MIS782 – Value of Information

Assessment Task – 3

Applying Emerging Technology for Competitive Advantage

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Maersk Enhancing their Supply Chain Efficiency using Digital Twins

Proposed Business Use Case Brief with the Emerging Technology

Business Opportunity/Problem

While being a global leader in logistics and supply chain management Maersk faces challenges in optimising its extensive and complex operations. When combined with the dynamic nature of global trade, the sheer scale of Maersk's logistics network leads to inefficiencies, poor management of assets, and high operational costs. Conventional methods of supervising and managing supply chain activities are not sufficient anymore to cater to these problems efficiently.

Emerging Technology: Digital Twins

By creating virtual copies of processes, physical assets, and systems the Digital Twins technology proposes a promising solution. Providing deep insights into the performance and state of the resources, these digital counterparts enable the organisation to real-time simulation, supervision, and analysis. With the use of Digital Twins, Maersk will be able to attain substantial augmentation in their operational efficiency along with enhanced decision making.

Business Value

1. Better Decision Making:

Maersk can optimise scheduling, routing, and inventory management with the availability of advanced analytics and real-time data. This will lead to lower fuel use, decreased transportation times, and increased reliability in deliveries.

2. Enhanced Maintenance and Utilisation of Assets:

By continuous supervision of the performance and health of resources like the containers, ships, and port equipment, Digital Twins will facilitate predictive maintenance. This approach will extend the life of assets, while reducing downtime and decreasing the maintenance costs.

3. Smooth Operations:

Through the simulation of different scenarios, Digital Twins technology will allow Maersk to test and apply various process improvements without

disrupting their ongoing real-time operations. This will lead to decreased operational bottlenecks along with an increased efficiency in workflows.

4. Stronger Relationships with Customers:

Maersk can boost their customer satisfaction and loyalty by providing their customers with real-time, transparent information regarding the possible delays and shipment status. Better communication and delivery of services cultivate stronger relationships with the customers.

Alignment with Maersk's Goals and Strategy

Maersk's vision of becoming the worldwide co-ordinator of container logistics heavily depends on utilising technology to drive sustainability, efficiency, and innovation. By improving Maersk's ability to manage its capabilities and assets effectively, the incorporation of Digital Twins technology sides perfectly with their vision. When looking at it from an RBV perspective: the implementation of this technology benefits from Maersk's existing strengths like their vast logistics network and data resources. Along with the provision of a strong platform for future growth, it will also lead to a competitive advantage.

Proposed Solution for the Use Case

For Maersk to employ Digital Twins technology, an extensive approach is required which will integrate real-time supervision, advanced data analytics, and predictive capabilities. Let's focus on the solution we are proposing. It will comprise of the sources of data, algorithms, the needed analytics capabilities along with a critical assessment of our use case's impact on Maersk's performance and decision making.

Implementing the Solution

1. Types of Data and Algorithms:

a) Internal Data: Maersk has an accessibility to huge amounts of internal data which comes from different sources and includes asset performance logs, operational metrics, and maintenance records. For generating precise Digital Twins of Maersk's resources and processes, this internal data provides a strong establishment.

b) External Data: For enhancing Digital Twins' predictive capabilities, integrating external data like port congestion reports, market trends, and

weather forecasts is crucial. The combination of internal and external data will allow Maersk to perform comprehensive yet precise analyses and simulations.

c) Models and Algorithms: To process and analyse the data, the implementation will make use of advanced statistical models and machine learning algorithms. The Digital Twins system will have optimisation models for scheduling and routing, simulation models for scenario testing, and predictive maintenance algorithms as its key components. Based on new data, these models and algorithms will continuously learn and improve thereby making sure that Maersk's operations stay active and responsive.

