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Navn:	Kristoffer Kupen og Magnus Stokke

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Master Thesis

By

Kristoffer Kupen & Magnus Stokke

How do vertical alliances influence the business model of a Norwegian MNE operating in a knowledge-intensive industry?

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Executive Summary

MNEs increasingly face difficult decisions regarding incorporating different ways to manage vertical alliances and adapt their business model. It is well established that firms must coordinate activities in technologically innovative environments and collaborate with customers and suppliers to align their business model in a rapidly changing business environment. This study aims to investigate how vertical alliances influence the business model of a Norwegian MNE operating in a knowledge-intensive industry.

Research on business models has shown that the concepts of creating and capturing value are central in identifying and understanding the activities of a firm. Similarly, alliance literature has identified how firms relate to alliances to create and capture value. As a result, this study aims to explore and understand the implications of how firms' activities create and capture value in vertical alliances.

To best meet the research objectives, we interviewed one ship design firm, three supply firms, and two shipowners in the ship design industry. Interviewees were selected based on their ease of availability, and we analyzed responses using Excel and tables to obtain logical results. Results revealed different interpretations of how vertical alliances influence the business model on different levels, using the ship design process as a reference to comprehend the business model.

The results suggest that knowledge and learning strongly influence the BM of an MNE due to the importance of knowledge-sharing and learning environments for firms to accumulate knowledge essential for developing unique products and services. On this basis, technology-focused alliances, especially in knowledge-intensive industries, should be taken into account when managing and adapting the business model to optimize products and services. These findings contribute to the literature on business models, vertical alliances, and recent work investigating their interaction.

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Oslo, 01.07.2022

Kristoffer Kupen and Magnus Stokke

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1.0 Introduction

Multinational enterprises (MNEs) operating in knowledge-intensive industries increasingly face complex decisions regarding incorporating different ways to manage alliances with their suppliers and customers into their business model (BM). Strategically, MNEs can create and appropriate value (Lunnan & McGaughey, 2019; Zott et al., 2011) by coordinating and managing exchanges among alliance partners. However, external forces and developments in technology have changed the traditional balance between customers and suppliers, and without a suitable BM, MNEs fail to either create - or capture value from their activities (Teece, 2010). Therefore, appropriately managing a BM in a knowledge-intensive industry (Snow et al., 2011) requires adaptability, sufficient knowledge, and a lot of customer and supplier information, especially as today's business environment is considered uncertain, complex, and ambiguous rather than stable and predictable (Johansen, 2007).

Similar to the growing interest in vertical alliances, BMs have been extensively studied (Zott et al., 2011) but are generally poorly understood as a research area (Osterwalder et al., 2005). Studies on BMs spiked after the arrival of the internet as new types of services and organizations emerged, creating a rapidly changing business environment where firms need to adapt and modify their BM accordingly (Fjeldstad & Snow, 2018). Correspondingly, digitalization changes the competitive landscape and affects customer behavior and how firms create and capture value. Therefore, firms increasingly collaborate with their customers and suppliers on different business model dimensions (Fjeldstad & Haanæs, 2018). Notably, knowledge sharing extends the business model across firm boundaries, where minor changes in the BM may affect parts of the collaborative relationships in which they are embedded (Zott & Amit, 2010).

With the increasing presence and complexity of vertical alliances, understanding its impact on the BM of an MNE in a rapidly changing environment takes on an elevated importance. Therefore, we aim to address the following research question:

How do vertical alliances influence the business model of a Norwegian MNE operating in a knowledge-intensive industry?

We understand *influence* as an impact exerted on the BM that leads to a change in its attributes. Theoretically, our research question relates to three factors emerging from the alliance literature that could influence the MNEs' BM: (i) Formal vs. Informal Collaborations (Governance), (ii) Power Imbalance and Dependencies, and (iii) Knowledge and Learning. These draw links to governance mechanisms aspects (Hitt et al., 2009) where: (i) relate to contracts and trust; and (ii) & (iii) influence potential governance choices and types. We also apply Fjeldstad & Snow's (2018) framework on BM elements: (i) Value Proposition, (ii) Role of the Customer, (iii) Value Creation, and (iv) Value Appropriation. Thus, our research question aims at exploring how these alliance factors influence the MNE's BM and its corresponding implications.

Empirically, our research question was motivated by studying a Norwegian ship design firm, NorShip (pseudonym), part of the Norwegian maritime cluster and a knowledge-intensive industry thriving on innovation (Reve, 2011). The MNE is involved in complex and ambiguous design processes in an industry that faces considerable external forces influencing its competitiveness. In such an industry, we want to explore and understand how NorShip's engagements in vertical alliances with suppliers and shipowners have influenced its BM.

2.0 Theoretical Background

In the following chapter, we address relevant literature within strategic management to help explain how vertical alliances influence the BM of a Norwegian MNE in a knowledge-intensive industry. Thus, we critically review BM and alliance literature, identifying relevant theories, methods, and gaps in existing research. Lastly, we assess the interplay of central elements from the literature, particularly Value Creation and Appropriation, to establish a more comprehensive understanding of vertical alliances and BMs.

2.1 Literature on Business Models

BM studies have grown significantly during the last two decades, particularly associated with securing and expanding competitive advantage by explaining firms' value creation logic and performance (Wirtz et al., 2016; Zott et al., 2011). Despite the extensive literature on the topic (Amit & Zott, 2001; Morris et al., 2005; Teece, 2010), scholars disagree on what a BM is and adopt definitions that best fit their studies (Zott et al., 2011). The lack of a clear definition explains why very few formal studies have looked into the dynamics and processes of BM development and why few companies understand their existing BM (Johnson et al., 2008). Consequently, BMs have yet to be understood and developed as a proper research area (Osterwalder et al., 2005).

To more succinctly describe BMs, following Fjeldstad and Haanæs' (2018) definition, a BM describes how a company creates and appropriates value, which builds on the logic of Chesbrough and Rosenbloom (2002) and Teece (2010). A BM can be distinguished between an *operational* or *dynamic* dimension (Fjeldstad & Snow, 2018). The former describes how a firm creates value for customers and appropriates value by executing its activities (Fjeldstad & Snow, 2018). The latter describes how a firm modifies the components of its BM over time to adapt to changes in its surroundings (Demil & Lecocq, 2010). Based on these dimensions, research suggests investigating how firms should coordinate activities in a technologically innovative environment and understanding whom to work with and how to align the BM adapting to a changing business environment (Fjeldstad & Snow, 2018). Lastly, digitalization and more open BMs are increasingly

providing more collaborations with external partners, such as customers and suppliers (Fjeldstad & Lunnan, 2018).

2.1.1 The Value Configurations' Link to the Business Model Elements

According to Fjeldstad and Snow (2018), researchers today could have analyzed and specified a BM more appropriately if they had followed Drucker's (1954) ideas on what a business is and how it operates. Based on Drucker (1954), the authors identified five business model elements: *customers, value propositions, product/service offerings, and mechanisms of value creation and appropriation.* The authors further proposed a framework arguing that the BM elements should be viewed combined with three value configurations as a contingency variable (Fjeldstad & Snow, 2018). Since Osterwalder et al. (2010) describe value propositions as the firm's products and services that create value for the customer, we integrate the product and service offerings into value propositions in the framework.

At the core of understanding a firm's BM is the choice of value configuration (Fjeldstad & Lunnan, 2018). The three value configurations are the Value Chain, Value Shop, and Value Network, which are models used to analyze firm-level value creation logic (Stabell & Fjeldstad, 1998). Firms may employ multiple value creation logics (Fjeldstad & Haanæs, 2018). Connecting BM elements with value configurations reflect that the choice of configuration changes according to the type of customer and the value proposed (Fjeldstad & Snow, 2018). The value creation logic is "the activities and resources used to create value and the economic factors that drive performance" (Fjeldstad & Snow, 2018, p. 34). Lastly, the value appropriation logic is the "sources of revenue and mechanisms that protect profits from innovation" (Fjeldstad & Snow, 2018, p. 34).

According to the framework by Fjeldstad and Snow (2018) - in a Value Shop: Value proposition entails promising a quality solution for the customers; The role of the customer is to co-produce along the process; The value creation mechanisms orient toward cyclical and spiraling activities of problem-finding and acquisition, problem-solving, choice, implementation, and evaluation (Stabell & Fjeldstad, 1998). Resources utilized to create value are competence and reputation, while economic factors that drive performance are information

asymmetry, learning, and knowledge; The value appropriation mechanism is twofold: the revenue mechanism pays for the resource utilization, and a No-Cure, No-Pay licensing; and the protection mechanism involves status and having patents, safeguarding the appropriation (Fjeldstad & Snow, 2018).

Typical industries with Value Shop characteristics are hospitals, law firms, and consultancy firms (Christensen et al., 2010, 2013). Value Shops "form reciprocally linked value systems of referring, sub-contracting, and collaborating firms that together harness the knowledge required to develop the desired solutions." (Fjeldstad & Snow, 2018, p. 35). In contrast, the Value Chain is exemplified by twenty-first-century manufacturing firms (Stabell & Fjeldstad, 1998), that "form sequentially linked value systems of suppliers, partners, and customers." (Fjeldstad & Snow, 2018, p. 35). At last, the Value Network is exemplified by communication services, insurance firms, retail banks, and transportation companies (Huemer, 2006) that "links nodes - customers, things and places - and provides services that allow various kinds of exchanges among them." (Fjeldstad & Snow, 2018, p. 35).

The Value Shop differentiates itself from the Value Chain, which is more oriented toward product benefit, where customers act as recipients, not co-producers. In contrast, the Value Network promises connectivity and conductivity (Fjeldstad & Snow, 2018). The Value Shop activities are cyclical and spiraling, in contrast to the sequential in the Value Chain and the simultaneous and parallel in the Value Network (Stabell & Fjeldstad, 1998). The digital age is transforming firms that operate as a Value Shop, as global databases and collaboration platforms increase the potential to make services more efficient (Fjeldstad & Haanæs, 2018).

2.2 Literature on Alliances

2.2.1 Alliances

Alliances embrace a diversity of definitions (Gulati, 1995; Harrigan, 1986; Parkhe, 1993) and collaborative forms (Grant & Baden-Fuller, 2004), and scholars have sought to identify explanations for ways firms might better manage alliances (Reuer et al., 2002). According to Fjeldstad and Lunnan (2018), the alliance literature confirms that alliances create value for the partners but also often fall

short of expectations, typically involving varying performance measures (Lunnan & Haugland, 2008). Additionally, research has recognized varying contractual mechanisms such as control and coordination features that dictate their governance structure (Dacin et al., 2007). Consequently, the literature is immense and highlights complex dimensions of alliance motivation, formation, governance, and objectives. Based on reviewing the extensive alliance literature, we identified a common emphasis on three theoretical factors that correlate to our data gathered: (i) Formal vs. Informal Collaborations (Governance), (ii) Power Imbalance and Dependencies, (iii) Knowledge and Learning. Therefore, we explore the literature on these further and link it to research on vertical alliances.

