid bulk reported a 4.9% increase in throughput. This mainly consisted of basic chemical products, vegetable oils, and biofuels. More liquefied petroleum gas (LPG) and styrene were also reportedly handled in the first quarter of 2015. On the whole, the port had made good progress. As what Allard Castelein, Chief Executive Officer (CEO) of the Port of Rotterdam Authority, said, "After declining last year (2014), oil products are experiencing a strong recovery."

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Apart from the mentioned figures, the Port of Rotterdam Authority noted some significant trends: growing Suezmaxes going to Singapore for bunkering; distribution to China through the Port of Rotterdam; and more trading companies expected to develop their own terminals for better market control. The port also expects Russia to continue exporting more diesel oil to Europe, because the popularity of diesel vehicles had been lukewarm in Asia, and supply had been greater than Russia's domestic consumption. To cope with rising demand, many upgrading plans were said to be underway, of which one was to raise refining STS capabilities.

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The port's performance is testimonial of the Port of Rotterdam Authority's commitment not only towards developing the liquid bulk segment, but also across all other sectors. As a speaker from the authority assured, "This is a mature market, but there are still investments going on."

### **Maritime Arbitration**

During the visit, Dutch Maritime Law Associate Taco van der Valk conducted a talk that drew on the long history of shipping and trade. The students learnt that the tradition of shipping and trade in the Netherlands has close ties to her colonial legacy.

In the earlier days, Rotterdam's exchange exceeded Lloyd's of London as the centre for maritime services. Over time, however, British supremacy in maritime finance, maritime law, and general business led to the growth of shipping expertise in London, as Rotterdam's maritime lead position was overtaken. Influence from London as a maritime cluster during this time eventually led to the widespread use of the English Common Law in the shipping scene.

However, the subsequent decline of London as a trading centre eventually weakened the universality attached to the English Common Law, and led to present day status, whereby law is viewed as a service similar to other complementing maritime services. This transition presents a new set of circumstances for planners and regulators of maritime clusters to ensure that their country's legal system, or arbitration centre, is efficient and attractive, and above all, fair and credible to all parties.

Taco van der Valk also led a discussion geared towards challenging what the students had learnt about maritime finance, law, and insurance. Applying new insights gathered during the visit, the students were tasked to consider future possibilities and challenges of developing a maritime cluster.



A collaborative powerhouse of the Port of Rotterdam, Municipality of Rotterdam, Delft University of Technology, Erasmus University Rotterdam, and port businesses in Deltalings, SmartPort is a platform that nurtures port-related research for the benefit of the community.

As renowned institutes of tertiary education, Delft University of Technology and Erasmus University Rotterdam contribute and interact with the local ecosystem of businesses or government through research. Collaboration of this nature, however, is not frequent as issue owners from the industry often do not know how to solve their problems, and academics are unable to attract funding when their research is perceived to lack real applicability to businesses.

SmartPort was born out of the need to coordinate port-related research by matchmaking issue owners with research institutes. SmartPort houses all port-related research, initiates programmes by challenging academia to test their research on real world issues businesses face, and matches funding to research that will most benefit the port-related industry in Rotterdam. Stakeholders are matched, with a focus to address major challenges that Rotterdam faces as a port city.

By bridging the experiences of the industry with technical capabilities of Delft University of Technology, and economics expertise of Erasmus University Rotterdam, the research facility fosters a collaborative framework to develop not only young talents, but also adds value to the industry. As an open and innovative platform, SmartPort aims to facilitate the transfer of knowledge from its research outcomes to stakeholders in the maritime industry, thereby making the Port of Rotterdam future-proof and robust.

### **Founding Partners**



Five partners congregate to focus on SmartPort's initiatives

SmartPort has five founding partners: Port of Rotterdam Authority, Municipality of Rotterdam, Deltalings, Erasmus University Rotterdam, and Delft University of Technology.

While Erasmus University Rotterdam and Delft University of Technology are academic institutions, Municipality of Rotterdam is a body linked to the municipal and state government, and Deltalings is an organisation representing over 700 companies from 14 sectors related to port and industrial activities in Rotterdam.

### Terms of Cooperation

While SmartPort aims to be an open platform to facilitate ease of matching of stakeholders, there are some common terms of cooperation that need to be adhered to. Some terms of cooperation include:

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### Long-Term Commitment

Stakeholders have to commit to more than five years of cooperation.



#### Demand-Driven Knowledge Development

Issue owners provide problems that research institutes attempt to answer, instead of researchers seeking funds based on their ideas. Better match of issues and expertise ensures that research is useful to the industry.



### Joint Research and Development

As an open and innovative platform, intellectual property will be held by SmartPort, with per-project agreements dictating exit strategies for any marketable research outcomes, allowing for flexibility of cooperation between stakeholders, while pre-empting disagreements and conflicts.



#### **Knowledge Dissemination**

As a platform for cooperation and education in port-related research, knowledge will be transferred from SmartPort to all stakeholders.



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### Focused on Challenges and Roadmaps

This ensures that short-term interests of businesses and companies are met with useful and applicable research beneficial to the port and industry. This also helps to prevent blind spots or cognitive biases.



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#### SmartPort

### **Challenges and Roadmaps**

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The Port of Rotterdam is an important driver for economic growth and development for the city of Rotterdam, and the Netherlands. For every dollar earned by the port, one-third is contributed by port activities, while two-thirds is contributed by inland services, making the port a key driver of businesses and employment for Rotterdam. The port also accounts for 3.3% of the country's GDP, highlighting its importance as a strategic seaport at the national level.

As such, SmartPort deems it essential that academic institutes and businesses contribute to the continued survival and future-proofing of the port. Research efforts are based on several key roadmaps to help focus efforts, and are aimed at solving several key challenges.

The first challenge is the operation strategy of the infrastructure and machinery of the port. Most ports have a lifespan of about 60 years, and the Port of Rotterdam is approaching 50 years of operation. The maintenance of obsolete infrastructure and machinery will incur greater costs over time, and the main challenge lies in optimising the usage of current infrastructure and facilities, while planning and developing future infrastructure that are robust and future-proof. The problem of future-proofing the Port of Rotterdam will challenge academics and pique the interest of businesses and the municipality, and require the pooling of knowledge to anticipate uncertainties.

The second challenge lies in its dependence on fossil fuels. Most industrial activities (port-related or not) in Rotterdam are still heavily reliant on fossil fuels. With ever tightening regulations and changes in the business climate, diversifying fuel sources to cleaner and renewable resources makes better economic sense. With heavy industries located in and around the port, Rotterdam will benefit greatly when greener technologies are incorporated in future infrastructure upgrades and developments of the port.





