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Sustainability Enforcement

A qualitative study into the drivers and barriers of sustainable value creation: A Norwegian salmon farming context

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Master Thesis in New Business Development & Energy, Natural Resources and the Environment

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Abstract

As the salmon farming industry is expected to increase production fivefold by 2050, it is pertinent to explore how the firms in the industry manage their business operations. The purpose of this Master Thesis is to examine how salmon farming companies can strengthen their sustainability position through strategies and practices, in view of traditional business administrative theories. Although novel theories and frameworks concerning sustainable business procedures are being developed, such as the concepts of circular economy or corporate social responsibility, we recognise that it will be applicable to rather explore new phenomena using traditional business literature in a new context. This can be justified by the idea that we want to understand what sustainability explicitly means to firms in the salmon farming industry. We want to comprehend how organisations ensure profitability while simultaneously reduce negative environmental impacts. The global shift in consumer- and market trends regarding sustainability legislation and standards, implies that it is required for businesses and industries to change rapidly to maintain or improve their reputation and solve the operational challenges. The salmon farming industry constitutes one of the largest industries in Norway in terms of export, and therefore has a great responsibility.

Semi-structured in-depth interviews were conducted with eight business representatives from seven salmon farming firms to examine their experiences with sustainability strategies and practices. Overall findings and analyses show differences in the use of resources towards sustainability implementation, which is characterised by different priorities among the salmon farming companies. Various priorities are thus dependent on each firm's resource composition, considering intangible and tangible assets such as access to licenses, specialised technologies/equipment, competencies, and compliance standards and certifications. The willingness to invest in long-term specific projects are high, and the associated resources are either tailored within the firm or in alliances with suppliers and partners. Finally, our findings indicate that the firms' competencies constitute the underlying resources that enable them to foster sustainable innovation within the industry.

Key words: Sustainability, innovation, resources, resource-based view, transaction cost, asset-specificity, development projects

Acknowledgements

This Master's Thesis is part of our MSc in Economics and Business Administration programme at the Norwegian School of Economics and is written within the two majors *New Business Development* and *Energy, Natural Resources and the Environment*. The subject of this thesis is innovation and sustainability enforcement, which we reckoned as a good match with both of our majors and personal interests. These past months of writing has been a great learning curve. Sustainability is a topical theme, and it has been very interesting to study the phenomenon in a new context within the salmon farming industry.

First and foremost, we would like to give a *big* thanks to our supervisor Professor Aksel Ivar Rokkan. He challenged and supported us with valuable feedback and guidance throughout this master thesis. Secondly, we want to thank Knut Fredrik Jahre Ramm and Kine Berntsen from Deloitte Norway for their contribution through constructive feedback along the way. All their efforts and support are highly appreciated.

Furthermore, we would like to express gratitude toward all informants for committing and participating in our project. You contributed to valuable insights and perspectives on how sustainability can be generated with respect to economic, social and environmental concerns, all being interdependent. We want these contributions to make the general debate on sustainability dilemmas less polarised and engage more people in exploring similar issues in different contexts and environments. We want to thank participants from Nova Sea, Nordlaks, Cermaq, Grieg Seafood, Norwegian Royal Salmon, SinkabergHansen and Bremnes Seashore for taking the time to get involved despite the Covid-19 pandemic and its complications.

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Acronyms

ASC	-	Aquaculture Stewardship Council
B2C	-	Business-To-Consumer
B2B	-	Business-To-Business
BMC	-	The Business Model Canvas
CSR	-	Corporate Social Responsibility
GSI	-	The Global Salmon Initiative
IDH	-	The Sustainable Trade Initiative
MTB	-	Maximum Allowable Biomass
NSD	-	Norwegian Centre for Research Data
RBV	-	Resource Based View
SAM	-	Safeguarding Adaptation Measurement
SPC	-	Soy Protein Concentrate
TCE	-	Transaction Cost Economics
VRIO	-	Valuable Rare Inimitable Organised
WWF	-	World Wide Fund for Nature

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1. Introduction

1.1. Rationale and Actualisation

Norwegian salmon farmers have benefitted greatly from the country's long coastline comprising of over 100 000 km (Hersoug, Mikkelsen and Osmundsen, 2020). Over decades, production methods and innovations have developed, and today Norway is recognised to be among the largest producers of farmed salmon (Bailey and Eggereide, 2020). In 2019, the Norwegian industry sold over 1.35 million tons of salmon with a value of more than 68.1 billion NOK (Fiskeridirektoratet, 2020a). Production of seafood has been identified as the most rapid growing industry within the food sector (Béné, Barange, Subasinghe, Pinstrup-Andersen, Merino, Hemre, and Williams, 2015), and salmon farming is considered the largest production group within aquaculture (Asche, Roll, Sandvold, Sørvig, and Zhang, 2013).

Because of increased awareness among the public, the industry is encountered with criticism for its production activities and associated negative consequences on the environment (Osmundsen, Amundsen, Alexander, Asche, Bailey, Finstad, Olsen, Hernández and Salgado, 2020). According to a research institution report, the mortality of farmed salmon in 2019 constituted 52.8 million fish (Sommerset, Walde, Bang-Jensen, Bornø, Haukaas and Brun, 2020). This is a tremendous concern for the industry and is commonly associated to large amounts of sea lice and diseases (Mattilsynet, 2020). Currently, other vast industry challenges also involve escapes of farmed salmon and carbon footprint from fish feed (which is connected to the issues of soybean production) (Guttormsen, 2015).

As the growing world population is expected to reach nine billion people by 2050, the demand for food supply will increase consequently (Béné et al., 2015). The future prospect is radiant, as it is indicated that production in Norway may increase five times as much within 2050 (Hersoug, Mikkelsen, and Karlsen, 2019). But to reach this goal, the industry challenges must be solved to ensure sustainable development. More specifically, growth rely on factors such

as environmental impacts and fish welfare, which is why sustainability is pivotal to increase production. Consequently, sustainability must be the key focus for companies, in the prospect of the future (EY, 2019). These industry issues combined with the associated monetary consequences make it applicable to examine salmon farming in Norway, as there is a great need to explore how the industry can tackle sustainability-related challenges. This thesis intends to illuminate how the salmon farming industry can align their sustainability strategies and practices in balance with economic, social and environmental dimensions, to meet the demand for food supply to feed the growing population.

1.2. The Research Problem

The aim of this research is to contribute to a better understanding around drivers and barriers of implementing sustainability-oriented strategies and practices in the Norwegian salmon farming industry. More specific, we want to identify factors that promote or hinder the industry to practice sustainability and explore whether there are essential challenges that should be considered. The thesis also aims to establish an understanding of what elements make sustainability practices feasible and what works based on existing experiences in the industry. One focus area is to evaluate how firms can be sustainable in a profitable and competitive way, hence the focus will only be from a business perspective. A business perspective in this sense, is what allows us to prioritise a business orientation rather than a technology orientation of the industry, and focus on seeking understanding of overall business activities, processes, interactions and relationships between them (Baghdadi, 2005). The academic purpose is to contribute to enhance knowledge about challenges and opportunities regarding sustainability in respect of capability and resource utilisation, explored in the context of the Norwegian salmon farming industry. This leads us to the following research question:

"What are the drivers and barriers for Norwegian salmon farmers to define and execute sustainable business strategies and practices?"

To help answer this question, we introduce the following sub-questions, which are based on our theoretical background to keep us within the thesis boundaries:

Sub-question 1: *What resources and capabilities are needed in order to meet economic, social and environmental challenges in the industry?*

This sub-question allows us to explore which resources are essential for differentiation and advantages in a competitive environment.

Sub-question 2: *In what ways can investments that increase levels of sustainability create cost advantages or generate excess value?*

From a strategic point of view, this sub-question let us identify why the various companies make different investment decisions in their work towards sustainability.

We will explore what participants within the industry considers as economic, social and environmental responsibilities, and what opportunities they see as when enhancing their sustainability work.

1.3. Boundaries of the Thesis

This thesis targets the Norwegian seafood context, narrowed down to the salmon farming industry. The scope of this thesis is limited to salmon farming companies with the intention of being able to analyse the underlying reasons for their choices and priorities in the work towards sustainability enforcement.

Boundaries were set, and the salmon farming industry, particularly the production stage of the value chain, was chosen as focus. It was naturally to choose the salmon farming industry due to its size and impact in Norway. This thesis is not performing a profitability analysis of firms in the salmon farming industry, but merely examines sustainability implementation through reviewing sustainable business strategies and practices. Thus, we assume that the companies have financial capital from either government subsidies and/or through their own business profits.

Furthermore, we will be interviewing a limited number, eight informants, of seven different salmon farming firms within Norway. A specific boundary on the number of companies were set, and the restrictions had to be confined to manage the phenomenon. There are some important aspects to consider when delimiting the number of companies and the scope of information gathering, such as, the study's purpose and what it aims to achieve. In this research, we want to examine the experiences of leading companies within the industry in the context of sustainability implementation. Thus, one of the conditions/criteria were to have different company sizes but that they were among the most influential salmon farming firms within the industry. In this way we could attempt to compare companies and examine contrasts between them through evaluating in what ways they are heterogeneous and vice versa. The firms are of dissimilar size and structures, which pose different prerequisites for each informant to answer interview questions, due to their various positions and knowledge backgrounds. The informants are in general working within areas of sustainability, R&D, innovation, communication and fish health/-biology, and their knowledge and background cover many aspects of salmon production.

1.4. Thesis Structure

To answer our research question, our thesis will be structured as follows. In Chapter 2, we commence with introducing the evolution/history of Norwegian salmon farming and how salmon has become the most salient export industry in Norway after oil and gas. We also identify sustainability definitions and aspects of the pertinent industry. The idea is to recognise the scope of sustainability issues within the industry. In Chapter 3, the thesis outlines the chosen theoretical concepts about resource-based views and concepts within transaction cost economics, and thus explore its relevance to our context. In Chapter 4, we present the business model canvas, a framework or management tool applicable to propose strategic plans towards a desired outcome, which we will later apply into our findings in the context of sustainability. This framework outlines key components imperative to complete that plan.

Our methodological approach will be presented in Chapter 5. Thereafter, in chapter 6 we will include our findings from the semi-structured interviews, in which we break down our main findings into components of a modified business model and we use a VRIO framework to evaluate pertinent segments from findings. In chapter 7, we elaborate on the principal findings and discuss how these can be explained using our main theoretical concepts. Ultimately, in the final chapter we draw a conclusion and present implications, limitations and suggestions to further research.

Figure 1: Outline of the thesis structure

2. Industry Background & Sustainability Dimensions

2.1. Evolution of the Norwegian Salmon Industry

The salmon industry has a long tradition in Norway. Salmon has over history comprised a rich source of seafood and have been of great value to fishers. The salmon rivers in Norway are of the "largest spawning grounds for wild Atlantic salmon" globally (Liu, Olaussen and Skonhoft, 2011). And not to mention, the advantages of location and the entire Norwegian coastline of over 100 000 km (Hersoug, Mikkelsen and Osmundsen, 2020). Norwegian salmon farming commenced in the 1960s as a political-supported activity and as a reaction to the decreasing wild fisheries and economic decline in rural fishing communities. Since then, aquaculture has evolved due to technological and biological developments, such as dry feed and smolt rearing. Salmon farms were in the beginning owned by small family businesses, targeting markets in the local areas. Further, the small businesses emerged in the 1970s due to great profitability and dominated over the wild fish production, significantly (Liu et al., 2011). This was the beginning of a change in the industry structure, as the number of small firms declined, and fewer but larger firms evolved, from at least 800 operational firms in the 1980s to 186 operational firms in 2009. Salmon farming turned into a large-scale industry in the 1980s and has since then experienced prominent economic growth (Liu et al., 2011; Larsen & Asche, 2011). However, growth has been led by requirements regarding operational capital, and the seek for economies of scale and scope in terms of production and sales. Other growth factors in the salmon industry over the past decades include industry contracts. Such contracts are incorporated with the purpose of reducing both transaction costs and risk (a concept which we will come back to in the literature review). Contracts within the salmon industry are, according to Larsen and Asche (2011) based on the intention of "regularising quantity flow, allowing better production planning for producers, better capacity utilisation in the supply chain, and reduction of quantity risk for both parties", with the parties being the exporter/seller and the importer/buyer.

The sustainability dimensions have been an interest from the inception, and the industry considers aspects of economic, social and environmental sustainability. These factors include the economic profitability of the industry, the employment possibilities of the industry and the environmental impacts from the industry. Sustainability has historically, to an extent always been a concern for the industry and this is still pertinent to this day (Hersoug et al., 2020). The evolution of how this aspect has changed over time will become more evident in the next following chapters.

By 2050, the growing human population is expected to reach 9 billion people. Thus, the demand for food supply will experience a steady growth as a result. Production of fish is recognized as the most rapid growing within the food sector (Béné et al., 2015) and salmon farming is identified as the largest production group within aquaculture (Asche et al., 2013). Research has revealed that the aquaculture industry (i.e., incl. salmon industry) can intensify the current production of its animal protein that is essential to feed the growing population. Given the scope that salmon farming only exists in some limited areas in the world such as Chile, Scotland, the Faroe Islands, Ireland, Canada, USA, Tasmania (Australia) and New Zealand (Mowi, 2020), Norwegian salmon farmers have with their extensive capability been able to dominate most of the production (Hersoug et al., 2019), and maintain their prominent position as one of the most sustainable among food protein producers (Norwegian Seafood Council, 2019). This can be supported by the fact that three of the largest seafood companies in Norway has been ranked among the top in the world when it comes to sustainable production (Norwegian Seafood Council, 2020), and considering that farmed salmon is the animal with the lowest carbon footprint compared to other protein sources (Global Salmon Initiative, n.d.).

In 2019, Norwegian production accounted for over 1.35 million tons of salmon which generates over 68,1 billion NOK in value (Fiskeridirektoratet, 2020a). Salmon export is superior to domestic sales, this makes the industry the greatest in Norway after the petroleum industry of oil and gas (Hersoug et al., 2019). However, in 2009, the Norwegian aquaculture constituted not more than 0.3 percent of the Norwegian Gross Domestic Product (GDP). This can be explained by the fact that the production requires great product inputs, constituting 75

percent of production. Also, 50 percent of the product inputs consist of fish feed. This is the reason why the industry amounted the low percentage for the Norwegian GDP, despite generating substantial monetary value (Zahirovic, 2012, p. 13). Nevertheless, the salmon industry is imperative for the Norwegian economy especially in terms of creating employment and for the export market (Liu et al., 2011). In the long-time prospect, it is believed that Norway could possibly increase its production fivefold by 2050 (Hersoug et al., 2019).

Statistics of the industry's historical development 1998-2019:

The statistics displays the salmon farming industry's historical development from the past twenty-one years (from 1998 to 2019). As depicted in figure 2, quantity of sold slaughtered salmon (shown in tons) by Norwegian counties (before county fusion in 2020) has increased over the last decades. The most recent statistics demonstrate a total of 1.35 million tons of slaughtered salmon in 2019. Further, as displayed in figure 3, value of slaughtered salmon (shown in NOK) by Norwegian counties (before the county fusion) shows a steady growth between 1998 and 2019. The latest data depict a value of 68.1 billion NOK of slaughtered salmon in 2019 (Fiskeridirektoratet, 2020b).

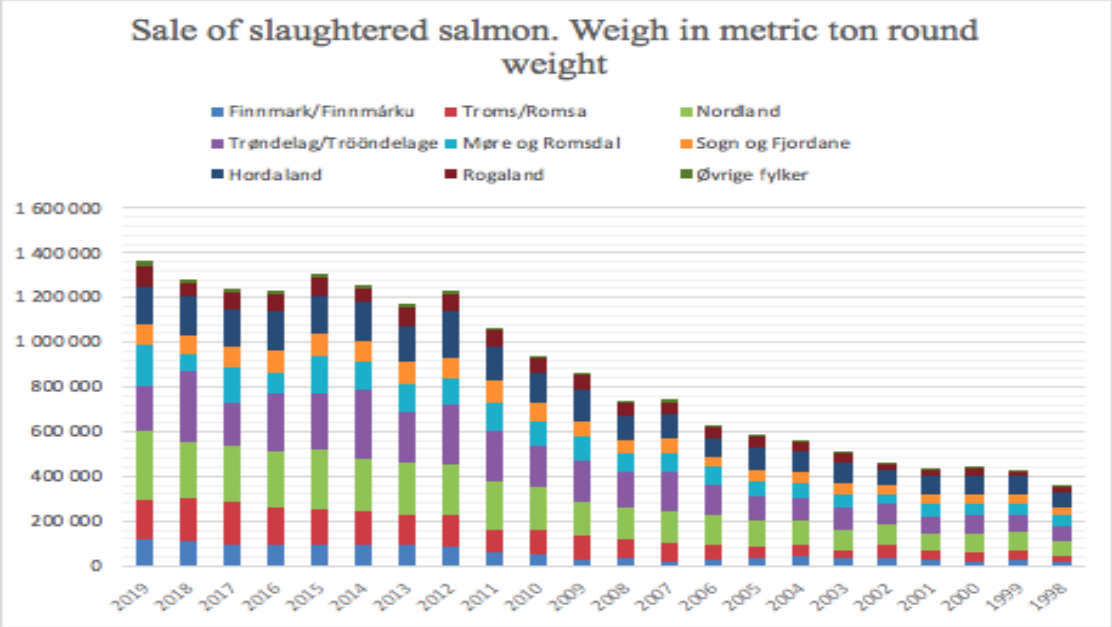

Figure 2: Sale of slaughtered salmon (1998-2019), in weight, metric ton round weight. Source raw data: (Fiskeridirektoratet, 2020b).

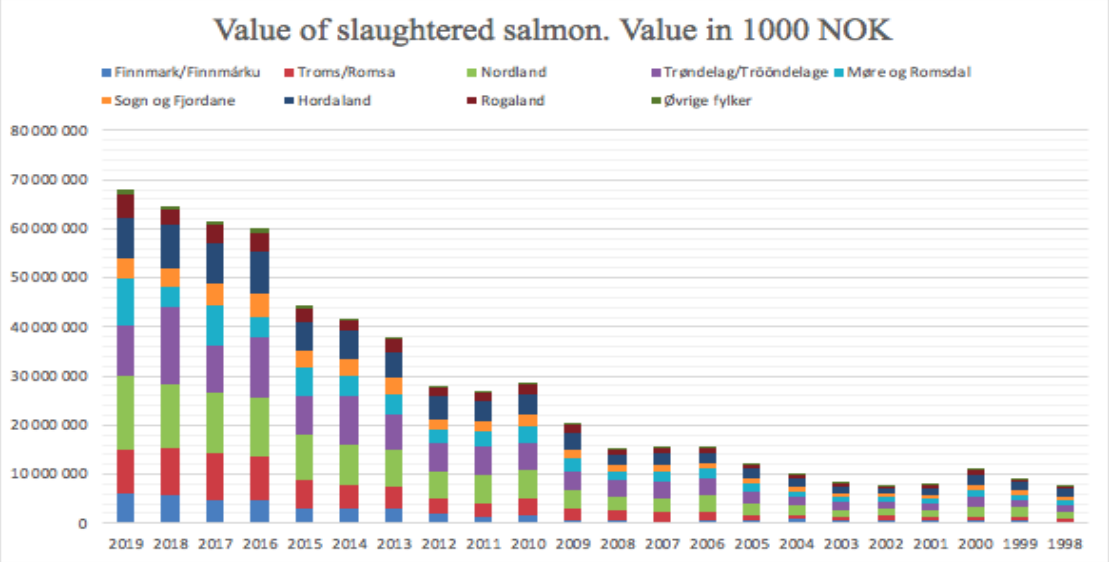

Figure 3: Value of slaughtered salmon (1998-2019), in 1000 NOK. Source raw data: (Fiskeridirektoratet, 2020b).

2.2. Sustainability Terms and Definitions

There are a numerous of definitions concerning sustainability. For example, what conditions are essential for sustainability or how sustainability is achieved. However, the actual sustainability term is not clearly defined (Brown, Hanson, Liverman and Merideth, 1987). Nevertheless, a common definition of sustainability (or sustainable development) is described as utilising resources to "meet the needs of the present without compromising future generations' ability to meet their own needs" (Brundtland, 1987, cited in Verma, 2019). The term sustainability does however vary in different contexts. Business management contexts are progressively exploiting the triple bottom line perspective, concerning economic, social and environmental concerns (three-dimensional). This perspective allows managers to increase awareness on the life cycle implications of decisions being made. It is about understanding the impacts throughout the value chain, from raw material extraction to end-user delivery (Ahi and Searcy, 2013). In a business context, scholars also recognise sustainability activities as 'corporate sustainability' or 'corporate social responsibility' (CSR). In addition to the three dimensions, businesses implementing sustainability in their activities

are often keeping their focus on: the stakeholders' needs, the voluntary nature of acting sustainable, being resilient and adapt to changes, and maintaining long-term sustainability activities (Ahi and Searcy, 2013).

Another big and trending concept within sustainability is *circular economy.* In simple terms, the idea of a circular economy is to reduce waste by reusing resources. The aim is to 'close the loop', which means to limit the number of resources fading to waste or emissions and instead reuse these resources (Jørgensen and Pedersen, 2018, p. 104, 112). There are several main principles for the circular economy to take place, including "a) designing out waste, b) separating the biological from technical nutrients where the former is turned back to the biosphere, and the latter are used indefinitely, and c) use renewable energy to reduce dependence on finite resources and develop sustainable systems" (Veleva and Bodkin, 2018). Circularity encourages the idea of creating and implementing a collective system change for the whole value chain. Thus, a unified effort from all actors (policy makers, business representatives from the entire chain, academic field, etc.) is required to ensure and create new opportunities for the future (Eijk, 2015). Albeit the idea of circular economy being a salient concept within sustainability, circularity is in this thesis context considered impractical as challenges and concerns are related to sea lice, escapes and fish feed ingredients. Therefore, we will not focus on circularity at this point when examining sustainable approaches.

2.2.1. Transition towards sustainability

Many scholars have acknowledged the literary relevance of business models for sustainable development and firms' performance (Schaltegger, Hansen and Lüdeke-Freund, 2016). Bocken, Short, Rana and Evans (2014) claim that business models for sustainability incorporate more than changing *what* services and products one offer. It is rather about changing *how* one do business, and that companies must focus on maximising environmental and social/societal benefits in addition to economic benefits. Foss and Saebi (2017) consider the greater need for sustainability as "a major antecedent for business model innovation".

Nidimolu, Prahalad and Rangaswami (2009) refer to sustainability as the "key driver to innovation", and present various stages towards sustainability, each which has its challenges, and requires new company capabilities to manage. The next sections explain various approaches to advance sustainability, and thus how opportunities for innovation transpire:

Viewing certifications and standard compliance as opportunities. Countries, regions and even cities have different legal standards to minimise environmental impacts. In addition, there are several non-governmental agencies that have developed industry-specific standards, which also apply across country borders and put increased pressure on entities (Nidimolu et al., 2009). Examples of global sustainability initiatives within the seafood industry includes, Aquaculture Stewardship Council (ASC), the Paris Agreement, Global G.A.P. and the Global Salmon Initiative (GSI). Nidimolu et al. (2009) argue that such industry initiatives tend to be more stringent than national regulation. Therefore, companies can achieve first-mover advantages if they comply with such standards before they potentially become imposed. This requires the skill to collaborate with other entities for problem solving solutions. The opportunity for innovation is to persuade companies to test new and sustainable processes, materials and technologies. In terms of environmental issues, this process makes companies more proactive and aware (Nidimolu et al., 2009). Certifications and product labels put firms in a position of differentiation, because it conveys information to consumers about their products' quality, sustainability and safety (Banterle and Stranieri, 2013). Although there are benefits of gaining first-mover advantages such as brand recognition and image or technology leadership through intellectual property rights (e.g., patents), first-mover disadvantages may also occur. Technology pioneers' activities are exposed to the public, and new entrants (i.e., followers/late-movers) can learn from first-mover mistakes and thus develop new and more efficient solutions. First-mover disadvantages are often related to cost disadvantages, which can highly affect the firm performance, long term (approximately 10-12 years' time frame). Therefore, managers should evaluate how their cost structure and revenue streams will be affected and whether the potential revenue advantages exceed prospective cost disadvantages, long term (Boulding and Christen, 2001).

Next, *making value chains sustainable*, is about increasing efficiency throughout value chains. More specifically, companies must focus on reducing waste and minimise the use of non-renewable resources, like natural gas, coal, petroleum and water. Many companies offer incentives to their suppliers by persuading them to reduce emissions and waste and spend less on product packaging costs. However, required competencies include the propensity to redesign business operations and production to less energy consuming activities and to generate less waste from production. By redesigning business operations and productions into innovation opportunities, companies can contribute with increasing the use of more sustainable energy and raw material sources and find new ways of utilising returned or surplus products (e.g., waste) (Nidimolu et al., 2009).

The third stage, *designing sustainable products and services*, accounts for the challenge of redesigning existing offerings or develop new ones to reduce environmental impacts as a response to customers' awareness and demand. It is essential to understand consumer preferences and concerns, as well as being able to thoroughly examine the life cycle of the company's products. To make this feasible it is crucial to understand which products are causing the most harm or requiring the most energy and what changes can be done to it. Innovation opportunities include transforming techniques in product development through biomimicry (natural-like processes) and create eco-friendly packaging (Nidimolu et al., 2009).

The fourth stage, *developing new business models*, is about finding new and different ways to capture revenues and deliver value through services. It is once again necessary to understand customer needs and preferences and enable to meet those demands in different and more eco-friendly ways. Innovation opportunities involve identifying new revenue streams and change from product-oriented to service-oriented business models. Companies may identify the value of disposed waste using new technologies and thus learn how to reduce waste or recover the value from waste. For instance, companies should think entrepreneurially and collaborate with entities that, e.g., use novel technologies to extract carbon dioxide from manufacturing emissions, and then utilise the carbon dioxide to create new products (Nidimolu et al., 2009).

The latter stage, *(5) creating next-practice platforms*, is about moving beyond existing practices and question the underlying assumptions of current business practices. Corporations must understand how industries and ecosystems are affected using non-renewable and renewable resources. Moreover, companies must assess scarce resources – how can we produce using less non-renewable energy sources? Competencies on environmental commitment and social responsibility among workers are crucial. Innovation opportunities occur when companies explore new, but less energy consuming alternatives of business operations. One of the main objectives with changing current practices through innovative solutions is to cater the needs of more people than what traditional economic systems do (Nidimolu et al., 2009).

