



Digital Tanker Trade

Future perspectives in a conservative and slow-moving business

Master of Science Thesis in the Maritime Management Programme

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Department of Mechanics and Maritime Sciences Division of Maritime Studies CHALMERS UNIVERSITY OF TECHNOLOGY Gothenburg, Sweden 2018 Report No. 2018:48

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Frontpage; a rusty chain in the foreground of a painted piece of metal (PxHere, 2017)

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Abstract

The technical advancements and digitization change the landscape of the shipping industry. An industry that has been considered slow-moving and conservative for ages, but slowly have started to see benefits of technological improvements such as Blockchain from the office side of the business. Money and valuable time could be saved due to improved processes but how does that affect the people within the organisation and the sales process? And what factors in the tanker market may affect the willingness to adopt new technological inventions? By using semi structured interviews to interview industry representatives from the maritime sector in Gothenburg, Sweden, the writers try to understand how the shipping business eventually will change in the five to ten years to come. The results show that Charterers are likely to do more fieldwork due to new technology that replace and change current work roles. Several interviewees emphasize that the business relations between Cargo-owners, Shipowners and Charterers are extremely important in the shipping industry and will likely become even more important in the future. Technology as Blockchain has also the positive impact of reducing financial risks for Charterers and Shipowners because of less need for Letters of Indemnity which has been a branch standard. It also increases transparency in the market, which was both negative and positive depending on where in the world the vessels from the company were trading.

Keywords: Digitalization, Transformation, Organisational change, Blockchain, Shipping, Tanker, Liquid Bulk, Documentation exchange.

Preface

This Master's Thesis was carried out during the spring of 2018 in Gothenburg, Sweden. The empirical findings have been collected from several different companies in the tanker segment in Gothenburg. This Thesis is the final step before graduating from the Maritime Management Master's Programme at Chalmers University of Technology, Gothenburg.

We would like to *genuinely* thank our supervisor Olle Lindmark, Lecturer at the Division of Maritime studies and Director of the Maritime Management Master's Programme, who really has supported us throughout the writing process. We would also like to thank Erik and Therese, our anchors at Stena Bulk. Furthermore, many thanks to all the companies within the maritime sector in Gothenburg who has taken their time for interviews and supported us with valuable data – without you, no research.

Johan would like to thank ABJC, friends and Agnes who has supported and assisted throughout the writing process. Jacob would like to thank his friends and huge family, especially CJSPABCD, and also, a big thanks to Kreeta Kaber, a person who has meant a great deal to him.

Finally, we hope that this Thesis will cast some light on what the future within the shipping industry might look like and help organisations with data that may support the decision making, in order to take measures in the years in the shipping industry.

Chalmers University of Technology

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Acronyms abbreviations and Terminologies

AI	Artificial Intelligence - an intelligence, demonstrated by machines and not by humans. The machine or computer is given a synthetic "human mind" to solve complex conditions.	
AIS	atomatic Identification System – A system to identify vessels ovement, speed, position, destination and cargo carried onboard. sed by ships deck officers and Traffic control rooms to monitor affic at sea.	
BBB	Before Breaking Bulk – The Party receives payment before commencing discharge at the port of destination.	
Demurrage	Demurrage – A fee Charterers must pay to Shipowners due to cargo operations delay in port.	
IMDG	International Maritime Dangerous Goods Code – Regulations to declare guidelines for safe transport of dangerous goods when carried across water.	
LAYCAN	A time-window the vessel need to arrive within, otherwise the shipowner risks cancellation of the contract of carriage, by the charterer.	
LOI	Letter of Indemnity – An issued document where the shipper indemnifies the shipping company against implications from problems arising from Bills of Lading.	
NOR	Notice of Readiness - A document issued by the ships master or agent to inform the port of discharge or loading that the vessel has arrived.	
Oil Majors	The largest Oil and Gas companies that controls the market. They trade, prospect, refine, distribute and transport oil.	
P&I Club	Mutual Organisations issuing insurance policies Shipowners purchase to protect them against liability from damages caused by ship's crew and third party.	
Liquid Bulk	Cargo that is transported in large volumes and has no package wrap around it. The cargo could be either floating liquid such petroleum products but also solid substances as grain, ore and coal.	
Q88	A platform shipping representatives as Brokers, Charterers and Shipowners use to conduct business.	
ShipNet	A platform to transform data from the vessels performance to the ship operator.	
Veson	A platform to transform data from the vessels performance to the ship operator.	

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1. Introduction

In this chapter, the writers introduce readers to the subject that was chosen and the background and briefly describe what is investigated. Delimitations, scope and purpose will also be presented to clarify what the Thesis is all about.

Technological development is fastmoving and several different industries are changing or have recently changed. The first industry revolution was categorized by steam-machines and railroads, second by the development of electricity and the combustion engine which improved the daily life for millions of inhabitants worldwide. The third technical revolution was categorized by automatization of production (Schwab, 2016). Today, researchers claim that humanity has entered the fourth technological revolution which is the digital transformation of the economy according to the Confederation of Swedish Enterprise, Svenskt Näringsliv (2016).

Osborne (2013) believe almost half of all jobs have the potential to be replaced by robots and computers in a short period of time. However, the most common future belief from economists is that the technical development creates more jobs than ruining them. Digital platforms and systems to increase efficiency and transparency have been developed which has led to new products, services and business models. All these changes affect organisations, labour markets and the global economy.

Therefore, digitalization lead to the replacement of jobs that are common today but are nevertheless, replaced with a new or changed work-role. With increased computerization, work tasks can be more efficient, valuable time may be dedicated to other tasks while other errands can be automated. Examples on jobs that face radical changes are switchboard operators or accounting, which are believed to be replaced by automatization in the future. However, digitalization also affects qualified work roles which contains advanced calculations or programming. These work-roles are believed to increase their work effectiveness and become more productive in the future. (Svenskt Näringsliv, 2016)

The shipping industry has been considered conservative and slow-moving from several perspectives, particularly the technical development and the digitalization of the trade and how it is conducted. (World Maritime News, 2018)

Still, several analogue systems are used which create bottlenecks and inefficacy once cargo are carried from one continent to another. These congestions through Bill of Ladings being stopped at the banks, cargoes discharged against Letter of Indemnities and high-risk exposure for Shipowners and Charterers are branch standard. However, some leading companies in the maritime sector are slowly changing their conservative view and exploring new ways of using technologies with digitalization to change their way of doing business and to increase efficiency from the land office perspective. AP Møller Mærsk and IBM has started a joint venture to explore the benefits of Blockchain and predicts saving up to one fifth of the total shipping costs due to less bureaucracy when transferring shipping documents or other relevant information between Shipowners, Charterers and Cargo-owners (Loklindt, et al., 2018).

In a market estimated to grow from todays 8.1 trillion USD to 15.5 trillion by 2023 in terms of value, a prediction from Cision Transparency Market Research (2016) claims that huge amounts of money could be saved. But also, benefits such as transparency and efficiency will increase as well in the wakes of the technology (Christidis & Devetsikiotis, 2016).

However, even though advanced technologies such as both Blockchain and electronic Bill of Ladings do exist today, they suffer complications of being implemented and fully absorbed of the industry. Why, one might ask since the pros overcome the cons. In an era of digitalization and a world market where competition increase, these tools would increase efficiency a lot and eventually change the future landscape of the industry.

Thus, this Thesis will explore the possibilities of the new available technologies, hinders towards the technological change and what organisational change eventually happens in the future. Based on the assumption that improved technology would not only be faster, but also cut documentation handling time and costs, leads to the research questions of this report, and exploring the possibilities of new technologies, such as Blockchain, and how it may affect the business organisation ashore.

1.1 Purpose and Research questions

The purpose of this report is to explore the possibilities of using Blockchain technology, and how it may change a future land office within the tanker segment that until now has leant on tradition and culture in an important business segment.

To reach the research aim, these questions will be addressed:

- What factors in the tanker market may affect the willingness to adopt new technological inventions?
- How may technology affect the sales process in the tanker market?
- What organisational change will follow a technological invention, such as Blockchain?

1.2 Scope and Delimitations

The scope of this paper is to identify possibilities and evaluate factors how the tanker market will change due to new technical inventions in a five to ten years future.

This paper will focus on the tanker segment and market. The companies that were selected are active on the North European market or trade worldwide and vary in size and number of vessels they charter or own. The companies are all situated in Gothenburg, as the port of Gothenburg is deemed the hub and centre of the maritime cluster in Sweden, as well as the largest port of Scandinavia, leading to the concentration of expertise and knowledge.

The result of this paper should be considered as generalizations of opinions from industry representatives and how they believe the future will look like. Thus, this paper will evaluate interesting thoughts and interpretations which provide us with a glimpse of what the future might look like but are no certainty.

1.3 Disposition

Chapter one – Introduction of the subject where background, purpose and research question are presented to the reader. Delimitations and scope to clarify the framework of the Thesis.

Chapter two – Theoretical framework which describes the phenomenon Blockchain, market analysis models and barriers towards technical implementation.

Chapter three – In this chapter, the methodologies to the Thesis are presented. Why the authors have chosen the used method to receive answers to from the interviewees. The reliability and quality of the research are also being presented and discussed in this chapter.

Chapter four – The results from the interviewees are presented in bar charts and relevant facts to explain the current situation in the industry and what the future might look like.

Chapter five – This section analyses and discuss answers from the interviewees, and why interviewees have responded in the way they did.

Chapter six – Conclusion of the main findings in the report and recommendations to further research.

2. Theoretical framework

This chapter will present the theoretical framework of this Thesis which later will be used to analyse the key findings of the report. At first, the concept of paper documents will be explained and later market analysis models. Barriers towards implementing new technology and explanation of Blockchain and how this eventually will change the future landscape within the shipping industry.

2.1 Bill of Lading

Bill of Lading is one of the world's most important shipping contracts due to its characteristics as a sales contract in the world trade (Schmitz, 2011), followed by the insurance Policies and invoices according to Nel (2016). This section will describe and explain the importance and functions of the Bill of Lading.

Gooch & Williams (2014) describes a Bill of Lading as "A document acknowledging the shipment of a consignor's goods for carriage by sea. The bill serves three factions: it is a receipt for the goods, it summarizes the term of the contract of carriage, and it acts as a document of title to the goods. A Bill of Lading is also issued by a Ship-owner to a Charterer who is using the ship for the carriage of his own goods".

The shipping line is responsible for the transport of the goods from port A to B which are issued by the shipper. The shipper is the firm who pays the shipping line to transport the goods and pays the transporter as soon as the goods are received onboard. (Nel, 2016)

The Bill of Lading will name *consignors* (the buyer) and the person who holds the contract are enabled to collect the goods at time of arrival in the port of destination, in simple words; the holder of the Bill of Lading holds the possession of the cargo (Nel, 2016). In some cases, a freight forwarder acts on behalf of the consignor to collect the goods and arrange the transport of the cargo from the port to the consignor.

The Bill of Lading is also described as a "document of title" as it enables the holder to sell the goods before arrival in the port, receive credit from banks and proves ownership of the goods. The Latin language describes the Bill of Lading as a *prima facie* document, meaning that only the rightful holder of the Bill of Lading can collect the goods but also serves as evidence of the right amount of quantity of cargo, quality and condition. (Schmitz, 2011)

As previously mentioned by Gooch & Williams (2014), the Bill of Lading is a paper-based document issued in three pieces. The documents are traded on the world market and very often, the vessel arrive long before the paper-based documents do.