SmartPort

The roadmaps around which research will be carried out are as follow:

- Hinterland connectivity;
- On-land and maritime infrastructure;
- Port authority strategies;
- Energy and chemistry; and
- World port city.

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# Early Successes

While SmartPort is still in its infancy—having been officially launched on 9 April 2015—there are already 25 fully funded research projects, and 13 new proposals in the works. Based on the open innovation and knowledge platform that SmartPort promises to deliver, many research projects are more focused on business-related topics than scientific or technical solutions. Nevertheless, these serve as pre-competitive information for many businesses.

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# Background

APM Terminals' Maasvlakte 2, officially opened by King Willem-Alexander on 24 April 2015, is a state-of-the-art fully automated facility with zero carbon dioxide  $(CO_2)$  impact.

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The 86 hectares deepwater terminal features 1,000 metres of quay, on-dock rail, eight fully automated electric powered ship-to-shore (STS) cranes, and a Phase I annual throughput capacity of 2.7 million TEU which required an investment of €500 million from APM Terminals. At full build-out, the terminal now covers 180 hectares and offers 2,800 metres of deep-sea quay. The annual throughput capacity is 4.5 million TEU.



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# **Company Value Proposition**

### APM Terminal's core values are:

#### **Client Centricity**

APM Terminals endeavours to provide its clients unparalleled service, and compete on more than just price, by delivering a broader set of transportation solutions for clients like shipping lines, supply chain managers, and other key players in the market.

#### Innovations to Increase Productivity

APM Terminals will develop strong inland services and exclusive partnerships such as joint ventures with local businesses, governments, and customers.

### **Business Model and Approach**

#### **Focus on Landside Operations**

APM Terminals has adopted a new approach in the management of Maasvlakte 2 terminals. Concentrating on both the delivery and forwarding of containers over sea, and delivery from and to the hinterland, the company hopes that a fresh approach would contribute towards developing a modern terminal.

#### **Scheduling Optimisation**

An area of optimisation adopted by APM Terminals is the delivery and dispatch scheduling of containers by road. Slot planning has been the selected method of operations, whereby each truck is assigned a time slot to which they have access to the terminal to pick up or deliver a container. While trucks are no longer able to access the terminal at any time, the duration involved in loading and unloading operations has been shortened considerably to improve efficiency. In its next phase, APM Terminals will be improving its system to allow new access slots to be requested via mobile devices to address incidents such as delays or missed appointments. Transparency

Transparency is a key part in Maasvlakte 2 terminal operations. In order to develop collaborative relationships with its stakeholders, great consideration has been given to the needs of other parties in the development of its operations. An example of this would be making the status of clients' cargoes transparent. With this development, clients are able to use the central port platform Portbase, and a special website to determine the transport phase of a specific container, and its location real-time.

#### Fixed Windows for Inland Waterway Vessels

APM Terminals also introduced a window approach to managing its inland waterway vessels. Under the operandi modus, vessels are guaranteed a reserved space at the quay during certain fixed time windows. At the reserved location, a standby team will aid the vessel in loading and unloading operations. In return, clients would agree to pick up or deliver a large volume of containers, adhering to the agreed timeslot. The interest of APM Terminals and clients are now closer aligned via the assurance of quay place and timely handling by APM Terminals, while the client undertakes volume, frequency, and reliability. As a result, overall vessel traffic management of the terminals has improved considerably.

# **Critical Success Factors**

#### State-of-the-Art Equipment

The terminal employs remotelycontrolled STS gantry cranes that move containers between vessels, and 62 battery-powered lift-automated guided vehicles (Lift-AGVs) to transport containers between the quay and the container yard, including barge and on-dock rail facilities. A fleet of 54 automated rail-mounted gantry cranes (ARMGs) then positions containers in the yard in a high-density stacking system.

The use of automation ensures that speed and productivity are maintained at a constant level throughout the day. Compared to the use of manually operated machines, automated operations ensure that productivity is less affected by human factors such as fatigue, or weather conditions such as fog, rain, or wind. Reduced Operating Expenses and Increased Capital Expenditures

The cost comparison and co-relation between automation and labour costs tend to be more significant in Europe than Asia. Cost differences are mainly driven by a minimum wage legislation which exists more commonly in Europe, and the general strength of the euro as compared to most emerging market currencies in Asia. Average salaries of crew or dock workers, and crane operators, tend to cost approximately 20 to 40% higher in Europe, against their Asian counterparts as a result. With automation, operating expense, in terms of labour cost is reduced, while capital expenditure on equipment assets increases.

Green Energy and Zero Emissions

One of AMP Terminals' core values is sustainability, and it has successfully achieved the goal through the use of green energy in the newest terminal in Maasvlakte 2. APM Terminals has signed a two-year, €5 million contract with Amsterdam-based NV Nuon Energy for the supply of environmentally -sustainable wind-generated electricity to power the new APM Terminals Maasvlakte 2 cranes and container handling equipment. The new terminal is the world's first container terminal with zero emissions on site and off site.

APM Terminals has also leased 35 e-NV200 electric vehicles from Nissan to transport personnel and staff at the Maasvlakte 2 terminal. These battery-charged vehicles feature very low noise levels, zero emissions, and are more than sufficient for operational use at the terminal.

In Europe, where there are heavy controls on  $CO_2$ , nitrogen oxides (NOx), and particulate emissions, and much pressure from environmental activists, the move towards green energy definitely gives AMP Terminals an edge over its competitors.

### **Key Insights and Challenges**

#### Reduced Landside Bottlenecks

Building and Operating a Fully Automated Terminal

Seamless transition between terminal-totruck operations has successfully reduced the issue of landside bottlenecks. This has been achieved through container stacks that are positioned perpendicular to the vessel and gate. The layout has been optimised to allow truckers to drive a shorter distance from the in-gate to the stack. The automated stacking crane lifts the requested container from the stack onto the truck chassis. Each average gate-in to gate-out time now clocks fewer than 30 minutes per single transaction, saving time and increasing the number of transactions that may be performed per operational day. Building a fully automated terminal is capital intensive—the construction of Maasvlakte 2 required an investment of €500 million. An automated container yard also requires larger terminal surfaces to lay strips and pathways for its AGVs. Finally, there is loss in flexibility, because in automated terminals, everything is builtin and modifications thereafter are more difficult to implement. In the event of mechanical or operating system malfunctions,



terminal operations run the risk of coming to a complete halt. Limitations on the speed of AGVs and ARMGs could also hinder operations during peak periods or when met with high container volumes.