Despite a diverse number of terms and definitions of sustainability, this thesis will adapt to a business-level approach where we seek to understand the individual firm's ability and incapability from their perspective and secondary data. The context of sustainability in terms of strategies or practices is referring to firm's decisions and actions towards long-term economic, environmental and social value creation. In our approach, we will build on existing traditional business literature and theoretical concepts and develop an understanding of what causes drivers and barriers of strategic sustainability implementation in a Norwegian salmon farming context. Further, this thesis will address the dimensions in the triple bottom line in the industry, meaning the economic, social and environmental sustainability aspects. This is because the three dimensions are intertwined and relevant to the overall outcomes of salmon farming.

2.3. Consequences of Salmon Farming

As with natural resources in general, fishes in the aquatic biodiversity are also threatened and affected by anthropogenic (human originated) activities (Glover, Solberg, McGinnity, Hindar, Verspoor, Coulson, Hansen, Araki, Skaala and Svåsand, 2017). According to a risk assessment analysis completed by the Norwegian Institute of Marine Research, some of the most salient hazards (i.e., environmental challenges) by salmon farming include direct effects on marine biodiversity inclusive benthic animals (flora/fauna on bottom of the sea), transfer of diseases, fish escapes leading to "genetic interaction with wild populations", and implications with sea lice (Taranger, Karlsen, Bannister, Glover, Husa, Karlsbakk, Kvamme, Boxaspen, Bjørn, Finstad, Madhun, Morton and Svåsand, 2015). We hereby present the main sustainability problems in real-time, as it is relevant for our context-specific discussion later in the thesis.

Sea lice. The Norwegian Food Safety Authority reported that the mortality rate of farmed salmon and algae-eating fish in the Norwegian seafood industry is high, with 52,8 million fish perished in 2019. This is commonly due to sea lice and diseases, as a reflection of suboptimal fish welfare and lack of efficient preventive measures (Mattilsynet, 2020). Sea lice (Copepods, Caligidae) is a marine parasite that is largely infesting fishes. Lepeophtheirus salmonis is the parasite that impacts Atlantic salmons. When salmons are infested by sea lice, the parasite can remove skin and underlying tissues from the fish, which further causes harm and stress towards the salmon's natural life cycle and its implications leads to serious threats and increases mortality among salmons (Costello, 2006).

Lice treatments. There are two types of delousing methods that should be distinguish from one other, medical approaches and non-medical approaches. The industry is attempting to avoid medical approaches and thus many new non-medical methods have emerged over the past years, and these include (1) mechanical treatments that are delousing operations "where the lice are mechanically removed" from the salmon. There are three different technologies, for this type of treatment, FLS delouser, SkaMik and Hydrolicer (Overton, Dempster, Oppedal, Kristiansen, Gismervik, and Stien, 2019).

(2) Thermal treatments are delousing operations involving warm water. Existing technologies for these treatments are Thermolicer and Optilicer. (3) Underwater laser is adopted as a delousing approach, which entails using a laser to strike lice off the salmon. Existing technologies are Optical Delousing and Stingray (Holan et al., 2017; Overton et al., 2019). (4) Cleaner fish is used as a delousing approach, the process entails that cleaner fish eats the lice directly from the salmon body (Overton et al., 2019). (5) Lastly, well boats are utilized as a delousing approach, which involve freshwater treatment (Powell et al., 2015; Hjeltnes et al., 2018; Overton et al., 2019).

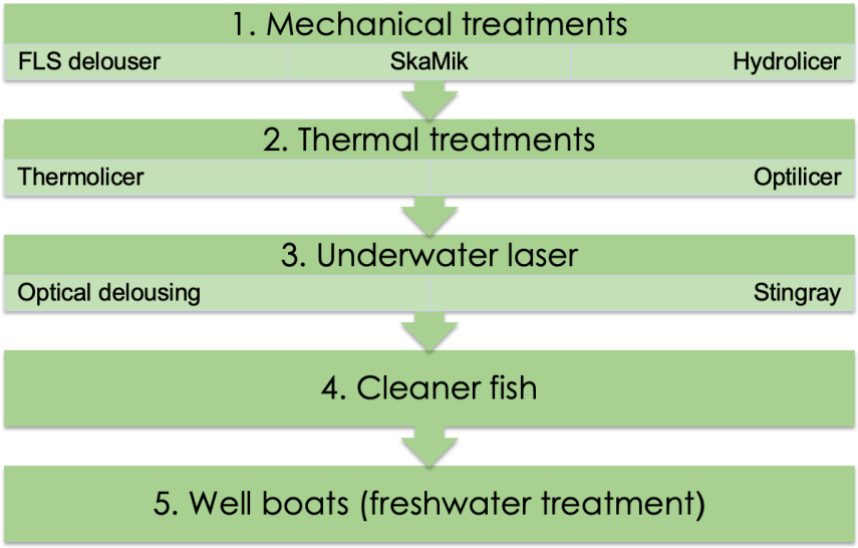

Figure 4: Overview of non-medical treatments

Escapes. The problem of salmon escapes is considered as a challenge related to sustainability for the salmon farming industry in Norway. One of the consequences of escaped farm salmon is how it is influencing the genetics of wild salmon. When farmed salmon escapes, they either migrate to rivers with wild salmon populations, dies from starvation or diseases, or becomes eaten by predators. Due to the possible negative effects on the environment and the impacts on the wild salmon, salmon farmers are trying to reduce the amount of escaped farm salmon to zero escapes (Guttormsen, 2015).

Fish feed and the carbon footprint. Further, fish feed ingredients are also seen as highly problematic, due to destruction of rainforest and other vulnerable areas of forests (Fylkesnes and Haltbrekken, 2019, p. 1). The increased volume of salmon production is among others depended on fish feed for the salmon. One of the challenges is to find protein ingredients to the fish feed with the lowest environmental impact (Solberg, Moiseyev, Hansen, Horn, and Øverland, 2021). Most of the vegetable protein ingredients of fish feed today stems from soybeans, i.e., soy protein concentrate (SPC), produced in South America. Soy protein production requires large areas of land. For example, SPC imported into Norway in 2017 required land areal of 1505 km^2 in Brazil (Fylkesnes and Haltbrekken, 2019, p. 1). Additionally, 0.55 kg soybeans are required to produce 1 kg salmon (Lundeberg and Grønlund, 2017). This is a great concern and a cause of vast issues, as the soy industry in South America and its associated problems of extensive environmental damages and immense carbon footprints are just among some of the dilemma that poses a substantial challenge for the salmon farming companies that use SPC in fish feeds. This place salmon farming companies in a difficult position, considering that 1,35 million tons of salmon was produced in 2019 (Fiskeridirektoratet, 2020a), which also means that at least half the number in million tons of soybeans were involved.

2.4. Sustainability Initiatives

2.4.1. Aquaculture Stewardship Council (ASC)

The Aquaculture Stewardship Council (ASC) is a non-profit organisation which is driven by "aquaculture producers, seafood processors, retail and foodservice companies, conservation groups, scientists and consumers" to provide certifications on sustainable farmed seafood. ASC has its own label on the products of member organisations, which therefore communicate environmental integrity to customers during the purchasing moment (Mowi, 2020, p. 38). ASC is a third-party certification, specialised for aquaculture operations. ASC was established in 2010 by the World Wide Fund for Nature (WWF) and the Sustainable Trade Initiative (IDH).

This certification standard is verifying to the market and consumers that they are purchasing a product that is considered environmentally sustainable and in compliance with UN Sustainable Development Goals (Vince & Haward, 2017; Aquaculture Stewardship Council, n.d.). The certification standards entail seven different principles that companies need to follow in order to get ASC certified (Aguayo and Barriga, 2016).

Figure 5: The seven principles of ASC certification (Aquaculture Stewardship Council, 2019).

2.4.2. Paris Agreement

The essence of the Paris Agreement, which was signed in 2015, was the unification of 195 countries and their shared commitment to cut carbon footprint and keep global warming to below 2°C. This climate change accord sends a clear message to businesses and investors that the future markets focus lies on renewable energy, low-carbon products and new technology. The agreement also entailed crucial aspects such as ending deforestation and reducing energy and transport emissions (Jacobs, 2016).

2.4.3. Global G.A.P

The Global G.A.P was established in 1997 and is an organisation that was shaped from growing concerns in terms of conditions such as “product safety, environmental impact, the health and safety of workers and animal welfare” (Aguayo and Barriga, 2016). Global G.A.P Aquaculture was further made to make fish farms become more transparent. The goal was to help companies document and present their sustainability work (regarding environmental impacts and animal welfare) and make it more visible to stakeholders. Focus areas are “food safety, protection of the environment, work environment and animal welfare” (Kiwa, n.d.). Global G.A.P certification entails having third-party inspections to certify aquaculture products (Aguayo and Barriga, 2016).

2.4.4. Global Salmon Initiative

The Global Salmon Initiative (GSI) was created by a network of global firms in the salmon industry. The coalitions’ purpose is to collaborate on tackling environmental challenges and work together to increase sustainability in the salmon farming industry. For example, one of the sustainability initiatives that GSI members have committed to, is their aim to certify salmon farms with the ASC certifications (Bush, 2018).

2.5. Licenses

The salmon farming industry in Norway are regulated by licenses or concessions, which are essentially permits that allow salmon farmers to access the industry. There are two fundamental explanations highlighting the need for regulation. First, the control of production volume and the whom the producer is, and secondly, the protection of the environment in terms of costal sea areas. The former can create risk of overproduction if not controlled and the latter can have harmful externalities towards other species and stakeholders in the areas (Hersoug, 2015).

The purpose of licenses and quotas is to control and measure production volume. From 2005 and onwards, production quotas are coordinated based on a system called maximum allowable biomass (MTB) (Hersoug, 2015), which entails the limit on how much fish that can be in the water at the same time (Guttormsen, Davidsen, Sæther, Berg, Knutsen, Ellingsen and Brandvik, 2012). The regulations for salmon farmers are separated into regions, from Nordland County and southwards as one, while northern areas such as Troms and Finnmark have another. An ordinary license for the former consists of 780 tons MTB as a limit and the latter has 945 tons (Hersoug, 2015). Meaning that this is the maximum allowance that the license permits the location to have of living fish in ocean (Guttormsen et al., 2012).

In Norway, different set of licenses has emerged, and these includes green licenses, development licenses, viewing licenses, research licences and teaching licences (Nofima, n.d.). The most pertinent ones in this research context are 'light-green', 'dark-green' and 'development licenses' (Christiansen and Jakobsen, 2017). A green license gives salmon farmers the possibility to increase production. However, it requires companies to use technology and production approaches to mitigate salmon escapes and lice (Lekang, Salas-Bringas and Bostock, 2016). The green licenses have stringent conditions, the 'light-green' have criteria such as "upper limit of 0.25 adult female sea lice per salmon" and the 'dark-green' have "maximum of 0.10 sea lice per salmon" (Hersoug, 2015). In 2013, 45 green licenses were available, 15 of these licenses were auctioned off in a closed bidding round and the remaining 30 were allocated for a fixed price of ten million NOK per license (Guttormsen, 2015). On another hand, development licenses are subsidies from the government. The conditions to gain development licenses are also very strict, companies must invest substantial amounts in the projects and develop new technological solutions towards becoming greener. This is only to become eligible to be considered among the applicants and the competition is fierce considering the high number of participants and the limited number of licenses available. The development licenses have mostly been granted to companies that focus on ocean farming, which has entailed large development projects of creating different and/or new technology/constructions (Christiansen and Jakobsen, 2017).

Licenses are issued by the aquaculture authorities, more specially by the Norwegian Directorate for fisheries, and are allocated to firm's based on different criteria, conditions and requirements (Christiansen and Jakobsen, 2017). There are limitations to licenses being granted, as part of the authorities' objective to control access to the market (Hersoug, 2015). However, the demand for licenses is high among the companies and thus the competition to obtain them are evident (Christiansen and Jakobsen, 2017). Subsequently, licenses are not only difficult to obtain but companies must also pay substantial prices (except from development licenses) and go through a demanding application process for the licenses (Hersoug, 2015). The low supply of licenses can be assumed to have prompted many of the creative innovations that have emerged in the industry (Christiansen and Jakobsen, 2017).

3. Literature Review

The following chapter presents the theoretical foundation of our thesis. The theory will be structured into two main sections, namely Resource-based theory and Transaction Costs Economics.

Subchapter 3.1: *Resource-based Theory* presents different aspects of resource-based views (RBV) that has evolved over several decades. The theory conveys how companies can utilise and gain resources to achieve competitive advantages which then leads to superior firm performance. The RBV concept is explained with the subchapters covering (1) economic rents, which involves the exceeded surplus earned by the company's unique resources, (2) assumptions of resource-based view, (3) resources and capabilities and (4) The VRIO Framework. However, it is important to include aspects such as 'Tacit Knowledge' and 'Dynamic Capabilities'. The latter creates an extension of the VRIO framework, thus encompassing companies' ability to utilise resources in an economically sustainable manner. Ultimately, we present a subchapter about critique, to provide an open insight into weaknesses of the RBV concept. We chose this theoretical concept to explore the importance of firms' resources and capabilities in a transition towards sustainability.

Subchapter 3.2: *Transaction Costs Economics (TCE)* allows us to build on the resource-based view by adding a primary understanding of why investments of new resources (i.e., related to sustainability-motivated innovations) are complex. Additionally, TCE theory conveys how companies should proceed when acquiring new and unique/tailored resources. The TCE theory is outlined through these consecutive subchapters: (1) Transaction attributes, (2) governance structures, (3) bilateral and unilateral dependency and conclusively (5) the SAM construct, for addressing the complexity of investments. Our aim is to demonstrate how companies can most efficiently create value when investing in solutions to preserve the environment, but also claim value in return.

3.1. Resource Based View

According to Barney and Clark (2007, p. 14), resource-based theory publications of Wernerfelt (1984) have been contemplated as a 'dualistic reasoning' for competitive advantages, as it builds on Michael Porter's (1980) view on market positioning as a competitive advantage. Wernerfelt conveyed that the degree of competitive advantages is influenced by the resources a company acquires or develops. Thus, he developed the idea of a 'resource-based view' and presented a different explanation to the same problem as Porter, among others, did with his five forces market positioning model (Barney and Clark, 2007, p. 14). While traditional industrial organisation literature focuses on external industry factors (Mahoney and Pandian, 1992), resource-based view has an intrinsic focus and contends that companies constitute a portfolio of resources through which they gain superior firm performance, competitive advantages and economic rents (Tate & Bals, 2018; Chatzoglou, Chatzoudes, Sarigiannidis & Theriou, 2018; Mahoney, 2001). Environmental changes are nonetheless crucial to be aware of, because it "may change the significance of resources to the firm" (Penrose, 1959, cited in Mahoney & Pandian, 1992).

3.1.1. Economic Rents

Mahoney (2001) claim that "resource-based theory is a theory of firm rents". To further understand the meaning of this statement, it is salient to clarify the term rents. Scholars explain the phrase in various ways. Tollison (1982) define rents as "a return in excess of a resource owner's opportunity cost". This means that rents are the extra earnings that exceeds the anticipated return of a resource. However, rent earnings are not solely in terms of money (Peteraf, 1993). There are three types of rents: Ricardian rents, Monopoly rents, and Entrepreneurial rents. These various types provide other returns like ownership and market power (Bain, 1968; Mahoney & Pandian, 1992).

First and foremost, “rents may be achieved by owning a valuable resource that is scarce” (Ricardo, 1817, cited in Mahoney & Pandian, 1992). A firm can gain Ricardian rents if they are in possession of a limited resource such as valuable land, patents and copyrights (Mahoney and Pandian, 1992). The key element is to have minimal in supply of the scarce resources. The firm “can sustain this type of competitive advantage only if their resources cannot be expanded freely or imitated by other firms” (Peteraf, 1993). Hence, heterogenous resources (which will be discussed below).

A firm can gain Monopoly rents if they are able to “maximize profits by consciously restricting their output relative to competitive levels”. This means that a firm is in a position where they have the market power to control production and regulate prices without having to fear competitors in the market (Peteraf, 1993). Thus, monopoly rents can often be earned at the expense of consumers. To illustrate, Apple is for instance a company with great market power and can to an extent maximise profits. Monopoly rents is often gained by for example government protection (Bain, 1968; Mahoney & Pandian, 1992).

Entrepreneurial rents (also known as Schumpeterian) are described as “value created when economic actors combine resources in new and different ways, and when the value of these resource combinations is not known, ex ante” (Rumelt, 1987, cited in Alvarez, 2007). This means that entrepreneurial rents often occur under uncertain conditions. It also implies that a firm needs to be innovative and willing to take risk to use resources in a rare way to earn rents (Alvarez, 2007). In other words, there must be a difference between a firm’s ex post value and ex ante costs for entrepreneurial rents to exist (Rumelt, 1987; Peteraf, 1993).

Additionally, it is imperative to clarify that rents occur solely when there is lack of competition involved, which further entails that rents are seemingly controlled by the existence of competition in a market (Mahoney and Pandian, 1992). Ultimately, RBV theory perceive ownership or control of resources as paramount to enable the process of earning rents for the firm (Lavie, 2006; Verwaal, Commandeur & Verbeke, 2009), i.e., Ricardian rents and Monopoly rents.

3.1.2. Assumptions of the Resource-based View

To expand on Mahoney's statement about resource-based theory of firm rents and how they induce them, four theoretical conditions are introduced: *heterogeneity*, *ex post limits to competition*, *imperfect mobility* and *ex ante limits to competition* (Peteraf, 1993). Resource-based theory builds on the assumptions that company resources are (1) heterogeneously distributed among companies, (2) difficult to imitate or replace, (3) imperfectly mobile and (4) protected from cost offsetting rents (Foss, 1998).

The assumption of resource *heterogeneity* conveys that companies are viewed as bundles of different resources that are unique for each firm, e.g., their innovation team, which create core competencies as a source of strengthened competitiveness (Barney, 2013, p. 124-125; Simão, 2010; Chatzoglou et al., 2018). *Ex post limits to competition* indicate that when a resource is heterogeneous, a firm will only sustain its superior position and competitive advantage if there exist barriers to protect the heterogeneity condition from competitors (Peteraf, 1993). Such barriers indicate that it should be complex or unfeasible for rivals to mimic or replace a firm's rent-yielding resources. From a resource-based perspective, there are two imperative aspects hampering ex post competition, which is 'imperfect imitability' and 'imperfect substitutability' (Peteraf, 1993). Imperfect imitability, also referred to as 'isolating mechanisms', is a condition when a firm is protected from imitation from competitors and can sustain their rent flows or competitive advantages (Rumelt, 1984, cited in Peteraf, 1993). More specifically, heterogeneous or scarce resources can be shielded from competitor's ability to imitate them if they are protected by e.g., patents, licenses, intellectual property rights or safeguarded by firms' tacit knowledge on an organisational level (that can be embedded in a firm's specific 'learning by doing' experiences) which makes it difficult to imitate (Rumelt, 1987; Peteraf, 1993; Howells, 1996; Teece & Pisano, 1994). Imperfect substitutability is a condition when a firm is protected from its resources being substituted by other competitor's equivalent resources (Barney, 1991). Competitors' incentives to substitute can be reduced by building isolating mechanisms around holding resources and capabilities and thus create entry- and mobility barriers (Amit, Raphael, and Schoemaker, 1993).

However, substitutability can appear in different ways, even though a firm's resources may not be imitated, it may still be substituted by an equivalent resource which can provide similar outcomes (Barney, 1991). Nevertheless, imperfect imitability and substitutability are barriers that can enable a firm's position to sustain and protect resource heterogeneity and earn rents.

Resource immobility (or imperfect mobility) refers to resources being highly costly to imitate, which potentially cause sources of competitive advantages (Barney, 2013, p. 125). Resources are immobile when they are specific to a firm and cannot be transferred to another company. To elaborate, resources can be perfectly immobile if they are not as valuable for other companies than the firm employing them. In the sense that if resources are catered to a specific firm (e.g., certain competencies or equipment), making the resources idiosyncratic in the sense that they may not be useful or valuable for other companies (Peteraf, 1993).

The last condition, *ex ante limits to competition*, convey that prior to the establishment of a superior position of resources, the existence of competition for that position must be limited (Wade and Hulland, 2004). To exemplify, when a firm obtain a new location for its business, the location must be attained in the absence of competitors for the site to become superior and gain above normal returns. This momentum is practically stating that limited competition is salient to prevent costs from offsetting the rents (Peteraf, 1993).

The four conditions are to a certain degree connected, although not being completely dependent of one another or in a chronological order. The assumption of RBV is that resources are heterogeneous when ex post limits to competition is present, whereas resources are immobile when there exist ex ante limits to competition. However, it is salient to note that all four conditions must be met for resources to have sustained competitive advantage and thus sustained rents. One or two condition alone is not sufficient to preserve competitive advantages, but at best merely parity or temporary as will be discussed in the VRIO chapter (Peteraf, 1993).

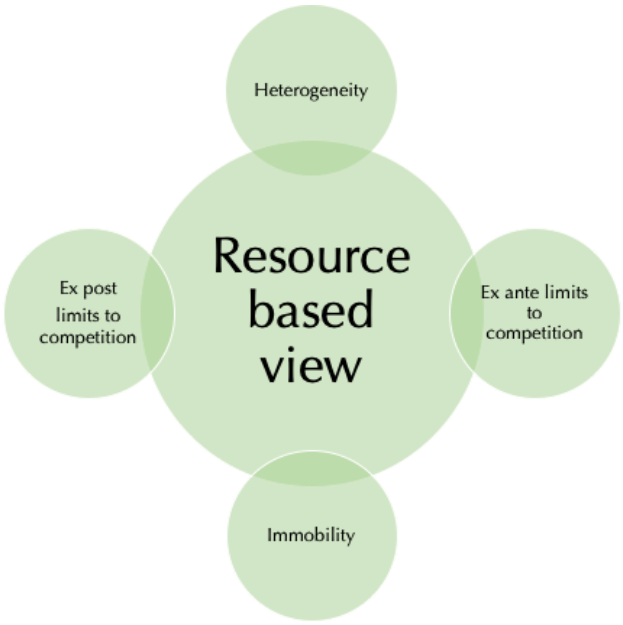

Figure 6: A conceptual model of the resource-based view's four resource conditions

3.1.3. Resources and Capabilities

Barney (2013) describe company resources as "all assets, capabilities, competencies, organisational processes, firm attributes, information, knowledge, that are controlled by a firm and that enable the firm to conceive and implement strategies designed to improve its efficiency and effectiveness" (p. 125). RBV articulates the imperative of synthesis between capabilities and resources for organisational success and value creation (Ngo and O'Cass, 2009). According to Collis (1994), a simple definition of capabilities is "the ability to conceive of new ways to create value". Capability is also the firm's ability to create value for stakeholders. This can for instance be distinctive technological capabilities or general management capabilities, which are needed in e.g., system development processes (Tate & Bals, 2018; Wade & Hulland, 2004). In other words, capabilities refer to the way a firm, through organisational processes, deploy its resources to achieve a desired goal (Amit et al., 1993), given there are no ex-ante competition.

Resources are assets or capital that are either tangible or intangible. Intangible assets (or invisible assets) are non-physical resources and tangible assets are visible items (Yallwe and Buscemi, 2014). Resources are categorised into four, physical and financial capital, human capital and organisational capital (Tate and Bals, 2018). *Physical capital* consists of visible assets, such as equipment, machines and other physical technologies, geographical location or access to raw materials, which are essential for business operations to take place (Aranda-Usón, Portillo-Tarragona, Marín-Vinuesa & Scarpellini, 2019; Barney, 2013, p. 125). *Financial capital* includes monetary resources companies holds to implement strategies. Sources to financial capital include equity- and bondholders and banks. *Human capital* covers the intelligence, experience, training, judgment, relationships and insights of workers and managers in all levels of the company. *Organisational capital* is the administrative aspect and includes the structure of the firm's formal "reporting, planning, controlling, coordinating; culture and reputation, as well as informal relations among groups within the company and between the firm and those in its environment" (Barney, 2013, p. 125).

Intangible assets consist of two categories, formal and informal. Formal includes copy rights, patents, licenses and R&D, whereas informal contains tacit knowledge, customer trust and relationship (Yallwe & Buscemi, 2014; Howells, 1996), technology, brand image, corporate culture, management skills and control of distribution, which encompass sources of adaptability and competitive power. Invisible assets can be gained through different sources of information, including environmental, corporate and internal information. Information that flows from the environmental to the company create invisible assets such as customer information and production skills. Corporate information circulates from the company to the environment and include brand- or company image and reputation. Internal information moves around within the firm and include norms and morale among employees, corporate culture and management capabilities. On one side, companies should rely on projects that correspond to their skills and area of expertise. However, to achieve business growth and development, companies should seek to accumulate new invisible assets. For instance, companies that aim to enhance an eco-innovate culture and -attitudes (Aranda-Usón et al., 2019), should acknowledge that their competitiveness may be less effective than prior to this transition.

This transition is however crucial for potential growth and development (Barney and Clark, 2007, p. 19-20).

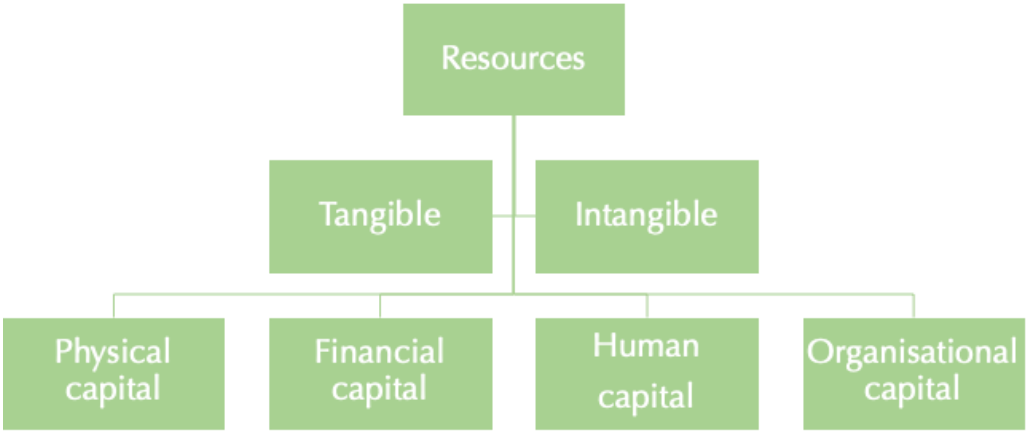

Figure 7: Illustration of how resources are constructed

Tacit Knowledge

Tacit knowledge is "non-codified, disembodied know-how that is acquired from learned behaviour and procedures". In other words, knowledge, skills and capabilities that is acquired through actual experiences. Tacit knowledge can generally not be directly or easily transferred, as the knowledge and procedures are often individual and specific (Howells, 1996). When tacit knowledge is obscured and disorganised, it becomes complex for others to assimilate it (Cohen & Levinthal, 1990; Howells, 1996). To obtain tacit knowledge, it requires aspects such as 'learning by doing', 'learning by using' and 'learning to learn', which makes it complex to imitate (Howells, 1996). Considering that tacit knowledge creates barriers for imitation, this imply that, for example if a company have knowledge that is socially embedded in the firm which requires network of relationships among the employees that work together, this can become difficult to replicate. Thus, when tacit knowledge is high and there is a barrier for competitors to imitate, it becomes likely for firms to sustain a competitive advantage (Teece and Pisano, 1994).