2. Setting Up Analytics Capabilities:

a) Consolidated Analytics Team: It is extremely important for Maersk to set up a centralised data analytics team for the effective deployment and maintenance of Digital Twins. This team will include data analysts, scientists, and field experts. They will be responsible for developing and perfecting the Digital Twins models. The team will also ensure data integrity and generate actionable insights.

b) Technology Infrastructure: To aid the real-time data processing and storage needs of Digital Twins, Maersk will be required to invest in a strong technology infrastructure. This infrastructure will include secure data integration platforms, highly performing computation systems, and cloud storage solutions.

c) Collaboration and Training: Successful implementation will require collaboration across different departments i.e. operations, IT, and logistics. It will be essential for the Maersk management to conduct training programs as it will ensure that employees understand how to make use of and benefit from the Digital Twins technology. The trainings would be focused on data interpretation, maintenance of data quality, and insights-based decision making.

3. Assessment of Impact:

a) Benefits: Decreased downtime, improved operational efficiency, cost savings, and increased customer satisfaction are the key benefits of employing Digital Twins at Maersk. Real-time supervision and predictive analytics will facilitate optimised routing, proactive maintenance, and

better management of the inventory thereby significantly reducing costs and increasing reliability in service delivery.

b) Limitations: The main limitation is the massive initial investment Maersk needs to make for technology infrastructure and training purposes. The integration of different data sources and ensuring that the data quality is top-notch can be difficult. Employees who are comfortable with the traditional methods might be unwilling to accept and adapt to new ones.

c) Information Asymmetry: By providing transparent and real-time data to all the stakeholders, the Digital Twins technology will help Maersk to alleviate information asymmetry. This data transparency will augment collaboration and trust among employees, partners, and customers.

d) Risks and Ethical Implications: Data security and privacy concerns are few of the various risks involved with implementing Digital Twins technology. To protect the sensitive information, it is extremely important for Maersk to implement strong cyber security measures. To ensure that the decisions made by the Digital Twins are unbiased and fair, Maersk will be required to consider the ethical implications of utilising AI and machine learning.

The solution proposed for implementing Digital Twins at Maersk will provide a tactical approach which would enhance their supply chain efficiency while also attaining competitive advantage. Maersk will be able to further optimise their operations while reducing costs and improving customer satisfaction by utilising advanced analytics and real-time supervision. In-spite of the few risks and challenges that will follow, Maersk's investment in Digital Twins technology makes it a worthy venture for the organisation's future growth and success.

The Role of Dynamic Capabilities

1. Sensing Capabilities:

a) Sophisticated Data Collection: For sensing changes in environmental conditions, asset performance, and market dynamics, developing advanced data collection systems is important for Maersk. These systems will be utilised to fetch real-time data from several sources such as satellite imagery, IoT sensors, and market reports.

b) Market Intelligence: For Maersk to stay ahead of the emerging threats and opportunities, forming a dedicated market intelligence team will be crucial as they will monitor the competitor activities, industry trends, and regulatory changes. Through analysis of external data and providing strategic insights, this team will support decision making.

2. Seizing Capabilities:

a) Predictive Analytics: Making use of predictive analytics to cater to potential issues and optimising operations is an important seizing capability. Through the use of predictive models, Maersk can optimise shipping routes, anticipate maintenance requirements, and supervise inventory levels more efficiently.

b) Agile Decision Making: It is important for Maersk to build/have a culture of agile decision making for seizing opportunities swiftly. Employees will be able to make informed decisions quickly through empowerment with real-time data and analytics. To encourage this agile mentality across the organisation, workshops and training programs can be useful.

3. Transforming Capabilities:

a) Integration and Innovation: Continuous innovation is essential for integrating Digital Twins technology into Maersk's existing systems. It will require regularly updating and refining the Digital Twins' models on the basis of latest data and insights. A dedicated innovation team can handle this process thereby making sure that Maersk stays at the top of technological advancements.

b) Cultural Transformation: It is crucial to transform Maersk's culture to embrace Digital Twins technology and data-driven decision making as it is important for longstanding growth. It will involve promoting a culture of transparency, collaboration, and continuous improvement. To drive this cultural shift, change management strategies like support from leadership and communication campaigns will be important.