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### **Visit Summary**

The students' visit to Maasvlakte 2 took them around the newly reclaimed grounds surrounding the new terminal in a guided bus tour. The tour gave the students a sense of how large-scaled the project is, encompassing beaches for recreation, industrial areas beside the port, as well as land set aside for future development. At the end of the bus tour, the students also visited the FutureLand Information Centre, where they gained a deep insight into the construction and strategic purpose of Maasvlakte 2. Due to security and other reasons, no visitors were allowed to enter the container terminal operating site of Maasvlakte 2.

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# Background

Constructed in 2008, Maasvlakte 2 covers 1,000 hectares of industrial site located on land entirely reclaimed from the North Sea. Catering to the trend of larger seagoing vessels, Maasvlakte 2 has deep port basins that reach 20 metres deep, and capable of accommodating vessels up to 450 metres in length. This is to ensure its continued competitiveness in the container growth sector.

# Capabilities

The construction of Maasvlakte 2 followed a master plan that accounted for the growth forecast of the shipping sector, in line with the growth of and changes in the global economy. By 2033, the capacity of Maasvlakte 2 would double the current capacity of the port, amounting to 29 million TEU.



# **Critical Success Factors**

#### **Phased Construction**

Maasvlakte 2 is constructed based on a medium- to long-term outlook, with only two-thirds of Maasvlakte 2 being constructed, and the remaining area to be developed after 2015 over the subsequent five to 10 years. This market-driven approach allows flexibility in responding to future developments, as well as better allocation of available land to capture future demands of the ever-changing industry landscape. Investments may be postponed, for instance, and sites could only be constructed when there is a demand or when contracted by a company. This is a lesson learnt from the construction of Maasvlakte 1—sites constructed for certain industries were left vacant for many years. Currently, the undeveloped area of the sea is being used for ship-to-ship transhipment, where competitively lower prices are being charged in comparison to seas closer to the British coast.

#### **Room for Three Sectors**

The deep water-based construction of Maasvlakte 2 accommodates three main market segments, with more space set aside for future developments. Apart from catering to container vessels, the master plan of Maasvlakte 2 also considers the design of chemical ships, coastal vessels, and inland vessels in meeting the growth of other market segments.



Over the next 30 years, the container segment is projected to have higher demand for space in Maasvlakte 2 over other segments. Construction of APM's expansion, and Rotterdam World Gateway (jointly established by DP World, APL, and CMA CGM), have completed. The second phase sees Euromax's expansion of an existing terminal, and a joint venture between shipping lines Cosco, K-Line, and Hanjin.

#### Strategic Opportunities in the Chemical Industry

Another sector that presents Rotterdam with strategic opportunities is the chemical industry—by far the most important export sector in the existing port. By 2035, 300 hectares on Maasvlakte 2 will be used to house companies engaged in chemical-related activities. Developing green technologies and solutions in areas such as process biofuels produced by algae, hydrogenpower plants, and  $CO_2$  storage would contribute mostly to the industry's sustainable innovation. The strategic role of the sector would be in supporting alternative sustainable energies, instead of having high dependency on oil and gas that could only be imported from a few countries, and would exhaust within the century.

That said, oil and gas refinery and storage capacity in Maasvlakte is still an important strategic asset for both port cities Rotterdam and Singapore. During the tour, the students drove past Maasvlakte Oil Terminal (MOT)—one of the biggest in the world with 39 tanks owned by various refinery companies, and the capacity to store more than 4 million cubic metres of crude oil. Also situated on Maasvlakte, the new LNG terminal opened several years ago to ease dependency of gas imports from Russia. The terminal handles LNG imports from regions such as the Middle East, Australia, and Asia. Similarly, the petroleum industry of resource-scarce Singapore offers strategic value in the high volume of crude oil exports and refining activities at Jurong Island.

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# Sustainability

The Port Authority of Rotterdam ensures the construction of Maasvlakte 2 follows its sustainable development aims, by engaging economic and sustainable solutions in all facets of the project. This includes strict requirements for businesses operating in Maasvlakte 2, with Rotterdam considering both the economic and sustainability contribution capabilities of companies in the selection process. Companies are to adhere to energy efficiency levels and innovate sustainable operating solutions.

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One important aspect of sustainable development would be reducing road transport (i.e., trucks) and increasing freight transport to the hinterland via inland shipping (i.e., barges and rail).

At present, Maasvlakte 2 faces road congestion, as only a single highway connects it to the city. Yet, more than 58% of freight is currently transported to the hinterland, such as Germany and France, using trucks. By 2033, the modal shift of Maasvlakte will see only 35% of cargo leaving the port via trucks, resulting in lower emissions of harmful substances and greater accessibility to the port area. This modal shift of turning towards the most efficient and environmental mode of transport would not only ease traffic congestion, but also relieve pressure on the environment.





Container transport spread for Maasvlakte (2003) and Maasvlakte 2 (2033)

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### FutureLand – Maasvlakte 2

The tour also brought the students to the new nature and recreational sites, which serve as obligatory environmental compensation required for the construction of Maasvlakte 2.

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### **Moving Forward**

Maasvlakte 2 is positioned to become an efficient transport hub of the future, with sustainability in every facet of the port and industrial sites. With Maasvlakte 2, there will be no need for a Maasvlakte 3, until 2030 or even later, due to efficient use of existing area and rapid market-driven developments.

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# Background

PSA International is a global container operator with 44 terminals, and presence in 13 countries. PSA Antwerp became PSA International's largest investment outside of Singapore, when the latter took over the merged company of Hessenatie Logistics and Noord Natie Terminals in 2002. Today, PSA Antwerp is the third busiest port in North Europe. In 2014, PSA Antwerp reported a handling capacity of approximately 9 million TEU.

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Viewing area at PSA DGD

Today, PSA Antwerp operates four container terminals-Noorde, Churchill, Europa, and DGD, capturing 76% of container throughputs in Antwerp. Of 34% which, comes from transhipment activities by MSC, through a joint venture with PSA International at MSC PSA European Terminal (MPET).

In 2013, Antwerp had the highest incidence of barge transport (37%) as part of its inland modal split in Europe. Rotterdam was in second spot at 34%. In addition, nearly 56% of all boxes arrived at or departed Antwerp by road. According to Antwerp Port Authority, these figures can be attributed to the fact that a large portion of the container cargoes was destined for or originated from a distance up to 250 kilometres from the port.