During the last two decades, the development towards digitalization of the document has emerged but it is still hard for the industry to rely on the technology. The main motive why the progression towards a digitalization of the Bill of Lading moves slow, is mainly due to the fact that it is not legally treated in the same means as a paper-based document. But there are facts that pinpoints towards the opposite direction. During the 1990's, a trading system named BOLERO was introduced to the market were members of the organisation could trade electronically with each other and the set of rules of the system was agreed in advance to govern the system. There has only been one issue, if one party of the contract is not registered as a member of the organisation, a paper-based Bill of Lading is issued instead. This has on the other hand haltered the development and growth of the system. Trading based systems are only effective if they have large stock of users and keep growing. Due to this status quo situation, traders have also waited to join in, which reinforce the negative spiral of spreading the system. (Underhill & Bibby, 2016)

2.2 EDI – Electronic Data Interchange

There is a growing trend of transforming the industry from paper-based solutions towards a computer-based system (Schmitz, 2011). The EDI system can be used to conduct transfer of documents from one trading party to the other and with potential of potent cost reductions, (Underhill & Bibby, 2016) as five to ten percent of the total value of the goods are linked to the cost of handling physical documents like Bills of Lading.

The EDI system has a goal to connect all parties of a transaction and link them to one system or platform. The parties of the system are banks, carriers, shippers and other relevant parties of the shipment of goods. This will enable trade without paper-based solutions with a high degree of security while the goods are in transit. (Underhill & Bibby, 2016)

The EDI system has many benefits, for instance, the administrative fees will decrease and at the same time, increase the access of doing trade internationally since the transferring of ownership of cargo will be a lot easier which in a later phase will increase cashflow for the supplier due to quicker connections (Schmitz, 2011). Moreover, Underhill & Bibby (2016) state that changes or corrections of contracts can be conducted easier and at a lower cost, as the system will likely erase situations where carriers discharge cargo after receiving *Letter of Indemnity* which is problematic in many parts of the world as of today.

2.3 Blockchain

Blockchain is a relatively new phenomenon. Most individuals might recognize the term due to cryptocurrencies such as Bitcoin, but it has applications which stretch far beyond investment and finance (Lim, 2017). Blockchain is built to solve and verify transactions without the need of an authority server or central server. It is an open platform system which is linked with a series of blocks and records all transactions through the chain. Hence its name, Blockchain. (Christidis & Devetsikiotis, 2016)

Christidis & Devetsikiotis (2016) define the Blockchain network as a distributed ledger which stores all transactions in a digital code. The digital code uses a decentralized shared data base (see Figure 1) which therefore is controlled by all the users (nodes). The decentralized system protects the users from manipulation or deletion and is completely transparent. This as a result of all transactions being logged within the data base. All transactions can therefore be traced to one individual with a specific signature. In simple terms, if one digit is changed along the chain, everything will immediately follow and be updated. There is only "one truth" of the transaction and this transaction is sent to all nodes within the network.

When the user or node signs a transaction in the block, they use an encrypted key which is personal and are traceable to one specific individual. Thus, the Blockchain creates an honest system that self-correct itself, without third party need to enforce the rules. (Laurence, 2017) This enables direct trade and changes the way of doing traditional business. More and more organisations and industries are adopting Blockchain as a part of their business model around the world to improve current ones and create new.



Figure 1 Decentralized system of Blockchain (Phillips, 2017).

As mentioned prior in the text, the decentralized system enables the data system to exist in multiple copies across a global distributed network of users, where changes are recorded and trackable (*Christidis & Devetsikiotis*, 2016).

Figure 2 explains how the Blockchain works. Each Blockchain has its own algorithms depending on what kind of value being added or traded. Some Blockchains store data and others are handling contracts or securing systems for instance. (Laurence, 2017)



Blockchain - Process

Figure 2 How Blockchain works (B140970324, 2017)

The Blockchain systems are possible to apply on countless of businesses and so far, users have only scratched the surface of possibilities. Therefore, it is likely to see a paradigm shift in the landscape of business. Rules that have existed in trade for decades are likely to be changed and society with it. (Christidis & Devetsikiotis, 2016)

Numerous banks have already started to use Blockchain to cut costs and many other businesses are not only forced to follow, but has started to do so already in medicine, education and the music industry. For instance, in logistics, Blockchain is believed to be able of providing efficiency- and savings opportunities in the reach of billions of dollars. By eliminating or reducing paperwork when using Blockchain, cargoes can be shipped at a lower cost. The cost reduction will have an impact on the world trade and may eventually cut out the middle men. (Britchenko, et al., 2018)

2.4 Blockchain in Shipping

The shipping and logistics industry is one of the world's largest markets (Cision, 2016) and the global market value will increase from todays 8.1 trillion USD in 2015 to 15.5 trillion USD by 2023. The industry itself, has been considered for many years to be conservative and slow in adopting new technologies and remains sceptic towards new incentives according to World Maritime News (2018). However, the positive attitude towards new technologies in the maritime sector are slowly developing as well. IBM and Maersk Line have started a joint venture to reduce cost, improve efficiencies for customers and find solutions for paper-based processes. The aim of the project is to open a platform for global trade based on Blockchain technology. All stakeholders in the supply chain line may participate and find information and look for value regardless of where in the process they stand when doing business worldwide (see Figure 3) (White, 2018). A proof of concept showed a 15 percent cost saving using Blockchain, which would have an impact on the process (Loklindt, et al., 2018).



 Inconsistent information across organizational boundaries and "blind spots" throughout the supply chain hinder the efficient flow of goods

- · Complex, cumbersome, and costly peer-to-peer messaging
- Manual, time-consuming, paper-based processes
- Risk assessments often lack sufficient information; clearance processes subject to fraud
- The administrative cost of handling a container shipment is comparable to the cost of the actual physical transport
- Fast, secure access to end-to-end supply chain information; single source
 of the truth
- · Verifiable authenticity and immutability of digital documents
- Trusted cross-organizational workflows
- Better risk assessments and fewer unnecessary interventions
- Far lower administrative expenses and elimination of costs to move physical paper across international borders

Figure 3 Future of Blockchain in shipping (White, 2018) Published with permission of the copyright holder.

Today, the shipping industry struggles with slow paper-based processes and identical information passes through numerous diverse parties (See Figure 3). The process is expensive, complex and time consuming according to White (2018). Maersk has exemplified that the shipment of one single refrigerated container can involve more than 30 individuals in some cases (Gronholt-Pedersen, 2018). Bureaucracy can account for more than one fifth of the total shipping cost, Gronholt-Pedersen (2018) declares in his research within the container business.

The future on the other hand enables move of physical paper work across international borders without risking slow and time-consuming bottlenecks, waiting for documents being signed or stamped. The platform provides an end to end supply chain which creates value for customers and enables easier access information of location of a container in transit, clearance of documents and handling Bill of Ladings. (Jabbar & Bjørn, 2018)

The platform will also enable stakeholders to securely exchange shipping transactions in real time without risk of losing valuable time due to slow processes (Jabbar & Bjørn, 2018). White (2018) states that the connectivity platform will provide connectivity between terminals, shipping lines, third party management, inland transportation and shippers.

2.5 PLC - Product Life Cycle

The Product Life Cycle (PLC) is a theory to describe the entrance of new products on the global market. PLC describes this theory as new products or services experience identical special pattern, regardless of what product or service trying to enter the market. The starting point of the PLC is the *market development* according to Levitt (1965) followed by *market growth*, *market maturity* and *market decline*. Figure 4 shows a S-curved distribution of the process of PLC.



Figure 4 The Product Life Cycle Model (Malakooti, 2013)

Market development – this is the stage before any signs of the technical aspects of the product is proven to be solid and a market demand for it (Levitt, 1965). New products are always related to risk and uncertainties (Rogers, 2003) (Levitt, 1965).

No one can ever know how exactly long it is going to take before a product reach the market, as it is partially linked to the level of complexity of the given product. It has been proven time after time that customer-related new product development drives the growth of increased profits and sales. Moreover, Levitt (1965) writes in his research that companies today systemically avoid being first to take hold of an opportunity as they rather wait and see what the competitors do than being the pioneers.

Market growth – in this phase, the interest of the product increases rapidly, and the market grows. This stage is also referred as the "take off stage". (Levitt, 1965)

Competitors or other firms that have waited on the side-line but carefully supervised the development on the market, are now ready to enter. Some of these companies will make functional design improvements and differentiation of "their" brand towards other competitors. As the consumer and customer rate of the product acceptance grows steadily, more competitors are attracted which eventually forces the price to fall on the service or product. The competitors that entered the growing market in a later stage are behind in the race due to later advances in technology and production, which forces firms to accept lower margins in order to get access to distribution. (Levitt, 1965)

Market Maturity – sooner or later, the market is going to be fully absorbed, meaning that most households or companies use the product. Sales now start to decline, and the competition becomes more intensive. To maintain the leading position, firms keep improving the product and customer service. According to Levitt (1965), the originator of the product must now focus on customer relations and communicate directly with customers to stay competitive and keep the advantage.

Decline stage – the final stage in the PLC graph (Figure 4) is the decline stage. In this sequence, the industry has changed and only the most successful firms have survived the transformation of the fierce market competition. Some companies change their organisation to adopt to the new rules of the market and believe that by having the best management and knowledge, they will survive even though the organisations know that the market is declining for the product. In this scenario, the distribution will be tightened and concentrated to fewer players on the market itself where margins will keep decreasing. (Levitt, 1965)

2.6 TAM - Technology Acceptance Model

At times when new technology is available on the market, the question arises if the market is going to accept it or simply reject it. New technology is often complex and hard to understand or grip before being implemented. This may lead to tough decision for managers or leaders, as it is difficult to know the right way. In 1986 Fred Davis developed the Technology Acceptance Model (TAM) as a key model to understand human predictions if they would accept new technology or reject it in an organisation. (Granić & Marangunić, 2014)

The theory of TAM is linked to the hypothesis that technological acceptance can be explained by internal believes and intensions (See Figure 5) according to Turner, et al. (2009). TAM measures two key characteristics upon the actual use of the technology. Perceived ease *of use* (PEU) and Perceived usefulness (PU). These two variables influence the behavioural intention to use (BI) and Attitude toward use (A) which will affect the actual use of the new technology.



Figure 5 TAM model (Sendiri, 2011)

2.7 Adopter Categorization

Adoption to new technology is difficult to foresee due to its shift from one product or service to another but following a normal distribution in form of a bell curve according to Butler & Sellbom (2002). Thus, the adoption of technology will start slowly and later accelerate until 50 percent of the population has adopted the technology and later reach zero of the population. By using a bell curve of normal distribution, Rogers (2003) explained in his theory that there are five main categories of adopters to new technology.

Innovators - the group represent only 2,5 percent of the total population. They are recognized for having strong financial backup from the company or other sponsors which prevent them from risking bankruptcy, even though the innovation might fail. They willing to take risks to a higher degree due to high risk tolerance from the company they are working for. They interact with other innovators and researchers which gives them an advantage of high profile connections. (Rogers, 2003)

Early adopters - this group of people have the highest levels of *opinion leadership* according to Rogers (2003) which gives them great influence on other people of spreading positive or negative feedback of the innovation. They possess high social status and provide advice to other adopters about the innovation. Moreover, early adopters approve the new technology by adopting it.

Early majority - at this stage, the adoption of the technology gets adapted slightly before the great masses. The product or service has entered the market and are well known to the earlier two categories. This group lacks the influence of *opinion leadership* but is an important link in the diffusion process. They adapt the technology but seldom lead the diffusion. (Rogers, 2003)

Late Majority - these groups usually approach the adoption of technology in a later stage compared to the average people in society, hence are in general more sceptic towards the innovation. However, market competition increases the pressure to adapt to the new idea. In this stage, most of the uncertainty or risk should be removed before the group feel safe to adopt the innovation. Compared to other groups, they have lower social status, financial means and less *opinion leadership*. (Rogers, 2003)

Laggards - this group, as the name implies, are the last ones, lagging to adapt the new technology. They are more suspicious of new inventions and advocates of change. Their decision process is slower and time consuming. Their financial resources are, compared to other groups, lower, which forces them to be absolute certain that the idea or innovation cannot fail before they adopt. Compared to other groups they are in general the oldest among adopters. (Rogers, 2003)



Figure 6 Adopter Categorization Bell-curve (Kaber & Kjellberg, 2018)

2.8 Decision Process

Rogers (2003) describes the innovation-decision process as a process from where an individual or organisation, going from initial information to start forming attitudes towards the innovation, to adopt or reject and eventually implementing the idea, which confirms the decision in a later stage. He describes this innovation-decision process in the following five steps.