2.2.2 Vertical Alliances

Several alliance scholars have noted essential differences between vertical and horizontal alliances and the outcomes they pursue (Rindfleisch, 2000). According to Fjeldstad and Lunnan (2018), an alliance can be horizontal with competitors or vertical between the firm and its customers and suppliers. Researchers have paid growing attention to the impacts of supplier relationships on the competitive advantage of firms, arguing that by including suppliers in product and process development, firms can achieve more efficient product development processes, lower input expenses, and better product quality (Kotabe et al., 2003). In addition, other studies figured that firms, especially customers, should encourage high-involvement relationships with suppliers (Thomke & Fujimoto, 2000).

Strategy research on vertical relationships has experienced a considerable shift (Kotabe et al., 2002). Earlier research outlined a notable distinction between a firm and its suppliers or customers (Porter, 1998), while newer studies have highlighted value-adding relationships (Kotabe et al., 2003). A customer could benefit from managing relationships efficiently with suppliers, providing a competitive advantage (Piercy, 2009). Studies have also investigated ways of overcoming barriers to durable customer-supplier cooperation and the benefits of interfirm trust (Laaksonen et al., 2009). In short, research indicates that firms can benefit from controlling and utilizing complementarities with suppliers, although there is a lack of empirical research on how these are pursued in practice (Kotabe et al., 2003).

2.2.2.1 Formal vs. Informal Collaborations

Alliances can be governed by formal written contracts or informal verbal agreements (Fjeldstad & Lunnan, 2018). Typically, alliances are governed by informal norms, less bound by boundaries established in more formal collaborations, providing flexibility and increasing the capability of alliance partners to collaborate across a broad spectrum of activities, yet also increasing the risk of opportunism, misunderstanding, and disputes (Barringer & Harrison, 2000). In addition, parties often face difficulty in writing precise and unambiguous contracts when pursuing long-term relationships (Srinivasan & Brush, 2006), as customers typically buy not only their suppliers' products or services but also their systems and capabilities (Monczka et al., 1998). Lastly, Luo (2008) argues that strategic decisions are fair if unbiased, representative, transparent, ethical, and consistent with contractual codifications so that real gains accord with resource contribution (Luo, 2007).

Previous empirical studies have focused on the role of trust in the context of vertical relationships (Rindfleisch, 2000) and informal collaboration, viewed as a highly effective means of fostering cooperation across all types of alliances (Doney & Cannon, 1997). Since contracts are often insufficient, trust is a central mechanism in governing alliances (Swärd, 2016) that reduces opportunism (Dyer & Singh, 1998). However, the relative significance of trust may depend on the relationship context (Smith & Barclay, 1997). For example, Adobor (2006) argues that personal relationships can help grow trust between partners and assist mutual knowledge sharing, thus reducing some of the risks in alliances, though also potentially increasing the risk for conflicts of interests. Further, Swärd & Lunnan (2011) argue that the relationship between trust and control is controversial as different views in research claim that control either reduces trust, improves and increases trust, or substitutes trust. Consequently, trust has emerged as an essential component of alliances, where multiple studies confirm the significance of trust and coordination in cooperative relationships (Dyer & Singh, 1998; Gulati & Nickerson, 2008; Monczka et al., 1998).

2.2.2.2 Power Imbalance & Dependencies

A consequence of exchange among alliance partners is the emergence of dependencies, often resulting in a power imbalance (Bucklin & Sengupta, 1993).

According to research, vertically-connected firms provide important sources of inputs enabling a firm to mitigate dependency problems (Rindfleisch, 2000). Relying on an alliance partner's goodwill involves conflict risks, but it may be necessary if a firm is dependent on another firm for valuable resources (Hillman et al., 2009). If dependencies are unbalanced in a relationship, the weaker party will take actions to limit its vulnerability, while the more powerful party may be unwilling to enhance the efforts required (Bucklin & Sengupta, 1993). Lastly, with a more dynamic view, (Dyer et al., 2018) argue that the complexity of coordination between alliance partners increases correspondingly to the degree of interdependence. Therefore, research finds that power imbalance and dependencies can be detrimental to alliance effectiveness.

Power imbalances are recognized for affecting alliance partners' processes when coordinating and integrating resources (Hao & Feng, 2018). According to Perrons (2009), firms may be motivated to follow their allies' footsteps and learn because of their dependence on partners' capability or market presence. Additionally, Lebedev et al. (2021) argue that value creation in alliances encompasses complex power relationships where the imbalance is a central determinant of an alliance since it creates an opportunity to exercise power and control over a partner. Lastly, although prior research often focuses on economic-based dimensions of power, such as ownership and management control (Meschi et al., 2017), other research has also emphasized beyond economic factors such as repeated ties (previous collaboration experience) which facilitate trust and mitigates opportunistic behavior (Lebedev et al., 2021). Thus, previous collaboration experience encourages partners to be more flexible and rely on trust rather than contractual governance to coordinate and make decisions (Ariño et al., 2014).

2.2.2.3 Knowledge and Learning

Previous research has confirmed the importance of knowledge exchange between buyers and suppliers (Kotabe et al., 2003) and shown that suppliers acquire knowledge to forge new technological capabilities and attain performance improvements through vertical alliances (Mesquita et al., 2008). Anand and Khanna (2000) describe that alliance partners gain better knowledge transfer impacts over time when the learning alliances become more efficient. Additionally, in line with current research, a firm's involvement in

technology-focused alliances is essential for its economic and innovative performance (Ahuja, 2000; Powell et al., 1996; Rothaermel & Deeds, 2006). Lastly, literature on the performance effects of vertical alliances has focused on cost reduction and demonstrated that supplier and customer alliances tend to impact productivity growth and incremental product improvements (Belderbos et al., 2012).

Grant & Baden-Fuller (2004) argue that studies on strategic alliances have recognized knowledge sharing, especially in technology, as their dominant objective, often adopting an organizational learning perspective, aiming to acquire the knowledge of alliance partners. Similarly, Mesquita et al. (2008) argue that a firm's ability to interact with other firms accelerates its knowledge access and transfer, affecting firm growth and innovativeness. Further, Rottman (2008) claims that managing a network of suppliers presents considerable challenges for MNEs, such as effectively transferring knowledge among alliance members while maintaining control over intellectual property. Lastly, Kale & Singh (2007) assert that an alliance learning process involving codification, sharing, and internalization of knowledge, is positively related to a firm's overall alliance success, where firms can learn indirectly from the experience of others as well as directly from their own experiences (Argote & Miron-Spektor, 2011).

2.3 Business Model and Alliance Literature Interplay

Reviewing the literature on BMs and vertical alliances reveals similarities and correlations we want to understand better. Both research streams contain literature that develops a wide range of motives for collaborative agreements, as cooperation and alliances are paramount to almost any firm's business model (Kaplan et al., 2010). Newer BMs call for increased cooperation as businesses must understand how alliance partnerships work and be prepared to complete the investments required to develop collaborative capabilities (Fjeldstad & Snow, 2018). Therefore, collaboration is a necessity in knowledge-intensive industries, where the knowledge base underlying products and services is considered complex and diffused (Fjeldstad & Snow, 2018).

Value creation and appropriation result from two things; first, how the firm organizes its resources and activities; and second, how it organizes the

relationship it is part of (Fjeldstad & Snow, 2018). Value creation is a co-production process between a firm and its customer, supplier, and partners (Hienerth et al., 2011; Ramírez, 1999). Lavie (2007) argues that value creation enhances the focal firm's ability to generate value from its relationships with partners by collectively pursuing objectives and extending the range of activities. Meanwhile, value appropriation determines the relative share of relational rents a firm can appropriate where partners competitively seek self-interest objectives to increase their share of relational rents (Brandenburger & Nalebuff, 2011; Dyer & Singh, 1998). Lavie (2007) argues that the focal firm's appropriation capacity depends on its bargaining power, described as the ability to change the terms of agreements to influence outcomes favorably. A challenge with Value Appropriation is ensuring that the relational rents are shared equally between the partners (Dyer et al., 2018).

The emerging literature on Coopetition, which explains the balance of pursuing cooperation to create value and competition to capture value, allows us to understand value creation and value appropriation better (Bouncken & Kraus, 2013; Hannah & Eisenhardt, 2018; Hoffmann et al., 2018). The literature on competition and cooperation is prominent but has evolved separately (Hoffmann et al., 2018). Collaboration is connected to acquiring a cooperative advantage when firms surpass their boundaries and create relational rents, pursuing mutual interests (Das & Teng, 2000; Dyer & Singh, 1998). On the other hand, competition is associated with gaining a competitive advantage and strengthening the firm's industry position (Porter, 1980), as well as pursuing one's own interests (Das & Teng, 2000; Hannah & Eisenhardt, 2018).

3.0 Research Method

The following chapter presents our research method, which is the techniques, procedures, and overall plan utilized to collect and analyze data to meet our research objectives. We conduct a theory-building case study, following an inductive, exploratitative, and qualitative approach. The empirical foundation is a single case study of a Norwegian MNE, including outside perspectives from suppliers and shipowners. First, we explain the overall research design. Secondly, we provide a case description and address the sampling reasoning. Thirdly, we discuss the data collection approach and data analysis process. Lastly, we elaborate on the ethical and legal considerations. We succinctly describe and justify our research method, discuss its limitations and critically assess its appropriateness throughout the chapter.

3.1 Research Design

Our chosen *research design* provided a framework for collecting and analyzing data (Bryman & Bell, 2015) consistent with the research objectives. Further, we have undertaken an *explorative* study by investigating phenomena and topics that we believed were unexplored in-depth, inspired by Cooper and Schindler's (2014) description of exploration as useful when sometimes lacking clear ideas of problems encountered. Due to the research question's *inductive* nature, generating rich information from respondents (Bell et al., 2019), we searched for patterns from the data and aimed to develop explanations for those patterns (Bernard, 2018). Contrastingly, a deductive approach could have been appropriate if it was inevitable that the evidence-based information gathered was valid, which we cannot conclude for certain due to complexities in the case. An abductive approach could also have been appropriate by moving back and forth between data and theory through iteration (Timmermans & Tavory, 2012). However, this approach rests heavily on the scope and sophistication of the theoretical background we could bring to the research, which we found insufficient.

We conducted a *single case study* due to the uniqueness of the case (Yin, 2009). Our case focused on gaining in-depth-knowledge of one specific MNE, enabling a more detailed and in-depth assessment of the setting (Bryman & Bell, 2015).

Thus, we preferred a single case due to its creation of richness in data (Langley & Abdallah, 2011), its ability to describe the phenomena (Siggelkow, 2007), and its facilitation of a manageable process. However, with other MNEs also accessible in the industry, a multiple case study could have been suitable as it creates robust theory with concepts grounded in diverse empirical evidence (Eisenhardt & Graebner, 2007), though often very time-consuming (Baxter & Jack, 2015).

