Growing a Small Firm in an Industry Dependent on a Constrained Natural Resource

By

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Abstract

The research focuses on the challenge of growing a small firm while the resources needed (e.g., fish) are declining and, hence, heavily regulated. The seafood industry is still growing, and fish as a protein is becoming more popular due to its positive effect on health, representing a growth opportunity. However, small fishing firms are exiting the market, performing erratically or simply stalling, which leads to the central question of this research: **How can small firms grow in an industry where the natural resource is in decline?** The research explores and evaluates factors shaping small firms' growth in Northern Norway's fishing industry.

This research adopts a critical realism paradigm. Unlike previous research on small firm growth, which has been dominated by positivism, this thesis follows a different approach, pivoting around the challenge to grow a small firm and questioning underlying assumptions of existing theories. The philosophy adopted in this research enabled combining the exploratory nature of the question and the explanatory aspects of identifying factors leading to firm growth, applying a mixed method abductive approach. The context of the research is the fishing industry in Northern Norway, and the data include secondary sources collected from two central databases, and qualitative primary data from eight semi-structured interviews and 124 professional trade publication articles.

The outcome of this thesis shows apparent differences in firms' performance, all exposed to similar macroeconomics and natural resource constraints, and that growth rates of small and large firms differ. The data also indicate that fish stock variations impact firm growth and that current mechanisms of adjusting the price per kilo of fish based on allocated quotas result in fluctuating and unpredicted revenues year on year, negatively impacting the growth of small firms. The thesis contributes to knowledge with a proposed business model containing four groups of variables sorted based on their impact on firm growth. The first group of variables is location, regulations, and risk management capabilities, predominantly growth inhibitors. The second group is principally growth enablers and includes collaboration & competition, efficiency & reliability, and revenue mechanisms. The third group is business acumen, knowledge, and personal preferences. It plays the function of dials to move the role of the first two groups of variables between inhibitors and enablers in a continuum. Finally, the fourth group includes beyond the status quo and the boat and acts as an accelerator of growth, pushing the overall dominant position of the firm from “as is” to “growth”. The thesis also proposes a mathematical representation of the model. Small firms seeking to grow could adopt this model to adjust their businesses, representing the contribution to the practical management of this research.

Acknowledgements

I dedicate this thesis to my wife Julie and my kids Nicolas and Vanessa for supporting me in this fantastic journey. I extend special thanks to my supervisors, Dr Pauline Found, Dr Jan Harwell and Dr Nathan Zhang, for their constructive feedback and clear direction.

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List of Abbreviations

- A (followed by a number): Article 1, 2,3,4, etc.
- ABS: Association of Business Schools
- BAM: British Academy of Management
- BERA: British Education Research Association
- CLSC: Closed-Loop Supply Change
- Cm: centimetre
- C (followed by a number): Code 1,2,3 etc.
- FAO: Food and Agriculture Organization
- ITQs: Individual Transferable Quotas
- IoT: Internet of Things
- I (followed by a number): Interview 1,2, 3, etc.
- Kg: Kilogram
- m: Metre
- MSC: Marine Stewardship Council
- MSY: Maximum Sustainable Yield
- nd: No Date
- NOK: Norwegian Kroner
- Mgmt.: Management
- OECD: Organisation for Economic Co-operation and Development
- PI: Profitability Index
- RBV: Resource-Based-View
- SD: Sustainable Development
- SME: Small and Medium Enterprises
- TAC: Total Allowable Catch
- TURFS: Territorial Use Rights for Fisheries
- UN: United Nations
- VBN: Value Belief Norm (VBN)
- WCED: World Commission on Environment and Development

Declaration of Originality and Prior Publication

As part of this research, I published and presented the following papers:

- Colman, P., Harwell, J. and Found, P., 2020. Value creation through innovation in the primary sector. *International Journal of Quality and Service Sciences*, 12(4), pp.475-487.
- Colman, P., Harwell, J. and Zhang, N., 2021. Gibrat and Penrose in and Industry dependent on a resource in decline. In: 35th BAM Conference, 31st August - 03rd September 2021. Online Event.
- Colman, P., Harwell, J. and Zhang, N., 2022. Towards a Business Growth Model for Small Firms in the Fishing Industry. In: 36th BAM Conference, 31st August – 02nd September 2022. Manchester, UK.

I declare that this research is my work.

1.- Chapter One: Introduction

1.1.- Research Context - Fishing Industry in Norway – Value Chain

This research examines small firm growth in the fishing industry in Northern Norway. Small firms are also called small-scale fisheries, though there is no exact definition, and authors use diverse concepts (Jentoft and Chuenpagdee, 2015). For this research, a small firm operates one or two boats of a length 10-11 meters with an annual income of more than 50,000 Norwegian Kroner (NOK), as classified by the Norwegian Directorate of Fisheries (Fiskeridirektoratet, nd). Other terms, such as fisher(s), are used interchangeably to describe a small firm in the fishing industry and during this research. The primary income of small fishing firms is the sale of fish. However, small firms are not allowed to fish as much as they want, and the Norwegian government enforces limitations. These limitations include fishing quotas or rights, in which firms are given a portion of the total allowance for the Norwegian fleet. These quotas change from one year to the next.

Norway has eleven fishing regions; 34% of the fishing vessels are registered in Troms and Finnmark, and 23% in Nordland, accounting for 57% of the total fleet, as indicated in Figure 1 (Fiskeridirektoratet, nd). These areas are in Northern Norway, where wild white fish migrate from the Northern Atlantic during the winter and spring (Stensholt, 2001), and hence selected as the geographical target of this research.

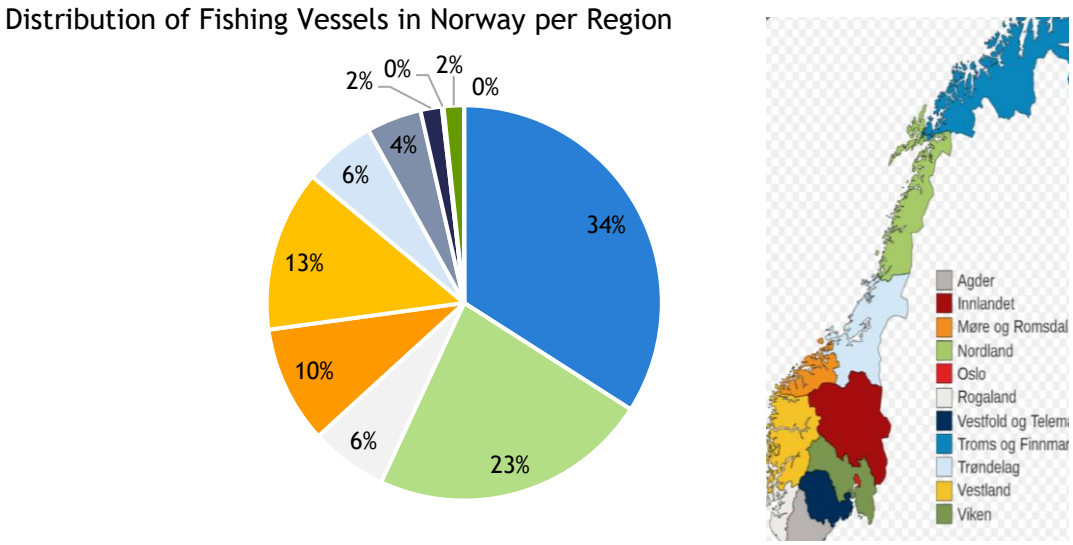


Figure 1 Distribution of Fishing Vessels in Norway (Source: Fiskeridirektoratet, nd; map: Wikipedia)

1.1.1.- Fishing Industry in Norway

The fishing industry supply chain in Norway can be categorised into three phases. The first phase involves the extraction of fish and other commercial species from their natural environment[1]. Small firms in this phase have limited capabilities to process the catch onboard; their business model is to fish and deliver fresh or frozen fish to receiving facilities. The receiving facilities sit in the second phase of the supply chain. These firms are fish buyers who process the raw product and may also produce the final products distributed to consumers. Throughout this research, firms in phase 2 of the supply chain are called receiving facilities and producers. The last phase involves logistics and distribution networks of the final products to consumers. Norwegian products are distributed locally in Norway and exported to many countries worldwide. The constraints of resource scarcity affect the firms operating in each one of these phases in different ways; the purpose of this research is to evaluate small firms in phase 1.

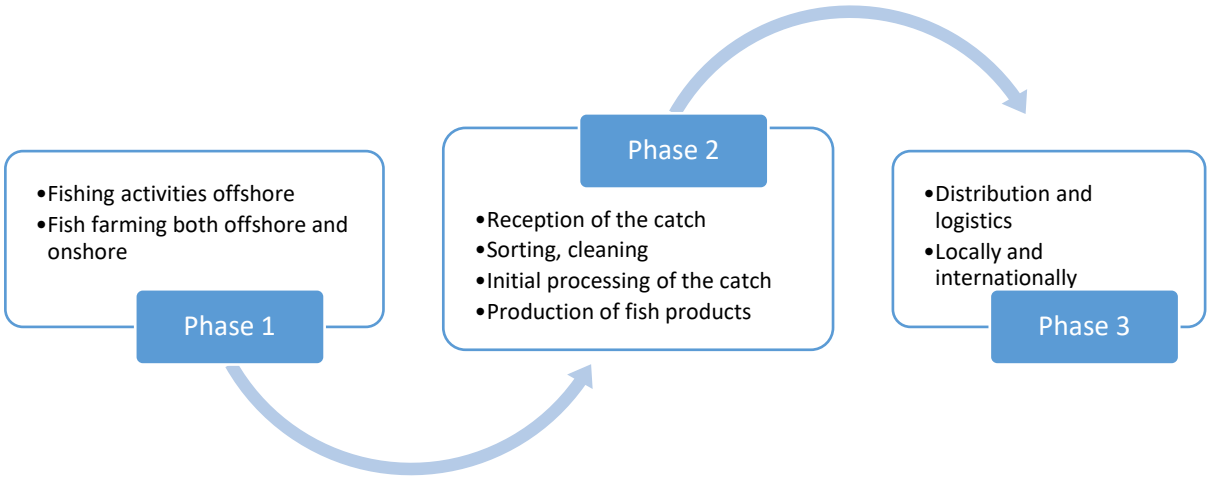


Figure 2 Fishing Industry in Norway - Supply Chain Phases

According to Fiskeridirektoratet, the fishing industry in Norway can be classified into three groups:

- **Professional fishing:** Fishers registered in the Fisketidirektoratet as their primary profession.
- **Aquaculture:** Firms operating fish farms.
- **Recreational fishing:** Fishing for recreation or leisure purposes.

The commercial fishing species are categorized into six groups, as shown in Table I.

1 The first phase of the supply chain also includes fish farming. Most aquaculture firms in Norway are large and outside the scope of this study.

Table I Norwegian Commercial Fishing Species Categories (Source: Fiskeridirektoratet, nd)

Category	Species
Pelagic fish species	Eyeball, herring, tuna and tuna-like species, mackerel, sea sparrow, coastal sprinkling coal mule, and tobis
Cod and cod-related species	Cod, pollock, and haddock
Flatfish, other sea-bottom fish, and deep-water species	Rosefish, Atlantic wolffish, wrasses, and halibut
Crustaceans, molluscs, and echinoderms	Crab, king crab, reddish, and shrimp
Cartilaginous fish	Sharks, skates, rays and walruses
Macroalgae	Seaweed and kelp

The most common species are pelagic fish, which accounted for 50% of the total catch in 2022, followed by cod species, which accounted for 27%, as shown in Figure 3.

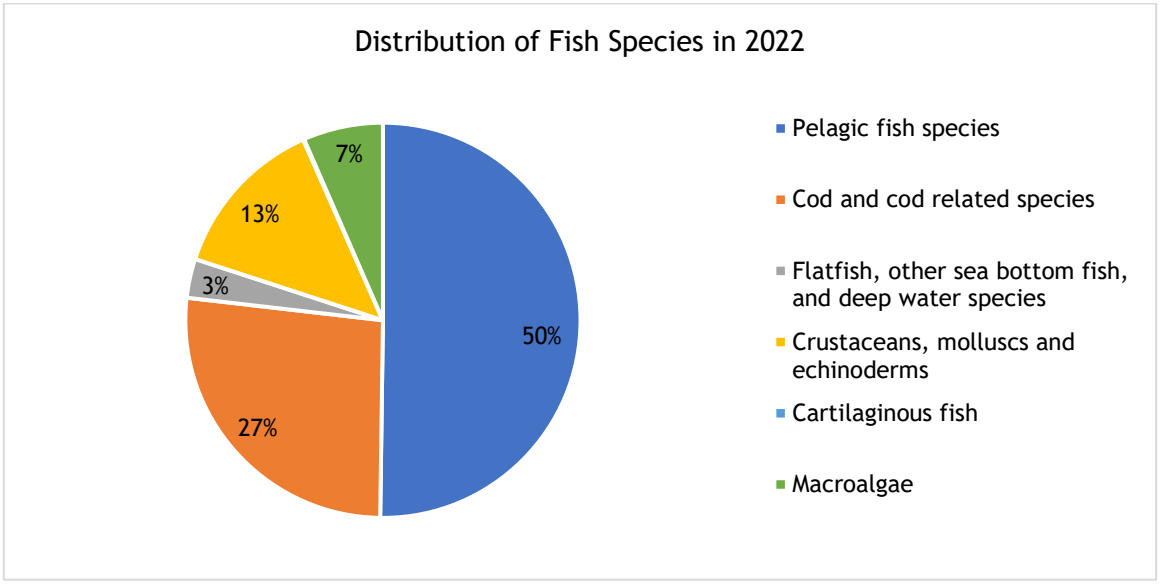


Figure 3 Distribution of Catch per Species (Source: Fiskeridirektoratet, nd)

The most common species among the small fleets (small firms) is cod, while the main catch of large vessels (firms) is pelagic species, as shown in Figure 4.

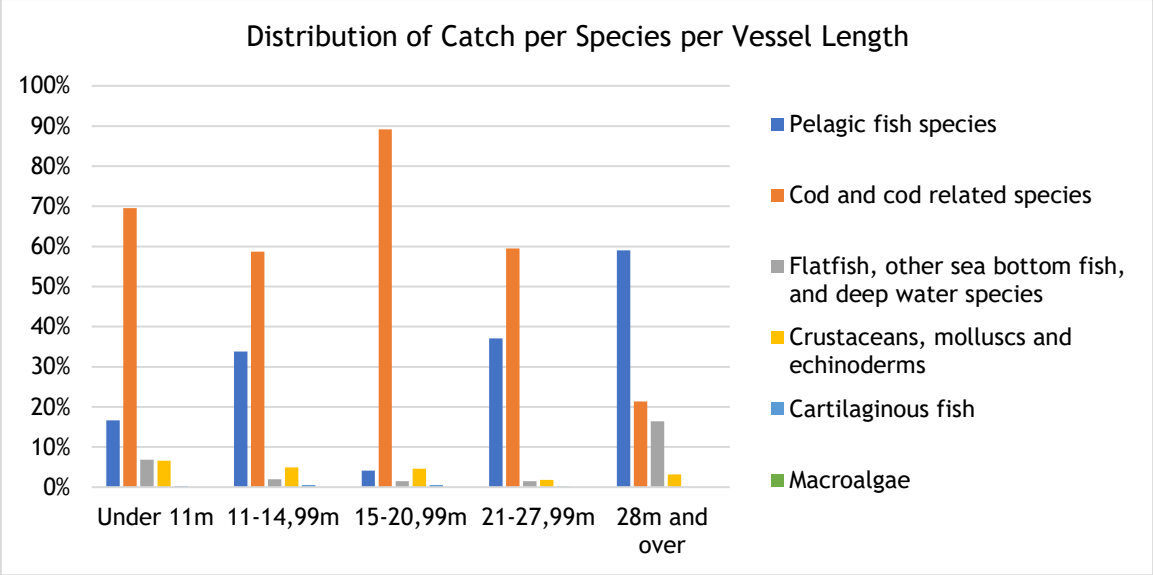


Figure 4 Distribution of Catch per Species per Vessel Length (Source: Fiskeridirektoratet, nd)

1.1.2.- Cod (Gadus Morhua) and Fish Stocks Historical Data

There are two types of cod in Norway: coastal and Atlantic cod. The coastal cod is all over the coast and is present year-round. The Atlantic cod has a migration pattern and usually comes to the Northern coast (latitudes above 62 degrees North) during the winter/spring seasons (Seafood from Norway, nd). The Atlantic cod migration patterns depend on water temperatures and can be predicted by scientists for up to seven years, enabling governments to plan the allocated quotas (Årthun et al., 2018). The Atlantic cod's spawning areas are near the coast (Drinkwater, 2005), allowing small vessels relatively easy access to the fishing grounds. The higher water temperature is causing the migration of Atlantic cod further north into the Barents Sea (Sundby and Nakken, 2008).

Historical data indicate a worsening in fish stocks, associated with changes in the water temperatures and hence fish migration patterns, which, added to competition and other factors, has resulted in industry stagnation (Edvardsson et al., 2019). Cod stocks in Norway have declined since the mid-1900s by more than 49%; they showed a temporary recovery in the 1990s due to the regulation and establishment of quota systems; however, recent years have shown a steep decline, and since 2013, cod stocks have come down by 47%, reaching similar levels to the ones observed in the 1960s.

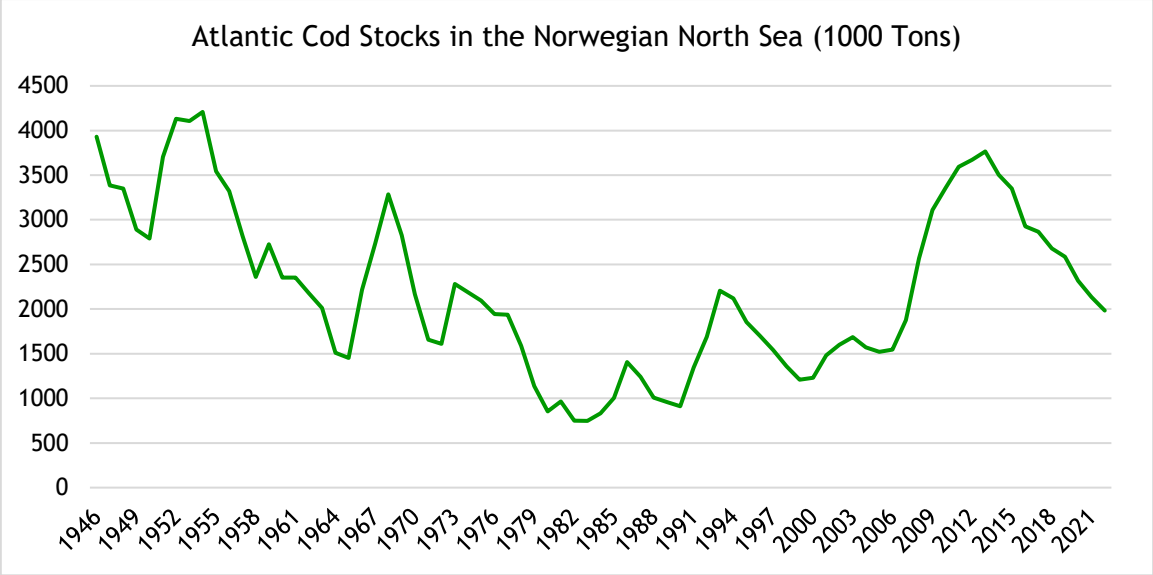
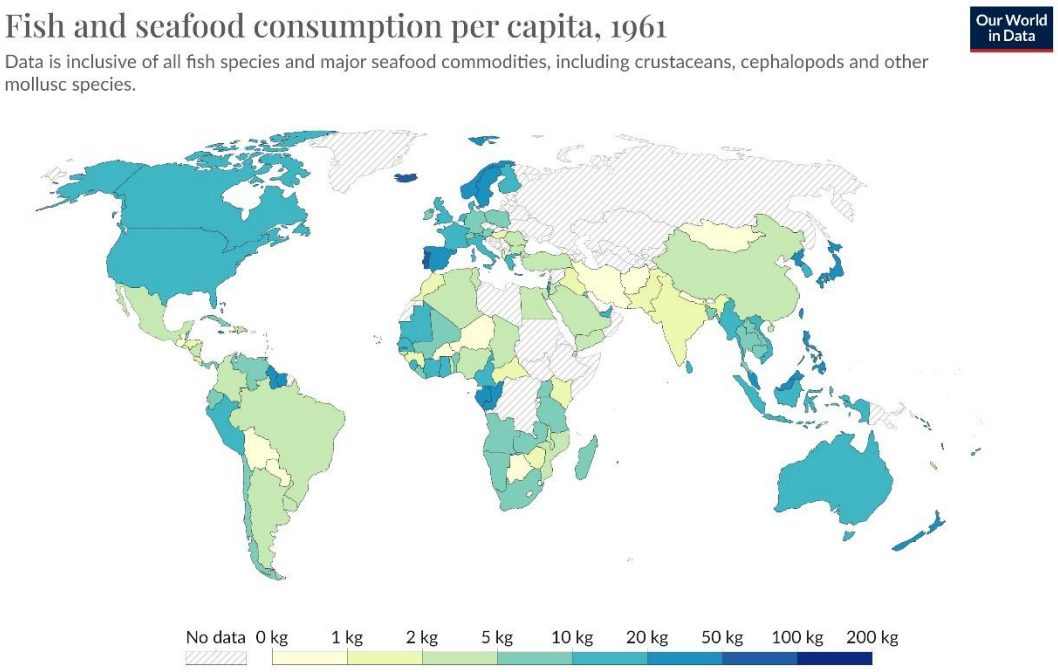


Figure 5 Atlantic Cod Stocks in Norway (Source: Fiskeridirektoratet, nd)

In summary, the scope of the research is to evaluate the dynamics of the fishing industry in Northern Norway in the regions of Troms, Finmark, and Nordland from the perspective of small firms, which are highly dependent on the Atlantic Cod, a species in decline.

1.2.- Research Problem and Research Question

Since 1961, global fish consumption has been increasing by an average of 3.3% per annum, outpacing the population growth (FAO, 2022b). The need for fish as a protein source is still growing (Asche and Smith, 2018; FAO, 2022b), as shown in the consumption of fish per capita in 1961 compared to the 2020 graphs in Figure 6.



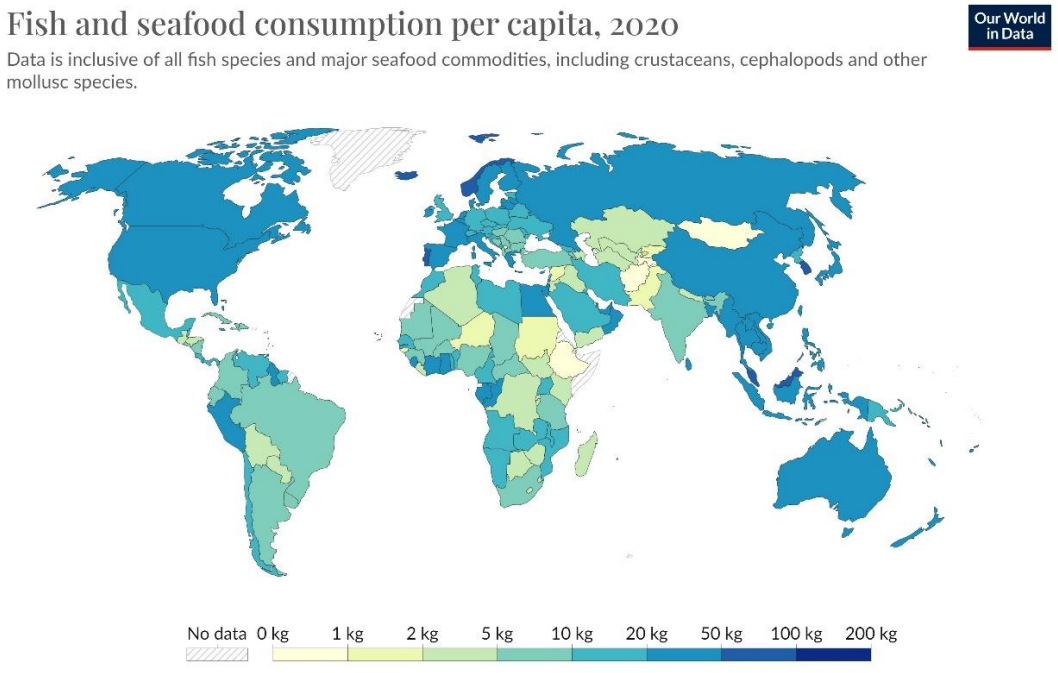


Figure 6 Fish Consumption per Capita 1961 and 2020 (Source: Global Change Data Lab, nd. Adapted from: Ritchie and Roser, 2019)

This growth may indicate that fishing is an attractive business to embark on. However, data do not support this in all cases. In Norway's fishing industry, the second biggest exporter of fish worldwide,

accounting for 3.1% of the global fish production (FAO, 2018; OECD, 2021), the number of small fishing vessels has decreased, as shown in Figure 7. The analysis of the secondary data (as presented in 4.- Chapter Four: Quantitative Data Analysis) indicates that the performance of small firms in Northern Norway has been erratic and that there also seems to be a difference in the performance of small firms compared to large companies in this industry.

The number of fishing vessels in Norway decreased by more than 81% since 1971 (Fiskeridirektoratet, nd) despite the increase in demand. A small firm typically owns one or two vessels under eleven meters long. The data from the Norwegian Fisheries Directorate show that this group decreased by 82%, compared to a 56% reduction of ships of twenty-eight meters or longer owned by medium to large firms, indicating a more significant displacement of small firms out of the fishing business (Kortesoja et al., 2022).

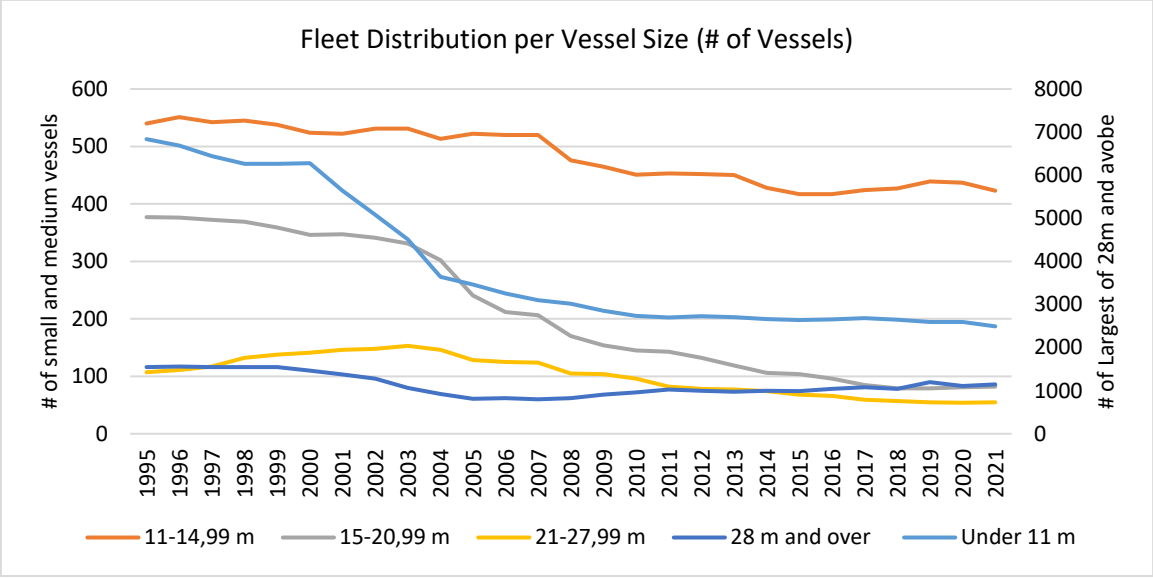


Figure 7 Fleet Size Decrease Since 1971 - # of Vessels per Size (Source: Fiskeridirektoratet, nd)

Fish stocks in the Norwegian North Sea, of all commercial species combined, peaked in 2004 and from 2004 to 2022, the stocks declined by 11%, as illustrated in Figure 8.

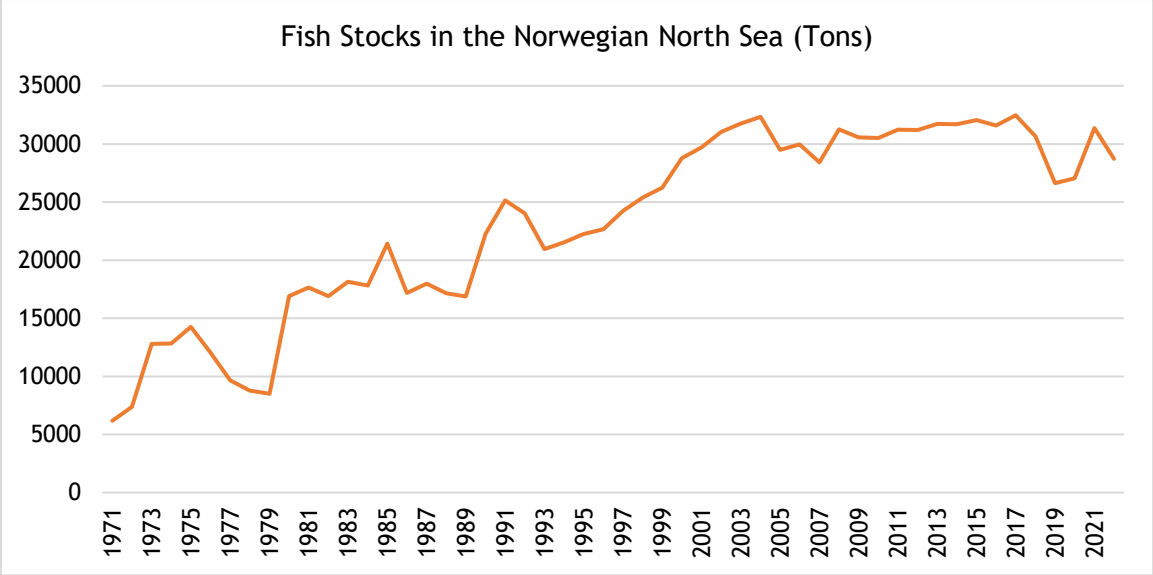


Figure 8 Fish Stocks of Norwegian Commercial Species in the North Sea (Source: Fiskeridirektoratet, nd)

While the total catch is trending down, the catch per fisher is increasing, partially explained by the decrease in fishers, as shown in Figure 9.

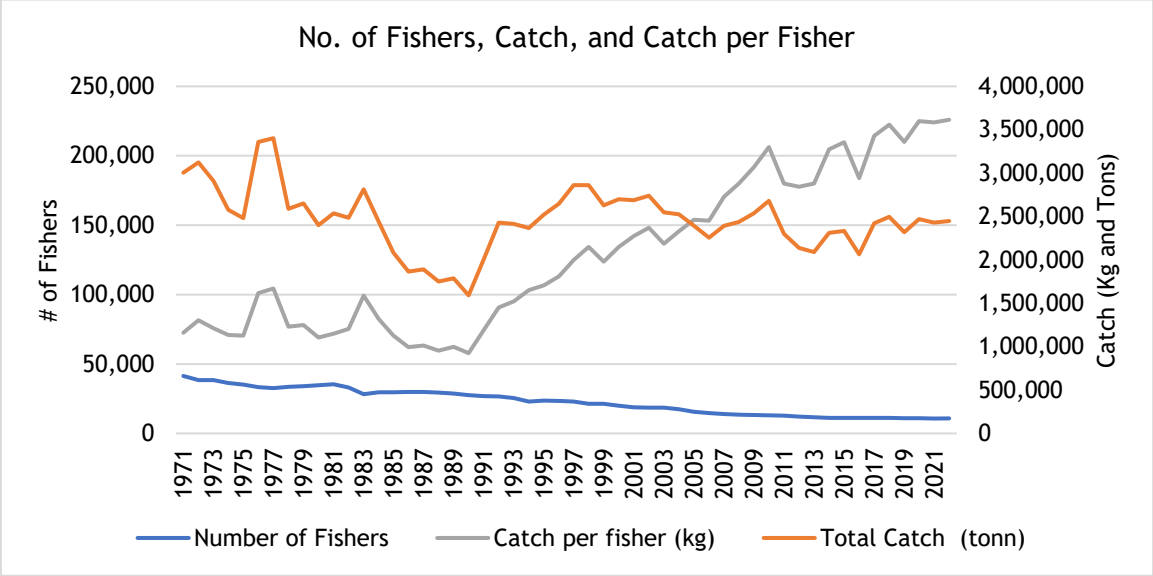


Figure 9 No. of Fishers, Total Catch, and Catch per Fisher (Source: Fiskeridirektoratet, nd)

Cod is the main commercial species for small firms. The Cod stocks show a significant decline since 1946; in the last decade alone, they dropped by 49%. This decline has driven the Norwegian Government to establish controls, and today's fishing industry is heavily regulated.

There are four primary laws regulating the fishing industry (Fiskedirektoratet, nd):

- **The Marine Resources Act;** act on the management of game-producing marine resources.

- The **Participation Act;** law on the right to participate in fishing and trapping.
- **Act relating to Norway's Economic Zone**.
- **Coast Guard Act**.

The following regulations support these acts:

- Harvesting Regulations.
- Participant Regulations.
- Licensing Regulations.
- Acquisition Permit Regulations.
- Landing Regulations.

These regulations evolved as follows (Strand, 2021):

- 1951: Protection of the coastal species starts by extending the fisheries limit from 4 nautical miles to 12 nautical miles. This regulation kept big trawlers from coming too close to shore for their catch.
- 1976: The first quotas were for trawlers to protect the cod, which started to become threatened.
- 1977: The Norwegian government created an economic zone of 200 nautical miles to keep away international fishing vessels. Controls started to take place to enforce this act.
- 1990: Fishers start to get quotas to fish. These quotas are transferable and could be sold to other fishers. This transferable quota system promoted quota trading.
- 1999: The Participation Act indicates who can participate in commercial fishing.
- 2009: The Marine Resources Act indicates that fishing quotas have a longevity of 25 years.

There are two types of quotas: **closed**, in which firms buy rights to receive an allocation for the year; **open**, which is free; and firms receive whatever is left after the distribution to the firms in the closed quota system. Most small firms operate in an open quota system, which means they are not guaranteed a fixed amount. This uncertainty may also explain the displacement of small firms from the market.

In summary, fish consumption is increasing, fish stocks are declining, and small firms are displaced from the industry. The contradictions in these data offer the foundation of the research.

The research revolves around the challenge of growing a small firm while the resources needed to do so (e.g., fish) are either in decline or heavily regulated, and the problem can be summarised as follows:

- The seafood industry is still growing, and fish as a protein is becoming more popular due to its positive effect on health (Evans, 2017), representing an opportunity for new entrants.
- But small firms are exiting the market.

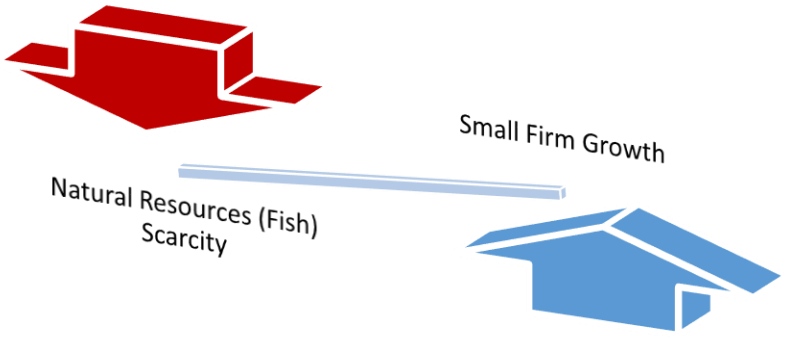


Figure 10 Research Problem Illustration

Despite much literature of small firm implying that small firm owners do not wish to grow their firms, this research shows that this contradicts with their financial goals and needs and the lack of willingness to grow is an inaccurate assumption, rather, the problem/ challenge leans towards a lack of knowledge and capabilities to do so, which is what this research is aiming to unlock, leading to the central question of this research:

How can small firms grow in an industry where the natural resource is in decline?

The research covers two fields: firm growth and resource scarcity. These two literature streams are treated separately, and their intersection has limited research. The study of firm growth in the primary sector has failed to evaluate the effects of natural resource scarcity (i.e., fish stocks). Previous studies did not consider this scarcity and assumed an indefinite industry growth, which in the fishing industry represents a contradiction (Samuels, 1965; Rubin, 1973; Audretsch et al., 2014; Wang, 2020). This intersection is an area of interest since it could offer an additional explanation to the challenges of small firm growth in the fishing industry, offering an opportunity to continue to add to this body of knowledge and supplement works from previous authors like Maurstad (2000), Merrien et al. (2008), Morgan (2013), Morgan (2016), and Nichols (2020).

1.3.- Research Aim and Objectives

The research explores and evaluates factors shaping small firms' growth in Northern Norway's fishing industry. The following objectives have been set to achieve the aim of the research:

- Evaluate how internal factors to the firms, such as innovation, risk management, organizational structure, and finances, impact firm growth.

- Evaluate how environmental or external factors such as natural resource scarcity, regulations, and environmental sustainability impact the firm's growth.
- Evaluate how the primary decision-maker preferences and decisions impact firm growth.
- Empirically explore how small firms in Northern Norway manage their fishing businesses to maintain sustainable profits and growth.

1.4.- Key Assumptions

The research is based on four assumptions:

- The demand for fish will continue to increase, as observed in historical trends.
- The quota system will continue to be in place to control the quantities of fish caught.
- Technology development will continue to play a role in firms' operations.
- The focus on environmental sustainability will continue to increase.

1.5.- Structure of this Thesis

This thesis consists of seven chapters.

- **Chapter One** introduces the research; it presents the research's rationale and sets the scene for the subsequent chapters. This chapter introduces the research problem and objectives and describes the context, background information and critical assumptions.
- **Chapter Two** is the literature review and the theoretical basis of the research. This chapter discusses entrepreneurial and firm growth theories to gain an understanding of the current knowledge gaps. This chapter also discusses the theories of natural resource scarcity concerning firm growth.
- **Chapter Three** presents the research methodology, starting with the research approach, including the philosophy and rationale for adopting critical realism, followed by the description of the research design and data collection and interpretation methods, and concluding with the research limitations and ethical considerations.
- **Chapter Four** describes the quantitative data analysis, which includes a macro analysis of the fishing industry in Norway, followed by a detailed analysis of firms in the regions selected for the research, enabling the selection of the sample for the semi-structured interviews.
- **Chapter Five** analyses the qualitative data from semi-structured interviews and professional trade publication articles. This chapter includes the interpretation of the data, which followed a thematic analysis methodology.

- **Chapter Six** discusses the data and relates the findings to the theories reviewed during the research, presenting the areas where existing theories are supported and challenged or where new elements are emerging to develop new theoretical frameworks.
- **Chapter Seven** concludes the research, highlighting the contribution to knowledge and practice. A business model for small firms in the fishing industry is proposed in this chapter. This chapter also outlines future research opportunities.

2.- Chapter Two: Literature Review

The literature review aims to provide context and theoretical framework by critically reviewing the literature in the designated areas of the research question: small firms, growth, and natural resources (Saunders et al., 2016). The purpose was to review debates on how small firms may grow in the fishing industry, which is highly regulated and where the demand for fish is increasing while the natural resources are diminishing.