Effect on organisation's Competitiveness and Sustainability

1. Competitive Advantage:

Through the development of such dynamic capabilities, there will be an enhancement in Maersk's ability to adapt to market changes also allowing them to stay ahead of their competitors. These dynamic capabilities will

allow Maersk to sense, seize, and transform threats and opportunities, thereby ensuring that they stay agile and responsive. This will aid the maintenance of Maersk's leadership status in the logistics industry.

2. Sustainability:

Digital Twins technology contributes to Maersk's sustainability objectives by optimising operations and reducing waste. Improved predictive maintenance and resource utilisation will help Maersk in reducing their environmental impact. Also, streamlined operations will lead to reduced carbon emissions. Maersk's commitment to corporate social responsibility and sustainability is reinforced by these dynamic capabilities.

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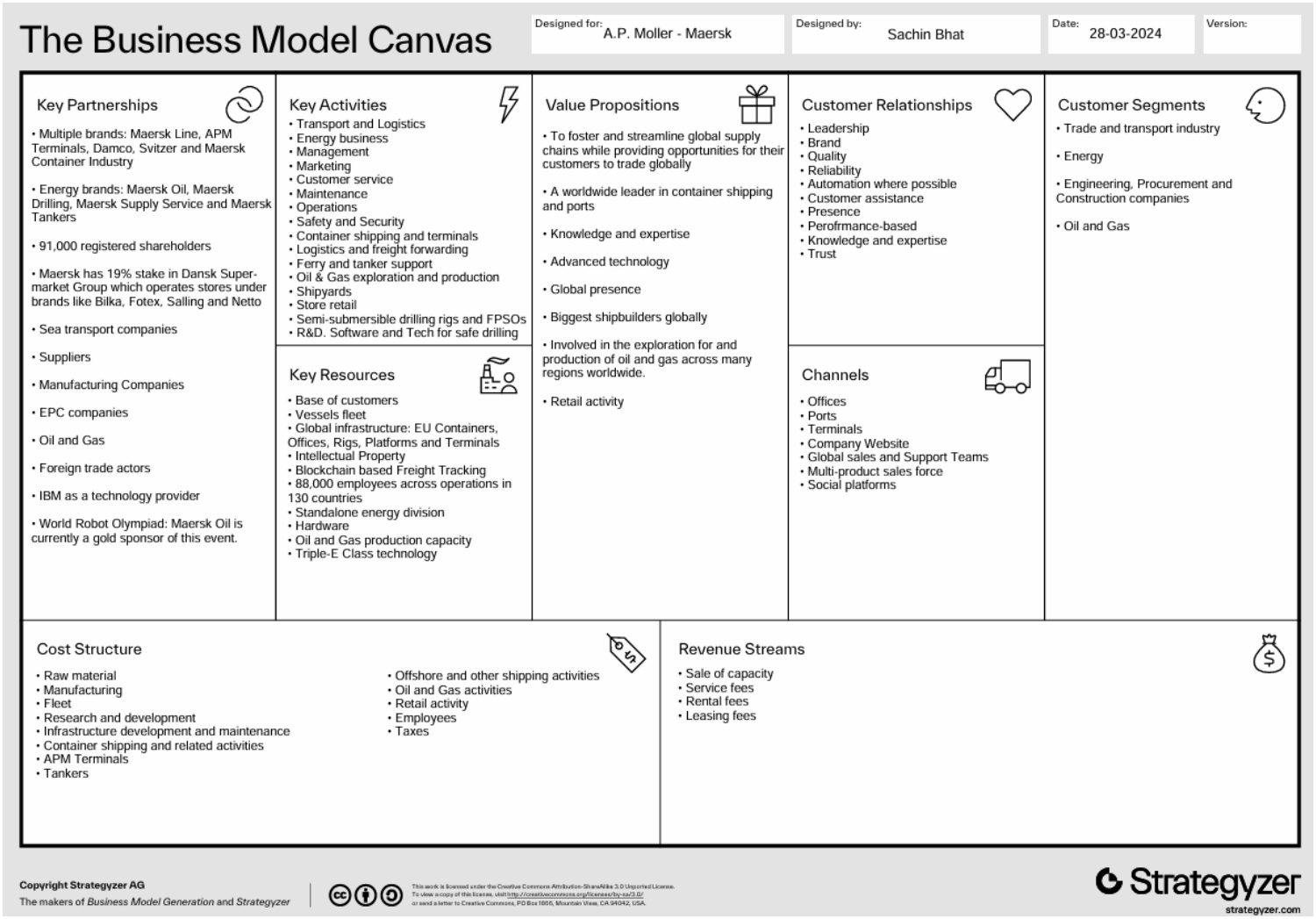
Appendices