We chose a *qualitative* research design, described by Denzin (2008) as multimethod research using an interpretive approach, highlighting the processes and meanings that emerge. According to Yin (2009), a qualitative approach is ideal for answering "How" research questions like ours. In contrast to quantitative research, qualitative research usually emphasizes words rather than numbers (Bell et al., 2019) and has distinct strengths for understanding processes due to its ability to grasp developing phenomena in great detail (Langley & Abdallah, 2011). Therefore, we were interested in understanding how people construct meanings to make sense of the world and their lived experiences (Merriam, 2009).

3.2 Case Description

In our case study, we investigated the ship design company NorShip, an MNE located in the northwestern part of Norway. NorShip is recognized for designing advanced and highly customized vessels for operations in areas like the rough North Sea. They specialize in ship design and have historically worked with designing ships for the offshore oil & gas industry and, more recently, vessels intended for offshore wind farm installation and maintenance, trawlers for the seafood industry, and passenger vessels, such as exploration cruises and yachts. NorShip has an organizational structure that facilitates dispersed design-related activities. Therefore, we incorporated the most central design activities in our description of NorShip as one unit.

Designing vessels is a challenging, intricate, collaborative, and expensive process (Tupper, 2013), especially for NorShip, which focuses on specialized and innovative designs. Consequently, their activities of designing ships typically require solving new and complex problems while constantly searching for vessel solutions that improve the effectiveness of their precursors. As a result, NorShip's efficiency in developing ship design, and thus their future business, is at risk if

they fail to deliver the ship design on time, within the agreed costs. Therefore, central to our research was understanding NorShip's BM, operations, and the different phases that constitute a ship design process. Furthermore, NorShip initiates its design processes by identifying the needs and expectations of all stakeholders involved in the design process, explaining why understanding stakeholders such as shipowners and suppliers were of interest to us.

We found NorShip to be a fitting collaborating partner with rich experience and relevance to our interest in understanding how they approach vertical alliances in a highly competitive industry. To ensure more data and bring new insight to the case, we expanded the empirical context to involve perspectives from central Norwegian suppliers and shipowners. Two of the three suppliers approached deliver central equipment and components required for the ship to operate, whereas the last supplier provides products and solutions that increase energy efficiency. Further, the two shipowners approached operate respectively within the oil and gas industry and the cruise segment. Lastly, all stakeholders agreed to share insights and had experience in specific projects relevant to our thesis objectives.

3.3 Sampling

In our research, *sampling* refers to selecting specific data sources from which data is collected to meet the research objectives (Gentles et al., 2015). We found *convenience sampling* the most relevant sampling approach since participants were selected based on their ease of availability (Saumure & Given, 2018). Individuals participating were the ones most willing and able, making the informant sample selection easy and quick (Straits & Singleton, 2018). However, we acknowledge that convenience sampling involves that participants may be biased (Saumure & Given, 2018).

NorShip provided a sample of participants that could generate rich information, although potentially biased in selecting the most appropriate personnel. As a result, we ended up with a smaller participant sample size, suitable for our single case and qualitative approach aiming to acquire information helpful in understanding the intricacy, variation, and context surrounding the case (Gentles et al., 2015). In contrast, a larger sample size of participants is more appropriate if

conducting a multiple case study or quantitative research by defining populations that require sufficiently large sample sizes to produce statistically accurate estimates. Therefore, we find the sample size of participants appropriate given the context of the research (Boddy, 2016).

Since NorShip provided several participants, specific sampling criteria were unnecessary to develop. However, we had some initial thoughts about the sample criteria in advance: the firm had to be a Norwegian MNE, a big player in the market it operates in, have more than ten employees, and that important employees involved in strategic decisions were still in the firm. Throughout the case and informant sampling process, suppliers and shipowners emerged as significant contributors to a better understanding of the research objectives. We then established sampling criteria for suppliers and shipowners: having worked with sizeable Norwegian ship design firms and being a big player in the market.

3.4 Data Collection

Both primary and secondary data sources were included in the data collection, allowing data to be cross-referenced with input from additional sources, increasing the overall validity.

3.4.1 Primary Data - Interviews

Interviews were the primary source of data. It was essential for us to stay flexible during interviews, allowed through semi-structured interviews, focusing on obtaining both retrospective and present interpretations from the participants (Gioia et al., 2013). We could have adopted an unstructured interview guide to let the conversation lead to where the respondents were going. However, as inexperienced researchers, we wanted structure in our interview guides to ensure recurring themes while being open to follow-up questions.

The themes in our interview guide were based on the phenomena of interest, and it was essential for us not to steer the interviewees in any biased direction. Therefore, questions were deliberately not built and framed on existing theory as it could lose critical aspects of individuals' lived experiences (Gioia et al., 2013). Also, we asked open-ended questions regarding the design process and vertical alliances to capture as much data as possible. Due to different directions taken by

designers in the first interviews, the interview guide structure and content had several edits before our second round of interviews with designers and first round with suppliers and shipowners, ending up with different versions, respectively. The interview guides are found in the appendix (Appendix 1-3) to increase the reliability and validity of our study by showing integrity and consistency within the employed analytical procedures (Long & Johnson, 2000).

During our first round of interviews, we noticed that central characteristics and challenges in the ship design process were related to designers' interactions and collaboration with suppliers and shipowners, indicating a need for further data collection through a second round of interviews with new perspectives. Therefore, After reviewing the first-round data and moving back and forth with data and theory, we conducted second-round interviews, allowing us to probe questions to determine which factors were essential in vertical collaborations. Finally, the second round of interviews provided opportunities to challenge and verify information from previous interviews and triangulate and cross-reference participants' answers to other sources (Read, 2018).

As shown in **Table 1**, we draw on 12 interviews from NorShip, suppliers, and shipowners in Norway. Interviews lasted between 25 and 60 minutes and were conducted in Norwegian, allowing respondents to speak freely in their mother tongue. These include both digital and physical interviews. Interviewees include top managers, project managers, other management positions, and product developers, all with broad competence and relatively long experience in the industry.

Interviewees	Interview Setting	Experience in the Industry	Number of Interviews
Designer X	In person	5-10 years	1
Designer Y	In person	15+ years	1
Designer Z	In person & digital	15+ years	2
Designer W	In person & digital	15+ years	2
Supplier X1*	Digital	5-10 years	1
Supplier X2*	Digital	5-10 years	1
Supplier Y	Digital	15+ years	1
Supplier Z	Digital	10-15 years	1
Shipowner X	Digital	15+ years	1
Shipowner Y	Digital	15+ years	1
Total			12

*We interviewed two subjects from the same firm simultaneously.

Table 1. Overview of Interviews

Observations

In February 2022, we went on a three-day trip to the firm's facilities, combining research project meetings with interviews. We also toured the site and observed various design activities in NorShip. However, our observations were unstructured, direct observations without pre-established procedures for deciding when, where, and what to observe (Straits & Singleton, 2018). Nevertheless, we were allowed to participate in and watch different meetings and ask questions while indirectly learning more about their BM and how it had evolved. During the workshops, we were also able to clarify NorShip's relationships with suppliers and customers, providing more clarity while working on our thesis.

3.4.2 Secondary Data

The secondary data gathered enabled us to inspect differences across the industry and actors. This data included annual reports, internal reports, open sources such as web pages, news articles, and governmental papers about the industry. NorShip

requested a signed Non-Disclosure Agreement (NDA), granting us access to archival data early in the study, which provided a solid database to collect and utilize archival data. Further, we used this data to gather information in various documents and PowerPoint presentations to review what information could help us identify more insight into the research question and provide a valuable source of measurement in our research (Straits & Singleton, 2018). Lastly, the goal was to use the secondary data to triangulate the discoveries from the primary data, where the purpose of triangulation draws on the soundness of different data collection methods (Yin, 1994) by utilizing different data sources.

3.5 Data Analysis

Data analysis and collection were relatively concurrent. We used data analysis to select, focus, simplify, transform, and organize a compressed assembly of data to draw conclusions and verify them (Miles & Huberman, 1994). Due to time constraints, there was limited time to identify patterns in the data and adapt them to theory building. Ideally, we would stop iterating between data and theory when experiencing only incremental improvement (Eisenhardt, 1989). Hence, we collected data quickly to continue the iterative process for as long as possible.

We organized the data and sorted it into codes and themes (Gehman et al., 2018). To code, we used informant-centric terms, and to develop themes, we used researcher-centric concepts, improving the data's reliability and providing consistency in the analysis (Gioia et al., 2013). However, we acknowledged that errors could occur, causing measurement inconsistencies to undermine reliability (Straits & Singleton, 2018). After interviewing members from NorShip, suppliers, and shipowners, we cross-referenced the interview data with observation - and archival data, both confirming and disproving inputs, thus increasing the validity of the data and eliminating biases. Interviews were transcribed, and we divided the efforts and double-checked each other's work to ensure a more accurate process. To code and uncover rich understandings, we found methods using tables and Excel most suitable, which provided clearly articulated and logical findings.

Early in the analysis process, we first made notes on emerging patterns during and after the transcription was completed and anonymized all personal data and potentially recognizable company information. Then, we wrote one-page

summaries of each interview to capture the critical points related to the interview categories presented in the guide. However, we recognized that not all participants provided adequate information based on the interview guide's categories and intentions. Next, we organized all transcriptions from designer, supplier, and shipowner interviews into separate documents, reading through each perspective and answers to our questions. Lastly, since interviews were semi-structured, we needed to focus on organizing and categorizing the data in a meaningful way.

Themes emerged based on codes and were analyzed according to the research objectives. Though feeling lost at times, we experimented with categories and trends seen emerging from the data. We especially looked for similarities and differences among the concepts between the respondents. Following this process, we made a new document aiming to describe the ship design process and see how it reflected the BM of the design firm while separating emerging trends on what factors of alliances emerged during our interviews. We aimed to discover elements of explanatory value to identify variation, interrelationships, and correlations between these factors. At this point, we experimented with themes and traits of categorizing the data to understand what might be happening within the industry. Lastly, we started to visualize our findings into tables and figures to capture the meaning-making of our results.

3.6 Ethical Considerations

In research, ethical implications revolve around data collection and analysis, the treatment of information related to the participants, responsibility towards society, and the credibility of science as a field (Reese & Fremouw, 1984; Straits & Singleton, 2018). We conducted the research in a manner that focuses on not only using the correct technique but using the technique “rightly” and ethically justified (Straits & Singleton, 2018).

Interviews exposed personal data requiring us to handle both the respondents respectfully and guarantee confidentiality to the best of our abilities. Before conducting the interviews, we got approval of a notification form regarding personal data from NSD (The Norwegian Center for Research Data). Personal data was collected and stored securely during the thesis process, according to a Data Management Plan (DMP), an adopted strategy inspired by NSD. The DMP

provided upfront reflection and thoughts that guided our preparations and increased our confidence in collecting and storing the data.