This chapter is structured as follows: the first section describes the scope of the literature review and the selection of the lenses for the research; the second section consists of a narrative on small firm growth and the determining factors of firm growth; and the third section is a summary of the knowledge gaps identified in the review.

2.1.- Field of this Research

The research of firm growth requires a multidisciplinary approach with different theoretical perspectives (Davidsson and Wiklund, 2001, 2006; Almarri and Gardiner, 2014; Burvill et al., 2018). There is no single theory of a firm, but rather a mainstream of economic, social, and management theories describing transactional concepts, managerial behaviours, and strategic approaches (Foss and Klein, 2012; Walker, 2021). Small businesses account for most enterprises in developed and underdeveloped economies and have attracted substantial attention among researchers (Keats and Bracker, 1988; Walker, 2021; Vaz, 2021). Small firm literature is closely related to entrepreneurship, and previous authors relate firm growth to the entrepreneurship and strategic management literature, placing the entrepreneur as a protagonist in the growth process (Keats and Bracker, 1988; Storey, 2011; Tunberg and Anderson, 2020; Vaz, 2021; Hafiz et al., 2022). Therefore, the research is set in the field of entrepreneurship as the primary discipline, going deeper into the small firm literature as a sub-discipline to evaluate the phenomenon of small firm growth in the context of the fishing industry to establish a clear scope, as shown in Figure 11.

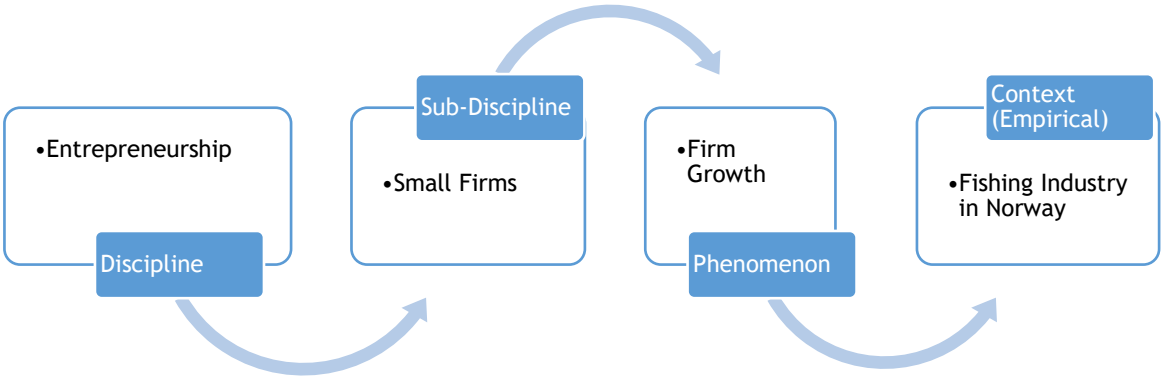


Figure 11 Field of this Research in the Literature (Adapted from: Tunberg, 2017)

2.2.- Literature Review – Designated Areas and Lenses for the Research

The literature review revolved around the research question, seeking to evaluate the discussions and theories governing small firm growth in the context of the fishing industry.

The literature review process started by looking at the elements of the research question, highlighted in different colours below and represented in the diagram of Figure 12. This research focuses on the intersection of these elements, shown at the centre of the chart.

How can small firms grow in an industry where the natural resource is in decline?

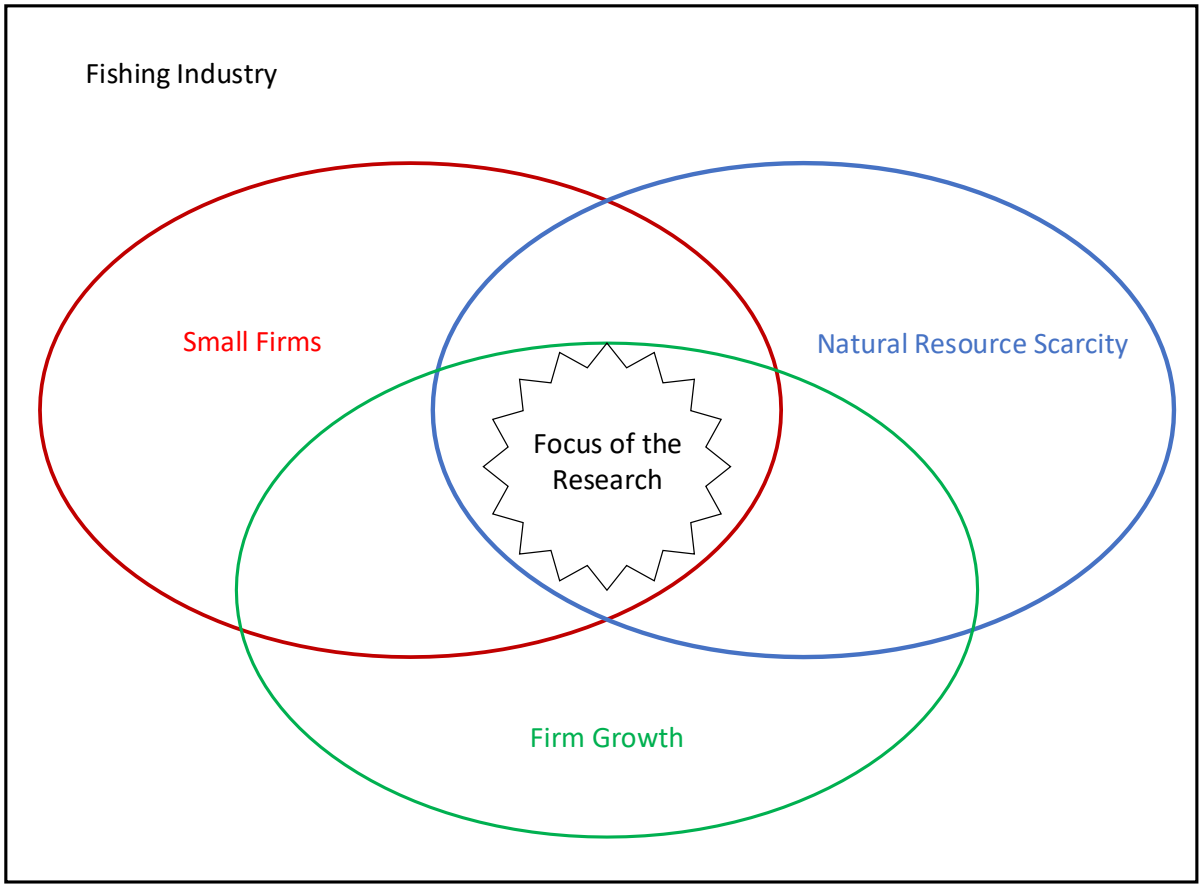


Figure 12 Literature Review Designated Areas Based on the Research Question

Searching for literature on these elements independently yielded many hits, as shown below.

Table II Results of Searches Using Keywords of the Research Question Independently

Search Keywords	Number of Hits (Using Google Scholar Search Engine) [2]
Small Firms	1,320,000
Grow(th)	8,120,000
Fishing Industry	3,760,000
Natural Resource(s) in Decline (Natural Resource(s) Scarcity)	1,630,000

2 Last search conducted on Aug 23, 2023 to draw the stats shown in the table.

These keywords were combined to attain more relevant results related to the research question; the table below shows some examples of the searches conducted.

Table III Results of Searches Using Keywords of the Research Question Combined

Keyword 1	Keyword 2	Keyword 3	Keyword 4	Number of Hits (Using Google Scholar Search Engine)
Small Firms	Grow(th)			1,010,000
Small Firms	Grow(th)	Fishing Industry		1,780
Small Firms	Grow(th)		Natural Resource Scarcity	131

In total, more than 188 searches were conducted using the combination of keywords related to the elements of the research question, using search engines such as EbscoDiscovery, Google Scholar, IEEE Xplore, Wiley Online Library, and JSTOR. The initial output of this exercise was the discovery that studies conducted on the intersection of small firms, growth, and natural resource scarcity are limited, supporting this research and its value proposition. The distribution of theories encountered in the literature is shown in Figure 13.


Theories/Frameworks Encountered in the Literature Reviewed
Motivation Entrepreneur 10.10%
Success Factors 9.33%
Risk 6.04%
Common Property Theory 6.04%
Firm Characteristics 5.71%
Gibrat's law 5.05%
Finance & Economics 4.28%
Resource Based View 4.17%
Innovation 2.96%
Profit 2.96%
Natural resource Scarcity 2.85%
Penrose 2.74%
Aquaculture 2.31%
Supply Chain Management 2.20%
Regulations 1.65%
SMEs 1.54%
Environment 1.43%
Strategy 1.32%
Financial 1.10%
Diffusion of Innovation 1.10%
Entrepreneurial... 0.99%
Diversification 0.99%
Creative Disruption 0.88%
Sustainability 0.88%
Luxury & Niche 0.77%
Marketing and... 0.77%
Blue Growth 0.77%
Real Options Theory 0.66%
Entrepreneurship... 0.66%
Human Systems 0.66%
Culture 0.66%
Competitive Equilibrium 0.55%
Organizational... 0.55%
Location 0.44%
Exit Decision 0.44%
Multiple Job Holding 0.44%
Academic... 0.44%
Sustainable development 0.44%
Resource Dependence... 0.44%
Self-employment 0.44%
Solo Self-Employment 0.44%
Job creation 0.33%
Internet of Things 0.33%
Change 0.33%
Values 0.33%
Algae Production 0.33%
Absorptive capacity 0.33%
Occupational Choice 0.33%
Structural Change 0.33%
Serial Entrepreneurship 0.33%
Access to finance 0.33%
Liquidity Constraints 0.22%
Limits of Growth 0.22%
Law of diminishing returns 0.22%
Weiss 0.22%
Knowledge 0.22%
Theory of the firm 0.22%
X-Efficiency Theory 0.22%
Psychology 0.22%
Statistics 0.22%
Pluriactivity 0.22%
Entrepreneurial Network 0.22%
Finance Literacy 0.22%

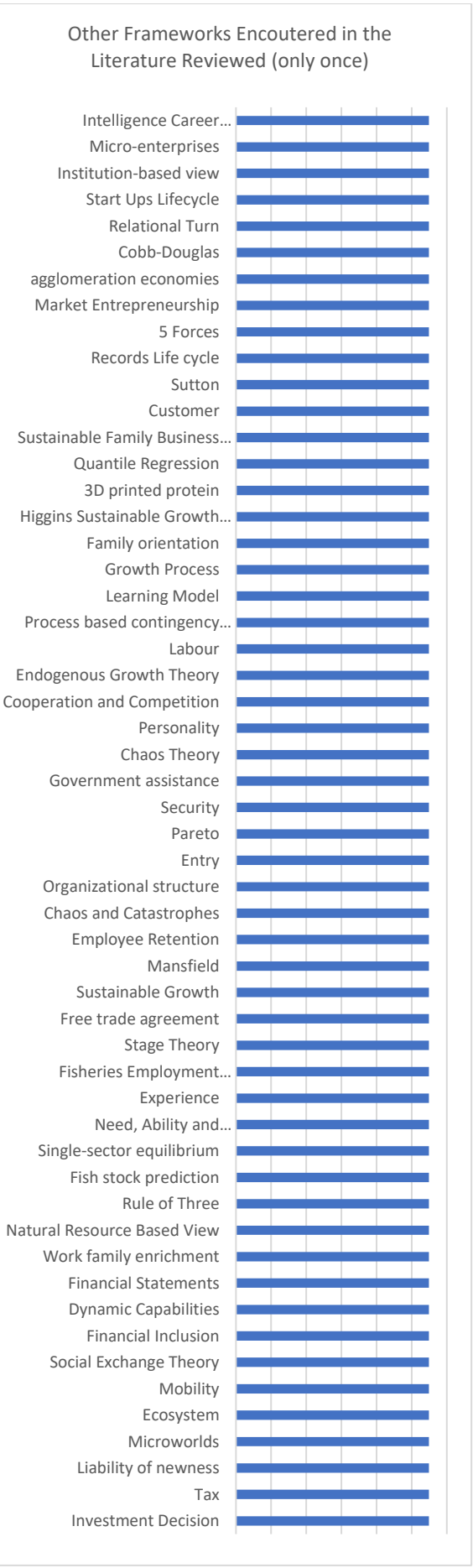

Other Frameworks Encoutered in the Literature Reviewed (only once)
Intelligence Career...
Micro-enterprises
Institution-based view
Start Ups Lifecycle
Relational Turn
Cobb-Douglas
agglomeration economies
Market Entrepreneurship
5 Forces
Records Life cycle
Sutton
Customer
Sustainable Family Business...
Quantile Regression
3D printed protein
Higgins Sustainable Growth...
Family orientation
Growth Process
Learning Model
Process based contingency...
Labour
Endogenous Growth Theory
Cooperation and Competition
Personality
Chaos Theory
Government assistance
Security
Pareto
Entry
Organizational structure
Chaos and Catastrophes
Employee Retention
Mansfield
Sustainable Growth
Free trade agreement
Stage Theory
Fisheries Employment...
Experience
Need, Ability and...
Single-sector equilibrium
Fish stock prediction
Rule of Three
Natural Resource Based View
Work family enrichment
Financial Statements
Dynamic Capabilities
Financial Inclusion
Social Exchange Theory
Mobility
Ecosystem
Microworlds
Liability of newness
Tax
Investment Decision

Figure 13 Distribution of Theories Encountered in the Literature Reviewed

The literature review revealed that there is a large spread of theories related to the topic of this research. Other studies have used the theories most adopted as a criterion for selecting the theoretical lens (Miller, 2015). This approach would have led to choosing one of the motivational frameworks, limiting the ability to answer the research question. Additional criteria were required to produce a sound rationale for selecting the research lens. These theories were grouped to start mapping and critiquing them in the context of the research question. The first group of theories relates to the fishing industry; this group offers the research background. They focus on fisheries governance and management at a macro level. The discussions revolve around regulations and how to set and manage quotas. They do not focus on firm performance. Choosing a framework from this group as a research lens was inappropriate since it did not support answering the research question. These theories were used as part of the research context.

The second group of theories relates to natural resource scarcity, which focuses on the biological field and protecting species and the environment. Two theories stood out from this group. The first is the Common Property Resource theory established by Gordon (1954), which governs many discussions in managing natural resources and the economy in the primary sector. The relevancy of this theory to the research question is the link made by Gordon between scarcity and how controls to avoid depletion impact the economics of firms in the primary sector. The second framework relates to the relationship between pricing and natural resource scarcity, as Hotelling proposed (1931). In isolation, these theories do not support answering the research question, but paired with other business management and economic theories, they provide valuable insights.

The third group of theories revolve around small firms and entrepreneurship. Several theories provide a solid foundation for answering the research question in the research context, such as the theories related to multiple job holdings or hybrid entrepreneurship. This group relates to how entrepreneurs find alternative sources of income to address the challenge of erratic firm performance. Also, diversification frameworks offer a supporting explanation of how entrepreneurs tackle income challenges. The theory of cooperation and competition is another aspect of the literature that provides information to answer the research question. These frameworks offer essential reference to the research. The Resource-Based-View theory combines all these aspects and is also one of the most commonly referred to theories in the literature. Hence, it is deemed an appropriate lens for the explanatory approach of this research.

The fourth group of theories relates to firm growth, which is the core of the research. These frameworks support the central question of this research. Gibrat's (1931) work provides a high-level

insight into the problem of firm growth. His research is at a macro level, and some authors (e.g., Sutton, 1997; Coad, 2007) have used his law to describe and compare small and large firm performance, which has sidetracked the original message proposed by Gibrat. The relevancy of Gibrat's work in this research is the effects of random shocks in the economy, which represents the fluctuations and fall of fish stocks and is deemed relevant to answering the research question. Finally, the works of Penrose (1959) continue to dominate the literature on firm growth and the focus on how firms use their resources to grow (Tunberg, 2017). Using Gibrat's and Penrose's theories as lenses for this research enabled to elaborate an inclusive narrative that combines exploring and explaining how small firms can leverage their resources to grow despite the randomness of the natural resource availability in the fishing industry.

Table IV maps the theories identified for each designated research area or element of the research question. The classification shown in the table below is for illustration purposes to guide the discussions. It is not intended to be a definite classification of such theories.

Table IV Theories Mapped to the Elements of the Research Question

Designated Area	Theoretical underpinning
Fishing Industry	*Quota Management* (Chang, 1971; Anderson, 1976; Townsend, 1985; Salz, 1986; Charles, 1988; Crilly and Esteban, 2013; Maurstad, 2000; Jentoft and Chuenpagdee, 2015; Hannesson, 2017; Bertheussen and Vassdal, 2019)
Natural Resource Scarcity	*Value Belief Norm* (Stern, 2000) *Marine Spatial Planning* (Douvere, 2008) *Blue Growth* (Douvere and Ehler, 2009; Soma et al., 2018) *Natural Resource-Based-View* (Hart, 1995) *Natural Resource Scarcity* (Malthus, 1798; Mill, 1848; Ricardo, 1821; Huxley, 1883; Baranov, 1926; Barnett and Morse, 1963; Stillman, 1975; Pfeffer and Salancik, 1978; Smith and Krutilla, 1979; Coppola and Pascoe, 1998; Daly and Townsend, 1993; Smulders, 2005; Hannesson et al., 2010; Kalaitzi et al., 2018) ***Common Property Resource*** (Gordon, 1954; McCay and Acheson, 1987; Brox, 1990) ***Price per Unit*** (Hotelling, 1931; Salz, 1986; Jeffs and Liyanage, 2005; Jiang, 2010) *Environmental Sustainability* (Schwartz, 1977, 1992, 1994; Ghemawat and Nalebuff, 1990; Stern et al., 1999; Stern, 2000; Bansal and Roth, 2000; Douvere and Ehler, 2009; Vijfvinkel et al., 2011; Perera et al., 2013; Saviolidis et al., 2020) Resource Dependence Theory (Pfeffer and Salancik, 1978)
Small Firms	*Economy /Profit /Risk* (Cantillon, 1755; Smith, 1776, Ricardo, 1817, 1821; Mill, 1848; Clark, 1892; Hawley 1893; Knight, 1921; Grinnell, 1924; Pålsson, 1996; Schulz, 2018 Multiple jobs/ Decreasing Marginal Returns: (Parker, 1996, 1997; Lévesque and MacCrimmon, 1998; Kimmel and Smith, 2001; Raffiee and Feng, 2014) *Innovation* (Tarde, 1892; Tarde, 1902; Rogers, 1962; Schumpeter, 1934, 1939, 1946, 1947; Liston and Smith, 1974; Utterback and Abernathy, 1975; Stephenson, 1981; Agnello, 1983; Wessells and Anderson, 1992; Homer-Dixon, 1995; Barbier, 1999; Kirkley et al., 2004; Finstad, 2004; Freeman and Engel, 2007; Eggert and Tveterås, 2013; Belton and Thilsted, 2014; Alvemar, 2015) *Role Strain* (Goode, 1960; Campion et al., 2020) *Need for Achievement* (McClelland, 1961).

Designated Area	Theoretical underpinning
	Risk Propensity (Atkinson, 1958; Brockhaus, 1980; Shane et al., 2003) *Occupational Choice* (Johnson, 1978; Jovanovic, 1979; Jovanovic, 1982; Miller, 1984; Evans and Jovanovic, 1989; Fraser and Greene, 2006) *Chaos Theory* (Gleick, 1987; Churchill and Bygrave, 1989, 1990; Bygrave, 2007) *Knowledge Spillover* (Acs et al., 2009; Frederiksen et al., 2016) *Organizational Identity* (Memili et al., 2010). *Jacks of All Trades* (Lazear, 2005) ***Multiple Job Holding/ Hybrid Entrepreneurship*** (Perrella, 1970; Weiss, 1999; Folta et al., 2010) *Entrepreneur Role in Markets* (Kirzner, 1973) *Entrepreneurial Orientation* (Lumpkin and Dess, 1996; Wiklund and Shepherd, 2003; Rauch et al., 2009) *Workforce Diversification* (Sequeria et al., 2018) *Liquidity Constraints* (Fazzazi et al., 1987; Banerjee and Newman, 1993; Holtz-Eakin et al., 1994; Hellmann, 2007; Mateev and Anastasov, 2010) *Intergenerational Links* (Dunn and Holtz-Eakin, 2000) *Competitive Equilibrium* (Kihlstrom and Laffont, 1979) *Macro-Economics* (Kuznets, 1973; Everett and Watson, 1998; Pasinetti, 1993) *Orienteering* (Atherton et al., 2016; Hannon and Atherton, 1998). ***Resource-Based-View*** (Chamberlin, 1933, Penrose, 1959; Galbreath, 2005; Miller, 2015) *Rate of Utility* (Shishko and Rostker, 1976) X-*Efficiency* (Leibenstein, 1966, 1978) *Entrepreneurs Vs Small Business Owners* (Carland and Carland, 2000; Carland et al., 1984) *Entrepreneurship Opportunities* (Shane and Venkataraman, 2000) *Real Option Theories / Prospect Theory* (Kahneman and Tversky, 1979; Wennberg et al., 2007) *Five Forces* (Porter, 1980) *Organisations as fonts for entrepreneurship* (Sørensen and Fassiotto, 2011) ***Competition and Cooperation*** (Deutsch, 1949; Harrigan and Newman, 1990; Dyer and Singh, 1998; Jentoft et al., 1998) ***Diversification*** (Slee, 1987; Merrien et al., 2008; Aslesen, 1999; Førde, 2009; Lindkvist and Sánchez, 2008; Cortesi et al., 2009; Bertella, 2011; Choong, 2013; Yusuf, 2013; Al-Belushi et al., 2015; Morgan, 2016; Wilson et al., 2020) *Niche* (Grinnell, 1924; Gause, 1937; Volterra, 1926, 1928; Lokta, 1932; Garrett, 1960; Vandermeer, 1972; Henderson, 1983, 1989; Pocheville, 2015)
Firm Growth	***Firm Growth Macro-Economics*** (Gibrat, 1931; Hoselitz, 1952; Hopenhayn, 1992; Sutton, 1997) ***Firm Growth*** (Penrose, 1959; Hart, 2005) *Regulations* (Bailey and Jentoft, 1990; High; 1991; Arbuckle, 2000; Maurstad, 2000; González-López, 2011; Tucci and Bogers, 2011; Sanday, 2015; van Helmond et al., 2016; Hannesson et al., 2010; Lee et al., 2020) *Supply Chain* (Rosenberg, 1973; Manuj and Mentzer, 2008; Chopra and Sodhi, 2004) *Scarcity and Strategy* (Bell et al., 2012) *Knowledge* (Jentoft et al., 1998; Dunn and Holtz-Eakin, 2000; Acs et al., 2009; Frederiksen et al., 2016; Matthes, 2019)

The fishing industry depends on natural resources, also referred to in the literature as natural capital (Ely, 1893; Gray, 1914; Ise, 1925; Barbier, 2021). These resources may be depleted if consumption exceeds reproduction rates, leading to scarcity (Barnett and Morse, 1963; Barbier, 2021). Gordon's (1954) Common Property Resource theory relates to this concept. It describes, in the biology field, how efforts to extract a natural resource do not always lead to higher rent since the resource declines over time, which seems counterintuitive if firms seek to increase sales (Coppola and Pascoe, 1998). It

is worth noting that most small firm growth empirical studies have taken samples from the manufacturing industry, with limited scope in the fishing industry (Hossain et al., 2016). Some studies have examined the problem of natural resources and environmental sustainability (Hart, 1997; Saviolidis et al., 2020; Yan et al., 2022). The research on firm growth in the primary sector has failed to evaluate the effects of natural resource scarcity (i.e., fish stocks). Previous studies did not consider this scarcity and assumed an indefinite industry growth, which in the fishing industry represents a contradiction (Samuels, 1965; Rubin, 1973; Audretsch et al., 2014; Wang, 2020). These two literature streams are treated separately, with limited research on their intersection. The existing literature has yet to establish a relationship between the theories of firm growth and the challenges of natural resource scarcity, which opens an opportunity to contribute to knowledge.

The literature review touches on several theories listed in Table IV, keeping the discussion focused on the research question. The review is structured around determinant factors of firm growth, which is in line with Penrose's (1959) growth of the firm theory (Resource-Based-View).

2.3.- Literature Review Narratives - Determinant Factors of Firm Growth

Theories of growth proposed in the last millennium have enriched the entrepreneurship literature, and the topic continues to offer opportunities to add to knowledge (Hafiz et al., 2022) due to variations in firm growth between firms and factors that enable growth (Delmar et al., 2003; Dobbs et al., 2007). The practical objective of this research is to identify factors that could lead to the development of a business model small firms in the fishing industry could adopt to grow, so the literature review has been arranged to analyse in more detail the determinants of firm growth discussed in previous studies. Determinants of company performance can be sorted into two major streams in the literature: the first one is external factors such as market conditions, and the second line of research is behavioural and internal factors of the firms (Hansen and Wernerfelt, 1989; Krasniqi, 2012). Most of the available empirical studies find correlations between inputs (Determinants of growth) and outputs (Growth), and there are still knowledge gaps regarding the direct and indirect nature of such factors, as well as the level of influence on firm growth (Vaz, 2021).

Several authors define growth as a change in quantity over time of specific business indicators such as sales, number of employees, assets, and market share. Revenues, or sales, are among the most predominant ones in the literature (Davidsson et al., 2010; Hossain et al., 2016; Tunberg, 2017).

The research on firm growth categorizes determinant factors in different ways. Still, these factors can generally be grouped as internal to the firm, external to the firm, and related to the characteristics of the entrepreneur or firm owner/manager (Hossain et al., 2016; Vaz, 2021), as shown in Table V.

Table V Determinants of Firm Growth Discussed in the Literature (Adapted from: Vaz, 2021)

Firm Factors	Environmental Factors	Firm Owner Characteristics
• **Innovation** • **Risk Management** • **Firm characteristics (Size, age, # of sites, organizational structure, HR management, resources, ownership structure, etc.)** • **Finances and liquidity (Financial performance, capital investment, financial institutions)** • **Strategy, Competition, and Niche**	• Natural resource scarcity and environmental determinants • Regulations and government policies	• Proprietary ownership • Technical knowledge • Personality traits • Need for achievement • Risk-taking propensity • Locus of control • Self-efficacy • Extraversion • Growth Motivation • Individual competencies • Personal background • Dynamic capability • Entrepreneurial growth orientation • Woman and power source • Optimism • Gender • Race

Another way to look at the subject of small firm growth is to evaluate factors that lead to small business failure (Storey, 1994; Mayr et al., 2021), where a similar list of factors to the ones listed above are debated, supporting empirical evidence that such factors contributed to the failure of firms, listed in Table VI.

Table VI Factors that Influence the Probability of Failure of a Business (Adapted from: Storey, 1994; Mayr et al., 2021)

Firm Factors	Environmental Factors	Firm Owner Characteristics
• **Size** • **Age** • **Ownership**	• Sector • Macroeconomic conditions	• People/management • Gender • Education

Firm Factors	Environmental Factors	Firm Owner Characteristics
• **Past performance** • **Firm type**	• Location • Businesses in receipt of state subsidies	• Experience • And it was ever so

These two tables illustrate the complexity of the topic and some factors affecting the fishing ecosystem, which could be categorized as perturbations or stressors and impact the performance of firms in the fishing industry (Himes-Cornell and Hoelting, 2015). The next section of the literature review goes into more detail on each one of these fields.

2.4.- Firm Factors

Penrose (1959) defines a firm as a collection of human and physical resources and proposes that a firm aims to make long-term profits and growth. Firms may achieve this goal depending on how well they manage such resources (Penrose, 1959). The Resource-Based-View theory proposed by Barney (1991) indicates that internal resources will provide a competitive advantage to firms based on their value, rareness, imitability, and substitutability. More recent research has expanded on this to evaluate the characteristics of these internal resources and the process of acquiring and managing them (Barney et al., 2011). While these concepts continue to support mainstream theories proposed in the 1700s and 1800s that present a directly proportional relationship between production and costs with growth (Sirmon et al., 2007), there is also a trend indicating that internal resources are dynamic and firms must adapt to changes in the environment (Sirmon et al., 2007; Thomas and Douglas, 2021), which may include a mechanistic approach, such as improving planning and production efficiency or embracing innovation as the prime drive to adapt (Thomas and Douglas, 2021).

2.4.1.- Innovation and Firm Growth in the Fishing Industry

Innovation has played an essential role in the success of firms in the primary sector (Abernathy and Clark, 1985; Reid, 1998; Quimba et al., 2020). Innovation in this sector takes a different pattern than other industries; it is not only related to developing high-tech solutions, but innovative ideas also relate to how things are done (Christensen et al., 2011). Innovation presents viable solutions to contradictions, forcing actors to evaluate the principles rather than the symptoms (Mann, 2019). This section aims to assess the effects of innovation in the fishing industry and debate how it may address the contradiction of growing a firm while exploiting a natural resource in decline.

Innovation is a change agent, a driver of growth, and a source of competitive advantage (Penrose, 1959; Avolio et al., 2014; Sgroi, 2023). Innovation in the fishing industry has started to gain attention due to the impact on the development of marine fisheries (Li et al., 2022). Innovation is a technological change or development of modern technologies (Myers and Marquis, 1969), and the fishing industry is not perceived as high-tech (Colman et al., 2020). However, the concept has evolved, and it is no longer limited to the development of innovative technologies but includes a spectrum of ideas to improve the workings of the enterprise to gain a competitive advantage (Keeley et al., 2013).

One innovative area in the fishing industry includes the diversification of products (González-López, 2018; Yusuf and Suyanto, 2019). For instance, the use of minced fish in sausage products as a niche and potential source of income for its economic potential (Agnello, 1983) or the shift in consumer behaviours to accept innovative fish products (Stancu et al., 2022). Creative efforts shift to developing value-adding products and promoting them in different markets, not necessarily to increase the quantities sold but to increase the value per unit of effort (Jeffs and Liyanage, 2005). The fish supply variability and unpredictability force fisheries to innovate and develop a new range of products. The Norwegian government recognizes the importance of innovation and supports research and development (Aslesen, 1999). Numerous venues to sponsor innovation are available in Norway. Among these are the Fishing and Aquaculture Industry Research Fund, Innovation Norway Bank, the Norwegian Federation of Fish and Aquaculture, and the Norwegian Seafood Export Council. However, new product innovation among fishing processors has been limited (Lindkvist and Sánchez, 2008).

Diversification is not limited to a new product or a niche. Expanding sources of income has also been a common practice in the primary sector (Slee, 1987; Weiss, 1999). Fisheries are forced to move away from their core fishing business to mix it with other activities, such as tourism, to maintain their revenue stream (Cunningham, 1994; Merrien et al., 2008; Førde, 2009; Morgan, 2013; Morgan, 2016).

Recent innovative developments include using marine products in other fields, such as medicine and biotechnology, enhancing the value added to fisheries, and diversifying options for growth (Al-Belushi et al., 2015). Choong (2013) presents fish scales as raw material to produce collagen and other products for clinical applications. The concept of the blue economy is increasing, and innovation to raise the value of waste sea products such as crab shells into valuable products like animal feed, herbal substitutes, and spices, to mention a few, is also gaining attention in the fishing industry (Yusuf, 2013). The latest trend to address the crisis of food availability is the production of synthetic protein using 3D printing technology. The market potential is vast, but technology is still in an early stage, as is the public's readiness (Wilson et al., 2020).

The innovative solutions presented above seem to work well at a macro level. The theory of creative destruction is evident in the creative cycles in the fishing industry (Colman et al., 2020). Innovation is happening at a macro level, but for small firms, many solutions are out of reach (Thurner and Zaichenko, 2015; Colman et al., 2020). A good example is aquaculture, which requires significant capital investments and governmental permits, putting small firms in a disadvantageous position. Existing financial models are not designed to address this problem and may call for new innovative financing methodologies for small and medium enterprises (Kleih et al., 2013). The theory of diffusion of innovation, which originated with Tarde (1890, 1902) and was expanded by Rogers (1962), is also observed in the fishing industry. Innovation is a factor in adaptation to overcome the effects of creative destruction (Sogner, 2009). Still, not all actors embrace it in the same way, and despite best fishing practices being openly available, the total factor productivity growth is different in the fishing industry of countries with similar characteristics, such as Norway and Iceland (Eggert and Tveterås, 2013).

Another example is fish processing ashore. Most small firms own one or two fishing vessels, and the expansion to build processing capabilities is also capital-intensive and prohibitive regarding regulations. The primary sector must innovate and introduce new technologies to feed the growing population. Unfortunately, this is accessible mainly to large producers, and small firms may not have the financial means to adopt or develop new ideas (Thurner and Zaichenko, 2015).

The table below summarises the innovations in the fishing industry since 1960. The architectural and niche innovations tend to be destructive, while the regular and revolutionary ones are not (Abernathy and Clark, 1985).

Table VII Summary of Innovations in the Fishing Industry using Abernathy and Clark (1985) Classification

Architectural	Niche	Regular	Revolutionary
• **Vessel Technology – Factory Trawlers** • **Aquaculture**	• Frozen Fish Fillet • Fish Products as Food • Fish Products for Other Applications	• Refrigeration and Preservation Techniques • Food Processing Optimizations	• Quota Management • Financial Structure for Small Firms • Diversification of Activities

Architectural	Niche	Regular	Revolutionary
	• 3D Printed Fish		(e.g. tourism, etc.)

Innovation does not always come with a positive outcome; if done in isolation from regional socioeconomics and cultural aspects, it may lead to firms failing (Alexander, 1975). His point is different from Schumpeter's creative destruction. The innovation is beneficial, but how it is handled, particularly in small firms, represents an additional risk. Innovation has yielded different results, and depending on the context and variables selected in studies, conclusions may continue to differ (Downs and Mohr, 1976; Vaona and Pianta, 2008; Guarascio and Tamagni, 2019).

The underlying assumption that innovative ideas will solve similar problems is not always accurate, and the diffusion of innovations has yielded different outcomes (Acheson and Reidman, 1982). For example, Alexander's (1975) study of artisanal fisheries in Sri Lanka shows the failure of mechanizing the small fishing fleet due to the industry's lack of local knowledge and insights. Another research by Stephenson (1981) on the Oregon trawling fleet supports the proposal that innovation success depends on regional characteristics. Still, his output differs from Alexander's (1975), who concludes that upgrading the fleets led to success for many fishers through an apparent diffusion of innovation and local governance. Acheson and Reidman's (1982) study on the diffusion of innovation in the fishing industry in New England in the 1970s concludes that such diffusion is highly differential between fishers and innovations are adopted to solve distinct problems, partially supporting the viewpoint of Downs and Mohr (1976). Their study is extended by Levine and McCay (1987), who conclude that fishers' expectations play a role in adopting modern technologies, indicating that uncertainty of future results leads to exploring innovations[3].

Abernathy and Clark (1985) propose a model composed of four dimensions[4] that may explain the differences observed; not all innovations are destructive nor revolutionary, and many innovative ideas preserve current systems and engrain existing competence. In summary, the diffusion of creative ideas is closely related to the structure of the fishery governance, in addition to individuals' ambitions, and its success is linked to how it is deployed and adopted (Stephenson, 1981; Avolio et al., 2014; Vecchio et al., 2024).

3 Levine and McCay (1987) base their hypotheses on the works of Barth (1967) in which change is related to social behaviours.

4 Innovations can be placed in one of four quadrants, based on the disruption or conservation of existing knowledge, or the disruption or conservation of existing competence (Abernathy and Clark, 1985).

Another interesting aspect of innovation in the fishing industry is the collaboration between actors to solve challenges (Aslesen, 1999; Pavlovich and Akoorie, 2010). The ratio of consumption vs production in the fishing industry favours the fishers since the demand has been historically higher than the production, a trend that is expected to continue (OECD, nd). The demand-supply ratio offers an opportunity to work together since the needs of the group, for instance, quota management, setting fish prices, and so on, surpass the individual needs of the fishers (Colman et al., 2020). While this has not been openly debated, the underpinning theory governing the effect is the theory of Cooperation and Competition proposed by Deutsch (1949) and expanded by Harrigan and Newman (1990). Penrose (1959) and Richardson (2003) build on these concepts, presenting the importance of cooperative alliances as a strategy for growth, particularly between firms across the value chain. This concept of coopetition enables competitors to cooperate to achieve common goals (Yu et al., 2019), especially in the fishing industry, to ensure the sustainability of the food supply chain (Harun et al., 2022). Innovation barriers include costs, knowledge, market conditions and regulations (D'Este et al., 2008). A way to overcome such obstacles is to establish a cooperative framework where small players can benefit from making financial contributions to sponsor a group of innovators to produce solutions for the group rather than individual firms (Freel and Harrison, 2006; Fernández et al., 2009). There is a cultural implication that must be considered. The success of establishing cooperatives or community-based fisheries management systems depends on the industry's maturity (Yamamoto, 1995). The cooperative model seems to provide a viable solution to the fisheries crisis (Clark, 2006).

Fish consumption has increased since 1961, with the highest per capita in countries like Iceland, Norway, and Japan (Ritchie and Roser, 2019; FAO, 2022b). It is well known that product quality plays a vital role for consumers who may become more aware of the complex process of extracting and processing the fish (Mansfield, 2003). Innovations in the fishing industry include replacing natural products with imitations produced in labs, such as fake crab sticks. Mansfield (2003) presents this complexity in the framework of the Actor-Network-Theory, highlighting that innovations of this type must go along with an interpretation of the effects of the different elements in the supply chain. This complex environment supports Nieuwenhuis's (2002) standpoint about small firms relying on external knowledge to innovate. It also highlights the importance of understanding customers' expectations in innovation, as Wessells and Anderson (1992) highlighted. Despite this, there is little networking between firms and interaction with the scientific community in Norway's fishing industry, hindering innovation (Lindkvist and Sánchez, 2008).

Another aspect of systems innovation is the interaction between the innovators and the governments. Successful niche or new product entries depend on the regime's support and regulatory changes, where new regulations may promote innovative efforts (Lebel et al., 2010; Jakobsen and Aarset, 2010;

Vecchio et al., 2024). Similarly, technology has played a dual role in the fishing industry. New technological advances help firms cope with new challenges and increase production, leading to overproduction and forcing government intervention and cohesive action (Hannesson et al., 2010). Innovation in the fishing industry is part of a system where different stakeholders may have conflicting expectations, often presenting a dilemma, particularly the role of governments, both in reducing uncertainty and regulating the effects of innovation (González-López, 2011). Systems innovation in rural or coastal fishing areas is heavily influenced by the commitment to the local communities (Fløysand and Jakobsen, 2011).

Large firms benefit from economies of scale and internal capabilities, as mentioned above; small firms, on the other hand, must leverage their innovative efforts to differentiate (Morley, 2003). Another contradiction arises: small firms in the food production sector are not perceived as innovative (Morley, 2003) but must innovate to stay competitive and create niche markets. Small firms that focus their innovation efforts on marketing and sales are likelier to succeed and compete with large firms (Bhaskaran, 2006). The fishing industry has been quick to respond to changes and find innovations. Still, due to the strong institutionalism and social conditions that characterize this industry, companies have failed to read the signals from the markets and stalled in their production methods, resulting in losses in market share and customers (Lindkvist, 2010). In summary, small firms must gain knowledge of the external markets and strategies to focus their innovative efforts on increasing the likelihood of growth (Alvemar, 2015).