Knowledge - the organisation or individual are gathering information and data to how the innovation functions. Change agents may influence the organisation, eventually creating motivation to learn more about it, followed by a need to adopt the innovation.

Persuasion - the organisation forms attitudes towards the innovation, positive or negative. The persuasion stage helps the organisation or individual to form psychologically interest of the innovation - in simple terms, the mind gets more interested. All innovations carry some extent of uncertainty, and individuals might have the need of support from the group to change his or her defiance towards the innovation.

Decision - this phase leads the organisation or individual to a decision to adopt or reject the innovation. An adoption decision has the meaning that the organisation will use and intend to integrate the innovation within the company. Rejection means the opposite and can be divided into two different types of rejection.

- *Active rejection*, the company has considered the innovation and used trials to make a decision but decided not to go any further.
- *Passive rejection*, the company never considered to adopt the innovation from the beginning.

Implementation - when the organisation or individual puts the idea or innovation in force, it's always difficult to implement new ideas and technology in an organisation compared to an individual. Individuals in the organisation might oppose the decision of implementation and they are also the employees who puts an innovation change into force. The implementation might take some time before being fully integrated within the company and a part of the adopter's daily operations.

Confirmation stage - the organisation or individual seeks reinforcement which confirms their previous decision or reverse the decision if they are exposed to negative outcomes which could not have been foreseen. (Rogers, 2003)

2.9 Porters five Forces

To fully understand a business and make wise decision as a company, the company itself should understand how the whole business is changing and the market with it (McGahan, 2004). Using Porter's Five Forces enables the analysis of the competition environment in a business and identifies the forces that threaten the organisations ability to make profit in the long term. This describes it as the attractiveness of the business. The less attractive a business is, in one the five categories, the more likely it will affect the profit of the business negatively. Porter (1979) categorized these five competitive forces as the cornerstones of how the market functions.



Figure 7 Graph illustrating Porters Five Forces (Fadeev, 2014)

Rivalry – this measures the degree of competition. A market with a high degree of competition will likely generate lower profits and vice-verse in a market where the completion is low. All firms are trying to position themselves as leaders within their own market. (Porter, 1979)

Threat of new entrants – If a firm fails to follow the market development where new competitors enters or competitors change their business model, it's likely that the revenue in the long term will decline due to lost market share on the global market. This is linked to the barriers to the market itself, is there an easy market to enter, more competitors will be likely to follow. There are in all firm's interest to create barriers for competitors, and the more difficult it is to enter a market, the higher probability for existing companies to maintain their profits. Barriers could, according to Law (2009) result from protected patents or well-established networks to end users which hinders new competitors to enter the market.

Buyer Power – Porter (1979) describes buyers, or end consumers as the group which can force down a price, which in the end will lower the total profit for a company or firm that offers the service. Robinson & McDougall (2001) states that buyers seek higher quality or better service at a lower cost, putting pressure on the seller's organisation. This will eventually force the organisation to lower their prices until reaching the point where they earn the lowest acceptable rate of return on their investment, ROI.

Supplier Power – the stronger the suppliers are in an industry, the harder it is to maximize profits for the company. This can be explained by the structure of the business itself, where the supplier is controlling the set price, not the company. This can lead to decreased profits in the long term for the firm and it is all linked to the suppliers' actions on the market (Robinson & McDougall, 2001).

Threat of substitutes – this measures how easy a customer can switch and change from one product or service to another that basically does the same thing. One example to describe this is explained by Robinson & McDougall (2001) were jar bottles of glass have been replaced with plastic or aluminium packages. The ease of change of product is linked to cost savings to the firm.

2.10 Switching Costs

Numerous corporations are nowadays facing switching cost related issues within the business to business (B2B) segment according to Matzler (2015), whom defines switching costs as how companies can achieve competitive advantages against their competitors in the battle of customers, by making it more expensive to select another supplier and how the relationship is affected when a buyer changes seller on the current market.

When a pioneer product is released on the market, several consumers tend to use the former instead of switching to an innovation. This is related to brand identification and the involvement of risk in switching from one product or service to another. Both these factors have a significant impact in terms of if the consumer is going to adopt or not. Some markets are more difficult to switch within due to that specific markets higher switching cost, meaning that even though consumers are unhappy or disappointed with the present product, they will not change to the potentially improved new products.

Consumers are more likely to stay due to the unwillingness of switching from one pioneering product to another when competitors launch a similar product because of the high costs that are involved according to Molina-Castillo, et al. (2012).

Markets with high switching costs tend to launch new products in a slower pace compared to markets with low costs according to Henard & Szymanski (2001). Matzler (2015) states in his research that the satisfaction rate and the relationship with the current company or supplier is the key for the consumer if they are willing to switch cost or not. The switching cost can be divided into several sub-categories, (stated below) which all are linked to how consumers perceive the barriers and why barriers sometimes are not worth the effort to change and switch cost. (Molina-Castillo, et al., 2012)

- Loyal consumer discounts
- Consumer habit
- Emotional costs and cognitive effort
- Finical, social, and psychological risk on the part of the buyer
- Transaction costs
- Search costs
- Learning costs

The previously mentioned variables are all influenced by the current market situation and what type of market the firm is active on. Henard & Szymanski (2001) describe three important dimensions of performance on the market.

- 1. Speed to market
- 2. Market performance
- 3. Financial performance

Speed to market is correlated with the capacity of a company to launch a new product or service, the tasks that are involved in the process to deliver on time and the success of commercializing the product. Market performance is described by what means the company can secure its competitive position on the market and keep its current market share or expand. Financial performance states the cost-effectiveness of the service or product and incomes generated. (Henard & Szymanski, 2001)

Consumers that started to use a pioneer product or a new brand tend to develop favourable attitudes towards the innovation which later act as anchoring effect. This is favourable on markets where companies are competing on a speedy and volatile market. On the other hand, some companies use the strategy to wait and see what their competitors are doing and focus on quality and service at the time they launch their product. (Henard & Szymanski, 2001)

There is always a higher degree of risk when launching a pioneer product on the market due to the lack of knowledge in terms of how to use and operate the product or the usefulness of it. But when the consumer starts to form positive attitudes and see the benefits of the pioneering product, the switching costs are starting to become less important in contrast to the benefits of the innovation. This is common in the mature stage of the PLC according to Henard & Szymanski (2001).

3. Methodology

This chapter presents the method and how it has been used in relation to this research and report; collecting, analysing and presenting data retrieved. Furthermore, the limitations of the study as well as the content of the research quality will be presented followed by other important aspects, such as ethics, data collection and research tools.

This study has been conducted using a qualitative method in order to understand the current technological situation in land offices in the tanker shipping sector, and what technological changes would have an impact on the sales process and organisation. The general purpose of academic research is to provide knowledge based on a set amount of research questions (Collis & Hussey, 2014). The research questions were constructed in a way to first investigate a possible reluctance to adopt new technologies in a conservative industry (Vogdrup-Schmidt, 2015) and what type of differences it would bring the sales process and office organisation to apply new technology, such as Blockchain. As the data required in order to answer the research questions was deemed in-depth, detailed and connected to understanding the behaviour beliefs and opinions of the participants, as well as the feelings of the participants, the authors found evidence in Hennink, Hutter & Bailey's "Qualitative Research Methods" (2011).

3.1 Aim of the study

The aim was to understand how technologies will affect organisations and create a theory regarding what it is that affects the willingness to adopt new technologies.

3.2 Research Design

This study has been based on the *constructionism paradigm*, a type of research philosophy well known and used. As surely as there are many different paradigms, constructionism was most befitting due to its characteristics as a first and foremost qualitative inductive method, where there may be more than one truth. The choice of methodology is derived from the assumptions and thoughts of the researchers' regarding what is to be studied, and how. (Berglund & Hoffström, 2016)

Constructionism puts the researchers in the position of a participant, where the data is gathered in a close position to and around the object that is to be researched. This enables the researchers of being close enough to delve deeper into, and further question to gain a specific knowledge in addition to a more general such, developing a new form of meaning and pattern during the process and progress of the research (Creswell, 2003). However, as further questions may lead the research into some aspects that provide a certain skewness to the research, it is also important to allow the research participants to have a certain freedom to paint their personal picture and perceived view regarding the research as a singular result is not certain - there are several truths which together may paint a fuller, more general picture for the committed study (Easterby-Smith, et al., 2015).

The constructionism philosophy can be divided into three categories, identificatory for any and every research philosophy, which helps the researchers as well as readers of the research to understand the recipe and cornerstone aspects of the research. Constructionism can according to Easterby-Smith, et al. (2015) be identified as:

Ontology - The study of being, and the assumptions of the nature of reality

- Relativism there are multiple realities and ways of pervading these.
- The facts are based on the observer's viewpoint and several truths, hence multiple realities

Epistemology - How to study the world, ways of investigating physical and social constructions

- Goal is to understand meanings and constructions as a part of the object and create a general understanding
- Subjectivism

Methodology

- Qualitative
- Inductive (Formulating a hypothesis from specific data)

As there is no supreme research philosophy befitting of all research, there is bound to some drawbacks. These will be presented in the method discussion.

3.3 Research Approach – Qualitative

The Qualitative research approach can according to Hennink, et al. (2011) be identified from a few of its characteristics; understanding and explaining behaviour, understanding and explaining views, understanding processes and understanding social interactions. Furthermore, the objective is to gain a detailed understanding, providing depth to why, how, and what underlying reasons there is to processes through a small number of participants, providing indepth data, words, through interviews. The data is interpreted, rendering in a research conducted that generates a fundamental understanding. (Hennink, et al., 2011)

Three different strategies that came to mind when conducting this particular research was Case studies, Ethnographies and Grounded theory. Using a mixed method, combining qualitative and quantitative methods, looking at statistics and in-depth interviews were rejected due to the limitations of statistical data, as the authors found no known source that provides fundamental data befitting the research questions. Though, conducting similar research could potentially be made using a mixed method, with the Sequential or Concurrent strategies.

Case Studies focus on a major, or a few major objects and studies these in-depth over time to gain greater knowledge within the certain segment. The researchers may be able of analysing and painting a very detailed picture. However, this strategy is synonymous with a great amount of time being set aside and consumed in order to fully understand the object and surroundings. Neither is the data generated general enough to show an applicable picture, as the object studied may be an outlier as likely as it may show the general picture. Therefore, it is hard to transfer the unique characteristics to any organisation similar enough. The Case study strategy is a useful tool in order to better understand a singular object, where the results presented may serve as an inspiration for further studies. (Easterby-Smith, et al., 2015)

As the research questions aims to identify a certain general behaviour within the industry segment, this strategy was rejected.

Ethnographies follow the objects, trying to understand the objects and the respective culture group over a longer amount of time in their setting through observations, without trying to affect or disrupt the culture from observing. Ethnographies are flexible, adaptable and adjustable to closely follow the culture on its conditions as it evolves and changes. Therefore, the research evolves and change systematically. (Creswell, 2003)

An Ethnographic study would have been suitable if the purpose of the research was to paint an intricate picture of a certain culture, such as the sales organisation or the culture among Shipbrokers. As the scope of this research was broader, not only trying to observe and understand one culture and behaviour, this strategy was rejected.

Grounded theory focuses on deriving a general explanatory theory from the objects participating in the study. It constantly compares the objects studied, identifies the similarities and differences which together creates the foundation upon which the theory is built. Grounded theory is furthermore characterized by theoretical sampling, in order to reach theoretical saturation. The first step is to identify objects which are believed to possess knowledge about the research, followed by semi-structured interviews upon which the foundation is laid. A first analysis is made, and further studies such as interviews is made. The analysis- and interview steps are made until theoretical saturation, which results in a theory. (Creswell, 2003) (Easterby-Smith, et al., 2015) Grounded theory is confusingly two methods; the Glaser method and the Corbin & Strauss method where one difference lies within the question on the researchers' participation in the study. Corbin & Strauss believes that the researchers does best by familiarizing themselves with the prior research, contrary to Glaser who deems no previous familiarization the best solution in order to let ideas emerge from the data. In Swedish research, the Corbin & Strauss point of view is the most common. (Salminen-Karlsson, 2002)

As the study tried to unearth a theory regarding behaviour, reluctance and situation within the tanker market based on previous knowledge and assumptions through the researchers' point of view, the Corbin & Strauss Grounded Theory was deemed the most suitable strategy, hence this is the strategy of choice.