We created a letter of information and consent, following NSD standards, to prepare for the interviews. The letter included information on the aim of the study and how we would collect and analyze data. NorShip recommended not to tape-record or show the letter of information and consent, as it would promote a more rigid formal setting and potentially hamper openness in the subsequent interviews. Consequently, as we had an established NDA with NorShip, we withdrew the letter of information and consent and replaced it with an oral consent. Regardless of NorShip's recommendation, we asked interviewees for approval to tape-record, arguing that we wanted to capture as rich data as possible, maximizing the data quality and analysis to optimize for insightful reflections.

4.0 Findings

The following chapter systematically presents our empirical findings based on the data analysis. We first explain and capture the essence of a ship design process by identifying stakeholders involved and describing the traditional and modern design process to comprehend our empirical findings better and make them easier to follow. Then, to better understand NorShip's BM, we use Fjeldstad and Snow's (2018) framework and categorize data to identify BM elements through the design process. Lastly, we discuss findings related to the three identified factors that emerge from the alliances when designers, suppliers, and shipowners collaborate to develop design solutions.

4.1 The Ship Design Process

4.1.1 Stakeholder Map and the Traditional Ship Design Process

To best meet the research objectives based on our findings, we limit the stakeholder interactions in the "ship design process" to focus our thesis on the ship designer, shipowner, and supplier interface, also referred to as the triangle relationship, as shown in **Figure 1**. All three collaborate to create ship designs. We understand ship designers as engineers or naval architects in the maritime industry, suppliers as providing materials, ship systems, and equipment, and shipowners as the customer. As the figure indicates, the three main stakeholders in this study operate in a larger ship design context, including shipbrokers, shipyards, and others.

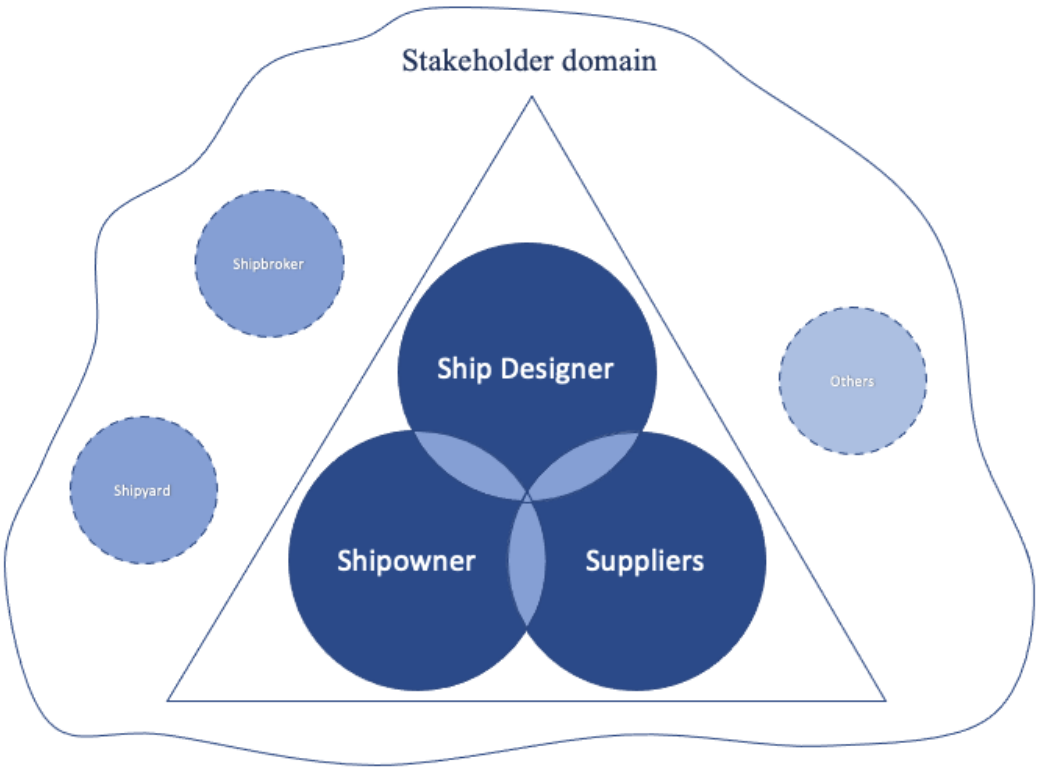

Figure 1. Thesis Focus in the Ship Design Stakeholder Domain

Early on, designers carried out ship design as an iterative process involving multiple stages: Concept -, Basic - and Detailed design, described by Evans (1959) as a design spiral (**Appendix 4**). The iterative nature of the process involves many interconnected tasks performed by different stakeholders with distinct specializations. Iterations are driven by the availability of new or corrected information, meaning that the design process will keep iterating until it converges into a design specification. However, the repetition of activities may compromise the efficiency, which is the swiftness to which the design solution is conceived, of the process.

4.1.2 A Modern Ship Design Process

Today, design firms propose alternative ideas for the design process beyond traditional design activities, as proposed by Evans (1959), involving business case development, market and technology insights, and using updated technical competence when defining requirements for the ship design solution. In general, when asked to explain a ship design process, interviewees agreed that the design process is complex and that there is no singular process, highlighting the ambiguity involved.

To simplify the understanding of the design process based on our findings, we illustrate it in **Figure 2** and divide it into three phases; the early -, late -, and contract phase. In short, the *early phase* involves designers utilizing market and technology insights to develop a vessel business case that generates relevant information so that a Concept Design can be made. The *late phase* includes the designers' development of a Basic Design, including a preliminary general arrangement that uses graphics to illustrate volumes, spaces, hull forms, compartments, decks, equipment, and more. Activities involved in the *contract phase* include detailed engineering and building vessels at the yard. Since data retrieved largely encompass activities before contracts, our findings primarily focus on the early and late phases of the design process. The three phases are discussed throughout the chapter to provide direction on how the design process might better explain different elements of the BM.

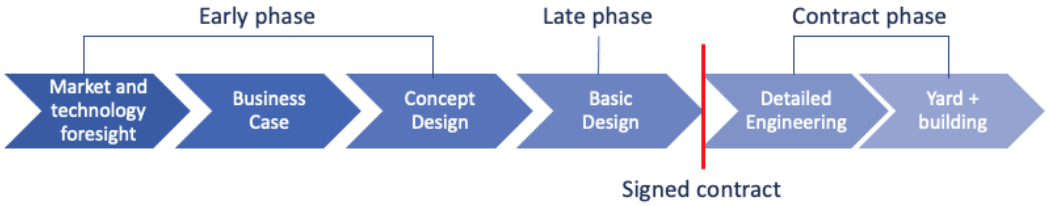

Figure 2. Simplified Ship Design Process

4.2 The Business Model Interpreted Through the Design Process

Aiming to reveal parts of NorShip's BM, we asked questions to better understand the design process from designers, suppliers, and shipowners' perspectives and how they conduct their business. Although we did not use direct wording from the Fjeldstad and Snow (2018) framework, we were inspired to ask questions that would capture the essence of BM elements. Hence, we utilize the BM elements as a framework to position our findings. **Table 2** provides an overview of central responses from shipowners, designers, and suppliers related to the ship design process linked to the BM elements.

BM Elements → / Actors ↓	Value Proposition	Role of the Customer	Value Creation	Value Appropriation
Shipowners	Considered as designers' customers who expect unique design solutions	Works closely with designers from A to Z to secure the best solutions	Claim the ship becomes better when Co-Creating	Holds the most power to bargain on price and influence details in the design
Designers	Offer novel and unique ship designs with precise estimations	Works closely with shipowners, though often facing "No-Cure, No-Pay" situations.	Expertise when making Concept and Basic design, but require collaboration to optimize	Want to control their processes and seek to establish clear boundaries
Suppliers	Claim that technical aspects are essential and that unique equipment increases proposed value	Propose their equipment to shipowners to convince the quality and become a part of the design process early on	Co-Create by providing designers with consultancy services and modern equipment	Negotiate along the entire design process. Require equipment to be selected into the design.

Table 2. Understanding the MNE's BM Through Different Perspectives

4.2.1 Designers Develop Unique Design Solutions (Value Proposition)

The *early phase* involves bringing commercial, operational, and technical aspects into a ship specification — enabling designers to create a Concept Design of the ship. This Concept Design typically includes estimations and calculations to develop documents describing the building conditions and ensuring that the vessel meets the shipowner's requirements. Shipowners explained that they seek unique, modern, and top-class vessel designs beyond what is already on the market. They also stressed that the lifetime cost was one of the most essential criteria as they envisioned a ship to operate for 25-30 years.

Designers generally agreed on their approach toward shipowners, and one designer stated:

"Because we are on the customer's side, we want the customer to get the best product. We will try to act as the customer's best consultant." (Designer Z)

When asked what products and services a design firm offers shipowners, one of the suppliers highlighted the significance of what designers deliver in the late phase, focusing on Basic Design aspects:

“A building specification is the main product of the designers - along with a general arrangement and supported drawings. They (designers) must [know how to] communicate details in the specification to others - and if it is challenging to understand - then the designer has not managed to do it [properly].” (Supplier Z)

Further, designers agree that there needs to be a good balance between commercial, technical, and operational aspects offered to the shipowners when designing a ship. One designer claimed that, as in any business, profitability is inherent. However, two of the other designers stated that the focus had shifted too much toward the commercial aspects, whereas it earlier was more emphasis on the quality and the development of a more optimal design:

"Our main task is to provide solutions to demands in the market. We perform services and create a product through those services. That is our goal. If we make money while doing it, great. However, our main mission is not to make money, although we have to reduce the cost of production. There is a balance in this that is extremely important. We are struggling with that and have partly lost the technological focus. Now it is mostly an economic focus." (Designer W)

One of the designers was also challenged by a reduced ability in the firm to highlight value proposed to customers, such as what type of value their products and services provide for shipowners:

"What new do we bring to the table? Where does it say ours is 30% more efficient, 20% cheaper, so much lighter, and contributes to 100% greater utility?" (Designer W)

4.2.2 Shipowners Co-Create Unique Designs (Role of the Customer)

Even though there is no singular design process, the data shows that an idea based on a need for a new ship typically emerges in the *early phase*. Though there are

different starting points, we observe that the shipowners often have a vision and need for a new vessel, which leads to a request where designers get involved.

There is also a difference regarding the role of customers, explained by several interviewees, between a tender process and a direct design request. The tender process entails a shipping company (shipowner) approaching multiple design firms in the industry with a tender document consisting of a description of expectations in the form of technical requirements. The design is further developed only if the tender is won. Tender processes are explained as No-Cure, No-Pay methods by respondents. In contrast, a direct design request occurs when shipowners pay in advance and directly approach one design firm based on, for example, its reputation for designing ships, as explained by one of the designers. What differentiates the two is that in a tender, shipowners have strong design opinions and demands, while a direct request fosters more collaborative exploration of the ship design according to designers.