1. A.P. Moller – Maersk's Business Model Canvas



The Business Model Canvas

Designed for: A.P. Moller - Maersk | Designed by: Sachin Bhat | Date: 28-03-2024 | Version:

Key Partnerships

- Multiple brands: Maersk Line, APM Terminals, Damco, Svitzer and Maersk Container Industry
- Energy brands: Maersk Oil, Maersk Drilling, Maersk Supply Service and Maersk Tankers
- 91,000 registered shareholders
- Maersk has 19% stake in Dansk Supermarket Group which operates stores under brands like Bilka, Fotex, Salling and Netto
- Sea transport companies
- Suppliers
- Manufacturing Companies
- EPC companies
- Oil and Gas
- Foreign trade actors
- IBM as a technology provider
- World Robot Olympiad: Maersk Oil is currently a gold sponsor of this event.

Key Activities

- Transport and Logistics
- Energy business
- Management
- Marketing
- Customer service
- Maintenance
- Operations
- Safety and Security
- Container shipping and terminals
- Logistics and freight forwarding
- Ferry and tanker support
- Oil & Gas exploration and production
- Shipyards
- Store retail
- Semi-submersible drilling rigs and FPSOs
- R&D. Software and Tech for safe drilling

Key Resources

- Base of customers
- Vessels fleet
- Global infrastructure: EU Containers, Offices, Rigs, Platforms and Terminals
- Intellectual Property
- Blockchain based Freight Tracking
- 88,000 employees across operations in 130 countries
- Standalone energy division
- Hardware
- Oil and Gas production capacity
- Triple-E Class technology

Value Propositions

- To foster and streamline global supply chains while providing opportunities for their customers to trade globally
- A worldwide leader in container shipping and ports
- Knowledge and expertise
- Advanced technology
- Global presence
- Biggest shipbuilders globally
- Involved in the exploration for and production of oil and gas across many regions worldwide.
- Retail activity

Customer Relationships

- Leadership
- Brand
- Quality
- Reliability
- Automation where possible
- Customer assistance
- Presence
- Perofrmance-based
- Knowledge and expertise
- Trust

Channels

- Offices
- Ports
- Terminals
- Company Website
- Global sales and Support Teams
- Multi-product sales force
- Social platforms

Customer Segments

- Trade and transport industry
- Energy
- Engineering, Procurement and Construction companies
- Oil and Gas

Cost Structure

- Raw material
- Manufacturing
- Fleet
- Research and development
- Infrastructure development and maintenance
- Container shipping and related activities
- APM Terminals
- Tankers
- Offshore and other shipping activities
- Oil and Gas activities
- Retail activity
- Employees
- Taxes