Finally, the fishing industry depends on natural resources, current population and economic growth could lead to a tipping point with adverse effects and hence, policies are required to manage this challenge (Sterner et al., 2019; Barbier, 2021). Companies have realised the value of addressing these environmental challenges and divert their activities to work towards a sustainable future (Hart, 2005; Gunningham, 2017). Hart (2005) relates sustainable entrepreneurship with firm growth. Firms may leverage the consumer's behaviour to develop new goods, like the buyers' response to environmentally friendly products. The public may support this if the end meets their individual needs. There is also an implication of knowledge, and consumers need to understand what the ecolabel means to trust the firms offering such products (Thøgersen et al., 2010). With the introduction of Blue Growth by the European Union in 2010, innovation towards sustainable products and production methodologies is increasing. Still, the challenge is changing social behaviours and sacrificing short-term goals to obtain long-term benefits (Soma et al., 2018).

In summary, while there are some differences in opinions on the impact of innovation, the general notion is that innovation is a driver of firm growth, and while mainstream theories like diffusion of

innovation and creative destruction are highly represented in the literature, innovation in the fishing industry drives the discussions towards other fields such as cooperation, entrepreneurial capabilities, government policies, and environmental sustainability.

2.4.2.- Risk Management and Firm Growth in the Fishing Industry

Companies seeking growth must manage risks (Penrose, 1959). Risk[5] management in the fishing industry is a vast topic since it covers multiple areas, including safety, community impact, and pollution (Sethi, 2010). The relevant aspects to the research question are the effects of natural resource scarcity on firm growth, such as stock depletion, costs, and risk of catch fluctuations.

The relationship between risk, entrepreneurship and profit was established by Cantillon (1755), Smith (1776), Ricardo (1821), Mill (1848), Clark (1886, 1892), Hawley (1893), and Knight (1921), among other pioneer economists. Risk has an impact on firm growth. Entrepreneurs constantly evaluate how their decisions affect outcomes (Johnson, 1978; Pfeiffer and Pohlmeier, 1992). When risks are too high or the relationship between return and investment is not favourable, firms may cease to expand (Penrose, 1959). Hence, firms need to manage risk, which can be done in different ways; one approach is to transfer it through insurance, and other approaches involve identifying mitigation to treat such risk (Smith, 1776). Another way to handle risk is through innovation; as an innovator, the entrepreneur manages risk by finding cheaper ways to produce the products, leading to higher profits (Schumpeter, 1939).

Hotelling (1931) describes the relationship between the scarcity of a natural resource and the price function, basing his rationale on the fundamentals of the economy presented by Smith (1776), where higher demand and lower supply drive prices up. However, Hotelling's hypothesis does not always hold due to factors like innovation that skew the relationship (Livernois, 2009), and price cannot be the sole mitigation measure, so other aspects must be considered. Technological developments have helped to increase the productivity of natural resources, improve production practices to reduce material waste, identify alternative sources, and explore and find more repositories of the resources (Rosenberg, 1973; Mok et al., 2020; Randall, 2021).

The complex phenomenon of the race to abolish poverty through capitalist systems and the environmental impact was first highlighted by Malthus (1798) and then retaken in the literature in the second part of the 1900s, probably because of technological development (Norgaard, 1975). The original apocalyptic standpoint is challenged since there are many other ways to mitigate the risk of

5 Risk can be evaluated from many angles, for the purpose of this research, the evaluation is the effect of risk on firm expansion/growth as described by Penrose (1959).

natural resource scarcity, such as technological developments and political solutions (Korhonen, 2018). Norgaard (1975) presents a model that considers social expectations concerning uncertainty and concludes that planning, which involves innovation, offers a better outcome to manage risk than learning from experience. This position of technological developments contradicts Hardin's (1968) conclusion that the solution to address scarcity is augmenting coercion and controls through regulations. The regulatory approach is an obvious solution to mitigate the risk of scarcity but does not address mitigating the risk to the firm of not growing or going out of business. The innovative approach should not only address the scarcity but also provide long-term solutions to the players, whose primary goal is to maximize profits in the short term at the expense of resource exhaustion (Stillman, 1975).

Natural resource scarcity may also impact innovative efforts (Barbier, 1999). Homer-Dixon (1995) describes the effect of ingenuity in addressing natural resource scarcity. While his economic growth predictions fell short[6], his argument of people's ingenuity to address the challenge seems accurate. However, scarcity pressures the economy and hence, actors may not have the means to innovate, such as low-income economies dependent on natural resources; therefore, the importance of planning and taking a proactive approach to the problem, which in some cases means sacrificing short term growth to obtain long term benefits (Homer-Dixon, 1995). This standpoint supports the model presented by Norgaard (1975).

The protection of the environment is discussed from many different perspectives. Environmentalists may represent a risk to the growth of firms. Psychologically, people have a moral duty to protect the environment, which may drive their behaviours; consumers may select eco-friendly products and sacrifice their way of life to be part of a more significant undertaking to save the Earth (Stern et al., 1999). Companies could leverage this as an opportunity to shift their approach to address the risk of pressure from environmentalists or simply change their behaviours to be part of the solution (Stern, 2000; Williams and Schaefer, 2013). Firms that embark on the ecological path gain competitive advantage, which can be achieved in a variety of ways, such as reducing energy and waste, developing new environmentally friendly products, and modifying production methods to minimise footprint, among others (Bansal and Roth, 2000; Perera et al., 2013). Some SMEs have embraced recycling policies and reduced pollution, yielding higher revenues and profits (Vijfvinkel et al., 2011). The caveat is that it is difficult to determine the financial benefits of efforts towards environmental sustainability, even for large corporations listed in the markets that produce regular sustainability reports (Castro

6 "THE EARTH'S CURRENT human population of 5.7 billion is growing by 1.6 percent a year. On a global average, real economic product per capita is also growing at 1.5 percent a year. These increases combine to boost the globe's total economic product by about 3 percent annually. Extrapolation therefore suggests that today's global product of US$25 trillion will exceed $50 trillion in today's dollars by 2020." (Homer-Dixon, 1995, p. 587). Current growth in 2021 exceeds $127 Trillion (Wikipedia, nd).

and Chousa, 2006), as well as the additional costs for small firms to tackle environmental concerns (Revell and Blackburn, 2007).

There are two schools of thought in the debate: one group supports the Malthusian prognosis of disaster, and the other group is more optimistic and believes scarcity can be tackled through exploration, substitution, pricing, and innovation (Neumayer, 2000). Both groups may be correct, but at a firm level, particularly small firms, some of the proposed solutions are out of reach. Small firms may not have the means or capabilities to address the environmental risk, and external financial aid like government subsidies may be necessary (Friedman and Miles, 2002). The type of industry also plays a role. For instance, the hospitality sector has benefited from an environmentally friendly business approach to reduce costs (Kassinis and Soteriou, 2003). There are still opportunities in the fishing industry to expand empirical research in substituting and exploiting different resources to overcome the Malthusian forecast of overfishing and extinction of natural resources (Finkbeiner et al., 2017).

There are different groups of firms in the fishing industry, and the approach to address risk may differ; some small firms have one or two small vessels and depend on their catch, which they handle to fish processors ashore; in this model, alternative solutions to add redundancy as proposed by Chopra and Sodhi (2004) is expensive, since it may require purchasing additional quota rights, which not always yield a favourable return on capital (Hannesson, 2017). The other group, which includes onshore fisheries, may expand their supply base and get alternative sources aligned with Chopra and Sodhi's proposal. Building flexibility in the supply chain system is also a way to mitigate disruption risks, but it comes at a cost (Manuj and Mentzer, 2008). Fisheries have taken a collective approach to managing challenges, and the prime focus has been pricing and quota management (Rees, 2005). Insurances are well-known mechanisms to transfer risk, and surprisingly, they have not been leveraged as mitigation measures in the fishing industry to address resource scarcity (Sethi, 2010). Yet, these approaches tend to benefit the bigger and more influential players.

Natural resource scarcity is often aggravated by factors such as geopolitics, regulations, and general market conditions, adding more uncertainty that firms must evaluate to determine the correct mitigation measures (Tucci and Bogers, 2011). Since it is difficult to predict these changes, in addition to flexibility, firms' capability to innovate in response to supply chain disruptions plays a vital role in achieving resilience and managing risks (Golgeci and Ponomarov, 2013)[7]. The cyclical effect has been evident in the fishing industry, and an equilibrium must be reached to reduce the risk of over-

7 Golgeci and Ponomarov (2013) built a simple model based on the dynamic's capability theory developed by Teece et al. (1997).

exploitation (Tapan and Gerhard, 2014). Governments have managed this risk at a macro level through regulations. Still, these disruptions may lead to poor financial performance at a firm level, and firms may need to find alternative solutions (Bell et al., 2013). Risk is not a simple concept, nor is how to address it. Research on natural resource scarcity risks has been predominantly focused on regulations and policies (Bell et al., 2012), and risks have been managed at a higher level than the firm level in the fishing industry. While this is good for the fish stocks, it is not always good for the growth of the firms (Jentoft et al., 1998).

The Natural Resource-Based-View theory proposed by Hart (1995) has been presented to address the environmental sustainability challenge, offering solutions such as closed-loop supply chains (Miemczyk et al., 2016). The use of closed-loop supply change[8] practices has also been discussed as a mitigation measure of the natural resource scarcity risk, but the applicability of this strategy is limited to the manufacturing industry in the production and distribution phases of the supply chain (Bell et al., 2013; Miemczyk et al., 2016). To address resource degradation, firms may use products from different geographical areas or avoid employing the resource (Bell et al., 2012). From a manufacturing perspective, these are viable options. However, small firms in the fishing industry may not be able to apply them practically. Bell et al. (2012) recognize the need to evaluate the problem of natural resource scarcity using a Resource-Based-View theoretical framework, where firms can employ their internal resources, such as knowledge, to divert their activities and tackle the challenge of scarcity, which in some cases may lead to the development of business strategies for sustainability (Hart, 1995). These observations support the conclusions presented by Edelman et al. (2002), in which small firms' growth strategies must align with their internal resources.

There is an emerging trend related to eco-entrepreneurship. The global pressure to align businesses with sustainable performance also drives firms to look closer at customer expectations and the value or disvalue provided to them (Jolink and Niesten, 2015). This aspect builds on Stern et al.'s (1999) theory of the value belief norm. The risk of losing customers because they believe the production and extraction techniques are not eco-friendly may increase, and firms could mitigate these risks by making the necessary adjustments. There is limited empirical data and research on this topic in the fishing industry.

While a large body of knowledge discusses supply chain management and natural resource scarcity, there is still limited knowledge on strategies that companies heavily dependent on a natural resource could adopt (Kalaitzi et al., 2018). The Resource Dependence theory has been used as a lens to start

8 Closed-Loop Supply Change (CLSC) is a management strategy proposed to enhance the value of a raw material throughout its lifecycle (Guide and Van Wassenhove, 2006).

closing this gap, but the trend to focus on larger firms, mainly in the manufacturing sector, continues and small firms in the extraction phase of the fishing industry may still not benefit from the findings of such research. Other recent studies used Morgan's (2016) diversification theoretical framework (Nichols, 2020). A way entrepreneurs in the primary sector can manage income risks is to diversify or pair their activities with employment (Folta et al., 2010; Solesvik, 2017).

Boonstra et al. (2018) describe growth in the fishing industry from two perspectives. In the first one, the output is directly proportional to the input, so to get more output, more input is needed; this can be achieved by adding capacity, exploring new fishing grounds, etc., which is also directly affected by regulations and other constraints. The second perspective is to get more output with the same or a lower input by improving the efficiency and value per unit effort; this second approach keeps the renewable resource stable and continues to provide opportunities for growth to the actors in the industry.

The scarcity of natural resources represents a risk to firms operating in the fishing industry to achieve financial growth. However, it is not to the same extent for all actors, nor are the mitigation measures adopted the same. The approaches discussed in the literature are summarised in Table VIII. Note that the final consumers are added to the table to illustrate their perspective since this has not been the focus of firms in the upstream stages of the supply chain, such as extraction and food processing (Lindkvist, 2010).

Table VIII Fish Stocks Depletion - Summary of Risk and Mitigation Measures from the Literature

Supply Chain Stage	Actor	Risks	Mitigation Measures
Retail	Consumer*	• Fish products are not available. • Products available do not meet expectations (e.g., Eco-friendly, organic, etc.).	• Choose alternative products. • Find alternative suppliers.
	Supermarkets /Restaurants*	• Fish products are not available.	• Offer different variety / alternative products. • Adjust prices.

Supply Chain Stage	Actor	Risks	Mitigation Measures
		• Fish products are available at higher prices.	• Hedge prices (Long Form Contracts w/Penalties).
Distribution	Fish Distributor*	• Fish products are not available. • Fish products are available at higher prices.	• Find alternative suppliers. • Change routes. • Adjust prices.
Food Processing / Production	***Fish Processor***	• Fish species are not available. • Current production is not efficient. • Prices increased due to a decline in fish stocks.	• Change species. • Design new products / Innovate. • Adjust prices. • Pay insurance. • Improve efficiency through innovation. • Increase supplier base.

Extraction	***Fisher***	• Stocks depletion
		• Different migration patterns.
		  ○ Longer commute to fishing grounds.
		  ○ Fish deterioration.
		  ○ Weather exposure.
		• Limited quotas / Cyclical income
			• Find new fishing grounds.
			• Choose an alternative species.
			• Develop aquaculture.
			• Expand scope (Vertical integration).
			• Purchase additional quota.
			• Reduce operational costs.
			• Upgrade vessels to travel further.

Supply Chain Stage	Actor	Risks	Mitigation Measures
		○ Operational costs are higher than Revenue. • Fishing grounds are overcrowded. • New regulations are more restrictive. • Public perception.	• Use innovation to improve fishing efficiency. • Increase Capacity. • Scan and follow-up notices from official bodies on new regulations. • Establish fishing cooperatives. • Use innovation to reduce environmental footprint. • Develop new sustainable alternatives. • Find different sources of income. • Insure catch /hedge. • Adjust prices.
	Governments /Communities*	• Stocks Depletion • Industry disappearance	• Regulate extraction (Quotas). • Provide subsidies.
	Environmentalists / NGOs*	• Stocks Depletion (Species extinction)	• Regulate

*These actors are shown in the table as illustrations but are outside the scope of the research.

In summary, natural resource scarcity continues to pose a risk to small firms in the fishing industry. While ample research discusses risks from other standpoints and at distinct phases in the supply chain process, the literature on supply chain risk management in the fishing industry is also limited (Bak, 2018), opening new venues for future research.

2.4.3.- Firm Characteristics and their Effect on Firm Growth in the Fishing Industry

2.4.3.1.- Firm Size and Age

Firm size is a common characteristic evaluated as a variable of firm growth, and recent research has used Gibrat's (1931) Law of Proportional Effect as a benchmark (Becchetti and Trovato, 2002; Canarella and Miller, 2018). Gibrat's (1931) study is at a macroeconomic level. He proposes that growth depends on random shocks and that growth rates are independent of firm size. This hypothesis has been assessed under several scenarios and industries, yielding various results (Colman et al., 2021). Firm growth can be logarithmically represented and modelled using random variables (Gibrat, 1931). Research on Gibrat's Law suggests that assumptions and observations taken at the time may not be valid in current market conditions (Sutton, 1997). One example is the firm growth in industries in decline. Hopenhayn (1992) presents a model of company growth dynamics based on productivity shocks. His model assumes a declining demand, arguing that firms would reduce their production capacities as demand decreases to stay competitive and will eventually take an exit decision (Reynolds, 1988; Baden-Fuller, 1989; Ghemawat and Nalebuff, 1990). In the case of the fishing industry, data indicate that demand is increasing, but small firms are disappearing (Fiskeridirektoratet, nd). These models have failed to consider constraints related to the scarcity of natural resources, forcing firms to adjust their business models or exit (Colman et al., 2021).

Previous research on Gibrat's Law (Kalecki, 1945; Hedija, 2016; Vaz, 2021) indicates mixed findings (Relander, 2011). Bérubé and Rivard (2020) suggest firm size hinders growth during the start-up phase, implying that small firms are at a disadvantage until they reach certain economies of scale, in which size becomes a positive factor in the growth process, also supported by Canarella and Miller (2018). Other authors propose that small firms grow at faster rates than big firms (Evans, 1987; Coad and Tamvada, 1996; Wang, 2020; Mazzarol and Reboud, 2020). The study of Gibrat's Law in industries where the cost of entry is vastly increased[9] may yield different results where the law can be validated, offering opportunities for future research (Relander, 2011), as proposed by Pham and Nguyen (2017) who validated Gibrat's law in a sample of Vietnamese firms indicating that size does not have a statistically significant effect on firm growth. Similarly, Staines (2005) concludes that firm size is independent of firm growth, supporting Gibrat's Law.

Businesses in the fishing industry are constantly juggling with the dilemma of maximising production while keeping the fish stocks healthy (Jentoft et al., 1998). Governments have managed this through regulations, and the literature indicates that quota systems are, in most cases, biased towards large

9 Data indicate cost of entry in the fishing industry is high, the cost of fishing boats and fishing quotas have been increasing year on year.

fisheries (Jentoft and Chuenpagdee, 2015; van Helmond et al., 2016). In summary, data suggest firm size influences firm growth, and there is value in further evaluating Gibrat's concept in the context of the fishing industry in Northern Norway, an area absent in the literature.

Firm age follows a similar pattern to firm size (Vaz, 2021), and older firms with clear strategies show higher turnovers (Blackburn et al., 2013). However, there is still an underrepresentation of young firms in longitudinal studies of firm growth (Coad et al., 2018). Variables such as profits play a role in the growth of small young firms. Davidsson et al. (2009) indicate that firms choosing to maintain steady profits and use them as a growth mechanism grow faster than firms that decide to grow even when sustaining losses. Other authors suggest young firms that prioritize growth before profits grow faster (Coad et al., 2018).

Further research relates the growth pattern of young firms with the learning organization process as described by Jovanovic (1979, 1982), indicating that as firms age, they learn and hence the growth pattern changes (Navaretti and Pieri, 2014). Many small firms in the fishing industry follow a family tradition where the firm and knowledge are passed on from generation to generation (Jentoft et al., 1998). The intergenerational transfer of knowledge and financial assets positively influences firm performance (Dunn and Holtz-Eakin, 2000).

Stinchcombe (1965) proposes a theoretical framework indicating that young firms are more liable to failure at the inception phase. In this phase, many activities are happening, such as securing funds, building up networks, and creating daily business routines, for which the capabilities play an essential role in reducing this liability (Aldrich, 1999; Yang and Aldrich, 2017). Firms that overcome such hurdles may achieve a higher growth rate in the early years (Coad et al., 2018).

The age study is not limited to firm age; many researchers have evaluated the effect of entrepreneurs' age on firms' performance (Nunes et al., 2013; Obeng et al., 2014; Vaz, 2021). Like firm age, the age of the entrepreneur alone does not provide sufficient information; many other indirect variables influence firm growth (Vaz, 2021), such as the entrepreneur's experience in strategic planning and governance models (Verreynne et al., 2016; Von Nitzsch et al., 2022), risk appetite that has an inversely proportional relationship to age (Pålsson, 1996; Peng, 2015), liquidity constraints which usually are high at the start-up phase for young entrepreneurs (Evans and Jovanovic, 1989; Barber et al., 2016), among others. Different standpoints are proposed. Shane and Venkataraman (2000) indicate that entrepreneurial activity is not limited to identifying and exploiting entrepreneurial opportunities but also using acquired knowledge (Acs et al., 2009). By acquired knowledge, Acs et al. (2009) refer to technical endogenously grown knowledge. Emphasis is placed on the research and development of high-tech industries. Certain similarities can be seen between this theory and the

Intergenerational Framework presented by Dunn and Holtz-Eakin (2000). Frederiksen et al. (2016) draw on the contexts of Knowledge Spillover to evaluate how knowledge acquired through mobility and experience impacts entrepreneurship entry and success. Knowledge spillover may positively impact firm growth since it fosters innovation (Matthes, 2019). it differs from the intergenerational standpoint. For Frederiksen et al. (2016), knowledge is learned, not transferred from the previous generation.

In summary, the firm's and the entrepreneur's age are often related to experience and knowledge, among other indirect variables influencing firm growth. However, findings are mixed, and not all studies agree (Cassar, 2006; Vaz, 2021).

2.4.3.2.- Organizational and Ownership Structure

Many small firms start with the entrepreneur as the sole employee adopting all the roles of the enterprise (Goode, 1960; Campion et al., 2020), but as the firm grows, the proper organizational structure is a driving factor in the performance of the firm (Meijaard et al., 2005; Zhou and De Wit, 2009; Zhang and Lau, 2017; Vaz, 2021). Organizations with a decentralized structure tend to perform well despite their size, but in general, organizations with a centralized and specialized workforce achieve higher growth (Meijaard et al., 2005; Zhou and De Wit, 2009). Zhang and Lau (2017) propose that a stable multilayer organizational structure enables growth.

While the literature on organizational structure in small/family firms yields inconsistent findings, there is a linkage between organizational structure and the exploitation of new opportunities or keeping the status quo (Tipu, 2022). There is also a relationship between the ownership status of a firm and its growth pattern (Pham and Nguyen, 2017). Private firms, where either managers or entrepreneurs are vested in improving firm performance, perform better than state-owned enterprises, supporting the agency theory (Rehan et al., 2020; Habuš and Prašnika, 2021).

In summary, organizational structure influences firm growth. Limited literature is available on this effect for small firms in the fishing industry.

2.4.3.3.- Finances and Liquidity

There is consensus that access to financial resources enables firm growth (Becchetti and Trovato, 2002; Donati, 2016; Tarfasa et al., 2016; Rafiki, 2020; Vaz, 2021). Small firms can get financial resources through sales and loans, among other sources (Vaz, 2021). However, small firms tend to have limited access to capital, which is a growth constraint (Gauthier and Gersovitz, 1997; Staines, 2005; Donati, 2016). The start-up phase of a fishing business requires significant capital investment, and as the firm grows, its risk profile changes if it acquires large bank loans (Colman et al., 2022). Small fishing firms

that start with inherited assets have an advantage, as presented in the framework by Dunn and Holtz-Eakin (2000), who highlight the importance of intergenerational transfer of financial assets.

Financial inclusion is another aspect that enables a firm's sales growth. Small firms that have developed a good relationship with financial institutions have an advantage, and government policies to improve financial terms for small firms play a significant role in the growth process (Lee et al., 2020). In the primary sector, small farmers and fishers may increase their production through microfinancing (Sulemana and Adjei, 2015). However, acquiring loans does not always yield growth. In some cases, risk-averse fishing firms that do not invest in additional quotas or large catch capacities perceive higher profits (Bertheussen and Vassdal, 2019).

Firm growth is often related to Gibrat's (1931) Law of Proportional Effect (Donati, 2016). Despite the substantial number of empirical studies testing this law in different scenarios, there have been several shortcomings, such as selecting the independent variables, mainly firm size and age, which have not included sufficient economic foundations and industry effects (Becchetti and Trovato, 2002). In the context of this research, where natural resources are scarce, Hotelling's (1931) proposal plays a key role. As resources diminish, prices are adjusted, which masks the random effects of fish stocks as proposed by Gibrat's law (Colman et al., 2021).

Smith (1776) establishes a relationship between the cost of production and profits, indicating that reducing the former leads to financial growth. This concept is supported by Ricardo (1817), who describes a proportional relationship between production efforts and profits. There is one point worth noting. In agriculture, as the land degrades, the cost of production increases. If the prices are regulated, the farmer does not perceive a higher rent, and his return remains constant. This phenomenon is described as the Law of Diminishing Returns (Ricardo, 1817). The effect of investing more to produce degraded land is often higher than acquiring a new piece of more fertile land, and this is an option to reduce the impact of diminishing returns (Marshall, 1890). This concept is supported by Gordon (1954), who proposes that additional effort does not always yield additional rent in the fishing industry due to the drop in fish stocks.

Finally, in the growth process, firms go through phases of evolution and revolution, or growth and crisis, where the entrepreneur, during the firm's incipient phase, disdains management or administrative tasks, focusing on the creation and sales of the product instead (Greiner, 1989). But, as the firm grows, additional capital may be required/secured, and financial procedures must be established, forcing the entrepreneur to embrace such administrative tasks (Greiner, 1989). The financial literacy of firm owners to manage financial resources and make sound investment decisions

plays a significant role in how the firm can grow while keeping a healthy balance sheet (Siekei et al., 2013; Amenuku, 2018; Rafiki, 2020; Vaz, 2021).

2.4.4.- Strategy, Competition, and Niche

In addition to risk and innovation, competition is also a topic impacting growth (Colman et al., 2021). The concept of perfect competition is based on the relationship between sellers and buyers, production cost and sales price, and the availability and demand of the products in the market (Smith, 1776). The outcome of this relationship could be predicted (McNulty, 1967). Merchants' goal is to make a profit, which is directly correlated with the quantity of product brought to the market and the cost to produce it (Cournot, 1838). Players can modify a few factors to increase profitability in this simple model. However, the reality is more complex, and other external environmental conditions, such as government regulations, also play a crucial role in the trading and competition/interaction between the parties (Smith, 1776). These discussions led to the development of the Niche theory, which has its roots in ecology (Grinnell, 1924; Vandermeer, 1972; Pocheville, 2015).

Darwin (1859) pioneers the concepts of competition in ecology, building on the studies of Hebert (1819), Lyell (1830) and de Candolle (1855) and observes that as species are exposed to different physical conditions and competition, they must change to overcome the new natural conditions and the dominance of other species (Darwin, 1859; Henderson, 1983). Darwin uses the metaphorical term "Struggle for Existence" (Darwin, 1859, p. 60) to describe the challenges each living organism faces every day to survive, and should this not be the case, their growth rate would be unmanageable resulting in an overpopulation of the Earth (Darwin, 1859). However, animals are not in a constant struggle to exist; they are driven by the need to find food and eat it and will spend most of their lives doing this, so their activities are highly dependent on the availability of food supply, and in most cases, it will follow seasonal cycles so that animals will be changing their behaviours throughout the year (Elton, 1927). In essence, Darwin's natural selection concludes that the ability to adapt is an essential mechanism for survival.

The term niche describes the distribution, interactions and taxonomies of species and subspecies in a geographical and ecological context (Vandermeer, 1972). Grinnell defines the environmental niche as "an ultimate unit, is occupied by one species or sub-species" (Grinnell, 1924, p. 227) and indicates that these units need the resources supplied by nature, should one of these species cease to exist, or new ones appear, nature will have to adjust to provide these occupants the necessary materials (Grinnell, 1924), he also mentions "that no two species regularly established in a single fauna have precisely the same niche relationships" (Grinnell, 1917, p. 433). Elton's standpoint is different and relates to the niche based on animal habits. He defines niche as "to describe the status of an animal in its

community, to indicate what it is doing and not merely what it looks like" (Elton, 1927, p. 63). These two definitions of niche, one based on the habitat and the other based on the behavioural patterns, although different, complement each other to gain a better understanding of competition.

Regarding competition, the interaction between the species and the environment is vital to their existence. For instance, two species cannot survive in the same habitat if they are competing for the same resources. At some point, one will "outcrowd" the other, leading to the disappearance of one of them (Grinnell, 1904, p. 377). Gause (1937) tests this concept with an experiment using the mathematical functions developed by Volterra (1926, 1928) and Lokta (1932) and establishes the Competitive Exclusion Principle (Garrett, 1960); Gause concludes that two nearly related species can live together and achieve a certain level of equilibrium (Gause, 1937), indicating that variety is critical for survival, supporting Darwin's Natural Selection Theory (Henderson, 1989).

The focus of Gause's research is competition for the same resources. However, it is interesting to highlight that certain species' physiological capabilities allow them to adapt to different environmental conditions (Elton, 1927). Elton observes that species groups can coinhabit while drawing in the same resources (Elton, 1946). One species' disappearance, or displacement, is not merely due to competition but could also be a factor of changes in environmental conditions (Hutchinson, 1957). In ecology, differentiation is essential for competition and survival (Henderson, 1983).

Applying the ecological niche concept in business draws attention due to the similarities. Henderson states that "biologists are better guides to business than economists" (Henderson, 1989, p. 143). The concept of niche translates into business and market research as differentiation, allowing brands to coexist in competitive environments (Henderson, 1989). Many marketing researchers have built on this theoretical framework to investigate market conditions and better understand competition (Milne and Mason, 1990). For small firms to create a marketing strategy that will enable them to compete with major well-established players is in many cases out of reach due to the required financial resources (Beverland and Lockshin, 2006), so there is a need to identify new opportunities, which in many cases have not been tapped by the incumbents. These opportunities may lie in market segments entirely different from those already exploited and, therefore, require creative and new ways of thinking to understand the needs of those new potential customers (Hart, 2005).

Small players in the fishing industry play a role in the supply chain for large processing plants and have simple business models. And another growth strategy is collaboration and partnerships with other stakeholders (Pedroza-Gutiérrez, 2019; Ramjaun et al., 2024).

Firms in the fishing industry should explore environmental sustainability strategies and blue growth (Saviolidis et al., 2020). However, such strategies are often discussed in the literature on government policies and not at a firm level (Pleym et al., 2021). In the Norwegian fishing industry, firms could shift their business model from selling the whole fish to utilizing most of the catch and using fish parts that were disposed of before since they are becoming raw material for highly specialised products and offer firms opportunities for additional revenue sources (Remme, nd). There is limited literature in this area. Capture fisheries are not considered to play an influential role in blue growth due to their lack of growth potential, and hence, discussions continue to dominate policies and quota management (Sulanke and Rybicki, 2021).

Regardless of the strategy adopted, strategic planning is vital to the survival and growth of a firm (Arend et al., 2017). While some authors recognize the importance of business plans to succeed and acquire financing (Hove and Tarisai, 2013; Donati, 2016; Vaz, 2021), others challenge this since entrepreneurial activities are often a way of doing things in a trial-and-error manner, following basic principles (Schramm, 2018).

In summary, starting and growing a small firm is an iterative process, and there is no recipe for it (Mann, 2019), but adopting the right strategy, collaborating with other players and developing a niche are factors that may enable firm growth.

2.5.- Environmental Factors

2.5.1.- Natural Resource Scarcity and Firm Growth

The fishing industry depends on natural resources. Daly and Townsend (1993) describe the challenge of economic growth and environmental degradation as an impossibility and present a simple solution of harvesting at rates lower than the reproduction of natural resources. This alternative may work at a macro level, but at the firm level, this solution may hinder growth (Gunningham, 2017; Riekhof et al., 2019).

Natural resources scarcity is a topic that dates back more than 200 years, with the works of Malthus (1798), Mill (1848), and Ricardo (1821), who predicted that population growth would outpace the reproduction of natural resources leading to scarcity (Barnett and Morse, 1963). Predictions on resource scarcity include an impact on economics, particularly the cost of production and product price, which are expected to increase as the resources fall, diverting investments or forcing the establishment of financial incentives (Malthus, 1798; Ricardo, 1821). The scarcity of natural resources may lead to large firms acquiring more power, establishing monopolies, perceiving higher profits in return, and pushing small firms out of business (Barnett and Morse, 1963). While these forecasts were

accurate, they did not foresee rapid technological development, among other factors, and hence, hypotheses on the effects on economic growth could not be thoroughly tested. Instead of increasing unit costs, the data show the opposite (Barnett and Morse, 1963; Smith and Krutilla, 1979). Technological developments may not always have a positive effect in extending the longevity of a natural resource. In the case of fisheries, advancements in steam engines and vessel designs enabled fishers to increase their predatory capacity, accelerating natural resource decline (Gordon, 1954; Hannesson et al., 2010). Not all authors agree with Malthus and Ricardo; Huxley (1881) states that fish stocks will prevail no matter what humans do. The relationship between growth and scarcity is complex, and much debate remains. There is a consensus that innovation plays a significant role in addressing the contradiction of growing while depleting the resource that feeds the production process (Smulders, 2005). This body of knowledge and the discussions about firm growth run in parallel, and there is limited cross-referencing. The focus remains on macroeconomics rather than individual firm performance.

Firms operating in the primary sector face the challenge of short-term profit vs. the durability of their operations; if the natural resources are exploited too rapidly, they will get higher profits but reach a limit to their operations earlier. If they reduce production to a rate that allows the resource to last longer, they will defer the profits (Hotelling, 1931). Conservationist groups, the public and governments play a role in this equation. Entrepreneurs do not have the sole decision power to produce or defer production, and the primary sector becomes highly regulated (Hotelling, 1931). The work of Hotelling focused on non-renewable resources. Renewable resources are not finite, but if produced too rapidly, the same effects occur (Hotelling, 1931). Gordon (1954) starts to integrate the impact of fish stocks into the economics of the fishing industry. He supports Hotelling's point regarding regulations, indicating that fish stocks increase with restrictive fishing laws[10]. Despite Huxley's (1881) standpoint, biologists realize there is a risk of extinction if fishing is left uncontrolled, but the controversy continues due to the phenomenon's complexity. Several theories started to evolve in the biology field, among them the Propagation theory, indicating that fishing must be planned so the species can spawn at least once, and the Thinning theory[11] indicates that catching young fish enables old ones to grow faster (Gordon, 1954). In summary, exploiting a natural resource without understanding its biological effects may lead to the extinction of the resource, even if it is renewable (Baranov, 1926; Gordon, 1954; Finkbeiner et al., 2017).

10 Data from the fiskedir.no supports this hypothesis – there is a clear correlation between cod fish stocks and regulations. Gordon (1954) refers to the effects of world war I and II in his paper and points that lack of fishing led to augmented fishing stocks.

11 These theories have limited relevancy to the research question. They address the biological field of the fish population.

The socioeconomics in the fishing industry involves multiple and conflicting objectives. One relates to the sustainability of natural resources, the second to economic development and the third to the social impact (Salz, 1986). Finding an optimal balance is challenging since not one field can be treated independently. Biologists would propose a model to defer resource extraction, while entrepreneurs would prefer a different one with a bias on gaining a higher profit (Hardin, 1968). Gordon (1954) presents a theoretical framework indicating that increasing fishery revenues is difficult since the production efforts will rise as the fishing grounds degrade.

The shared nature of the resource means that fishers are free to fish where they wish, and new vessels can enter the fleet, yet the total available fish is limited, negatively affecting the financials of the firms involved (Gordon, 1954). The increase in effort and labour costs follow a proportional relation with the catch providing a sustainable yield up to a certain point (called Maximum Sustainable Yield (MSY)), where the relation reverts, and more effort does not lead to a higher catch, diminishing the income of the activity, as shown in Figure 14 (Gordon, 1954; Brox, 1990). The argument presented by Gordon (1954) is that the expected income compared to the labour efforts is not favourable in the fishing industry, and actors may choose other activities to obtain higher returns. He relates the marginal returns to the decrease in the natural resources and argues that the Law of Diminishing Returns does not apply to the case of the fisheries. In a paper published by Coppola and Pascoe (1998), they challenge this standpoint and state that the Law of Diminishing Returns applies to the fishing industry since the underlying assumption of Gordon's model that the effort has a linear relationship with the catch is not valid, also supported by Szarek (2005). The catch per unit of effort varies.

In most cases, it is high at a low level of effort. Still, due to the uneven distribution of the fish and knowledge of the fishers, the probability of finding additional fish decreases as the catch increases, and so does the likelihood of catch per unit of effort (Coppola and Pascoe, 1998). Other factors, such as demographics, also influence the potential returns of fishing activities; there seems to be a contradiction in the demographic patterns since some regions were still attracting fishers in the 1990s due to the economic value (Brox, 1990). Despite some alternative views, open access to natural resources leads to scarcity and, hence, degradation in economic growth (Tisdell, 1993; Townsend and Wilson, 1987). Notably, the Common Property Resource theory has attracted much criticism from sociologists and anthropologists, who do not believe such a complex phenomenon can be modelled mathematically[12] (Brox, 1990).

12 Brox (1990) presents the arguments from several authors (i.e., Berkes, 1985; Feeny et al., 1990; Feeny et al., 1996) who have falsified the common property theory, mainly due to the simplicity of assumptions related to human behaviours; however, he also indicates the usefulness of the theory to protect the natural resource and set regulations (Brox, 1989). These debates have been purposely left out of the narrative since they do not deem relevant to the research question.

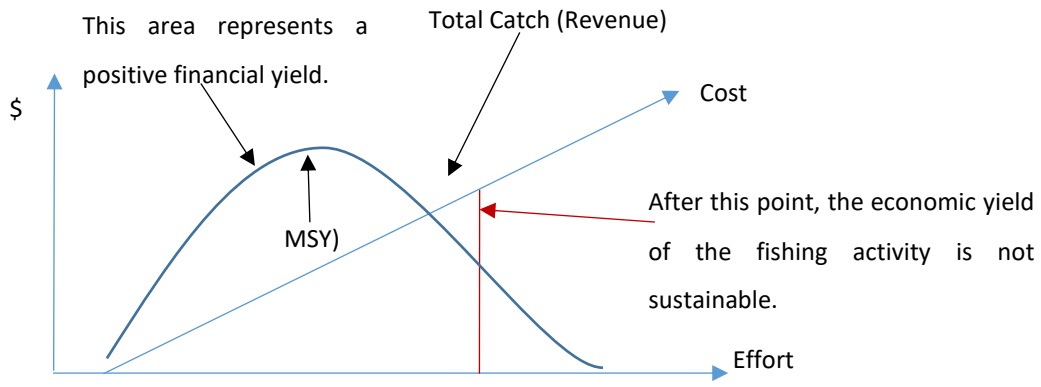


Figure 14 Gordon's Common Property Theory - Cost, Effort and Profit Relationship (Adapted from Brox, 1990)

Regulations play a role in firm growth in the fishing industry, where companies compete for a position in the market and fishing rights (Maurstad, 2000). From the discussions above, fishing relies on common pool resources, and distributing the rights and ensuring ecological sustainability drives the need to manage these resources. A customary practice is the establishment of a Total Allowable Catch (TAC) system and the distribution of Individual Transferable Quotas (ITQs) (Walden et al., 2012). Governments set the TAC annually following the advice from marine biologists, which creates large fluctuations in fishing companies' overall catch and profitability (Hannesson and Steinshamn, 1991). Quota systems are, in most cases, biased towards large fisheries (van Helmond et al., 2016). A study conducted by van Helmond et al. (2016) supports this. In their research, vessels of different sizes were given a 30% extra quota to participate. The results show that only the bigger fleets benefited from this additional quota.

In contrast, the small fleets did not manage to fish the extra allowance due to other limiting factors, such as boat power capabilities, technical constraints and regulations, despite the efforts to promote systems that allow fair competition among fishers, the distribution of quotas benefit the most effective and wealthy fisheries. As a means to limit entry, regulatory bodies have established high prices for fishing rights, so firms willing to increase their fishing quotas must incur high capital investment (Townsend, 1985), another factor impacting firm growth. These findings support Penrose's theoretical framework.