When asked how they contacted designers, shipowners explained that once an idea arises, the first step is to consult with a trusted design firm directly, stressing the importance of trustworthiness. Shipowners often initiate the use of shipbrokers as a middleman in a tender process when they do not know the most qualified design firms, where one firm potentially wins the tender:

"Then we enter into a partnership, often on a No-Cure, No-Pay basis. That is one model, and another is to pay them directly. However, the most common approach is No-Cure, No-Pay." (Shipowner X)

The data indicate that the involvement of shipowners varies during the different phases of the ship design process. However, shipowners are generally tightly involved throughout the process until the ship design is finished. One of the shipowners commented why they should not use the experience they have acquired during the last decades to partake in the design development, as they possess broad operational design competence themselves:

"Why is it so big? Why not make it a little more square? Why not make the door a little wider?" (Shipowner X)

4.2.3 Complex Design Require Collaboration (Value Creation)

The data indicate that the *late phase* includes designers' development of a Basic Design, involving more collaboration with shipowners and suppliers. One of the designers noted that most people in the industry would agree that a ship design process typically stops after Basic Design, including drawing packages and analyses. However, one designer claimed that the ship design process does not stop until the ship is finally delivered, and it is no longer possible to change. Core activities in developing a Basic Design often involve creating a preliminary general arrangement that uses graphics to illustrate volumes, spaces, hull forms, compartments, decks, equipment, and more. One designer described it as a developing a design framework:

"*We make a large framework and then make choices based on concepts such as functionality, performance, and capacity. We then get a more detailed framework, breaking it down to make a design study, drawings, and digitized drawings in 3D, which generates a general arrangement." (Designer W)*

NorShip can not develop unique ship designs without some interconnectedness with suppliers and shipowners beyond a typical business relationship. One reason is the degree of uncertainties and complexities emerging in the development due to varying opinions on what constitutes an optimal design solution. When asked about central challenges in the design process, one of the designers said:

"A critical challenge is the integration of suppliers. If we had closer collaborations with suppliers, we could have significantly improved our results. It is a big problem, especially communicating with suppliers and shipowners, and satisfying everyone's needs is challenging." (Designer X)

Another designer described a previous successful alliance project and emphasized the importance of alliances with suppliers:

"Collaboration is 100% the key to everything. In the context of establishing new designs, we depend on bringing along experienced partners to the projects and building strong relationships with one another. In one example where we developed an incredibly complex design, the key to success was an alliance with

three strong suppliers. All actors got to apply and share their core competencies to develop a joint project unlike any other project, which opened up new doors and removed economic barriers." (Designer Z)

By doing so, NorShip gathered experts from the respective firms, whom they got to know well, facilitating an easy and smooth way to manage tasks. In addition, the process became more dynamic and efficient by encouraging flexibility to develop their own solutions to a complex system. Furthermore, the focus was on creating a high-quality product rather than on costs by removing economic barriers. Similarly, suppliers and shipowners generally agree that alliances with designers are advantageous to performance. However, some experience that partnerships become insignificant when one actor does not follow the targeted design objectives and incentives differ. That way, two actors team up while one is more isolated:

"We often collaborate and agree with designers about drawing our equipment into the design. However, unless the shipowner agrees to those modifications, the process is useless to us." (Supplier X1)

Several interviewees also explained that the design process turns upside-down once the contract is signed. Designers and shipowners have grand visions, but for yards, there are mainly two things that matter: keeping costs down and delivering on time. These two are often incompatible with designers' and shipowners' design visions and describe a common quarrel in design projects.

4.2.4 Control versus Innovative Solutions (Value Appropriation)

Designers from NorShip somewhat disagree on the purposes of an alliance with suppliers and shipowners and how it may function to develop optimal design solutions. For example, some designers emphasized the need to protect their interests and internal design processes in alliances:

"We want to control our designs and processes to manage downstream activities. When working on specific projects, we have worked closely with suppliers and shipowners when they understand some specifics and we do not. However, our designers have strong ownership of the product and process and can quickly feel

threatened. However, it might work as long as we create clear boundaries."
(Designer W)

Therefore, the possibility and ability to avoid opportunistic behavior depends on different perceived needs for control and ownership. Other designers saw a clear need for establishing new alliances regardless of protection concerns.

When asked about the ship design process, one designer highlighted that NorShip had improved certain activities in the *early phase*, as they place a high priority on the business case part. NorShip employees explained to have significantly enhanced Concept Design analyses by reducing it to 30 minutes, which earlier took between 300 to 1000 hours. Designer Y claims that for NorShip to become more competitive, they must develop unique and innovative solutions to stay one step ahead. Moreover, the designer claimed they could justify a higher price for hours spent in the *early phase* due to their innovation focus.

Most design firms sell the Basic Design directly to the shipowner in the *contract phase* and are not engaged in further contracts with the yard, leading to a shipowner and a yard signing a contract. In contrast, NorShip is unique by constantly entering into contracts directly with yards making most of the equipment purchases themselves. NorShip claims that value is captured by its power to negotiate on prices of components with suppliers who compete in selling their equipment. That way, designers capture more of the revenue potential. Also, to protect financial interests, some NorShip designers work on enhancing intellectual property rights (IPR), strictly regulating patents and copyright to protect their designs.

4.3 Vertical Alliances Factors Emerging From the Data

The following sections present and discuss findings related to three factors that emerged from the data linked to vertical alliances. Variation prompted by our research enables us to compare the differences and similarities in responses between designers, suppliers, and shipowners, which we summarize in tables based on relevant data.

4.3.1 Clear Power Imbalances and Interdependencies in the Alliances

When NorShip coordinates a chain of activities in an alliance to design a vessel, power advantages and disadvantages arise through dependency relationships. Most respondents acknowledge mechanisms such as flexibility that influence the power imbalance in the triangle relationship. Designers often deliberately choose not to involve suppliers too early and instead facilitate competition between them to lower prices on components. As a result, designers claim NorShip aims to be supplier-independent. However, in cases where shipowners prefer certain equipment from specific suppliers, designers are forced to comply and are deprived of the ability to pressure prices. That way, selected suppliers can more easily calculate and analyze costs related to the durability of the design and coordinate directly with shipowners.

4.3.1.1 Shipowners Hold the Most Power

By establishing a large set of design variables, designers can draft an accurate design that meets given requirements. However, shipowners possess the most substantial power and can make adaptations as desired:

"Regardless of our preferred design process, we live in a commercialized world and need to adjust to shipowners accordingly. That is the power imbalance we face." (Designer Y)

"Shipowners hold all power. They are the decision-maker in 90% of all cases." (Supplier X2)

In several recent projects, suppliers have approached shipowners ahead of design projects to reduce dependencies on designers. Essentially, if suppliers succeed in establishing a collaboration with a shipowner by convincing them about the advantages of their equipment, designers' control and power are significantly decreased. Despite this, shipowners emphasize flexibility in choosing suppliers and equipment as essential while monitoring the market options. Lastly, designers agreed that unrealistic expectations from shipowners related to different functionalities on the ship could make it challenging to optimize the design process:

"Shipowners say that the ship should look like this today and like that tomorrow. So we are forced to change everything constantly. Everything is turned upside down, non-stop every day." (Designer Z)

4.3.1.2 Interdependencies Create Uncertainty

The power of NorShip to influence suppliers and shipowners leans on interdependencies, which increases complexities in the alliances. Since designing a vessel involves interconnected tasks, information needs and exchanges vary significantly depending on the phase stage. One designer stressed the consequences of dependencies in different design stages:

"Although we work closely together in different phases, different dependencies are exposed. For example, shipowners often experience annoyance related to different design stages because of a lack of competence, information, or resources." (Designer Y)

However, more focused on reducing the overall interdependencies, shipowners emphasize the need for coordination to sustain control over the design process. For example, when asked about challenges in collaborating with designers, one shipowner stated the following:

"It is all about balancing [dependencies] between the actors to incorporate the strategic qualities and advantages of an alliance. Though different in fields of competence, we need to assimilate knowledge and coordinate activities together." (Shipowner X)

Designers	**Suppliers**	**Shipowners**
Power Imbalance & Dependencies		
Common Responses		
Shipowners hold the most power	Shipowners are the decision-makers	We decide the process
Divergent Responses		
Focused on consequences of dependencies	Focused on avoiding strong dependencies	Focused on solving dependency issues

Table 3. Overview of Perspectives on Power and Dependencies

4.3.2 Informal Alliances are Preferred Above Formal Alliances

Uncertainty related to contracts and formal vs. informal alliance approaches influences the cooperation between the actors involved and has a noticeable impact on the design process. Regardless of the complexities of developing a vessel design concerning when and how suppliers and shipowners are involved, respondents emphasize the importance of informal collaborations above formal collaborations. However, patterns from the data indicate that each type plays a more influential role in different stages of the process. When the design is at its later phase, contracts and formality become increasingly important:

"Contracts are essential. It establishes the expectations between the designer, shipowner, and supplier and helps set goals and clarifications. Thus, developing a contract that makes the end design better is essential." (Shipowner X)

Similarly, some NorShip designers prefer a formal alliance structure when discussing intellectual property rights (IPR), strictly regulating patents, copyright, and designs to protect financial interests. On the other hand, suppliers believe designers and shipowners frequently avoid formal alliances for practical reasons, hampering the collective benefits of collaboration:

"A more formal preliminary agreement with designers and shipowners in an early phase would enable us to provide better advice on the design through closer collaboration. Unfortunately, I think some designers fail to capitalize on this opportunity to save time and resources on engineering, even though we have proven its success previously with others." (Supplier X1)

In an alliance, control is essential for NorShip to ensure more precise decisions. Interviewees, therefore, argue that various tasks by each stakeholder are interconnected and require sufficient coordination. When asked about the key characteristics of the collaboration with suppliers and customers in the design process, designers quickly pointed to the relationship as primarily informal in the *early stages* to ensure flexibility:

"Although better utilized in the past, an informal collaborative environment does exist today. This approach is more flexible and dynamic, which paves the road for future projects and increases effectiveness." (Designer Y)

NorShip claims to approach suppliers and shipowners outside of standard design projects frequently. However, the pricing of components often dictates the interactions, creating a source of uncertainties for each actor involved. Accordingly, suppliers are benchmarked against each other to put pressure on lowering prices before a contract is signed. Nevertheless, suppliers and shipowners target more informal relationships with designers to facilitate a more creative collaborative environment:

"The informal collaboration is what we work toward and want to utilize all the time. To gain more knowledge and have a collective direction, we must find new and creative ways to collaborate." (Shipowner X)

"The best projects are accomplished when we can develop innovative solutions together with a more flexible agreement. If allowed in early, we often have solutions no one has thought of yet." (Supplier Y)

4.3.2.1 Assess the Trustworthiness and Risk Between Partners

The increased internal commercialized focus over the past few years in NorShip has increased the emphasis on trustworthiness and costs-related risks. When asked about the background for emphasizing contracts and a certain level of formality in the relationship, respondents tended to believe that placing trust in one another and exposure to risks were the main explanations:

"Back in the day, you could sign an agreement on a napkin. Today, however, formal contracts and commercialized terms are prominent in distributing risk. Everything depends on the risks you are willing to take. However, regardless of the formality of the agreement, trust between actors is the main factor." (Designer W)

"It all depends on trustworthiness. We need to gain designers' trust in us to develop modern and futuristic solutions that reduce risks related to costs and vice versa. It is a constant cost-benefit evaluation that ultimately depends on trust." (Supplier Z)

It is clear from the responses that perceptions of the trustworthiness of others are essential for partners to be willing to take risks. Therefore, an adequate level of trust in one another is crucial to engaging in well-functioning alliances. However, the data reveal several occasions on which designers do not trust suppliers or shipowners to make the right decision in a design process and vice versa.