Dynamic Capabilities

Dynamic capabilities are described as “the firm’s ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments” (Teece, Pisano and Shuen, 1997). In simple words, it means the abilities to quickly respond and adjust in a changing environment. Although accumulating new strategic or technological assets is vital to gain competitive advantages, it is not fully adequate in a dynamic environment. Teece et al., (1997) presented the term ‘dynamic capabilities’ as a pivotal approach for firms to “demonstrate timely responsiveness and flexible product innovation, coupled with management capability to effectively coordinate and redeploy internal and external competences”. The dynamic capability perspective argues that capabilities have a greater effect on competitive advantages in the context of dynamic environments than resources alone, because it is crucial that companies use their intrinsic knowledge combined with their resources to attain strategic objectives (Cardeal and Antonio, 2012). Applying dynamic capabilities to RBV can generate innovation and create economic performance for firms (Penrose, 1959; Kor & Mahoney, 2004).

The ability to quickly respond to and deliver on potential legal restrictions of energy, land or resource use to reduce waste and negative environmental impacts can be an example of a company’s dynamic capability. For example, if a Norwegian seafood company, e.g., head of salmon farms, can use its internal resources to renew their capabilities and expertise in order to reduce annual fish waste rate or CO2 emissions from production, they achieve congruence with the changing business environment (Sodhi, 2015; Teece et al., 1997). The company then purposefully uses its capabilities to build, integrate, and configure competencies and thus extend and modify its resources. In contrast to organisational capabilities, which are existing core competencies, dynamic capabilities are created as employees quickly learn how to develop and integrate strategic knowledge into their business model and processes (Lenssen and Smith, 2019, p. xxxiv). In terms of dynamic capabilities, it is also essential to notice outcomes such as learning capabilities (or experiences), that will be gained over time. More specifically, this refers to the capability that is acquired/learned when there exists earlier execution experience.

For example, when a company build a product, they gain experience (which can be considered as a learning capability) and the experience they acquire will enable them to repeat the process and possibly build a better product because of former practices (Teece and Pisano, 1994).

3.1.4. VRIO Framework

To analyse the heterogeneity and immobility of a particular company's capabilities and resources, we introduce a management tool, the VRIO (valuable, rarity, inimitability and organisation) framework. VRIO was developed by Barney (1991), and was initially VRIN, which N stood for non-substitutable. The framework was later altered, and the N was intertwined with I, and O was added to the framework as we know it today (Barney, 1991; Cardeal & António, 2012). RBV theory claim that VRIO is a framework to understand the relationship between firm resources and competitive advantage (Barney and Clark, 2007, p. 68-69). The framework helps evaluate internal strengths and weaknesses of resources and capabilities in terms of firm performance. Thus, portrays four requirements a company must obtain to gain competitive advantages (Barney, 2013, p. 129; Bresser, Rudi & Powalla, 2012). However, such benefits are either temporary or sustained (competitive advantage) depending on the resources' position, compared to players in the competitive environment the firm is operating in.

Value. A company's resources and capabilities are valuable when utilised to respond to environmental opportunities or neutralise occurring threats from the environment (Barney, 2013, p. 129). Valuable resources contribute to economic value through e.g., reduced costs or increased revenues, and make business assignments more efficient and effective to complete (O'Riordan, 2006; Cardeal & Antonio, 2012). For example, if the geographical location of a corporate headquarter is nearby a cluster of resourceful business partners, it gives access to more business opportunities compared to being in a less populated district (O'Riordan, 2006). If resources and capabilities are not creating value, due to increased costs or decreased income, the firm is experiencing a *competitive disadvantage*. To solve this problem, the firm should consider replacing the resource with a different one or enhance the current one (Knott, 2015).

Rarity. A resource is rare if it is "controlled by only a small number of firms". If a resource or capability is valuable, but held by many competing firms simultaneously, it is not likely that these resources will result in any competitive advantage. If competitors utilise the same resources and thus develop the same value creating strategies, the valuable resource will not strengthen the competitiveness (Bresser et al., 2012; Cardeal & Antonio, 2012). A resource that lacks rarity results in the state of *competitive parity*, leading to unchanged or average economic performance, which is good for survival, but no firm can obtain competitive advantage, because the same resource is held by several firms (Barney and Mackey, 2016). In contrast, if a company possess resources and capabilities that are firm-specific and rare, the firm can generate competitive advantage. However, if the costs of imitating the resource or capability are low, this competitiveness is only short-term. On the other hand, with resources being significantly costly to imitate, the company can acquire sustained competitive advantage over a longer period (Bresser et al., 2012).

Inimitability. The resource is inimitable when companies that seek to imitate other resources or capabilities experience cost disadvantages in this process compared to companies that already possess these resources (Barney, 2013, p. 132). Other factors that prevent imitation may be that there are legal property rights such as patents, or extensive employee training of skills and knowledge to deploy the resources. Hence, when a resource is valuable, rare and difficult to imitate (i.e., inimitable), the company has the potential to gain *temporary competitive advantages* (Cardeal & Antonio, 2012; Barney, 2013, p. 138). When exploiting such resources, first-mover advantages may be generated (Knott, 2015). Examples of such advantages include gained "access to distribution channels, develop goodwill with customers, a positive reputation" (Barney, 1991). This advantage is temporary because competitors recognise this competitive advantage and are thus met with the opportunity to acquire similar resources through low-cost substitution or direct duplication (i.e., copying) (Knott, 2015). Besides, first-mover advantages require an industry to be heterogeneous and not homogeneous in respect of which resources they possess. This is because firms within homogeneous industries obtain the same resources and can efficiently develop a strategy and exploit the same possibilities (Barney, 1991).

Organisation. To fully attain *sustained competitive advantages* with resources being valuable, rare and inimitable, it is crucial for companies to be organised specifically to enable resource and capability exploitation (Barney, 2013, p. 138). This aspect can be complex to manage because it requires leadership to build a culture that allow resources to be prospered (O'Riordan, 2006). However, due to cost disadvantages, imitated companies will neither create competitive advantages or competitive parity as the successful firm is reflecting ambiguity regarding "which resources to imitate, the socially complex nature of these resources and capabilities, or any patent advantages" (Knott, 2015). Again, given that an industry possesses the same resources (resource homogeneity), including the physical, organisational and human capital, there is a lower, if not zero probability that any firm within that industry will gain sustained competitive advantage. This is because all competitive firms within the given industry can use the same resources to implement similar strategies and thus enhance their effectiveness and efficiency (Barney, 1991).

As the scope of resource-based business research is mainly restricted to economic performance and competitive advantages, topics on social issues and how to create capabilities to operate sustainably while simultaneously attain profitability are still in progress. RBV frameworks have been used in former research to highlight capabilities towards commitment to environmental challenges and eco-innovation (Aranda-Usón et al., 2019; Portillo-Tarragona, Scarpellini, Moneva, Valero-Gil & Aranda-Usón, 2018). Eco-innovation represents sustainable characteristics of companies' product design and production processes. However, utilisation of internal resources such as financial capital and company capabilities connected to sustainability implementation is yet to be explored (Aranda-Usón et al., 2019).

Resource/ capability	Value	Rarity	Inimitability	Organisation	Competitive Implication
1	No	No	No	No	*Competitive Disadvantage*
2	Yes	No	No	No	*Competitive Parity*
3	Yes	Yes	No	No	*Temporary Competitive Advantage*
4	Yes	Yes	Yes	Yes	*Sustained Competitive Advantage*

Table 1: Illustration of the VRIO framework and its competitive implications (Barney, 2013, p. 140).

3.1.5. Critique of the Resource-based View

The RBV framework has been widely discussed and received valuable contributions with insights from prominent academics during the past decades. Thus, there are many scientific viewpoints across the field. Foss (1998) discussed that the RBV suffer from some weaknesses in terms of feasibility of the framework. He argues that there is a gap of a conceptual model of how firms are to proceed with the internal development of new resources, specifically, how to create capabilities with attributes that are rare and difficult to imitate. Concurrent, some other scholars argue that the RBV did not explore organisational aspects that could lead to weaknesses in resources and thus how poorly it would influence a firm's competitive advantage (Page West III and DeCastro, 2001). Williamson (1998) claim that RBV can be an informative theory but lacks the "efforts to predict success". To fill this gap, we will introduce Transaction Cost Economics/Theory in a later section.

In this thesis, we aim to use the concept of RBV to understand how firms can create value from resources and capabilities. RBV examine and covers the fundamental cornerstones of a firm and how certain resources can generate value to organisations, e.g., competitive advantage or rents (Peteraf, 1993). However, Hart (1995) criticises the RBV framework for "systematically ignoring the constraints imposed by the biophysical (natural) environment".

Hart continues with arguing that traditional management theories have solely focused on political, economic, social and technological aspects of the external environment. To sustain competitive advantage in an era where environmental challenges and solutions seldom have been more important, frameworks such as RBV becomes inadequate when identifying essential sources to competitive advantages (Hart, 1995). Therefore, we aim at introducing RBV into a context where substantial focus on the natural environment cannot be neglected.

3.1.6. Summary of Resource-based View

To summarise, firms can earn economic rents through company's heterogeneous resources. More specifically, economic rents can be obtained through organisation's capabilities and competence involving how to effectively utilise resources, rather than solely being in possessions of exceptional resources (Mahoney and Pandian, 1992), thus, such competence poses a resource. Moreover, RBV can contribute to advance significant value for firms and their corporate strategies, as firms' can gain competitive advantages and sustained rents if they assure that the resources' four conditions of heterogeneity, ex post limits to competition, imperfect mobility and ex ante limits to competition, are met (Peteraf, 1993). Ultimately, RBV is about company resources (i.e., physical, financial, human and organisational capital) that are either tangible and intangible (Tate and Bals, 2018) and capabilities, and their ability to deploy these to create value. The essence of the theory is to be in possession of resources and capabilities that considered valuable and scarce or acquire them in order to gain competitive advantage (Aranda-Usón et al., 2019). Additionally, when tacit knowledge is present, the concept explains how it create barriers that prevent imitation (Howells, 1996). Furthermore, it is essential for firms to be familiar with the concept of dynamic capabilities because it can be beneficial for them to have these abilities intact, to quickly respond and adapt their resources to changes in the business environment (Teece et al., 1997). The VRIO framework was introduced as a tool to evaluate firms' resources and to understand how one can achieve the ultimate implication of *sustained* competitive advantage, by having resources that meets the four conditions of being valuable, rare, inimitable and organised (Barney, 1991).

3.2. Transaction Costs Economics

To understand the potential effects of sustainable value creation (excess value, i.e., rents), we want to introduce Transaction Cost Economics (TCE), also referred to as Transaction Cost Theory (TCT) (De Vita, Tekaya, and Wang, 2011). The idea is to complement the resource-based view, while being aware of the process and associated risk, in terms of how to acquire and develop new resources and capabilities that are specific and unique to foster innovation. Associated transaction costs are both *ex ante* and *ex post* costs. Ex ante costs involve direct costs of negotiating contracts (i.e., searching, drafting and negotiating) or indirect costs (opportunity costs) of "foregone transactions", in other words, cost of lost value when failing to identify the most fitting transaction partner (Ghosh and John, 1999). Ex post costs include direct costs associated with legally binding agreements (i.e., monitoring and enforcing agreements) (Rindfleisch and Heide, 1997) or indirect costs of lost value when failing to adopt the most profitable activities or assets, due to lack of sufficient information. Hence, there are uncertainty involved with transactions (Ghosh and John, 1999). Ketokivi and Mahoney (2017) describe uncertainty as "our fundamental inability to anticipate the future, our limited understanding of nature". In order to be/remain financially sustainable and survive, companies must attain results through specific and tailored investments (Ghosh and John, 1999), as in this thesis case, social- and environmental motivated investments.

According to TCE, two behavioural assumptions are *bounded rationality* and *opportunism* (Williamson, 1989). Bounded rationality is that the rationality of an individual party lacks the capability to "process all available information" in an exchange, thus this leads to failure in attempt of preventing opportunism (Williamson, 1989; Carlson & Bitsch, 2019). Opportunism contends that human actors may, for different reasons, dishonestly seek self-interests, this means behaviour that will not act in the best interest of all relevant parties of a transaction (Williamson, 1989). Examples of opportunistic behaviour are if a company is holding back on critical information, breach commitments or withdraw from contracts to benefit their own interests (Huo, Ye, Zhao, Wei and Hua, 2018). These assumptions are reasons for contracts being incomplete and complex.

3.2.1. Transaction Attributes

The unit of analysis in TCE theory is argued to be the "transactional relationship between buyers and suppliers" (Huo et al., 2018). Williamson (2010) confirm that the important dimensions of transactions (e.g., investments, resource acquisition, etc.) are connected to transaction attributes. To mitigate risks, we need to investigate attributes of transactions. These are (1) *frequency* of transactions, which is how frequent an interaction between two parties occurs. Frequency of investments are either categorised as one-time, occasional or recurrent (Williamson, 1979). Thus, it may allow the parties to utilise e.g., information sharing to build reciprocal trust. The frequency of transactions also contributes largely to determine which governance structure it pays off to set up (Williamson, 1979; O'Donnell, 2009; Carlson & Bitsch, 2019; Augusto & de Souza, 2015).

Further, (2) firms can experience *uncertainty*, an attribute which refers to the changes in environmental and behavioural uncertainty likely to arise, that exchange parties cannot foresee (Ketokivi and Mahoney, 2017). Environmental uncertainty[1] refers to lack of knowledge or information about changes in a business context or external alterations that emerge which may impact managerial decisions (López-Gamero, Molina-Azorín, & Claver-Cortés, 2011). For instance, new technology or new/high-risk projects may be an environmental uncertainty for a company because limited information is available about how the technology or projects will play out, and the firm may not be able to predict the outcome or control external changes (López-Gamero et al., 2011). Moreover, behavioural uncertainty (also referred to as performance ambiguity) is the unpredictability of human behaviour due to factors such as bounded rationality and opportunism (Williamson, 1985; cited in Meuleman, Manigart, Lockett & Wright, 2006).

[1]Environmental uncertainty is "the shortage of information on the events and actions taking place in the business environment and/or the impossibility of predicting external changes and their impact on organisational decisions" (Duncan, 1972; cited in López-Gamero et al., 2011).

The ultimate attribute, (3) *Asset specificity* (specific/tailored investments), "refers to the specialised investments made by one part or both parties, to enable the exchange" (Ketokivi and Mahoney, 2017). The asset specificity term has been criticised for its unclear and complex theoretical definitions. TCE articulates that the asset-specific investments should be deployed if it exceeds anticipations in terms benefits of cost savings and/or added value for a party (De Vita et al., 2011). Ghosh and John (1999) confirm this by arguing that additional transaction costs are not desired "unless π_1 exceeds π_0", meaning total margins ex post (π_1) should exceed total margins ex ante (π_0). The attribute builds on the subject of 'specialised ability' required in trades, through firm-specific resources and capabilities (Marshall, 1949, cited in De Vita et al., 2011). Asset specificity can be distinguished and divided into six dimensions: *site specificity, physical asset specificity, human asset specificity, brand capital specificity, dedicated asset specificity* and *temporal specificity* (see Table 2) (Williamson, 1998; De Vita et al., 2011).

Site specificity	A proximate relationship between buyer and supplier where there is a high priority to reduce inventory and transaction costs. Assets are immobile, which makes relocation costs high.
Physical asset specificity	Customised investments particular to a specific transaction and purpose, e.g., investment of an equipment or machine for a specific transactional purpose or general use.
Human asset specificity	Transaction-specific knowledge or knowledge-specific asset, which represent the knowledge required for collaborating with another firm, e.g., technical skills, learning-by-doing capabilities, pertinent experience for the transactional activity including costs of training and development, and other human capital costs.
Brand capital specificity	Investments on reputation, and thus, overall firm performance. Brand name capital can be measured in e.g., advertising/sales ratio and consumer perceptions. Another example: outsourced catering services within the aviation industry can damage an aircraft company's reputation in the buyers view if the food is of bad quality.
Dedicated asset specificity	Dedicated assets are specialised for certain uses and transactional agreements, whereas the aim is to entail long-term relationships and enhance capacity. For example, a large customer may demand a product contract for a certain event, which causes the company to increase their capacity to meet that demand. However, it is then crucial to maintain this relationship to avoid over-capacity.
Temporal specificity	Temporal specificity refers to the value of coordination and timing of transactional agreements, as assets are time specific if they are to reach an end user within a certain time frame (e.g., the importance of clean linen delivery to hotels each day).

Table 2: Dimensions of asset specificity (De Vita et al., 2011).

Unique or specific/tailored investments between two parties transpire with the aim of creating or enhancing value (Ghosh and John, 1999). The dimensions of transactions (i.e., transaction frequency, uncertainty and asset specificity) are salient aspects when deciding upon which governance structure to operate through (De Vita et al., 2011). The aim is to choose the governance structure that best safeguards the specific and vulnerable investments. The larger the specific investment, the more imperative is it to have stronger governance protection. The next section will explore different governance structures and to what extent they are protective against asset-specific investments (Ghosh and John, 1999).

3.2.2. Governance Structures

TCE affirms that companies' governance structures are dependent on their "incentive intensity, administrative controls and contract law regime" (Williamson, 1989). Transaction costs economics are relevant when it comes to preserving specific investments against uncertainty in an economic exchange through the appropriate governance structures (Ghosh and John, 1999). TCE studies firms as governance structures (i.e., organisational constructions), whereas "governance is the means by which to infuse orders, thereby to mitigate conflict and realize mutual gain" (Williamson, 2010), instead of merely a production function (i.e., technological construction) (Williamson, 1998).

Governance structures offers control and contribute to protect investments and determine how transactions are constructed, which can occur through market, hierarchy or hybrid forms. When firms' transactions are intrinsically operated through market forms, there are low incentives for administrative control and involvement. Conversely, hierarchical governance forms involve high incentives to administrate and manage company resources (Williamson, 1989). The latter, relational/hybrid governance forms rely on alliances to acquire complementary resources. Governance structures protect investments to different degrees, depending on the level of asset specificity of the pertinent project (Ghosh and John, 1999). The principle is that specific and complex investments create dependence and require the need of governance protection (Williamson, 1985, cited in Augusto & de Souza, 2015).

Market Governance

First, *market governance* describes spot transactions between parties in a market. This is simply what leaves the trading parties with autonomy in terms of flexibility, to either form or break relational ties (or contracts), thus increase the capability to utilise other and new opportunities to create value (Ghosh and John, 1999). In the spot market, transactions occur simply in the form of commodity sales. Market players adapt quickly to changes in the circumstances as new information emerges, as this is disclosed through price changes through competition (Ghosh & John, 1999; Banterle & Stranieri, 2013). Market governance implies vulnerability at the value claiming stage, due to high degree of environmental and behavioural uncertainty (Ghosh and John, 1999). More specifically, because this form of governance lack ownership and control of resources and have a low degree of dependency, it also means limited extent of power. Additionally, in terms of relationships between transaction parties, they are short-term interactions rather than long term partnerships (Bech and Pedersen, 2005).

Hierarchical Governance

Hierarchical governance depends on in-house control and ownership of resources and activities necessary to safeguard or protect the claimed value in a value creation process, making the degree of partnerships/contracts low (Klein, 2005, p. 438; Ghosh & John, 1999). The hierarchical alternative is the internalising and integration of production within the organisation instead of in the spot market (Ghosh & John, 1999; Bech & Pedersen, 2005). For example, large firms within salmon farming tend to turn to hierarchical governance to internalise capabilities essential to production, because it becomes salient for them to protect the specific capabilities (Bush, 2018). In cases of high asset specificity and complex investments, in-house production offers more security for these specific/tailored investments (Williamson and Ghani, 2012). However, there are vast opportunity costs that exists within in-house production.

High asset specificity creates a need for safeguarding and lack of appropriate safeguarding can lead to problems for firms. Especially the risks of losing their property rights over assets (control of assets) or low productivity as a follow of lost opportunity to invest in specialised assets (Rindfleisch and Heide, 1997). This can be argued with the recognition that in-house production, or internalised activities, require firm-specific competencies and routines, which is also difficult to imitate (Ghosh and John, 1999), as introduced in the resource-based view.

Hybrid Governance

Relational (hybrid) governance forms are a more combined governance structure of the market and hierarchical forms. There is a high number of contracts involved, due to partnerships, alliances and franchises, which all require partner-specific investments, as well as "social norms to safeguard claims to shares of the value created" (Ghosh and John, 1999). Unlike market governance, hybrid governance considers coordination between parties as more important than incentive intensity[2] (Ebers and Oerlemans, 2016). Moreover, compared to hierarchy, hybrid governances value incentive intensity over cooperativeness, which places the hybrid governance form between market and hierarchical (Ebers and Oerlemans, 2016), because the hybrid approach aims to safeguard specific/tailored investments in symbiosis with "retaining high-powered incentives of market relations" (Klein, 2005, p. 438). Hybrid structures are comparable to parties doing business together, without any joint ownership, but collaborate in terms of exchanging or sharing technologies, products, capital or services. Hybrid governance structures have in various research been explained as long-term contracts, alliances, joint ventures, selective intervention, profit centres and quasi-integration, which demonstrate that there is a great variation of hybrid forms, yet more investigation about how these differ is needed (Ebers and Oerlemans, 2016).

[2] According to Zenger & Marshall (2000), "the incentive intensity of rewards - often measured as the variable portion of pay - enhances employee contributions to performance. Incentive-intensive pay increases effort and may increase the talent level of those attracted to a compensation plan".

Research within hybrid forms on alliances addresses firms' incentives, terms of payment, structure of administration, learning capability regarding sharing technology knowledge and exchange of proprietary information (Ebers and Oerlemans, 2016). Oxley (1997) list examples of interfirm alliances for value creation: "licences, cross-licensing, technology-sharing agreements, international production joint ventures, collaborations in product and process R&D and customer-supplier relationships". The sharing of knowledge and proprietary information are relevant topics in terms of trust between parties (Kale, Singh, and Perlmutter, 2000). Both parties are positioned in a state between "trying to learn and trying to protect*"* their own proprietary assets (Kale et al., 2000). Specifically, the parties will procure new technological capabilities (knowledge) while the other part will 'lose' its proprietary capital to the other part. This is, according to traditional TCE, risky due to the uncertainty of opportunism. However, shared knowledge can be a source of mutual trust and respect among alliances, thus strengthen the relational capital. This may facilitate learning and reduce the probability of opportunistic behaviour in terms of 'stealing' proprietary information from other parts (Kale et al., 2000).

The following graph illustrate the spot market structure (M), the hybrid market structure of contracts (X), and hierarchy (H). Bureaucratic consequences are illustrated in the graph as the differences in costs of M and H becomes smaller the higher the asset specificity of holding resources. Costs of governance mode (i.e., bureaucratic costs[3]) increases the higher the asset specificity, therefore M(k) > X(k) > H(k). Thus, the more necessary it becomes to adapt to more coordination (i.e., ownership and control) (Williamson, 1989).

[3]"The term bureaucratic costs refer to the costs of solving the transaction difficulties that arise from managerial inefficiencies and the need to manage the handoffs or exchanges between business units to promote increased differentiation, or to lower a company's cost structure" (Hill, Jones, & Schilling, 2014, p. 302).

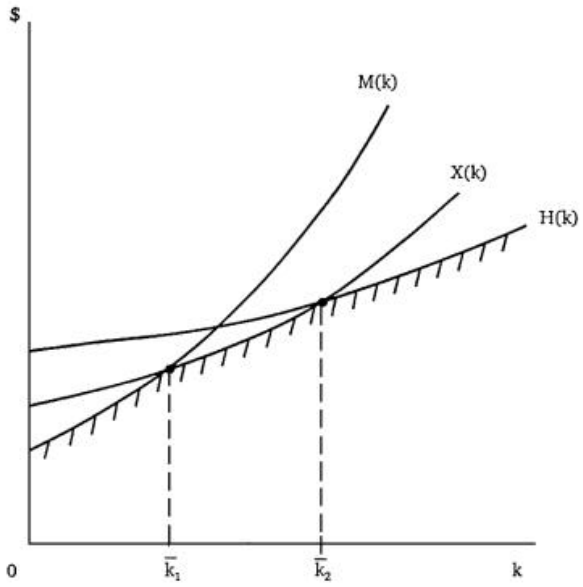

Figure 8: Costs of the various governance forms and degree of asset specificity (Williamson, 1989).

Bilateral and Unilateral Dependency

Contracts can be used to influence behaviour and therefore to some extent control the risk and uncertainty in relational exchanges. Further, there is one feature with different patterns that affects the positions in relationships, bilateral and unilateral dependence. The former is when exchanging partners are "highly dependent on each other" (which is often the case in hybrid governance) and the latter is when one of the parties "holds the balance of power" (which can be the case of hierarchical governance because of high dependency) (Lusch and Brown, 1996). When there is a high bilateral dependency between two parties it will likely reduce the risk and uncertainties, because both parties rely on each other too much to do harm to the relationship and cannot afford to jeopardise their benefits especially since the balance of power is equal between them (Lusch and Brown, 1996). Conversely, in terms of unilateral dependency, the weaker party contribute to the relationship more than the stronger or more empowered party. The stronger party may also demand information, or even flexibility in situations of environmental uncertainty from the weaker party, without providing the same in return.

Therefore, unilateral dependency is unlikely to yield relational behaviour or trust between parties. If there is a case of unilateral dependency, opportunistic behaviour can transpire in a bargaining between two parties in a transaction, because one party can exploit the other's vulnerability and use hold-up threats to negotiate within their own interest (Lusch and Brown, 1996).

In essence, Williamson (1998) argue that a firm's goal is to align its economic exchanges (i.e., transactions) with governance structures that will yield the highest results. Some firms possess an in-house production (hierarchical) structure and *make* their own inputs, while others *buy* their inputs on the spot market (market governance) with a flexible trading relationship (Williamson, 1979). Thirdly, some companies combine the two organisational forms and depend on e.g., partners and alliances (relational/hybrid) (Ghosh and John, 1999). Relative transaction costs of in-house production may be lower than buying from outside. Still, transaction costs such as flow of information, monitoring, incentives and performance evaluation (i.e., bureaucratic costs) increases the higher the asset specificity becomes (Williamson, 1998; Klein, 2005, p. 435-438). In cases where asset specificity is low (i.e., in investments that are more standard), market governance can be the preferred structure, as the costs associated with transactions through market governance is lower than in-house production (hierarchical governance), and the need to safeguard the asset is not as paramount when the investment is not unique or tailored (Williamson, 1985, cited in Augusto & de Souza, 2015). On another hand, hierarchical governance is preferred when transactions involve high asset specificity, because specific investments have the potential to create unique value, and therefore the need to safeguard and control the asset is rather higher. When transactions involve high asset specificity, but not high enough to produce in-house and when the frequency of transactions is not repeated as often (or when the cost is too high), integration is pointless and thus hybrid governance is more applicable (Menard, 1995, cited in Bech & Pedersen, 2005). Firms should consider the cost advantages between different governance structures when they determine which approach to utilise (Williamson, 1998; Klein, 2005, p. 437).