From a firm's perspective, the disruption in the supply due to scarcity represents a risk and needs to be managed (Chopra and Sodhi, 2004). The strategies proposed by Chopra and Sodhi to add redundant sources may not always be feasible for minor players in the fishing industry. Bell et al. (2012) present a strategic model to address the depletion and degeneration of resources, suggesting avoidance as a

mitigation measure, which supports other strategies that have been discussed, for instance, firms diversifying into different activities (Merrien et al., 2008; Morgan, 2016). Cooperation[13] is also an integral part of small companies operating in the fishing industry to allow a fair process in the distribution of income (Jentoft, 1985). Synergies between the primary sector and tourism have been identified as success factors (Bertella, 2011). Scarcity leads to monopoly, so the approach to addressing scarcity may not always be the same for small and big players (Barnett and Morse, 1963). Some authors draw on the Resource Dependence theory[14] to evaluate possible solutions (Kalaitzi et al., 2018; Tashman, 2021), but the relevancy of this framework is limited for small firms.

The phenomenon of firm growth in the primary sector is complex since it depends not only on the effectiveness of using internal resources, as established by Penrose (1959), but also on the external environment's effect. In summary, natural resource scarcity represents a challenge for small firms' growth, and it is counterintuitive to a traditional approach to producing more to get more revenue, as Gordon (1954) described.

2.5.2.- Regulations and Firm Growth in the Fishing Industry

Regulations impact entrepreneurial activities and firm performance (High, 1991; Peng et al., 2009; Sanday, 2015), particularly in the fishing industry, where quotas limit firms' scope for strategic development (Hannevig and Bertheussen, 2020). It is hard to challenge the argument presented by Hardin (1968, p 1243), "A finite world can only support a finite population", implying that in a world with finite resources and exponential population growth, the regulations of the commons are a necessity. The theory of Common Property Resource established by Gordon (1954) has governed many discussions in fisheries management, and while he claims to be one of the first authors to introduce economics into fisheries: "The great bulk of the research that has been done on the primary production phase of the fishing industry has so far been in the field of biology. Owing to lack of theoretical economic research" (Gordon, 1954, p. 124), other authors precede him. Warming (1911) presents a similar model indicating that with open access, the maximum sustainable yield will be surpassed, and the economic benefits of the fishing efforts deteriorate as more fishers enter the market (Topp, 2008; Eggert, 2010; Andersen, 2013). The common denominator in most economic models in fisheries management evaluates the fishers as one group, not individual firms (Fullenbaum et al., 1971; Anderson, 1976). Not much has changed since this period.

13 Cooperation and competition are interrelated concepts, and their difference lies on the goals of the individuals, common goals drive cooperation, while individual goals drive competition (Deutsch, 1949); this theoretical framework governs many discussions in the growth of firms in the primary sector.

14 Apart from the interrelation with policy makers, the Resource Dependence Theory proposed by Pfeffer and Salancik (1978) does not support empirical results of small firm growth in the fishing industry.

Governments control the effort to manage natural resources through fishing licenses. The effort comprises several elements such as the quantity of catch, size and power of boats, fishing gear, and so forth, so when a regulation limits any of these components, fishers may find other alternatives (Townsend and Wilson, 1987). This cycle impacts the marginal costs of fishing operations and, hence, their profitability. Hotelling (1931) argues that monopolies in the primary sector help to defer resource depletion and control industry prices, as indicated in Figure 15. However, in the case of the fishing industry, while big players dominate the market financially, many small firms operate, and prices and profits are controlled by other factors, such as regulations (Anderson, 1976; Bertheussen and Vassdal, 2019). Access without controls results in a higher profit per boat at the expense of a deterioration of the industry's overall performance (Anderson, 1976). The crisis in the 1990s related to overfishing triggered the establishment of regulations to address overcapacity, driving many small players out of the fishing industry (Kinds, 2021). Access to fishing quotas requires individual firms to invest additional capital to increase revenues; however, access to extra capital may also be limited to small firms, and government subsidiary schemes play an essential role in addressing this challenge (Townsend, 1985; Lagares and Ordaz, 2015; Molo, 2019). Technological developments have also impacted the socioeconomics of the fishing industry. With more efficient technologies, fishing grounds deplete more, forcing institutional changes (Chang, 1971; Holt and Raicevich, 2018). Technology has helped actors in the industry improve their performance (Heck, 1975; Girard and Du Payrat, 2017). Conflicts arise between socioeconomic development and natural resource management through regulations (Salz, 1986; Mardle and Metz, 2017).

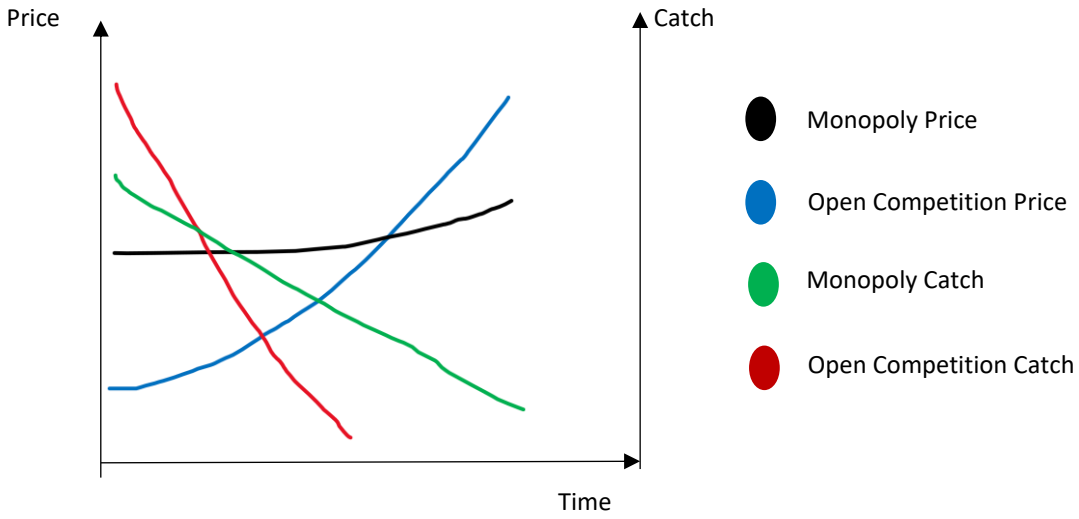


Figure 15 Hotelling's Hypothesis of Price vs Time (Adapted from Devarajan and Fisher, 1981)

The socioeconomics of the fishing industry is complex, and regulations lead to inequality of income distributions (Charles, 1988). One challenge is to find a solution that is open and flexible to manage the interests of diverse stakeholders (McCay and Acheson, 1987). The distribution of quotas does not consider the impact on society, and even though small fisheries have a more significant contribution to the well-being of the communities and less adverse effects on the environment, fisheries with large trawlers obtain most of the distributed allocated amounts (Crilly and Esteban, 2013). Despite efforts to promote systems that allow fair competition among the fishers, the distribution of quotas benefits the most effective and wealthy fisheries (Bertheussen and Vassdal, 2019). The governability of the fisheries should be more flexible and sensitive to the needs of the small firms (Jentoft and Chuenpagdee, 2015). The ideal balance to set and manage the quotas is yet to be found; scientists, politicians, and fishers are constantly debating finding a win-win solution (Maurstad, 2000; Copes, 2019).

Quota systems offer benefits in terms of firm growth, and government policies also play a role. Firms in the fishing industry that are given additional quota rights for free may also perceive additional profits (Bertheussen and Vassdal, 2019). ITQs allow players to increase their catch and revenues by acquiring new fishing rights. However, they continue to benefit larger firms with a stronger financial position and capability to purchase such quotas (Grafton, 1996). Other schemes, where quotas are limited, benefit only those players with access (Davis and Bailey, 1996). The unfairness of the quotas systems and debates on the governability of the commons leads to research in psychology on how involved parties juggle between personal gain and the benefit of the group (Hess and Ostrom, 2007;

Frischmann et al., 2019). Some authors argue that the fishers and governments should manage regulations or controls in collaboration. While this may represent a conflict of interest, the argument supporting this approach is the motive of fishers to become independent rather than acquire extensive financial benefits (Jentoft et al., 1998). This standpoint conflicts directly with Penrose's central assumption, which is that individuals seek monetary gain.

The tragedy of the commons has been criticized because of the underlying assumption that individuals seek their short-term benefit by exploiting natural resources as much as they can without realizing the long-term consequences, finding it difficult to see a viable solution (Stillman, 1975; Frischmann et al., 2019). But a solution for whom? Stillman's standpoint is that in the ecological field, coercion and regulation seem to be viable solutions presented by Hardin (1968) to protect the commons and the approach governments have taken. Jentoft et al. (1998) propose other collaborative methods of co-management to achieve a similar result without an autocratic regime, basing their logic on the perception that fishers do not seek financial growth, which may contradict previous perspectives. When regulations started to appear in the 1980s, fishers misreported their catch, triggering the need for more stringent monitoring of the landings (Gezelius et al., 2010). The co-management approach is critiqued for its naiveness and attachment to the past. Fishing has moved from a localized, family-driven activity to a globalized industrial business (Jentoft et al., 1998). Territorial Use Rights for Fisheries (TURFs) is another option that was evaluated. In this scheme, fishers get a right to fish in a designated area; like the conventional quota system, the TURFs have a mixed performance (Quynh et al., 2017). The TURF tactic supports Jentoft's standpoint, but several factors may not benefit from transferring more responsibility to the local communities or closing fishing areas for only a group of people. The method of setting regulations can be represented in a spectrum: on one extreme, the absolute authority by governments; on the other, a self-managed system, as shown in Figure 16. All options present pros and cons, and regardless of the different standpoints, regulations are still in place, as well as the enforcement of their implementation (Gezelius et al., 2010).

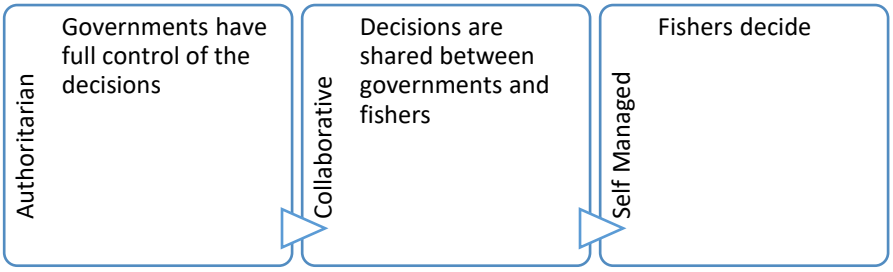


Figure 16 Approaches to Setting Regulations Based on Who Takes the Decisions (Adapted from Mackinson and Middleton, 2018)

Other alternative solutions have been proposed to manage the highly volatile costs of ITQs, which directly impact a firm's performance. The fishing industry resembles a manufacturing industry with fluctuating raw material costs. One alternate approach is implementing Auction Seasonal Quotas (ASQs), available at lower prices than the ITQs, reducing the risk to the involved firms (Moxnes, 2012). The productivity of firms following the implementation of ITQs indicates that firms produce less in the long run (Walden et al., 2012). While debates seem to go in circles, regulations affect a firm's performance. For any firm to exist, it must sustain profits; in the case of the fishing industry, an argument that contradicts Jentoft et al. (1998) is that due to the harsh conditions of this industry, fishers expect sustainable profits.

In many cases, governments must intervene to provide subsidies and other financial aid to support the actors' welfare (Johnsen and Vik, 2013). In summary, the argument presented by Stillman (1975) may still hold. There does not seem to be a viable solution to the tragedy of the commons due to the contradictory nature of the problem.

Research on fisheries management takes a new turn this millennium. With the advancement in technology, the traditional approach to setting quotas and maximizing sustainable yield is replaced by cybernetics (Johnsen et al., 2009a). With technological networks, proposals perceived as impossible a few decades ago are now possible, and fisheries can play the role of regulators and regulated systems concurrently (Johnsen, 2014). These changes caused a departure from the traditional way of fishing and managing a fishing business, where fishers were families and had local control of their own decisions, and cooperative networks were common. Now, the system is managed by information, and the fishers must adhere to signals given to them by the system (Johnsen et al., 2009b). This situation seems appropriate for fisheries management but continues challenging small firms since capital investments and financial liabilities have increased with the evolution of technology and information networks (Johnsen et al., 2009a). The complexity of the system relies on the relationship between the performance of firms and other elements such as policy, biology, and production; fluctuations in any of these have an impact on the rest, and small firms operating in the fishing industry may not survive such volatility in the short term[15] (Mardle and Metz, 2017).

Knowledge of local fishing grounds and vessel mechanics is insufficient in today's technologically developed world. Fishers must also acquire knowledge of financial systems, quota management, and technology systems, as Johnsen et al. (2009a) stated: "As one would expect with any professionalized technologically advanced operation, not every person can participate in commercial fishing. Physical

15 Mardle and Metz (2017) model the effect of the introduction of new landing obligations set by the Advisory Council and EU Agreement under article 15. They conclude that small and medium enterprises in the UK would struggle to survive with the introduction of these new regulations.

and mental compatibility with techno-scientific fishing systems is now required to legitimately enter a modern managed fishery" (Johnsen et al. 2009a, p. 23). Management skills and knowledge of the general aspects of the business play a vital role in firm growth in the primary sector[16] (Alvemar, 2015). Johnsen et al. (2009a) refer to the Actor Network Theory[17] in their paper to illustrate the complexity of the network and the relationship between fishers, environment, markets, technology, and culture, among other factors.

In summary, many viewpoints still exist on how regulations should be established. Some support Hardin's coercive proposal, and others, like Jentoft, prefer a collaborative approach. The design of quotas is also an extensive debate about whether they are individual ones that can be transferred, quotas that can be auctioned, or regional property rights, amongst others. They all lead to the same goal: limit fishing. An exciting evolution of the debates is cybernetics, how technology affects regulations, and how the fishing business is managed. Finally, another aspect drawn from these discussions is that fishers must be fishers, managers, and strategic planners and have a deep understanding of regulations and technological networks to succeed in the industry.

2.5.3.- Environmental Sustainability & Firm Growth in the Fishing Industry

The conceptualization of Sustainable Development (SD) dates back to the 1960s (SD Commission). As the public grew more concerned about the environment, new theoretical frameworks emerged, such as the Value-Belief-Norm (VBN) theory established by Stern in 1999, which builds on the motivational framework developed by Schwartz (1977, 1992, 1994) and links consumer behaviour with environmental protection and sustainability (Stern, 2000). The VBN theory describes the causal effects of behaviours based on beliefs and values; organizations that adopt an environmentally sustainable approach do so in response to regulations, social norms, or customer expectations (Stern, 2000). There is also a need to establish boundaries and work together towards sustainability through structured marine spatial planning, given the number of players operating in the maritime environment (Douvere, 2008; Douvere and Ehler, 2009).

Some believe economic growth and environmental sustainability, referred to as sustainable growth, are mutually exclusive (Daly and Townsend, 1993). This standpoint has been challenged; firms using a neo-classical economies approach, in which profit takes a protagonist role, while environmental and social responsibility are subordinate, need to change their business models to succeed (Stubbs and

16 Alvemar (2015) presents the importance of management skills and knowledge on current markets and strategy as success factors in dairy farming in Sweden. This clearly departs from the traditional approach and highlights the importance of adaptation.

17 The Actor Network Theory has its roots in the works of Callón et al., (1986).

Cocklin, 2008). The models may differ depending on the sector since sustainable growth rates vary from industry to industry (Seens, 2013).

Environmental and social responsibility are embedded aspects for many stakeholders. An example worth mentioning is the United Nations (UN), which established an SD agenda in 2015 with several goals related to environmental sustainability (UN, nd). Sustainability triggers interest in other fields, such as social entrepreneurship, which has become more popular in the last decade since many entrepreneurs are taking SD elements as an opportunity to contribute to society while perceiving a financial benefit (Abu-Saifan, 2012). This concept supports efforts such as Blue Growth, which relates to economic progress through responsible exploitation of marine resources (Boonstra et al., 2018). This concept was deeply discussed during the fourth SD conference held in Rio in 2012, and firms in the fishing industry started to align their business models with it to enhance their value creation and competitive advantage (Eikeset et al., 2018).

Infinite growth using finite resources is a dilemma many firms in the primary sector face. A world where individuals seek their well-being without considering the consequences of uncontrolled use of common finite resources will only lead to tragedy (Hardin, 1968). Leaving the management of the commons to conscience and morality does not yield the expected results, and some form of penalties or coercive approach must be taken if there is a chance to control the exploitation and use of the commons (Hardin, 1968). Daly and Townsend (1993) refer to sustainable growth as an impossibility theorem since perpetual economic growth cannot happen in an environment with limited resources. These initial thoughts from Hardin have evolved; the public is growing more concerned about the environment, and firms are facing no alternatives but to align and go green, motivated by various factors such as regulatory compliance and competitive advantage (Bansal and Roth, 2000).

SD of firms in the fishing industry, which rely on a natural renewable resource, requires the consumption of this resource to be lower than the rate of natural growth (WCED, 1987) and has driven policymakers to establish stringent regulations to manage the catch and triggered innovative solutions, such as aquaculture to secure supply into the value chain. The environmental focus has also forced firms to take a stakeholder standpoint rather than a shareholder position, transforming their business models (Stubbs and Cocklin, 2008). Climate change is a real threat, and addressing it requires changing existing behaviours and a collaborative approach (Stern, 2000) and policymakers' support to make it easier for producers and consumers to adopt an environmentally friendly mindset (Lucas et al., 2008). Managing natural common resources is not only an individual task but also needs to be supported by solid governance and understanding of the problem (Dietz et al., 2003). Collaboration

plays a crucial role. Daly and Cobb (1994) emphasized how working together to achieve a common goal can help firms enhance their financial performance.

Population growth, paired with the exhaustion of natural resources, drives consumer focus towards environmental sustainability, in which ocean users are expected to act responsibly (Douvere and Ehler, 2009). Companies have leveraged the ecological challenges to produce what environmentally-minded consumers would buy if available (Stern, 2000), aligning their corporate strategies with customer expectations to achieve higher financial returns (Narikae and Lewa, 2017).

Environmental concerns are not the only drivers for customers' choices; consumers often choose what is economically viable. The simplicity of Stern's theory assumes personal values surpass financial implications, which may differ depending on the socioeconomic status of the individuals (Quiggin, 2006; Cole, 2008). There is an element of individualism; ultimately, the behaviour will revert to the personal motive of well-being (Gatersleben and Vlek, 1998), which is not limited to the consumers. Producers face a dilemma in fisheries since financial growth has had a historically negative environmental impact (Boonstra et al., 2018; Eikeset et al., 2018). In this industry, capitalist practices contradict environmental sustainability efforts (Doerr, 2016).

Despite being a renewable resource, the fall in fish stocks is well documented and has driven many fisheries out of the industry or to operate at partial capacity (Magdoff and Foster, 2011). This contradiction opens room for innovative solutions, and many believe green capitalism is feasible. Companies work with short-term financial goals, which could be, in many cases, detrimental to long-term sustainable goals. However, associating their firms with an environmentally friendly label may attract more customers and loyalty to their brands (Magdoff and Foster, 2011). The focus is to ensure the long-term sustainability of the business, which cannot be limited to the downstream of the value chain. It is also essential to promote the supply chain's sustainability (Mangun et al., 2021; Alexander et al., 2024).

Several authors have evaluated the relationship between environmental sustainability and firm performance. Hart and Ahuja (1996) conclude that focusing on lowering emissions and producing environmentally friendly products presents a competitive advantage; similarly, Russo and Fouts (1997) propose that it pays to go green. On the other hand, a similar study conducted by Bansal (2005), using Resource-Based-View and Institutionalism theories, concludes that return on equity negatively correlates to sustainable development in firms in the primary sector. The motive of many firms to go green is not financial but rather regulatory or peer pressure (Bansal and Roth, 2000). However, this seems to be changing. An analysis of environmentally and socially responsible firms listed in the S&P 500 indicates they have a better financial performance, higher return on equity and less earnings

volatility than other peers of similar size (Barbu, 2019), supporting the results of the study conducted by Yadav et al. (2017), indicating that firms that allocate resources to enhance their environmental performance achieve a higher competitive advantage. Despite the amount of empirical research done to establish a relationship between financial performance and environment, the results are mixed and inconclusive (Eleftheriadis and Anagnostopoulou, 2015), which continues to present an opportunity for future research.

The literature reviewed reveals that the theory many authors have used in their studies is Resource-Based-View (RBV). Hart (1995) expands the RBV theory to include nature, indicating that firms must align their strategies with environmental sustainability to keep a competitive advantage due to the constraints and dependency on the environment (Hart, 1995). One aspect of Hart's Natural Resource-Based-View theory is stakeholder integration, a reason why customer expectations play an essential role, as described in the theory of Value Belief Norm (VBN) developed by Stern et al. (1999) and Stern (2000), making a stronger link between stakeholder theory and RBV (Yadav et al., 2017).

In summary, environmental sustainability is opening opportunities for firms in the fishing industry to grow and maintain a competitive advantage.

2.5.4.- Creative disruption

Section (2.4.1.- Innovation and Firm Growth in the Fishing Industry) presented innovation from the firms' perspective. However, the innovation cycles in the fishing industry can be seen at a macro level (Colman et al., 2020). Innovation is driven by the need to solve a problem (Boer and During, 2001), and issues in the fishing industry have been shifting, partly because of external conditions and partly because of the effects of creative destruction as described by Schumpeter (1934, 1939, 1946, 1947), illustrated in Figure 17.

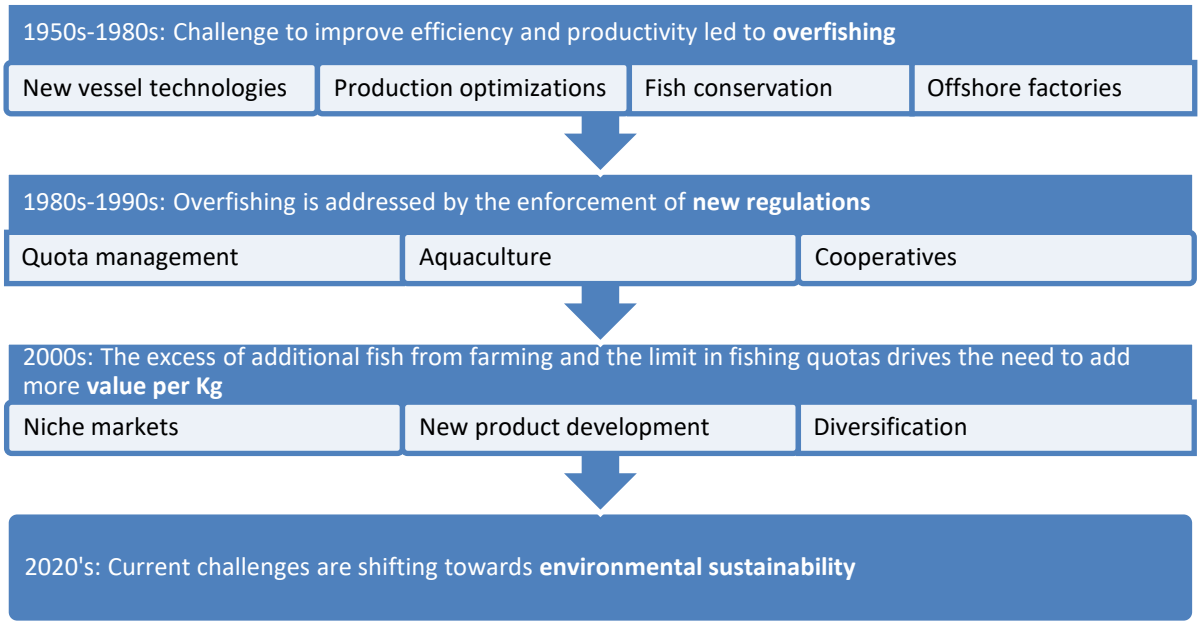


Figure 17 Innovation Cycles and Creative Destruction in the Fishing Industry (Adapted from: Lebel et al., 2010; Colman et al., 2020)

Each cycle in Figure 17 has disrupted the fishing industry (Colman et al., 2020). In the second half of the twentieth century, fishing vessels became bigger; they could stay at sea for extended periods, forcing the development of preservation techniques and establishing floating factories to process fish at the source (Liston and Smith, 1974). Innovation advancements made vessels more productive (Kirkley et al., 2004; Gobillon and Wolff, 2020). Factory trawlers have been among the most disruptive innovations. They have created significant controversies because of their impact on local employment, land-based production facilities, and small fishing firms in coastal regions. While the innovation focus in this fleet faded in this century, the trawler fleet continues to be the most profitable one (Standal, 2008). Large vessels are also more technologically advanced than smaller ones (Eigaard, 2009). Another innovation after the Second World War was technologies to freeze the catch; vessels had to travel large distances, and fishers also salted the fish to conserve it. The prices for salted fish were lower than for fresh fish, and the development of chilling equipment was a solution to maintain the high price per kilo (Finstad, 2004). On the shoreside, fish processing firms had to adapt their production capabilities to build flexible models, such as variable workforces, to cope with the cyclical fish supply (Aslesen, 1999). Fish processors are also pushed to find new ideas to preserve the fish or diversify their product portfolio (Cortesi et al., 2009).

As vessels became more productive and fished more, the decline in fish stocks drove new regulations. In this second cycle, the management of quotas became another area that triggered innovation in the fishing industry to find flexible frameworks (Jentoft et al., 1998; Arbuckle, 2000; Gezelius et al., 2010;

Quynh et al., 2017). The fall in wild fish threatened food security, forcing the fishing industry to find alternatives. Restrictions for wild fish diverted innovation efforts towards fish farming or aquaculture, which represented new challenges (Liao, 2000) and changed the way fish was marketed (Wessells and Anderson, 1992). Aquaculture is becoming more predominant in the fishing industry, and globally, the total fish produced in aquaculture has already exceeded wild catch methods (Ritchie and Roser, 2019); in Norway, the tonnage of fish caught in the wild is higher than aquaculture, but the trends are closing, as indicated in Figure 18.

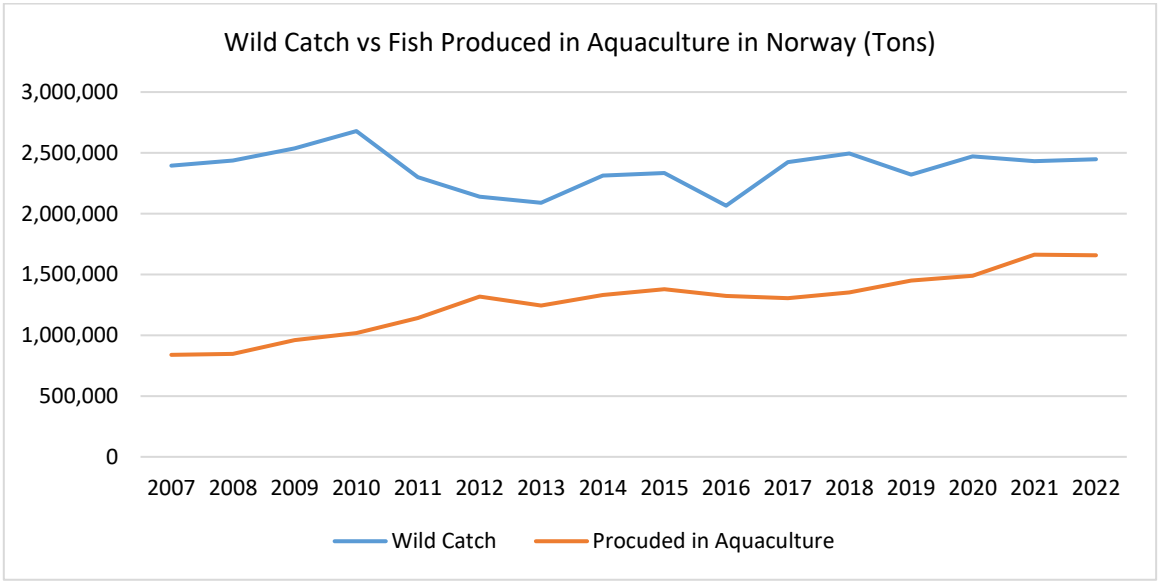


Figure 18 Aquaculture and Capture Fisheries Figures in Norway (Source: Fiskeridirektoratet, nd)

The world's total capture fisheries and aquaculture production reached 214 million tons in 2020 and is expected to increase by 15% by 2030 (FAO, 2022). The statistics look promising, but the odds are not favourable for a small firm in the capture fisheries. Aquaculture production has increased three-fold since 2000, disrupting the industry (Colman et al., 2020). Aquaculture provides about half of the total fish consumption and continues to grow, forcing a structural change in the fisheries and fish supply as they are succeeded by aquaculture. Solutions to this problem rely on government policies (Belton and Thilsted, 2014).

In the third cycle, the disruptive nature of aquaculture for the capture fisheries presents opportunities for small players to change their business models. Some examples include fishing other species, higher utilisation of the by-catch, and marketing unusual species to increase demand. Hence, innovation to identify creative solutions and adapt to the current challenges plays a vital role in the growth of small firms (Kortesoja et al., 2022). Aquaculture is a disruptive innovation since farmed fish are increasingly available in larger quantities (Ritchie and Roser, 2019). In an equilibrium model, aquaculture replaces

the decline in the wild fish stocks. It can be seen how the increase in population would increase the demand, yielding a higher sales price. However, based on the fundamental economic function of demand-offer-price, adding more supply to the market through fish farming balances the equation and reduces the price (Jiang, 2010).

In the fourth cycle, creative destruction shifts the problem toward economic development and environmental sustainability (Kahuthu, 2006; Fernandes et al., 2021).

In summary, Schumpeter's (1934) theory of creative disruption has driven innovation cycles in the fishing industry. The innovation process is dynamic and depends on the firm's internal factors and the external environment where firms function (Utterback and Abernathy, 1975; Bell et al., 2013; Kalaitzi et al., 2018). Firms in the fishing industry must adapt to the disruptive innovative cycles to stay in business and grow.

2.6.- Firm Owner Characteristics in the Fishing Industry

While mainstream entrepreneurship literature has neglected the agricultural sector and provides opportunities for future research (Fitz-Koch et al., 2018), there are studies indicating that entrepreneurs' characteristics and entrepreneurial orientation are factors that influence the performance of small firms in this sector (Lumpkin and Dess, 1996; Barbieri and Mshenga, 2008; Rauch et al., 2009; Barlian et al., 2021). Growth intention is also a factor that influences firm growth (Cesinger et al., 2018). For some fishers, motivation is not necessarily achieved by growing their firms, supporting McClelland's (1961) standpoint on self-actualization. In addition, fishers may not be willing to take the additional risks that accompany a growing firm (Atkinson, 1958; Memili et al. (2010).

For a fisher, increasing the revenue with the fishing activity requires additional effort and time at sea, primarily driven by the financial position and debt obligations (Maurstad, 2000). Fishers enjoy time at sea and have the independence to choose when to fish, and while the fishing intensity relates to the fishers' willingness, financial obligations often lead to these groups of people taking on additional activities (Maurstad, 2000). Challenges in the fishing industry drive small firm owners to find alternative sources of income (Morgan, 2013; Raffiee and Feng, 2014; Morgan, 2016; Nichols, 2020). The decline in the small fishing fleet and the ever-growing challenges the capture fisheries face drive entrepreneurs to adapt and embrace new opportunities across other industries like services/tourism (Andersson, 2021). This concept of pluriactivity[18] to generate multiple incomes through diversified activities and business ownership is a common feature of entrepreneurs in the agricultural sector

18 Carter (1999) introduces this concept (word) in her paper in 1999.

(Carter, 1998, 1999; Carter et al., 2004). These concepts are also linked to the financial literacy of the fishers, showing that a higher understanding of the economic dynamics enables better decision-making and choice of how to finance the growth of their firms, either through equity, loans, or microfinance, being the former the most common approach (Amenuku, 2018). The financial decisions of small firm owners are linked not only to their economic literacy but also to the expectations of the outcome, as indicated by Kahneman and Tversky (1979) in their Prospect Theory. The Role Strain is also evident in the fishing industry since, as small business owners, fishers may need to adopt multiple roles to grow their firms (Goode, 1960; Lazear, 2005; Campion et al., 2020). The concept of jack of all trades is also supported by the Decreasing Marginal Returns framework, established by Lévesque and MacCrimmon (1998), which indicates that entrepreneurs keep wage jobs for the need of money while their venture takes off and become self-sufficient.

A paradigm shift is observed with the Internet and technology revolution, and firm owner capabilities to leverage the Internet of Things (IoT)[19] have started gaining attention as another variable to provide a competitive advantage (De Vass et al., 2018; Barlian et al., 2021). IOT delivers not only a technological platform to have easy access to information but also enables firm owners to have better interaction with other stakeholders in the value chain (Jæger and Mishra, 2020), supporting the discussion on the benefits of innovation in the performance of small fisheries and how entrepreneurial orientation to adopt new technologies provide means for growth (Courrent et al., 2018; Barlian et al., 2021). The entrepreneurial capabilities to interact with individuals in a network play a key role in the growth of small firms (Meyer, 2002), supporting the discussions of cooperation and competition, in which a cooperative model, where small players come together and collaborate for the benefit of the whole group has been a successful approach, and it is rooted in strong traditions (Chang, 1971; Dyer and Singh, 1998; Searles et al., 2018).

There are differences between small and large firms in terms of innovation. In the former, the entrepreneur drives innovation. In large corporations, managers may not perceive a direct benefit and hence do not drive it, but one thing is common: innovation involves partnerships (Freeman and Engel, 2007). Penrose (1959) discusses entrepreneurial versatility as a critical factor in the adaptation process to create new products and meet new customer expectations; firms that fail to adapt also fail to grow. She also recognizes that identifying the opportunity to optimize internal operations and reduce cost, typically using new technologies, is a key factor in staying ahead. Penrose (1959) identifies management competence as another factor for a firm's sustainable profits since opportunities for

19 "The term "Internet of Things" (IoT) was first used in 1999 by British technology pioneer Kevin Ashton to describe a system in which objects in the physical world could be connected to the Internet by sensors" (Rose et al., 2015, p. 7).

growth need to be recognised and exploited. This notion is supported by the theory of absorptive capacity, presented by Cohen and Levinthal (1990), who propose that innovation is a function of previous knowledge. Additional sources of value creation in the fishing industry include the identification of alternative solutions and new market trends (Kirzner, 1973), like marine biotechnologies[20] deployed to address the vulnerability of the decline in resources; this could be achieved with an innovation process that requires inflows and outflows of knowledge (Al-Belushi et al., 2015).

Wessells and Anderson (1992) challenge previous studies of fisheries economics, indicating that the focus of innovative solutions has targeted the front end. Knowledge of market conditions and demand forecasts is fundamental in value creation and firm survival (Millán et al., 2012), and hence, it is where innovation should focus (Wessells and Anderson, 1992). For small firms, building knowledge and innovative capabilities may not be as easy as for large firms and hence, entrepreneurs play a pivotal role; small firms also depend on external knowledge and networks (Nieuwenhuis, 2002), while large firms may rely on external acquisitions and partnerships (Freeman and Engel, 2007). Penrose (1959) identifies the need but does not go deeper in analysing small firms and their dependency on the external environment as extended resources. When describing knowledge, Penrose implies that it is with the management, and the firm's success depends on its strategic vision and top-down approach. A study conducted by Sogner (2009) challenges this position and highlights that a bottom-up approach yields better results, where researchers are free to innovate without a fixed direction.

In summary, most discussions of internal and external factors related to firm growth pivot around the entrepreneurs and their capabilities. Firm owners play a crucial role in the performance of their firms.

2.7.- Summary of the Literature Review

This chapter explored literature on firm growth concerning natural resource scarcity in the context of the research question. This research defines firm growth as the cumulative improvement of selected business performance indicators such as revenue (or sales), number of employees, assets, and market share. Natural resource scarcity refers to the decline of fish stocks, which leads to a heavily regulated industry constraining the possibilities for firm growth. The chapter describes factors that drive firm growth.

The first group of factors explored in this chapter are internal to the firm, in which innovation plays a key role. Mainstream theories such as creative destruction are evident in the fishing industry, which

20 "Marine biotechnology can be defined as the use of marine biological resources as the target or source of biotechnological applications" (Al-Belushi et al., 2015, p. 147)

has undergone several disruptive cycles since 1960. The diffusion of innovation and how firms adopt technologies and other innovative solutions are also described. It leads to a general conclusion that embracing innovation depends on local governance and regional features. Risk management is explored as another internal factor and relates to how firms in the fishing industry mitigate risks connected to natural resource scarcity, which differ between the different stages of the supply chain; for firms in the extraction stage of the supply chain, mitigations include optimizing efficiency, acquiring additional quota, fish alternative species, establish cooperating models, among other solutions. The third area explored as firm factors is the firm's characteristics, indicating that the size and age of firms, organizational structure, and firm liquidity and financials impact firm growth and performance. Finally, how firms adapt their strategies to challenges such as environmental sustainability also plays a role in firm growth. These discussions support mainstream theories of firm growth, Resource-Based View, and the Law of Proportional Effects.

The chapter moves to the second group of factors external to the firm. In this section, natural resource scarcity is the prime discussion, governed by the theory of Common Property Resource and how regulations in the fishing industry impact the performance of fishing firms. This section concludes with a narrative of environmental sustainability and how the focus on the environment is shifting fishing firms to find alternative solutions to their revenue streams in line with global trends to grow and maintain competitive advantage.

Finally, the chapter ends with a narrative of the firm owners, or entrepreneurs, and how their characteristics and capabilities influence the growth of their firms. This chapter highlights the value of researching firm growth with natural resource scarcity, two literature streams that have historically been treated independently.

3.- Chapter Three: Research Methodology

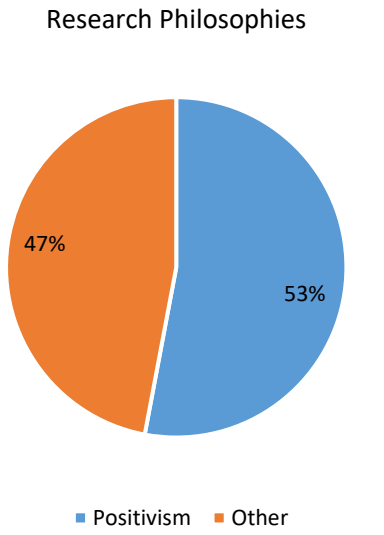
3.1.- Introduction

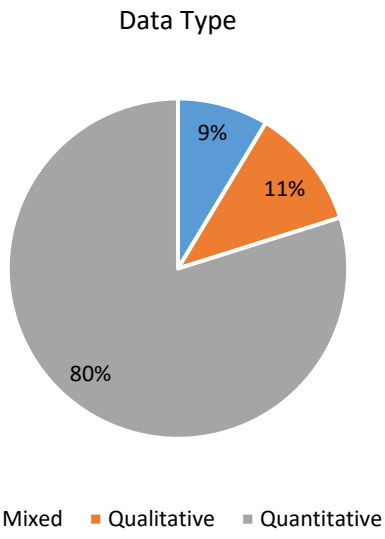
This chapter is structured as follows:

- The first part, “3.2.- Research Approach,” presents the research approach, describing the development of the research question and offering a discussion of the researcher's philosophical position and the mode of reasoning. This section presents a summary of research approaches encountered in the literature reviewed, which shows that abductive research is underrepresented in the literature on firm growth. This section also explains the rationale for selecting critical realism for this research.
- The second part, “3.3.- Research Design,” describes the design of the research and data collection and interpretation methodologies. The research was structured in three sequential phases, adopting a mixed method approach, in which data on each phase were collected and interpreted. This method resulted in several iterations between the phases to answer the research question and improve the quality of the research outcome.
- The third part, “3.4.- Publication, Copyright, Data Protection, and Ethics,” summarises the limitations and presents the ethical considerations adopted following the British Education Research Association (BERA) guidelines of the University of Buckingham’s policies.
- The fourth part, “3.5.- Research Limitations”, summarizes the limitations of the research.
- Finally, the fifth part, “3.6.- Actions Taken to Improve the Quality of the Research,” summarizes the actions taken to improve the quality of the thesis.