3.4 Data Collection

This research has been formed using primary and secondary data. The primary data was collected using semi-structured interviews with objects possessing good knowledge about the industry, active and working today or former professionals now active in academia. This rendered in a situation where the researchers were not only able of understanding the industry and work tasks within the industry segment, but to understand the perceived reality of the respondent, and how it may understand its surroundings. The interviewee could furthermore reflect during the interview, leading to a depiction of reality based on the respondents' own experiences. Using semi-structured interviews is time efficient, as it enables the processing of data while at the same time being able of reflecting upon the opinions and experiences of the objects (Bryman & Bell, 2011)

The secondary data has been collected from reports, academic writing, company websites, books and industry reports. As the number of secondary data sources can be vast, each with their own intricate amount of detail, there is an importance to determine what data to be used (McCaston, 2005). The number of interviews resulted in an accurate depiction of reality, which could be applied to previous theory found in secondary data.

3.5 Literature Survey

The literature survey is a systematic method of refreshing knowledge, identifying, evaluating and compressing larger quantities of sources and data into a smaller, concentrated source of information (Fink, 2014). This enables the researchers of always being able to return to a comprehendible source of data, originally put together by scholars and researchers, to assist in the present research. The literature survey commenced as a way of better understanding relevant models, concepts and general knowledge within the subject creating the theoretical framework, in addition to increase the general knowledge regarding the subject connected to the study. A guide of how to conduct a literature survey was found and followed (Easterby-Smith, et al., 2015). The literature was found through databases, such as Google Scholar and the Chalmers University of Technology Library's database search engine Summon. Through Summon, a number of Master theses were found and investigated that conducted similar research within other industries and segments, which used appropriate literature and models. The literature collected was grouped into categorical themes and analysed, organizing key aspects and therefore already initiating the analysis process. (Collis & Hussey, 2014)

3.6 Background Preparation

First, the study's authors formed a review panel where the task was to consider different sources of information and data and decided to not limit themselves to only peer-reviewed sources, as the thematic area, technology such as Blockchain in shipping, is deemed relatively new and to some extent unexplored in academia. Books, reports, theses, web pages, journals were all included in the search for secondary data. The researchers then used terms that were deemed relevant to the study, such as "transform*" and "digital*". The use of asterisk in database searches retrieves not only searches based on the search word, such as transform, but also variations such as transformation and in combination with "digital"; digital transformation.

3.7 Keyword Search

As the research focuses on organisational change and transformation in organisations due to digitalization, the core search- and keywords were "organisation*", "change*", "transform*" and "digital*". Whenever words were deemed complementary, the word "AND" was used to narrow down searches. As a way of trial and error, the word "OR" was used at times to differentiate from the "AND"-searches and try whether words were used as substitutes, such as "change* OR transform*"

3.8 Exporting Results

The results were downloaded and printed in order to systematically label, categorize and group into broader themes, creating order as physical copies were deemed easier to handle initially. The reports were at first skimmed through, creating a basic understanding more than the abstract, and irrelevant results discarded. Irrelevant results were results that did not fit in the scope of the research due to lack of relevance. After the exclusions, the results were furthermore grouped into sub-themes and categories, and the data within was further researched creating new searches for models connected to the research, such as "Technology Acceptance Model" and "Porter's Five Forces".

3.9 Semi-structured Interviews

In order to collect appropriate data guided open interviews, *semi-structured interviews*, were conducted with representatives within academia and the industry. Conducting interviews face to face brought the researchers the opportunity to understand opinions, behaviour, tonal changes, ideas, feelings and understandings even further compared to interviews made digitally (Bryman & Bell, 2011). According to Easterby-Smith, et al. (2015) interviews are the most common yet a complex tool but deemed the best way of obtaining primary data when using a qualitative research method. It is time consuming and could in some cases be neglected in favour of a questionnaire. (Easterby-Smith, et al., 2015)

3.9.1 Background Preparation

Before conducting the interviews, the researchers read into the data generated from secondary data sources, the literature. The knowledge provided created a basis for the interviews to be successful (Easterby-Smith, et al., 2015), such as reading about the first interviewees sampled through direct contacts with company representatives of an organisation that the researchers has had good connections with during the initial planning phase of the study. A topic guide was made, outlining the topics and questions that at least had to be covered in connection to the research questions, in order to fulfil the need for data. The topic guide was a permanent companion, in which the questions and topics always could be found. Before each interview, the project plan and research questions were sent to the interviewees in order to prepare the interview objects.

3.9.2 Interview Procedure

The interviews were held in the participants offices in Gothenburg, Sweden, creating a safe atmosphere for the participants, increasing their willingness to speak freely and also creating an opportunity for the researchers to understand the setting the participants work and context. The interviews were held with eleven participants in different positions from 7 organisations of varying sizes, due to reasoning that there may be different data generated depending on organisational size and position.

During the first interviews, a standardized confidentiality form was used in the beginning of the meeting. After a number of interviews, the confidentiality form appeared to be excessive, rendering in a situation where the consent was given orally, and the confidentiality was promised. The participants were asked by the researchers for permission to audio-record the interview, which in every case was approved. A short introduction was made by the researchers to refresh the participants on the research questions and paint a picture of whom they were conducting the research and why. The participants did in a majority of the cases present themselves furthermore, creating an understanding of each other and creating a setting from which the research questions and topics were touched upon, leading to an open environment.

While conducting the interviews, at least one researcher took notes and wrote during the participants exposition, capturing setting and behaviour in connection to different topics. In the cases were the discussion accelerated in another direction than the scope of the interview, the participants were left to finish their reasoning in order to not disturb a line of thought. In many of these cases, a ray of new insights was brought to the research which is in favour of the semi structured interview. In the cases where a line of reasoning went out of topic, a guiding question was asked by any of the researchers from the topic guide, leading the respondent back into the subject or area. When there was a reasoning of great interest, follow up questions were asked to clarify and create deeper understanding of the participants thoughts. The flexibility of the semi-structured interview method creates a scenario where the data generated is deeper than a questionnaire (Creswell, 2013) in clear favour of this study.

3.9.3 Sampling Strategies

The first interviews were conducted based on relations with an organisation that had taken interest in the work and research conducted, closer to Ad-hoc sampling as the objects were selected on availability and access (Easterby-Smith, et al., 2015). As a result of having participants in the study, a Snowball sampling strategy revealed itself as the most inherent strategy of choice. The former interviewees, now selected participants, recommended other participants of their former colleagues, business contacts and acquaintances (Easterby-Smith, et al., 2015). The snowball sampling strategy appeared to be extra useful as there appeared to be an initial reluctance to partake in the study, limiting access at first, which after being recommended by associates.

3.9.4 Data Saturation

After conducting several interviews in organisations of different size that provided no more surprises in the data, nor any new patterns, the question arose whether the study had encountered data saturation. The data that emerged were analysed during the process of transcription, where the researchers found support for a thematic saturation, as the results were in many of the cases very similar. After meeting with the researchers' supervisor, the researchers concluded that saturation had been encountered and decided to not seek any more participants in the study. (O'Reilly & Parker, 2012)

3.10 Data Analysis

The data gathering, and analysis were two repetitive, interacting and overlapping processes, as a way of composing and re-developing the actual data to avoid analytical bias and reducing disrupting data noise. (Bryman & Bell, 2011) (Collis & Hussey, 2014)

The results were transcribed manually from the recordings made during the interviews, where the researchers had one more chance of re-experiencing the data gathering without being concentrated on asking the right questions in real time. As the transcription process progressed, themes were found and noted, creating categories in advance of subjects and topics being brought up with the research questions in mind. The transcriptions were then compared to the research questions and the theoretical framework, marking an opportunity to further analyse and label the data similarities and differences.

The transcriptions were printed out and cut into pieces, labelling each piece with respective participant, receiving a colour code, in order to avoid confusion and repeating the same statement connected to a single person several times. The pieces of paper and data were categorized and grouped on large sheets of paper marked with the three research questions. As an extra layer of analysis, each interview was then read through once more, and occurring themes were identified and written out in the peripheral margin of the sheet in order to create a better overview of common themes and conceptions which furthermore could be compared and examined once more (Bryman & Bell, 2011). The researchers found support for these actions, as it provided a link between interpretation of data and further analysis (Collis & Hussey, 2014).

3.11 Ethical Considerations

Easterby-Smith, et al. (2015) exemplifies constructionists' views on ethics as whether the researchers will be able of protecting the personal or organisational interest of the participants. As the research involved objects that may or may not work in an organisation where their participation may jeopardize either; their work, thoughts and reputation, the organisations work and reputation, the research or projects, the decision was made to make each data source anonymous. As the interviews were conducted in person, the anonymity could not be granted per se, as the researchers themselves took part in the data gathering process. Anonymity could have been granted through either questionnaires or if another person would have interviewed instead of the researchers. As none of these was fulfilled, the decision was made to handle each primary data source with utmost care and confidentiality. Each of the audio files recorded were kept on locked devices, ensuring that no one other than the researchers - the holders of the devices - were able of retrieving the data.

The transcriptions were printed out on machines where one of the researchers waited for the print-outs, and one executed the action on a nearby computer, ensuring that no one else than the researchers had the chance of getting the transcripts. These papers were then held at safe places, making sure that the data was kept out of reach from anyone unauthorized. Transcripts not in use were shredded and thrown away in different trash cans and bins, ensuring that the papers could not be re-animated or replicated. During the first interviews, consent forms were used to ensure the participant of confidentiality. This step was neglected afterwards, as it was deemed unnecessary - this is something that may be subject to criticism in retrospect as a lack of systematic approach to consent forms.

3.12 Trustworthiness

The trustworthiness of a research, or the power to withstand close examination from the outside is a sensitive topic, where the research most commonly is attacked on basis of methodology. The constructionist views on validity and reliability differs from example a positivists point of view, as the different perspectives will put emphasis on different criteria. An example of the constructionist's views on; (Easterby-Smith, et al., 2015)

Validity

Reliability - Wil

- Are there enough perspectives included?
- Will the observations of other researchers be similar to the ones of this research?

As a constructionist research report, these questions and respective responses are what creates the basis for the trustworthiness in this report, and why the study should be trusted. Regarding the validity, and whether the sample of perspectives are enough to fulfil data saturation, was controlled by data triangulation. Triangulation is the method of using certain means or perspectives in order to satisfy confidence, accuracy and validity of observations and research. As for this research, the researchers made sure to always analyse the data as the transcription process progressed, making sure that the data from several sources were compared. This process enabled the researchers of determining the point of data saturation, entry of new data and if there were contradictory data, and whether the data was in line with secondary data; theory.

The point of data saturation provided a relevant point where the researchers could deem the validity question solved - there were enough perspectives, which is why this Thesis shall be considered valid. An external part was used in order to certify the point of saturation, as the data collected proved that there were enough perspectives included.

Furthermore, during the interviews, the researchers used the Mirroring technique, mirroring of reflecting what has just been said using own words avoiding bias on purpose to describe and affirm what has just been said. This is effective, as it may force the respondent to rethink and sometimes reconstruct a reply, boosting the reply. (Easterby-Smith, et al., 2015)

This report should be deemed **reliable**, even though it should be said that there is no final truth in a constructionist report (Burr, 2015), the results are general in its setting. The findings may be applied in a similar setting; tanker or liquid bulk market segment, as the aim was to provide rich detail to the topic. As with any research or situation where the data is provided through a social interaction where the respondents freely describe their reality, there may be sudden temporary perceptions or opinions; rendering in results that may not be true to a greater general reality. As the participants of the study were first informed through a send-out of the project plan and research questions, the respondents were well-acquainted with the scope, goal and background to the research. During the interviews, the participants were deemed thoughtful and formulating their responses with care and detail. As the research progressed, the responses and results from the participants could be found in other participants data as well. The belief is therefore that the data is actual, and not temporary perceptions unless every single participant has succumbed to the very same temporary opinion. The belief is therefore that the report is reliable; the observations of other researchers will be similar to the ones of this research.