3.2.3. Safeguard, Adaptation and Measurement of Performance

To secure some of TCE related mechanisms, namely asset specificity, environmental and behavioural uncertainty, S.A.M was created as a summary and an extension to address this matter (John & Reve, 2010; Williamson & Ghani, 2012). SAM stand for safeguarding, adaptation and measurement (of performance). The idea of transaction-specific investments conveys that "physical or human assets are dedicated to a particular relationship that cannot be redeployed easily". In other words, transaction-specific investments are meant for creating long-term value and are therefore not effortlessly acquired. These investments create the issues of safeguarding, as one wish to secure the value of the specific/tailored investment. Secondly, a transaction-specific investment reflects external uncertainty which are hard to predict ex ante. This leaves the firm with an adaptation problem, whereas it must adapt to changes of events in the environment (Heide, 1994). Specifically, decision makers notice that their circumstances demand them to point out new directions for their existing assets or even abandon former investments (Ghosh and John, 1999). Thirdly and ultimately, there exist an evaluation problem, as firms must measure and evaluate "whether contractual compliance has taken place" (Heide, 1994). In this case, the parties of a transaction must measure both the value given to another party, and the value received in return. Difficulties regarding such performance measurements comprise opportunity costs related to misdirected efforts of investments, and/or direct costs of insufficient efforts regarding "monitoring, enforcement and termination" (Ghosh and John, 1999).

The essence of the SAM construct is to (1) safeguard asset specificity, (2) adapt to environmental changes and (3) measure behavioural changes (John and Reve, 2010). There are different costs associated with safeguarding, adaptation and measurement. Williamson suggested that transaction costs often emerge in the form of *direct costs* and *opportunity costs*. The former refers to for example "costs of managing relationship" (Rindfleisch and Heide, 1997), and cost of negotiating contract. Whereas Buchanan (1991) describe the latter as "the anticipated value of 'that which might be' if choice were made differently". This simply refers to costs associated with loss of value that could have potentially been.

For example, opportunity costs of lost value when failing to invest in the most profitable asset (Ghosh and John, 1999). The direct and opportunity costs that emerge in TCE are those associated to safeguarding asset specificity, adaptation to environmental uncertainty and measuring (performance) of behavioural uncertainty (Rindfleisch and Heide, 1997).

3.2.4. Summary of Transaction Cost Economics

To recap, TCE theory suggests that behavioural assumptions i.e., bounded rationality and opportunism, are contributions to why contracts in transactions are incomplete and complex (Williamson, 1998). Transaction partners must evaluate the three attributes of transactions (frequency, uncertainty and asset specificity) to understand the risk that may emerge (Rindfleisch and Heide, 1997). This examination of the attributes will lead to determining which governance structure that are best suitable (De Vita et al., 2011). Ultimately, the essence of TCE theory is about figuring out how to complete transactions in the best possible way. The more complex the investment, the more demanding and comprehensive governance is required. Standard investments should be operated through market governance, whereas unique and tailored investments need to be safeguarded through hierarchical governance. When the investment cost of in-house production is too high, and the frequency of the transaction is not often or only one-time, hybrid is the solution (Ghosh and John, 1999). To create value or cost advantages, TCE focus on the effects of firm's resources and how to make them operational. The theory concentrates on the functionality of resources and the integration of them (Combs & Ketchen, cited in Augusto & de Souza, 2015). TCE explores the implications of reducing relative direct costs and opportunity costs, in addition to considering ex ante and ex post transactions costs in the exchange process (Ghosh and John, 1999).

The theories of RBV and TCE are generally similar, and its resemblances may give a holistic outlook on what is essential for companies to focus on to move forward and innovate. The idea with RBV and TCE is to build on the resources and capabilities that the firm have and identify what they lack and need to create sustainable value and sustained competitive advantage.

3.3. Gaps in Literature

TCE and RBV are two familiar theoretical concepts with strong fundamentals. The theories have obtained ongoing contributions from scholars from many decades. Although the theoretical principals build on value creation, we noticed a gap for *sustainable* value creation, in terms of the sustainability dimensions introduced in chapter 2. We hope to intertwine the two theories and contribute to the literature by providing inputs on how business strategic management theories can be aligned with sustainability to create value and competitive advantage.

In terms of the sustainability concept, there is not consensus in the understanding of the concept. A gap in the literature (or the business industries) reveals that in the business context, the understanding of what sustainability entails is not entirely clear. Sustainability is often connected to environmental concerns/impacts, and many exclude the social and economic aspect. Thus, it leads to a misunderstanding of what sustainability actions or behaviour encompass. Hence, aligning traditional business theories that has been empirically tested (Williamson, 1989) with fundamental concepts of sustainability is pertinent.

The presence of literatures on sustainability is considerably more limited compared to traditional business theories. Considering that sustainability is such a topical theme today, and the substantial influence the three dimensions have on businesses and the direct connection to value creation theories, there is a distinct necessity with more literature on sustainability. Additionally, we want to contribute to the literature with insights into the relevance between sustainability and traditional business theories.

4. The Concept of Business Models

There exists a vast number of different definitions and explanations of business model formats. Timmers (1998) defined business model as "an architecture for the product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various business actors; and a description of the sources of revenues". Nosratabadi, Mosavi, and Lakner (2020) explained the concept of a business model as a tool that "provides the ability to design and analyse the value a business is offering and delivering to its customers". A business model involves a company's value proposition proposed to existing and potential customers, also referred to as *value creation* - how the company is structured to create value or what job must be done for customers. Further is *value delivery,* which comprise the company's key resources, key partners and activities to deliver that value. Conclusively is *value capture*, the financial aspects on how the company's cost structure and revenue model is designed (Schaltegger et al., 2016; Jørgensen & Pedersen, 2018, p. 59). These components lead us to the *Business Model Canvas.*

4.1. The Business Model Canvas

The Business Model Canvas (BMC) was created by Osterwalder and Pigneur, as a simple instrument for organisations to follow and understand how to create and build business strategies (Osterwalder, 2013). As the BMC illustrates the structure of organisational creation, delivery and capture of value, the model can contribute with the interpretation of how a company strategically generates competitive advantages. Joyce and Paquin (2016) argue that the BMC allows managers to analyse how internal components and functions are incorporated to deliver value, and how these are interconnected throughout the stakeholder network. According to the BMC layout, there are nine building blocks covering the fundamental structure of a business. These are as follow: customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure (Osterwalder & Pigneur, 2010, p. 15-17; Joyce & Paquin, 2016).

The BMC can be perceived as a management tool and an entrepreneurial approach that are accessible and used by firms, regardless of size of business unit (Osterwalder, 2013).

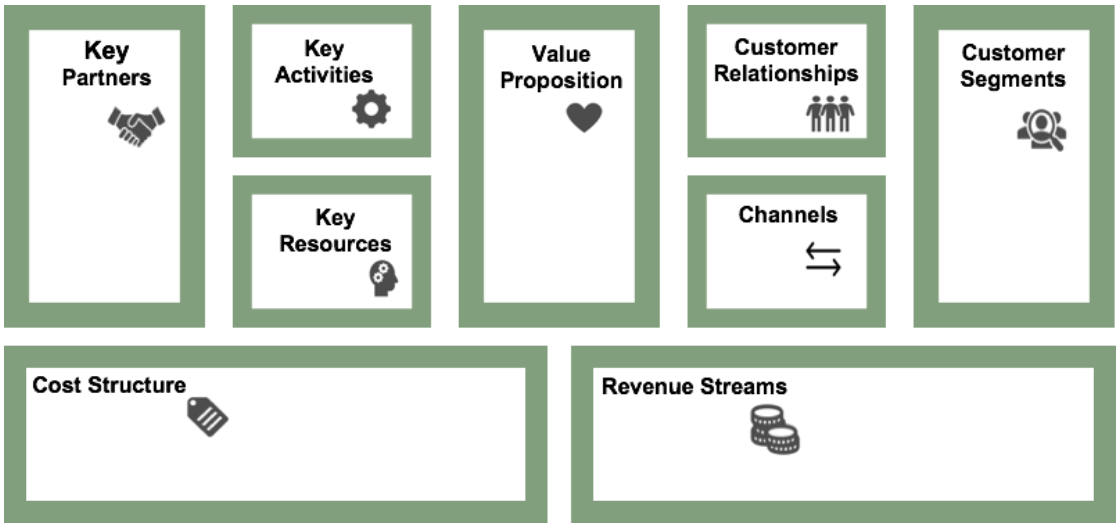

Figure 9: The Business Model Canvas illustrated (Osterwalder and Pigneur, 2010, p. 44).

Customer Segments

The customer segment building block of a business model is important, because it represents who the company is serving and what needs they are meeting. The company must however decide upon which customer segment to prioritise. These are reached through different types of channels, and the fact that customer segments require different kinds of relationships also differentiate their willingness to pay for dissimilar offers (Osterwalder and Pigneur, 2010, p. 20).

Value Proposition

A company's value proposition represents what benefits customers are offered and it explains how a business attract customers and satisfy a demand. It allows firms to create value for customers and establish a position to make customers choose their products over others. When

doing so, a company's value proposition help customers get a certain 'job' done (Osterwalder & Pigneur, 2010, p. 22, 24; Johnson, Christensen & Kagermann, 2008).

A sustainable value proposition creates value for many different stakeholders in addition to customers, that being suppliers, shareholders, partners, society and the environment. Jørgensen and Pedersen (2018) argues that a successful value proposition reflects the 'job' to be done for a customer's needs to be met (p. 60). If the needs are not met and there exists substitutes, then the customer may choose to purchase a different product or service that get the same result (p. 61).

Channels

A company's interference with customers to deliver value occurs through their distribution, sales and communication channels. Positive customer experience is a necessity for good company reputation. There are five recognisable stages in customers purchasing process, which are awareness of value proposition, evaluation of the value proposition, purchasing of certain products and/or services, delivery of value proposition to customers and aftersales, what makes customers repurchase from that company? Channels are either intrinsically owned or distributed by partners. It is a company's task to find the most appropriate channel mix that will fulfil customer expectations. Direct channel types include web sales, in-house sales forces and stores. Owned channels can also be indirect, e.g., retail stores. Partner channels include stores, retailers and wholesalers. These are indirect channels and pose benefits because they allow companies to reach out to a vast number of customers (Osterwalder and Pigneur, 2010, p. 26-27).

Customer Relationships

Customer relationships are either personal and based on human interaction, or automated, which entails for example access to customised services online. Customer relationships are also driven by three motivations: customer acquisition, customer retention and boosting sales (Osterwalder and Pigneur, 2010, p. 28-29).

Revenue Streams

Companies generate revenue streams (price x volume) when they have provided its customers with value (Johnson et al., 2008). It is important to understand what each customer segment is willing to pay for a certain value. If there are more than one potential source or customer segment that can generate revenue streams, companies can receive different flows of income. (Osterwalder and Pigneur, 2010, p. 31, 33).

Key Resources

Key resources can be financial, physical, human or intellectual, depending on the sort of business model (Osterwalder and Pigneur, 2010, p. 34). More specifically, key resources include facilities, products, technology, equipment and brand needed to create value for the target customer segments and the company itself, and how those various resource elements interact (Johnson et al., 2008).

Key Activities

Key activities relate to what companies do to create their value proposition, generate revenue streams, maintain their customer relationships and thus operate in a successful manner. Production is the main component of manufacturing firms (Osterwalder and Pigneur, 2010, p. 36-37), and it represents the main activity and actions to create value. Production involves extracting raw material from the biosphere to produce outputs of higher value (Joyce and Paquin, 2016).

Key Partnerships

Partnerships with other entities reduce risks in uncertain competitive environments, brings access to resources and creates opportunities for optimising business models, which can contribute to the development of economies of scale and thus reduced costs. Common partnerships are alliances between non-competitors, collaboration between competitors (strategic), joint ventures for developing new businesses, and buyer-supplier relationships to reassure that the suppliers are reliable (Osterwalder and Pigneur, 2010, p. 38-39).

Cost Structure

The cost structure of a business model portrays the most important costs of operating. Costs occur consistently each time a company creates and delivers value, maintain their customer relationships, implement new strategies and when they generate revenue streams. Costs are often determined when a company choose their key resources, key activities and key partnerships (Osterwalder and Pigneur, 2010, p. 40). Costs are either *value-driven* or *cost-driven.* Value-driven costs are usually a reflection of personalised and exclusive services. The focus is to create and deliver value. Conversely, for cost-driven business models, the aim is to keep costs low as far as achievable. In business operations, the focus is to maximise automation processes (p. 41).

5. Methodology

The following chapter will outline the steps towards answering our proposed research question in a comprehensive and thorough way. We will present and clarify our choice of methodological approaches and research design, including methods for data collection and analysis.

5.1. Research Design and Purpose

5.1.1. Research Purpose

Research design is the general plan of how one intends to implement the research project. Therefore, it is important as a researcher to recognise their own purpose with the research. Three common purposes to be approached are either exploratory, descriptive and explanatory, with all different potential outcomes (Saunders et al., 2016, p. 174). Thus, the choice of approach is also dependent on what one aims to achieve (p. 163). In this thesis, an exploratory approach becomes pertinent because there is a need to uncover "what is happening" and generate an understanding of a phenomenon within sustainable value creation challenges and drivers in the salmon industry, to gain new insights. We want to understand what makes sustainability implementation complex, because there is an uncertainty regarding its precise nature, in the business context we are studying, such as what makes the salmon industry unique. Because of that, it is reasonable to argue that we will conduct an exploratory study (p. 175). According to Saunders et al. (2016), "Exploratory research may commence with a broad focus, but this will become narrower as the research progresses" (p. 175). This remark became clear for us when we recognised how we started the research process focusing on a wide area and how that eventually had to be confined to create a more concrete research problem. Hence, we had to narrow the focus on food companies down to seafood companies and thereby salmon farming companies.

5.1.2. Theoretical Approach

The theoretical approach of this research commenced with novel literature on sustainability, such as the concept of *Creating Shared Value (CSV)*[4] by Michael E. Porter and Mark R. Kramer. But as the research evolved, we noticed that such literature lacks clear frameworks and instructions on how to apply and implement sustainability in business operations while simultaneously create profit. As we worked through the literature, we recognised the need to emphasise the balance between sustainable value creation and economic efficiency. This led us to the field of resources, as the salmon farming industry is dependent on great volume of both tangible and intangible resources to create value. Hence, this thesis builds on traditional business literature about how resources can generate competitive advantage (Resource-based View), and what makes acquisitions of resources complex and/or valuable to firms (Transaction Costs Economics), but in the context of sustainability enforcement. The focus is therefore about testing traditional theories with qualitative approaches (Saunders et al., 2016, p. 168).

5.1.3. Research Approach

"Reasoning is the act of drawing inferences from evidence", and there are different ways to interpret information (Hayes, Stephens, Ngo, and Dunn, 2018). Two common approaches are deduction and induction. The inductive approach is where data is collected, and a theory is developed based on the data analysis (Saunders et al., 2016, p. 146, 51). In other words, induction is based on given premises, and involves estimating the likelihood of a reasoning without having any logically valid inference (Hayes et al., 2018). Whereas in a deductive approach it is the opposite, as an existing theory is tested through data collection and analysis (Saunders et al., 2016, p. 51), which is the pertinent approach in this thesis.

[4] Definition: "The concept of shared value can be defined as policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates" (Porter and Kramer, 2019).

Specifically, to answer our research question, we seek to gain understanding of a topical theme and a phenomenon (sustainability enforcement) using traditional business management theories, resource-based view and transaction cost economics. Because of the utilisation of existing literature and the condition "the theory is expected to hold", it is reasonable to argue that we use a deductive approach (Saunders et al., 2016, p. 146). It is sensible to mention that a qualitative deductive approach commonly requires a highly structured interview to compare the data gathered and ensure reliability (Saunders et al., 2016, p. 146). However, the goal of this thesis is not to empirically test the theories through hypotheses, but rather to apply the theory to a certain context. All informants were asked the same set of principal questions, which allowed them to speak freely, and follow-up questions were asked if necessary.

5.2. Methodological Approach and Research Strategy

Qualitative research approaches are typically conducted in real-time natural settings or research context (Murphy & Yielder, 2009; Saunders et al., 2016, p. 168), whereas the researcher studies "socially constructed meanings about the phenomenon being studied*"* (Saunders et al., 2016, p. 168). The purpose is to gather thorough perspectives and experiences from participants (i.e., interviewees).

5.2.1. Case Study

When selecting a research strategy, we considered factors such as the research question(s) and objectives, coherence with research approach and purpose, availability of time and resources (Saunders et al., 2016, p. 178). A case study is described as "an in-depth research into a topic or phenomenon within its real-life setting" (Yin, 2014, cited in Saunders et al., 2016, p. 184). As the aim is to explore the nature behind sustainability strategies and practices in the salmon farming industry, case study is the strategy most applicable for this thesis. The case itself were conducted on individual people from seven different companies. As case study strategies allow for an in-depth examination of the phenomena, it can be constructed to recognise and understand what is happening and why something is happening (Saunders et al., 2016, p. 184).

Our research question, *"What are the drivers and barriers for Norwegian salmon farmers to define and execute sustainable business strategies and practices?"* presents specifically a mere unexplored topic in a particular context (salmon farming industry), by which we will need to investigate. As there are no clear hypothesises included in our research question, we are rather going to unveil the most relevant variables and parameters (Jacobsen, 2015, p. 79). The two sub-questions help us narrow the research focus, and thus guide us further through the research agenda. This strategy is commonly used in exploratory research because it seeks to answer questions like 'why', 'what' and 'how' (Saunders et al., 2016, p. 139).

Multiple case study

Our intention is to create and understanding complexities the salmon farming industry is facing in their work towards sustainable value creation, which is why we want to focus on multiple cases to see whether findings can be replicated across the cases throughout the study. As we are testing the theory and thus commence deductively, there is leeway for replication (Yin, 2014, cited in Saunders et al., 2016, p. 187).

5.2.2. Primary Data Collection

To answer the research question, we intended to generate an in-depth understanding of the phenomenon being studied. For that matter, it was natural to conduct a non-numeric data collection through semi-structured interview questions. We conducted semi-structured in-depth interviews online (using Zoom and Microsoft Teams), with eight business representatives from seven different salmon farming firms. Semi-structured interviews pose a set of questions that will "somewhat reduce the amount of freedom enjoyed by the respondents but still allow them considerable leeway" and thus the opportunity to speak freely (Gagnon, 2010, p. 61). Semi-structured interviews were relevant for this study, because our aim is to gain as much detailed information from the various informants in their explicit contexts, as possible. As interviews' flow of conversation may vary between informants, we allowed ourselves to ask follow-up questions to further explore organisational events (Saunders et al., 2016, p. 391).

To gain answers to our desired questions and to maintain a semi-structured interview, we prepared an interview guide in advance. The questions were categorised into different topics to correspond with our theoretical structure and sustainability topics that we wanted to cover (see Appendix C for the interview guide). The questions were designed to be open-ended. This was to allow the informant to talk freely and elaborate about their experiences concerning the company's sustainability enforcement. Since we had some prior knowledge regarding the subject from literature and secondary data, it was imperative that the questions were constructed in a way that would not let the informant interpret any form of bias or get an impression that we expected certain answers.

5.2.3. Secondary Data Collection

Secondary data "include both raw data and published summaries" (Saunders et al., 2016, p. 316), thus information from for example firms' annual reports among others can become salient secondary sources (p. 319). This thesis obtained secondary data to analyse the research phenomena. In this study, secondary data are presented in chapter 2, and is based on statistical reports on the aquaculture industry's economic contribution and annual sales reports, as well as information about third party certifications pertinent for the industry. These sources became important in the process of examining the research problem and gather enough information to understand the industry and validate information achieved from primary data (i.e., interviews).

5.2.4. Sampling

In research studies where it is difficult for researchers to collect data from the whole industry, a sample must be chosen (Saunders et al., 2016, p. 274). In this thesis, we had a sample of eight participants from seven different companies. As we wanted to gain a holistic representation of sustainability enforcement among the most influential companies within the industry, we could not rely on random sampling and thus the sampling technique appropriate for this study was non-probability (p. 295-297). The range of companies selected for these interviews included large industry firms: Bremnes Seashore, Norway Royal Salmon, SinkabergHansen, Nordlaks, Nova Sea, Grieg Seafood and Cermaq.

More specifically, we used a maximum variation (also referred to as heterogeneous) purposive sampling method. This approach entails selecting businesses with a wide range of characteristics to ensure variation, additionally these features should be identified in advance. In this context, sample criteria were that informants were selected based on the condition that their position was pertinent to the firm's sustainable development. The intention was to generate a balanced insight on the topical aspects of sustainability enforcement from company representatives. We considered this salient because obtaining perspectives from people with different professional competencies, allow us to gain insights from multiple angles and ensure maximum variation of data (Saunders et al., 2016, p. 301).

5.3. Data Analysis

5.3.1. Processing the Data

The conducted interviews were audio-recorded after approval by each informant and confirmation from the Norwegian Centre for Research Data (NSD). Each interview was transcribed shortly after it was done to maintain important information, and to make the information more accessible when proceeding with the analysis. After transcribing the interviews, the thematic analysis approach was followed to identify the main themes or patterns from the interviews. In our context with a deductive approach, the themes we wanted to examine was connected to the theories of resource-based view and transaction cost economics (Saunders et al., 2016, p. 579). Further, we analysed the text using 'a priori' coding method, which entailed to label unit of data such as words and sentences with terms/concepts derived from existing literature (p. 580-582). The data was organised to establish a structure for the analysis. A list of different categories/themes was created from the literature review and included concepts that was relevant to answer the research questions.

In the following step of our analytical process, we categorised words, sentences or paragraphs to each pertinent theme/category. This was repeated in all the seven interview transcriptions and the entire process enabled us to organise the collected data and categorise applicable information in a structured way.

5.4. Quality Assurance

To evaluate the research quality of this thesis, there are some tools that can be adopted, these include validity and reliability. Additionally, we will discuss how to overcome threats that may occur. To defend the quality, it is vital to address validity (i.e., trustworthiness of the used measures) and reliability (i.e., accuracy of findings) (Pratt, Kaplan & Whittington, 2019; Saunders et al., 2016, p. 202).

5.4.1. Data Validity

In qualitative research of social sciences, it is essential to determine, if not maximise, the validity of the collected data and the accuracy of analyses conducted (Saunders et al., 2016, p. 202). The purpose is to determine the appropriateness of the used measures, and whether they are pertinent for the intended research purpose.

Internal Validity

Internal validity refers to causal relationships between parameters and whether the results conform with reality (Jacobsen, 2015, p. 228; Saunders et al., 2016, p. 450). Our objective is to study the depth and various perspectives within a sustainability implementation, thus internal validity will not be evaluated in this thesis.

Construct Validity

Construct validity allows us to evaluate to what extent the interview questions truly measure the constructs we have planned to measure (Saunders et al., 2016, p. 450-451). Construct validity pertains the extent of correlation between the concepts and their measures (Peter, 1981).

In this context, interview questions are used to assess the operationalisation[5] of the study's theories of resource-based view and transaction cost economics and examine the extent the answers correlate with the theoretical concepts. Moreover, construct validity requires that all concepts are operationalised (Peter, 1981), especially in our context of interviews, as it is imperative that participants understand the concepts used during the interviews. To avoid any misinterpret among informants, we formulated interview questions so that they would be easily understood and that they were not too theoretical. To control this, we also asked follow-up questions to assure that the informants' perceptions were explored. If the level of construct validity is high, it contributes to explain how this research study measure what we intend to measure (Saunders et al., 2016, p. 450-451). For example, construct validity can describe how we measure that salmon farming companies have resources that meet the conditions of VRIO.

External Validity: Generalisability

External validity (also known as generalisability) refers to the extent we can generalise our research results to other settings (Ali & Yusof, 2011; Saunders et al., 2016, p. 398). The intention of this thesis was not to develop new theories or frameworks, nor was it to make statistical generalisations of whole populations (whereas one would have to apply a different research design), hence the non-probability sample. Instead, it was rather to explore a complex phenomenon in a specific context which can contribute to answer current issues or suggestions that others can benefit from. The generalisability of this research is influenced by our ability to test existing theories. As we used traditional resource-based and transaction costs theories in our research procedures, we enabled to demonstrate a broad theoretical relevance of our findings in the given research setting (Saunders et al., 2016, p. 400). Our findings may nevertheless provide insight and be transferable to other industries, if tested in similar settings, and the main remarks from this research can be applied to equivalent contexts to give a richer and deeper understanding of similar research problems.

[5] Operationalisation is the process of turning a theoretical concept into a measurable variable (Peter, 1981).

5.4.2. Data Reliability

Data reliability is the criteria of whether we can replicate (i.e., recreate) similar findings or results again (Ali and Yusof, 2011). A high level of reliability is present when it is feasible to acquire the same findings if the study is replicated by other researchers or during a different time (Saunders et al., 2016, p. 202). Reliability is preferred in research because it implies/demonstrate trustworthiness of a study's findings. However, some scholars argue that reliability is difficult to examine in qualitative studies due to measurements issues. On another hand, it is asserted that research can obtain reliability by "explaining the methodological framework and the range of strategies that have been used within the study" (Morgan & Drury 2003, cited in Ali & Yusof, 2011).

Researcher bias

Moreover, concerns about reliability in semi-structured and in-depth interviews can be connected to lack of standardisation and researcher and participant biases that can emerge during interviews. Researcher (interviewer) bias refers to the way "comments, tone or non-verbal behaviour" can affect the informants' answers and provoke bias. This type of bias can appear when the interviewer reveals their beliefs and lead the interview in a subjective direction. Researcher bias can also emerge in the way one interprets interviewees answers. The interviewer can be more prone to their own subjective perception of the responses which can lead to misinterpretation (Saunders et al., 2016, p. 397). To avoid researcher bias and overcome reliability threats, we recognised that during the interviews it was crucial to be objective and focus on asking open ended questions, in this way the informants would talk and answer freely. By focusing on the threat of *researcher bias*, we refrain from interpreting the responses of participants with our own opinions and subjective views (p. 203).