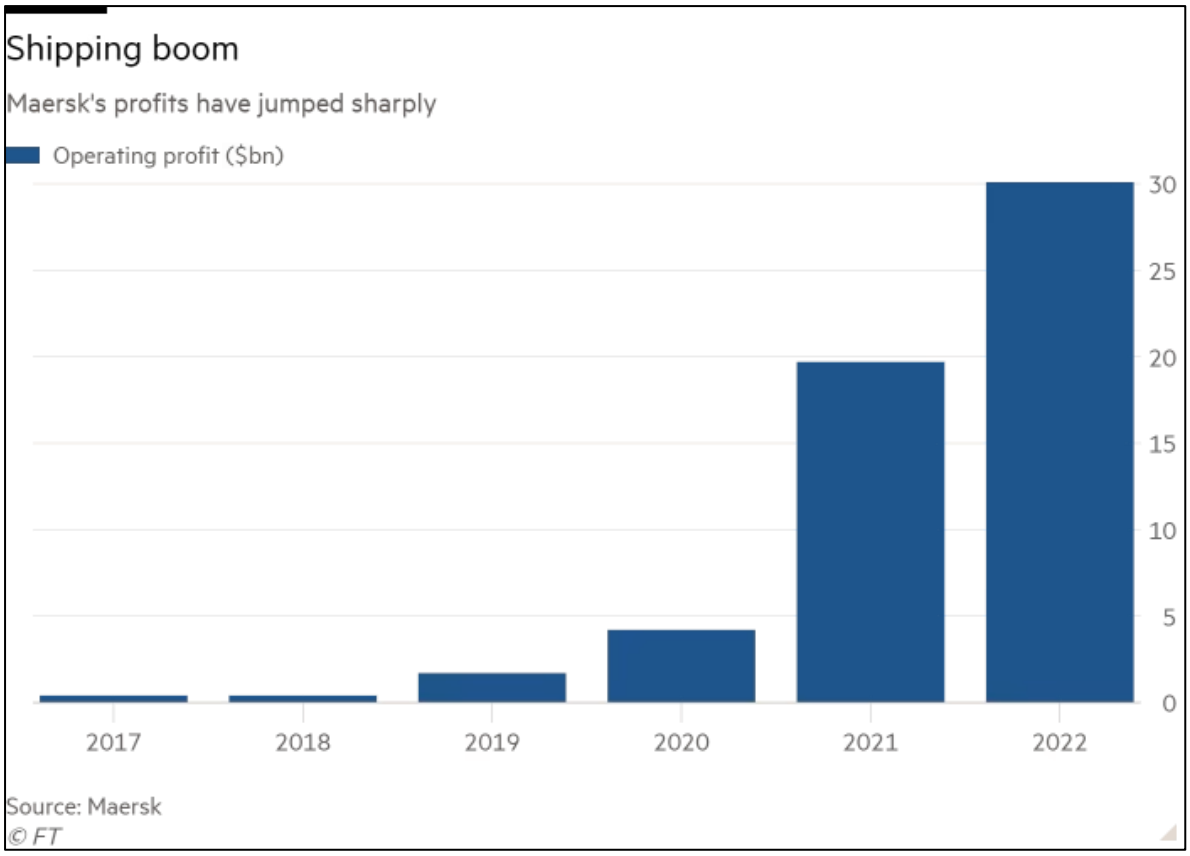
Revenue Streams

- Sale of capacity
- Service fees
- Rental fees
- Leasing fees

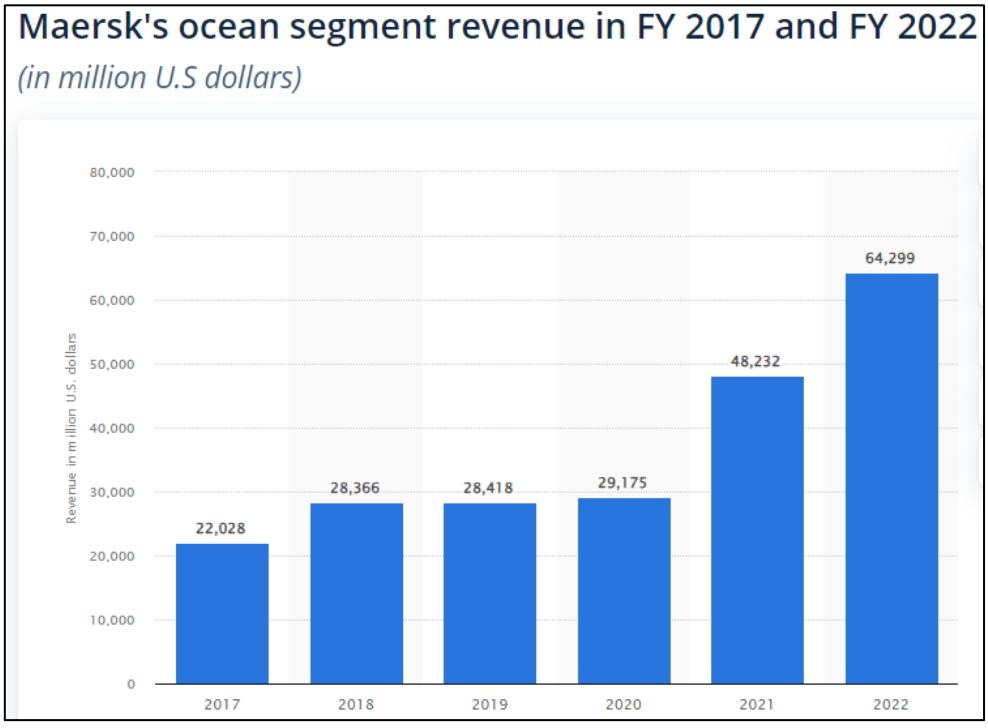
2. VRIO Analysis

	Value	Rarity	Imitability	Organisation
Global Brand and Reputation (Resource)	Maersk's global brand is highly valuable. It capitalizes on its reputation for reliability and efficiency to gain trust and attract business worldwide.	While there are several large players in the shipping and logistics industry, Maersk's status as the world's largest container shipping company is relatively rare.	The brand reputation built over decades through consistent service excellence is difficult to imitate, as it requires significant time, investment, and operational success.	Maersk is well-organized to exploit this resource, with marketing strategies and customer service that enhance its brand equity.
Technological Capabilities in Logistics (Capability)	Maersk's investment in technology, including digital booking systems, blockchain for supply chain transparency, and AI for logistics optimization, adds significant value by enhancing efficiency and customer satisfaction.	While technology in logistics is becoming more common, Maersk's early adoption and continuous innovation make its capabilities relatively rare.	High due to the complexity and cost associated with developing similar advanced technological infrastructures and the expertise required to integrate them seamlessly into global operations.	Maersk is structured to leverage technology effectively, integrating it across operations and aligning it with strategic objectives.
Diverse Global Network (Resource)	Maersk's extensive global network, including ports, terminals, and vessels, enables it to offer comprehensive logistics solutions, providing exceptional value by reducing transportation times and costs.	While other companies also operate globally, the scale and integration of Maerk's network are rare.	Building a comparable network is highly costly and time-consuming, involving regulatory, geopolitical, and financial challenges.	The company is organized to fully exploit this network, optimizing route efficiency and logistics management.
Sustainability Initiatives (Capability)	Sustainability is increasingly important to customers and regulators. Maersk's initiatives, such as carbon-neutral shipping and green logistics solutions, address these concerns and enhance customer loyalty.	Many companies are making strides in sustainability, but Maersk's commitment to becoming carbon neutral by 2050 sets it apart.	While competitors can emulate sustainability practices, integrating them at the scale and depth of Maersk's operations is challenging.	Maersk is structured to pursue these initiatives aggressively, integrating them into its core business strategies.

3. Increase in Maersk Profits over time



4. Maersk's Ocean Segment Revenue over time



5. Logistics industry Market Size forecast