4.3.2.2 Having Close and Personal Relationships is Critical

Designers, suppliers, and shipowners all emphasize the importance of close personal relationships with one another. However, the way in which they can build such relationships depends on whether the collaborative environment is established within close proximity in terms of geographical location and personal relationships. When asked about how each firm approach the other actors, most agreed that it typically started with close relationships and proximity:

"The way I have worked all these years is close to suppliers and shipowners. Sometimes, in only 3 minutes [by car], I would be down there talking to my friends and finding good ways to work on the design. We know people in most firms." (Designer Z)

"Some are easier to work with than others. The local ones are much easier to communicate with because you can call or walk down there immediately. A cluster of firms in the same region enables close and personal relationships." (Designer X)

Despite the like-mindedness on the benefits of personal relationships, some designers explained the significance of understanding the consequences of overly strong relationships, which could limit the usefulness of flexibility in choosing suppliers. However, respondents undoubtedly emphasized the advantages over the disadvantages of close relationships:

"If there already are personal relationships established, the dialogue is much more satisfactory. It becomes less likely that we can influence the outline specification with longer distances" (Supplier Z)

"You can call it an old habit, but we typically choose designers and suppliers based on personal relationships. It is often colleagues we have worked with before." (Shipowner Y)

There is a clear consensus across actors that local partners rather than more distant partners are beneficial in an alliance when developing a ship design. Especially suppliers stress the closeness as an absolute necessity to keep up to date on projects. Similarly, designers underline the lack of personal relationships as a considerable hindrance to a more efficient design process. Lastly, some shipowners claim there are no formal agreements on collaboration, only informal ones where personal relationships are critical.

Designers	**Suppliers**	**Shipowners**
Formal vs. Informal Collaborations		
Common Responses		
Informal collaboration is more flexible and increases effectiveness	Informal collaboration enables better projects	Informal collaboration is what we work toward
Trust between each actor determines the potential risk exposure	Risks depend on the trustworthiness of others	We must trust them and assess risks accordingly
Having close personal relationships makes the process more efficient	If personal relationships are already established, everything is easier	We choose partners based on personal relationships
Divergent Responses		
We need to protect our interest through IPR and formal contracts	Designer and shipowners avoid formal contracts to stay flexible	Formal contracts are essential to establish expectations

Table 4. Overview of Perspectives on Formal vs. Informal Collaborations

4.3.3 Knowledge Transfer and Learning is Vital in Alliances

Knowledge and learning are two crucial factors in the design process that some designers hold higher than anything else. One designer argued that NorShip has moved from an engineering mindset - improving tasks incrementally and repeating them, toward a design mindset - being more flexible to take different approaches. That way, designers are free to use their knowledge differently and explore more, less bound by what has already been done. In contrast, one supplier claimed with frustration that most design firms have not learned enough and are stuck with engineers who are not sufficiently process-oriented, which is necessary to take on an advisory role as a designer.

Several respondents agree that design projects facilitate knowledge-sharing activities in an arena for all actors to accumulate and share unique knowledge. On several occasions, designers highlighted previous examples of collaborations with suppliers and shipowners and the advantages of incorporating external expertise. One designer commented on a core objective of ship design:

"It is not about building complicated designs, it is about building people. We can accomplish anything by increasing competence levels, stimulating rich insights, and facilitating unique learning." (Designer Z)

Although the data collected predominantly indicated shared agreement on the mutual benefits of sharing knowledge across actors, concerns related to safeguarding knowledge from unwanted use by others became apparent. Lack of trust and the risk of opportunistic behavior among actors creates barriers that inhibit knowledge sharing:

"Knowledge transfer in projects is critical when moving forward in different design phases. Unfortunately, that is where many are vulnerable." (Designer W)

"The mentality of designers is that they do not need us until they find out that they actually need us. Such opinions have significant room for improvement. If we had been on the inside earlier, we could have better exploited our shared knowledge about solutions to the design." (Supplier X1)

4.3.3.1 A Need for a Stronger Collaborative Learning Environment

NorShip designers generally agree that exchanges of knowledge with allies sometimes create circumstances of potential vulnerability, especially in the early phase of the design process. Designers want to avoid errors in the specification of ship requirements, which significantly affect costs and time spent on designing. However, some also recognize current interchanges of information with suppliers as well functioning and essential to the design process:

> *"That way, we acquire the latest news, which fosters the development of state-of-the-art solutions in the design. They (suppliers) are often up to date on details and components, which opens up a network of expertise everyone can benefit from." (Designer Y)*

However, suppliers and shipowners tend to disagree with designers regarding the extent to which such established learning environments exist, where exchanges of knowledge and expertise can flow more freely. Especially suppliers emphasize the possibilities of knowledge transfer to improve design quality when design firms have invited them in early in contrast to those who have not, which is more common:

> *"There are many schools of thought. However, designers are among the worst to collaborate with regarding knowledge transfer. They will rarely let you in early." (Supplier X2)*

> *"The is no explicit functioning learning platform. As a result, there is minimal knowledge sharing, and it is typically poorly organized." (Supplier Z)*

4.3.3.2 Technology, Innovation and Sustainability is Required

Choices of technology largely influence the complexity of developing a ship design. Accordingly, designers emphasize the challenges of implementing technology in the design that will remain relevant in the future. More specifically, increased focus on innovation, sustainability, and green solutions is pressuring designers to think differently about technology:

"Technology has a significant effect on the design—especially battery development. Therefore, when discussing equipment with suppliers today, we need to predict the role of battery technology in 2030-2035." (Designer X)

"Alternative fuel [makes the ship design process] very complicated. It is almost impossible to design a ship today due to the uncertainty regarding whether technology on fuel is available or not. We have invited shipowners in to discuss these topics." (Designer Y)

Designers further exemplify successful scenarios in which they have collectively developed technology in different vessel segments with suppliers and shipowners. It is evident that external sustainability pressures force adaptations to technology requirements on ships, causing a continuous debate between shipowners and designers. Suppliers and shipowners further confirm similar collaborations and attempt to educate designers on the latest technological advancements, arguing that the need to develop greener and more sustainable technology together is crucial:

"Environmental efforts are pushing technology development to remain sustainable for the next 25 years. Consequently, we work with designers and suppliers to develop the most optimal solutions." (Shipowner X)

Other shipowners, however, disagree about the responsibilities and capabilities regarding who is actually advancing the technological development through innovation:

"Designers will promote themselves as the innovators. However, that is not the case. We are the innovators in the market." (Shipowner Y)

Designers	Suppliers	Shipowners
Knowledge and Learning		
Common Responses		
Technology and green solutions has a significant effect on the design and our work	The sustainability focus is pushing the technological advancement in designs	The need to develop greener and smarter technology together is vital for vessel designs
Divergent Responses		
We have evolved from engineers to designers with modern knowledge	Designers are stuck with old engineering knowledge	Designers need to expand their knowledge-base and be more creative
We drive the technological advancement	We have the newest and most advanced innovative equipment	We are the innovators in the market, designers are not
Information and knowledge exchanges are well-functioning	We need to develop better collaborative learning environments	We need new and more creative ways to share knowledge

Table 5. Overview of Perspectives on Knowledge and Learning

5.0 Discussion

In the following chapter, we interpret and discuss the significance of our empirical findings in light of existing literature. To assess the influence vertical alliance factors have on the BM elements, we combine, discuss and evaluate central findings in line with our theoretical approach using Fjeldstad and Snow's (2018) framework. We then discuss implications related to other findings that go somewhat beyond our initial theoretical approach. At last, we describe our research's theoretical contribution.

5.1 Alliance Factors That Influence BM Elements

This thesis aims to answer the following research question: *How do vertical alliances influence the business model of a Norwegian MNE operating in a knowledge-intensive industry?*

Merging elements from BM and vertical alliance aspects and analyzing them reveals different interpretations and combinations of how vertical alliances influence the BM. Interestingly, our findings show that each alliance factor influences some BM elements more than others. However, the complexity in different phases of the design process demonstrates an intricacy of understanding the influences on the BM, implying that interpretations may be inaccurate. Regardless, based on our findings, we interpret each factor's influence on the BM, understood as the power to change or alter it, and provide an overview in **Table 6** before discussing it more in-depth.

Vertical Alliance Sub-factors	Vertical Alliance Factors	Most Influence on BM Elements:
Continuously assess the trustworthiness and risk between partners Having close and personal relationships is critical	Informal alliances are preferred above formal alliances	The role of the customer and Value creation
Shipowners hold the most power Interdependencies create uncertainty	Clear power imbalances and interdependencies in the alliances	Value proposition and The role of the customer
A need to develop stronger collaborative learning environments Technology development, innovation and sustainability is required	Knowledge transfer and learning is vital in alliances	Value creation and Value appropriation

Table 6. Overview of Factor Influence on the Business Model

5.2 Assessing Influence Through the BM Framework

We used the ship design process as a reference to understand the BM. However, divergences in the design process findings make the MNEs' BM challenging to properly define, implying various potential interpretations of its attributes and functionality. It is further challenging because the ship design process is highly complex and never looks the same. Therefore, a ship design process resembles understanding a BM in an unstable and unpredictable business environment, a common characteristic of a knowledge-intensive industry (Johansen, 2007; Snow et al., 2011). The following section discusses and interprets our findings in light of Fjeldstad and Snow's (2018) framework. Specifically, we discuss how the three factors influence each BM element. We further discuss that the MNEs' value configuration resembles a Value Shop, and contrast it to a Value Chain to assess interesting differences. The Value Network is less relevant as our results do not point to this configuration being pertinent.