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# **Challenges and Opportunities**

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#### **Strong Inter-Port Competition**

PSA Antwerp has always faced intense competition from ports around the Benelux region, as well as ports from the Hamburg - Le Havre region. Out of the many ports, Rotterdam is the strongest competitor.

Despite the competition, PSA Antwerp strives to be the first port of call for long haul trades, as the first port of call usually handles a higher number of containers. Even though Rotterdam and Hamburg handle majority of the Europe-Far East volume, Antwerp is the strongest port for routes to and from the Americas (North and South), Africa, and the Middle East.

Within or amongst ports, competition between terminal operators is very much similar to a perfect competition model, with each terminal operator proffering competitive prices and attractive service level agreements to court liners.

#### **Extensive Hinterland Competition**

With world-class ports upgrading to accommodate worldclass container vessels, facilities at competing ports are usually on par. As such, these ports compete on their ability to extend the connectivity of their hinterland network to reach key manufacturing areas in Europe. To stay competitive, Antwerp has plans to reach further south and east of Europe to extend its reach.

### **Moving Forward**

In Antwerp, the activities of MPET, a joint venture between PSA International and Terminal Investment Limited (TIL), will shift from behind the locks in Delwaide Dock, to the riverside in Deurganckdok, where PSA International already has a terminal. This is projected to be a huge project, as MSC's volumes at the Home Terminal amount to approximately 4.5 million TEU per annum.

Expansion and redevelopment of the Deurganckdok terminal is required to ensure that its service to other clients would not be compromised. There is also the question of what happens to the vacated Home Terminal.

Apart from expansion plans, PSA Antwerp has also started to roll out green incentives for its clients, in a move to become a greener port operator. These incentives come in the form of rebates for liners that are able to reduce emission around Antwerp waters.



Work-in-progress at Deurganckdok terminal

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### Visit Summary

A presentation by Maritime by Holland provided the students with an overview of the maritime cluster in Holland, and how the organisation strives to create a smart city/port through cooperation and knowledge sharing. This was in line with the objective of the study mission for students to better understand the development of ports and industrial clusters in Europe. Students were introduced to possibilities and innovations that could be achieved in the near future, as Rotterdam strives to remain competitive in the European market.



# **Overview of Dutch Maritime Sector**

The maritime sector has been a significant part of the Dutch business for centuries. Up till today, the sector thrives on the fundamental principles of entrepreneurship, cooperation, and innovation. Boasting vast resources and a knowledge and innovation driven cluster, Rotterdam has developed over the years to become a global leader in delivering innovative solutions to the international market.

# Background

Stichting Nederland Maritiem Land (NML), also known as Maritime by Holland, is an organisation that connects 12 maritime sectors: ports, offshore, maritime suppliers, shipbuilding, ship operating, dredging, maritime services, knowledge institutes, inland shipping, the Royal Navy, water sports, and fisheries.

Established in 1997, NML exists as a market-driven initiative aimed to facilitate the Dutch maritime network. Its objective was to connect various maritime sectors by acting as the overall umbrella organisation for the Dutch maritime cluster. Linking 12 sectors, and combining both government bodies and knowledge institutes, NML encourages the creation of joint initiatives that would not only strengthen individual sectors, but also promote the Netherlands as a global leader in the maritime industry. Since knowledge sharing across the organisation makes provision for the transfer of know-how, and prevents wastage of resources, the result is collective prosperity within the maritime cluster.

Being a privately funded organisation, NML also seeks to co-finance a range of projects to further the interests of the Dutch maritime community. It is governed by a board of directors selected from the network to provide a range of skills that reflects the entire spectrum of the membership.

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### Looking Inward

Developed by NML over many years, a comprehensive database containing up-todate information about the Dutch maritime sector is made available to the entire network. This database tracks relevant developments and updates input by NML or members within the network. This cross-sector cooperation not only creates a strong interdependency within the cluster, but also allows the port of Rotterdam to become more competitive amongst other major ports in Europe.

Clearly, NML's strength lies in its diversity. By leading Dutch maritime firms alongside maritime Small and Medium-sized Enterprises (SMEs), trade associations, and knowledge institutions, the breadth of expertise and experience within the network is second to none. This allows Rotterdam to generate social and economic values for global clients, through an unbeatable combination of imagination, collaboration, and expertise.



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#### **Dutch Maritime Sector Facts**

- One-stop destination located in a small geographical area;
- Largest fleet of inland shipping vessels;
- Strong fleet of short sea shipping vessels; and
- Largest European port



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#### **Dutch Maritime Sector Figures**

- Production value: €49 billion
- Total added value: €21 billion (accounts for 3.3% of GDP)
- Employment: 224, 000
- (accounts for 2.2% of total employment)
- Maritime businesses: 12,000

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#### Looking Outward

NML is committed towards promoting the expertise of the Dutch maritime sector on an international level. Doing so would allow the Dutch maritime business to prosper and become more competitive—by means of attracting new talent.

On a national level, the organisation works closely with politicians and regulators to ensure that the maritime sector remains in the public eye, and continues to operate in the best possible climate for businesses, through the various trade policies discussed and implemented. Collaboration among members within NML's network also enhances the visibility of the Dutch maritime sector. This is conducted through activities such as lectures held to develop awareness of the maritime sector, publication of publicity materials via social media, and maintaining personal contact with politicians, government officials, and the media.

The "Maritime by Holland" brand is also promoted by NML to provide added value to its members. Members can use this brand at international trade shows, external publications, and private promotional activities. It is through the creation of a strong identity and sound reputation that NML has become the central portal that connects the entire maritime sector, linking other industry players, as well as international and national policy-makers such as regulators in Brussels.

However, in spite of its strong home market in the areas of dredging, offshore, special-purpose vessels, super yachts, heavy transport, and refrigerated cargoes, the Netherlands has to ultimately specialise. This is important as its production level can no longer match those of labour-intensive production countries like Korea. As such, the formation of NML would not only serve in escalating this process, but also ensure that resources are used efficiently. By specialising in providing innovative maritime solutions, NML is able to distinguish its ports from other major ports in Europe.

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In order to maintain its current competitive edge in the European maritime sector, NML is focused on developing the following four strategic thrusts: innovation; research and education; trade accessibility; and public relations.