3.13 Method Discussion

As there is not a single superior method, there is bound to be flaws. These flaws are what makes the method discussion interesting, as it is a way of proving that the researchers understand and acknowledge the fact that the method of choice is not best nor worst, but simply is a method like any other, and was chosen as it was deemed fit.

As good as the method of choice was, there are some flaws. As the interviews conducted has been in-depth regarding the assumptions and feelings of the participants towards the situation in the industry, the data may be viewed as highly subjective. However, it is the firm belief of the researchers that this was the single best method to use, as a questionnaire cannot capture the feelings, tone and views that interviews may. Language, location and attitude is of importance, and may affect the outcome to some extent (Easterby-Smith, et al., 2015). That interviews takes time is no lie, nor is it something that can be denied. It is perceived that interviews may provide difficulties due to time-consumption, although, this might be necessary in order to obtain a certain trust.

Furthermore, interviews may not present the data that is wanted. Bias may affect the data, disrupting the actual data. The researchers have avoided becoming bias through example probes in the interviews, repeating initial question and following up with questions such as 'What did you mean by that?', or the simple 'How?'. Further issues with interviews not presenting 'wanted' data can be mitigated through semi-structured interviews, as it opens for the possibility to steer the interview in the right the direction, however, the participants may also neglect the steering attempts and steam on in an undesired direction.

Hennink, et al. (2011) points out that in-depth interviews have a lot of advantages, such as gaining in-depth information and identifying the participants experiences, but also disadvantages in the form of receiving no feedback from others and focusing on individual perceptions. This is something that is true in this report as well, though the individual perceptions are the main focus. Interviews are to a large extent connected to the sampling strategy, and whether the sample is representative enough to create a diverse sample that can be applied to a larger setting. The replication can be hard as well, as each point of view is individual. However - this is not something that is of worry to this research, as the data collected has been so similar. It should always be kept in the back of every researcher's mind, that there are issues with every method.

Regarding the sample, and sampling strategy, there are different options that could have been used; Random, Maximum-variation, Negative-/deviant-case. Using random samples may simply not have gotten the researchers in contact with the appropriate participants - a completely random participant may have been more involved in something completely else than the research questions. Maximum-variation does not fit the research question or scope (Easterby-Smith, et al., 2015). Negative-/deviant-case sampling might have been interesting, but searches for the contradictory interviews rather than the explanatory interviews that seek to answer the question. In order to conduct Negative-/deviant-case sampling, one must know of a theory to contradict or explain - this is something that may be very interesting for further research, as a way of trying to contradict this research paper. Can these results be falsified or perhaps approved in a future study, using such a sampling method as Negative-/deviant-case sampling?

As a remainder, the researchers would like to notify and identify flaws, or what could have been done differently. There are many things that may or may not affect the outcome, and the fact that the research has been conducted the way it has is of no debit. The researchers would still like to lift forward that they believe this is the right way to conduct a study like the way it has, although there are some particulars. One is the consent- and confidentiality forms, which in order to work systematically should have been included in every single interview. Many of these has been 'made' vocally, before the interview and consent has been given per se when asked for the interview opportunity, accepted the project plan as well as interview through email and face to face giving permission to record the interviews. Though, in the future, these consent-and confidentiality forms would have been something that would have been more 'correct', as a token of acceptance and credibility to a third party.

As a final comment on saturation, one can never be certain that every aspect has been considered. Much like the Æsir god Frigg tried to save her son Baldur from the death of every object on earth, save a single mistletoe which became Baldur's bane (Colum, 2004), there can always be some aspect that turns the tide of the whole research. However, it is the belief that the study became data saturated, in its scope, through the interviews as the same data was found several times within the majority of the interviews, leading the researchers to the point where the decision was made to close the interview time slots. This decision was also based on the fact that new results cannot seep in forever in a project with a deadline.

4. Empirical findings

The empirical findings chapter will delve deeper in the factors that affects the willingness to adopt new technologies in the organisations of the interviewees. The empirical findings are the results of semi-constructed interviews, resulting in a colourful and detailed data chapter.

The commercial shipping business segment is a conservative industry, slow-moving in the technological adoptions and change management yet reliant on fast decision making in a volatile business. The commercial tanker business is, in several organisations, where the container segment was twenty years ago in terms of technological inventions, labelling them as laggards whereas some few leading actors may be deemed innovators due to their interest in where the industry could be and what the container industry has transformed so far. The industry consensus is that the industry, in its slow transformation rate will need at least five to ten years in order to adopt a ground-breaking technological invention such as Blockchain or any invention leading to not using physical contracts.

Although all the interviewees agreed that there will be a change in time, not all were keen on losing out the traditional ways of conducting business that they deemed a success factor, if not *the* success factor. The traditional ways are identified as using phone calls, emails and meetings in person even though it involves long-distance travels. This is a crevasse dividing not only organisations, but staff within the same organisations regarding the willingness to adopt new inventions. Some of the actors deem choosing inventions to adopt as too complicated as there is not a universal platform to which everyone will connect to, but several platforms made by different organisations that all consider their platform superior to others in ways of customization and user friendliness, leaving customers with the burden of using several accounts and passwords for the same purpose – technological advancement. (See Figure 8)



Factors affecting willingness to adopt new technologies in the tanker market

Figure 8 Factors affecting willingness to adopt new technologies (Kaber & Kjellberg, 2018)

4.1 Economy

A common factor that affects the willingness to adapt new technologies can be connected to economy and finances. As the organisations in the Nordic tanker market consists of smaller organisations, with a few exceptions, organisational size plays a part in the willingness to adapt. Even though smaller organisations at times are connected through strategic alliances, their sizes are simply not big or powerful enough to set the agenda, resulting in a market where there is an initial willingness suppressed by the lack of leverage. Furthermore, there is a fear of adopting the wrong invention and trend, investing in a product to no avail, leading to failure and costs that triumphs the economic power of the organisation. (See Figure 8)

Some technological inventions, such as information apps and platforms gained followers initially as the usage theoretically could have improved the processes in the organisation. However, the excess number of similar platforms arising from several actors led to an unwillingness from the Ship-owner's organisations to invest time and energy in a multitude of staff and different, although similar, platforms and applications. It has also been identified in some smaller organisations that there are economic winnings to be made from the present system, than changing into more transparent systems such as Blockchain where the data is visible for all parties involved. This affects the reluctance and acceptance, which can be connected to the Technology Acceptance Model, TAM, regarding Attitude toward Using (Granić & Marangunić, 2014).

Another aspect connected to economy is the means of finance for every organisation around the globe, and capability of financing a new system. Some trade routes start deep in the jungle with a horse and carriage of 3 cubic meters of liquid cargo. Using a digital system for the Bill of Lading, like Blockchain based solutions, in a situation like this is deemed to be complicated as the owner of the equine carrier may not be as technologically developed as the counterpart office in the port of discharge. The cargo transporter simply wants a signed and stamped paper copy of the Bill of Lading. It is an imbalance in the global technological development, which in a global business is a major barrier to adopt. The system can only develop as fast- and be as developed- as the least developed part in a global system functioning for everyone.

4.2 Power Structures

Internally, the slow response to technological inventions and pleasing of shareholders can be accounted for the unwillingness to adopt new technologies, even though the organisation is small. A larger organisation may identify the slow speed of adjustment and change management as a key factor, however, it seems to be the case in smaller organisations as well. The case in smaller organisations where the adjustment speed is slow-paced is attributed to shareholders not being keen on trying whatever may jeopardize profits.

Externally, the power of the large oil companies, the Oil Majors, is the single most powerful entity in relation to the Shipowners except for laws and regulations - which may be dodged or moderately tampered with. The wholly owned fleet of BP matches the size of strategic alliances in the Nordics, and almost triple the amount on Time-charter. Being a smaller organisation operating smaller vessels is therefore hard to compare to the power of the Oil Majors who themselves sets the term for how the contracts shall be stipulated, how old the vessels may be when transporting their cargo and any details surrounding a generally complex deal that never may be spoken of publicly, enforced by the Oil Majors themselves.

Resisting the terms or speaking of freight rates may jeopardize the contract which although rich in details and complexity is very lucrative for the Shipowners, rendering in an unequally distributed power relation.

Furthermore, there are jurisdictions that may not affect the willingness per se, but the willingness to break laws and regulations. The usage of Letters of Indemnity, LOI, when discharging cargo is the most common option, reportedly being used in 80-90 percent of all cargo discharges in the tanker segment due to reasons such as original Bill of Lading not being present and taking too much time to transport and catching up with the actual cargo. The port of discharge may also have been changed, as a result of the cargo being sold several times while traversing the seas. However, the use of LOI, though phrased and formulated by the help of the P&I clubs, is legally deemed as fraudulent, as the LOI is not worth anything more than the ink and the paper it is written on. The binding part is based solely on the contractual relation between the two parties, putting emphasis on the relations being so important in shipping business. Using a LOI is legally invalid, yet praxis in the wet bulk segment whereas in Dry Bulk close to never used. The reason to why Dry Bulk cargo never would be released unless presented with an original Bill of Lading can be found in the fact that dry bulk is cheaper to store in port terminals and cargo holds than liquid bulk.

4.3 Human Factor – Culture

Shipping is, as previously mentioned, in general a very conservative business segment with support in the empirical findings and literature (Vogdrup-Schmidt, 2015). Liquid Bulk and tanker is even by industry standards seen as very conservative, if not outdated even seeing as sample organisations identify with how container organisations operated in late 1990's. Traditions plays a big role in the industry; interior design reflects a bygone era with specific interior details and furniture, handshakes and words are their bonds, physical meetings and representation is much more common than in other industries ashore and is believed to not being replaceable by a computer. The physical meetings and greetings plays a big role in the relationship building, resulting in up to 50 percent of the working hours being committed to phone calls to not only finding information but building trust and relations over several years. This behaviour is seen as central in the tanker business and is deemed a working way of conducting business, rendering in a segment that questions why it should be changed into something else.

The working ways are considered a winning concept, a unique such, and even though technological inventions materialize, there simply is not enough willingness to adopt them as new technologies do not instantly guarantee trust. This can be connected to a fear of losing purpose or employment, and a question on what to do next if technology can replace their actions. One quality that is attributed to the working staff unlike digital solutions is gut feeling, which is deemed a crucial quality in conducting business in conjunction with relations. It is also apparent in some organisations that there is no need for new technological solutions as "no one is asking for them", though the solutions exist. There are several digital solutions and platforms created by individual companies and organisations, though these are neglected due to the lack of a single system to bind all, instead of using several logins and accounts. Another aspect of this is the human indecisiveness, on whether to invest in trending technology system A, B or C - and whether it's the vessels that should be digitalized first, or the land offices.

Emphasis is put on the complexity of the non-standardized deals where contractual and operational details are crucial for the process to finalize. In these scenarios, each deal's characteristics is deemed too complex to be handled through a digital platform or in a transparent system based on Blockchain technology - phone calls, chat clients and printing of paper is all part of the deal process, as is trade lingo used in the communication. To replace these means of communication with a completely digital platform where all the information is enabled for all the parties is considered too complex, due to each deal's characteristics and due to the complexity of educating every personnel in a new system or solution. Replacing them is in some parts of the world and industry actively opposed by actors defending their own interests, as they fear losing their purpose and jobs, like Ship-brokers and demurrage calculators. This can also be attributed to a question of age and generation, as older employees in the industry are more actively opposing and halting the technologies advancement than their younger colleagues, although there is a belief that younger staff working with older colleagues are influenced in the same conservative mind-set.