3.2.- Research Approach

Firm performance has been a central topic in entrepreneurship literature (Khedhaouria et al., 2015), which is dominated by positivist research, as drawn from the statistics of the literature reviewed, illustrated in Figure 19. Most studies have used secondary data available in existing databases to test their hypotheses, and it is evident from the analyses of these studies that the construction of research questions revolved around filling gaps in the literature, which is a common strategy (Sandberg and Alvesson, 2011; Tunberg, 2017).





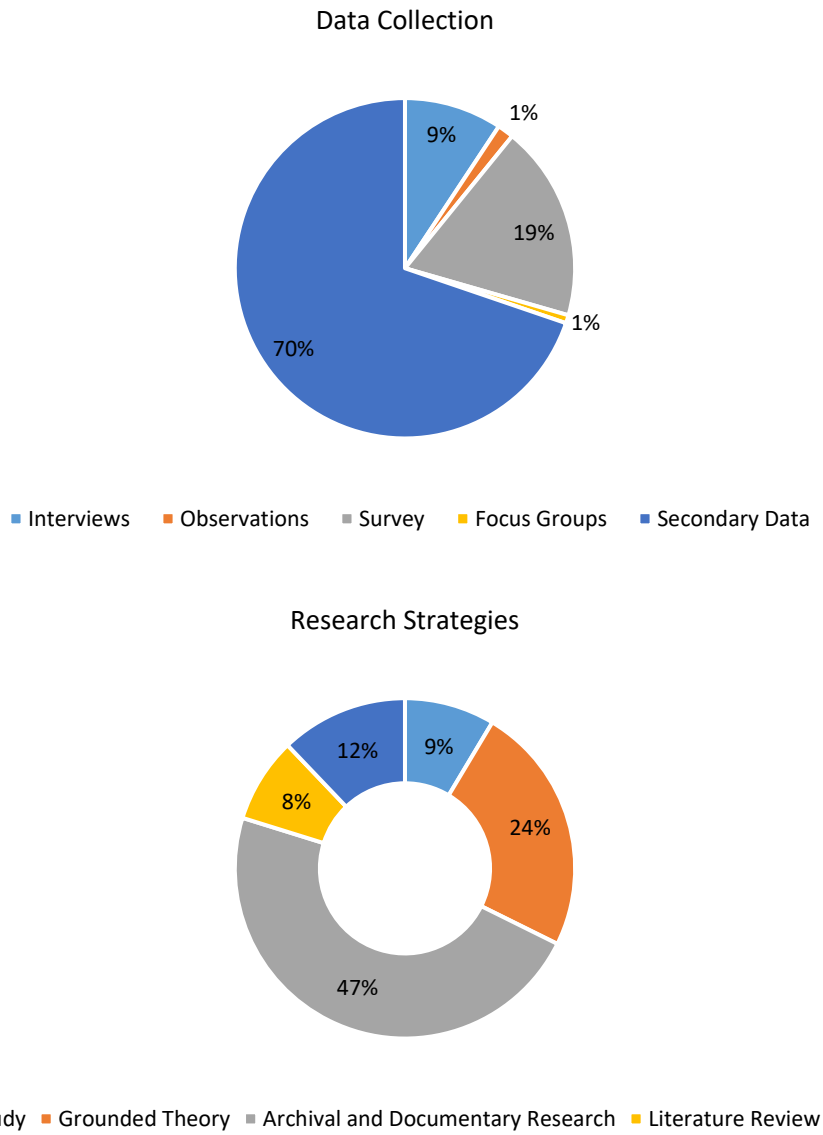


Figure 19 Research Approach Encountered in the Literature Reviewed of Firm Growth (Using Saunders et al. (2016) classification)

This thesis aims to contribute to the literature on small firm growth. During the development of the research question, initial versions aimed at evaluating additional variables and their effect on small firm growth. However, this approach would have continued to take underlying assumptions that do not fully represent market dynamics (Ghemawat and Nalebuff, 1990). Despite this much deductive research, the problem of small firm growth persists (Bygrave, 2007; Churchill and Bygrave, 1989, 1990).

This research is inspired by the challenge that small firms face in the fishing industry due to the constraints of natural resources. The strategy adopted for constructing the final version of the research question (**How can small firms grow in an industry where the natural resource is in decline?)**

pivots around this challenge and questions underlying assumptions of existing theories (Sandberg and Alvesson, 2011). The philosophy to be adopted in this research should enable combining the exploratory nature of the question and the explanatory aspects of identifying factors leading to firm growth to achieve the objectives of this research. In addition, the dominance of quantitative/positivist research offers an opportunity to use alternative methods to complement existing literature. Hence, a mixed methods abductive approach was selected for this research.

A mixed-method abductive approach is coherent with the critical realism paradigm because of the philosophical alignment and the practical implications of examining complex problems (Proudfoot, 2023; Diaz De Oleo, 2023). The mixed methods abductive approach allows for a greater understanding of the topic, generates credible explanations of the problem, and reduces researcher bias (Xiao et al., 2023). The mixed method research approach adopted resembles the multimethod framework described by Yawson (2016), in which multiple data sources, data types, and data collection techniques help to gain an understanding of the stakeholders in the fishing industry in Northern Norway, the ecosystem where the firms operate, and considering potential factors into a firm growth model, with the ultimate goal to answer the research question, as illustrated in Figure 20.

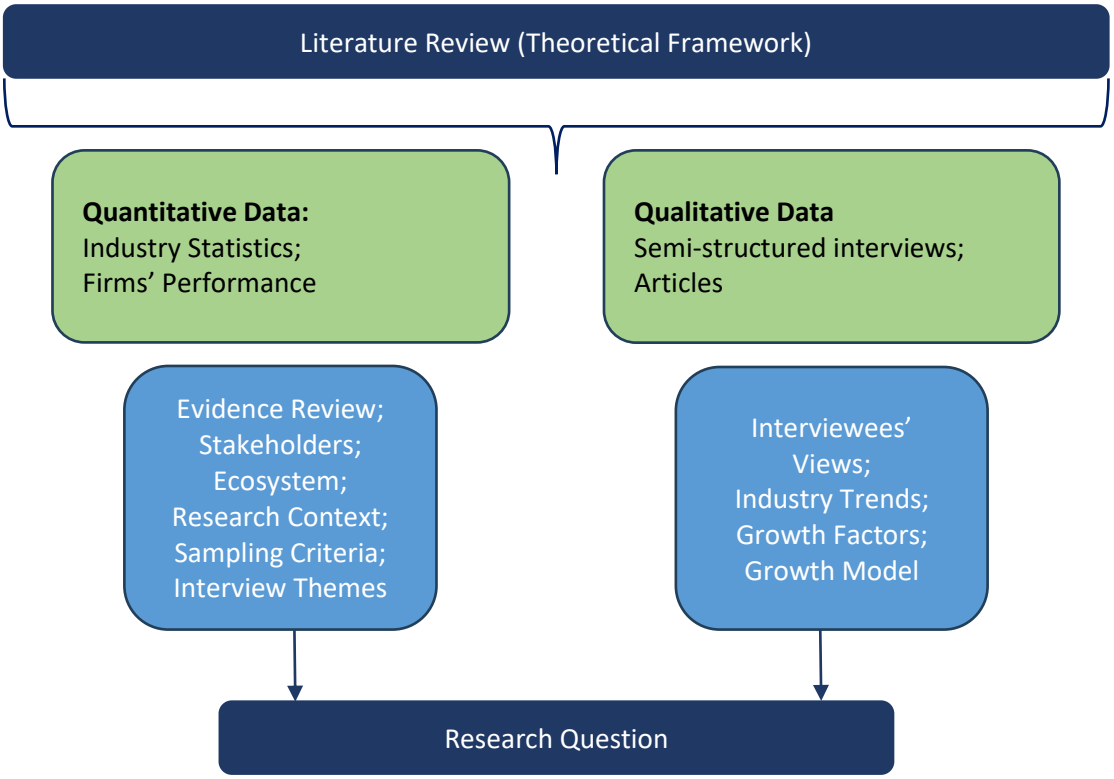


Figure 20 Mixed Methods Abductive Research Structure (Adapted from Yawson (2016))

The complexity of strategic management and the causal effects of variables and assumptions present a challenge when evaluating management theories and require a broad understanding of social phenomena and other external mechanisms (Miller and Tsang, 2010). However, too much focus on individuals' perceptions and the high involvement of the researcher may lead to missing other important aspects that relate to these causal effects (Kabir and Ullah, 2021). So, the philosophy that enabled the bringing together of aspects of both these paradigms was critical realism, as proposed by Bhaskar (2008).

Critical realism enabled data analysis using the theoretical lenses selected for this research. It evaluated the conjunction of events between small firm owners' behaviours and other factors that drive small firm growth (Bryman and Bell, 2015). This feature is distinctive of critical realism. It helps identify theory and practice inconsistencies through criticism, explain reality as it happens, transform practice and enhance reflexivity, relate theories to day-to-day practices, and promote change (Bhaskar and Hartwig, 2013, 2016). Using a multimethod approach enabled a more profound understanding of the fishing industry in Norway from the fishers' perspective and the objective observations and data collected throughout the research (Mingers, 2006).

Critical realism methodology is increasingly applied in management and organization qualitative research (Danermark, 2019; Frederiksen and Kringelum, 2021). In the abductive study conducted by Frederiksen and Kringelum (2021), they elaborate on the distinctive features proposed by Bhaskar and Hartwig (2016) by emphasising the potentials of critical realism, the ones relevant to discuss for this research are first, the critical realist ontology enables to study the topic empirically using qualitative data; second, critical realism, using triangulation of different data sources, helps to add explanatory value to the research such as understanding performance based not only on observable items but also areas that cannot be observed; the third aspect is the epistemological stand that knowledge of the reality is not the same as the reality itself, described as epistemic fallacy (Archer et al., 2013), indicating that the researcher is part of the research and the interpretation of the events. Finally, critical realism provides researchers with a potential venue to bridge local and general knowledge by using an abductive non-linear process. In summary, critical realism includes both positivist and interpretative aspects in the research (Sayer, 2000; Zachariadis et al., 2010).

Regarding the approach to theory development, the prime reasoning of this research was abductive, aiming to examine small firm growth in the context of the fishing industry and the theories of firm growth and natural resource scarcity (Thornberg, 2012). This approach offers a creative way to evaluate the evolution of mainstream theories in a particular area (Dubois and Gadde, 2002). Abductive reasoning is often used in critical realism research, where the researcher follows a narrative

process to explain an empirical phenomenon using additional data and theory (Eriksson, 2015; Eriksson and Engström, 2021). This research examined theories of firm growth, not only from internal and external perspectives of the firm but also in a complex field in which firms rely on a natural resource perceived to be in decline and, hence, heavily regulated. The research evaluated and extended the assumptions and original observations in developing such theories (Whetten, 1989), and the design includes proposing a business model to address the challenges of small firm growth in the fishing industry.

Finally, this research expanded across several disciplines, such as entrepreneurship, natural resources, small firms, firm growth, and leadership, supporting the adoption of critical realism and abductive reasoning to address the research question's complexity and explanatory nature (Danermark, 2019). The research approach is summarised in Table IX.

Table IX Research Approach

Existing Research		**This Research**	
Philosophical Position	Dominated by Positivism	Critical Realism	This position addresses the research question's complexity and the investigation's multidisciplinary nature.
Research Strategy and Reasoning	Use of secondary data, mainly quantitative, to test hypotheses using deductive reasoning	Abductive reasoning using primary and secondary data sources	Abductive thinking addresses the research question's complexity and the research's explanatory nature.

3.3.- Research Design

The design of this research included three sequential phases. In each phase, data were collected and analysed. The data and analysis of one phase informed the scope of the subsequent one. While the phases were sequential, for example, quantitative data were collected before interviews; there were iterations between each phase to refine the analysis, as illustrated in Figure 21.

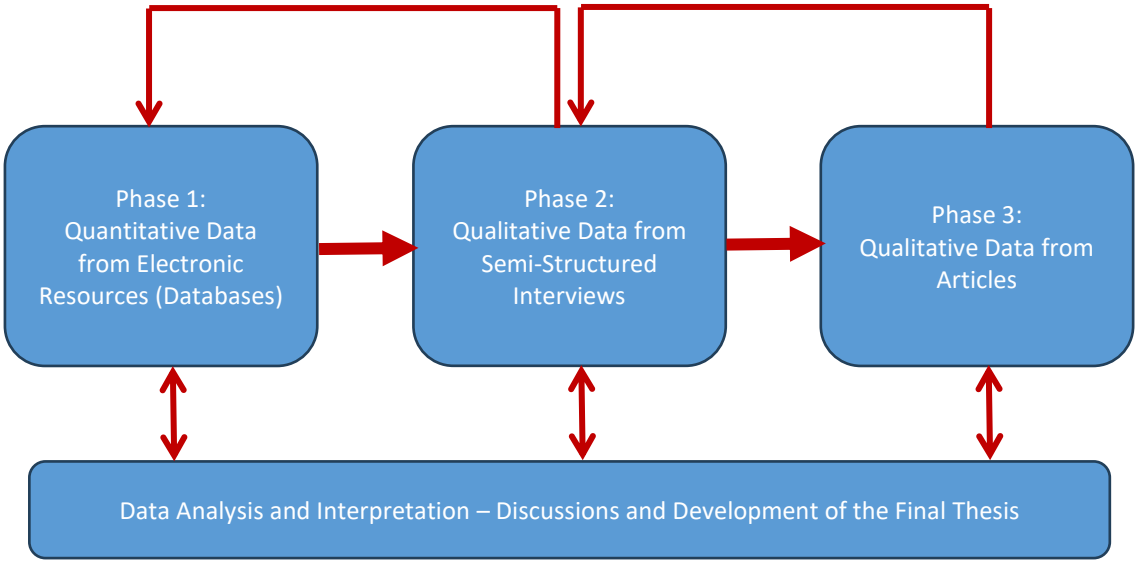


Figure 21 Research Phases (Adapted from Creswell and Creswell, 2018)

As indicated in Figure 21, a mixed-method approach was adopted in this research. This approach increased the research quality by using more than one method and multiple sources for data collection as a triangulation (McGrath, 1981; Scandura and Williams, 2000; Yin, 2018; Creswell and Creswell, 2018). The time horizon of this research has the characteristics of cross-sectional research, in which the phenomenon of small firm growth in the fishing industry was evaluated at one particular time. The research did not include the evaluation of the firms over an extended period (Saunders et al., 2016). The following section of this chapter describes each research phase in detail.

3.3.1.- Phase 1 – Quantitative Data from Electronic Resources (Databases)

The quantitative phase started at a macro level with data from the fishing industry in Northern Norway to establish the context of the research, evaluate trends and patterns between fish stocks, fleet performance and other variables like price per kilogram, and analyse these patterns from the perspective of the theories adopted as lenses for this research. The second part examined a sample of firms in Northern Norway to select themes for the interviews, develop a better understanding of the differences in performance between firms and what factors could drive such differences, and finally, choose the sample for the interviews, as illustrated in Figure 22.

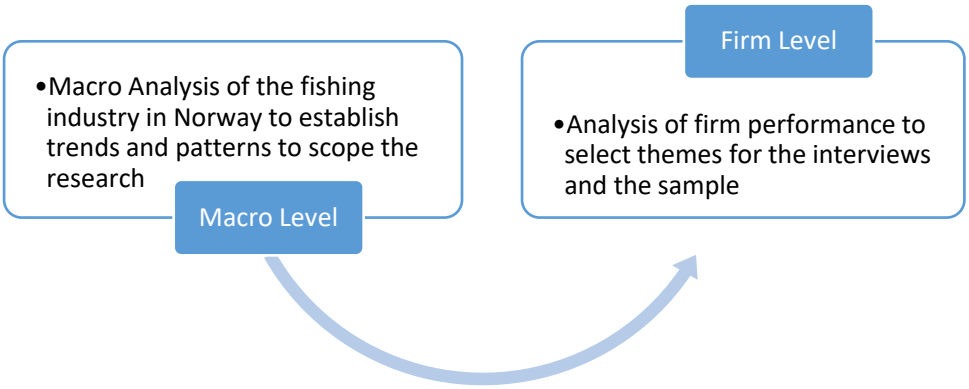


Figure 22 Components of the Quantitative Data Analysis

The first component of the quantitative data was a macro analysis of the fishing industry in Norway, including overall firm performance, fish stocks, and fish catch or landings per vessel size and species. The outcome of this analysis helped to scope the research. The quantitative data also enabled an understanding of trends in Norway's fishing industry and the identification of patterns in the data. In summary, this first part helped establish the research context.

The second component was a detailed analysis of financial reports of all small and big firms operating in Northern Norway. Combined, they represent a sample of 265 and 90 firms, respectively. The selection of these two groups aligns with existing research comparing large and small firms' performance (Coad, 2007a, 2007b). This part included the analysis of variables such as revenues, profits, and assets, which are common in firm growth research (Davidsson et al., 2010; Vaz, 2021). Finally, the analysis included evaluating differences in the performance between small firms. This part of the analysis calculated a profitability index (PI), a ratio of lucrative years vs total years of operation. This indicator was used to normalize the data to determine which of the 265 small firms studied performed better. The outcome of this phase yielded the sample selection for the interviews, which is further explained in (3.3.2.1.- Sampling Strategy).

The data were collected from several governmental databases, including https://www.ssb.no/en, https://www.fiskeridir.no, and https://www.regjeringen.no. The period selected for the data collection was from 2000 to 2019 since this period shows two different trends in fish stocks (from 2000 to 2013, fish stocks recovered; from 2013 onwards, there was an evident decline).

At this stage, the scope of the research was finalized, the research region was selected, and a potential list of firms that could be used as the sample for the next phase of the thesis was identified. Analysing

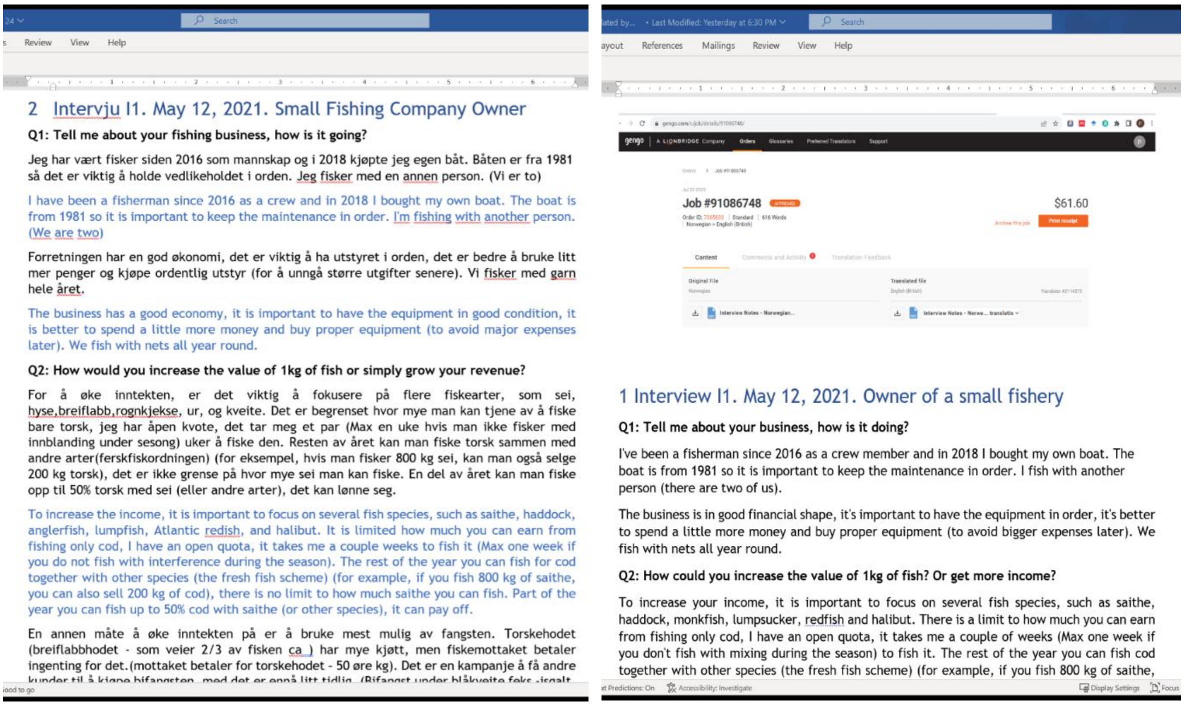
firms' performance also helped identify some possible themes and interview questions. The next phase of the research was collecting and analysing primary qualitative data.

3.3.2.- Phase 2 – Qualitative Data from Semi-Structured Interviews

The second phase of the research was the data collection and analysis of semi-structured interviews. The research continued with the collection and analysis of data through qualitative interviews, which were semi-structured by design and aimed to capture the views and opinions of the interviewees through a series of open-ended questions (Creswell and Creswell, 2018). According to the study by Frederiksen and Kringelum (2021), interviews dominate the data collection methods in critical realism research and are deemed appropriate for this research.

The analysis of the data in phase 1, paired with the literature review, yielded the identification of themes for the interviews. Because themes were defined in advance and there was a list of initial questions to trigger the discussions, the interviews can be considered semi-structured (Saunders et al., 2016). The questions were designed to be conversational, allowing the interviewees to present their points of view without being led in a particular direction (Yin, 2018). This approach led to asking different questions to different interviewees based on the discussions taking place (Bryman and Bell, 2015), aiming to get the opinions and views of the participants (Creswell and Creswell, 2018; Yin, 2018).

Notes were taken during each interview in the participant's native language (Norwegian). The interviews were not recorded using a recording device to keep the confidentiality of the interviewees, as established in the Norwegian regulations (Sikt, 2023; Datatilsynet, nd-b), which consider voice as a personal identifier that could lead to finding personal details of the interviewees. Most of the interviews were conducted via Skype. All the interview notes were translated into English for annotation and analysis. Selected transcripts were sent to an official translator in Norway to confirm the quality of the translations. Both texts were compared, providing a high level of accuracy, as shown in Figure 23.



2 Intervju I1. May 12, 2021. Small Fishing Company Owner

Q1: Tell me about your fishing business, how is it going?

Jeg har vært fisker siden 2016 som mannskap og i 2018 kjøpte jeg egen båt. Båten er fra 1981 så det er viktig å holde vedlikeholdet i orden. Jeg fisker med en annen person. (Vi er to)

I have been a fisherman since 2016 as a crew and in 2018 I bought my own boat. The boat is from 1981 so it is important to keep the maintenance in order. I'm fishing with another person. (We are two)

Forretningen har en god økonomi, det er viktig å ha utstyret i orden, det er bedre å bruke litt mer penger og kjøpe ordentlig utstyr (for å unngå større utgifter senere). Vi fisker med garn hele året.

The business has a good economy, it is important to have the equipment in good condition, it is better to spend a little more money and buy proper equipment (to avoid major expenses later). We fish with nets all year round.

Q2: How would you increase the value of 1kg of fish or simply grow your revenue?

For å øke inntekten, er det viktig å fokusere på flere fiskearter, som sei, hyse,breiflabb,rognkjekse, ur, og kveite. Det er begrenset hvor mye man kan tjene av å fiske bare torsk, jeg har åpen kvote, det tar meg et par (Max en uke hvis man ikke fisker med innblanding under sesong) uker å fiske den. Resten av året kan man fiske torsk sammen med andre arter(ferskfiskordningen) (for eksempel, hvis man fisker 800 kg sei, kan man også selge 200 kg torsk), det er ikke grense på hvor mye sei man kan fiske. En del av året kan man fiske opp til 50% torsk med sei (eller andre arter), det kan lønne seg.

To increase the income, it is important to focus on several fish species, such as saithe, haddock, anglerfish, lumpfish, Atlantic redish, and halibut. It is limited how much you can earn from fishing only cod, I have an open quota, it takes me a couple weeks to fish it (Max one week if you do not fish with interference during the season). The rest of the year you can fish for cod together with other species (the fresh fish scheme) (for example, if you fish 800 kg of saithe, you can also sell 200 kg of cod), there is no limit to how much saithe you can fish. Part of the year you can fish up to 50% cod with saithe (or other species), it can pay off.

En annen måte å øke inntekten på er å bruke mest mulig av fangsten. Torskehodet (breiflabbhodet - som veier 2/3 av fisken ca) har mye kjøtt, men fiskemottaket betaler ingenting for det.(mottaket betaler for torskehodet - 50 øre kg). Det er en kampanje å få andre

Job #91086748

$61.60

1 Interview I1. May 12, 2021. Owner of a small fishery

Q1: Tell me about your business, how is it doing?

I've been a fisherman since 2016 as a crew member and in 2018 I bought my own boat. The boat is from 1981 so it is important to keep the maintenance in order. I fish with another person (there are two of us).

The business is in good financial shape, it's important to have the equipment in order, it's better to spend a little more money and buy proper equipment (to avoid bigger expenses later). We fish with nets all year round.

Q2: How could you increase the value of 1kg of fish? Or get more income?

To increase your income, it is important to focus on several fish species, such as saithe, haddock, monkfish, lumpsucker, redfish and halibut. There is a limit to how much you can earn from fishing only cod, I have an open quota, it takes me a couple of weeks (Max one week if you don't fish with mixing during the season) to fish it. The rest of the year you can fish cod together with other species (the fresh fish scheme) (for example, if you fish 800 kg of saithe,

Figure 23 Extracts of the Researcher's Translation (Left) Compared to the Official Translation (Right)

Using the file comparison function of Microsoft Word, the results show 271 revisions between the two translations, as illustrated in Figure 24.

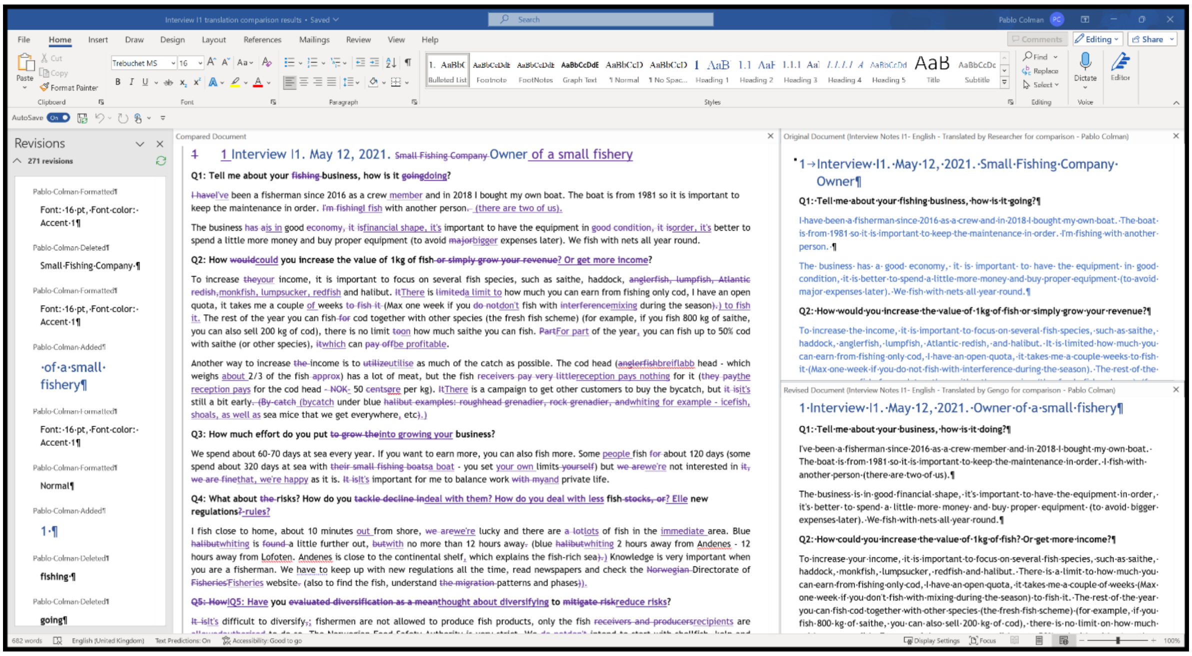


Figure 24 Comparison Between the two Translations Using MS Word Function

These revisions do not change the original message. Some examples include:

Table X Examples of the Revisions Between the Original Translation and the Official Translation

Researcher Translation	Official Translation	Comments
Small Fishing Company Owner	Owner of a small fisher	These two phrases have the same meaning, simply different writing styles.
I have been	I've been	Same
I am fishing with another person.	I fish with another person.	Imply the same message: the person fishes (or is fishing) with another person.
Grow your revenue	Get more income	Same message
Can pay off	Can be profitable	In the context of the original paragraph, these two have similar meanings
What about the risks	What about risks	The article "the" refers to risks related to the fishing industry.
Diversification as a means to mitigate risk	Diversifying to reduce risk	Both refer to risk reduction or mitigation

In summary, the researcher's translations indicate that the interviewees' messages remained unchanged.

3.3.2.1.- Sampling Strategy

Selecting the sample for the interviews was a process that took two iterations, explained below.

3.3.2.1.1.- Iteration 1 – Sample Selected from the Quantitative Data Analysis

The quantitative data collected and analysed in the research's first phase covered 265 small firms operating in the regions selected for the research. For the qualitative phase of the thesis, selecting a sample from this population was necessary. The sample selection criteria were based on the quantitative data analysis outcome, including firm age, revenue growth, and Profitability Index (PI), leading to a purposive sampling strategy.

The analysis of these data showed that 183 small firms had a positive annual revenue growth (greater than 0%). The data also indicated that 143 small firms had profits in the last year of the data

collected[21]. The data also showed that 10 (from the 265) small firms had operated since 2000. Another indicator evaluated was the PI, which measures the percentage of profitable years. This indicator showed that 49 small firms had consistent profits (PI=100%) and were operating for over two years from 2000 to 2019. The quantitative data also revealed that none of the firms working for more than eight years had a PI of 100%. From this analysis, the population for the interviews was selected. The criteria used are based on the literature review and finance literature, which proposes that growing firms maintain consistent profits (Buffet and Clark, 2008).

Research in the fishing industry shows difficulties in accessing the fishers since they seem protective of their environment and do not tend to open easily to outsiders (Maurstad, 2002). The selected firms were contacted via phone to arrange the semi-structured interviews. During these phone calls, the researcher introduced himself, explained the scope of the research, and asked if they were willing to participate as interviewees in the research project, but they respectfully declined. This challenge led to revising the sampling strategy, and a volunteer-snowball approach was adopted instead.

3.3.2.1.2.- Iteration 2 – Sample Selected Using a Volunteer Snowball Approach

The sampling strategy evolved from the probabilistic purposive technique explained above to a convenience snowballing method. One advantage of the purposive sampling approach is the opportunity to generalize from the selected interviewees (Adeoye, 2023), which is also a feature of a snowball non-probabilistic method (Obilor, 2023). Convenience and snowball sampling are typical in organisational and operations management research (Zickar and Keith, 2023; Saf'a et al., 2023; Akpan and Ukpong, 2023). One potential drawback of this technique is reaching sufficient numbers for the sample size (Zickar and Keith, 2023); this challenge was overcome by adding enough interviewees to the sample until the sentiments from these interviewees echoed and reached saturation.

The criteria for selecting the participants were access to them, their knowledge and relevancy to the research question, and voluntary participation. The first interviewee, a Northern Norway professor who authored many fisheries management papers, was purposively identified during the literature review. While this individual's research was not specific to firm growth, knowledge of fishing regulations, fish stocks, and the evolution of the fishing business in Norway were considered essential aspects of this research. The following interviewees were identified using a convenience and snowballing technique. The second interviewee was the owner of Firm A. The researcher knows this individual, who started a business in 2018 by purchasing a small fishing boat. Firm A owner had contacts with other small firm owners and people who work(ed) in this industry and made several

21 2019 was the last year of the sample, some firms did not have data in 2019, so data from 2018 was considered for this analysis.

referrals. The first referral was to a person who works in a bank, has access to several other firm owners, and has knowledge of firm growth and risk management in the fishing industry. The second referral was to a friend who owns a small firm and has been in business since the 1990s. This interviewee also referred to another friend who had inherited a small firm from his parents. The fourth referral was to a person who was retired from the fishing industry and managed to grow the small business into a medium-sized firm, which the person passed on to the dependents. The bank worker referred to an additional firm owner, who managed to grow a firm from one small fishing vessel to a medium-sized firm[22]. Due to the prolonged exposure to the fishing industry, this person made another referral to a small firm owner. In total, eight interviewees were identified, summarised in the table below. Similar studies have used similar sample sizes (Merrien et al., 2008; Morgan, 2016).

Table XI Summary of Interviews Conducted

Interviewee	Code*	Interview Date	Mode of Interview**	Duration
Professor	Prof	18 June 2019	Face to Face	2.5 hours
Firm A owner	Firm A	20 June 2021	Face to face	3 hours
Small firm owner	I1	12 May 2021	Skype	1 hour
Expert (Finance)	I2	12 May-2021	Skype	2 hours
Small firm owner	I3	04 June 2021	Skype	2 hours
Medium firm owner & Fish producer	I4	11 August 2021	Skype	1.5 hours
Small firm owner	I5	20 August 2021	Skype	1 hour
Medium firm owner & Fishing boat manufacturer/owner	I6	20 August 2021	Skype	2 hours

*For confidentiality purposes, contact information and names are omitted[23].

**The use of social media in interviews is becoming widespread since it offers many advantages and an alternative approach to face-to-face interviews (Gibson, 2022). Skype and WhatsApp are good examples of this. Both offer synchronous methods.

22 Medium size firms operate one or two vessels of size between 11-20 meters.

23 For auditing purposes, the consent forms and other relevant information from the interviewees could be made available to the examiners upon request.

While WhatsApp has the advantage of having the text already transcribed, the means selected for some interviews was Skype since it provides more extensive content during the discussion. It is not limited to written text in a message.

The inclusion of a medium size firm in the sample helped to understand how a firm owner managed to grow the firm from small to medium, which contributed to the research question.

3.3.2.2.- Semi-Structured Interviews Design

The interviews were semi-structured, where a set of themes and priming questions were identified from the literature review and quantitative data analysis, shown in Table XII. This tactic resembles the interview guide described by Patton (2002). The interview design followed the methodology proposed by Brinkmann and Kvale (2015) because of the relevancy and thoroughness of their approach. Due to the nature of the research question, the interviews are qualitative, seeking to describe the experiences of human interaction in past events (Brinkmann and Kvale, 2015). The primary purpose of selecting this method for the interviews was to gain a deep understanding of the themes from the interviewee's perspective and their experiences.

A lack of structure in the interviews does not mean a lack of focus on the research questions; instead, it represents a conversational, open approach. The idea is to keep the interviewee as the central point and let the interview follow the information provided by the interviewees (Patton, 2002).

Table XII shows the link between the elements of the research question and the selected themes, as well as a list of interview questions.

Table XII Interview Themes and Prime Questions

Research Question Elements	**Interview Themes & Questions**
Small Firms	**Theme:** Innovation & Risk **Potential Interview Questions:** How would you generate more value from one kilogram of fish? How are you leveraging innovation? In addition to fishing, do you have another job/income? Can you tell me about it? Can you tell me what drove you to have an additional job? What would it take for you to focus only on your small fishery? As a small firm, what are your main risks?

Research Question Elements	Interview Themes & Questions
	Who are your customers? Some biologists suggest that fishing should stop for one or two seasons to allow fish stocks to recover. What would this mean for your firm?
Growth	**Theme:** Growth **Potential Interview Questions:** How are you planning to grow your business? What factors may hinder this plan? Can you tell me about any innovative projects you carried out in the last two years? What results were you expecting, and did you achieve these results? How do you believe the government influences small firms' growth in the fishing industry? If you had a certain amount of money available to invest, where would you invest it? (Examples include buying a new quota, getting a larger boat, starting a fishing receiving co. etc.) How important are your customers for the growth of your firm? How are you using your internal resources to grow your business?
Fishing Industry	**Theme:** Small Vs Big / Climate Change / Environmental Sustainability **Potential Interview Questions:** How are regulations affecting your business? For example, tell me what upgrades you have done to your vessel to meet the latest environmental restrictions. Your primary income is cod. Have you evaluated diversifying into other areas (examples include crab, seaweed, aquaculture, etc.) Do you invest in environmental initiatives? Have you considered this as an area for future growth?
Fish Stocks Decline	**Theme:** Fish Stocks Decline **Potential Interview Questions:** How are you managing the year-on-year fluctuations in allocated quotas and fish prices as a small firm?

Research Question Elements	Interview Themes & Questions
	If you can think of a fishing season a few years back, compared to the latest one, how much more or less effort did you have to put into fishing the total allocated quota? The cod migration patterns seem to change, and the fish is moving further north into the Barents Sea. How is this affecting you as a small player?

3.3.2.3.- Semi-Structured Interviews Daca Coding and Interpretation

Thematic analysis was the methodology selected to interpret the information collected. This method offers a flexible approach to locating patterns and themes within the content (Braun and Clarke, 2006). The analysis was adapted from the six-step process proposed by Braun and Clarke (2006), as shown in Figure 25. This methodology resembles the conventional content analysis presented by Hsieh and Shannon (2005), where data are analysed, and themes arise from interpreting the content and context. The theory chosen as the lens for the research is brought during the discussions or reporting phase of the analysis when using this approach (Hsieh and Shannon, 2005). This approach is deemed valid for the research's abductive exploratory and explanatory nature and enables the researcher to gain direct information from interviewees without imposing a preconceived theory (Hsieh and Shannon, 2005). It is also important to mention that unlike discourse analysis and conversational analysis, which require detailed, high-quality transcripts (Silverman, 2014), thematic analysis does not prescribe one unique way to collect and record the data (Braun and Clarke, 2006), which for this research were notes taken by the interviewer during the interviews.

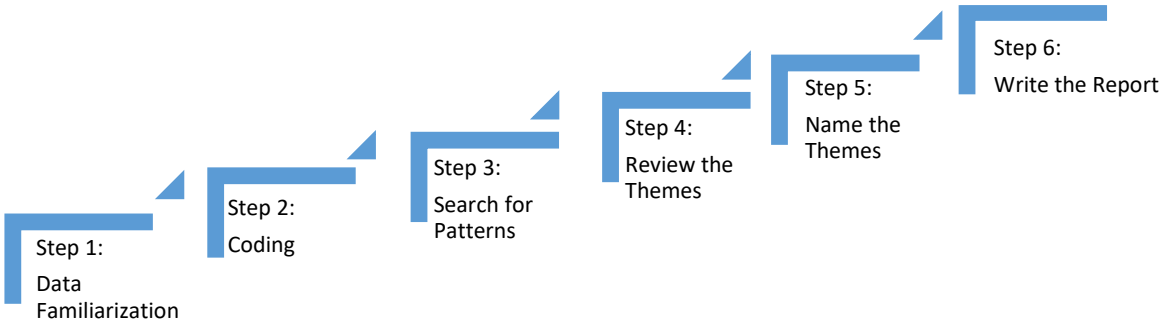


Figure 25 Thematic Analysis Steps (Adapted from Braun and Clarke, 2006)

The analysis and interpretation of the data include immersion in the content in an iterative approach and understanding of the data (Green et al., 2007; Schreier, 2012; St. Pierre and Jackson, 2014). Green et al. (2007) propose maintaining a theoretical standpoint running in the background of the analysis,

driven by the researcher's theoretical and analytic interest and the research question (Braun and Clarke, 2006). The following sections (3.3.2.3.1.- Data Familiarization, 3.3.2.3.2.- Coding, 3.3.2.3.3.- Search for Patterns, 3.3.2.3.4.- Review the Themes, 3.3.2.3.5.- Name the Themes, 3.3.2.3.6.- Write the Report) expand on each of the steps shown in Figure 25.