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### **Factors to Gain Competitive Edge**



#### Innovation

Geared towards developing strategies to win at sea, NML has been paying attention to the development of green technology, stemmed from switching to cleaner energy. A notable example would be replacing tugboat engines that run on fuel—found to be not only inefficient, but cause pollution—with those that operate on electricity. NML also favours the use of LNG over biodiesel, as the former is a greener option. This is in line with reducing pollution, while ensuring a sustainable maritime business in the Netherlands.

The desire to win at sea has also resulted in the development of effective infrastructure that supports smart and safe shipping. Through a series of upgrades over the years, Rotterdam has developed into a port that boasts complex logistics systems designed to meet growing trade demands, on top of being more operationally effective. This, coupled with international sustainability policies, has enabled NML to rise to become both a profitable and socially responsible enterprise, and solidifying its status and reputation as a global leader in the maritime industry.



### Safe and Secure Smart Ports

NML seeks to actively brand itself as a maritime hotspot set in a geographical region that combines both a major seaport function and the presence of major maritime world players. This drives the organisation to seek similar maritime hotspots like that of the Netherlands, in a bid to foster cooperation to achieve mutual benefits. The focus is on the development of smart ports that are safe and secure, and would best serve the needs of its clients.



#### **Research and Education Agenda**

NML has identified five areas that the organisation would like to direct its research and education efforts: hydromechanics; maritime operations; communications and materials; systems and procedures; and design and conduction.

Development in these areas would enable NML to come up with innovative maritime solutions. Research and education are carried out collaboratively among various members in the organisation, and advancements are made possible through the sharing of knowledge and efficient use of resources. So far, there has been no lapse that results in cannibalisation.



#### **Public Relations**

NML has to constantly seek and employ appropriate human capital that would form the primary driver of growth within the organisation. It is essential for the industry to attract and employ the right people with the right skillset, as it is only under the right leadership that NML could grow to become a global leader in maritime solutions. As such, NML has been spearheading efforts to promote the maritime sector in the Netherlands. This is in its bid to recruit the brightest minds to bring NML forward.

#### Wilmar International (Wilmar Edible Oils BV)

### Visit Summary

The students attended a presentation on Wilmar International's global reach and growth in recent years. The presentation also covered Wilmar Europe's operations, with special emphasis on Wilmar Edible Oils BV (Wilmar EO). Sustainability in the palm oil sector, one of Wilmar International's core concerns, was also elaborated on. The opportunity allowed the students to learn more about Wilmar International's product range, such as palm oil, coconut oil, biodiesel, oleochemical, as well as trading and distribution of these products in Europe.



### Background

Wilmar International manages its European commercial and trading activities through its European headquarters in Rotterdam. Wilmar Europe Trading sources crude products and sells them to Wilmar EO and other third parties. Wilmar EO provides refining services through its palm and coconut oil refinery and fractionation plant in Rotterdam. It produces refined bleached deodorised palm oil (RBDPO) and derive blends from RBDPO. Key clients include Nestle, Unilever, PepsiCo, Mondelez, Danone, and Coca-Cola. Today, Wilmar International is the biggest producer of fatty acids in the world.

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### **Key Developments**

Wilmar Europe has demonstrated much success in consolidating Wilmar International's presence in Europe. The following is a summary of some key developments:

2004	•	Took over two oil Unilever plants in Brake and Kleve, Germany
2005	•	Built and commissioned its first refinery in Rotterdam to handle a capacity of 1,000 mt per day
2007	•	Expanded capacity of refineries in Rotterdam and Brake to handle 3,500 mt per day and 2,000 mt per day, respectively Opened new office in Barcelona
2008	•	Built new refineries in Rotterdam and Brake Opened a new Europe headquarters in Barendrecht to handle centralised trading, sales, operations, customer services, human resource, finance, and IT
2009- 2012	• • •	Commissioned ref capacities in Brake and Rotterdam Started trading biodiesel Started trading and distributing oleochemical products Started a joint venture with ADM
2013- 2014	• • •	Moved office to Rotterdam Central Post Built and commissioned a fatty alcohol plant Acquired an ethoxylation plant in Lavera, France Tolling agreement in St Mihiel and Casstiglione

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### **The Port of Rotterdam**

The Port of Rotterdam is by far the most important centre in Europe for the supply, transhipment, storage, and processing of vegetable and animal oils and fats. The major oils, in terms of volume, are palm oil, soya oil, and rape oil. Smaller volume products are peanut oil and fish oil. These oils and fats are mainly used in foodstuff, but are also used as raw materials in oleochemical products (i.e., cosmetics, resins, and paints) and biofuels. Waste edible oils and fats are also processed to produce biofuels.

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Besides Maastank, there are two other larger specialised storage terminals in the port area of Rotterdam, namely Koole Pernis and Vopak Vlaardingen. Together with Botlek Tank Terminal, they represent a storage capacity of 1.2 million square metres.

Five specialised refineries are located in the port area, namely MaasRefinery (Botlek), Wilmar (Pernis), Cargill (Botlek), IOI Loders Croklaan (Maasvlakte), and Sime Darby Unimills (Zwijndrecht). Together, these refineries can produce around 3.5 million tonnes of raw materials for foodstuff and oleochemical products. Neste Oil, another refinery located in Maasvlakte, converts used, as well as new oils and fats into 800,000 tonnes of renewable diesel every year. ADM, located in Europort, presses rapeseeds and soya beans into oil.



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### Wilmar Europe

Wilmar EO has factories capable of the refining and fractionation of palm, palm kernel, and coconut oil. The first factory was established in 2005, and the second in 2009. In Rozenburg, Wilmar Oleochemicals has a factory that produces fatty alcohols. The factory was established in 2014.

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#### Key Value Proposition

Wilmar Europe's mission is to become the European leader in the trading, processing, and distributing of vegetable oils and its products, including oleochemicals, biofuels, and biomass.

#### Major Products

A major product is palm oil. Fresh palm fruit branches undergo milling to produce palm kernels that then undergo further crushing to form palm kernel meal or crude palm kernel oil (CPKO). CPKO is then further refined to produce products such as RBD palm kernel plein, PBD palm kernel stearin, or RBD palm kernel oil.

Crude palm oil (CPO) is refined into RBD palm oil and fractionated to form RBD palm olein and RBD palm stearin. Finally, RBD palm olein and RBD palm kernel oil are further processed into specialty fats such as oleochemicals and biodiesels.

#### Operations

40% of tropical oils arriving in Brake and Rotterdam are brought in directly from Wilmar Trading Singapore. The rest of the supply is purchased through third parties.