4.4 Sales process

Several of interviewees had many different opinion's and thoughts what was going to change in the sales process due to technological advancements, but the main theme that was presented during the interviews were three major categories; Business relations, Transparency and Financial risk (See Figure 9). The sales process in the tanker market, both short sea and deepsea shipping will here be briefly described in Figure 10.



Figure 9 Distribution of what affects the sales process (Kaber & Kjellberg, 2018)

The Cargo-owner declares that they have a shipment which needs to be transported from one port to another. The cargo can either be released straight to the market, or to an appointed Shipbroker tasked with finding a suitable ship for the carriage of the cargo, who contacts numerous Shipowners or Chartering departments to find a suitable vessel.

The Shipowners and Chartering departments on the other hand provide the Brokers with relevant facts as daily positions for suitable vessels awaiting new orders in the area. They provide the Broker with expected rate \$/tonne, and the Broker calculate each vessels probability of reaching the loading port before the cancellation date, *Laycan*. The Broker then selects the most suitable vessel. The daily \$/tonne rates to transport fluctuates daily, leading to a negotiation situation between the carrier and Cargo-owner, through the Shipbroker. When terms and conditions are all set, the Ship-owner or Chartering department orders the selected vessel to steam towards the agreed port of loading and load the cargo onto the vessel. The vessel then steams to the agreed port of discharge and delivers the cargo.



Figure 10 A chart to illustrate the sales process in the tanker market (Kaber & Kjellberg, 2018)

4.5 Financial risk

Interviewees describe and foresee that the financial risk will decrease rapidly with technologies such as Blockchain, which can be clearly noted in organisation B, see Figure 11. They anticipate that Blockchain is going to remove the "*man to man trust*" which the tanker market business is grounded upon. There are risks involved when a Ship-owner is trading in an area with customers they have never dealt with before. The lack of trust is linked to Letter of Indemnity, LOI, which usage is a standard procedure in the industry segment, used in up to 80-90 percent of all tanker cargo discharges. The Letters of Indemnity are issued when the cargo has arrived prior to the Bill of Lading, the *sole* rightful guaranty for a cargo discharge, due to bureaucratic congestions resulting from cargo resale and bank procedures.

The Ship-owner cannot wait for a clean Bill of Lading and must discharge the cargo before accepting next voyage orders. And yet, in some cases, the vessel must wait for the paperwork before they are accepted on the berthing list, in order to discharge cargo. This is a time-consuming procedure, as some ports will not accept the vessel unless every documentation is in order. This is costly for the Shipowners, as time spent in anchorage areas equals income loss.

The risk for the Shipowners are related to not knowing whom is collecting the cargo, especially in times when the cargo has been resold during transit from port to port. There is no legal guarantee from the Cargo-owner when discharging against a LOI, although they state that the risk is theirs. The LOI is not binding per se, leading to the question on responsibility in case of for example bankruptcy; who owns the cargo then. This leads in extension to risk of not receiving rightful payments. The only security when using LOI is the trust between Ship-owner and their counterpart, all based on the business relation. This is complicated when conducting business with new partners, as the trust is not guaranteed. This leads to the use of so called Before Breaking Bulk clauses, BBB clause, stipulating that payment shall be made before cargo discharge commences, removing the Shipowners risk. The BBB clauses are often removed as the relations grow. The parties therefore only rely on legally void words written on a paper as the sole security, the cargo, is pumped ashore. One manager said;

"How we conduct business today is extremely inefficient and we take great risks and the sum of money in every deal we make are huge. We would like to change this in the future". - (Interview Series Company A-F, 2018)

	Financial Risk	Transparency	Business Relations
Company A		Х	Х
Company B - 1	X		Х
Company B - 2	X	х	Х
Company B - 3		х	Х
Company B - 4	X	х	Х
Company C		х	
Company D	Х		Х
Company E		х	Х
Company F		х	Х
Former Professional A	x		х
Former Professional B			x

Figure 11 Distribution of what affects the sales process (Kaber & Kjellberg, 2018)

Interviewees that mention the financial risks also describe the dilemma of not receiving any interest awaiting freight payment. Payments are standardly made 90 days after finished voyage, and the question has arisen whether the income and profits should have been increased due to interest, as in other business segments outside of shipping. This is attributed to old traditions on how contracts are drafted, as these does not mention late payment of affreightment. One manager explained the dilemma where Cargo-owners have tried to escape payment by arguing that the Notice of Readiness, NoR, has not been correctly made and signed in accordance with standards and procedures when arrived at the port of call. Even though email was confirmed to inform all stakeholders of safe arrival of the vessel and clearly, as well as being visible on radar, satellite pictures and GPS, some Cargo-owners still claim that the vessel has not arrived, as the NoR has not been sent 'correctly'. In a Blockchain based system, this would not be possible according to a manager as all relevant information already has been logged in the system, disabling fraudulent behaviour through transparency.

Moreover, some participants visualized a future with a digital platform where parties match their vessels and cargoes. This would lead to freight rates being more stable and less fluctuant. They also claimed this will have a potential impact on the Ship-brokers business, which will decline and play a more insignificant role in the future. Some proclaimed that Brokers only forward information without creating any value.

"They make money on forwarding information and are always on the Cargo-owners side, even though they should be neutral" - (Interview Series Company A-F, 2018)

However, transforming the system to implement Blockchain may bring increased financial risks and issues. One participant used the 'Gartner's Hype Curve', a technological trend analysis, in order to put emphasis on how long it still will take in order for Blockchain to be topical, where the 2017 graph showed Blockchain not being in action for at least 5 to 10 years, in addition to being situated in the degressive valley of the cycle; Trough of Disillusionment, See Figure 13.

4.6 Transparency

The lack of transparency will change in the future, and the information flow will increase, but if it will be due to Blockchain or another solution is uncertain. Information that used to be inaccessible for the large mass and used for negation leverage will in the future not be possible due to increased transparency in an open market. Through the implementation of Automatic Identification Systems, AIS, and digital platforms such as Vessel Finder, the transparency has already improved. Numerous corporations have capitalized and made profits by portioning out selected information, keeping valuable data in control. By further making the market more transparent and viable for customers, more value would be added for the customers which may result in higher margins for the transport providers, in a segment where the margins have declined the last 15 years. One manager exemplified this by having had margins fall from 3-4000 USD to 3-400 USD per day. Organisations has identified the need to develop new methods to attract new customers and develop new tools in order to maintain the present customer base, in the wake of fiercer market competition. Providing the customers with all relevant information on one platform as a full service, instead of diving it between several providers, is one solution. AIS, Cargo situation, temperature and speed of vessel are today information that is provided separately and often on request through email instead automation. By offering this transparent solution, a competitor advantage will arise.

Furthermore, a manager from company B noted that customers soon will be able to track the cargo and to monitor the temperature of the cargo via sensors onboard. The temperature of the cargo is extremely important to supervise and log in case of cargo claims and are today supervised by the crew onboard. The manager also saw a future where the cargoes onboard chemical transporting vessels are mathematically calculated and separated according to the International Maritime Dangerous Goods Code, IMDG, standards and procedures but more optimized by an advanced platform. Today, it is mostly done by staff, either onboard the vessel or from the office and some cargoes must be segregated from each other, without segregation, the vessel and crew could be in harm's way. The optimization enables better planning of the separation and a more streamed-lined cargo puzzle which eventually will save the corporation some percent every year.

On the other hand, interviewees that worked in smaller tanker companies argued that they believed transparency will increase (See Figure 11). However, they still benefit today from not being transparent when trading to some extent. One senior employee described, by "hiding" vessels from the market, 'falsely' labelling them as engaged in operations though ready to operate, one's negotiation situation improves, with the possibility of increasing the daily rate. In short terms, you profit from not being transparent and leave all relevant information to the market.

One organisation thought Blockchain could increase the transparency in their shipments but also the quality as a premium carrier if the customers for some reason would doubt the legitimacy of the cargo. The origin of the cargo could for some motive be of interests for end users. Has the oil been mined from the North Sea sector or traded and transported from vague locations? All data in the block are accessible for the customer. One interviewee was quick to point out that the stated information will not be more legit or true than the input from the start.

4.7 Business Relations

The current digital transformation is form of tipping point according to a manager from company B and companies which presume all business today will be conducted in the same way tomorrow as today are in danger. Therefore, the relations with customers are extremely important (See Figure 11) but exactly how the business will change and develop – cannot be told exactly.

Ten out of eleven interviewees responded during the interviews that they believe the business relations will improve (See Figure 11) and become even more important in markets where the business is conducted through platforms or digital tools. Some of the interviews explained humans cannot compete with technology in speed or accuracy in terms of calculations in best optimized voyage, calculation or best rate of return on a several trip options for instance.

The employees at the office will instead use the data as support in the daily work, in order to make the right decisions when closing a deal with customers, a former professional explained. Thus, the relations between individuals or companies will become even more important than today to make business because this is what humans can compete with, a former professional quoted.

A participant in the interview series described when working abroad that well established connections and relations with Ship-brokers and customers enabled being the first to see business opportunities in form of cargo and vacant transport opportunities. Brokers provide information which the rest of the market eventually never had the opportunity to see and come with counter-offers. And if more of the working process were computerized, more time would be available to look for new value and establish new customer relations.

One manager described the future as Charterers having to travel more to maintain well established relations, target and meet new customers and do the fieldwork, and when time comes; to close and sign the contract of a carriage of cargo. The signature of the contract is conducted through an app were all relevant data is calculated automatically and a digital sign confirms the deal. But you win the deal through your established customer relation which is based on a well establish business relation between transporter and Cargo-owner. This will save both time and streamline the sales process and shift focus from compare offers and calculate to work more towards customer relations.

Moreover, the "soft values" were according to some of the interviewees important and they stressed that no machine or computer can replace the "gut feeling" in the tanker business. Former Professional A explained the "gut feeling" as a feeling when the customer held they got additional options but the professional experience (feeling) said something else and later got the deal, even though the initial discussion of a deal seemed unlikely.

Three interviewees believe that business relations will become more important also declared they believe humans will act more as "service providers" in the future. Former professional A explained the importance to "be there" for your customer in times when things do not go according to plan. If you are willing to be there and show commitment and solve urgent questions, you will gain a lot of trust and eventually receive new offers if the company is working according to a long-term strategy along with their customers. Trust takes extensive time to establish and build but minutes to ruin.

4.8 Organisational Change in the future

There is a divided opinion on whether the organisation will be slimmed down or remain fairly in the same size as today. One way of handling the organisational change was to fire excess staff. The surplus of staff meant extensive costs which could be spared through leaning the organisation down due to the advantages that Blockchain could create. AP Møller Mærsk reckons that savings in the size of 20 percent of the paper- and contract handling costs could be saved using Blockchain based systems, instead of the present system reliant on paper Bills of Lading. One assumption is that by implementing more technological inventions and solutions, more tasks will be made with the same number of employees, and an even greater fleet and within more geographical areas than previously operated in. As in any economic recess, the assumption is that the staff will be partially discharged from duty. However, in an economic expansive state, there is not necessarily a need to hire more staff. In order to sustain and grow, the organisation may do without hiring more. Using the same amount of staff along with Blockchain based technologies may also open for breaking down the group situation with chartering and operations, where the groups will work in a more mixed situation and cooperate with the same projects. Though, mixing Chartering and Operations may encounter some questioning as the staff that works within operations and chartering are deemed just as important, though different in characteristics. By letting the personnel work within their old field is considered an efficient use of Human Resources, as an operator may not have the same sales approach that generally can be identified in an employee of the Chartering and Sales department. It is not uncommon though to start a career within Operations, followed by a transfer to Chartering rendering in an employee that has greater knowledge of the segment and operational difficulties.

Another view is that the land office organisation will change radically, rendering in an operations department consisting of lesser staff and more screens, resembling a control station in a power plant. Fewer operators monitor many vessels with the possibility of interacting directly with each vessel in need, as the paperwork and documentations is made directly in the Blockchain system. Some interviewees believed chartering department and operations will work closely as one unit rather as today, working as two separate units. This will increase flexibility and the employee will supervise and control the whole transit from one continent to another. The staff that once was a part of the operations team can now focus on sales, and therefore become a part of the transformed chartering department. The Chartering department is now based "in the field", spending more time on the relations and relationship building that will be of even more importance when relations rather than numbers will be the major decision factor in conducting trade. Blockchain will enable the use of mobile applications which will assist the Chartering department in the field, where the data is visible for the head office as well as the personnel whom together may create the basis for decision making.