Participant bias

Interviewee (participant/response) bias can be referred to as "the type of bias that can be caused by interviewees' perceptions about the interviewer, or perceived interviewer bias". Interviewee bias can arise during interviews when the participant wants to avoid certain

themes or conceal information, for example by answering what they think the interviewer expect them to answer (Saunders et al., 2016, p. 397). To mitigate this threat of bias, we informed the participants about the study's topic, and provided them with practical information in advance, i.e., the consent form with information and offering anonymity. By doing this, participants can be prepared prior to the interview (p. 402). However, it is salient to note that this does not entail revealing any questions in advance, because we wanted the interviews to be natural and for the participants to respond freely without preparing any answers. Another concern is that the participants may depict only one side of a story that results to the interviewee presenting the situation in their subjective opinion and withholds information (Saunders et al., 2016, p. 397). However, awareness and objective attitude towards the interviewees were applied to reduce this threat.

5.4.3. Ethical Considerations

There are several ethical considerations to be aware of while conducting a research project. This research thesis involved performing qualitative interviews with several companies and their employees. Therefore, the aspect of ensuring confidentiality and anonymity of participants becomes a salient consideration and gaining consent from each informant is thus paramount. Before reaching out to potential participants we had to fill out notification forms for personal data collection through the Norwegian Centre for Research Data. In the process ahead of each interview, information letters were forwarded to notify all participants about the purpose of the interview and our intentions with the data collection. A consent form was also given to each informant, which gave both parties a written agreement and thereby providing participants the opportunity to give us consent on whether they wanted to stay anonymous and allowing us to use personal data. The use of a written consent protects both parties and can contribute to clarify the boundaries of an agreement (Saunders et al., 2016, p. 252).

Conclusively, the interviews were recorded, and consent was given by all participants beforehand. The informants were also informed that we would protect their privacy by deleting the recording straight after transcribing the interviews.

6. Findings

Findings from our data collection will be presented in the following subchapters. In subchapter 6.1, we commence with an industry-specific and modified business model canvas in which we present overall findings of sustainability implementation, concerning key resources, activities, partnerships, cost structure and value proposition. Note that the business model components are only based on the different responses from the interviews, hence, secondary data is not cited. The business model canvas assists in identifying company-specific procedures and decisions related to sustainability enforcement. Direct quotes represent statements and opinions from each company representative, but these will be presented under the pertinent company name. An overview of the participant is available and can be seen in Appendix A. In subchapter 6.2 we build on the components identified from the business model and distribute salient resources/capabilities per company into seven VRIO matrixes. The purpose is to discover prominent industry resources and why these are related to sustainability compliance implementation.

6.1. A Business Model for Sustainability

Business Model				
Key resources	Key activities	Key partnerships	Cost structure	Value proposition
Human resources	Sustainability reporting	Suppliers	Value-driven	Provide/offer certified products
Specialised knowledge and information sharing	Sustainability compliance	Moen Marin	High cost, short term – high income long term	More than just "buying green alibi"
Equipment and Technology	Electrification	Aker Solution	Cost advantages	High quality and strong salmon brand
Certifications and licenses	Delousing methods	NSK	Large investments in resources and capabilities	Full transparency with stakeholders and customers
	Innovation capability	MS Steigen	Cost of activities	Meeting customers' needs
		L'Oréal		Create and deliver value
		Global Salmon Initiative		

Table 3: Contextual Business Model for Sustainability

6.1.1. Key resources

The following components are identified as key resources that are the most salient for sustainability implementation within the salmon farming industry, based on the interviews and its given context.

Human resources

Human resources were repeatedly mentioned as key resources to create sustainable value for the companies. The informant from Nova Sea expressed that without having the people to conduct the work of figuring out what improvements were essential to make an impact and to execute the improvements, it would be difficult if not impossible to make it happen. Another informant (Cermaq) indicated that the human resources are the most paramount resource, and that physical resources were essentially facilitated so that human resources can perform their jobs in the best possible way.

Motivated workforce is among the key (human) resources. One of the informants (Cermaq) claimed that the human resources and especially a motivated workforce is essential for success rates. The informant further explained that people that are excellent by being focused, eager and attentive and wants to do a good job, are valuable and pivotal for the firms. For example, having good operational managers at the farming sites when it comes to feeding can be crucial. This was in the company's experience of having people that are focused on the feeding, and are careful to not feed too much, but just the right amount of feed for the salmon to grow provided the best financial results and lowest resource loss. From fish feeding routines where the intention is to avoid feed deviation/waste, to intrinsic motivation among employees to ensure precision of when to start and stop feeding. As fish feed is mentioned as the biggest input factor in the industry, wasting feed by overfeeding would be a tremendous resource loss.

"We see, in fact, a correlation between the number of non-conformities we give on an audit and the financial result on the feed factor." - (Cermaq, 2020)

Specialised knowledge and information sharing

Knowledge is a key resource for the industry, most informants affirmed that increasing knowledge about sustainable practices and sustainable goals is important for the firm and across departments because it enables them to make good decisions. They expressed that the knowledge level needs to be accumulated and thereafter shared, both internally in the organisation but also externally across companies in the industry. This is because pertinent knowledge and information about sustainable practices can affect the whole salmon industry, and thus it becomes applicable for all companies. In terms of knowledge level within the organisation, Bremnes Seashore highlight that it is important that department heads contribute to spread and accumulate information to the organisation, but that it is also essential to prompt employees along too. Further, they claim that when knowledge and information is spread across to the different positions in the company, employees working at the feeding barges or around the pens[6] for instance, can see opportunities for things they can change or improve. Cermaq conveyed that the world is moving forward, and the sustainability trend is part of the direction and that people working on production is aware that the world is becoming more preoccupied with sustainability standards. Therefore, to raise the level of knowledge and create a common understanding among all is pivotal, especially when it comes to specific goals setting such as the company's climate commitments.

This process of information sharing in-house (i.e., internally) and with external companies provides efficiency among firms because they learn from best practice experiences on what methods and measures are feasible and not. In line with the environmental sustainability aspect and the industry's common challenges, the informants claim that most people are less resistant when it comes to helping each other by sharing information and experiences on this area.

[6] Pens or net pens. A system that restricts fish from escaping.

"On the sustainability side, the environmental side, I think all the companies… I feel like I could get in touch with any of the major companies, and I do with certifications, and we share that information pretty frequent with each other" - Nova Sea, 2020

Equipment, such as well boats for delousing practices, are also commonly shared between companies operating in the same geographic areas. For Cermaq, there are own positions to manage the well boats and capacities.

"If there is someone who has available well boat capacity, it is very quickly rented out to someone else" Cermaq, 2020

Some firms highlighted the importance of having and utilising the appropriate people with the right knowledge as a key to success. The knowledge base within the salmon industry has been in a steady state in terms of constant learning and experiences from development projects and global and national initiatives. The constant knowledge building in the industry leads to extended competence among workers.

"Employees get more fish health knowledge when they continuously tend and evaluate the fish health." - Grieg Seafood, 2020

Specialised competence and skills are particularly valued as a source of advanced knowledge. The industry consists of a wide scope of areas of expertise with everything from technological to biological competence within the different subject fields. For instance, SinkabergHansen expressed that they have about 50-60 different occupational categories, including veterinarians, fish health biologists, civil engineers, economics, computer expert, etc. However, positions and teams vary from firm to firm, some of the companies have the possibility or they prioritise the resources to create their own positions or teams of people devoted to specific areas of sustainability work by having e.g., a sustainability department.

"We have our own fish health team and dedicated positions for the environment and sustainability." - Cermaq, 2020

In this research context, different firm sizes have different focus and priorities. When one operates in an innovative industry there are many projects and initiatives *("many arms and legs"),* sometimes decisions must be made and priorities in some cases becomes necessary.

In some durations, human resources are for example facilitated to focus on development projects instead of sustainability reporting or vice versa. Each individual firm in the industry have the right to decide based on what is in the best interest for themselves.

"Our organisation is built around our core business. Large development projects require a lot from our organisation, so we have to make our priorities" - Nordlaks, 2020

For example, some of the development projects such as the offshore farms, that type of building construction is closer to offshore/oil and gas and maritime technology than what the aquaculture industry was familiar with. Therefore, new competence from other sectors is crucial for the salmon farming companies to attain, and the need for partnership with suppliers in such projects has become imperative. For instance, Norway Royal Salmon developed their offshore farm in partnership with Aker Solution, which is a company with offshore expertise. Further, the informant from Nordlaks implied that the decline in the oil sector (in 2014) affected the aquaculture industry in a positive way, and that the farming companies ended up gaining valuable external competence of human resources from another sector.

"*Our project timeline accidentally overlapped with a downturn in the large oil and gas sector in Norway. That meant more interest for new diversifying business areas, such as exposed aquaculture, from some of the supplier companies traditionally focusing on the petroleum sector"* - Nordlaks, 2020

People's intrinsic interest and general concern for the environment was raised as a motivation for implementation of sustainability and environmental improvements. A few companies such as SinkabergHansen, Norway Royal Salmon and Nordlaks mentioned initiatives like beach clean ups along the coast that employees and the firms have initiated in the local areas. The awareness among employees and stakeholders are evidently urging companies to take more

accountability. The informant from Grieg Seafood supports this by explaining that graduates are constantly getting highly educated and have expectations for how companies are supposed to behave and act.

"I would not work at Grieg Seafood if it was not a company that I could vouch for. I don't think companies are able to be attractive to today's youth without taking sustainability seriously" - Grieg Seafood, 2020

Equipment and Technology

Equipment and technology were identified as one of the key resources to improve sustainable aspects in the industry. Based on information from our informants the following equipment some of these companies utilises are: (1) waterborne feeding, (2) laser technology, (3) lice skirts, (4) electric boats/hybrid vessels, (5) well boats, (6) battery pack, (7) the Mid-Norwegian-Ring, (8) camera technology/sensors (e.g., camera surveillance), (9) feeding barges, and (10) nets. The various equipment's are considered as tools that are used for several purposes and have different functions. Some of these equipment and technology functions was elaborated by the different informants and are listed in this next paragraph.

The informant from Norway Royal Salmon mentioned that they invested in waterborne feeding, which is something the firm will start adopting in their new offshore farm and the equipment system entails that the feed is transported by water rather than air through hoses, which is supposed to be up to 70% more energy efficient. SinkabergHansen claim that one of the things that have highest diesel consumption on a salmon farm is the feeding. They have also invested in this type of waterborne feeding equipment (Subsea Feeder) and convey that when over 75% of the energy consumption lies in the feeding, thus the waterborne feeding will help reduce a considerable amount of consumption.

Laser technology (e.g., the Stingray system) was mentioned as a preventative approach against sea lice. For example, Nova Sea utilises laser over their salmon farms regularly to attempt to avoid lice treatments. Another preventative measure against lice is the lice skirts and most of the informants conveyed that the companies have invested in this and that the lice skirts are

currently in usage. Nova Sea explained that the lice skirts are taken around the cages on the farming sites and they work like a physical barrier preventing sea lice to get in.

A few of the companies (e.g., NRS, Bremnes, Nova Sea) have invested in electric boats and hybrid vessels. The informant from Norway Royal Salmon claim that the hybrid vessels has been a success and justified it by explaining that employees are very satisfied because of the low noise level, lack of any soot, and the diesel consumption is either low or non-existent. The hybrid vessels have also led to a reduction of emissions for companies. Well boats have another different function then the other electric boats and hybrid vessels. The interviewee from Cermaq explained that well boats are also used for delousing operations, and that the process works in a way that salmons are taken onboard the well boat and are given different treatments to get rid of the lice. Well boats are another investment that only some companies have been able to obtain, for example Nova Sea and Nordlaks. The rest of the companies either have partnerships with well boats companies (where they hire their services) or they lease the well boats (this is done by e.g., Cermaq). Further, Nordlaks claims to be the only company that have invested in well boats that are operated on gas and battery.

A few companies have invested in battery packs or battery solutions. SinkabergHansen conveyed that the battery pack is a more environmentally power option, and they use battery for instance on the feeding barges. They have also invested in three different battery technologies that will be tested in the foreseeable future. Other firms (Nordlaks & Nova Sea) adopt battery for their well boats to get them running on a hybrid solution instead of diesel.

The camera technology/sensors functions are many and the informants listed some of them. For example, most of the companies adopt camera technology to control and limit waste of feed resources, in this way they can monitor when to stop feeding by following when the fish stops eating. Another example is that Bremnes Seashore utilises camera technology to focus on preventing escapes, this is done by using underwater camera to examine conditions of the nets before and after treatments, and thus a way that allows them to maintain and change nets when necessary. Cermaq invested in a technology construction called iFarm, which is

essentially a sensor-based product. The informant explained that the system work in a way so that the salmon swim through sensors (further details will be presented in the key activity section later).

Certifications and licenses

The Aquaculture Stewardship Council (ASC) certification is identified as a key resource. The companies are focused on this in vary degrees, and by prioritising ASC certification the firms are committing to the three dimensions of sustainability. According to the informant, Norway Royal Salmon has a goal to certify all their farming sites with ASC because the firm wants to operate sustainably and there is a customer demand for certified salmon. Cermaq claim that in their previous sustainability strategy, a big commitment was to work towards 100% ASC certification (they currently have 24 salmon farms certified), which they claim have given them an advantage because they were the only firm to deliver ASC fish every single week. There is consensus that ASC fish provides a higher price in the industry. The interviewee from Nova Sea asserted that they have about 90% of production ASC certified and are aiming at 100%. He implied that salmon farms will eventually be pushed to get ASC certified, which is good as it has points on emissions, escapes and feed (according to ASC feed standards).

Licenses was identified as a key resource among the informants. In this section, we will only present numbers of development licenses that the representative companies obtain (see table 4), because this license was the one with most accurate and reliable statistics from the data collection and it was verified by the Norwegian directorate of fisheries register (Fiskeridirektoratet, 2021). The interviewee from Grieg Seafood explained that the industry/companies do not have any ownership over the areas (e.g., the fjords) where they produce salmon, and thus need permission to operate, and this happens in terms of licenses which are issued by the authorities. Moreover, Nordlaks received 21 new developing licenses in order to develop two offshore farms, which they claim will give them immense possibilities to expand as a company. Another interviewee (Cermaq) emphasised that the developing licenses work as an incentive to create new ways of farming, because the key is that licenses allow companies to increase production, so without that aspect one might not be motivated in

the same way. Moreover, Norway Royal Salmon conveyed that they managed to obtain ten of the green licenses, in addition to the development licenses they achieved for their offshore farm. Ultimately, licenses were highlighted as a valuable resource among the interviewees.

Companies	Development licenses
Sinkaberg Hansen	1
Grieg Seafood	3
Nova Sea	4
Cermaq	4
Bremnes Seashore	6
Norway Royal Salmon	8
Nordlaks	21

Table 4: Development licenses (Fiskeridirektoratet, 2021).

6.1.2. Key Activities

These following components are identified as the key activities in the sustainability strategies and practices within the representative companies in the salmon farming industry.

Sustainability Reporting

Sustainability reporting is one of the key activities. Majority of the informants revealed that this was a focus that they have been prioritising for years and others reveal that it is becoming more applicable for the entire industry to commit and comply to sustainability reporting. For example, Grieg Seafood has been conducting sustainability reporting since 2012, and they also

published their largest sustainability report back then. Another initiative that was identified is climate accounting, which was introduced as a way for firms to measure and become aware of their own climate impacts and footprints. And not the least, a way to become more open and transparent about the climate goals that they set.

Many are also anticipating that the market will require firms to have public climate accounting eventually. The interviewee from Nova Sea conveyed that one of the biggest things in their company that they started with, was to focus on climate accounting and gaining an overview of their climate footprints.

"Grieg Seafood has chosen to focus on emission cuts and have specified sustainability criteria's that we are currently working towards. With a long-term view, emission cut will go hand in hand with profitability, as consumers and customers will prefer low carbon products, because we will avoid carbon taxes that are expected to increase and be able to attract cheaper, green capital" - Grieg Seafood, 2020

Sustainability Compliance

Certification of farms/locations is a key activity most firms are working towards achieving or completing to be able to grow as a company. Especially, in terms of meeting industry and market demand for sustainable production and thus provide a multitude of options that fit and fulfils their customer criteria. Informants claim that in return this can increase their economic profits, reputations, and provide them other competitive and/or strategic advantages. Nova Sea explained that certifications (e.g., ASC) are good because it has points on for example emissions, escapes, feed etc. As stated in the ASC certification section above, it includes the three aspects of sustainability, and thus this activity entails that the companies focus on covering and committing to production criteria that impacts social, environmental and economic considerations. In addition, Bremnes Seashore, Norway Royal Salmon, SinkabergHansen also have other certifications such as Global G.A.P. The companies express that one of the purposes with certifications is to have external auditors to verify the companies, which provides the market with legitimate verification.

Electrification

Electrification of farming sites and feeding barges is a key activity that many of the companies are in the process of conducting. This entails that they transition from diesel consumption to electrical solutions. The interviewee from Nova Sea explained that this process of electrification contributes to reduce emissions. Moreover, some of the informants conveyed that they have gone from for example diesel boats to electric or hybrid boats. And others state that they are pursuing hybrid solutions instead of diesel solutions. Electrification has been largely focused on and more detailed findings on the electricity process will be presented in the cost structure section below. On another note, a few informants mentioned another initiative of changing transportation mode, where they explain that they try to move salmon out to the market through trains instead of using trailers. For example, Nova Sea had a goal in 2020 to attempt to transport by train half of their fish that they send to the market, which is also way to reduce emissions.

Delousing Methods

A prevalent concern and challenge across the companies is related to salmon escapes, sea lice and fish feed. All interviewees mentioned activities and initiatives related to these issues, especially sea lice. Delousing was raised as a key activity in the industry to treat salmons for lice. Both medical and non-medical approaches was discussed and most of the informants claim that the former are substantially rare, whereas the latter are used more often. However, although they expressed that they attempt to avoid medical treatments, they also admit that there are cases where it is necessary to use it. Furthermore, it was highlighted that antibiotics are not used as a medical treatment among any of the companies. On the other hand, the non-medical operations that were mentioned are for instance cleaner fish, flushers, lasers, freshwater treatments, thermal treatments.

Bremnes, Grieg Seafood, Norway Royal Salmon are among the companies using cleaner fish as a preventative measure against lice. However, the use of cleaner fish is also considered a large sustainability dilemma in the industry, because of the ethical concern regarding animal welfare. For example, Nordlaks decided to stop using cleaner fish due to these dilemmas, and their decision was based on them not being able to utilise cleaner fish in a good way enough to be comfortable to continue. The informant from Cermaq supported the same view by explaining that one exploits another species only to eat the lice, and that this is merely an acute measure rather than a permanent solution.

There are also dilemmas that emerge with the use of non-medical approaches, such as mechanical and thermal solutions, whether these are gentle enough or harmful towards the fish. The informants from SinkabergHansen conveyed that the procedure of treating salmon for lice can be difficult and complex, because at worst it may lead to them dying during the process, which is why they claim that the more optimal solution is to reduce treatments needed and have gentle methods. In addition, they also mentioned that they are working on a new method that they are waiting for approval of, which is supposed to be considerably gentle and effective against lice. Grieg Seafood add that one of the reasons for salmon mortality is because they need to treat the salmon when there are infested with lice. It is evidently for a good reason since they must apply treatment to take care of the salmon. However, they also agree that finding delousing methods that are gentler for the salmon can create great significant. Nevertheless, there are contrasts across the companies on the delousing activities and their varies assessments. There is not consensus among them on which methods are best, because approaches at one company may not necessarily be experienced in the same way at another one.

"If you manage to find good delousing methods that are gentle with the salmon, you will see an improvement in fish welfare and wild salmon co-existence, which will have a substantial positive effect on aquaculture sustainability" - Grieg Seafood, 2020

Most of the informants expressed how they use site fallowing (i.e., to empty production sites) as a preventative measure against lice infestation. Firms operate at the locations during the production cycle, and after a production cycle is over, they fallow the sites so that the location can recover – not only for the bottom conditions but also to remove sea lice from the locations. It was repeatedly mentioned that by fallowing a site, the entire area is emptied of farmed salmon and thus eventually the lice too. The interviewee from Grieg Seafood explained that the sea lice need a host to survive and propagate, if a location is without any fish – the lice may not have any host to stay alive on. Therefore, this measure may allow the location to restart the production cycle without the constant challenge of sea lice. Moreover, it is required by the law to fallow a site for at least two months, after every production cycle. However, some companies fallow their site for longer than what is required of them. For example, SinkabergHansen claim that they often fallow longer than two months and they have even managed to do it for up to six months.

"*Fallowing is a fundamental and proven principle to help prevent salmon lice to become an issue"* - Nordlaks, 2020

Innovation Capability

Development projects came up as a repeated topic of key activities among the informants. Majority talked about different projects that they were involved in or in the process of developing. The firms outlined the importance of maintaining the focus on innovation and how the innovative level of the industry was a key to explore potential changes and find new solutions. Innovation is also perceived as pivotal to solve challenges and a big contribution to preventative measures for the industry. Certain development projects are regarded as one of its kind for the firms. Many are exploring new developments such as offshore farms, closed fish cages (e.g., Atlantis Subsea Farming, the submersible cage), artificial intelligence/technology projects (i.e., iFarm). Which they believe can possibly work as preventative measures against sea lice and escapes and increase production efficiency.

The interviewee from Cermaq described the iFarm and conveyed that they are in the process of developing and testing the concept. The process involves having 'health journals', using recognition algorithms to identify each salmon, and in the long term discover and sort out the individual salmons that have sea lice and consequently, need treatment. Instead of completing delousing treatments of entire populations, only the fish affected will undergo treatment.

"The industry has constantly readjusted quickly, there are few industries that have such a pace of innovation." - SinkabergHansen, 2020

6.1.3. Key Partnerships

These following actors are identified as the key partnerships in the industry and are paramount in the involvement of sustainability implementation.

The partnerships with different suppliers emerged in the interviews as one of the most salient collaborations for the firms. Suppliers provide most of the different equipment, technology, machinery etc. that are essential for the industry. The partnerships also vary a lot, in some cases it involves a collaboration to develop things together and in other cases it entails suppliers developing the product on their own and thereafter sells it to the buyers (the salmon companies). For example, Norway Royal Salmon mentioned that they bought the hybrid boat from Moen Marin (a supplier of working boats) and that the boats are developed by the supplier. On another hand, Norway Royal Salmon's offshore fish farm was developed in collaboration with Aker Solution because of the offshore expertise needed to develop the construction.

The interviewee from Nordlaks also conveyed the importance of partnerships with suppliers that have knowledge and understanding of maritime and offshore technology in developing offshore farms and highlight that they depend on the suppliers that are involved in the development of their offshore farm. Nordlaks has a partnership with NSK ship design (the suppliers that designed the offshore farm) and pay for the services. However, NSK owns the farm. Hence, Nordlaks has no intellectual property rights over the offshore farm.

The interviewee further explained that Nordlaks came up with the concept and are responsible for the technical and biological part of farming and ensures the feasibility of running/operating salmon farming on an ocean farm, and NSK is responsible for designing and creating the technical solutions that Nordlaks want and describe. The partnership is secured through contracts and the contracts governs how the collaboration works and what rights each party have. The informant emphasised that it is also beneficial for suppliers to learn new things and increase their competence and expand to other industries such as the aquaculture industry.

"*It was one of the intentions of the entire system of development permits – to develop the industry, not only as an industry, as aquaculture companies, but also the entire supply chain and to introduce new technology and knowledge clusters to the aquaculture industry"* - Nordlaks, 2020

As vaguely mentioned in the key resources section about well boats, when ownership is not an option some of the companies have partnership with well boat suppliers to rent the boat over a certain extent of time. For example, Cermaq is currently leasing a well boat (MS Steigen) long-term. They collaborate with other salmon farming companies and either share or rent out well boats with each other when necessary. Grieg Seafood use these partnerships to create incentives for the suppliers to become more environment friendly. Since Grieg Seafood have strict sustainability criteria and goals such as reducing CO2 emissions, one of the ways for them to reach their goals is to negotiate sustainable agreements, and they do this when they are in contract negotiations with different suppliers. The informant expressed that when the company create arrangements with well boat suppliers, they negotiate different terms for example stating that the suppliers need to invest in hybrid solutions or more environment friendly solutions for their well boats.

"It is also the case that aquaculture is dependent on hired services, such as well boats, divers and service vessels. These services are indirectly connected to our emissions and we are in need of agreements and collaborations to reduce the greenhouse gas emissions for the

industry. for example, our suppliers will need to invest in hybrid- or environmentally friendly propulsion" - Grieg Seafood, 2020

The partnership that the companies have with fish feed suppliers provides them the ability to affect the soya problem. The informants talked about the large issues surrounding soya beans used in fish feed that comes from deforestation areas in Brazil (creating enormous amounts of Carbon footprint) have resulted in that the Norwegian salmon farming industry is holding a large campaign, and many of the companies are taking action to demand that suppliers have soya that are 100 % certified deforestation free. Most of the informants mentioned the soya problem and about how the partnership that the companies have with feed suppliers enables them to make stringent demands. For example, Nova Sea conveyed that they are one of the signatories to the support letter for the Amazon Soy Moratorium manifesto, pushing feed suppliers to say 'no' to soya from deforestation areas, and they can impact suppliers in a more sustainable direction by giving them ultimatums about changing suppliers if they do not comply to the demands.

"We are in contact with suppliers of the soy concentrate in Brazil to impact them to switch to full deforestation-free volumes, so it is not only deforestation-free - what we get, but also that the suppliers' total volume is deforestation-free. We are part of this together with Grieg and Lerøy, among others" - Norway Royal Salmon, 2020

Grieg Seafood highlights sustainability challenges regarding circular economy, recycling, plastic consumption and reuse of materials. Fish residue from production are often added with a type of acid and thereafter sold as a by-product. They are required to collect this silage. Thus, this by-product is refined and sold to beauty brands such as L'Oréal to be utilised in cosmetic products, such as facial creams and moisturises. Another issue is the salmon farming industry's enormous consumption and procurement of plastic. The tremendous flows of plastic require the firms to take great responsibility. Therefore, Grieg Seafood collaborate with Bellona Foundation, which help with expertise related to procedures of plastic use and procurement.

"For example, is the plastic we buy sourced from recycled materials, can the products be recycled, and does it contain harmful substances?" - Grieg Seafood, 2020

Global Salmon Initiative indicate an important partnership among the salmon farming companies. Some informants (Cermaq) states that they are very active in GSI, because it helps to drive the industry forward holistically. Nova Sea claim that through GSI they can push forward with e.g., climate accounting and ASC certifications in other companies too.