Some operations are:

- Rotterdam and Brake arrange for discharge and storage of oils at the factory;
- Wilmar Trading provides daily prices to Olenex's sales, and the pricing forms the basis to which Olenex sells to customers;
- When sales are concluded, Wilmar Trading sells to Wilmar EO or Wilmar EO GmbH;
- Wilmar Trading decides when to cover the raw materials;
- Vessel travel time from the Philippines, Malaysia, and Indonesia to Rotterdam is from four to six weeks.

#### Refining Process in Rotterdam

CPO is processed to produce degummed and bleached oil, which is further processed to make fully refined and deodorised palm oil. These are placed in tank storages or trucks for export into the hinterland.

# Wilmar Oleo in Europe

All oleochemical activities in Europe are centralised in the Rotterdam office. Fatty alcohols is produced in Rozenburg to service mainly the detergent industry, while fatty alcohols ethoxylated is produced in Lavera to cater to the home and personal care industry. Wilmar Oleo also has a glycerine refinery in Belgium to meet the demands of other industries.

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### **Critical Success Factors**

Wilmar's Leadership in Sustainability

Sustainability involves finding the right balance between environmental, social, and economic issues. In particular, the expansion of plantations to meet global demand is associated with several environmental, ecological, and social issues: deforestation; loss of high conservation value (HCV) areas and high carbon stock (HCS) forests; peat-land development that exacerbates climate change; and the displacement of local indigenous groups.

Wilmar's commitment can be seen in its adherence to global standards and certifications, such as Roundtable on Sustainable Palm Oil (RSPO), International Sustainability Carbon Certification (ISCC), and United Nations Global Compact (UNGC). It has also forged partnerships with organisations that aim to protect wildlife and nature such as The Forest Trust. A zero-burn policy, alongside other policies to prohibit developing on peatland, and preserve HCS and HCV areas, has also been endorsed.

Wilmar's role in sustainability is important, because out of a global annual palm oil production of 60 million MT, Wilmar processes and produces 15 million MT and 1 million MT, respectively, accounting for nearly 25% of the market.

### Wilmar International (Wilmar Edible Oils BV)

#### **Becoming Specialists in Edible Oils**

Olenex was incepted through a joint venture with ADM. The entity has seven European marketing and distribution offices, with an extensive product portfolio that includes soybean oil, rapeseed oil, high oleic rapeseed oil, palm oil, palm kernel oil, coconut oil, and sunflower oil.

Olenex, through its Europort liquid oil refineries, handles refined rapeseed oil and refined soybean oil. Meanwhile, tropical oil refineries in Rotterdam produce refined palm oil, refined palm fractions, and refined coconut oil, on top of a wide range of blends.

The massive hinterland connections offer a fast and efficient way of bringing the oils into the rest of Europe. With the deep draught at Rotterdam allowing for larger vessels to sail in, larger volumes of cargoes from further destinations can be shipped in.

#### **Growing Emphasis in Biodiesels**

In response to EU Directive 2009/28/EC, and amid growing "food versus fuel" concerns, Wilmar has taken a greater interest in biodiesel. It is currently the largest producer of biodiesel in Indonesia, with production in Belgium, and trading in north-western Europe.

### Key Insights and Challenges

A key challenge is marketing the new Rozenburg and Lavera factories, particularly for its oleo business, in view of Wilmar Europe's move to satisfy the demand in quality markets serving the food and feed industries. Another challenge lies in making a distinction of, and marketing RSPO certified oleochemical products.

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There is also uncertainty pertaining to Indonesia's CPO export tariffs. In the past, the Indonesian government has revised CPO export tariffs so that more CPO could be processed in the country. Should an upward revision in export tariffs take place, Wilmar Europe would incur increased cost of crude palm oil imports.

Despite the many challenges, the strategic location of Wilmar EO in Rotterdam could facilitate alliances with Unilever, the Anglo-Dutch company headquartered in Rotterdam. One of the largest buyers of palm oil in the world, Unilever uses palm oil in products such as margarine, oils, sauces and seasonings, ice creams, soaps, shampoos, and detergents. By building a reputation as an ethical and reliable palm oil trader, Wilmar Europe will likely benefit from long-term supply contracts with Unilever.



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# Visit Summary

To further the students' understanding of European terminal operators, a visit to Belgium New Fruit Wharf (BNFW), a subsidiary of the SEA-invest group, was organised. In order to facilitate structured learning, the students were brought on a chronological tour starting from the berth where vessels discharge their cargoes, and ended at the other end of BNFW's warehouse, where cargoes are loaded on trucks and distributed to the European continent via land.

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Following the supply chain flow of the warehouse, the students experienced first-hand how BNFW handles and accounts for cargoes moving through each step of the warehouse chain. An account from the host provided the students rich insights on the strategies BNFW undertake to remain efficient and competitive. The students found it engaging to witness the integration of high-technological infrastructure and systems to bring about near fully-automated processes to ensure quick and error-free handling.



# Background

Belgium New Fruit Wharf (BNFW) functions as a stevedore, serving a one-stop shop for the import handling of bananas and pineapples. It provides efficient and quick distribution into the European hinterland, where it owns up to 90% of the market share. It is the biggest player in Europe, in terms of bananas and pineapples as commodities, serving major retailers such as Del Monte.

BNFW is equipped with a 3.5 kilometres quayside, several modern terminals, six warehouses, and 30 cranes. Together, they serve up to 35,000 pallets of bananas per week. This figure is indicative that 3,000 trucks (or 1,000 container trucks) leave the warehouses each week. BNFW distributes its cargoes by barges or trains, tapping into the wide multi-modal network established across the European continent.

BNFW specialises in trading bananas and pineapples partly due to strong market demands, but also because these tropical fruits yield all year round. This means that supply of these fruits is constant and predictable. This is critical to BNFW's success from a logistical management and commercial perspective. In 2013, BNFW generated a revenue of €6.1 million, accounting for 5% of SEA-invest's total revenue.

### **SEA-invest Group**

BNFW is the subsidiary of SEA-invest. Originally a coal and scrap dealer, SEA-invest has grown into one of the world's largest terminal operators for dry bulk, fruit, and liquid bulk. In the past decades, the Group has also invested in purpose-built installations, thereby allowing SEA-invest to tailor products to meet its clients' requirements, as well as provide a wider range of value-added services.

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The activities of SEA-invest can be divided into eight divisions:

- Dry bulk;
- Fruit and food;
- Liquid products;
- Break bulk;
- Containers;
- Roll-on/Roll-off (RoRo) logistics and warehousing;
- Freight forwarding and customs brokerage services;
- Shipping and agencies; and
- Other services.