5.2.1 Value Proposition

Following Fjeldstad and Snow (2018), the MNE matches its value proposition to what shipowners value and are willing to pay for. A recent study by Lunnan and McGaughey (2019) of a Norwegian shipbuilder (MNE) investigated its new BM, concentrated on creating standardized vessels involving external shipbuilding yards for series production. The authors found that the firm continually experimented with its BMs and recognized several BM variations. Similarly, our findings indicate different BM interpretations, though often emphasizing the development of more specialized ships. Interestingly, however, the BM of designing complex and unique ship designs following a Value Shop logic contrasts with creating cheaper standardized vessels, conceivably building more on the Value Chain characteristics of increased scale and bringing costs down by utilizing external yards. Following the framework, it seems that designs offered and value proposed to shipowners connect standardized vessels to the Chain logic and specialized vessels to the Shop logic.

Lunnan and McGaughey (2019) further found that designers' mindsets in Norway are tilted toward quality, not price - contrasting some of our findings. Although emphasizing a balance between commercial, technical, and operational aspects when designing a ship, we found that designers seem somewhat conflicted about what to prioritize. This uncertainty is further strengthened by shipowners holding the most power to request what a design should look like. Based on our findings, we believe today's knowledge-intensive industry is impacted by demand which requires developing both high-quality and cheap designs, leading to a challenging discussion about whether designers should focus their BM on constructing standardized versus specialized vessels. Regardless, similar to Lunnan and McGaughney's (2019) findings, we find that across the choice of more traditional and newer BMs, the MNE seeks a collection of partner firms through informal relationships that can engage in successful projects with good knowledge sharing.

Despite previous research emphasizing the significance of cost reduction as a motivator for vertical alliances (Belderbos et al., 2004), our findings predominantly indicate that costs are considered less important than, for example, knowledge sharing and learning as a motivator for why the MNE engages in partnerships. However, suppliers' responses diverge from this idea, claiming that

there must be other hidden incentives for designers to commit as they are among the worst to share knowledge. Furthermore, since designers want to avoid errors in the specification of ship requirements, which significantly affect costs, most emphasize the interchanges of information with suppliers as essential to the design process and meeting shipowners' expectations. This could further explain why we believe lack of trust and the risk of opportunistic behavior among actors are the main hindrances that inhibit knowledge sharing, slowing down the collective ability to offer unique ship designs to shipowners.

5.2.2 The Role of the Customer

Fjeldstad and Snow (2018) claim that for a BM incorporating a Value Shop logic, the customer represents the problem to be solved and may actively participate in creating solutions or co-producing. On the contrary, following a Value Chain logic, a firm is merely a product or service recipient. We found that shipowners defended that there is no process in which they would not be significantly involved in the design process in collaboration with the designers, confirming the co-producing factor. However, designers were somewhat frustrated by the shipowners' constant involvement as it created a never-ending adaptation of the design and established an environment where constant change became the norm.

Investigating knowledge-intensive business service firms, Skjølsvik et al. (2007) found that a high level of customization in projects needs comprehensive customer co-production, where the working environment between the customer and the firm ought to be efficient. Likewise, our results indicate that the likelihood of successful co-production between the MNE and shipowners depends on the degree to which shipowners have realistic expectations of different features in the design development. If they do not, we believe it may reduce the long-term competitiveness of the MNE since shipowner expectations are not met. Furthermore, our findings show that when suppliers convince shipowners of their equipment early, shipowners increase their power over designers. Conversely, shipowners' power decreases if suppliers and designers agree on a solution before reaching an agreement with the shipowner. Consequently, it seems like shipowners' ability to adapt depends on the power imbalance in the specific design context.

Although the majority of participants referred to the design process as typically initiated by the shipowner, we recognized scenarios in which the designers were the initiators. Correspondingly, Lunnan and McGaughey (2019) found that in more traditional market segments, the shipowner usually initiated a design project through a tender process, while in newer market segments, the design development process was started by the designers. Therefore, it seems to be distinct customer role effects on the design process with different starting points for shipowners as co-producers where the ability to co-produce appears to be enhanced if designers work closer to shipowners over time. We also observed that the shipowner's role looks different depending on whether there is established trust and personal relationships or not. A higher degree of trust seems to affect the direct contact process, disregarding shipbrokers and creating a more efficient design process. Since shipowners seem to approach suppliers and designers they already know, new insights from other potential partners may be overlooked.

5.2.3 Value Creation

According to Fjeldstad and Snow (2018), knowledge and learning are particularly important to value creation for firms following a Value Shop logic. Similar to Løwendahl et al. (2001), we found that value creation is knowledge-intensive and provided by experienced and knowledgeable workers in the industry who seem connected with scientific advancement within their field of expertise. Our results further indicate patterns of knowledge and learning playing a vital part in value creation for the MNE**.** Specifically, we found that collaborative problem solving is a crucial source of value creation in the design process where knowledge transfer between alliance partners is essential for the design outcome. Also, unique competence seems essential, as the ability to consult as designers may increase the firm's reputation as a worthy partner. These findings help explain why shipowners expect designers to act as competent consultants with good problem-solving skills, in line with the Value Shop logic.

Interestingly, the iterative nature of the design process draws resemblance to the iterative nature of the Value Shop activities. Different activities are continuously repeated and improved in a spiral-like sequence to maximize value creation and solve design issues more efficiently. These results are comparable to Stabell and Fjeldstad's (1998) view on value creation in Value Shops, stating that

problem-solving involves changing from an existing to a more desired condition where activities are iterative and cyclical. Regardless, our results demonstrate that innovative solutions and the ability to generate unique ideas seem to be among the core value-generating activities a design firm can contribute to a shipowner, where different activities by each stakeholder are interconnected and require sufficient coordination.

Previous literature has found that customers should encourage high-involvement relationships with suppliers where activities require ongoing knowledge exchange and vice versa (Kotabe et al., 2003). Similarly, we found that designers and shipowners promote collaborations with suppliers where design projects facilitate knowledge-sharing activities in an arena for all to accumulate and share knowledge. Additionally, existing research on vertical alliances highlights the complexities of knowledge transfer and distinguishes between relatively simple technical knowledge exchanges and higher-level sharing or transfer of full technological capabilities (Kotabe et al., 2003). Similar distinctions are evident in our case, where we found that designers emphasized protecting their expertise and only sharing simple details, while suppliers and shipowners claimed to typically share a broader body of knowledge. Thus, knowledge seems to influence the BM strongly.

We discovered connections between expertise in technology and in sustainability regarding ship design and how these significantly influence the motivation for why designers, suppliers, and shipowners collaborate. Along those lines, knowledge sharing being essential for performance in technology alliances is commonly addressed in research (Ahuja, 2000; Rothaermel & Deeds, 2006), and we found sustainability aspects particularly important to advancing the collaborative development of future vessel designs. However, our findings also revealed that actors disagree about who is advancing technological development through innovation, implying that innovative performance might be measured regardless of collaborative efforts.

5.2.4 Value Appropriation

According to Fjeldstad and Snow (2018), value appropriation refers to revenue and protection mechanisms. In Value Chains, products and services are paid for

directly, which is more predictable. In contrast, in Value Shops, payment is more unpredictable with the risk of not receiving compensation for resources utilized. Following the Value Shop logic, these mechanisms are linked to No-Cure, No-Pay licensing, and having patents that safeguard the ability to capture value. Interestingly, our findings identify a No-Cure, No-Pay BM as the most common, although negative for designers with increased risks related to unpaid efforts where they depend on landing contracts. It seems that the MNE's ability to protect especially financial interests is weakened by the No-Cure, No-Pay licensing, most likely explaining why the MNE prefers direct design requests above tender processes.

Although our findings revealed collaboration being primarily informal when creating new designs, there were disagreements on how to protect and control interests in the alliances. Several results also demonstrated that designers want to utilize IPR and other protective initiatives to secure their financial interests. Specifically, designers used their bargaining power to lower the price of components bought by suppliers to ensure higher profitability. Overall, a clear divergence is that most respondents agree that collaboration increases value creation while disagreeing on how appropriately to capture value in the partnership. Further, designers claim to be supplier independent, increasing their ability to capture value by promoting competition, although it may come at the cost of not being able to explore new collaborative environments.

Investigating how firms pursue new or modify an existing BM, Bouncken and Fredrich (2016) assess several factors influencing a firm's ability to capture value: size, age, duration, and alliance experience. Our findings show similar implications. The MNE seems to have more bargaining power than most suppliers in most design projects, allowing them to negotiate higher returns from the collaborations and gain advantages in capturing value. Although having been an established design firm in the knowledge-intensive industry for a long time, the data also shows concerns that the MNE fails to leverage innovative thinking. With a typically longer duration of partnerships, the MNE could enable more complex technology-related knowledge transfer, though this is rarely the case. Lastly, due to its previous alliance experience, the MNE can better align new knowledge with new partners, increasing its potential to absorb innovations. As innovation seems

to increase the value created in the designs, designers have an opportunity to be one step ahead and secure a competitive edge.

5.3 Implications of Managing the BM with Vertical Alliances

In line with Barringer & Harrison (2000), our findings reveal the benefits of informal alliance governance where respondents stress the significance of informal above formal collaborations, providing more flexibility. However, our findings also indicate the increasing importance of formal contracts in vertical alliances to minimize opportunism, as argued by respondents from the MNE. Based on these findings, we believe vertical alliance partners pursue informal and formal collaborations differently, often due to dependencies related to either commercial, technical or operational aspects of developing a vessel design.

Belderbos et al. (2012) claim that vertical alliances with different partner types are essentially interrelated, as apparent in interdependencies between them. Similarly, our findings support that vertical alliances with different partner types demonstrate different degrees of influence on their BM. The data further indicate that shipowner alliances imply a higher degree of influence on the BM than supplier alliances, potentially linked to the strategic importance of customers as alliance partners throughout the design process. Further, customer alliances might come with fewer economic risks compared to collaborations with suppliers, potentially explaining an MNE's tendency to engage less in supplier alliances to retain more power. We also observed that past supplier collaboration influences current shipowner alliance strategies and vice versa. Interestingly, we found that the most efficient and optimal ship designs typically emerge from joint alliances that include all three actors.

Previous research emphasizes the importance of Coopetition for innovation in knowledge-intensive and complex industries, like in our case, enabling access to valuable knowledge and resources (Bouncken & Kraus, 2013). Interestingly, our results indicate that the MNE cooperates with suppliers and shipowners to create value while competing to capture value. Moreover, while seeking the benefits of sharing costs, knowledge, and technology through alliances, the MNE also faces the disadvantages of unintended knowledge spillover to their partners. Consequently, we see that vertical collaborations allow the MNE to learn about

new technologies and markets that could impact ship design innovation. The risk of information leakage or failure to conduct joint R&D is apparent, as confirmed by Nieto and Santamaría (2007). Interestingly, as the design process progresses, performance in the vertical alliances develops positively as previous alliance experiences may increase trust and coordination, and thus governance (Dyer & Singh, 1998). However, over time previous alliance experience and trust may also diminish performance or raise the competitive environment in alliances (Dyer et al., 2018) as the MNE and their partners compete for accumulating knowledge and learning.