3.3.2.3.1.- Data Familiarization

Considerable time was spent reviewing the interview notes and reflecting on the content to identify vital information to answer the research question. The notes were read several times to determine the relevancy of each sentence or group of words to answer the research question. This phase of data familiarization was the initial stage of reading and interpreting the data using a method like the one proposed by Lapadat and Lindsay (1999). For the familiarization process, all the notes were placed into one Microsoft Word file, which allowed for an initial acquaintance with the data's depth and breadth (Braun and Clarke, 2006). At first, these notes were narratives that, without understanding the terminology and context, would have provided limited information. So, immersing in these data and grasping all the concepts was necessary by actively reading the dataset several times in search of clarification and patterns (Bruan and Clarke, 2006). Below are some examples that illustrate the familiarisation process:

- "I have been a fisherman since 2016 as a crew and in 2018 I bought my own boat. The boat is from 1981 so it is important to keep the maintenance in order. I'm fishing with another person. (We are two)" (I1)

This extract from the interview I1 mentions the word ***crew***, which in this context means a member of a group of people working on board a fishing boat. The interviewee continues, and mentions ***bought my own boat***. These two sets of words in isolation may not provide any information, but the data starts to yield patterns when looking at the research question. For instance, the word ***crew*** paired with ***bought my own boat*** could be related to the element ***small firms*** in the research question, since such firms tend to have one owner, as shown below:

How can small firms grow in an industry where the natural resource is in decline?

Likewise, in the same extract of interview I1, the interviewee mentions the construction year of the boat (***1981***), which in this context relates to the age of the boat. In isolation, this age may not provide any meaning, but when paired with the other group of words, ***it is important to keep the maintenance in order,*** a pattern may start to arise related to the element ***grow*** of the research question.

Another example is this extract, also taken from the interview I1:

- "To increase the income, it is important to focus on several fish species, such as saithe, haddock, anglerfish, lumpfish, Atlantic redish, and halibut. It is limited how much you can earn from fishing only cod, I have an open quota, it takes me a couple weeks to fish it (Max one week if you do not fish with interference during the season). The rest of the year you can fish for cod together with other species (the fresh fish scheme) (for example, if you fish 800 kilograms of saithe, you can also sell 200 kilograms of cod), there is no limit to how much saithe you can fish. Part of the year you can fish up to 50% cod with saithe (or other species), it can pay off" (I1)

This extract is full of technical terms and jargon used in the fishing industry. For example, the interviewee mentions ***saithe, haddock, anglerfish, lumpfish, Atlantic redish, and halibut***. These fish species found in Northern Norway have commercial value and relate to the element ***natural resource*** of the research question. The interviewee also mentions ***open quota*** that relates to the element **decline** in the context of the research question***.***

This extract also provides information related to techniques that could increase revenue: ***you can fish for cod together with other species.*** The message in this statement is not that obvious; it indicates an opportunity to get additional cod as bycatch when capturing it with other species, which may yield a significant increase in income. This statement relates to the element **grow** of the research question.

Another example is the following extract from the interview I2:

- "In the bank, part of my job is to analyse risk. For most fishermen, the risk is low if they stay in the open quota. There are very few who go bankrupt. They earn about 1 million NOK a year and have no debt. " (I2)

Briefly, this statement may just relate to risk management, but in this context, it could yield additional information, for instance, the stability of the business when staying in an open quota, which relates to the element of **grow and industry** of the research question. This statement and the following ones from Firm A are complementary:

- "The initial estimates provided a total revenue of NOK 1,718,000, with a net before taxes of NOK 1,161,000. This was a promising start with the forecast to increase in the next years. The 2018 results did not yield any revenue and ended up with a net loss of about NOK 11,000. At this point the reasons were evaluated, there was no fishing in 2018 due to a late start of the season and other external constraints, so we kept similar estimates for the 2019 results." (Firm A)
- "a bank loan of about NOK 1,400,000 to cover the expenses." (Firm A)

Firm A may be one of those few that go bankrupt, or this is a typical performance in the initial phases of a startup. Such statements relate to the elements **grow and industry** and provide general insights into a small firm's economics in Northern Norway's fishing industry.

The following is an extract from the interview I3:

- “the problem is the price per kilo, it also changes, for example, in 2020, I sold fish for 42 NOK per kilo, this year I got 24 NOK per kilo. There is a lot of ups and downs and variety every year. The buyers are very clever, they can sit and wait. Some of the fish go abroad (Portugal, Spain, Brazil, etc.), they know that if the quota is larger, they can buy more fish for less money,” (I3)

This statement shows the fluctuations of the price per kilogram of fish year on year, which relate to the element of **industry and decline** of the research question. It also provides information about the dynamics between different players in the industry (e.g., fishers and buyers).

Reading the data several times allowed the researcher to understand the terms used, the context of the discussions, the identification of similarities, and the sentiments in the dataset, enabling the researcher to start taking notes and capturing general ideas (Braun and Clarke, 2006). The next step was coding the data.

3.3.2.3.2.- Coding

The subsequent phase in the analysis was the coding of the interview notes. Each interview was first analysed independently and then combined with the whole dataset (Green et al., 2007). The coding is an iterative process in which the dataset is read and organized several times, and the codes evolve after each iteration (Braun and Clarke, 2012).

The interviews were coded using the comments function of Microsoft Word software. Each section of the dataset was analysed and coded separately. Figure 26 shows an example to illustrate the coding process.

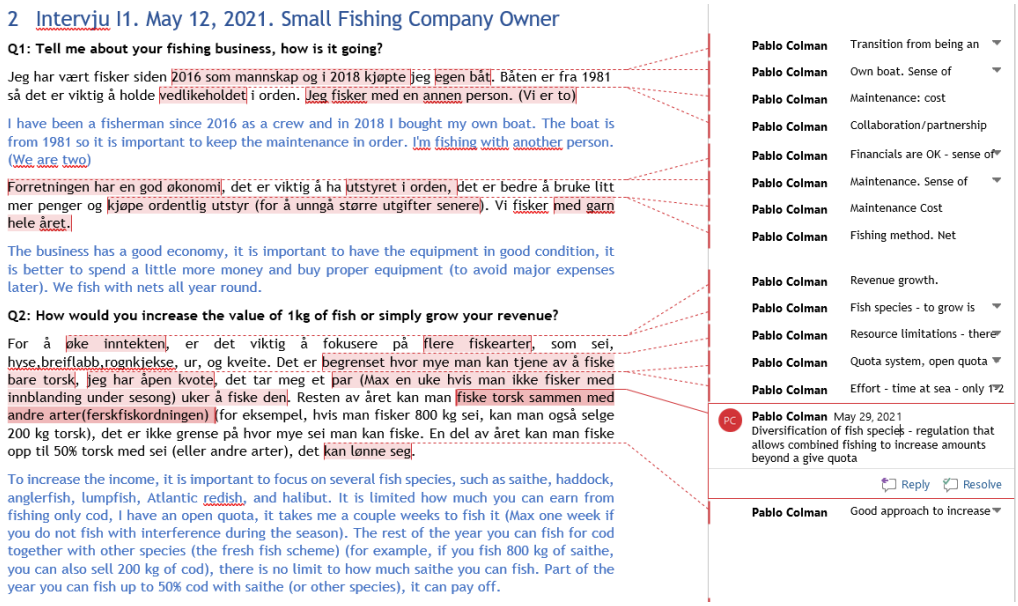
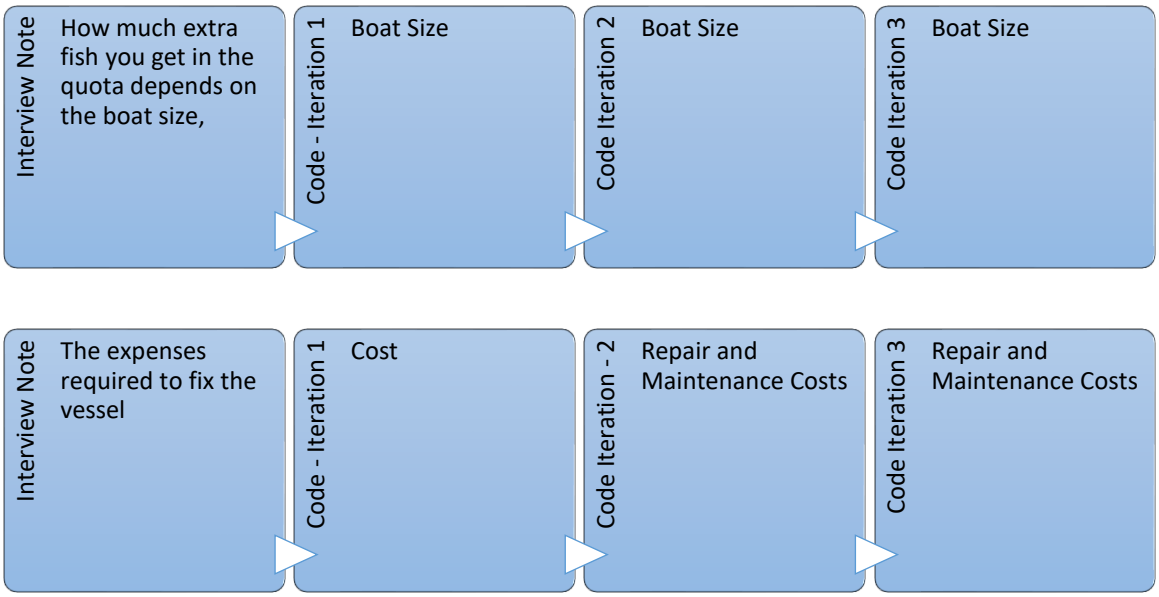


Figure 26 Illustration of the Coding Process Using Microsoft Word

The identification of the codes came from the content discussed during the semi-structured interviews. Each word and sentence were read and analysed separately to identify, from the content, words or terms that could relate to the message provided by the interviewee. For example, if the interviewee talked about expenses to fix the vessel, a code about costs could be identified; likewise, if the interviewee spoke about fishing location, a code related to the location was documented. As illustrated below, the codes were revised and modified on each analysis iteration if needed.



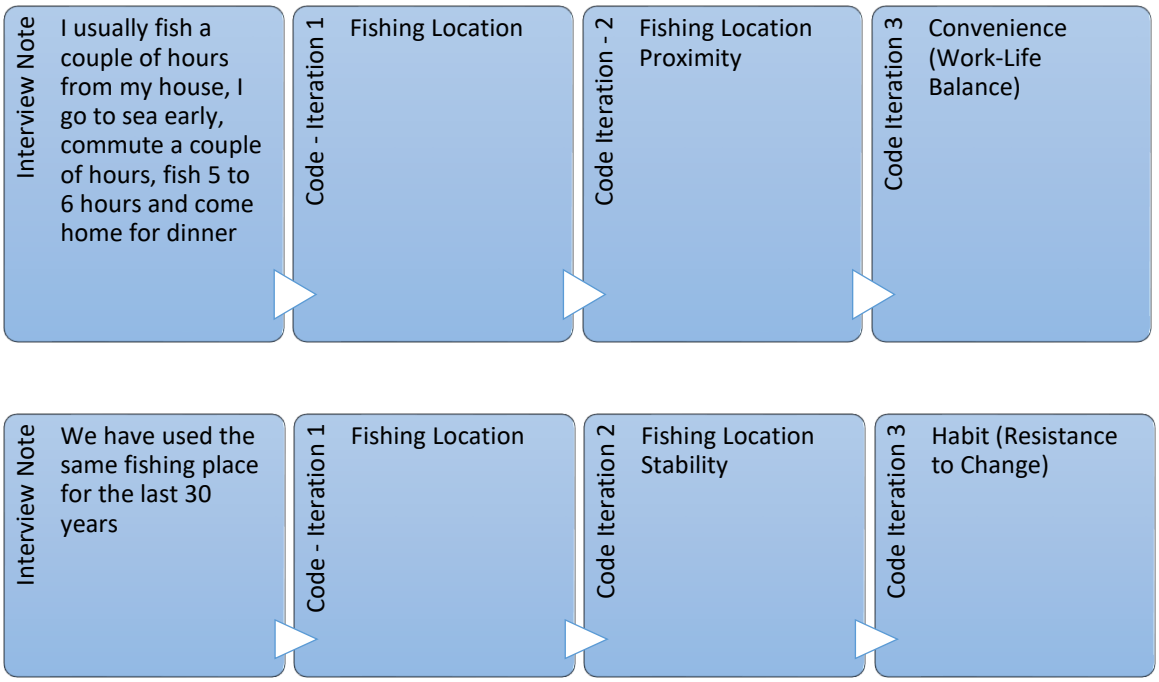


Figure 27 Illustration of the Coding Iterative Process

The codes were descriptive of the content and interpretative, based on the researcher's view and conceptualization (Braun and Clarke, 2012). The coding followed the deep dive of the data familiarization and hence is not purely keywords of the content, but rather words that capture a pattern or idea. The first example in Figure 27 shows a code called **boat size**, which did not change in the various iterations. The second one shown in the same figure is **cost**. This code captures the notion of the expenses required to maintain and repair a fishing boat. This code did not change much in the three iterations; additional words were added to clarify and specify the **repair and maintenance costs**. The next example is the code called **fishing location**. This code evolved in the second and third iterations. First, it evolved to add more clarity, from **fishing location** to **location proximity,** but this was not enough to capture the idea/message. During the third iteration, the code changed completely to **Convenience (Work-Life Balance).** In this example, the initial code evolved from something specific to a broader concept. It is not just about the location; it is more about the preference of the individual and work balance, which may be significant in answering the research question. Finally, the last example of Figure 27 also shows an evolution of the code **fishing location** to **Habit (Resistance to Change),** which is similar to the previous example; it is linked to the individual's preferences.

The iterations in the coding process involved coding the same material at separate times, which can enhance objectivity and reduce potential researcher bias (Schreier, 2012). The meaning of the codes is not straightforward. The codes may be interconnected because they are not fixed in people's minds

and depend on the social reality (Gioia, 2021). Coding was an iterative process that took significant time since active reading of the dataset yielded additional insights into each interaction. Below are examples of this iterative process to illustrate the coding rationale.

3.3.2.3.2.1.- Examples of codes that remained unchanged during the iterative process

The following interview extracts yielded codes that were not changed during the coding iterations.

- "A fisherman can catch up to 4.5 tons of fish in a few hours, there is much less handling today than before . It is not expensive to catch fish with a small shark[24]." (I6)

The code inferred from this statement was **efficiency.** Notes were taken for each code to provide insights into the relevancy of the code. For this one, the notes were: "Running the business efficiently at low costs is vital for growth. Innovation has enabled firm owners to improve the fishing techniques. In the 90s, a trawler could make NOK 15-16 million per year, today, the same trawler can bring in NOK 178 million with the same crew and lower costs."

- "I fish close to home, about 10 minutes from shore, we are lucky and there are a lot of fish in the area. Blue halibut is found a little further out, but no more than 12 hours away. (blue halibut 2 hours away from Andenes - 12 hours away from Lofoten" (I1)

The code that came out of this statement was **location advantage**. The notes were: "Being close to the fishing grounds provides flexibility. It is convenient."

- "The location of a fishing receiving facility is very important, many large boats have the capabilities to freeze catch on board, this makes it difficult for those who have facilities on land, since the boats can wait and drive longer distances before delivering fish." (I4)

This statement yielded the code **location of the receiving facility**. The notes taken were: "A must to succeed". This code may raise the question of why this should not be included in the location advantage code shown above. While there is no right or wrong answer, the rationale is that fishers are mobile and location is just an advantage, but the locations of receiving facilities are fixed, and hence, it is not just an advantage; it plays a much more critical role.

- "The situation improved for fishermen when the quota system was introduced. We now work under a well-structured quota system, every autumn it is decided how much fish can be caught

24 Shark is the term used in Northern Norway for a small fishing boat.

next year, the total amount is divided between the countries that fish in the North Sea and the Barents Sea. All boats get their own part calculated based on their size." (I3)

The code from this statement was **Regulations (quotas).** The notes accompanying this code are: "Quota system and regulations to protect fish stocks. Quota system structure. Close quota system, Steep increase in price – large capital gain. Quota system speculation. Close quota does not guarantee a minimum amount of fish. Open quota fishers get a lot less."

- "The company was registered in 2018, with 51% ownership to my father-in-law and the remaining 49% with my wife as the second shareholder . The distribution is linked to a regulation in Norway that does not allow non-fishers to own a decision-making stake in a fishing company." (I1)

The code from this statement was **Regulations (firm structure).** The notes related to this code are: "The structure of the firm is also regulated, if a partnership is established between an investor and a fisher, the fisher must have 51% or more of the total shares. This may not attract many investors and could hinder additional funding using equity."

These codes remained unchanged since they had already captured the original idea.

3.3.2.3.2.2.- Examples of codes that were modified to add more clarity during the iterative process

The following interview extracts yielded codes that required minor changes for further clarification during the coding iterations.

- "Norway has different rules than, for example, Iceland, where most of the fishermen work for large companies. These companies own the entire quota. Icelanders come to Norway to fish, but as foreigners, they cannot own a boat larger than 15m." (I2)

The initial code from this extract was **regulations**. However, this code was too general and did not capture the idea of the statement, and it was modified to **regulations (local workforce priority).** The notes taken for this code are: "The Norwegian regulations do not allow foreigners to own a fishing boat above 15 meters long. This is a limitation to bring additional international funding."

- "The local news often show success stories of fishermen who start their own business," (Firm A)

The initial code from this statement was **media**. Likewise, this term did not capture the meaning and was modified to reflect **media influence**. The notes for this statement are: "The acquisition of the boat

and starting the business was a decision influenced in part by the positive and optimistic news presented in the media regarding start-ups in the fishing industry".

- "The easiest way to get in is with a large boat and quota, but we are talking about an investment of more than 25 million NOK, for the bank to lend money, you must come with at least 30% equity, it is about 7.5 million . Then you can get 100 tons of quota, if the price per kilogram is 25 NOK, we are talking about an income of 2.5 million NOK a year. This is not enough to cover all expenses. Another way to increase income is to fish other species all year round, many do" (I4)

The initial code from this extract was **loan-finance**. While it captured the message, it was modified to **financial aid – -loan** to add clarity. The notes related to this statement are: "A small firm may require NOK 25 million to start, this means NOK 7.5 million for the initial down payment and then borrowed from the bank. This investment may lead to acquiring a quota of 100 tones, with a price of 25 NOK/kilo, the revenue is around NOK 2.5 million per year, barely enough to cover operational costs and bank interests."

- "The rules are also fair, the crew earns as much as the owner, this is regulated, there are different rules if you have more than two people on board." (I2)

The initial code from this extract was **income**. It was necessary to clarify and change the code to **income crew member vs. boat owner**. The notes related to this statement are: "As a crew member, you may get as much as the boat owner. This may not drive many to undertake a start up. This is also regulated, and different rules applied depending on the crew size."

- "The fjord[25] cod is a little harder to find, there are many who can catch it" (I5)

The code from this statement was **local fish**. Likewise, this code did not capture the whole meaning and it evolved to **local fish decline**. The notes taken from this statement are: "The local cod however is getting less common, sizes are getting smaller, this fish is available all year round and there are changes in the patterns."

This series of codes did not evolve much, and additional words were added for further clarification.

3.3.2.3.2.3.- Examples of codes that show major changes in the coding iterations

The examples below resulted in codes that changed significantly during the coding iterations.

25 Fjord: a long strip of sea between steep hills, found especially in Norway (Definition from the Cambridge Dictionary)

- “The fishing industry has two distinct phases in the value chain: the first one includes catching the fish, this phase is where the fishermen belong to, the second phase involves receiving and processing the fish, this phase includes firm ashore” (I4)

In this extract, the code went from **sectors** to **fishing industry value chain structure**. The notes describing the statement are: “The fishing industry has several sectors. Put in a value chain, the fishers are in the first phase, the fishing receiving facilities and producers are ashore and form part of a different sector. They have different business models.”

- “it is important to have the equipment in good condition” (I1)

The first code from this statement was **maintenance**. It evolved to **boat reliability**, which covers a higher spectrum in which maintenance is part of. The notes taken from this statement are: “Boat reliability. Keeping the boat in good condition is important to maintain the boat running, there is also a safety implication if the boat breaks down in the middle of the sea. This is of particular importance for old boats (e.g., built in 1981).

- “it is important to have the equipment in order, it is better to spend a little more money and buy proper equipment (to avoid major expenses later).” (I1)

At glance, this code is similar to the one shown in the previous example and it was identified as **maintenance cost**. Nevertheless, the message is deeper than that and the code evolved to **knowledge fishing business**. The notes taken from this statement are: “It is better to spend more money in the proper equipment than spending time ashore repairing the boat due to technical breakdowns. This message is not only about maintenance, it is about understanding the implications of breakdowns to firm growth.”

- “maintenance, safety, everything” (I6)

From this statement, the initial code was **maintenance**. But, looking at the context, the code evolved to **safety**. The notes taken from this code are: “Boat upgrades and keeping the equipment in good condition are also paramount for safety, which in turn may be enablers of growth.”

- “A fisherman needs to understand the business and see all the details” (I1)

The first code was **details**, but this did not capture the underlying message and the code changed to **understanding the details**. The notes taken from this statement are: “Do not ignore the details, the growth of a firm depends on how good the owner evaluates all the angles.”

These codes evolved to capture the underlying message from the statements and in some cases the final codes were significantly different from the first one identified.

The next section (3.3.2.3.2.4.- Semi-Structured Interviews – Codes) shows all the codes identified from the interviews along a brief description, which illustrates the thoroughness of the coding process.

3.3.2.3.2.4.- Semi-Structured Interviews – Codes

The notes from each interview and the codes identified were documented in Microsoft Excel. The interviews' content generated 80 codes, described in Table XIII.

Table XIII Codes Generated from Interviews

Code	Description	Code	Description
Investment Opportunity	Opportunities to purchase old fishing vessels at a low price	**Best Practices**	There are opportunities to adapt practices from other sectors in the industry, such as salmon producers. Leverage their experience and reputation.
Capital Investment	An initial investment, boat purchase and quota is required to start the business.	**Location Advantage**	Proximity to the fishing grounds is considered an advantage since it reduces the logistic costs.
Transition to Entrepreneurship	Self-actualization and the sense of achieving something unique, starting something independently	**Fishing Location Proximity**	Proximity to the fishing grounds is convenient. It provides flexibility – and enables work-life balance.
Boat (Firm) Owner	Sense of ownership and independence	**Fishing Location Stability**	Stability of cod migration patterns, fishing at the same location year on year
Fishing Family Tradition	Business knowledge – experience, known expectations	**Location of Receiving Facility**	A must, the wrong location for a receiving facility may lead to bankruptcy
Inheritance	Families that have already acquired quotas have an advantage. Newcomers with no quota will have to make significant investments.	**Fishing Location Incentives**	Fishing/residing in Finnmark provides certain benefits and government incentives.
Repair and Maintenance Costs	Spending more on maintenance pays off in the long term.	**Fishing Location Constraints**	Small vessels cannot fish in specific fishing grounds far from the coast.
Boat Reliability	Boat reliability. Keeping the boat in good condition in the short season is vital to avoid taking it out of service	**Fishing Location Knowledge**	Knowing where the fishing grounds are located is essential for the success of small firms.

Code	Description	Code	Description
	for repairs. A breakdown at sea is not only very dangerous but also very expensive to engage a rescue boat. Also, having the fishing gear in good condition means the job can be done quicker and more efficiently.		
Boat Upgrades (Regulations)	Government regulations require the boats to meet minimum technical requirements. For instance, the boat's electrical system had to be replaced entirely. This regulation represents additional costs and time ashore in the workshop.	**Knowledge (Regulations)**	Likewise, knowledge of the regulations is important
Efficiency and Operational Costs	Running costs should be minimized. An example is upgrading engines to new efficient ones to save fuel. Fishing techniques are also essential to improve efficiency. The best way to maintain a good profit is to be cost-effective.	**Knowledge Fishing Business**	Knowledge of how to operate the boat, fishing migration patterns, seasons, how to read weather forecasts, among others
Efficiency with Innovation	This area is not seen as a direct need. The bigger boats have a lot of technology and are very efficient. Innovation is not a priority for the fishing techniques used in a small boat, maybe in the long term.	**Experience**	It is important to understand the industry well to succeed as an entrepreneur. Holding several leading jobs before starting a firm is an excellent way to gain this knowledge. Coming from a fishing family also provides experience.
Technology	Technology from the salmon industry could be adapted to improve productivity in the white fish industry. Particularly at the receiving and producing end. The problem is not how much fish is available but how much can be processed.	**Family Tradition**	Business knowledge – experience, known expectations
Safety	Accidents at sea may have severe consequences, both personal and financial.	**Education**	Formal fishing education. Limited how much tacit knowledge can be acquired

Code	Description	Code	Description
Vision and Strategy	A clear vision and goal from the beginning are critical to make a path to success.	**Understanding the Details**	The growth of a firm depends on how well the owner evaluates all the angles.
Media Influence	The news may impact decision-making.	**Regulations (Quotas)**	The fishing industry in Norway is heavily regulated, and quota systems are in place to avoid overfishing and extinction of the species.
Business Reviews	Regular reviews to evaluate the performance of the firm – not a common practice	**Regulations (Firm Structure)**	The firm's structure is also regulated, if a partnership is established between an investor and a fisher, the fisher must have 51% or more of the total shares. This rule may not attract many investors and could hinder additional equity funding.
Financial Aid - Loan	Loans impact the risk profile of the firm. Understanding this as a firm owner is	**Regulations (Local Workforce Priority)**	Norwegian regulations prohibit foreigners from owning a fishing boat over 15 meters long. This rule is a limitation to bring additional international funding.
Market Conditions	The market conditions are changing. The oil and gas industry is in the phase-out, but the fishing industry is still growing and will substitute the oil and gas in the future. Immense growth opportunities. Current trends, such as the circular economy, present options to change business models and grow the firms. Norway is in a favourable position at present.	**Price Fluctuations**	Prices follow the allocated quota and fluctuate. Fishing receiving facilities are exposed to price fluctuations. They could buy the fish from the fishers at a higher price than they could sell it for.
Financial Performance	The small fishing firms are making a profit. Sense of satisfaction with the financial performance of the firm	**Regulations (Vessel Ownership)**	A person not registered in Blad B cannot own more than 49% of a fishing firm; this makes it less attractive for investors since they will have no voting authority in the firm's decisions. This rule protects the local workforce and forces firms to grow organically.
Business Admin	Fishers are happy at sea and have limited administrative skills to drive a business – nor do they have the will to do so, which hinders growth since a growing firm will	**Species Diversification**	Increasing revenue by fishing several species – following them during the year – all seasons.

Code	Description	Code	Description
	require more administrative work.		
Perseverance and Patience	The fishing business is not easily accessible, so it is essential to stay focused.	**Vertical Integration**	Small firms in the first phase of the value chain expand to become receiving and producing facilities.
Structured and Unbiased	The media and other players in the industry could mislead the decision-making process. Staying focused and taking an objective stand enables one to make the right decisions.	**Product Diversification**	As a fisher in the first stage of the value chain, there are limited options regarding the products; the firm would typically sell the catch directly to a fishing facility ashore. They could sometimes diversify to produce dry fish, which could be traded directly to restaurants and other retailers.
Assertive Decision Making	Fishers make decisions based on information – factual decision-making.	**By-Catch**	Catching cod and other commercial fish using a net also simultaneously catches different species. Still, the fishers have not identified their commercial value yet, which is an opportunity to increase the revenue.
Identifying Opportunities	The opportunities lie where others see problems. The government presents many challenges, which could become business opportunities to grow the firm.	**Unfished Quota**	There are several species for which the entirely allocated quota is not fished, representing an opportunity to close a gap. However, the limitation is that these species are found where small boats cannot reach them, too far out at sea. There are also unregulated species that offer an opportunity to grow.
Low Costs and Savings	As a small firm, it is vital to keep the costs at a minimum and save money for future investments to grow.	**Horizontal Integration**	Most common growth model. Buying additional boats and fishing rights. However, many firms keep only one boat. Sense of satisfaction
Collaboration	The fishing industry enables players to collaborate. It is a tight network, but opportunities to cooperate and grow together arise once in a while.	**Quota Trading**	Buying and selling quotas could generate a good profit. The privatization of the fishing industry opened a lot of opportunities.
Partnership	Choosing the right partners enables firm growth.	**Organic Growth**	Starting with a small fishing boat, expand to operate more. Growth is organic, not through the acquisition of other firms.
Roles and Responsibilities	The roles and responsibilities of the	**Prize per Kilo**	There is limited room for growth as a fisher. This group of actors in

Code	Description	Code	Description
	players in the fishing industry value chain are well-defined.		the value chain can only control the maintenance and operational costs; external factors such as price per kilo or quota allocation are outside their control.
Competition	There is not much competition for a small firm in the first phase of the value chain—simply the allocation of the quotas as the primary constraint.	**Boat Size**	The size of the boat plays a role in the company's growth. A firm owner with a small ship and open quota has limited growth possibilities. A firm with one or more boats of 15 m or more has a better chance to grow.
Ethics and Trust	Ethics is also a must when doing business. Choosing the right partners will also make it easy to trust them and sustain a successful partnership.	**Expansion Outside Industry**	Wise investment to use the money from the fishing business into opportunities arise to continue to enable growth.
Global Warming	Not perceived as a threat, cod comes yearly, and no changes are observed.	**Effort**	To fish the full cod quota takes two weeks, and the rest of the year can be utilized for other activities, like fishing other species, to increase the revenue. Fishing the whole year is an option if one wants to raise revenue. Different species can be caught during the various seasons.
Value Chain Structure	Firms in the different phases of the value chain have different business models.	**Work-Life Balance**	Sense of satisfaction with current state. Lack of will to grow since this will require more effort and time at sea.
Bankruptcy	Small firms in the first phase of the value chain rarely go bankrupt – Bankruptcy is more common in fish-receiving and producing facilities.	**Satisfaction**	The sense of comfort, the job offers a good life-work balance, and provides enough to get around – there is no need to grow – it is good as is. No sense of urgency. Optimism
Environmental Risks	Firms that produce dry fish face environmental risks, and the conditions for a good product are demanding.	**Income**	You may get as much as a crew member as a boat owner. This equality may not drive many to undertake a start-up. It is also regulated, and different rules are applied depending on the crew size.
Fish Stocks Decline	Not perceived as a threat	**Passion**	The fishers must love what they do to succeed; it is not about the money.

Code	Description	Code	Description
Small Fleet Displacement	Large firms displace small firms. These firms have large factory-vessels; high tech and very efficient operations that the small firms cannot compete against	**Hybrid Entrepreneurship**	Small firm owners often have parallel activities to maintain a reasonable income.
Risk Profile	Firms in the different phases of the value chain have different risk profiles – the closer to the final consumer, the higher the risk.	**Religious Belief**	Belief that God played a role in the visions of the future. Helping others is also a practice that, in the long term, provides rewards, both personally and in the business. It is not only about money.
Fish Farming	Aquaculture is a growing business but requires significant capital (around NOK 100 million), so small firms cannot afford to enter. It is also a very different business model with a different risk profile.	**Personal Drive and Desire**	Working hard to achieve set goals
Local Fish Decline	The local cod, however, is getting less common, sizes are getting smaller, this fish is available all year round, and there are changes in the patterns.	**Optimism**	Optimism does not mean making blind decisions and hoping for luck. Being realistic and understanding the whole picture is essential to stay focused and objective.
Climate Change	Same as global warming, not perceived as an issue	**Self-Actualization**	Growing the firm is not about making more money. It is about achieving a personal goal.

The coding stage was completed when the data were fully coded, and there were enough codes to capture diversity and patterns in the dataset (Braun and Clarke, 2012), which led to the next stage, search for patterns.

3.3.2.3.3.- Search for Patterns

In this stage, the analysis shifted from evaluating individual codes to examining the aggregated data. Multiple codes were grouped based on their similarities, leading to the generation of sub-themes and patterns (Byrne, 2021).

The themes emerged from the data. They were neither prescribed nor pre-set and relevant to the research question (Braun and Clarke, 2006). These themes were not the same as those identified during the interview design. The challenge was to start the coding with an open mindset and let the data drive the identification of the new themes rather than trying to put the answers of the interviews in the themes identified in the design phase of the interviews.

The generation of the themes was an active process where the initial codes were used to create patterns and identify broader issues (Braun and Clarke, 2012; Byrne, 2021). The aim was to collapse and cluster the codes into broader categories (Burnard, 1991). Each theme is distinctive, and using sub-themes was a steppingstone to further categorize the codes, since having too many themes, or too few, may lead to an incoherent dataset analysis (Byrne, 2021). A thematic map started to take shape at this stage, illustrated in Figure 28 (Byrne, 2021), where several codes relate to a sub-theme, and the sub-themes subsequently relate to a theme.

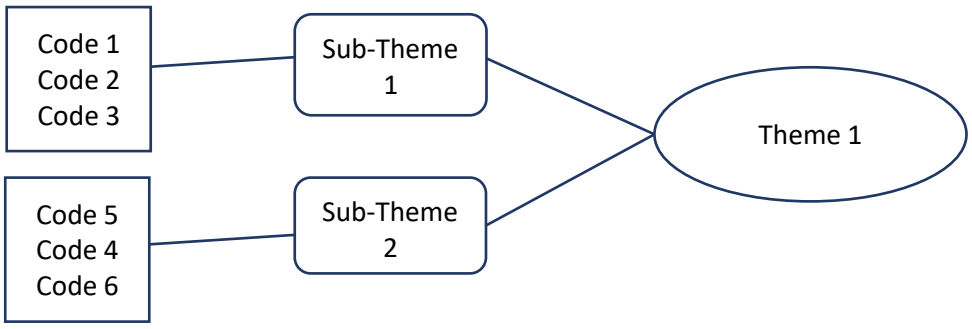


Figure 28 Illustration of a Thematic Map (Adapted from Byrne, 2021)

This initial thematic map represents the codes, sub-themes, and themes, but further detailed analysis of the interview notes was required to finetune the themes and ensure they hold as they were identified.

Identifying patterns in the dataset and creating the sub-themes is a stepping stone for the final development of themes (Byrne, 2021). When developing themes, the points listed in Table XIV were considered.

Table XIV Check Points to Evaluate when Developing Themes (Adapted from Braun and Clarke, 2013)

Check	**What to look for**
Is this a theme or just another code or sub-theme?	The theme captures a central organizing concept, containing several ideas and aspects of the data. The theme unifies these data extracts.
Quality of the theme	The theme is meaningful in describing the patterns in the data, and it helps to answer the research question.

Check	What to look for
Boundaries	The theme has clear boundaries. What is included and excluded in the theme is well described.
Coherence	The data extracted within each theme tells a coherent story. The title of the theme reflects these extracts and central concepts.
Boundaries and Themes Interrelationships	There are clear boundaries between the themes, and there is also a clear interrelationship among them.

Based on the data patterns and verification points listed above, themes were proposed and refined. The next step was to review these themes.

3.3.2.3.3.1.- Sub-Themes Identified from the Semi-Structured Interviews

Like the coding process, identifying patterns or sub-themes was an iterative process, and the final codes were grouped into patterns based on their similarities. The 80 codes presented above came from 148 interview extracts, each one was given a number (Extract #), and colours were assigned to each sub-theme for easy sorting, as illustrated in the examples of Table XV.

Table XV Sample of Interview Extracts and Codes

Interview	Extracts of the original text of the interview notes	Extract #	Code
Firm A	Other people were interested in the purchase and the paid price was 30% higher than the original offer.	C2	Capital investment
I2	Fish receiving facilities cannot be moved, they are in a fix location and depend on fishermen in the area delivering fish to them. Last year, the cod came to the outside of Lofoten, so the fish receivers on the inside did not get much delivery of fish.	C55	Location of receiving facility
I5	I see that innovation can help us grow over time, but not right now. We are managing well. The large boats use a lot of technology that makes it easier and faster to fish. We fish with nets and that's OK. We now have nets in 500 to 700 meters deep water to get blue halibut	C112	Efficiency with innovation

Interview	Extracts of the original text of the interview notes	Extract #	Code
I5	I have also worked on large boats as a crew, with the fishing education I got a navigator certificate, and I was a helmsman on a fishing boat.	C101	Education
I4	The easiest way to get in is with a large boat and quota, but we are talking about an investment of more than 25 million NOK, for the bank to lend money, you must come with at least 30% equity, it is about 7.5 million. Then you can get 100 tons of quota, if the price per kg is 25 NOK, we are talking about an income of 2.5 million NOK a year. This is not enough to cover all expenses. Another way to increase income is to fish other species all year round, many do	C87	Financial aid - loan
I3	The situation improved for fishermen when the quota system was introduced. We now work under a well-structured quota system, every autumn it is decided how much fish can be caught next year, the total amount is divided between the countries that fish in the North Sea and the Barents Sea. All boats get their own part calculated based on their size	C66	Regulations (quotas)
I6	Norway plays an important role in delivering food to Europe and Asia. It is a stable environment. We have good international cooperation, with Europe and the Russians. It is also very important to follow all the rules. Collaboration with good people is important. You manage to do this if you contribute. You have to give before you get	C138	Collaboration
I6	I have a housing project of 50 million NOK, this was a derailment, and it is still early to see how it will work. I mainly run a shipping company. I have reached my dream and I am now well settled.	C137	Expansion outside the fishing industry

Interview	Extracts of the original text of the interview notes	Extract #	Code
I6	got the gift to see the future	C115	Religious belief
I2	Norway has different rules than, for example, Iceland, where most of the fishermen work for large companies. These companies own the entire quota. Icelanders come to Norway to fish, but as foreigners, they cannot own a boat larger than 15m.	C148	Small fleet displacement

The next step was to group all the similar codes in a separate tab in Microsoft Excel, each tab represents a sub-theme. After 2 or 3 iterations, ten sub-themes were identified, shown in Figure 29.

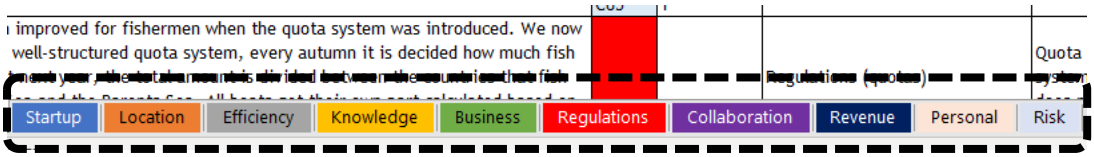


Figure 29 Illustration of Sub-Themes Identified from the Semi-Structured Interviews Dataset

Eighty codes and ten sub-themes were identified, shown in Figure 30.