The Group has gained a worldwide reputation in these functions, and look to expand through organic and inorganic growth, so as to provide its clients with a comprehensive suite of efficient and reliable services.



Organisational Structure of SEA-invest Group

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Description	Operations			
Antwerp Bulk Terminal	<ul> <li>Four dry bulk docks</li> <li>Draft: 11-14 metres</li> <li>Delwaide Dock can handle capesize vessels</li> <li>Breakbulk, container, and RoRo</li> <li>Multi-modal dispatch</li> </ul>			
Assuvan	• Provides insurance brokerage services, insurance products, and risk management and insurance advice to business and private clients			
Belfruco	Offers full forwarding services covering customs documentation,     fiscal representation, phytosanitary control, and transport			
Belgium New Fruit Wharf	<ul> <li>Three docks</li> <li>Covered storage</li> <li>Break bulk, container, and RoRo</li> </ul>			
Compagnie Belge de Manutention	<ul> <li>Dry bulk terminal</li> <li>Blending</li> <li>Crushing/screening</li> <li>Covered storage</li> <li>Break bulk, container, and RoRo (also handles cars and trailers)</li> </ul>			
Ensagent	<ul> <li>Cement storage</li> <li>Crushing/screening calcined petcoke</li> <li>Bagging facility</li> </ul>			
FCC	Cross-docking (frozen and chilled cargoes)			
Ghent Coal Terminal	<ul> <li>Handles coal, petcokes, biomass</li> <li>Screening/crushing</li> <li>Washing/drying</li> <li>Covered storage</li> </ul>			
Infortel	Manages a number of distinct but interrelated IT facilities for the SEA-invest Group			
SEA-invest Shipping Agency	<ul> <li>Nautical assistance</li> <li>Port costs studies and settlements</li> <li>Provides real-time information</li> </ul>			
SEA-Rail	Rail logistics throughout Europe			
SEA Tank 510	Handles mineral oils			
Sea Tank Terminal	<ul> <li>Handles chemicals, oleochemicals, vegetable oils, fats, liquid fertilisers, and biofuels</li> <li>Tri-modal</li> </ul>			
Sea Tank Terminal Antwerp	Handles minerals, chemicals, mineral oils, biofuels, oleochemicals			
Sogatra	<ul> <li>Logistic distribution centre</li> <li>100,000 square metres of warehousing facilities</li> </ul>			

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SEA-invest's subsidiaries and operations in Belgium

ISM Antwerp Rotterdam\_V14.indd 43

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Headquartered in Belgium, Antwerp, SEA-invest is active in more than 25 ports across Europe and Africa. Leveraging on their proximity and connectivity to both producers and end destinations, SEA-invest has formed a crucial link in its clients' supply chains. The Group serves as a vital link between transportation modes, helping to move cargoes from vessels to a series of multi-modal networks. Cargoes handled are typically large volumes of natural oil, zinc, and coal. In addition, SEA-invest also services specialised goods such as fruits and food, which require specialised equipment and skilled staff.



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### **SEA-invest Key Statistics**

- Employs 6,000 employees;
- Operates across 25 ports, eight countries, and two continents; and
- More than 100 million annual tonnage turnover.

# SEA-invest Geographical Operations

SEA-invest operates across two continents, namely Europe and Africa. The following is an overview of its geographical operations:

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	Europe				Africa			
	5.1.1	_				South	West Africa	
Operation/ Country	Belgium	France	Netherlands	Germany	Poland	Africa	Senegal	Ivory Coast
Dry bulk	Yes	Yes	Yes		Yes			Yes
Fruit & food	Yes		Yes	Yes		Yes		
Break bulk, container, RoRo	Yes	Yes						Yes
Logistics & warehousing	Yes							
Freight forwarding & custom brokering services	Yes	Yes	Yes	Yes				
Shipping & agencies	Yes	Yes						
Services (port & handling engineering)	Yes	Yes						

Breakdown of SEA-invest's operations in Europe and Africa

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### **Handling Bananas**

The majority of bananas that passes through BNFW's warehouses is imported from the Middle East and South America. The bananas are grown in specialised farms in countries such as Ecuador, Costa Rica, Columbia, Dominican Republic, and Venezuela, where a steady daily output is assured.

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Upon arriving at the berth, all bananas should be green, to suggest that they have not ripened. If found to be yellow, or ripened, the bananas will be deemed contaminated and rejected by both the food agencies and BNFW.

Unlike pineapples, which can be transported directly to retailers, all bananas upon leaving BNFW, will be transported to central hubs where they would be left to ripen. Each banana retailing company adopts a unique ripening recipe and process to give its bananas a unique taste.

# High-Tech Stevedoring and Warehousing



Belgium New Fruit Wharf's role in the process flow when produce arrives at the port

BNFW's role as a stevedore starts way before a vessel arrives at the port. BNFW has to maintain close communications with its clients, and ensure that digitalisation and tracking of cargo data are synchronised. Working alongside its sister companies, BNFW is able to provide clients with agency functions such as custom clearance and digital manifest. Once vessels are brought in, dockworkers would discharge the vessels at a rate of 6,000 pallets per shift.

At the port, containers need to be repositioned and loaded on the deck, but the cost of repositioning empty containers can be very significant. BNFW offsets this imbalance by providing cheaper containers to be exported.

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BNFW mainly handles reefer vessels, which have decks specially designed for loading pallets. Decks and containers are fitted with cooling units to help to control atmospheric conditions and maintain temperatures at 13.7° to prevent the bananas from ripping prematurely.

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Before entering the warehouse, the bananas are subjected to an initial quality inspection, which tests for discrepancies in terms of sight and smell. When bananas ripen, they emit ethylene; batches with traces of contamination will be rejected.

Quality is of upmost importance to BNFW. Once the pallets are loaded into the warehouse by dockworkers, they are placed on plastic pallets fitted with Radio-Frequency Identification (RFID) tags. These tags serve as location trackers that communicate with other similar sensors in the warehouses to provide BNFW's clients with accurate information of their cargoes' whereabouts.

Next, lasers are used to check pallets to ensure that boxes of bananas are perfectly stacked. This step is crucial, as after this, robots and algorithms will be performing all the processes and handling.