6.1.4. Cost Structure

Informants indicate that different resources and activities require financial investments which is often costly, thus each individual company must prioritise which resources and activities to focus on. Given the fact that each company have invested in different projects and performed distinct transactions, (which can for example be seen through technologies and equipment that was listed in the key resources and key activities sections) companies must choose some over others, based on their own preconditions. Whether if it is certifications, electrifications, various technologies and equipment, large investments are required. It was conveyed that some firms invest in the activities that yield the highest potential return, whether it being sustainability-motivated or not. Cermaq claims that the incentive to conduct large investments would be lower if it would not be profitable to make sustainable investments or to be sustainable. At least to the point that one will not suffer economic losses.

"ASC certification actually costs quite a lot of money. One is the direct costs in the audit itself, but it costs a lot of resources and a lot of time, getting all the management systems implemented" - Cermaq, 2020

ASC certification is largely prioritised across the companies. For example, Cermaq, Grieg Seafood, Norway Royal Salmon and Nova Sea invests substantially to certify their farms with ASC. The informants from Cermaq and Nova Sea conveyed that ASC certifications is something they have been investing in for the past five years, because it provides them extra profits on the sales side with ASC certifies fish.

Additionally, Norway Royal Salmon explained that in return for the investment customers are willing to pay a price surcharge to purchase ASC fish. Cermaq claim that, one potential obstacle with the ASC certification is that, because ASC requires a certain amount of data, first-time generation of fish (i.e., first production population on a new locality), will not be certified/approved. Moreover, small localities are as costly to certify as bigger localities, which makes the profitability to certify small localities lower and unnecessary.

"The cost of certifying a small locality is as great as for a large locality. The yield will be lower per krone, because there will be so little biomass. You have the same costs for monitoring, for auditors, and for the time you spend on them." - Cermaq, 2020

The electrification of e.g., farming sites and feeding barges is an expensive process and investment. The companies have prioritised differently on this area. The interviewee from Bremnes Seashore conveyed that they have invested largely in electrification and shore power, which makes it possible for them to run their operations on the pens with electricity. On another hand, the informants from SinkabergHansen explained that even though electrification is good, the salmon industry is an energy intensive sector, which is why they want to reduce the consumption of non-renewable energy resources and not just convert over to electricity instantly. Therefore, their large investments in the Atlantis Subsea Farming and Subsea Feeder will contribute to reduce some of the energy consumption. In terms of cost, electrification can for instance minimise operating costs, by changing from fossil energy source (which is more expensive) to electricity or hybrid. Additionally, value is generated because transitioning to hybrid and electric solutions and reducing diesel consumption will lead to mitigating the CO2-emissions.

"An average fleet uses 100,000 L of diesel a year. In 2017 we probably used well over a million L of diesel. It is quite a lot, but it also produces a lot of food then" - SinkabergHansen, 2020

Hybrid working boats is among the large investments that have been made among some of the companies. According to the informant from Norway Royal Salmon, hybrid boats are more expensive than the diesel boats that many of the companies still use and the cost barrier on this case, is if this sort of investment is profitable enough for companies to justify this as a priority.

Grieg Seafood is trying to reduce their emissions associated with transport as transport of salmon and transport of feed to salmon are among their largest emissions. They have invested in e.g., moving from fossil to electricity, due to fossil sources being more expensive. Also, they are trying to find other alternatives for fossil fuel, e.g., hydrogen and ammonia. However, the problem with hydrogen is that it is not possible to obtain hydrogen fuel and there are a lot of political guidelines that need to be in place to make it work. This poses a dilemma.

"*I don't see any other solution than to invest in hydrogen the next 5-10 years to be able to reach a sustainable future, not just for the aquaculture industry, but for the entire society".* - Grieg Seafood, 2020

Most companies (e.g., Cermaq, SinkabergHansen, Nordlaks, Norway Royal Salmon, Nova Sea) have invested large amounts in their development projects that may contribute to increase production and solve the problems that the industry is facing. For example, Nordlaks have spent over a billion NOK on their offshore fish farm, and Nova Sea has invested approximately 500 million NOK on theirs. Whereas other companies such as Grieg Seafood, has prioritised differently. They focus on the direction of reducing emissions and thus have other sustainability criteria that they work towards, which makes them less cost leading in terms of production compared to other companies.

"*The ocean farm was a large investment, over a billion kroner"* - Nordlaks, 2020

The possession of licenses across the companies varies, some have made more investments than others to obtain these, and the different firms have achieved various types of licenses. Norway Royal Salmon and Nordlaks have made large investments in developments that in return have provided them many development licenses, which for instance permits them to

produce more quantities of fish. Cermaq have also been working on a development construction (i.e., the iFarm) that are costing them considerable amounts, but in return they also received four development licenses for the construction, and they are optimistic that the technology will be cost effective *if* they succeed. Further, the informant from Bremnes Seashore explained that licenses are very limited in supply and when they are offered to the industry players the prices are relatively high. Nordlaks mentioned that large investments are risky but that the purpose with development licenses is that companies would receive risk relief from the authorities to be able to conduct sizable investments and have reduced liability.

"*Of course, these development projects are risky. Even though we are now working on the first generation of exposed fish farms, there is always a risk that you will not succeed" -* Nordlaks, 2020

A few of the informants conveyed that their companies (i.e., Norway Royal Salmon, Bremnes Seashore, SinkabergHansen) have invested substantially in RAS[7] technology for their smolt facilities. For example, SinkabergHansen invested approximately 750 million NOK for their new RAS facility. Moreover, it was articulated that with the RAS facility it means that water is recycled and reused – making it resource-efficient and more environmentally friendly.

6.1.5. Value Proposition

"All food production has a footprint, or all industrial food production has a footprint" - Cermaq, 2020

How the companies operate varies, but the companies revealed that they approach certain issues differently. As the problems regarding sea lice are pertinent, there are evident contrasts in terms of animal welfare perspectives and preferred delousing methods, as presented in the key activity section. Also presented in the key activity section is the various investments in

[7] Recirculating aquaculture system (RAS). Land-based RAS facilities are often used to produce fish and the system works in a way that allows water to be reused (Hines, Fang, Chan, Stiller, Brauner & Richards, 2019).

technological projects appropriate to reduce sea lice issues. Because in aquaculture production fish has the same rights as e.g., cows have in agriculture (i.e., Norwegian Animal Welfare Act/Law), the fish must be taken care of – regardless of animal species or population size. As stated among interviewees, sea lice are a critical reason behind mortality among salmon. Thus, there is an official limit to how much lice are allowed, and the salmon farming companies must strive to stay below that limit to avoid being deprived of the permission to produce.

"*The salmon has the right to a good life, you should make sure that they do not live in fear, they should not starve and they should be able to move freely"* - Grieg Seafood, 2020

Further, the firms highlight the importance of responding to their customers' needs, as they are becoming more conscious about production methods, food quality assurance for health reasons, and how the environment is affected because of the production. Customers are becoming aware, and they require certain standards to be met before purchasing the product. For that matter, the ASC certification were argued to be helpful in the transition towards sustainability, because it helps the entities becoming compliant with e.g., regulations, employees' rights and avoid over-production/environmental harms. The certification thus increases their product sales price.

Not only customers, but also global market trends affect operational procedures. For example, Cermaq and Grieg Seafood emphasised the enormous demand for transparency in terms of ingredients used in fish feed, this factor has pushed the industry forward to seek for new and more sustainable sources or input factors. Soy production accounts for large negative externalities and consequences to e.g., Brazilian forests – where it is extracted from, which is a great challenge for the seafood industry today, as there is not yet any officially satisfactory fish feed that does not contain soy. As pointed out by the informants from both Norway Royal Salmon and Grieg Seafood, they are demanding 'deforestation free' soy from the suppliers, to manage the implications. However, Grieg Seafood claim that this does not mean that those suppliers are not producing and selling soy from deforested areas to other customers, which result in forests still being burned down to the ground and thus releasing immense amounts of

carbon emissions, consequently. Several informants emphasised that the soy problem is greater than the diesel/non-renewable energy source problem, as soy accounts for the greatest source of carbon emissions within the industry.

"*Society now moves faster in a direction where consumers are concerned about what they eat, how food is produced and how their own choices affect both planet and society. Then business also moves faster to remove the distinction between business goals such as profit on the one hand, and sustainability issues on the other. These things are interdependent"* - Nordlaks, 2020

The importance of operating economically sustainable is evident among the informants. Purchasing expensive "green alibi" is neither expected to be sufficient environmentally nor economically for a large industrial food producer. Hence, one must be part of new processes and demand innovation throughout the value chain, and by that means generate learning and new ways to operate.

"We can shop expensively and buy ourselves a green alibi. But do not think that is the way to become sustainable, neither on the environmental side nor on the economic side." - SinkabergHansen, 2020

6.2. VRIO analysis of the seven companies

Based on the key components identified using the Business Model Canvas template in the previous section, we have gone more into detail about salient firm resources for each of the companies and evaluated their heterogeneity and immobility using the VRIO criteria presented in the literature review. The following findings are based on our data collection (i.e., interviews and secondary data) and depict conditions of the present.

Nova Sea					
Resource/ capability	Value	Rarity	Inimitability	Organisation	Competitive Implication
Electrification	Yes	No	No	No	Competitive Parity
Sustainability Position (Environmental Advisor)	Yes	Yes	No	No	Temporary Competitive Advantage
Specialised Workforce	Yes	Yes	No	No	Temporary Competitive Advantage
Company Image/Reputation	Yes	Yes	No	No	Temporary Competitive Advantage
Licenses	Yes	Yes	No	No	Temporary Competitive Advantage
ASC certification	Yes	Yes	No	No	Temporary Competitive Advantage
Innovation Capability	Yes	Yes	Yes	Yes	Sustained Competitive Advantage
Equipment/ Technology (Spidercage)	Yes	Yes	Yes	Yes	Sustained Competitive Advantage

Table 5: VRIO analysis of Nova Sea

Norway Royal Salmon					
Resource/ capability	Value	Rarity	Inimitability	Organisation	Competitive Implication
Sustainability Position	No	No	No	No	Competitive Disadvantage
Electrification	Yes	No	No	No	Competitive Parity
ASC certification	Yes	Yes	No	No	Temporary Competitive Advantage
Company Image/Reputation	Yes	Yes	No	No	Temporary Competitive Advantage
Specialised Workforce	Yes	Yes	No	No	Temporary Competitive Advantage
Equipment/ Technology (Arctic Offshore Farming)	Yes	Yes	Yes	Yes	Sustained Competitive Advantage
Licenses	Yes	Yes	Yes	Yes	Sustained Competitive Advantage
Innovation Capability	Yes	Yes	Yes	Yes	Sustained Competitive Advantage

Table 6: VRIO analysis of Norway Royal Salmon

Nordlaks					
Resource/ capability	Value	Rarity	Inimitability	Organisation	Competitive Implication
Sustainability Position	No	No	No	No	Competitive Disadvantage
Specialised Workforce	Yes	No	No	No	Competitive Parity
ASC certification	Yes	No	No	No	Competitive Parity
Company Image/Reputation	Yes	No	No	No	Competitive Parity
Electrification	Yes	No	No	No	Competitive Parity
Equipment/ Technology (Offshore farm, 'Jostein Albert')	Yes	Yes	Yes	Yes	Sustained Competitive Advantage
Innovation Capability	Yes	Yes	Yes	Yes	Sustained Competitive Advantage
Licenses (development licenses)	Yes	Yes	Yes	Yes	Sustained Competitive Advantage

Table 7: VRIO analysis of Nordlaks

SinkabergHansen					
Resource/ capability	Value	Rarity	Inimitability	Organisation	Competitive Implication
Sustainability Position	No	No	No	No	Competitive Disadvantage
ASC certification	No	No	No	No	Competitive Disadvantage
Company Image/Reputation	Yes	No	No	No	Competitive Parity
Electrification	Yes	No	No	No	Competitive Parity
Specialised Workforce	Yes	Yes	No	No	Temporary Competitive Advantage
Equipment/ Technology (e.g. Atlantis Subsea Farming)	Yes	Yes	Yes	Yes	Sustained Competitive Advantage
Innovation Capability	Yes	Yes	Yes	Yes	Sustained Competitive Advantage
Licenses	Yes	Yes	Yes	Yes	Sustained Competitive Advantage

Table 8: VRIO analysis of SinkabergHansen

Cermaq					
Resource/ capability	Value	Rarity	Inimitability	Organisation	Competitive Implication
Electrification	Yes	No	No	No	Competitive Parity
ASC certification	Yes	Yes	No	No	Temporary Competitive Advantage
Sustainability Position (Sustainability Manager, - Risk)	Yes	Yes	No	No	Temporary Competitive Advantage
Licenses	Yes	Yes	No	No	Temporary Competitive Advantage
Specialised Workforce	Yes	Yes	No	No	Temporary Competitive Advantage
Company Image/Reputation	Yes	Yes	Yes	Yes	Sustained Competitive Advantage
Innovation Capability	Yes	Yes	Yes	Yes	Sustained Competitive Advantage
Equipment/ Technology (iFarm)	Yes	Yes	Yes	Yes	Sustained Competitive Advantage

Table 9: VRIO analysis of Cermaq

Bremnes Seashore					
Resource/ capability	Value	Rarity	Inimitability	Organisation	Competitive Implication
Sustainability Position	No	No	No	No	Competitive Disadvantage
Specialised Workforce	Yes	No	No	No	Competitive Parity
ASC certification	Yes	No	No	No	Competitive Parity
Electrification	Yes	No	No	No	Competitive Parity
Equipment/ Technology	Yes	Yes	No	No	Temporary Competitive Advantage
Licenses	Yes	Yes	No	No	Temporary Competitive Advantage
Company Image/Reputation	Yes	Yes	No	No	Temporary Competitive Advantage
Innovation Capability	Yes	Yes	Yes	Yes	Sustained Competitive Advantage

Table 10: VRIO analysis of Bremnes Seashore

Grieg Seafood					
Resource/ capability	Value	Rarity	Inimitability	Organisation	Competitive Implication
Electrification	Yes	No	No	No	Competitive Parity
Sustainability Position (Global Sustainability Advisor)	Yes	Yes	No	No	Temporary Competitive Advantage
Specialised Workforce	Yes	Yes	No	No	Temporary Competitive Advantage
Licences	Yes	Yes	No	No	Temporary Competitive Advantage
ASC certification	Yes	Yes	No	No	Temporary Competitive Advantage
Equipment/ Technology	Yes	Yes	No	No	Temporary Competitive Advantage
Innovation Capability	Yes	Yes	Yes	Yes	Sustained Competitive Advantage
Company Image/Reputation	Yes	Yes	Yes	Yes	Sustained Competitive Advantage

Table 11: VRIO analysis of Grieg Seafood

As displayed on the tables, eight company resources and capabilities were identified as the most relevant to generate competitive advantage for the salmon farming companies. The same resources/capabilities were presented in each table to demonstrate variations between companies. Resources/capabilities that scores as valuable, rare, inimitable and organisational meet the requirements of sustained competitive advantage. The tables display that the innovation capability is the only resource/capability which is considered a sustained competitive advantage in all seven companies.

Equipment/technology in terms of development projects or constructions are indicated as a sustained competitive advantage among five of the seven firms. All else demonstrate an evident contrast between what resources and capabilities each company possess that generate competitive implications (which is clearly presented in the tables). To summarise, Nova Sea and Grieg Seafood has two resources/capabilities that provides sustained competitive advantage and Norway Royal Salmon, Nordlaks, SinkabergHansen and Cermaq has three

resources/capabilities that gives them sustained competitive advantage. Whereas Bremnes Seashore has one resource/capability which is considered to bring sustained competitive advantage. All companies were assessed on each VRIO condition based on theory and information from the data collection. This means that we had to confirm that information from the data collection, met the theoretical requirements behind the resource-based view conditions of heterogeneity and immobility (that a company must obtain to gain competitive advantage), which is how we managed to conclude with yes/no in the tables. To grasp the reason why there are contrasts between companies, one must understand the context and explanation behind each resource and capability according to the RBV theory's conditions, this will be analysed and discussed in the next chapter.

7. Analysis and Discussion

In this chapter we will analyse the main findings presented in chapter 6 and discuss its relevance with respect to theoretical implications and sustainability enforcement.

7.1. Resources and Capabilities

The resource-based view theory conveyed that four conditions must be satisfied to achieve sustained competitive advantage. These are heterogeneity, ex post limits to competition, immobility and ex ante limits to competition (Peteraf, 1993). The VRIO framework allowed us to evaluate resources and capabilities that are pertinent to the industry representatives, within the research boundaries. Figure 10 displays the resource categories and is narrowed down to the most salient ones pertinent to sustainability strategies and practices. The eight resources/capabilities are presented as followed.

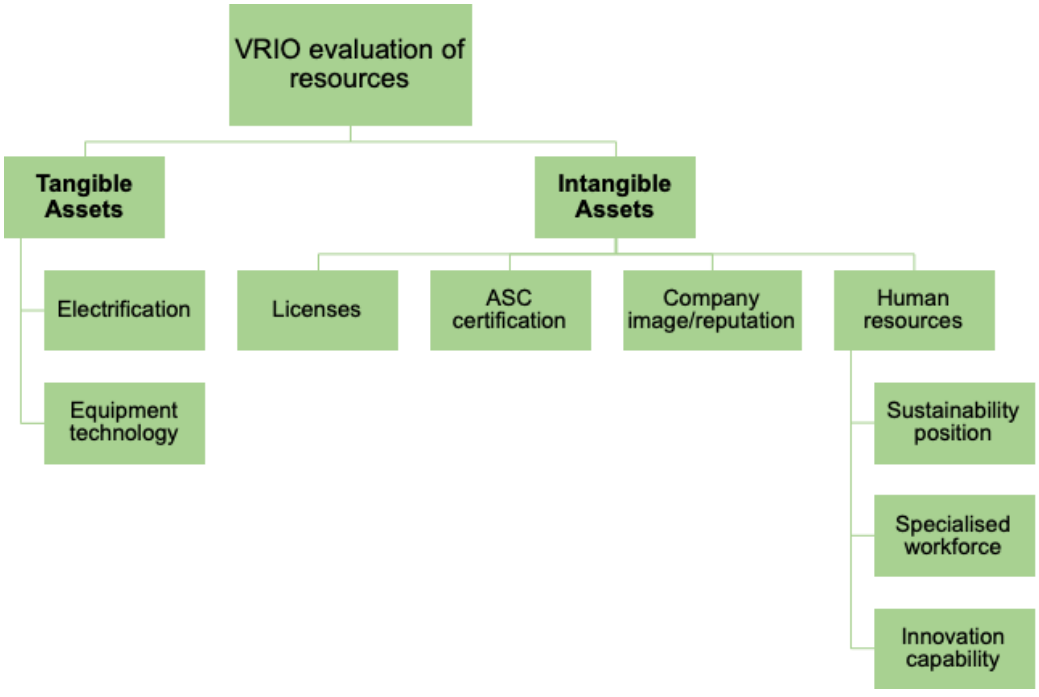

Figure 10: VRIO evaluation of selected resources and capabilities

7.1.1. Intangible assets/resources

The key intangible assets that create value to the salmon farming companies are identified as licenses, ASC certification, company image/reputation and human resources (in terms of skills and competencies).

Licenses

Most of the companies have invested in different licenses, especially green licenses and development licenses. Nevertheless, there are still considerable contrasts between the number of licenses that each company possess, and they have different priorities and prerequisites in terms of types of licenses that they acquire.

In terms of development licenses, Nordlaks has for instance the highest number of licences, which is largely because of their offshore farm projects. The more licenses that one company possess the bigger value are they likely to generate. However, it is not given that the number of licenses each company have is going to decide their performances nor successes. Investing in licenses is not solely about the price a company must pay to get a license, especially considering that development licenses are government subsidies (Christiansen and Jakobsen, 2017), but it also involves the components that need to be in place within the organisation, for companies to be considered as qualified. For example, the organisation's underlying competence and capabilities. But a high number of licenses is an advantage for firms to be in possession of. We would argue that investing in licenses appears to create added value since it allows the companies to increase production volumes, which further leads to added value through for example larger quantities of fish and increased revenue.

Development licenses provide companies with the incentive to create new and innovative developments/constructions, which gives them a competitive advantage against their competitors. Companies must make large investment only to become eligible and meet the conditions of applying for licenses. This demanding process can be a significant barrier/obstacle for companies that want to obtain licenses.

As depicted in the VRIO tables (under subchapter 6.2), Nordlaks, SinkabergHansen and Norway Royal Salmon are the only companies that were evaluated as having sustained competitive advantage due to licenses. This is because they were able to acquire a substantial number of licenses (e.g., Nordlaks with 21 licences) through investing in unique innovations that differentiates them from competitors, on each their own methods, and the competence and experience they have enables them to stay innovative and thus preserve competitive advantage.

There are substantial barriers in terms of the costs of purchasing licenses and the limited availability of number of licenses. The competition between the companies to gain licenses are fierce, which makes the possession or the outcome of having licenses scarce and valuable, hence leads to the resource being heterogenous. We also argue that because the companies are competing for limited licenses, the criteria to get them becomes even more difficult, rather than if the demand was lower. License acquisitions require high degree of organisational coordination and innovation capability, two aspects that are highly connected to each firm's human resources. The uniqueness and scarcity of licenses are barriers preventing imitation or substitutability, which is why there is ex post limits to competition. Every company that was granted licences possess crucial competencies and capabilities that make it feasible for them to implement measures in the process of claiming licenses and these components remains retained in the firm. Immobility exists with the anticipation that each company have firm knowledge/skills and thus firm-specific projects that enabled them to obtain the licenses. Conclusively, ex ante limits to competition exists because licenses are very costly and difficult to attain, the requirements to gain permits are very strict (Peteraf, 1993). This entails that it is expected of companies to fulfil the preconditions and in addition invest financial capital. Due to these requirements, licenses can also facilitate further learning and competence building for the companies that manage to obtain them. Hence, licenses are not possessed by all companies, because there are not many organisations that have what it takes to meet these conditions.

Aquaculture Stewardship Council certification as consensus

Aquaculture Stewardship Council (ASC) certifications has emerged as an imperative resource in the industry, and a few companies have come a long way in certifying their farms with the ASC certification. As presented in the findings section, Cermaq has for example certified 24 of their salmon farms in Norway and therefore have the capability to deliver ASC salmon quite frequently. When they can deliver ASC certified salmon recurrently and often, there is an indication of temporal specificity because of the timing and coordination of delivery of a product that is compliant with international sustainability standards (De Vita et al., 2011). In contrast, other companies are in the early stages of reviewing the certification process. ASC certification is a valuable resource and an advantage for companies because it provides them the opportunity to sell their salmon for a higher price and in addition to the certification being a demand in the market. However, it is emphasised by the firms that ASC certifications are substantially resource-intensive, meaning that it is very costly and requires considerable time and human effort to implement. Consequently, we have noticed that firms prioritise differently when it comes to certifying their farming sites with the certification.

The number of certifications varies between the firms. ASC certification is something companies across the salmon farming industry is targeting, and because the certification covers great extents of sustainability criteria that are even compliant with the UN Sustainable Development Goals (Vince & Haward, 2017; Aquaculture Stewardship Council, n.d.), the certification is feasible to imitate and substitute, which makes it difficult to consider this resource as heterogeneous, hence there are no ex-post limits to competition (Peteraf, 1993). The certification is costly to acquire, and it requires a lot of time, coordination and effort. These issues constitute a barrier for firms to quickly meet and adopt ASC requirements, and therefore we argue that ASC certification is a source of temporal competitive advantage (Knott, 2015). Given the dynamic environment where adopting ASC is profitable and builds company image, the firms may have different learning capacities to quickly adopt. However, the certification cannot only be retained within one (specific) firm, which makes it mobile because when others obtain the ASC certification it also becomes as valuable for them.

Although it is a costly investment, ex ante limits to competition hardly exist, due to the certification being accessible for all companies to obtain (Peteraf, 1993). ASC certification do not meet the four conditions in the resource-based view theory. Therefore, as demonstrated in the VRIO tables (in subchapter 6.2), the companies were not considered to have sustained competitive advantage for having ASC certifications, but rather temporary competitive advantage. The companies were evaluated on all the components in the VRIO analysis. In terms of ASC certifications being valuable, six of the seven companies met this condition because they receive added value in terms of higher price for ASC fish. Four of seven companies fulfilled the condition of rarity, because it is perceived as rare due to ASC certification is controlled by only a small number of firms (Bresser et al., 2012; Cardeal & Antonio, 2012).

Company Image / Reputation

Company image/reputation is an invisible asset that naturally varies between the firms, because some of the firms operate B2C (business-to-consumer) and others B2B (business-to-business), and because the image/reputation are highly dependent on various components. Brand value is another asset and can be perceived very similarly as reputation for companies but is more narrowed down to customer segments' perceptions (Osterwalder and Pigneur, 2010, p. 20). Nevertheless, it is important to discriminate between the two, reputation is pertinent to B2B relationships, whereas brand value is applicable for B2C relations. Brand value can have a large impact on companies' activities and can generate great value. However, as emerged from research findings, the salmon farming companies are not highly attentive on building brand value, probably because most of the firms operate B2B rather than B2C. The only exception is Bremnes Seashore, that own the well-known Norwegian 'Salma' brand and have focused largely on their brand value. Due to this premise and the research project's focus on sustainable strategies and practices, we analyse the salmon farming firms based on their company image/reputation regarding sustainable actions and behaviour.

A strong company reputation of being sustainable by having activities that harmonise with sustainability can be a valuable resource for companies in many ways. Because it can affect and strengthens their attractiveness towards market demands and their transparency towards stakeholders. In addition, companies' utilisation of learning capability, competence and experience within sustainability can contribute to enhance companies' reputation, and this performance can impact and enhance the relational trust to external parties. Companies that have a large focus on sustainability have it often socially embedded inside the organisational culture, and it reflects in the employees working there and the people they attract to the company. As emphasised among some of informants, a company's commitment to sustainability can be essential to appear attractive to prospective graduates. Moreover, firms can specifically improve their image/reputation by focusing on sustainability reporting and climate accounting because this is a way for organisations to be transparent. Many of the firms claim that their core focus is to be, and to be perceived as, a company that is putting their effort into environmental and social interests. For example, Grieg Seafood has been ranked as one of the most sustainable protein producers among many global companies (Norwegian Seafood Council, 2020). This achievement supports their efforts and commitment to sustainability and thus improve their reputation as a sustainable company.

A few companies are recognised to have a good reputation connected to sustainable goals. For instance, Cermaq has been acknowledge for having activities that align with the UN sustainable development goals and they have a sustainability manager with experience from working with the UN global compact. As highlighted earlier, Grieg Seafood decided to focus on sustainability criteria which do not make them cost leaders regarding production criteria, but their performance is better in other areas, such as sustainability (Grieg Seafood, 2020). As depicted in the VRIO analysis (in subchapter 6.2), Cermaq and Grieg Seafood are the only companies that was considered to have sustained competitive advantage regarding company image/reputation, because their invested efforts and commitments towards sustainability which discriminate them from other companies' activities. The two companies' learning capabilities and competence to stay ahead regarding sustainability performance generates

great value. And the knowledge and intrinsic engagement among their employees reflect an organisation culture that have sustainability embedded inside, which contribute to increase their probability to preserve the company's sustainable reputations and thus sustain the competitive advantage.