Although there is little knowledge of how firms adapt their BMs in response to external threats and opportunities (Saebi et al., 2017), our results highlight the importance of BM adaptation to improve the design process. It seems that the MNE attempts to actively align its BM to the changing environment through collaboration, facing changes in shipowners' preferences, technological shifts, and competition. Inevitably, we also see trade-offs between price and quality as a significant implication for alliance performance. As designers stress the impact various externalities have on their operations, commercial interests gain more priority, potentially blinding the significance of technical and operational aspects that shipholders and suppliers exalt. Thus, we believe the MNEs ability to adapt its BM according to different industry forces hinges on how it manages the vertical alliances.

5.4 Contribution to Theory

Our study contributes to understanding how vertical alliances influence the BM of an MNE operating in a knowledge-intensive industry. Arguably, relatively little research has merged these perspectives. Our findings provide insight into which alliance factors influence distinct BM elements in different stages of the process. Moreover, the results demonstrate a unique direction compared to established literature regarding the degree to which MNEs pursue vertical alliances to gain competitive advantages in knowledge-intensive industries. Therefore, we argue to have contributed to BM and alliance research by focusing more closely on vertical alliances in which trust, power, and knowledge sharing influence the MNE’s ability to create and capture value and by examining the strengths, weaknesses, and combinations of alliance factors influencing the BM.

Our findings indicate that vertical alliances with different partner types are interrelated while affecting an MNE's BM differently. Arguably, this insight contrasts approaches taken in other literature until now. It seems that prior studies have often focused on one type of vertical alliance at a time or implicitly considered BMs and vertical alliances as somewhat unrelated. Instead, our study shows that different alliance factors along with two distinct partner types matter for the BM, as interdependencies run across them. We also contribute to advancing theory by utilizing and testing Fjeldstad and Snow's (2018) framework, which combines research on Value Configurations and BMs. By highlighting implications while considering the MNE as a Value Shop and its impact on the BM elements, we were better able to assess the corresponding level of influence.

We address value creation and appropriation that established partnerships with suppliers and shipowners enable, and contribute to understanding the role of formal and informal collaborations, power and dependencies, and knowledge and learning in alliances. Our results especially point to the relevance of knowledge transfer in the vertical alliances where we differentiate between simple technical exchanges and high-level technology transfer between partners. Further, contracts, trust, and interdependencies emerge as influential factors that further challenge how the MNE governs its BM, where a tradeoff between price and quality is evident. Thus, this work contributes to the study of vertical alliances while extending prior research on BMs.

6.0 Conclusion

6.1 Answering the Research Question

Our master's thesis aimed to investigate how vertical alliances influence the BM of an MNE operating in a knowledge-intensive industry. A single case study allowed us to go in-depth in understanding a ship design firm's BM and the tensions in vertical alliances through the role of suppliers and shipowners in developing ship designs. In line with Fjeldstad and Snow's (2018) framework, we connected vertical alliance factors with BM elements resulting in several interpretations of how they influence each other. Through the lens of literature on alliances and BMs, our research sheds light on ways MNEs may collaborate to create and capture value. The results of our study confirm the significance of utilizing vertical collaboration in a complex and dynamic environment to increase knowledge sharing and optimize design processes.

Based on our findings, we conclude that vertical alliances influence the BM elements of an MNE in several ways on different levels and that an MNE operating in a knowledge-intensive industry must collaborate with suppliers and shipowners to optimize its products and services. However, the way in which the vertical alliances influence the BM involves several implications. Therefore, understanding the complexity of the process as an evolving and ongoing set of activities, and the collaboration context, play an important role in understanding directions taken by the MNE. We found that the MNE always enters into alliances to drive down costs and make activities more efficient. However, there is no established norm on how the firm may optimally do so. Yet, the MNE continually experiments with its BMs, and we recognize several BM variations. Although adding complexity, variations in BMs and alliances increase the learning potential and induce creative solutions.

How the MNE manages its BM and vertical alliances influence the degree to which value is created and captured. Among the alliance factors, we argue that knowledge and learning influence the BM the most due to the significance of knowledge-sharing and learning environments as establishing an arena to accumulate critical knowledge for creating unique products and solutions. With

the increasing importance of technology and digitalization in the industry, each actor stands to benefit from systematic knowledge exchange with one another. In addition, we see that including shipowners and suppliers in the early stages of the process should deliver innovative results more quickly.

6.2 Limitations and Future Directions

Our research's limited scale and scope have led to several limitations that need to be further addressed. First, we acknowledge that a considerable limitation of conducting a single case study relates to generalizability (Eisenhardt & Graebner, 2007). In short, we could not sufficiently test whether our research applies to other design firms by studying one single MNE in the ship design industry with multiple competitors. Additionally, some results may be limited explicitly to firms aligning their BM to vertical alliances in this industry-specific setting and case. We realize that these aspects may have affected our findings.

Another limitation is the short time frame of writing a master thesis. With a relatively broad topic that has received attention in multiple research fields, we see that there exist other approaches and directions that would have been interesting to investigate more thoroughly, although time-consuming. Also, a total of ten interviewees participated in the research, which some might consider relatively few when conducting a single case study. More specifically, we regard only having four interviewees from NorShip as a significant limitation, being the focal firm in focus. Lastly, including perspectives from shipbrokers, yards, and other actors involved in the industry arguably would have contributed to more detailed and precise insights on how NorShip operates and collaborates.

While writing our master’s thesis, we have been involved with NorShip in different settings. First, we had a school project where NorShip was the client in a consultancy course. Second, BI Norwegian Business School paid us as research assistants to gather and present data about NorShip and its competitiveness in the Norwegian ship design industry. Therefore, we have gained more in-depth knowledge of the industry than we would have done by only conducting interviews for the thesis. Our evolving relationship with NorShip during our master’s thesis has impacted our thinking and analysis in the thesis, increasing potential research biases.

We notice several directions and possible avenues for future research based on our findings and limitations. A business model innovation perspective (Saebi et al., 2017) could prove helpful in better taking into consideration the causes of BM changes by identifying drivers and facilitators of BM modifications in vertical alliances. We also recommend that future studies investigate how an MNE changes its BM over time through a longitudinal study and focus on how other externalities, such as climate change regulation, alter different BM elements. Future research may also test the Fjeldstad and Snow (2018) framework through a multiple case study or in other case contexts to assess whether influencing aspects are sufficiently generic to apply to other industries. Therefore, we encourage future research to include these perspectives in pursuing an understanding of how vertical alliances influence the BM of an MNE in practice.

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Appendixes

Appendix 1 - Interview guide for designers (In Norwegian)

(Merged first - and second round interview questions)

Innledningsspørsmål:

- Hvor lenge har du jobbet i NorShip?
- Hvordan ser en typisk arbeidshverdag ut for deg?

Design prosessen:

- Hvordan ville du beskrevet rollen deres i en typisk design prosess fra start til stopp?
    - Hvordan opplever du at en utypisk designprosess ser ut?
    - Hva opplever du som mest utfordrende?

Samarbeid/Allianser:

- Hvordan opplever du at samarbeid påvirker designprosessen?
- Hvordan ville du beskrevet samspillet mellom kunde, utstyrsleverandører og designselskaper?
- I hvilken grad er kundene med på å utvikle designet?
    - Hva fungerer bra og dårlig med dette?
    - Hva tenker du kunder anser som mest verdifullt i møte med design selskaper?
- Kan du fortelle hvordan og når utstyrsleverandørene kommer inn i bildet i designprosessen?
    - Kan du fortelle litt om hvordan maktforholdet mellom leverandør og designfirma ser ut?
    - Kan du fortelle om de formelle og uformelle typene samarbeid med utstyrsleverandørene?
- Hvor viktig er tillit i samarbeidene?
- Kunne du utdypt litt mer om hvordan læring og informasjonsoverføring foregår i disse samarbeidene?

Appendix 2 - Interview guide for suppliers (In Norwegian)

Innledningsspørsmål:

- Hvor lenge har du jobbet i (leverandør selskap)?
- Hvordan ser en typisk arbeidshverdag ut for deg?

Design prosessen

- Sett fra en leverandørs perspektiv, hvordan ville du beskrevet en skipsdesignprosess og rollen dere spiller i den?
- I denne designprosessen, hva skaper mest verdi for dere?
- Hvordan er prosessen/planleggingen for dere før en potensiell kontrakt med et designselskap?

Samarbeid:

- Hvordan ville du beskrevet samarbeidet med designselskaper i designprosessen?
    - Hvordan fungerer samarbeidet med kunden av designselskapet?
    - Hvordan opplever dere da at samspillet i dette triangelet fungerer?
    - Hvem har størst makt?
- I hvilken grad ville du sagt dere lykkes i disse samarbeidene?
- Hva ser du på som de største utfordringene i disse samarbeidene?
    - Har du eksempler på positive/negative erfaringer med samarbeid i designprosessen?
- Hvilken rolle spiller kontrakter eller løsere avtaler i slike samarbeid?
    - Hvordan ser dere for dere disse samarbeidene på kort- og langsikt?
- Hvor viktig er tillit i samarbeidet?
- Hvordan opplever du at det eksisterer en plattform av læringsutveksling mellom partene involvert i samarbeidet?
    - Hvor viktig mener du teknologi og innovasjon er i møte med retningen skipsindustrien er i ferd med å ta?

Appendix 3 - Interview guide for shipowners (In Norwegian)

Innledningsspørsmål:

- Hvor lenge har du jobbet i (rederi selskap)?
- Hvordan ser en typisk arbeidshverdag ut for deg?

Design prosessen

- Sett fra en kundes eller rederi's perspektiv, hvordan ville du beskrevet en skipsdesignprosess og rollen dere spiller i den?
- I denne designprosessen, hva skaper mest verdi for dere?

Samarbeid:

- Hvordan foregår prosessen dere har for valg av designselskap dersom dere skal investere i et nytt skip?
    - Tilsvarende for valg av utstyrsleverandører?
- Hvordan ville du beskrevet samarbeidet med designselskaper i designprosessen?
    - Hvordan fungerer samarbeidet med leverandører?
    - Hvordan opplever dere da at samspillet i dette triangelet fungerer?
    - Hvem har størst makt?
- Hva ser du på som de største utfordringene i disse samarbeidene?
    - Har du eksempler på positive/negative erfaringer med samarbeid i designprosessen?
- Hvilken rolle spiller kontrakter eller løsere avtaler i slike samarbeid?
    - Hvordan ser dere for dere disse samarbeidene på kort- og langsikt?
- Hvor viktig er tillit i samarbeidet?
- Hvordan opplever du at det eksisterer en plattform av læringsutveksling mellom partene involvert i samarbeidet?
    - Hvor viktig mener du teknologi og innovasjon er i møte med retningen skipsindustrien er i ferd med å ta?

Appendix 4 - Evans' design spiral (1959)