Operations department supervise and controls autonomous vessel on large screens from the office. The operators receive a constant flow of transparent information through the Blockchain system and supervise the crossing of the vessel. The operators are monitoring up hundred vessels and are quick to act in case of mechanical failure or other unforeseen events onboard. It will be possible to hand steer the vessel from the office. This future description of the future is still far away according to the interviewee but still likely to happen, but if it's connected to Blockchain or not was still difficult to tell.



Figure 12 Graph illustrating the pillars of digital transformation (Kaber & Kjellberg, 2018)

All the factors presented in Figure 12 are all dependent on how the organisation transformation will follow the digital transformation and are according to a senior manager based upon three main categories, Core Business, Human Resources and Technology. They live in a symbiosis and affect each other (See Figure 12). The technology development such as Blockchain enables tremendous new ways of doing business but in order to receive an output – the whole business chain need to work in unison.

The chain on the other hand is built upon information input, made by humans. Thus, if they do not see any benefits or understand the advantages of the technology, sooner or later the technology will act more as an obstacle than a tool to increase organisational efficiency. The company might have a fantastic idea, but the technical solution is too weak, or a technical solution but no added value for either customer or employee. Therefore, in order to succeed, all three categories need to be aligned.

5.Discussion

This chapter analyses the data that was collected during the interviews and is further discoursed along with the thoughts of the researchers, rendering in the researcher's discussion.

Through the interviews, it was clear that there are evolutionary bumps regarding technology and advancement therein. It was thought from our point of view when we first conducted this research that costs would be included - but without knowing precisely what costs it would be. Throughout the previous courses and lectures in our academic career, we have understood how pressured Shipowners and actors in the industry are; demurrage may sometimes be the factor that tips the scale and makes a voyage profitable or not. However, we may have either hit a spot on the market that simply does not reflect the rest of the industry, or perhaps the industry does not identify the costs the same we did.

In connection to the study, the switching cost seems to merely be connected to the rate of failure and to some degree the organisational size. One interviewee confessed that there had been systems superior to today's systems in use - and built internally by two employees - and that had not cost more than any of the systems in use today. Switching from a Ship-owner or Carrier to another is done in the swipe of a finger and no contract lasts forever. Especially in the tanker segment very much identified with the spot market and voyage charters. There is no hook on the customers, more than the relations and length of the contract. No, the switching costs are connected to the internal office systems that the Charterers and Operators use; Shipnet, Q88, Veson - used in combination with each other, rendering in a suboptimal situation where not a single platform is used to do linear tasks. And yet it was said that one of the interviewees made their own system which could do all this. One interviewee had a theory, that the newest system never is used, as organisations and actors are afraid of a too expensive switching cost, which does not gain the instant followers and therefore leaves the brave organisations with a fantastic product that cannot be used with other actors. After all, it was stated that in a global market the least developed country or actor in a deal sets the standard for how the trade will be made; paper Bill of Lading or electronic Bill of Lading, internal systems creating data for a mail sent by an employee or communicating interactive systems. As a small organisation, it is hard to set the agenda and push forward for a technological development in a globally small but fairly developed region with limited resources and voices.

One organisation argued that they will save tremendous amount of time and decrease financial risks, compared to the smaller companies which in most cases did not reflect over the benefits of new technology in the same way. One might argue and say this is related to the markets were the companies are operating on. Company B are operating on the world market and trade worldwide. Their customers vary to a higher degree, and the complexity in the areas their vessels are trading eventually do the business more complicated. Thus, they are more interested in decreasing their risk exposure and improve business-process for employees at the office with new technology. The smaller companies on the other hand operate on the North European market where the competition is different. Several of the companies know their customers to a higher extent and their concerns of not receive payment are precluded. They are also governed by smaller owner groups and have a stricter budget and financial means of developing and testing new technological inventions of how to conduct business compared to larger organisations.

The LOI is viewed by Company B as something unmodern and they would in the long run like to conduct business without the involvement of LOI. None of the other companies seem to believe there is an imminent risk with LOI, their use of BBB has served them well in times of uncertainty with new customers, and the willingness to change seems irrelevant to them due to the branch standard of using LOI. However, representatives from company B described the issues with LOI in terms of bankruptcy from one party of the affair and the legal aspects, in times the cargo which act as the security has been discharged. During the interviews, the smaller companies did not reflect to this as a problem at all which is interesting. This is eventually linked to the branch standard and wording, explained by tradition as:

"...we have always conducted business like this and it is extremely difficult to change" - (Interview Series Company A-F, 2018)

Thus, Shipowners and Charterers rely on the mutual trust between two individuals, which hinders them from seeing the main legal issues with LOI since other firms are doing it. And so far, they have not suffered any losses from it - yet.

A Senior Manager claimed their margins has decreased over the last fifteen years. Porter (1979) describes this as where the competition is fierce among the firms, they will likely generate lower profit in the long term. However, if a firm eventually change their business model and create new barriers for competitors to compete on the market they will most likely gain market shares. Thus, we believe this is what Company B is doing and why they are keen to develop their business model. They believe the industry most likely will change in the five to ten years to come, and how we do business today will certainly not be in the same way tomorrow. Thus, they have understood the benefits of new technology and explore how they will capitalize from it in the long term and to stay ahead of the competition.

Company A, D, E, F are acting on smaller, more local markets which eventually have made them more reluctant to new forms of conducting business and adoption of new technology. One interviewee claimed they are in the hands on the Oil Majors and cannot do anything without their consent, they control everything of how the business is conducted.

Some of our interviewees mentioned that paper-work as Bill of Ladings or other important shipping documents such as LOIs are repeatedly getting stuck at institutions such as banks or employees experiencing problems with issuing them. The slow movement of paper contracts occasionally forces vessels to anchorage areas resulting in valuable time is being lost, both at the office but also at sea which halters the discharge or loading operation and later transit to the next port. There were exclusively representatives from company B which pinpoints their business would benefit from a Blockchain system was all the relevant paperwork is uploaded directly in the chain, thus, increase the flow of paperwork and the process would run smoothly.

We believe this is once again correlated to their trade which is worldwide, and they constantly work with new stakeholders, based all over the world. White (2018) describes that the Blockchain system is built to increase transparency and remove inefficacy paperwork and eventually this will change now. We believe the timesaving and particularly the cost saving will act as the final carrot for the industry to change in a future.

Some of our interviewees from the smaller companies have describe themselves in organisations with less financial means in comparison to larger companies, resulting in having to be one hundred percent certain that the innovation are the standards the market will accept and work with in long-term before they adopt. One interviewee described the current situation as;

"...sometimes it is better to wait and see how the market develops and let someone else do the testing before you act.". - (Interview Series Company A-F, 2018)

We believe this statement describes the view of the smaller companies clearly. They are not that interested of testing and exploring pioneering products on the commercial side of the business. They seem "fat and happy" on their current methodologies how the business is conducted in the industry. But we believe they need to open up to new possibilities and look for new value, in a world who changes fast.

The smaller companies had difficulties to see the use of new technologies and some of them acted sceptics towards how new technologies would be beneficial to them in the long-term perspective. During the interviews for instance, two representatives mentioned the difficulties with electronic Bill of Lading and why still they have not been implemented, even though the electronic Bill Lading has been around in the industry for a long time. Their scepticism was based on the fact, there is still no, or extremely poor access of internet onboard the vessel which hindered the use of electronic Bill of Lading. They also reflected education was part of the problem while the use of technology put pressure on the master onboard to fully understand what she or he are doing to fully utilize the system. With this background, they could not see the benefits how Blockchain or something similar would change their way of doing business.

The TAM model eventually explains their scepticism since it is tough decision for managers and employees to fully understand if this is the way to move forward or not. The *Perceived Use* (PU) is low and thus, their *Intention of Use* (BI) and *Attitude towards use* (A) which made their scepticism to take over and they reject it without knowing the long-term benefits or how it might be implemented in the long term. We have seen similarities within all the small organisations during the interviews, the technology seems less attractive to them, even though financial risk will likely decrease and transparency on the market increase.

The larger organisation was positive towards the new technology although, they believe the market will change in the years to come and have planned to act. Thus, they fit into the description as Innovators which Rogers (2003) described as having strong financial backup which prevent them from going bankrupt and having a high-risk tolerance from the company even if the innovation or technology eventually fails.

Levitt (1965) describes this phase in the PLC model as the market *development stage* and there are still no signs of a market demand or proven facts of working which is linked to the complexity of the product or service. We believe this is exactly in the phase where we are now, no one really knows what is going to happen, but several industry representatives believe something is going to happen - we will not conduct business in the same way as we do today in the future.

Levitt (1965) also writes in his theory that customer-related products drive the profits and sales and we believe Company B are on the right path, since they are exploring possibilities how technology will improve their business to business relations and eventually create an extra added value. As previously mentioned, the smaller firms have less financial means and fit the description of adopting the innovation late. Rogers (2003) would probably describe these companies as *late majority* or *laggards* in the aspect of adopting new technologies and seize the opportunity to see the benefits of the innovation a long perspective. They will not adopt the technology until the rest of the market has done so and are forced to follow the development in their active segment. One may speculate that the smaller companies will not be ready to use the technology until the stage of *Market Maturity* which Levitt (1965) refers to as the time the market is fully absorbed, and all firms have adopted the technology. We believe this is linked to the conservatism of the industry in general and the lack knowledge of what is possible to do in the future, and how that eventually will affect the business.

During the interviews, some of our interviewees mentioned and discussed transparency in the market and how this eventually will affect the firm in the long term. One organisation, B, believed the transparency in the market in time will increase and that it is impossible to stop the development. The organisation is therefore investigating how the transparency might be a part of their future business model and what positive benefits there are from being transparent. They saw a future where cargo temperatures are monitored by sensors on board and positions updated constantly for instance. All relevant data would be transferred to the customer to increase their transparency and eventually they will gain more customers, even though they might debit the customers a higher rate compared to others. The Blockchain system would make this possible by its transparent character since all transactions and data are logged and traceable, it is impossible to deceive (Jabbar & Bjørn, 2018).

"We will see this development, rather we want or not. Therefore, we cannot work against transparency" – (Interview Series Company A-F, 2018)

Organisation B visualized themselves as a premium transport company where they in order to survive in a fierce market competition, must want to act and change. We believe their innovative style will pay off in the years to come due to their strategy of differentiating themselves from competitors. Porter (1979) describes this as the *Threat of substitutes* which measure how easily a customer can switch and change from one product or service to another that basically does the same thing. The tanker market is exactly this kind of market, many competitors and the skill is not linked anymore to move the freight from one part of the world to the other, it is more linked to 'how do we do this' and service outside of the transport itself. Company B will still do and act as a transporting company, however, they will in the future add more value to the service they offer and provide than today.

The smaller organisations believed transparency will increase but did not see it beneficial as Company B. We believe this is related to how they do business. A part of the dealing within the tanker market is related to not being transparent and reveal to your customers when and how your next voyage might look like to eventually receive a higher rate on your affreightment. We believe all Chartering departments are doing this to some extent. It's a part of the job to *wheel and deal*, no matter the size of the organisation or how many vessels the organisation are responsible to charter. One might argue and say this is also related to the fact they are all small companies and specialized in what they do. They are not directly involved in how the business might change in the future since they only see to their own work role today and not by tomorrow. Moreover, smaller firms eventually believe it is in the responsibility of the owner and not the Charting department to see the benefits of transparency in the long term.

When the interviews were conducted, the final question was "what Organisational change will follow inventions such as Blockchain?" We had many interesting point of views from the respondents and almost all of them related to the fact that relations have huge importance of the shipping business and we will likely see work roles change towards more physical meetings and visits with customers to make good relations even better in the future. Charterers will therefore likely work more on the field to establish and maintain relations but also visit new potential customers. Ship Operations and Chartering will merge more and not act as two separate departments and eventually, one employee will be responsible for the whole transport instead of small parts of it.