Different firm-specific incentives to build reputation/image as well as their implementation indicate resource heterogeneity among firms because this is conducted by only a few companies. Whether there are ex post limits to competition is slightly dependent on whether the initiative to build a good reputation is easily imitable or substitutable. Based on the anticipation that it takes time and great efforts to build relational trust and establish substantial evidence validating for conscious production, it is not simply to mimic or replace this resource. Hence, there are ex post limits to competition. The resource is considered immobile because assuming that the efforts/initiatives and the competencies on an organisational level within the firm, each firm implement to strengthen their reputation and image is specific and unique only to the pertinent firm, the value will then be retained in the company. For example, Cermaq company’s reputation and the recognition they have received as a serious player when it comes to the commitment to the UN sustainable development goals cannot be transferred or imitated by another company, because what one firm have achieved will be worthless for anyone but themselves. This can be reflected in a high level of organisational capital where a culture that is built on trust among relations internally and externally is present. Consequently, there is ex ante limits to competition, because the position of a company’s strong image and reputation in context of being sustainable is not achievable for all firms (Peteraf, 1993). The great extent of tacit knowledge among the workforce is behind companies' capability to build a sustainable reputation, which creates a barrier for competitors to imitate. Thus, makes it not easily achievable.

Human Resources

The following capabilities/assets that are identified as human resources are sustainability position, specialised workforce and innovation capability.

Sustainability Position/Sustainability Teams

A sustainability position(s) is a human resource that some companies possess, by this we mean that the company have their own positions for people working specifically with sustainability e.g., a sustainability team or an executive position that is responsible for environmental, social and economic operations. At present, some firms prioritise to have this while others do not, and it depends entirely on different factors within the firm.

From the data collected, it is evident that only a few of the companies have sustainability teams or explicit roles designated for specific sustainability work. As Cermaq pointed out, the world is moving in a direction where sustainability has become a trend and we could argue that by having sustainability positions/teams, a company can utilise the resource/capability to create an advantage by being able to focus on specific tasks, such as creating public company sustainability reports or climate accounting which aims to increase sustainability performance and thus creates value to the firm. They can measure and document their progress, and thereafter communicate this to the public. Practices and routines that such teams and positions develop may facilitate establishment of new procedures and standards on the organisational level. Thus, competence building on the individual level can create systematically improved competence on firm level. However, it is not explicit that companies that lack this resource/capability are not focusing on being sustainable, but it is arguably a disadvantage for them. Because, by not having a sustainability team/position one lacks the ability to have the time and efforts to ambiguously work on tasks that specifically focus on sustainable outcomes or goals. It is sensible to contend that sustainability positions and teams characterise a knowledge-specific asset, meaning that the people working on sustainability earns the experience and development skills needed to communicate with stakeholders when bringing the sustainability work forward (De Vita et al., 2011). Therefore, human asset specificity is a pertinent dimension to explain the complexity of human resources within the salmon farming industry, given this context.

A sustainability position/team was further considered a rare resource, because it is seen as unique due to every employee possessing different experiences and skills and is therefore only

controlled by a small number of firms (Bresser et al., 2012; Cardeal & Antonio, 2012). However, as companies learn to manage challenges and thus gain new skills and insights that follow with sustainability development and trends, which Cermaq emphasised, sustainability executives/teams are unlikely to remain a source of superior competitive advantage, because the barriers to protect its heterogeneity becomes lower (Peteraf, 1993). Nevertheless, sustainability positions or teams consist of employees with different competencies and experiences, and these workers contribute with knowledge and capabilities that is not easily transmitted and difficult to imitate (Howells, 1996). There is a great extent of interdisciplinary expertise among the employees in sustainability positions/teams, some of these includes competence backgrounds from biology, technical engineering and marine biology. This interdisciplinary competency is salient, especially for firms that have sustainability teams/positions, because it can become embedded in the companies' organisational level, which secure and strengthen their capabilities for sustainable development and make it unique only for the pertinent company that have in intact. Thus, with high competence embedded on the organisational level that keeps the companies to a certain standard, as previously emphasised, firms may experience synergy effects through for example further recruitment of competent individuals. A sustainability position or team itself may not be recognised as heterogeneous, but the experiences and competencies that these employees acquire is considered as unique and valuable. Hence, the workers resource/capability are heterogeneous and ex-post limits to competition exists due to employees in sustainability positions/teams is in possession of tacit knowledge that is difficult to imitate or substitute (Peteraf, 1993).

Due to the various companies' innovation capabilities and high investment incentives, hiring new sustainability personnel were not considered as an activity that is costly to imitate. Because there are ongoing practices of sustainability implementation in progress throughout the salmon farming industry, the firms are acquiring new information about sustainable innovation at a steady pace, simultaneously. To exemplify, when environmental information, such as customer criteria on animal welfare and environmental concerns, reached the pertinent companies, most of the firms interviewed have responded with investing in intangible assets,

such as ASC certifications to increase specialised knowledge about how to proceed to improve economic, social and environmental commitment, and to obtain third-party quality assurance. On the contrary, the competencies of these employees working with sustainability is considered costly to imitate, and with the anticipation that the competencies are socially embedded in an organisation's culture, they are not as valuable for other companies than the firm employing them. Hence, a sustainable position/team is immobile under these assumptions (Peteraf, 1993).

In order to implement motivational and profit yielding incentives, the firm must possess underlying dynamic capabilities to integrate such initiatives to their processes in a timely manner (Lenssen and Smith, 2019, p. 103). If a firm can maintain its ability to continually extend and modify competencies in line with environmental changes, ex ante limits to competition may be present, because the firm consistently stays ahead when it comes to knowledge and it becomes evident that the capability is not possess by all companies (Peteraf, 1993).

As demonstrated in the VRIO analysis (in subchapter 6.2), Nova Sea, Grieg Seafood and Cermaq are the companies that have sustainability position/teams. They scored on value and rarity because the sustainability position/teams are considered to create great value to the firms, and it is controlled by a limited number of companies (Bresser et al., 2012; Cardeal & Antonio, 2012). Considering the assumptions of heterogeneity, inimitability, immobility and ex ante limits to competition, none of the companies were considered to have a sustained competitive advantage, regarding the sustainability position/teams. As the position/teams itself, can be effortlessly acquired, it is merely the capability and the competencies of the personnel that can create sustained competitive advantage.

Specialised Workforce

To build on the previous human resource, competencies *among* workers constitute a key resource for the companies, given our context. For the salmon industry, it is pivotal to have a workforce with the right competence, skills and people, particularly within a certain role. For

example, people working with fish health and welfare might be biologist and veterinarians that have specialised competencies within the certain field. These components are contributing to empower a company's organisational capital and amplifies the organisations' procedures and routines. It would be difficult for companies to solve or mitigate problems and understand how to find the right solutions without any form of specialisation or competence. Accordingly, the industry is always seeking to attract new talents and people with specialise competency. Similarly, recent graduates with professional aspirations will be more captivated by ambitious organisations

However, prior knowledge is not necessarily a requirement in order to work with sustainability. For example, allowing employees that work outside on the cages to accumulate fish health knowledge by letting them study, for instance, the fishes' behaviour and eating patterns. Subsequently, general competencies will become specialised when exploiting current human resources and provide them with new knowledge by giving them different responsibilities associated with fish health, welfare and other tasks related to social and environmental concerns. By gaining such training and experience, workers obtain interdisciplinary competencies, which can be beneficial as multiple skills and knowledge can improve employee's productivity, and thereby productivity on the organisational level, and lead to efficient sustainability development, anticipating that the right tasks are completed without complications. A workforce that becomes specialised on sustainability concerns within the firm is therefore considered a heterogeneous and unique resource. Moreover, the salmon farming companies are considered to have a workforce that are particular on various sustainability concerns, which involves some of them having specialise competency on among other, fish health and welfare, environmental implications of salmon farming, innovative constructions for improvements, etc. Under the assumption that the specialised workforce and their experiences emerge from interdisciplinary competencies inside the organisation, this creates a barrier for others to imitate or substitute this resource. Hence, there are ex-post limits to competition (Peteraf, 1993).

Further, due to the abundance of incentives, a specialised workforce is not considered to be perfectly immobile, because a workforce that becomes specialised on sustainability concerns (regarding the salmon farming industry) are valuable and useful for all the companies within the industry that employs the resource. However, the specialised competencies and experiences behind a specific workforce is not effortlessly acquired. Despite a specialised workforce being useful for all salmon farming companies, an organisation's specific set of competencies and experiences is not replicated without further ado. Thus, this component is highly costly to imitate, which makes the underlying elements of specialised workforce, competence and experience, immobile. The possibility for all salmon farming companies to create a specialised workforce is present, with the assumption that they already have the right competence, skills and people within the firms, or if they can attract new and competent talents that are essential. Hence, ex-ante limits to competition hardly exist because specialised workforce is attainable for all companies (Wade and Hulland, 2004).

The resource does not meet all the four conditions in the resource-based theory, and as portrayed in the VRIO tables (in subchapter 6.2), none of the companies had implications of sustained competitive advantage regarding specialised workforce. However, all the companies fulfilled the condition of value, because they were all considered to have a workforce that specialised on various aspects of sustainability concerns which creates value for the organisations. For example, Cermaq and SinkabergHansen has employees with specialised competencies within certain fields and Nordlaks has workers with specialised competencies on innovative projects. These components contribute to intensify the companies' specialised workforce. Moreover, all companies except from two (Nordlaks and Bremnes Seashore) met the condition of rarity, because each individual organisation have elements of specialised workforce which is controlled by only a small number of firms (Bresser et al., 2012; Cardeal & Antonio, 2012). Nevertheless, it is important to be aware that competence and motivation should initially be well implemented at the individual level (i.e., employees) for it to take place at the organisational level.

Innovation Capability

Capabilities are "the ability to conceive of new ways to create value" Collis (1994). The innovation capability among all the various firms interviewed was considered high, which can be interpretated through the several investments they had in different research and development projects, collaborations across industries, and acquisition of new technologies and equipment. General commitments commonly applied to hybrid/electrical solutions and technology/equipment among others. The companies emphasised the importance of implementing holistic change that can generate economic and environmental returns, rather than just buying 'green alibi'. As found in our interviews, the salmon industry has demonstrated that applying external competencies through oil and gas technologies has been of great value for their development projects, i.e., offshore farms. The ability to acquire specialised knowledge from different industries indicate that there is a level of reciprocal trust and willingness to cooperate with third parties to acquire technological skills and knowledge. By cultivating these capabilities, firms demonstrate that they have the competency to constantly innovate. Thus, these relations can foster new innovations.

Other examples are how Grieg Seafood collaborates with Bellona on plastic management while Nova Sea recycles their old ropes and reuse them to create designer chairs. These activities explain their incentives and abilities to cooperate with external corporations to strengthen knowledge, and to find new value-creating side paths in the value chain. It also indicates flexible innovation capabilities, because the firms demonstrate ways to quickly respond to stakeholders' demand in a timely manner. Innovation capabilities make the firms respond to changing environments and are therefore perceived as a parallel to dynamic capabilities (Shuen, 1997; Teece et al., 1997). Most of the companies are involved in research and development projects. The industry relies on finding and developing solutions to combat existing problems such as escapes and sea lice, thus the need for research and development is essential to facilitate new solutions. In terms of research, incentives can be to study whether preventive innovations/technologies give rise to desired outcomes such as making sure there are wild salmon and not farmed salmon in the rivers, by studying its shell layers. Other

incentives are focused on ethics with delousing methods, e.g., to understand which methods are the gentlest in terms of animal welfare. However, to do research and development, it is required to have R&D licenses.

The ability to adapt to changes in the environment and contribute to research and development projects unique for each firm (e.g., offshore farms, collaboration on recycling, etc.) implies the ability to use resources combined with intrinsic knowledge to obtain strategic intentions. The innovation capability is thus considered heterogeneous, because the various salmon farming companies proves that they manage to maintain and cultivate firm-specific/unique projects. Furthermore, such firms will experience ex post limits to competition, because it would be difficult to imitate or substitute companies' abilities and competence to foster similar projects. It is highly costly to imitate firm's innovation capabilities with the assumption that the abilities are specific to a firm, which makes it less valuable for other companies and the innovation capability would be immobile (i.e., imperfectly mobile). Ex ante limits to competition is present because it is costly to imitate and the barrier to achieve innovation capabilities that are specific to a firm exist (Peteraf, 1993). Hence, all companies will not possess firm specific capabilities. Due to innovation capabilities being particular to an organisation, more specifically, companies' employees which possess the competencies and abilities to innovate.

As presented in the VRIO tables (in chapter 6.2), all seven companies have implications of sustained competitive advantage in terms of the innovation capability. This is based on that each company demonstrate competence and ability to adapt to changes in the industry and by that affirm that they are capable to stay ahead and constantly innovate, which leads to the possibility to preserve the competitive advantage. The salmon farming companies' innovation capabilities foster different firm specific projects which make them valuable, rare and inimitable for each individual company. They display innovation capabilities that have cultivated singular concepts such as Cermaq's iFarm construction, SinkabergHansen's Atlantis Subsea Farming, Nova Sea's Spidercage, etc.

7.1.2. Tangible Assets/Resources

The key tangible assets that create value to the salmon farming companies are identified as renewable energy (electrification) and equipment/technology (firm-specific development projects).

Renewable Energy: Electrification

Electrification is a resource/capability that most of the companies have prioritised to focus on. The electrification process is long and there are many steps before a firm can become 100% electrified. The companies also have various priorities depending on their different factors within the firms. Some focus on transforming their feeding barges to electrical solutions, whereas others prioritise to invest in electric or hybrid well boats and work boats. The majority aims to holistically reduce the diesel consumption and thus converts to hybrid or all-electric solutions. This is an important step for the industry to mitigate pollution and part of their contribution to fulfil conditions in the Paris Agreement (Jacobs, 2016), and the commitment towards reducing their carbon footprint. Electrification creates many advantages for companies because it can for example minimise operating costs, by changing fossil energy source (which is more expensive) with electricity. One firm argued that reducing the consumption of diesel/non-renewable energy sources before 'converting' to renewable energy sources is more efficient, economically and environmentally. This is due to technologies and production facilities requiring a large amount of energy to produce the optimal quantum of fish.

The degree of electrification on production localities is observed to vary among companies. However, electrification on production sites/sea areas is becoming a typical move in the work towards a more sustainable future. This implies that the knowledge and capability to transition to electrification is not difficult to replicate. Therefore, we presume that electrification is a source of competitive parity (Barney and Mackey, 2016). Accordingly, the barriers to imitate are low, industry-wise, and we consider ex-post limits to competition to not exist. Although electrification is costly to imitate, the investment incentive is high which justifies our

interpretation that the resource is mobile (i.e., not immobile). Electrification is highly prioritised, and there are no ex-ante limits to competition (Peteraf, 1993), because all companies within the industry can attain electrification, making it a standard asset that requires minimal safeguarding. Electrification do not meet the four conditions of the resource-based view and the companies were not considered to have sustained competitive advantage regarding electrification. However, as depicted in the VRIO tables (in subchapter 6.2), all companies achieve great value for possessing the resource in terms of reducing carbon footprints, cost advantages, production efficiencies, etc. Electrification is not considered as a unique resource, however, the added value and advantages that comes with electrification is considered as unique and valuable for companies, because it contributes to create substantial outcomes for salmon farming production, which makes it a pivotal investment for the companies in the industry.

Equipment/Technology: Firm-specific development projects

Due to the high innovation capability and resourceful human- and financial capital, salmon farming companies are developing new offshore farms with the intention to increase production efficiency while simultaneously reduce negative impacts on the environment and facilitate better animal welfare. These projects represent one of the biggest investments and are meant to facilitate long-term profitability. It is the competence inside the companies that underlies the implementation of these development projects, which is considered as valuable and paramount. This is unique because the specific development projects are substantially beneficial and limited to only the individual companies that establish them, and therefore the value will remain in the company that control the development. Offshore farms allow salmon producers to operate on larger areas far out in the ocean (*SpiderCage*, Nova Sea), enhance animal welfare and reduce mortality through new technology (*iFarm*, Cermaq) that can make delousing methods more efficient, by only delousing the salmons that need treatment, to produce bigger quantum of fish while reducing biological harms that comes with high density of production localities in the fjords (*Jostein Albert offshore farm*, Nordlaks), and to reduce the probability of catching sea lice by operating deeper below the surface (i.e., due to sea lice

mainly exist just below the surface) (*Atlantis Subsea Farming*, SinkabergHansen, and *Arctic Offshore Farming*, Norway Royal Salmon). These development projects create value to firms because they can work as solutions to problems the industry is facing, and it can contribute to tackle challenges related to fish escape and sea lice.

Anticipating that developments constructions and offshore farms are safeguarded by specific and confidential information that is difficult to access, more preferably, intellectual property rights (Rumelt, 1987, cited in Peteraf, 1993) or protected by tacit knowledge (Howells, 1996; Teece & Pisano, 1994), the development projects are considered unique and therefore heterogeneous to firms that possess them. Considering there are several tailored offshore farms that have been developed within the industry, this implies that the constructions and underlying competencies are difficult to imitate. The intentions behind every development project are similar, as the industry is aiming to make production more efficient, while improve animal welfare and thus reduce mortality rates. However, as the projects are under progress, there are still no evidence for which projects has the most rewarding outcome, economically, socially and environmentally. Therefore, we do not claim that the development projects are substitutable (Peteraf, 1993). However, it is the competency and tacit knowledge to develop these development constructions that gives the projects unique value. Thus, by implementing these projects further competencies are created and tacit knowledge is increased, which amplifies the unique value (Howells, 1996). This is not easily imitated or substituted, hence, there are no ex-post limits to competition (Peteraf, 1993).

Furthermore, given the circumstances, the competencies and projects are difficult and highly costly to imitate. Considering that each development construction is different, this implies that various forms of competencies and different set of skills and interdisciplinary knowledge is required for every individual project. Further, investments range from 500 million to 1 billion Norwegian kroners (NOK), each project is therefore considered immobile and valuable only to the specific firm that possess these. Accordingly, ex ante limits to competition are present because the projects and competencies are not attainable for all companies (Peteraf, 1993). As demonstrated in the VRIO tables, five of seven companies are considered to have implications

of sustained competitive advantage in terms of equipment/technology (i.e., firm-specific development projects). This is because these companies have proven that they can cultivate projects and therefore demonstrate the competencies and abilities that are required to constantly innovate and/or invest in new solutions and constructions.

7.1.3. "What resources and capabilities are needed in order to meet economic, social and environmental challenges in the industry?"

We conducted a VRIO evaluation of eight resources and capabilities that representative companies occupy (presented in figure 10 in subchapter 7.1). Further, we analysed and discussed their characteristics to identify which resources and capabilities that are essentially needed to meet economic, social and environmental challenges in the salmon farming industry, hence which resources/capabilities salmon companies should invest in to tackle challenges related to sustainability. These factors include the economic profitability, social aspects and the environmental impacts from the industry. It became evident that licenses, human resources and development projects are pivotal within the salmon farming companies, and the combination of these three was observed and recognised as most paramount because they contribute to create (competitive) advantages and develop solutions for the salmon farming industry to incentivise sustainable development. Moreover, this implies that the resources can meet the company's present needs without comprising future needs for the industry (Brundtland, 1987), as well as allowing companies to sustain profitability by being in the business of industrial food production. We argue that companies should increase their investments in more licenses, human resources and development projects, because based on findings we anticipate that the outcomes will create substantial benefits to the individual firm in terms of competence building and enhanced technological skills which improve operational procedures. Consequently, more sustainable practices may be the new standard on organisational level, and eventually the industry level.

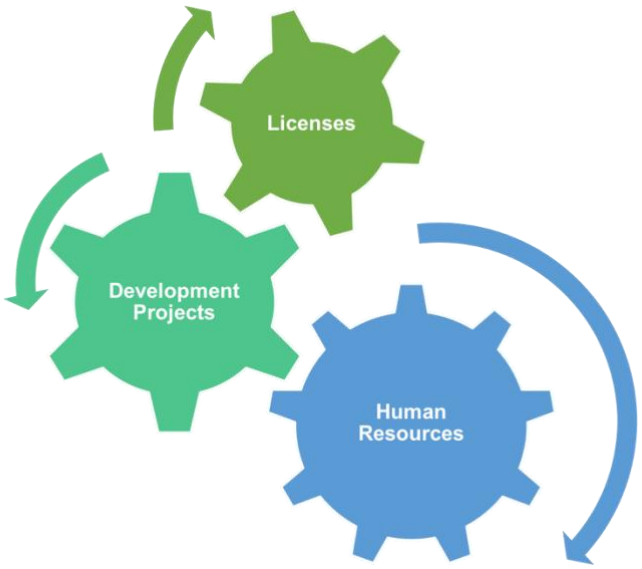

Figure 11: Illustration of the three pivotal resources/capabilities

7.2. Implications of Transaction Cost Theory

As explained by Hersoug et al., (2019), there is an expectation that Norwegian salmon production will increase fivefold within 2050. The growing human population and increased demands for food supply (Béné et al., 2015) drives current industries to adapt for present and future uncertainties (such as, climate change, the meaning and purpose behind certifications, the responsibility the salmon industry possesses throughout the whole value chain, what today's choices mean for future generations). The Norwegian salmon farming industry has a competitive advantage with the vast coastline in Norway (Hersoug et al., 2020). Accordingly, they have the access to exploit large sea areas, hence there are countless possibilities to innovate and facilitate for the best exploitation. Considering that Norway is known as the world's leading producer of farmed salmon (Bailey and Eggereide, 2020), this implies that they possess great capabilities and competencies within the industry in Norway. Our purpose is to explore how the salmon farming industry in Norway can ensure production that safeguards biodiversity, including animal welfare, and economic profitability – through

efficient and optimal acquisition and use of resources. If the salmon farming companies decide to increase their investments in human resources, licenses and development projects, they should examine implications such as cost advantages or the possibility of excess value creation. Hopefully this can contribute to reach the future goals of increasing production to meet growing food demands in a sustainable way. These next sections will explore the implications that the investments can lead to and considerations that are important to acknowledge/recognise.

7.2.1. Implications of dependency between transaction partners

Lusch and Brown (1996) claim that high bilateral dependency between two parties will likely reduce the risk and uncertainty of opportunistic behaviour, because both parties are too dependent on one another to harm the relationship. As it emerged from the findings, our interpretation of the data is that the companies do not experience great extent of opportunistic behaviours among their trading partners (to our knowledge). However, on the other hand, we do not exclude possibilities of opportunistic behaviour among trading partners that we are not aware of due to the limited data. We argue that the risk of opportunism is confined because of the high bilateral dependency between the salmon companies and their suppliers and the high possibility that they will meet again in another project. Additionally, the collaborations and partnerships that they have together, the balance of power is equal between them. And because with the anticipation that the trading partners are well-known counterparts and the frequency of transactions are likely to recur in future projects and/or investments (Lusch and Brown, 1996). Thus, bilateral dependency can be created between trading partners when there is a need to cooperate to exploit complementarity.

To illustrate, Grieg Seafood use their upper hand in negotiations to demand terms (regarding sustainability agreements) in contract negotiations with suppliers. Grieg Seafood negotiating terms with their well boat suppliers indicate terms that are of interest for both parties. They both benefit from the deal and joint value is generated among them because Grieg Seafood can reach their sustainability goals of reducing CO2 emissions and the suppliers will be able

to sell their services and generate profit. In this case, bilateral dependency is created between the pertinent parties and the perceived level of uncertainty decreases because the relationship is valuable for both partners (Lusch and Brown, 1996).

For example, as Nordlaks emphasised, it is beneficial for suppliers to acquire new knowledge and develop new competencies about the aquaculture industry. Consequently, they will be able to provide services and products to more industries. Given the fact that the oil sector experienced a downturn in 2014, the suppliers within the industry benefitted from the aquaculture industry projects by having more opportunities outside the oil sector. This also supports our argument about bilateral dependency, because the suppliers depend as much on the salmon companies as the other way around. The exchanging partners benefit greatly from the partnerships, because the salmon companies gain new developments and possibly solutions that can enhance the industry. Whereas the suppliers e.g., from the oil sector get to increase their customer base and deliver services to another industry, particularly during recessions or when the sector experience difficult times (e.g., downturn in 2014).

7.2.2. Implications of transaction attributes

De Vita et al., (2011) conveyed that the attributes of transactions (i.e., transaction frequency, uncertainty and asset specificity) influence which governance structure companies operate through. From this perspective, identifying the level of transaction attributes is essential. There is limited data from the interviews regarding the frequency of transactions between the companies and their transaction partners. We will therefore address this attribute with the assumption that in a large project, the frequency of the transaction only occurs ‘one-time’. However, we assert that the probability of frequency of recurrent interaction between salmon farming companies and familiar counterparts/transaction partners is more frequent. The frequency in that aspect of transactions can impact cost advantages of deciding on governance structures. For example, if it pays off to set up in-house production when the transactions are recurrent in dealing with the spot market or drafting and negotiating contracts.

López-Gamero et al., (2011) pointed out that a company may experience new technology or new/high-risk projects as a source of uncertainty because of limited information available to predict the outcome and potential rewards of those projects. It can therefore be important for companies to cooperate with vendors who can demonstrate high level of expertise and results from previous projects, as a kind of quality assurance, and to take more control over the uncertainty. As emerged in the findings, the companies experience uncertainty regarding the new technologies and projects that they have invested in, e.g., offshore fish farms and iFarm, because the developments are still in the early phases and they have yet to gain enough information to know how the developments will play out and can therefore not anticipate any results. As the informant from Nordlaks conveyed, development projects always involve risks, and it is always a possibility of failure. This makes it critical for firms to conduct ex ante investigations of the potential risks. However, considering the investment of 1 billion NOK, the companies signal that they have evaluated the investments carefully in advance. Hence, the anticipation is that the potential value must exceed cost, for companies to justify investing in such projects. Additionally, in these cases, licenses can provide risk relief and reduce liability for companies in the context of new high-risk projects. Ultimately, bilateral investments from the salmon farming companies and partners (company in other industries or governmental actors) can contribute to secure such projects and limit the liability in case of failure or loss.

Human resource, development projects and licenses are unique and valuable resources/assets for salmon farming companies, and they are created through investments that express qualities of high asset specificity. High innovation capability and incentives to acquire novel technologies require technical skills and specified competencies, which is a high priority among the salmon farming companies. Therefore, human asset specificity was considered high. Consequently, there is a need to put skills and competencies into practice and invest further through unique development projects that are customised for production efficiency purposes. We therefore consider that the development projects demonstrate high *physical asset specificity* (De Vita et al., 2011).