Start-Up	•Investment Opportunity, Capital Investment, Transition to Entrepreneurship, Boat (Firm) Owner, Fishing Family Tradition, Inheritance
Location	•Location Advantage, Fishing Location Proximity, Fishing Location Stability, Location of Receiving Facility, Fishing Location Incentives, Fishing Location Constraints
Efficiency and Reliability	•Repair and Maintenance Costs, Boat Reliability, Boat Upgrades (Regulations), Efficiency and Operational Costs, Efficiency with Innovation, Technology, Safety
Knowledge	•Fishing Location Knowledge, Knowledge (Regulations), Knowledge Fishing Business, Experience, Family Tradition, Education, Understanding the Details
Business Acumen	•Vision and Strategy, Media Influence, Business Reviews, Financial Aid - Loan, Market Conditions, Financial Performance, Business Administration, Perseverance and Patience, Structured and Unbiased, Assertive Decision Making, Identifying Opportunities, Low Costs and Savings
Regulations	•Regulations (Quotas), Regulations (Firm Structure), Regulations (Local Workforce Priority), Price Fluctuations, Regulations (Vessel Ownership)
Collaboration and Competition	•Collaboration, Partnership, Roles and Responsibilities, Competition, Ethics and Trust
Revenue Generation Mechanisms	•Species Diversification, Vertical Integration, Product Diversification, By-Catch, Unfished Quota, Horizontal Integration, Quota Trading, Organic Growth, Price per Kilogram, Boat Size, Expansion Outside Industry
Personal Preferences	•Effort, Work-Life Balance, Satisfaction, Income, Passion, Hybrid Entrepreneurship, Religious Belief, Personal Drive and Desire, Optimism, Self-Actualization
Risks Management Capabilities	•Global Warming, Value Chain Structure, Bankruptcy, Environmental Risks, Fish Stocks Decline, Small Fleet Displacement, Risk Profile, Fish Farming, Local Fish Decline, Climate Change, Best Practices

Figure 30 Codes and Sub-Themes Identified in the Interviews

3.3.2.3.3.2- Grouping the Sub-themes into Themes

The analysis has been descriptive so far. Before identifying the themes, this stage of the research involved establishing a relationship between the codes, sub-themes, and the research question (Braun and Clarke, 2013). Not all the codes and sub-themes identified have the same significance to the research question, and further grouping and prioritization were required. At this stage of the analysis, prior to developing the themes, the sub-themes were mapped to the elements of the research question, as indicated in the Table XVI

Table XVI Mapping the Sub-themes to the Elements of the Research Question

Sub-Theme	**Element of Research Question**	**Remarks**
Start-up	Not in the scope	The start-up sub-theme has been identified to be on the critical growth path. Still, the research question implies that the firm has already been established, so the psychological and mechanical aspects of the start-up process are not relevant at this point and can be set aside.
Location	Growth Industry Natural Resource Decline	Location plays a role in multiple elements of the research question. As indicated in the interviews, firms can **grow** revenue by fishing additional species in different places. It is also linked to the context of the **industry**, in which location is paramount. Fishing grounds are at specific locations and fish migrate in particular routes, which relate to the **natural resource**, and finally, location also plays a role in **decline**, since certain fishing grounds (e.g., coastal locations) are becoming extinct.
Efficiency and Reliability	Growth	The data from interviews clearly indicate the importance of efficiency and reliability to avoid costs and maintain profits, which relate to **growth**.

Sub-Theme	Element of Research Question	Remarks
Knowledge	Small Firm Growth	Understanding the fishing business is vital, and for **small firm** owners this plays a key role in how they can **grow** revenues and maintain sustainable business.
Business Acumen	Small Firm Growth	Similar to knowledge, business acumen skills are important for **small firm** owners to **grow** their enterprises.
Regulations	Natural Resource Decline Growth	Regulations in this context relate mainly to the **natural resource decline** since it covers quota management. It also relates to **growth** because some of the local regulations may impact the firm and investment decisions.
Collaboration and Competition	Small Firm Growth Industry	This sub-theme describes how **small firms** can partner with other players in the **fishing industry to grow**.
Revenue Generation Mechanisms	Growth	Increasing the revenue has a direct relationship with the **growth** of the firms
Personal Preferences	Small Firm Growth	The preferences of the primary decision maker (e.g., firm owner) in the **small firm** are key on the **growth** of the firm
Risk Management Capabilities	Small Firm Growth Industry Natural Resource Decline	Risk management covers all the aspects of the research question

This mapping exercise was not intended to rank or prioritize the sub-themes, it was done as a tool to group sub-themes and initiate the development of the final themes, as shown in Figure 31.

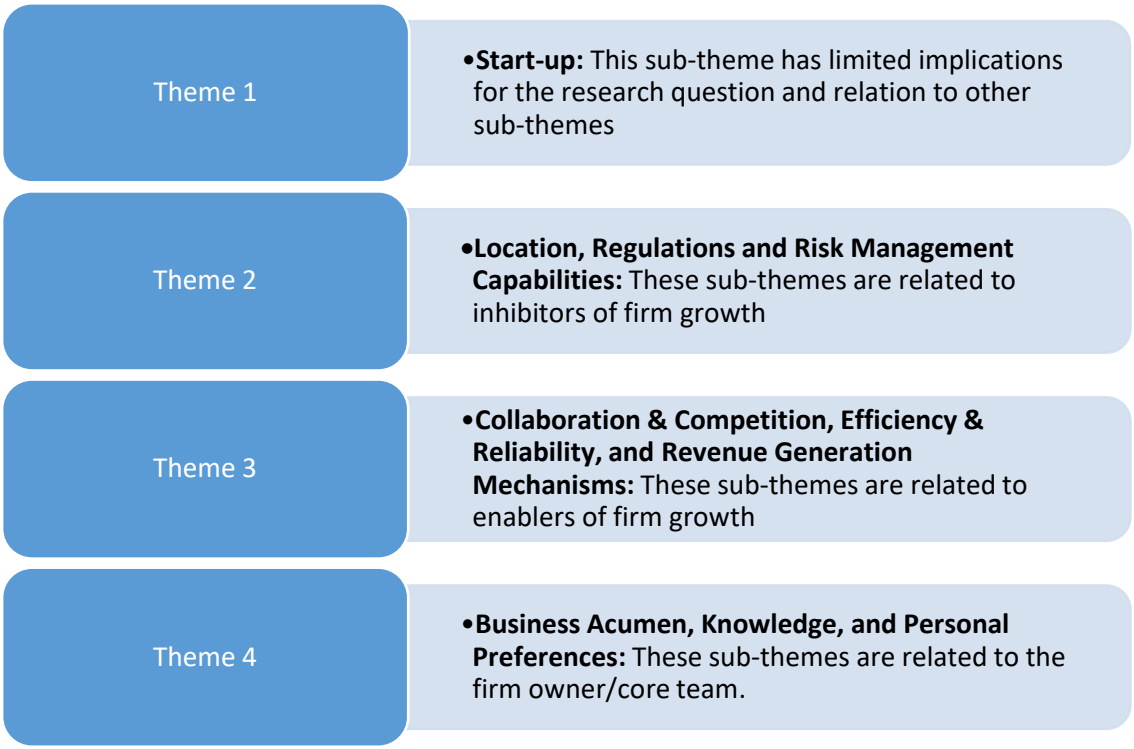


Figure 31 Grouping of the Identified Sub-Themes

3.3.2.3.4.- Review the Themes

This phase involved the refinement of the themes using two levels of analysis: the first level was to read all the collated data from the notes composing each theme; this led to some themes being removed or combined or new themes added to the thematic map. In this stage, some sub-themes or codes were relocated into other themes. The second level required reading the whole dataset and evaluating if the thematic map accurately reflected the interviewees' meanings based on the researcher's theoretical and analytical approach (Braun and Clarke, 2006). Another purpose of analysing the entire dataset was to establish relationships between the themes (Byrne, 2021). The evolution of the sub-themes is illustrated in Figure 32, where the sub-theme “start-up” was removed due to its limited relationship with the research question. The sub-themes “regulations and location as enablers” were added; these came from discussions in the interviews where some participants favoured these items as factors for growth.

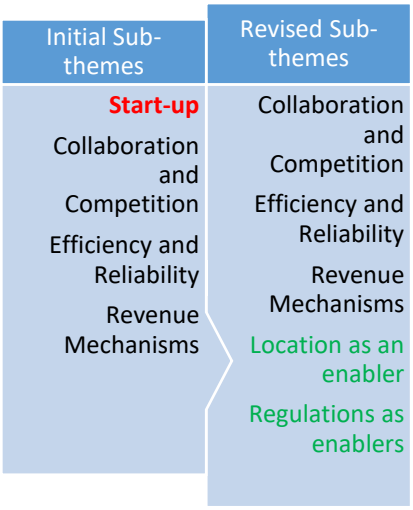


Figure 32 Illustration of the Evolution of Sub-themes During the Data Analysis

The output of this phase was a partially completed thematic map, in which each sub-theme is connected to one theme, as illustrated in the schematic of Figure 33.

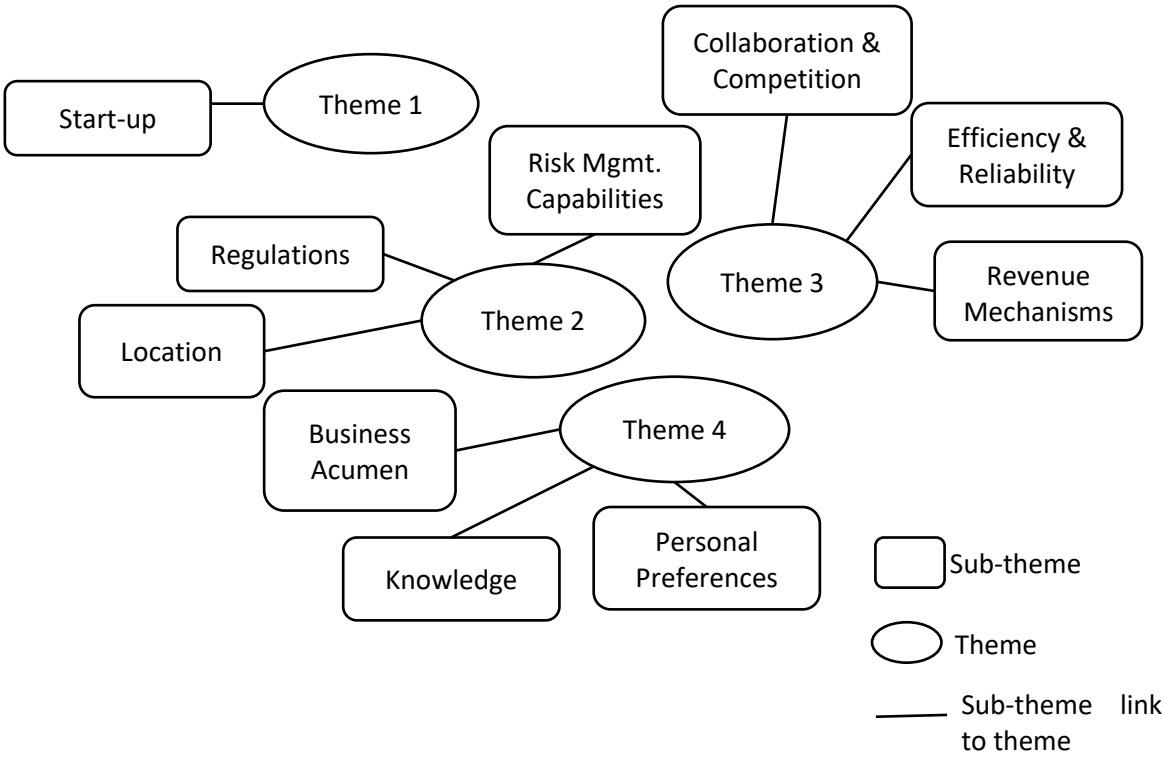


Figure 33 Initial Thematic Map (Adapted from Byrne, 2021)

The next step was to identify relevant names for each theme.

3.3.2.3.5.- Name the Themes

The analysis starts to become more interpretative, moving from the description of sub-themes and grouping, into the identification of meaningful themes that could lead to answering the research question. This step required reading and analysing each theme for further refinement. It was also the phase where the final names of each theme were established, and the overall story and narratives to answering the research question started to be built. The naming of the themes was not a straightforward exercise since there was no prescribed formula for this. The initial attempts resulted in almost a mirror of the sub-themes. For example, some themes identified were location, regulations, and risk, which limited the interpretation of their interface and interrelation, so it was necessary to elevate the analysis and recognise the messages from each sub-theme; this led to grouping them differently by looking at their similarities, for example, risks and regulations have several things in common, one factor is that both could hinder growth; hence, a theme for growth inhibitors was established. Likewise, other sub-themes like collaboration and efficiency, when elevating them to a level high enough to see their commonalities, led to selecting a theme for growth enablers, and so on. The final step in this analysis was to establish a relationship between the themes; in this case, all the

themes seem to interrelate; this relationship is represented with dashed lines in the thematic map schematic. As indicated previously, the startup sub-theme and corresponding themes were removed due to their lack of relevance to the research question. The final thematic map from the interview's dataset is shown in Figure 34.

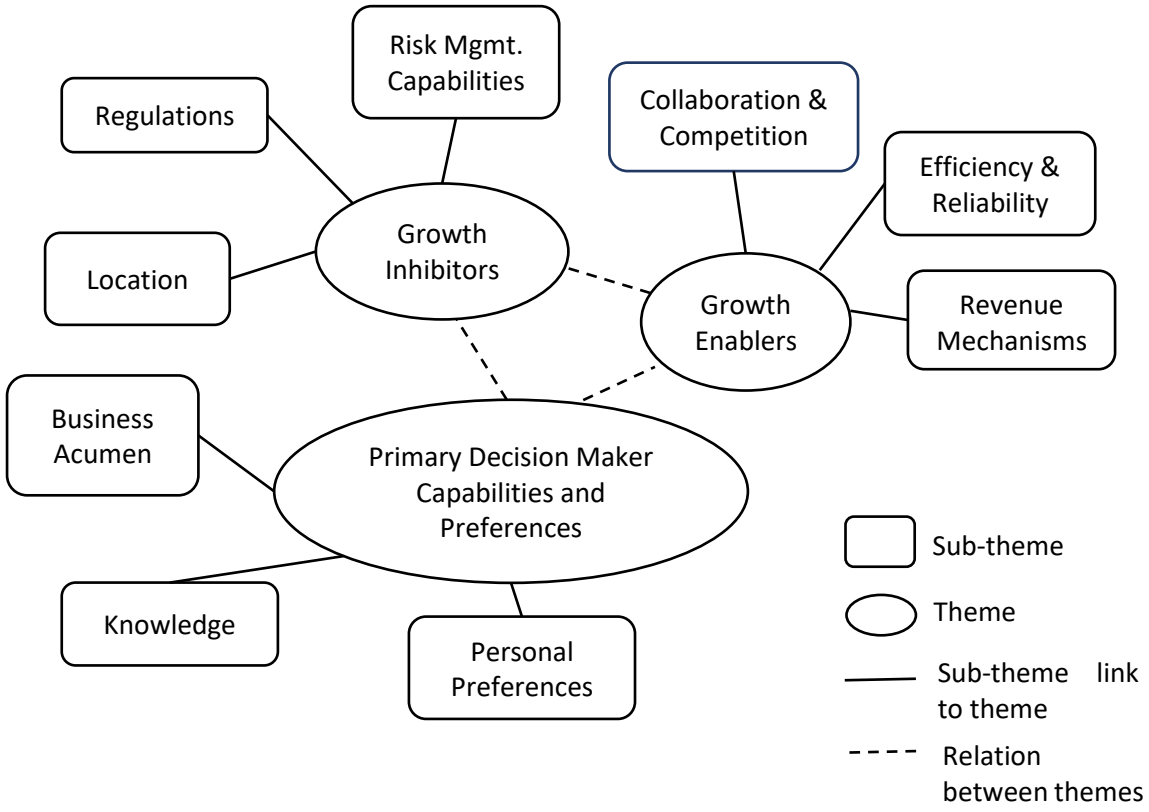


Figure 34 Sub-themes and Themes Developed from the Interviews Data (Adapted from Byrne, 2021)

3.3.2.3.6.- Write the Report

The final step was writing up the report. Here, all content was brought together, and the themes and the theoretical frameworks underpinning the research were interpreted. This research was abductive, and the theories of firm growth were considered during the analysis. In this stage, the narrative explicitly refers to new items adding to knowledge identified during the research or areas where empirical observations support existing theories. The narratives of the report are in chapters 5 and 6 (5.- Chapter Five: Qualitative Data Analysis, 6.- Chapter Six - Discussion).

3.3.3.- Phase 3 – Qualitative Data from a Professional Trade Publication Articles

The interview data yielded valuable results in identifying themes and answering the research question. Additional mechanisms were included to enhance the research quality with data triangulation to reduce researcher bias (Patton, 2002). For this, the decision was to increase the dataset in search of more answers that could bring additional knowledge to the research. At this point, several options

were explored, one being continuing with the interviews using the snowball method, but the outcome of the semi-structured interviews was already reaching saturation. The saturation of interview data led to seeking online resources, which is a method of data collection from documents available in the public domain (Silverman, 2014; Rapley, 2018). This search identified a professional trade publication focused on the fishing industry in Northern Norway called **Kyst og Fjord**[26], which releases a weekly volume. It was established in 2011 and won two prizes in 2021: The Best Journal in Norway, awarded by the Landslaget for Lokalaviser[27] (Hus, 2021), which indicated this data source was trustworthy and relevant for the research.

A timeframe for the articles was selected. The decision was to use one year's worth of data to evaluate all the fishing seasons; hence, 2021 and its 52 volumes were chosen since it was the most current year and could offer the most up-to-date information.

This professional trade publication offers articles rich in qualitative data from the perspective of the individuals interviewed and mediated by the journalists. The articles were carefully evaluated based on their relevance to small firm growth and the research question. The articles were selected by reading the headlines and then the content to filter out those relevant ones. This exercise led to the selection of 124 articles. The thematic analysis of the interviews was complemented with the article's dataset. The selected articles were written by 13 journalists, which provides robustness to the whole dataset and minimizes researcher bias. The dataset of these secondary sources yielded additional codes, sub-themes, and themes to strengthen the output of the semi-structured interviews, enabling more accurate answers to the research question (Silverman, 2014; Rapley, 2018; Yin, 2018).

The abductive method applied for the content analysis of the article's data, as described by Elo et al. (2008), should not be confused with the conventional quantitative approach of content analysis presented by other authors (Franzosi, 2009). It is tempting for a positivist researcher to run a series of statistical computations and find patterns in the data and correlations between the professional trade publication articles and the interviews, but this may side-track this research's explanatory nature. The articles' data, while serving as a venue to triangulate the outcome of the interviews, are an extension of the interviews' data set and should be treated accordingly.

3.3.3.1.- Analysis of the Articles Data

The analysis of this dataset started with scanning and filtering the content in the selected articles. Due to the secondary nature of these data, not all the content in the articles was relevant to the research

26 Translation to English: Coast and Fjord

27 Translation to English: Norwegian Local Journals Organization. Website: https://lla.no/

question, so each article was read carefully to select the extracts that offered pertinent information, as illustrated below in the highlighted text in yellow from the articles.

Fisket 41 tonn torsk i åpen gruppe

Det er absolutt mulig å gjøre det godt i åpen gruppe. En av dem er danske Svend-Åge Ankjær, som topper torskestatistikken i åpen gruppe for 2020.

KF Erik Jenssen
erik@kystogfjord.no

Ved å utnytte alle bonusordninger, bifangstregler og frie fiskeslag er det mulig å skape store tall også uten å kjøpe seg inn i de lukkede fiskeriene. Tall fra Norges Råfisklag viser at 19 båter i åpen gruppe har en total fangst på over 100 tonn i 2020.

Den aller beste båten er fra Myre, og drives av Gunnar Olafur Gunnarsson. Hans båt «Gunnar» har fisket til sammen 215 tonn, hvorav 114 tonn var hyse.

Interessert i været

På torsketoppen finner vi båten «Nemo» fra Berlevåg, med hele 41,2 tonn torsk og 142,8 tonn total fangst. Den 10,9 meter lange båten er sertifisert for bankfiske 2, og har seilt mange og lange turer i året som gikk, blant annet ut mot russegrensa og det kjente feltet «Bananen».

– Ja, jeg leser mange værmeldinger, ler skipper og eier Svend-Åge Ankjær når Kyst og Fjord ringer for å høre oppskriften på fiskerieventyret hans.

Voksen mann

- For dette klarer du altså uten å kjøpe kvote?

- Nei, kvote skal jeg bare glemme. Jeg er dansk med dansk statsborgerskap. Selv om jeg har bodd her siden 2004 sammen med min kone kan jeg ikke kjøpe kvote fordi jeg selv eier mer enn 51 prosent av aksjene i selskapet, sier Ankjær.

- Og ei kvote begynner jo også å bli dyr. Jeg kunne sikkert fått banken med på det, men jeg blir jo 71 år nå straks. Så akkurat nå er jeg ikke så begeistret med tanken på å satse så mye penger, ler Ankjær.

Sparer torsken

Han forteller at fiskeriet er anlagt på å utnytte bifangsten maksimalt. I fjor var han faktisk så sparsom med torsken at 9 tonn av garantikvota gjensto i oktober, og det fortsatt gjensto fire tonn av den garanterte torskekvota ved nyttår.

- Så vi får se hva vi gjør i år. Kanskje vi heller satser hardere på torsken for å bli ferdig med den til i mars. Da får jeg berga de ekstra tonnene som ligger i maksimalkvota, og så ligger vi i ro til vi starter på blåkveitefisket i starten av mai.

Til Lofoten for å unngå torsken

I løpet av 2020 ble det gjennomført 33 sjøvær, men antallet driftsdøgn er høyere ettersom det ofte handler om lange turer.

Blåkveita har han pleid å dra til Lofoten for å ta, for å unngå torsk sammen med kveita.

- Her nord får man ikke gunstig fordeling mellom torsk og blåkveite, og dermed har det blitt vanskelig å spare torsken.

Ringvirkninger

Selskapet hans, Linefisk AS ligger på en omsetning mellom 2,5 og 3 millioner kroner. På utgiftssiden finner vi en lønnspost på 1,5 millioner som forteller at han skaper adskillig flere arbeid enn til seg selv.

- Ja, jeg ror sammen med en kar som har vært mannskap hos meg siden 2018, og som har en stor andel i de gode resultatene jeg har hatt de siste årene. I tillegg holder vi én til tre egnere i gang. Du vet, linefisket er det dyreste man kan holde på med, ler Ankjær, som sier han er svært fornøyd med å kjøpe tjenesten fra folk som gjør den bedre enn han selv får til.

Svend-Åge Ankjær fra Berlevåg er torskemesteren i åpen gruppe, og nest best når total fangst måles opp. Driftsoppleget konsentreres om hyse og blåkveite, mens torsken spares så godt det går. Her i full sving med krabben. (Foto: Privat)

«Gunnar» har fisket mest i åpen gruppe. (Foto: Frode Adolfsen)

«Nemo» er 10,9 meter, og sertifisert for å gå helt ut på «Bananen». (Foto: Privat)

Figure 35 Article from Kyst og Fjord Online Publication 05 January 2021

The extracts were put in Microsoft Word and coded using a similar thematic analysis methodology as in the semi-structured interviews dataset (Braun and Clarke, 2006), with the difference in the number of iterations. For the articles data, since they were complementary to the interviews, only one iteration was done. The codes were placed in the existing themes identified during the analysis of the interview data, or in new themes, as described in the sections below (3.3.3.1.1.- Professional Trade Publication Articles – Coding and 3.3.3.1.3.- Professional Trade Publication Articles – Additional Theme)

3.3.3.1.1.- Professional Trade Publication Articles – Coding

The analysis of the articles yielded 18 additional codes, and a brief description of these other codes is provided in Table XVII[28].

Table XVII Additional Codes Generated from the Professional Trade Publication Articles

Code	Description	Code	Description
Location as an enabler - Commute	This code relates to the location of the fishing grounds. The fishing fleets commute long	**Boat selection**	The age of the boat plays a vital role in the efficiency of the fishing operations. New vessels are more

28 To avoid repetition, the codes that were generated from the interviews are omitted from Table XVII.

Code	Description	Code	Description
	distances to get to the various grounds and fish the different species throughout the year. The location code was described as a barrier to growth during the interviews; this is if one looks at it from a cost perspective. From a revenue generation perspective, following the fish to new fishing grounds significantly increases the total catch.		fuel efficient. They have the latest technology and fishing equipment to ease fishing activities and improve productivity. The boat size also represents an advantage for a small firm owner. Understanding the regulations and quota structure is vital to making the right decisions when buying a new vessel. The choice of vessel is critical in the growth path.
Environmental sustainability costs	The environmental trend is to optimize energy usage and reduce harmful emissions, so new boat designs are coming up with hybrid options; regulations are also expected to demand more environmentally friendly solutions.	**Efficiency through technology**	Technology continues to play a critical role in the fishing industry. Big firms have an advantage over small firms since they have more extensive cash flows that can be diverted to the investment of technologies.
Customer portfolio (Beyond the status quo)	Offering products to a wide range of customers is a mechanism to manage risk. A good example was the pandemic in 2020; while Europe reduced purchasing and imports, African customers still demanded products. Similarly, some local customers closed (i.e., restaurants), forcing the firms to go directly to the final consumers. There is also an increase in digital transformation to expand the customer portfolio (i.e., online orders, etc.).	**Business model flexibility**	There are different dimensions in this code. The first one relates to the adaptative capabilities of the firms, those that adapt to changes, perform better, and tend to grow. The second dimension is to have the skills to identify changes in the business models of other players to enable closer collaboration and partnership.
Environmental sustainability	Sustainable development. There is more pressure from the authorities and the public to find alternative production methods that do not damage the environment. Sustainability is both a growth barrier and a growth opportunity; several firms have taken it as an advantage to develop new products, expedite innovation, and get additional government incentives, to mention a few.	**Niche – Product Quality**	Niche differentiation. Norwegian fish products are known for their high quality globally, representing an opportunity to leverage quality as a growth mechanism.
Subsidies	The government provides financial aid for young entrepreneurs to buy their first	**Regulations as enablers**	Regulations were identified as growth barriers in the interviews' dataset, but the articles yield a

Code	Description	Code	Description
	boat. These economic incentives in the primary sector are a blessing and a curse.		different perspective, where specific regulations enable growth. A particular example is the limitation for shore-based businesses to own vessels enabling more collaboration and partnerships.
Partnership model – beyond the status quo	The partnership model includes research organizations outside the fishing industry to evaluate the development of new products from fish and sea products as raw materials.	**Growth through acquisition**	As a small firm starts to grow, the firm may raise enough capital to acquire other small firms.
Pride	There is a competition to determine which boats are the best in their class, and the crews closely follow the result to compete for first place. This competition is not a market competition but simply an incentive to perform better. The media widely present the results.	**Growth through innovation**	Innovation is an essential enabler of growth.
Safety preferences	The conditions of the vessel, particularly the features related to safety, are factors that individuals consider to work offshore; they may indirectly impact a firm's growth pattern.	**Risk appetite (Individual)**	The personal consideration of an individual to incur additional financial risk is a decision that could affect the firm growth.
Disruptions of fish farming	The aquaculture of whitefish is growing. The demand for fish is still sufficient for the firms fishing wild species to place their products in the market. As farming becomes more efficient and productive, the offer-demand ratio may be disrupted. Aquaculture of white fish could affect the growth of the firms fishing wild fish.	**Product diversification – Beyond the status quo**	This code relates to the customer portfolio. As new customers are identified, the product offerings must be revised to meet their expectations. A small fish company could integrate vertically to produce the final consumer product and sell the catch at a much higher value per kilo. It goes beyond the conventional products that firms are producing at present. There is a lot of research that shows that firms can embark on producing products for applications outside the fishing industry, or a small firm in the fishing industry could start producing feedstock for the aquaculture industry (such as some algae).

Below are some examples of extracts from the articles explaining the coding process and codes identified from the articles.

The article A8 states:

- “We wanted to move to Finnmark and establish ourselves there, so that we could get a crab quota and extra cod” (A8) (Jenssen, 2021e, p.8).

This statement continues to support location as a factor related to increasing revenue by acquiring additional quota and diversification of species.

The article A1 indicates:

- “It is certainly possible to do well in an open group” (A1) (Jenssen, 2021a, p.5)

This statement relates to the code of satisfaction: a small firm owner operating in the open quota group who managed to fish at least twice the allocated cod quota by fishing other species and using the benefits of the by-catch, as stated in the same article:

- “By utilizing all bonus schemes, by-catch rules and free fish species, it is possible to create large numbers even without buying into the closed fisheries. Figures from the Norwegian Raw Fish Association show that 19 boats in the open group have a total catch of over 100 tons in 2020. The very best boat is from Myre, and is operated by… His boat "…" has fished a total of 215 tons, of which 114 tons were haddock” (A1) (Jenssen, 2021a, p.5)
- “His company, … , has a turnover of between NOK 2.5 and 3 million. He spends about NOK 1.5 million in salaries, indicating that he is creating workplaces. - Yes, I fish with a guy who has been a crew with me since 2018, and who has a large share in the good results I have had in recent years. In addition, we keep one to three fishing lines in place. You know, line fishing is the most expensive thing you can do, laughs …, who says he is very happy to buy the service from people who do it better than he can” (A1) (Jenssen, 2021a, p.5)
- “At the same time, it is also about a strategy where they invest heavily in all species other than cod. - People must get the cod out of their heads, it is possible to fish for saithe for 12 kroner a kilo as well. You do not have to have 30 kroner a kilo for everything that is delivered” (A2) (Jenssen, 2021b, p.6)

This statement relates to the codes of species diversification and by-catch. They are well-known techniques to increase revenue. The additional revenue also supports the positive financial performance of the firm, crew member income, and efficiency & operational costs, which were also codes identified during the interviews.

In this article, Jenssen (2021a) presents a table from the fishing authorities showing 25 vessels in the open quota group that caught more than their allocated initial fishing rights. This data supports the

findings from the interviews. The diversification of species is an element that should be included in the growth model of a small firm.

The importance of boat reliability, another code identified during the interviews, was also highlighted in some of the articles:

- "We had not been fishing since November 10th after the helm was about to fall off. The boat went out after Christmas day. We had a few tons left of the quota we wanted to get caught" (A3) (Jenssen, 2021c. p.7)

In this statement, the boat owner indicates that they almost missed the window to fish the full allocated quota, which usually expires at the end of the calendar year.

Small firms performing well also put in additional efforts and spend more time at sea, as shown in A2. There is also an excellent example of how the risk profile of the firm could change with additional bank loans and poor financial planning:

- "People ask why we keep working as hard as we do, and never take a weekend off. But perhaps it is our history that made my son respond as he did once someone asked why we operated so hard: "If you operate as if you were going bankrupt tomorrow - then you will never go bankrupt." (A2) (Jenssen, 2021b, p.6)
- "In 1998, he experienced personal bankruptcy after a failed boat project, followed by several years of struggle to get rid of the debt." (A2) (Jenssen, 2021b, p.6)

During this interview, they mention an event in 1998 when the firm went bankrupt and managed to start again. This previous experience and the will to succeed drive this small firm to fish large amounts (638 tons in 2020) and produce good revenues, enough to pay a crew of three or more (which was also mentioned during the interview).

The factor of collaboration is also recurrent. Both in A1 and A2, this is evident:

- "Yes, I fish with a guy who has been a crew with me since 2018, and who has a large share in the good results I have had in recent years. In addition, we keep one to three fishing lines in place. You know, line fishing is the most expensive thing you can do, laughs …, who says he is very happy to buy the service from people who do it better than he can" (A1) (Jenssen, 2021a, p.5)
- "We have people who have been involved with us for several years. We thrive and work well in teams, and get a lot done when everyone knows each other well and knows what they have to do for things to work" (A2) (Jenssen, 2021b, p.6)

The codes of partnership, product diversification, and species diversification were frequently mentioned in the interviews. The articles take these codes further, demonstrating the importance of innovation and adaptability as mechanisms of growth:

- “Five articles present the history, different types of bait in the snow crab fishery, different heat treatment regimens for the snow crab clusters, management challenges related to a new resource, the profitability of the Norwegian snow crab fishery, and opportunities for utilisation of valuable components from the snow crab raw material.” (A13) (Johansen, 2021a, p.18)
- “We look at what values we can extract from the parts of the fish that the producers do not get paid so well for today, … explains. So far, researchers have been able to identify the inside of 20 molecules that the bacteria have made using the residual raw material. Some of the molecules are especially valuable. For example, it is one of those that is widely used by medical device companies in both blood pressure and allergy medicine. The value of this one molecule alone is 8500 kroner per gram” (A12) (K&F, 2021c, p.22)
- “The Dominican Republic and Jamaica are the largest importers of clipfish in the Caribbean. Turnover is highest in the Dominican Republic, but then there are almost four times as many people living as in Jamaica” (A14) (Antonsen, 2021a, p.5)
- “We are constantly working to reduce the load on marine species. But this is a development that will happen over time. We buy algae flour and algae oil already today, these are very nutritious raw materials, which in nature are the food source for just redfish” (A22) (Jenssen, 2021g, p.8)

The boat selection did not come up during the interviews as a critical enabler of growth. However, this item came up during the review of the articles:

- “The value of the fishing boat "…" has probably been two million kroner higher as a result of the two centimetres. Now boats of 11.01 meters are being built instead of 10.99. It can give an extra gain of two million kroner. This year, a 10-11 meter cod quota goes for NOK 4.3 million, if the quota is on a boat under 11 meters. But if the quota is on a boat over 11 meters, the price is quickly a couple of million higher, says Nofima researcher …. - This is because boats over 11 meters can be used as a structural object. But not those under 11. A little depending on what happens in the future, this can make a huge difference, he says.” (A59) (Erlandsen, 2021b, p.8)

Technology was not a hot item during the interviews, meaning that not all the interviewees saw it as an enabler of growth. In the articles, it is evident that technology and innovation are critical enablers of growth, as described below:

- "The technology behind the climate warehouse, which was completed last year, is so secret that … does not want to show pictures from the inside. - It was an investment of many millions, which is best suited to players with a certain volume of their stockfish production. But the feedback from our customers has been good." (A28) (Ellingsen, 2021a, p.23)
- "Since the new year, Selfa has signed a contract with four customers who want a hybrid shark. Now comes the electric wave, and at Rødskjær they are now rigging to meet the demand" (A34) (Jenssen, 2021f, p.30)

Other articles are showing a trend of technology to align with environmental sustainability:

- "First out with hydrogen" (A119) (K&F, 2021a, p.42)
- "Green fleet renewal is going too slowly" (A120) (Ingilæ, 2021a, p.36)
- "Cod farming with solar power" (A123) (Jenssen, 2022, p.15)

The articles also show the importance of having a flexible business model, a diverse portfolio of customers, and various products as factors to enable growth. Here are some examples:

- "The live catch, i.e., the cod taken alive on board and placed in a cage for at least three weeks before it is slaughtered, has initially received much praise. It is because this form of catch provides both increased quality, increased price and not least that some of the cod is taken from the market during the busiest winter season, and put back in later, when there is more agreement between supply and demand." (A75) (Erlandsen, 2021a, p.19)
- "African markets are becoming increasingly important for clipfish exporters." (A69) (Antonsen, 2021b, p.11)
- "Reverses negative trend with pot-ready stockfish" (A114) (K&F, 2021b, p.18)

In summary, the data from the professional trade publication articles provides supplemental information, and the additional codes identified should also be considered when developing a growth model.

3.3.3.1.2.- Additional Sub-Themes Derived from the Articles

The article's content is part of the entire data set. Ten of the eighteen additional codes resulting from the articles were grouped in one of the existing ten sub-themes from the interviews. The remaining eight codes were grouped into four additional sub-themes, as shown in Figure 36.

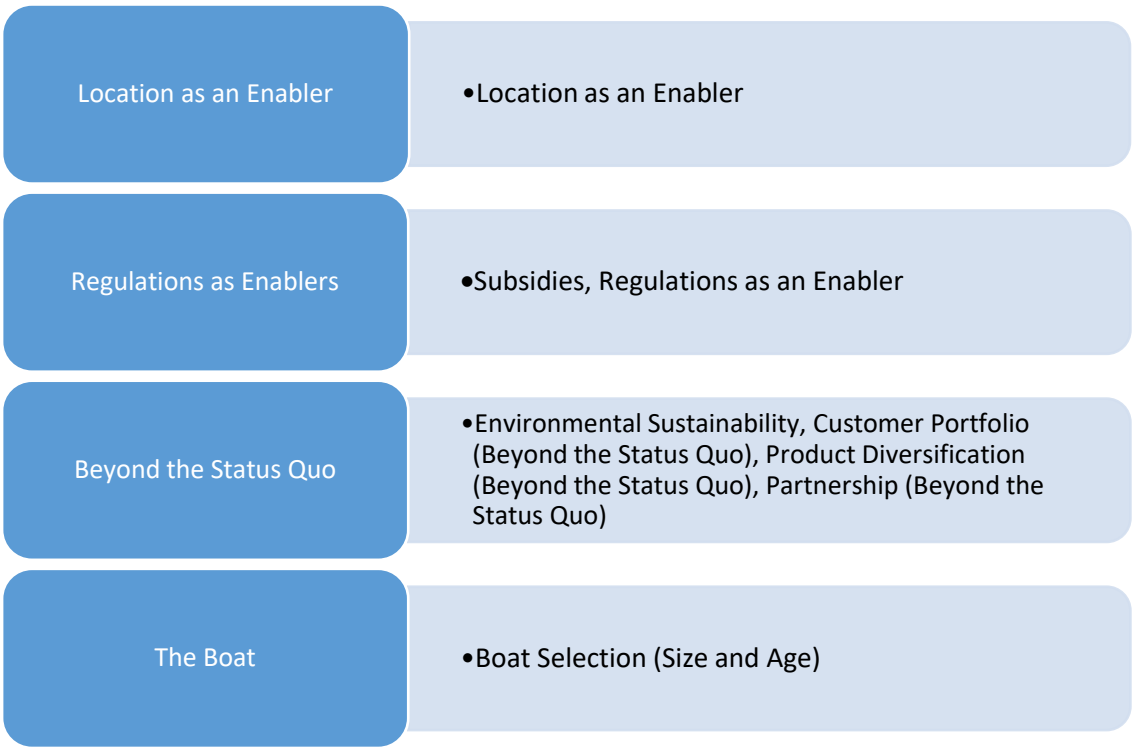


Figure 36 Additional Sub-Themes and Corresponding Codes from the Articles

The articles provided new perspectives, the new sub-themes 'Location as an Enabler' and 'Regulations as Enablers' were added to the theme 'Growth Enablers'. The other two new sub-themes, 'The Boat' and 'Beyond the Status Quo' deserved their own classification and a new theme was created for them, called 'Unexplored Options and Market Trends.'