Robots in the storage units are able to handle up to 11,200 pallets at any one time. The pallets will be stacked up to nine storeys high, in atmospheric-controlled storage units segmented by different atmospheric conditions—far surpassing the physical limit of four storeys with the use of manually operated forklifts. Total transit time from the discharge of cargoes from vessels to storage units is kept to a minimal to prevent temperature changes. Each pallet will be transported to a warehouse under three minutes—an achievement that BNFW takes pride in.

The other end of the storage unit is fitted with "ballerinas", or automated rotating machines that help with the dispatch of cargoes out of the warehouse. BNFW's clients are able to communicate directly with the system and apply for loading orders. Upon which, the system would fetch the bananas from storage units and bring it out for dockworkers to load onto trucks parked at the other end of the warehouse. During a dispatch, dockworkers would scan the pallets and the respective tags of trucks to ensure that cargoes do not get wrongly loaded.

The entrance of each truck shelter is also fitted with a monitor that screens the respective truck's number plate to ensure that cargoes are correctly loaded. By employing the use of state-of-the-art technology and skilled labour, BNFW is able to achieve 0% wrong delivery.





# Macro Environmental Risks and Trends

#### Shift in European Logistics

BNFW's strategic location in Antwerp, Belgium, gives it quick access to 60% of the market within a five kilometres radius. Coupled with well-built infrastructure and smooth traffic conditions with no congestion, BNFW is able to maintain reliable cargo flows to major hubs in Belgium, Germany, and France.

However, these trade flows are beginning to spread towards the east. As countries outside the western bank of Europe develop and gain affluence, more people are willing to pay for direct import of goods into their countries. This means that trucks are now travelling further, which poses the potential threat that growing demand for logistics will shift eastwards. If importers choose to call at eastern ports like Saint Petersburg, it is possible that Belgium might lose its footing as a port hub.

#### **Increased Import Duties**

Another threat that could lead to fewer bananas passing through BNFW is increasing pressure for European banana producers such as Spain and France to protect their domestic markets by increasing import duties. With increased import duties, imported bananas become less price-competitive.

### **Market Trends**

Recent research revealed that imported bananas are still a popular choice amongst consumers in the European market, and strong demand for this commodity ensures the longevity of BNFW's business.

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The shift of logistics towards the east might be unsettling, but it is considered to be at its early stages, where only 20% of the overall market resides in the countries concerned. This figure is not big enough to attract long-term investments required to develop terminals in the eastern ports.

Thus, BNFW's position as one of the market leaders in the area of fruit and food handling remains deeply entrenched, so long as it continues to stay client-focused and reactive to market trends. A key area BNFW has triumphed in is providing its clients with state-of-the-art technology to deliver increased efficiency and reliability. Another strategy that has served the company well is careful consideration when exploring long-term investments, and only committing upon receiving a sure signal from the market.

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### **Critical Success Factors**

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#### Maritime Innovation and Technology

BNFW's main competitive edge lies in its ability to provide clients with efficient and reliable services. As a one-stop destination for clients to import their cargoes, BNFW value adds by providing a state-of-the-art tracking system that contributes to a 0% wrong delivery track record. This system allows clients to receive instant data on their cargoes' status and location, and crucial information in dealing with perishable products.

The system employs the use of digital manifest, so that cargoes can be tracked once they have been discharged. The value-added service to streamline IT systems, provided by BNFW's sister agency company, also allows for the synchronising of information between BNFW, its clients, and all other stakeholders such as the authorities and regulatory bodies. This transparent exchange of information has helped BNFW forge stronger ties with its clients, and has allowed BNFW to leverage it to bring in more cargo.

Given the demand of the work, BNFW hires dockworkers on a long-term basis, and only recruits from a pool of trained personnel certified by Canadian Energy Pipeline Association (CEPA). As a result of a limited resource pool, qualified workers generally command higher wages. Through automation investments, BNFW is able cut back on wages expended, whilst maintaining high service quality. Furthermore, the use of automated systems lowers headcount. These cost reductions make provision for BNFW to pass on cost savings to its clients through more competitive rates.

#### Client-Focused Services and Business Flexibility

BNFW does not own all of its cranes and equipment. This gives it leeway to achieve a certain extent of business flexibility. In fact, many of its cranes and equipment are leased, depending on market demands. This leaner model effectively lessens the financial burden on BNFW in a bad market, and allows it to focus on serving its clients' needs better. For instance, BNFW has started to focus its efforts on optimising the loading of containers and cargoes on the deck, since freight is calculated based only on the volume of cargo loaded on the deck. This helps its clients to increase their profit margins. Such efforts strengthen BNFW's relationships with its clients, and result in a more sustainable bottom line.

BNFW also strives to be flexible in its operations by being responsive and operationally ready to meet varying requests from clients. For instance, BNFW could engage in the cutting of vacuum bags to allow oxygen to act on the bananas to shorten their ripening time. This allows clients to react to the market quicker, and push their products into the market in the shortest possible time.

BNFW further value-adds its clients by playing an active role in quality control. It renders general quality control services, and relates the conditions of the cargoes to its clients promptly. This allows clients to quickly rectify problems if and when they surface. The highest quality standards can also be ascertained when independent surveyors step in.

#### **Critical Mass and Diversification**

As a subsidiary of a conglomerate, BNFW is able to tap on the Group's diverse businesses and better ride through tough market conditions. This is a key advantage given the cyclical nature of the market, coupled with the fact that goods handled by BNFW are perishable.

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During the visit, the host also mentioned that in spite of a low barrier to entry, new entrants would find it difficult to survive in the industry, because of a lack of deep financial support and scale to help them tide through a crisis. On the other hand, BNFW's ability to tap on services of her sister companies under the SEA-invest Group umbrella would mean that it is able to offer clients a single product that is well supported with services across the value chain. For instance, BNFW is able to offer clients a deal that already covers agency, insurance, and land-based logistical services.

Today, BNFW also diversifies its business risks by pursuing a variety of clients. Besides large multinational fruit importers or producers, BNFW also serves smaller industry players. This mix allows BNFW to tap on the possible exponential growth of start-ups, while financially sound firms act as the safety net.



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The first-hand opportunity to learn about Europe's maritime industry would not have been possible without the support of Maritime and Port Authority of Singapore (MPA), Singapore Management University (SMU), International Trading Institute, and many other industry partners.

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The students would like to extend special thanks to the parties involved in making the trip a success. They sincerely hope that industry partners would continue to invest in educating and nurturing their peers to become the next generation of business thinkers and leaders.

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- Rotterdam Maritime Museum;
- Rotterdam Maritime University;
- SEA-invest;

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