7.2.3. Implications on choice of governance forms/structures

According to De Vita et al., (2011), asset-specific investments should be deployed if it generates exceeded value in terms of benefits of cost savings and/or added income for a party. In line with findings from the interviewed companies, it appears that they make different investment decisions, which indicate that the companies have various capabilities and priorities. As a few of the companies have invested large amounts on development projects such as the offshore fish farms, submersible cages, technology constructions (i.e., iFarm). This imply that the investments that are made by the companies are expected to generate benefit of cost savings and added value, for example in terms of creating new solutions and possibilities for the industry that in return can exceed expenses and thus generate profits. Given the fact that the industry is experiencing many difficulties and challenges with salmon farming e.g., mortality and sea lice (Mattilsynet, 2020), there is an urgent need for innovative projects and solutions for the companies to be able to tackle these issues, move forward and grow as an industry.

Our aim is to seek understanding about the options that reduces relative transaction costs and exceeds value created for salmon farming companies when they conduct investments. To find the approach most suited for transactions of licences, human resources and development projects, the salmon farming companies must consider and make decisions based on the knowledge that each type of transaction they perform produces a cost. The holistic aim should be to find and utilise the governance structure that are best suited for the firm to minimise relative direct costs and opportunity costs (indirect costs). In the context of these investments, firms can examine and identify the best suited approach by comparing costs/benefits that occurs with attaining outputs from the market (market governance) versus the ones that emerge with vertically integrating outputs (internal production/hierarchical), or explore the intermediate option, which consist of contracts and alliances (hybrid).

Given an (improbable) scenario where salmon farming companies decide to use the spot market in the process to attain licenses, human resources and development projects (which are

of high asset specificity), the firms would experience high bureaucratic costs and lack of control and ownership of the investments. The market governance form would be inadequate when asset specificity is high, and investments are tailored. Given a different scenario whereas hierarchical governance is chosen for transactions, salmon farming companies gain control to create unique value of their assets, because the processes of procuring licenses, human resources and development projects are internalised and integrated within the organisation which provides the firms ownership over the assets (Klein, 2005, p. 438; Ghosh & John, 1999). Ultimately, and most adequately, given that firms operate through hybrid governance forms in the process of attaining licenses, human resources and development projects, firms may focus on building relations through contracts and alliances, which is more likely in order to create a bilateral dependency between exchanging partners.

7.2.4. "In what ways can investments that increase levels of sustainability create cost advantages or generate excess value?"

Governance form of licenses

Licenses are considered being of high asset specificity, because it is specialised and meant for specific projects, whereas the aim of licenses is to increase production volumes of salmon and tackle industry challenges (De Vita et al., 2011). Licenses are unique and valuable, but it is paramount to clarify that one depends on the expertise that lies behind licenses, which means that without competencies firms will not be approved to get licenses.

Licences represent the need for coordination, control and planning within firms (Barney, 2013, p. 125). Such structure can be practiced through hierarchical governance, where output takes place in-house, which provides salmon farming companies ownership and control of activities necessary to secure the investment associated with licenses (Ghosh and John, 1999). This is feasible when firms have the capability to manage productions in-house, more specifically the capabilities and experiences which are necessary to satisfy all requirements essential to attain licenses. The expertise to get licenses is considered as scarce and unique, and it generates substantial value to the salmon farming companies. Firms that decide to conduct transactions

through hierarchical governance, may experience to be less threatened by uncertainties because of its high level of safeguarding (Klein, 2005, p. 438; Ghosh & John, 1999). Hierarchical governance is the ideal alternative for salmon farming companies considering the high asset specificity and the desire to protect the unique competence behind licenses.

Unique or specific/tailored investments (like licenses) are developed in-house to secure control. However, in cases where in-house production within the company is not feasible because the investment/transaction frequency is not regularly (or often), or it becomes too costly to invest, a mix of hierarchy and market becomes more pertinent (Ghosh and John, 1999). Hybrid governance is the middle ground and is applicable to safeguard the investment. Integration of output takes place in alliances with suppliers, which provides salmon farming companies the possibility to still control their own resources. The hybrid form entails that salmon companies work together in alliances with their partners in terms of exchanging or sharing technologies, products, capital or services that are needed for the salmon companies to gain licenses (Ebers and Oerlemans, 2016). For example, if the salmon farming companies lack knowledge or competencies in the process to obtain licenses, they can collaborate in alliance with suppliers to acquire the inputs that are needed. Moreover, shared knowledge between the salmon firms and suppliers can be an indication of a collaboration with mutual trust, which is good because it strengthens the organisation's relational capital and can reduce uncertainties among transaction partners (Kale et al., 2000). Hence, hybrid governance is a favourable option when in-house production is not possible because it can safeguard investments through long-term contracts and/or relational trust between transaction partners.

Governance form of human resources

Considering that human resources such as sustainability positions/teams, specialised workforce and innovation capability are unique and valuable investments for the salmon farming companies these resources displays high asset specificity.

If human resources through a scenario were to be governed through the spot market, it is reasonable to argue that the salmon farming companies would hire workers through short term

contracts to do general/non-specific work, due to the market governance characteristics of weak ties between parties (i.e., employer and employee). However, because there is a need for specialised competencies and skills in the work towards sustainability, both on individual level and thus organisational level, it may be more sufficient to build strong ties between employers and employees to secure prolonged labour. Hence, the firms can control and protect their human resources from outside parties.

Companies in the salmon farming industry see a need to safeguard salmon producers' capabilities, considering that large firms tend to internalise capabilities (those essential to production) through hierarchical governance to protect the capabilities (Bush, 2018). Hierarchical governance entails in-house production which require firms in the salmon farming industry to develop skills, knowledge and competencies that are essential for sustainability positions/teams, specialised workforce and innovation capability inside the organisation (Ghosh and John, 1999). Human resources are paramount for the companies, and they work as fundamental building blocks for the industry's innovations and achievements. Hence, the assembled expertise within the salmon farming industry is utmost crucial, valuable and create unique value for the companies. Therefore, there is a strong need for ownership and control of the internal human resources/capabilities and considering that high asset specificity is involved (Williamson and Ghani, 2012). Hence, hierarchical governance is the best and most pertinent alternative for salmon farming companies with the anticipation that in-house production is feasible.

In cases when it is not possible for firms within the salmon farming industry to develop unique human resources/capabilities inside the companies, regarding those that are fundamental for sustainability positions/teams, specialised workforce and innovation capability. The second-best alternative is to develop or combine these in alliances with other companies and/or suppliers, i.e., the hybrid governance (Ebers and Oerlemans, 2016). For example, as seen in some of the development projects within the salmon farming industry (the offshore farm projects), human resources are assembled from various suppliers and industries with salmon farming companies. This implies that together in alliances they share knowledge and

capabilities and combine forces to develop the necessary competencies. When transactions of human resources are operated through hybrid governance a variety of mechanisms to secure control is available. The applicable varieties are to secure control of the investment through formal contracts or through bilateral dependency. For example, when salmon farming companies develop competencies in alliances with partners, both exchanging parties become mutually dependent on each other, which reduces the risk of uncertainties because they both rely on the partnership. And there is a low chance of doing anything to risk jeopardising the relationship considering that the counterparts are well-known and will expect to cross paths again in the future (Lusch and Brown, 1996). Hence, the option of hybrid governance is pertinent for salmon farming companies to control the value of human resources without complete ownership and while creating relational trust in alliances with partners or exchanging parties.

Governance form of development projects

Development projects demonstrate high physical asset specificity and requires safeguarding. These construction projects are unique because of the competencies that lies behind. The extensive knowledge that are beneath the work of constructing offshore fish farms, technological constructions such as the iFarm, submersible salmon cages and the list continues, is what makes the projects valuable and rare. Salmon farming companies have a broad range of people with comprehensive expertise regarding all fundamental purposes of development projects and especially the practical outcomes of what the projects can contribute to. This aspect is evident and paramount because it serves as the underlying building blocks that enable and push development projects. However, development projects such as the offshore farms requires collaboration or partnerships among other with industry suppliers (e.g., Moen Marin) and external companies (e.g., Aker Solution) to conduct the projects, more specifically, the technical competencies to perform the developments. This demonstrate that the salmon farming companies is not alone in managing development constructions and projects, and they do not create technologies and equipment by themselves, but rather in collaboration or alliances with their partners. Development projects depend highly on

competencies/expertise, but they also require specific set of skills and technique from other industries to perform the projects. For example, a supplier/company that can design the construction and a supplier/company that can build the construction. There are many stages in these projects and many players are involved, which makes the mobilisation of external people, services and industries (external or internal) imperative.

In an unlikely scenario where transactions of development projects would occur through market governance, this would imply that salmon farming firms buy/obtain their outputs (products/services) on the spot market. This aspect makes them more dependent on partners and therefore more exposed to uncertainties due to lack of control and ownership (Ghosh and John, 1999). Considering that development projects demonstrate high asset specificity, they need to be safeguarded through ownership and control. Thus, transactions through market governance are not a relevant alternative for salmon farming organisations when it comes to securing control over the pivotal elements in development projects. The probability that salmon farming companies will have long-term (at least repeated) interactions with their transaction partners in this type of projects is high, which makes it salient to build reciprocal trust between exchanging partners (Bech and Pedersen, 2005). Since high asset specificity is displayed in the development projects, hierarchical governance is the option which is more preferred to safeguard investments (Williamson and Ghani, 2012), but this will require the salmon farming companies to internally develop skills/expertise and have essential resources provided from within the organisation. Despite in-house production being the more favoured preference when it comes to unique investments, it may not be the most viable in development projects such as offshore fish farms. Hence, hierarchical governance is not recognised as the most realistic alternative, because it is not feasible and too costly for salmon companies to invest and integrate all the essential capabilities inside the organisation, regarding those that are required for development projects. This is due to the salmon farming companies' reliance on collaboration and partnerships (in terms of technical competence and implementation skills) in these types of development constructions.

Another aspect is that in most cases, the main responsibility of projects (offshore fish farms, iFarm, submersible cages) lies with the salmon farming company. Transactions through market and hierarchical governance tend to not address assurances in terms of responsibility division, whereas this is something contractual agreements through hybrid governance can secure for transaction partners. The option of long-term contracts through hybrid forms can make the responsibility division clear between transaction parties and facilitate so that companies can safeguard tailored investments such as development projects (Ghosh and John, 1999). In addition, when salmon farming companies develop e.g., offshore farms in alliances with suppliers and/or other companies, bilateral dependency can become relevant. Because the partnership often entails that each party must cover their end of responsibilities and they depend on each other to accomplish the task/work. Given the likeliness that these types of projects will lead to repeated interactions between the salmon farming companies and their partners, building relational trust becomes vital to avoid uncertainties and as a bonus it is also good for business reputations. Hybrid governance is the most suitable alternative because it provides salmon farming companies' the possibility to secure control and protect their investments in development project. Considering that they need to develop these unique projects in alliances with partners (suppliers) as they need their complementary resources, and in this way, salmon farming companies and their business parties can collaborate by exchanging or sharing technologies, products or services (Ebers and Oerlemans, 2016).

7.3. Discussion Summary

The main point based on the resource-based view is that the underlying competencies constitute the predominant resources that are required to facilitate and foster sustainable innovation, given this context of the salmon farming industry (i.e., licenses, human resources and development projects). The composition of interdisciplinary competencies within salmon farming companies contributes to cultivating dynamic capabilities. This further affect the coordination and allocation of additional tangible and intangible resources, which are necessary in innovation processes the industry is undergoing.

The primary remark in terms of transaction cost theory and implications of investment decisions of human resources, licenses and development projects, is that there is always an opportunity cost of choosing one option/investment over another. The risk that accompanies the major development projects is often related to the uncertainty about the outcome of the projects. However, when excess value outweighs costs the asset specific investments should be deployed. Excess value can arise as a result of increased animal welfare and higher productivity and efficiency during production, which is then communicated to both corporate customers and other consumers who primarily demand increased sustainability improvements.

8. Conclusion

In this chapter, we will present the answers to the research question and finally the chapter will conclude by presenting the study's limitations and suggestions for further research.

This research aimed to identify drivers and barriers for Norwegian salmon farming companies to define and execute sustainability strategies and practices. This is done using a deductive approach where we test existing business theories and apply them to a context where sustainability enforcement is the focus. Based on the analysis/discussion of the research findings, we have identified substantial drivers and barriers the companies within the Norwegian salmon farming industry are faced with in the context of sustainability implementations. Essentially, we recognise that the underlying competencies of the firms are paramount to foster sustainable development, because competency work as a fundamental building block for innovation within the industry. The companies that carry the essential organisational resources (i.e., correct internal procedures, routines, norms) are unique and differentiate themselves from other corporations. Moreover, human resources constitute a key resource for many salmon farming companies when it comes to their capabilities to implement initiatives and innovation processes towards sustainable development.

Market trends and consumers' demands are largely involved with driving the salmon farming companies to reduce negative externalities and environmental harm. As a response, companies commit to development projects that promote improvements for economic, social and environmental conditions. Additionally, they engage in initiatives that cultivate better fish health and welfare, which in return lead to better economy for companies and reduces fish mortality rates while simultaneously meeting criteria that the market demand. Besides, the activities associated to sustainability enforcement contributes to increase a company's image and the industry's reputation.

During these processes, some companies must also tackle barriers associated to production and investment costs. Among barriers of human resources are the costs and time of obtaining the right training, experience and knowledge about operational procedures that are associated with development projects and sustainable value creation. Thus, the lack of pertinent competencies or the ability to efficiently utilise competencies can delay additional projects or investment decisions (i.e., development projects), which are also meant for sustainable innovation and operational improvements. In relation to these projects, development constructions are often cultivated in compliance with licenses, because companies run their business operations (through) using permits. Considering that licenses allow companies to increase production quotas, it functions as a driver to innovation incentives. Additionally, licenses contribute to expand companies' revenue streams and reduce risks that arise due to uncertainties around the vast investments associated to new projects. Nevertheless, with limited availability of licenses and tenacious competition to gain them, it becomes a barrier for firms to acquire licenses, which further influence companies' sustainable value creation.

Development projects are of high asset specificity, which makes it important for many firms to own and control them. Among the drivers of these projects, are the opportunities that arise to reduce industry challenges, especially regarding sea lice and fish mortality rates. If the projects succeed, they enable the producers to increase salmon production and maintain low mortality rates through more gentle delousing methods and increased animal welfare. Incentives to innovate through new technologies further provide firms with increased opportunities to obtain licenses. The most substantial barrier of development projects includes its high investments costs, and thus the high risks associated with the outcome of the long-term projects.

Ultimately, the underlying competencies behind licenses, human resources and development projects are considered the most pivotal to tackle challenges and foster sustainable innovations. The assets are unique and tailored investments, thus developed and integrated inside the organisation or in alliances with suppliers and other companies (within the industry or externally), as their complementary resources are essential for the salmon farming industry.

8.1. Limitations and suggestions for further research

The chosen theories are not aimed at sustainability implementation directly, as literature of sustainability is still in progress. Despite the emergence of sustainability being considered relatively recent compared to traditional business theories, the three-dimensional aspects of sustainability (economic, social and environmental) have nevertheless been present in business contexts. This implies that the dimensions may have been considered in business theories without being categorised directly under the term sustainability. Therefore, we wanted to test how traditional business theories could be applied to illuminate the phenomenon. There are limitations to how much our research study can contribute to a general understanding of the complexity of three-dimensional value creation, due to our choice of research design. Therefore, we will propose further research from which one goes deeper into this topic, but in different contexts, to test the reliability and transferability of the three-dimensional value creation perspective.

Despite the interviewed firms being of different size, and knowledge level targeted at sustainability, the firms are among the largest salmon farming companies within Norway (and some internationally), which limits our ability to capture substantial contrasts within the entire industry. If there were greater contrasts between the companies, e.g., in terms of inventory of different resources and various levels of specific knowledge and views of sustainability, we could create a deeper understanding of mechanisms behind drivers and barriers to sustainability implementation.

The results of this study should be carefully interpreted, because they have been qualitatively analysed and processed by the researchers which imply that the transferability may be limited. We have covered perspectives and initiatives, but the conditions will differ according to the individual business and industry, and associated resource compositions. Thus, we have conducted a deductive approach, and were not developing any new theoretical frameworks. This study does not emphasise potential barriers and drivers from the government (other than

licenses), nor consider potential drivers and barriers of legislation. This is because of the main focus on internal resources and capabilities, and less attention to external factors.

Another aspect that has not been covered in this thesis is methods of valuations of sustainability strategies and the prerequisites to succeed profitably with sustainability enforcement. Thus, we have also disregarded low salmon prices. Further research should emphasise the profitability of sustainability enforcement in various industry context such as the salmon farming industry.

As there is an increased focus on environmental consequences of how firms operate, there can be many interesting perspectives to study. We have not created any framework for the pertinent industry, as there may not be any 'one-size-fits-all' in sustainability enforcement. An explanatory study could contribute to develop new insights through causal relationships between industry-specific variables and concepts. For example, the relationship between sustainability-specific knowledge in the organisation and its effect on productivity/profitability.

Lastly, another suggestion would be to conduct a longitudinal study on how today's innovation strategies and practices may unfold in the future. Will the industry become 'more sustainable' - will emissions and mortality rates decrease, and will the industry experience higher profits as a result of that?

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Appendices

Appendix A: Overview, Interviews conducted

Overview of conducted interviews					
Company	*Interviewee*	*Position*	*Type*	*Length*	*Date*
Nova Sea	Samuel Anderson	Environmental Advisor	Video Call via Zoom	1,5 hrs.	23.11.2020
Nordlaks	Lars Fredrik Martinussen	Communication Manager	Video Call via Zoom	1,5 hrs.	27.11.2020
Grieg Seafood	Jostein Iversen	Global Sustainability Advisor	Video Call via Teams	1,5 hrs.	30.11.2020
Norway Royal Salmon	Marianne Olderø	Controller	Video Call via Zoom	1,5 hrs.	02.12.2020
Cermaq	Silje Ramsvatn	Sustainability Manager	Video Call via Teams	1,5 hrs.	03.12.2020
Bremnes Seashore	Laila Knarvik	Innovation Manager	Video Call via Zoom	1 hrs.	03.12.2020
SinkabergHansen	Ragnar Sæternes	R&D Coordinator	Video Call via Zoom	2 hrs.	07.12.2020
SinkabergHansen	Bjørn Gillund	Quality Manager / Veterinarian	Video Call via Zoom	2 hrs.	07.12.2020

Appendix B: Business Model Canvas, Raw Data Collection

Key resources	Key activities	Key partnerships	Cost structure	Value proposition
Human resources	Sustainability Reporting (internally and public)	Suppliers	Value-driven	Provide/Offer certified products
Knowledge: specialised competence and skills, highly educated	Climate Accounting (traceability)	Network clusters: Marine Recycling Cluster, NCE,	High cost, short term – high income long term	More than just "buying green alibi"
Expertise to order	Dialogue with stakeholders and local communities	Global Salmon Initiative	Low on cost-leadership	High quality and strong salmon brand
Motivated workforce	Set measurable goals	UN Global Compact	Differentiation	Transparency with stakeholders and customers
Technology: offshore technology, oil and gas technology	Reduce use of non-renewable energy sources (one step before electrification)	Snøhetta*, L'oreal* / external partners	Huge investments	
Equipment: Lice skirt, Nets, Well boat, Electric boats, hybrid vessels, RAS-facility, Waterborne feeding, Salmon Hatchery, Camera and sensors, The Mid-Norwegian-Ring	**Development projects:** Offshore salmon farms, iFarm, Closed fish cages, Atlantis Subsea Farming	Energy Management (ENOVA initiative)		
Renewable energy sources	Recycle old ropes*	Bellona		
Financial Capital	Using the whole fish*	Salmon Group		
Standards and certifications: Paris Agreement, ASC, Global GAP, NS 9416, GHG Protocol, 100% certified non-deforestation soy, Traffic Systems, UN SDGs	Bottom surveys, to map the bottom conditions (required by law) e.g. sedimentation modelling,	Report medical use on Barentswatch		
Lice Regulation	Delousing Methods	Sømna biogass		
Measurement tools (goals)	Production of fish oil, fish 'flour'	Klimapartnere		
Licenses	Site fallowing	Biomega		
Local society involvement	Active campaigns to reduce Soy from Brazil			
	Certify farming operations			
	Changing transport mode from truck/trailers to train			
	Preventative approaches to reduce escapes			
	Energy Efficiency (energy demanding industry)			

Appendix C: Interview Guide

A. Introduction

- Present ourselves
- Thank the informant for taking the time to participant in the interview
- Give a short background about the thesis and the purpose
    - Clarify how the data will be used in the thesis
    - Ask for permission to use the company name and the informants name in the thesis
    - Ask for permission to record the interview
- Let the informant introduce themselves.

B. Introduction:

1. Can you tell us what sustainability means for the company?
2. Can you tell us about how the company started working with sustainability?
3. What impacts does the company contributions have on the environment, both for marine life and nature in general

C. General information about the company's position in accordance with Sustainability/Value creation

4. What challenges have you encountered in this work with sustainability?
    a. How did you solve this? (if relevant)
5. Examples of drivers or what makes this implementation feasible?

D. Resource-based view theory:

6. What physical resources are important for the company in the transition to sustainable production, and how?
7. What human resources are pivotal for the company? What makes these unique?
    a. What are some of the methods used to create a common understanding among employees about what it entails for the company to act sustainably?
8. Other types of resources you think are important in the transition to a more sustainable business? And why?

9. Has the company experienced an impact on the economy (i.e., costs/revenue) that are connected to investments related to sustainability?
    a. Would you say that the company has achieved added value beyond profits in return for having implemented sustainable practices? (i.e., rents)
10. Does focusing on sustainability give the company any kind of competitive/strategic advantage? If so, in what ways? (rents)

E. Transaction cost economics theory:

11. What kind of investments have the company made regarding its work towards increasing sustainability?
    a. What is different about your company's investments compared to other salmon farming companies?
    b. Are these investments made in alliances with other parties/companies? If so, who? (partners, internal, external)
        i. If so… How do you consider the division of responsibilities in a collaboration like that?
    c. How does the company ensure that their investments fulfill its desired purpose? (safeguarding)
12. How does the company ensure that important investments related to sustainable development are secured against external forces, such as development partners that try to exploit the partnership to their own advantages? (adaptation)
13. How does the company measure the results of sustainable strategies? (e.g., profit, fish health and welfare, external pollution, antibiotics)
14. Does the company have solutions/strategies to reduce challenges related to salmon lice and escapes, if so which ones?
15. Is there anything else you want to add?

- Thank the key informant for their participation.

Appendix D: Consent Form

Vil du delta i forskningsprosjektet

"A qualitative study into the drivers and barriers of sustainable value creation: A Norwegian salmon farming context"

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å finne barrierer og drivere for lakseoppdrettere til å implementere bærekraftige strategier for å skape verdi. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål

Formålet vårt er at vi ønsker å forske på ulike barrierer og drivere som lakseoppdretts-industrien har i forhold til å implementere bærekraftige strategier i bedriften og på hvilke måter disse tiltakene kan bidra til å skape bærekraftig verdi for bedriften. Vi vil finne de unike ressursene og kapabilitetene som er viktig i prosessen mot overgangen/ omstillingen til å øke bærekraft i lakseoppdrettsindustrien. Dette forskningsprosjektet er en masteroppgave som blir skrevet som en avslutning for mastergraden vår på Norges Handelshøyskole.

Hvem er ansvarlig for forskningsprosjektet?

Therese Thorhus og Liana Nguyen med Norges Handelshøyskole som overordnet er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?

Vi ønsker at du deltar i vår studie fordi du jobber innenfor områder i virksomheten din som er relevant og som kan bidra til forskningsprosjektet vårt. Vi har funnet aktuelle personer enten gjennom personlig nettverk eller via bedrifters hjemmeside. Derfra har vi spurt om kontaktinformasjon eller blitt henvist videre via bedriftene selv.

Hva innebærer det for deg å delta?

Vi foretar dybdeintervju med varighet 1t-1,5t. Vi vil, med godkjenning fra informant, foreta lydopptak via zoom/teams, og/eller pc'en generelt for å transkribere intervjuet i ettertid. Når masteroppgaven er fullført vil alt av lyd- og eventuelt videoopptak slettes fra alle enheter.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Det er kun oss masterstudenter, Liana Nguyen og Therese Thorhus, som har tilgang til dine personopplysninger i forbindelse med dette forskningsprosjektet og generelt. Vi lagrer personopplysninger på en felles mappe inne på Google Docs., som kun vi har delt tilgang til. Det er også vi selv som skal transkribere intervjumaterialet, dvs. ingen tredjeperson.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?

Opplysningene anonymiseres når prosjektet avsluttes/oppgaven er godkjent, noe som etter planen er mellom 20. desember 2020 og 28. februar 2021. Som tidligere nevnt vil alt av lyd- og videoopptak slettes ved prosjektslutt.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke personopplysninger som er registrert om deg, og å få utlevert en kopi av opplysningene,

- å få rettet personopplysninger om deg,

- å få slettet personopplysninger om deg, og

- å sende klage til Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra Norges Handelshøyskole har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- Student, Liana Nguyen, liana.nguyen92@gmail.com
- Student, Therese Thorhus, tthorhus@gmail.com
- Norges Handelshøyskole ved veileder Aksel Ivar Rokkan, Aksel.Rokkan@nhh.no (+4755959722)

- Vårt personvernombud: personvernombud@nhh.no eller kontakt seniorrådgiver i forskningsadministrasjonen, Anita Jensen: anita.jensen@nhh.no (+4755959719)
- Hvis du har spørsmål knyttet til NSD sin vurdering av prosjektet, kan du ta kontakt med:
- NSD – Norsk senter for forskningsdata AS på e post (personverntjenester@nsd.no) eller på telefon: 55 58 21 17.

Med vennlig hilsen

Prosjektansvarlig

Therese Thorhus

Liana Nguyen

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet "A qualitative study into the drivers and barriers of sustainable value creation: A Norwegian salmon farming context", og har fått anledning til å stille spørsmål. Jeg samtykker til:

- å delta i dybdeintervju
- at det blir tatt lydopptak av intervjuet
- at Liana Nguyen og Therese Thorhus kan gi opplysninger om meg til prosjektet – hvis aktuelt
- at opplysninger om meg publiseres slik at jeg kan gjenkjennes, dvs. opplysninger om arbeidsposisjon i bedrift kan stå skrevet i selve masteroppgaven, og det vil være sannsynlighet for at masteroppgaven publiseres i dataarkivet til Norges Handelshøyskole, NHH Brage – Open Institutional Repository.

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

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(Signert av prosjektdeltaker, dato)