"We humans can never compete with AI in calculations or statistical calculations to make the best decisions... But we can compete in service, and make commercial switch to act as service providers in the future" - (Interview Series Company A-F, 2018)

We believe that humans are social beings and the main reason the interviewees have responded in the way they did are connected to the fact people like to interact with each other. Several things that are done today could be slimmed to increase efficiency of how the contracts are signed and flow of paperwork through the system in general. Nevertheless, the human behind the affair who eventually has established a personal relation with the customer and gained trust, is not likely to be replaced with a machine, we believe humans still have a lot of value to add in the business process. Doubtless with experience but also soft skills which will be the key to strengthen the business relation and attract new customers on the market. And since the business process is streamlined, more time will be saved and enables customer focus and care.

As mentioned in the previous text, company B would like to explore the possibilities of adding value to the customers and this is linked to the statement as of the former professional how he visualizes the future. We can only compete in service and need to develop our skills there. Yet, it's still difficult to argue or say if this is linked to EDI or Blockchain or if something else will develop and take over the market in the future. One of our interviewees from the smaller companies described Blockchain as a hype of society and argued strongly;

"It will take years before Blockchain has overtaken the market and we have seen its full potential" – (Interview Series Company A-F, 2018)

The interviewee described Blockchain as if they were in the phase of "At the peak" and moving towards the "sliding into the through" in the graph presented below, Figure 13. We reflect upon this scenario, interestingly, although he is a representative from a smaller organisation and we have seen from the interviewees that they are more sceptic towards how the business will change in the years to come and take position as reserved.



Figure 13 Gartner's Hype Curve and the different stages of the curve (Tarkovskiy, 2013)

As mentioned prior in the study, the shipping business has been considered conservative and slow moving from more or less all our interviewees, as well as previously in text (Vogdrup-Schmidt, 2015). And one might question, how come? Why? We believe that it is connected to what one of the senior managers described during the interviewees. The world is still in a huge imbalance between resources and how business is conducted. One example to describe the scenario of imbalance was presented how palm oil are loaded in the jungle of Amazonas - where the local farmer delivers three cubic of oil to the vessel, transported to the port with a donkey. The farmer might be an illiterate and are therefore only concerned of a signed paper and a stamp mark which confirms the transaction. Thus, you must start in the right angle of the problem, as a Blockchain solution here seems ridiculous and ineffective.

"Our branch has to adopt to all sorts of scenarios" – (Interview Series Company A-F, 2018)

The system can therefore only develop in a pace where the system is allowed to move forward and function for all parties of it. This is interesting and pinpoint that the development of the shipping industry relies on the weakest part of the system to develop forward. We believe this system in the long term not sustainable in an industry that could save billions of dollars by developing it processes and cutting out the middle man (Britchenko, et al., 2018).

Furthermore, another important view of why the maritime industry has been slow and conservative was explained as, people have enjoyed and capitalized on the old traditions and values. The use of new technologies and development seems to act more as a threat than as an opportunity to some of the interviewees, above all, employees from the smaller companies expressed, to some degree fear or negative emotions towards the future landscape we eventually will see in a decade or two. We believe this eventually explains why there has been a reluctance towards technical development in some areas.

Several of the interviewees described a future where they saw a platform were Cargo-owners, Shipowners and Charterers were matched instead of usage of a Ship-broker. Some interviewees thought that Brokers does not provide any new relevant information, only forwarding e-mails between Cargo-owners, Shipowners and Charterers. Therefore, some of them assumed the Ship-broker business is likely to decrease or have a less importance of the future. We also believe the relevance of the of Broker may decrease if a cargo platform is developed and used in the coming decade, as the platform will be able to forward information that a broker is sharing now. However, this is the opening for a new business opportunity for the brokers as a real source of information sharing, as a consultant- and database and asset on demand.

One interviewee contemplated regarding organisations, that the organisational change only occurs if the *Core Business, Human Resources and Technology* are aligned. They cannot work without each other and this is interesting because humans are the ones who carries out the digital transformation. Maybe this answer is the key to understand why most technical inventions in the shipping industry have met such resistance and unwillingness to develop. The technical solution has not been aligned with the inner personal believe that its useful for the individual, the technical solution is too advanced for employees and therefore difficult to adopt. In the future, it cannot be precluded that organisations need other categories of employees with different kinds of knowledge and skills. In those cases, it might be useful for the companies further ahead to invest more in education to meet the new requirements of the work role. This is of course deepening on how the business develops and change.

Furthermore, employees might have reasoned that technical solutions are not part of the core business as Charterers because they eventually risk of be unemployed and are afraid of the consequences of what new technology will bring.

During the last week of the progress of this research, the European Union regulation on General Data Protection, GDPR, was enforced on May 25th, 2018 (Computer Sweden - IDG, 2018). The GDP Regulation may in terms of blockchain prove an obstacle, as the regulation provides people within EU with the opportunity to be forgotten (European Commission, 2012). As this was found in the last stage of the research, it is a shame that it is not included in the results, nor more extensively in the report. We, as authors, does not think that the GDP Regulation itself is a matter strong enough to halt the expansion of Blockchain technology, nor that it is the strongest factor in terms of the technological reluctance in shipping. However, as this is merely the discussion, there is no scientific proof. Therefore, we would like to put emphasis on further research; GDPR and shipping, is there any collision due?

5.1 Technology in Society

As a final part of the discussion, we would like to consider how the new technology eventually will affect society and sustainability in the future since we are students at Chalmers University of Technology. We believe, as mentioned prior in the report, that employees will be more flexible and do more diverse work-tasks. This will put pressure on further extensive education and knowledge from the employee to handle the changed work-role to meet the future. Therefore, we strongly believe that further education on sustainability; social, well-being, ecological, economical, in the future will be even more important. Our view on the present situation in the industry is that there is often focus on only one of the aspects, often economy. As economy is the driver of every organisation – Swedish companies are bound by law to generate profit, as the core of a company (Justitedepartementet L1, 2005) – we want to further put emphasis on the fact that our research may not show per se that there are winnings to be made in sustainability due to our findings. However, there are surely points to be made here. Unnecessary spending on documentation is money better spent elsewhere, and couriers flying around with paper documents is not a sustainability driver for the sake of the environment. No, the sustainability could really fare well from blockchain technologies, as more technologies will remove work load on the employees, whom may rather spend more time improving wellbeing.

To increase the knowledge regarding sustainability as a whole, we suggest that companies in the shipping business increase the opportunity for their employees to take part in courses in fields were they today lack knowledge and skills. The technical development is progressing faster and faster and employees need to edge their own competence to cope with the demands from the labour market. Suitable courses for instance would be connected to digitalization, IT-knowledge, impact on the environment due to waste and increased of awareness how to reduce carbon footprint. The ethical aspect of increased education for employees is as often, linked to cost. Firms might find this unnecessary and expensive due to loss of productivity when sending employees to take courses, but in a long-term aspect they sharpen the competence of the company and increase awareness.

We have confidence in the technical development of EDI's and Blockchain solutions that they will reduce and hopefully in the coming years, remove the use of paper contracts and Courier's, traveling worldwide to deliver Bill of Ladings while cargo has been sold multiple times during transit. This is neither effective nor sustainable in the long run. The United Nations has declared in one of their seventeen sustainable goals by 2030; that industries need to retrofit in order to become more sustainable and adapt clean processes to a higher degree (United Nations Development Programme, 2015). We believe the Blockchain technology answers the need of transforming a business to become more sustainable to reduce carbon footprint.

6. Conclusion

In this chapter the writers draw the conclusions of the key findings and give recommendations to further research.

The shipping industry is still behind several other industries in technical development and has been considered conservative and slow moving of both representatives and the industry itself. This Thesis is investigating the factors of hinders to adopt technical development and how the shipping industry eventually will change in the years to come.

The use of Blockchain and other technical inventions are likely to increase the efficiency in the shipping business in the future. This will put pressure on organisations to change and adapt to the new reality of how the business is conducted. Furthermore, the organisations might therefore be forced to increase their employee's knowledge and skills to completely equip them with all necessary tools to meet the future. It also put pressure on mangers and leaders which sets the agenda and have the opportunity to change old culture and traditions.

In the long-term perspective, the industry will likely transform but still awaits the firms who wants to be the game-changer and drive the implementations and forces competitors to follow their lead.

6.1 Willingness to adopt new technological inventions

The first question that was addressed for this research was; *What factors in the tanker market may affect the willingness to adopt new technological inventions?*

The main factor that can be concluded are still related to the conservatism of the shipping industry. Industry employees and representatives have enjoyed capitalizing on the old traditions that have embraced the industry through the centuries. Some organisations are on the other hand exploring new possibilities to use technology to save time and money and increase efficiency. Although the shipping industry is also a global business dependent on the all the actors in the chain to transport cargo from one part of the world to another. Thus, the imbalance between rich and poor countries acts as a major obstacle, especially for the organisations who trades on the global market.

Smaller organisations lack the financial means to set the agenda on the market. Some of these firms are family owned enterprises and they must be certain of how the future market will be before they decide to adopt new technologies. Likewise, the lack of knowledge of what is possible to do and achieve with new technology also acts as an obstacle to new technical inventions.

6.2 Sales process in the tanker market

The second research question that was considered was; *How may technology affect the sales process in the tanker market*?

Three main factors; *Transparency*, less *Financial risk* and *Business relations* will change in the coming years due to new technology. The business relation between customers, Charterers & Shipowners will become even more important to increase sales and look for new markets and customers. The technology development enables more transparency between Cargo-owners, Charterers & Shipowners where customers can track their cargo with current cargo temperatures, platforms and solve claims in one platform. The cargoes in the future, are more likely to be matched in a platform than the usage of a broker who today work more as a link between Cargo-owners, Charterers & Shipowners. Therefore, the Ship-broker business will likely decrease and lose their importance in the tanker business in the long-term perspective. The decreased finical risk was correlated to the less use or stop of using Letters of Indemnity when trading worldwide. The branch standard of using LOI will eventually also decrease and eventually disappear.

6.3 Organisational change

The final and last research question was related to the organisational part; *What organisational change will follow a technological invention, such as Blockchain?*

Employees are more likely to achieve more work tasks and become even more efficient due to more computerized processes which acts as a support and backup to the employee. Calculations on voyages with highest rate of return are carried out by computers instead of humans. Charterers are out on the field and Ship Operators will operate and control more vessels than today. The vessels are likely to be controlled on large screens and the Operator take actions when needed. The informational flow is uploaded and accessible in the Blockchain. In a long-term scenario, both these two separated departments (Chartering & Ship Operations) are more connected and working as one unit, rather than two separated as today. The organisational long-term change is connected to the three values; *Core Business, Human Resources* and *Technology*. And to fully succeed when the change and implementations of new technology starts in the future, these three values need to be aligned to prosper.

6.4 Recommendations for further research

This Thesis has been more of an investigation of what representatives from the maritime cluster in Gothenburg, Sweden, believes will change in the five to ten years from a technical perspective. There are many options to investigate since our report is written in a more general perspective than going in deep detail.

Therefore, we suggest conducting a similar Thesis in a decade from now to see if any technical inventions have been implemented and if the work process has changed anything from today as the interviewees describe. We would also suggest investigating if there are similar answers between different regions in the world, why the willingness to adopt technical inventions eventually differs from region to region or are they similar? We also recommend following up how the organisation eventually has changed due to the technical advancements; Do Charterers travel more and have the two departments, Operations and Chartering, merged as one.

Finally, we would like to say that one unfortunate shortcoming was that we were not able to discuss every single aspect. We would like to return to the discussion, where we mentioned GDPR, the EU regulation and its impact on blockchain. Therefore, we would very much welcome studies on *GDPR and shipping, and whether there is any collision due*? If future researchers find our study, you shall remember where you heard your future Thesis title first.

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