3.3.3.1.3.- Professional Trade Publication Articles – Additional Theme

The data from the articles revealed a new theme derived from 'The Boat' and 'Beyond the Status Quo' sub-themes. This latest theme relates to factors still in an infant development and unexplored phase to adapt to new market conditions. Figure 37 shows the updated thematic map with all the identified sub-themes and themes. This map was the foundation of the growth model proposed as the primary outcome of this research.

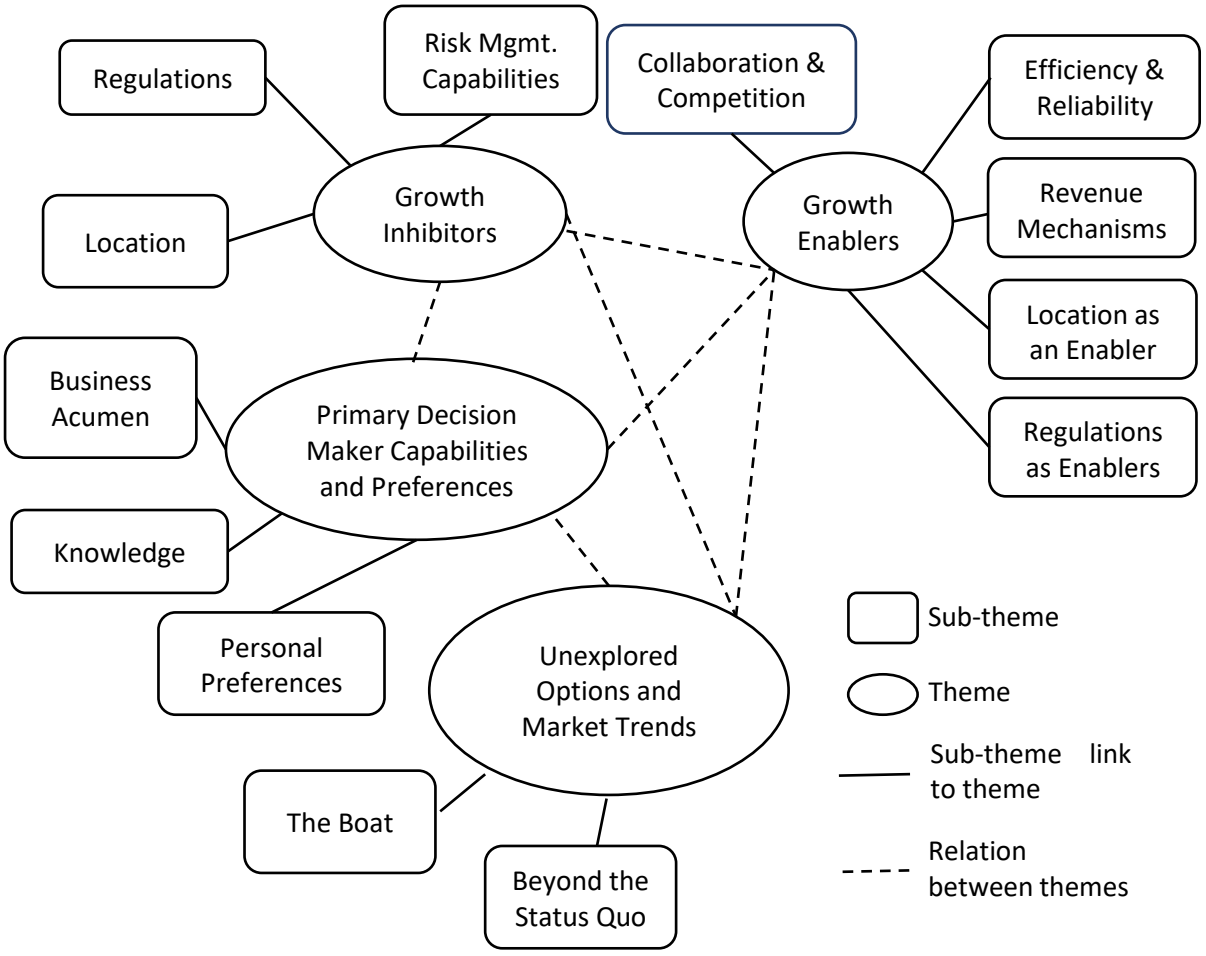


Figure 37 Updated Thematic Map with all Sub-themes and Themes from the Whole Dataset(Adapted from Byrne, 2021)

The new theme is related to the firms' primary decision maker preferences and capabilities, indicating that this person(s) must decide to grow to enable the growth of their firms. The unexplored options have first to be discovered and evaluated by the owner before pursuing them further. The new theme is linked to all the other themes. The final step was to update the report written during the analysis of the interview's dataset.

3.4.- Publication, Copyright, Data Protection, and Ethics

This research complies with the University of Buckingham's ethical framework, described in chapter 7 of the University's Research Handbook (Buckingham University, nd). The points listed below addressed all the requirements of this framework and the guidelines from the British Education Research Association (BERA, 2019). All content has been carefully reviewed to ensure all references to the original authors have been made in this thesis.

- This research does not include any copyright material.
- The work presented in this thesis is the researcher's work. No content has been plagiarized.
- The data were taken from official sources and referenced throughout the thesis.
- All records of the data and analyses are available in the event of an audit.
- Regular interactions were held with the University supervisors to monitor the research progress and analysis of the results.
- The design includes data triangulation and a mixed method to avoid data manipulation.
- The data collection remained confidential throughout the research, and all information was anonymised to avoid tracing it back to the individuals who participated. At the end of the research, all personal data were deleted, and the material remaining as a future reference was kept anonymous (Sikt, 2023).
- All interviews and interactions with participants were voluntary. The scripts of the interviews were shared with the interviewees to seek their consent to use them in the research.
- The output of this research is expected to yield a mechanism to develop a business model that small firms may adopt to improve their chances for success. It is unlikely that the output of this research will harm firms in the fishing industry.
- The authorship of the papers published concerning this thesis includes all researchers who contributed.

The research complies with the Norwegian Data Protection Authority, in which the data collection remained confidential throughout the thesis, and all information was made anonymous to avoid tracing it back to the individuals who participated in the research. At the end of the research, all personal data was deleted, and the material remaining as a future reference is anonymous (Datalitsynet, nd).

3.5.- Research Limitations

This research has various limitations, grouped as follows:

- **The time horizon of the research**. The main objective of the research is to explore and evaluate factors shaping small firms' growth in Northern Norway's fishing industry. The secondary data contain the historical performance of firms in the region selected for the research and provide longitudinal insight. Similarly, the data from the articles cover one year (12 months from January to December) to evaluate the seasonal features of the discussions. However, the interview data are punctual and do not include a follow-up with the interviewees. The research was not designed to be action research and did not include

following up on the recommendations to evaluate their efficacy. Adding a longitudinal time horizon would have significantly extended the time required to complete the research.

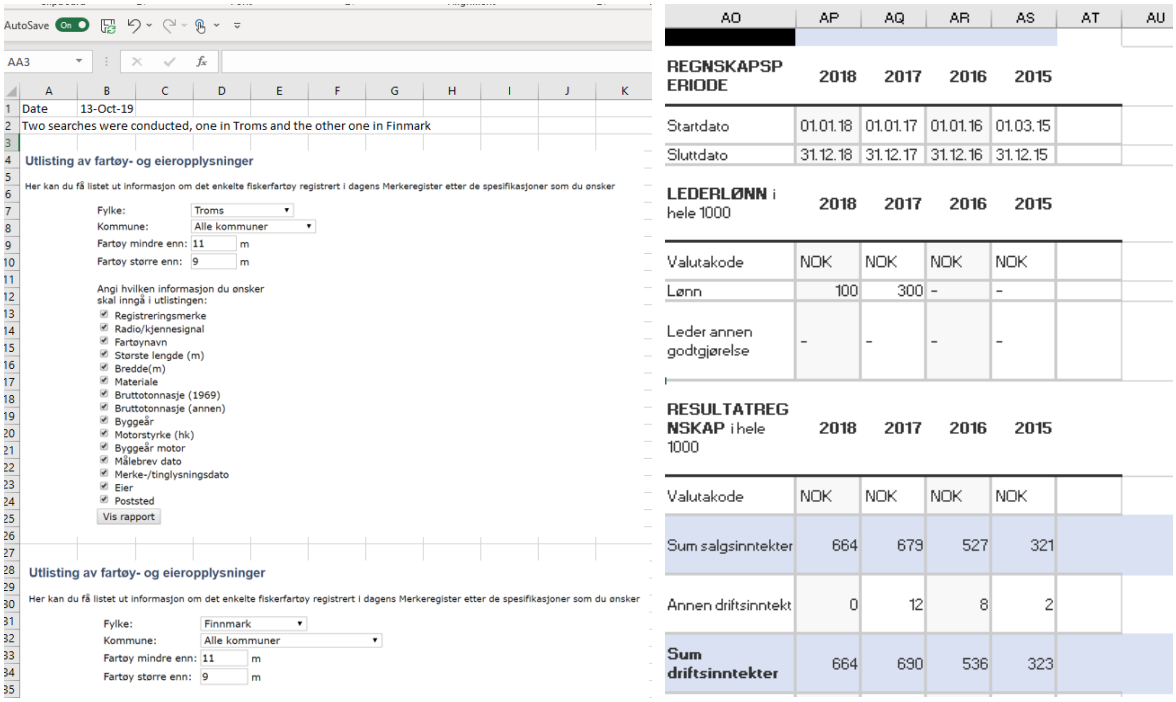
- **Interview sampling technique**. Another methodological limitation is the sampling strategy. As initially planned, a purposive strategy could not be adopted due to a lack of access to the identified firms. This limitation was addressed with the shift to a snowball strategy. While the interviews reached saturation, this limitation was addressed with the addition of articles data in the qualitative data set, which was also helpful in tackling the limitation related to the sample size and reducing researcher bias.
- **Regional scope of the research**. While the fishing industry in Norway plays an important role in fish production worldwide, challenges that small fishing firms face in this region may differ in other geographical locations. The business model of growth presented in this research has not been tested to determine the effectiveness of the different elements to enable small firm growth in the fishing industry. This research was conducted in the context of the fishing industry in Northern Norway, where enablers and growth barriers may not have the same impact as in other regions of the world. However, the literature review was not limited to Norway, which enabled the evaluation of discussions of similar challenges in different countries, minimizing the impact of this limitation.
- **Testing the proposed mathematical model**. Most growth models encountered in the literature represent growth as a function of several variables in linear equations. This research took a novel approach by designating two variables as exponentials to illustrate the accelerated impact these variables may have on growth. This model is conceptual based on the qualitative data extracted for this research, but it has not been fully developed nor tested to account for all mathematical possibilities. The original design of this thesis did not include testing this model.

It is worth mentioning that these limitations do not detract from meeting the objectives of this research and answering the research question. The limitations could be evaluated to scope future research (e.g., Future research may continue to explore/test the variables of the proposed growth model in different settings). The following section shows actions taken to address some of these limitations and improve the thesis's quality.

3.6.- Actions Taken to Improve the Quality of the Research

The first challenge was the selection of reliable secondary data. The explanatory nature of this research required the analysis of existing databases to put the problem of small firm growth into the context of the fishing industry. For this analysis, official databases from the Norwegian government

were used to ensure data came from reliable sources. Each search and combination of parameters were documented for replicability and traceability. The raw data, analysis, and calculations are recorded and available upon request. Figure 38 shows snapshots of these data for illustration purposes.



AutoSave On

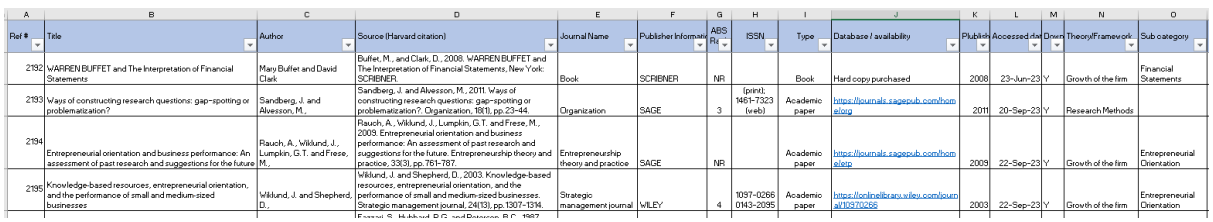
AA3

	A	B	C	D	E	F	G	H	I	J	K
1	Date	13-Oct-19									
2	Two searches were conducted, one in Troms and the other one in Finmark										
3											
4	**Utlisting av fartøy- og eieropplysninger**										
5											
6	Her kan du få listet ut informasjon om det enkelte fiskerfartøy registrert i dagens Merkeregister etter de spesifikasjoner som du ønsker										
7		Fylke:	Troms								
8		Kommune:	Alle kommuner								
9		Fartøy mindre enn:	11	m							
10		Fartøy større enn:	9	m							
11											
12		Angi hvilken informasjon du ønsker skal inngå i utlistingen:									
13		☑ Registreringsmerke									
14		☑ Radio/kjennesignal									
15		☑ Fartøynavn									
16		☑ Største lengde (m)									
17		☑ Bredde(m)									
18		☑ Materiale									
19		☑ Bruttotonnasje (1969)									
20		☑ Bruttotonnasje (annen)									
21		☑ Byggeår									
22		☑ Motorstyrke (hk)									
23		☑ Byggeår motor									
24		☑ Målebrev dato									
25		☑ Merke-/tinglysningsdato									
26		☑ Eier									
27		☑ Poststed									
28		Vis rapport									
29											
30	**Utlisting av fartøy- og eieropplysninger**										
31											
32	Her kan du få listet ut informasjon om det enkelte fiskerfartøy registrert i dagens Merkeregister etter de spesifikasjoner som du ønsker										
33		Fylke:	Finnmark								
34		Kommune:	Alle kommuner								
35		Fartøy mindre enn:	11	m							
		Fartøy større enn:	9	m							

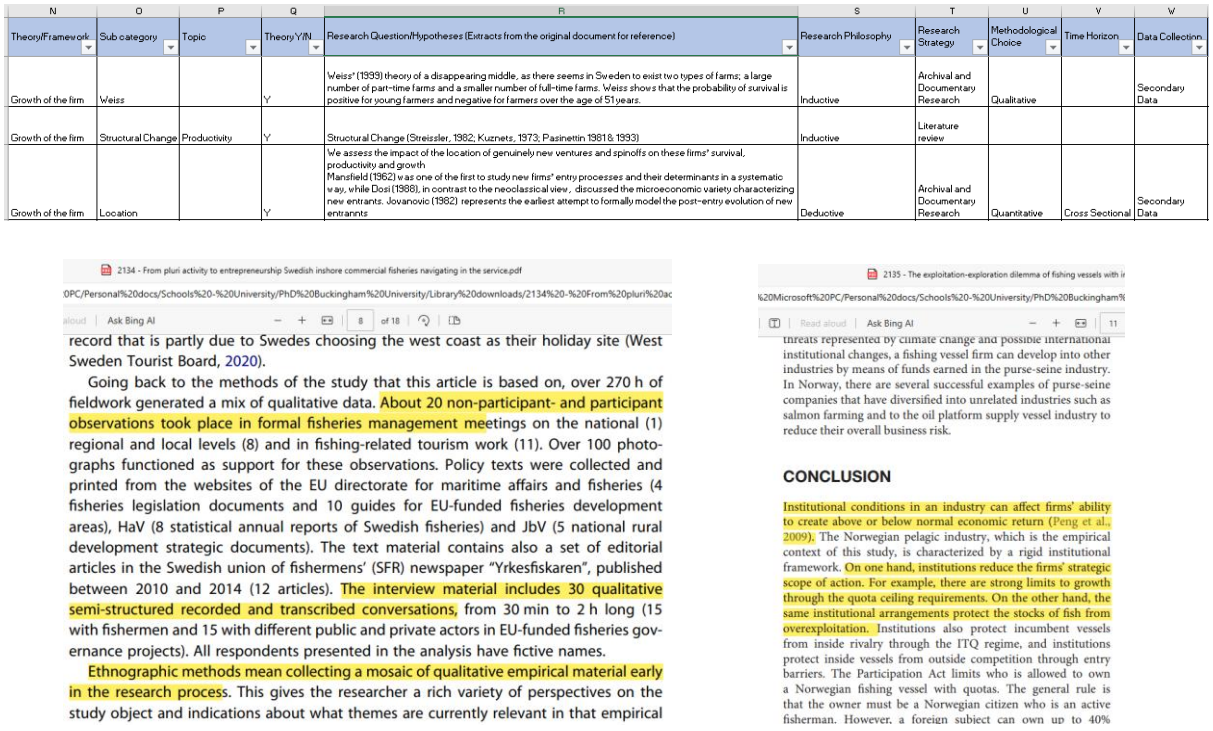
	AO	AP	AQ	AR	AS	AT	AU
	REGNSKAPSPERIODE	**2018**	**2017**	**2016**	**2015**		
	Startdato	01.01.18	01.01.17	01.01.16	01.03.15		
	Sluttdato	31.12.18	31.12.17	31.12.16	31.12.15		
	LEDERLØNN i hele 1000	**2018**	**2017**	**2016**	**2015**		
	Valutakode	NOK	NOK	NOK	NOK		
	Lønn	100	300	-	-		
	Leder annen godtgjørelse	-	-	-	-		
	RESULTATREGNSKAP i hele 1000	**2018**	**2017**	**2016**	**2015**		
	Valutakode	NOK	NOK	NOK	NOK		
	Sum salgsinntekter	664	679	527	321		
	Annen driftsinntekt	0	12	8	2		
	Sum driftsinntekter	664	690	536	323		

Figure 38 Examples of Raw Data and Search Parameters (Left: Sample of the Searches; Right: Financial Data from One of the Firms Studied)

Ample literature was reviewed as part of this research. Multiple databases were searched, including EbscoDiscovery, Google Scholar, IEEE Xplore, Wiley Online Library, and JSTOR, to increase the likelihood of finding relevant sources. The ABS (2015) Ranking Guide was used as a reference; 64% of the reviewed literature includes publications that are ranked in this guideline, as well as books, seminar works, and theses. The discussions and debates were followed to their origins and read in the original languages, where possible (e.g. Gibrat (1931) “Les Inégalités Économiques”). A register was created to keep track of all the literature and all the searches, as illustrated in Figure 39. Each document was read carefully, and the relevant information was extracted and highlighted to ease future referencing, as shown.



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ref #	Title	Author	Source (Harvard citation)	Journal Name	Publisher Informa	ABS Ra	ISSN	Type	Database / availability	Publish	Accessed	Down	Theory/Framework	Sub category
2192	WARREN BUFFET and The Interpretation of Financial Statements	Mary Buffet and David Clark	Buffet, M., and Clark, D., 2008. WARREN BUFFET and The Interpretation of Financial Statements, New York: SCRIBNER.	Book	SCRIBNER	NR		Book	Hard copy purchased	2008	23-Jun-23	Y	Growth of the firm	Financial Statements
2193	Ways of constructing research questions: gap-spotting or problematization?	Sandberg, J. and Alvesson, M.,	Sandberg, J. and Alvesson, M., 2011. Ways of constructing research questions: gap-spotting or problematization?. Organization, 18(1), pp.23-44.	Organization	SAGE	3	(print): 1461-7323 (web)	Academic paper	https://journals.sagepub.com/home/org	2011	20-Sep-23	Y	Research Methods	
2194	Entrepreneurial orientation and business performance: An assessment of past research and suggestions for the future	Rauch, A., Wiklund, J., Lumpkin, G.T. and Frese, M.,	Rauch, A., Wiklund, J., Lumpkin, G.T. and Frese, M., 2009. Entrepreneurial orientation and business performance: An assessment of past research and suggestions for the future. Entrepreneurship theory and practice, 33(3), pp.761-787.	Entrepreneurship theory and practice	SAGE	NR		Academic paper	https://journals.sagepub.com/home/etp	2009	22-Sep-23	Y	Growth of the firm	Entrepreneurial Orientation
2195	Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses	Wiklund, J. and Shepherd, D.,	Wiklund, J. and Shepherd, D., 2003. Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. Strategic management journal, 24(13), pp.1307-1314.	Strategic management journal	WILEY	4	1097-0266 0143-2095	Academic paper	https://onlinelibrary.wiley.com/journal/10970266	2003	22-Sep-23	Y	Growth of the firm	Entrepreneurial Orientation



N	O	P	Q	R	S	T	U	V	W
Theory/Framework	Sub category	Topic	Theory Y/N	Research Question/Hypotheses (Extracts from the original document for reference)	Research Philosophy	Research Strategy	Methodological Choice	Time Horizon	Data Collection
Growth of the firm	Weiss		Y	Weiss' (1999) theory of a disappearing middle, as there seems in Sweden to exist two types of farms; a large number of part-time farms and a smaller number of full-time farms. Weiss shows that the probability of survival is positive for young farmers and negative for farmers over the age of 51 years.	Inductive	Archival and Documentary Research	Qualitative		Secondary Data
Growth of the firm	Structural Change	Productivity	Y	Structural Change (Streissler, 1982; Kuznets, 1973; Pasinettin 1981& 1993)	Inductive	Literature review			
Growth of the firm	Location		Y	We assess the impact of the location of genuinely new ventures and spinoffs on these firms' survival, productivity and growth Mansfield (1962) was one of the first to study new firms' entry processes and their determinants in a systematic way, while Dosi (1988), in contrast to the neoclassical view, discussed the microeconomic variety characterizing new entrants. Jovanovic (1982) represents the earliest attempt to formally model the post-entry evolution of new entrants	Deductive	Archival and Documentary Research	Quantitative	Cross Sectional	Secondary Data

Figure 39 Illustration of the Literature Review Register and Identification of Relevant Information

Notes were taken during each interview in Norwegian and shared with the interviewees for review before including them in the dataset, as illustrated in the sample email shown in Figure 40. The researcher translated the interviews. A sample of the interviews was sent to a professional translation company (Gengo.com) for comparison to ensure the translations conducted by the researcher were accurate, and the results indicated that most of the differences between these translations were editorial without changing the meaning of the original message, as shown in Figure 41.

Re: Pablo Colman - Doctorate Project

SS [redacted]

To pcolman75@gmail.com

Reply | Reply All | Forward

Thu 5/13/2021 1:07 PM

Notat fra intervju May 12.
Jeg har vært fisker siden 2016 som mannskap og i 2018 kjøpte jeg egen båt. Båten er fra 1981 så det er viktig å holde vedlikeholdet i orden. Jeg fisker med en annen person. (Vi er to)
Forretningen har en god økonomi, det er viktig å ha utstyret i orden, det er bedre å bruke litt mer penger og kjøpe ordentlig utstyr(for å unngå større utgifter senere)
. Vi fisker med garn hele året.
For å øke inntekten, er det viktig å fokusere på flere fiskearter, som sei,(hyse,breiflabb,rognkjeks) ur, og kveite. Det er begrenset hvor mye man kan tjene av å fiske bare torsk, jeg har åpen kvote, det tar meg et par(Max en uke hvis man ikke fisker med innblanding under sesong) uker å fiske den. Resten av året kan man fiske torsk sammen med andre arter(fersksfiskordningen) (for eksempel, hvis man fisker 800 kg sei, kan man også selge 200 kg torsk), det er ikke grense på hvor mye sei man kan fiske. En del av året kan man fiske opp til 50% torsk med sei(eller andre arter), det kan lønne seg.
En annen måte å øke inntekten på er å bruke mest mulig av fangsten. Torskehodet(breiflabbhodet - som veier 2/3 av fisken ca)har mye kjøtt, men fiskemottaket betaler ingenting for det.(mottaket betaler for torskehodet - 50øre kg)Det er en kampanje å få andre kunder til å kjøpe bifangsten, med det er ennå litt tidlig. (Bifangst under blåkveite feks -isgalt, skolest, samt havmus som vi får overalt osv)
Vi bruker ca 60-70 dager på sjøen hvert år. Hvis man vil tjene mer, kan man også fiske mer. Noen fisker ca 120 dager(noen bruker ca 320 dager åå sjøen med sjark - man setter selv begrensinger) men vi er ikke interessert i det, vi har det godt som det er. Det er viktig for meg å balansere jobb med privatliv.
Jeg fisker nært hjemplassen, ca 10 minutter ut fra land, vi er heldig og det finnes mye fisk i nærområdet. Blåkveite finnes litt lengre ut, med ikke mer enn 12 timer unna.(blåkveite 2 timer unna Andenes - 12 timer unna Lofoten. Andenes ligger nært kontinentalsokkelen som forklarer det fiskerike havet) Kunnskap er veldig viktig når man er fisker. Vi må følge med på nye reguleringer hele tiden, lese aviser og sjekke fiskedirektoratets webside.(også for å finne fisken, forstå mønster og faser)
Det er vanskelig å diversifisere, fiskerne får ikke lov å produsere fiskeprodukter, bare fiskemottakene har tillatelse til det. Mattilsynet er veldig strengt. Vi har ikke tenkt å begynne med skalldyr, tare og tang, man må ha spesielt utstyr til det. Det er heller ingen mottak for slikt.
Klimaendringen har ikke hatt noe stor påvirkning for oss her siden vi er så pass langt nord, men torsken flytter lengre Nord hvert år, på grunn av at havet er blitt varmere. Men jeg tror at de kommer til å ta ca 20 år før vi ser store forandringer. (Lengre nord - fra mørekysten f.eks - ikke nord for Lofoten feks
Jeg synes fremtiden blir bra, jeg er fornøyd med hvordan det går.

Ellers veldig fint.

Figure 40 Email from one of the Interviewees Providing Comments and Approving the Notes

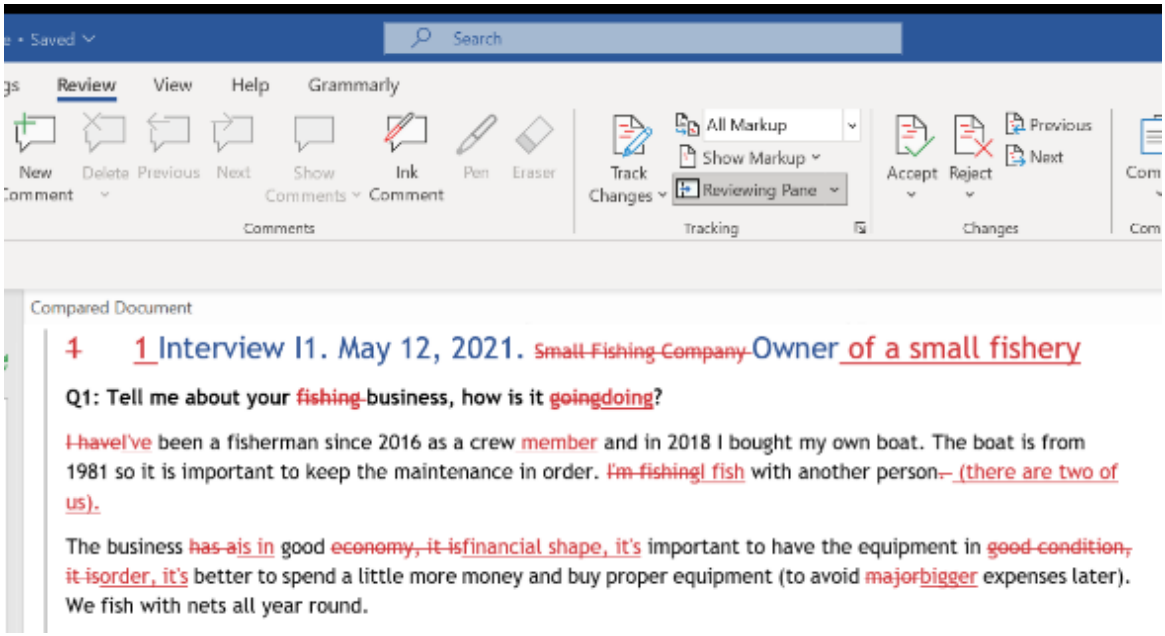
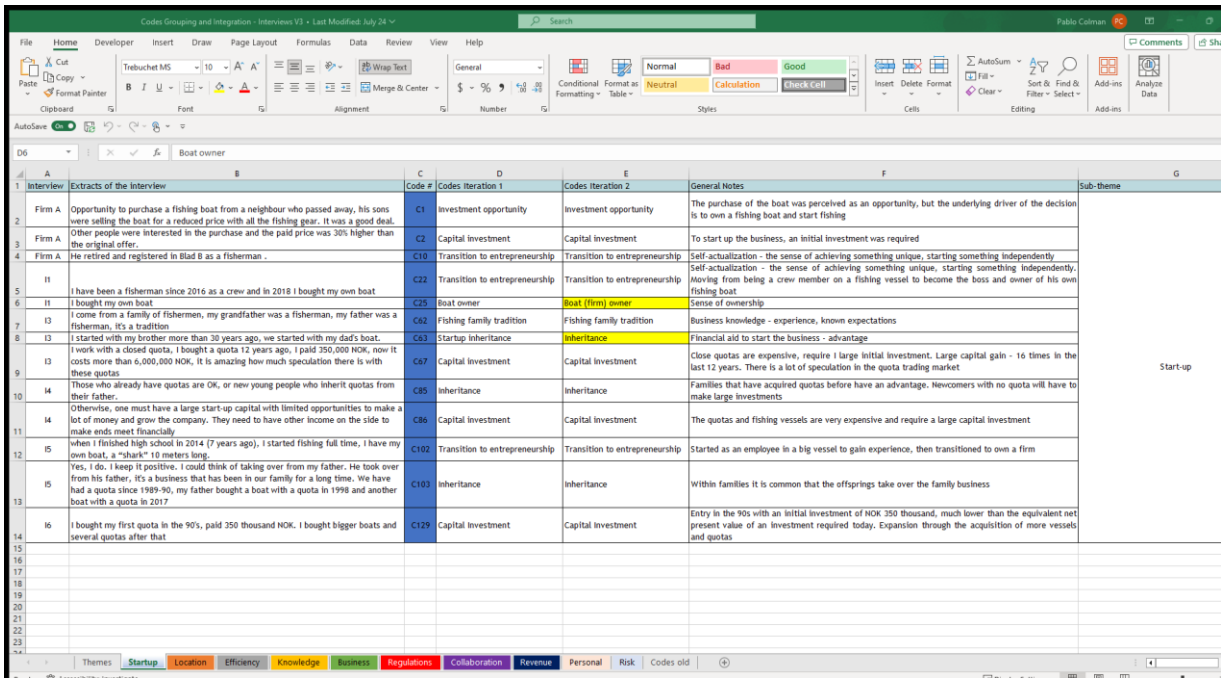


Figure 41 Sample of the Differences Between Translations

The qualitative data from the interviews was supplemented with qualitative data from articles from a professional trade publication from Northern Norway focusing on the fishing industry. The articles served as data triangulation and a mechanism to reduce researcher bias by collecting notes from several journalists. The full dataset was analysed, and each analysis stage is documented. A sample of the coding iterations and theme register is shown in Figure 42.



Interview	Extracts of the interview	Code #	Codes iteration 1	Codes iteration 2	General Notes	Sub-theme
Firm A	Opportunity to purchase a fishing boat from a neighbour who passed away, his sons were selling the boat for a reduced price with all the fishing gear. It was a good deal.	C1	Investment opportunity	Investment opportunity	The purchase of the boat was perceived as an opportunity, but the underlying driver of the decision is to own a fishing boat and start fishing	
Firm A	Other people were interested in the purchase and the paid price was 30% higher than the original offer.	C2	Capital investment	Capital investment	To start up the business, an initial investment was required	
Firm A	He retired and registered in Blad B as a fisherman .	C10	Transition to entrepreneurship	Transition to entrepreneurship	Self-actualization - the sense of achieving something unique, starting something independently	
I1	I have been a fisherman since 2016 as a crew and in 2018 I bought my own boat	C22	Transition to entrepreneurship	Transition to entrepreneurship	Self-actualization - the sense of achieving something unique, starting something independently. Moving from being a crew member on a fishing vessel to become the boss and owner of his own fishing boat	
I1	I bought my own boat	C25	Boat owner	Boat (firm) owner	Sense of ownership	
I3	I come from a family of fishermen, my grandfather was a fisherman, my father was a fisherman, it's a tradition	C62	Fishing family tradition	Fishing family tradition	Business knowledge - experience, known expectations	
I3	I started with my brother more than 30 years ago, we started with my dad's boat.	C63	Startup inheritance	Inheritance	Financial aid to start the business - advantage	
I3	I work with a closed quota, I bought a quota 12 years ago, I paid 350,000 NOK, now it costs more than 6,000,000 NOK, it is amazing how much speculation there is with these quotas	C67	Capital investment	Capital investment	Close quotas are expensive, require I large initial investment. Large capital gain - 16 times in the last 12 years. There is a lot of speculation in the quota trading market	Start-up
I4	Those who already have quotas are OK, or new young people who inherit quotas from their father.	C85	Inheritance	Inheritance	Families that have acquired quotas before have an advantage. Newcomers with no quota will have to make large investments	
I4	Otherwise, one must have a large start-up capital with limited opportunities to make a lot of money and grow the company. They need to have other income on the side to make ends meet financially	C86	Capital investment	Capital investment	The quotas and fishing vessels are very expensive and require a large capital investment	
I5	when I finished high school in 2014 (7 years ago), I started fishing full time. I have my own boat, a "shark" 10 meters long.	C102	Transition to entrepreneurship	Transition to entrepreneurship	Started as an employee in a big vessel to gain experience, then transitioned to own a firm	
I5	Yes, I do. I keep it positive. I could think of taking over from my father. He took over from his father, it's a business that has been in our family for a long time. We have had a quota since 1989-90, my father bought a boat with a quota in 1998 and another boat with a quota in 2017	C103	Inheritance	Inheritance	Within families it is common that the offsprings take over the family business	
I6	I bought my first quota in the 90's, paid 350 thousand NOK. I bought bigger boats and several quotas after that	C129	Capital investment	Capital investment	Entry in the 90s with an initial investment of NOK 350 thousand, much lower than the equivalent net present value of an investment required today. Expansion through the acquisition of more vessels and quotas	

Figure 42 Coding and Themes Register

Finally, the supervisors reviewed the report to ensure the final thesis did not have typos and other editorial errors, and the researcher used tools such as Grammarly in the last review process.

In summary, the design of this research comprises primary and secondary data sources and a mix of qualitative and quantitative data, which are proposed methods to increase the quality of the research (Stake, 1995; Voss et al., 2016; Saunders et al., 2016; Yin, 2018). The work presented in this thesis results from a thorough and systematic work expanding for six years with due diligence to ensure the outcome meets the doctoral degree requirements.

4.- Chapter Four: Quantitative Data Analysis

4.1.- Fishing Industry in Northern Norway – Macroanalysis

4.1.1.- Cod Stocks and Fleet Performance

The total cod stocks in Northern Norway have decreased by 49.5% since 1946. While stocks recovered from 1982 to 2013, they have declined by 47.3% from 3.7 million tons in 2013 to 1.9 million tons in 2022, as shown in Figure 43 (Fiskeridirektoratet, nd).

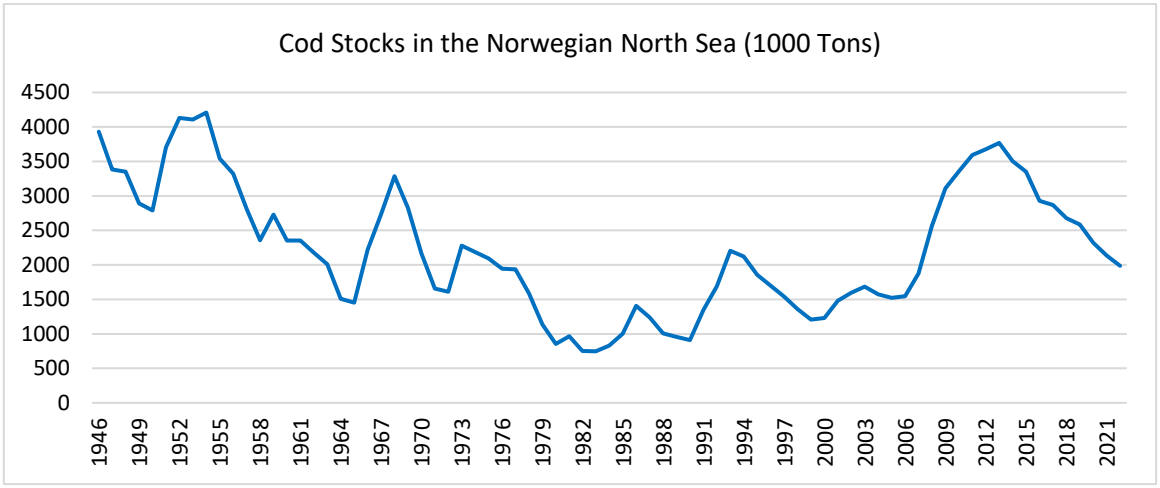


Figure 43 Cod Stocks in Norwegian Sea North Latitude 62 Degrees (Source: Fiskeridirektoratet, nd)

The total catch, or landings, increased for all fleet sizes since 2000. For the small fleet (Vessels under 11m), this increase was 264%, and the fleet that perceived the highest rise in the landings is the large fleet (vessels 28m and over) with 577%, as shown in Figure 44.

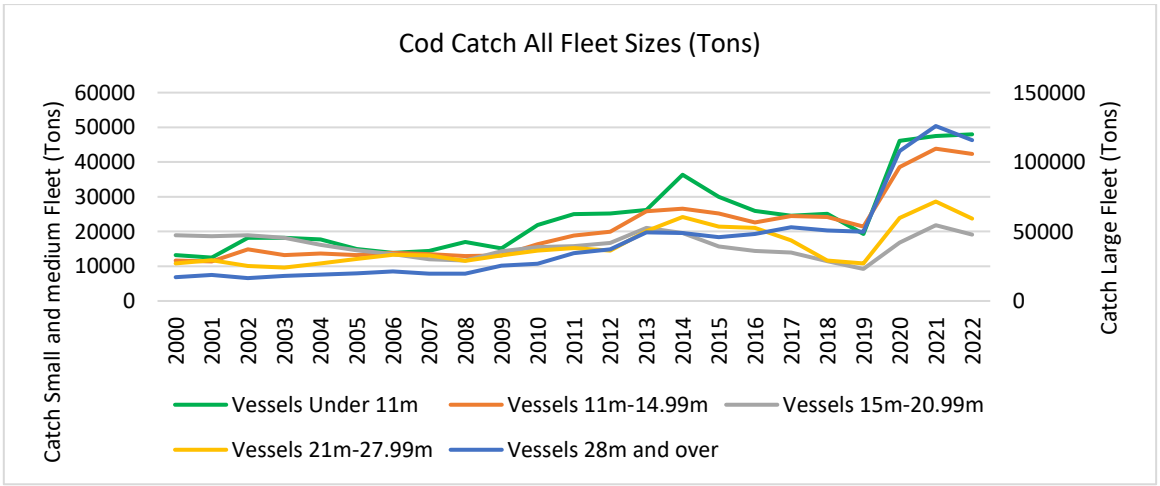


Figure 44 Cod Catch per Fleet Since 2000 (Source: Fiskeridirektoratet, nd)

There is a proportional relationship between cod landings and cod stocks between 2000 and 2019, as illustrated in Figure 45. Since 2020, the cod landings have increased, breaking the previous correlation pattern. Historically, the cod landings were below 6% of the cod stocks. This percentage rose to 10% in 2020 and 13% in 2021 and 2022.

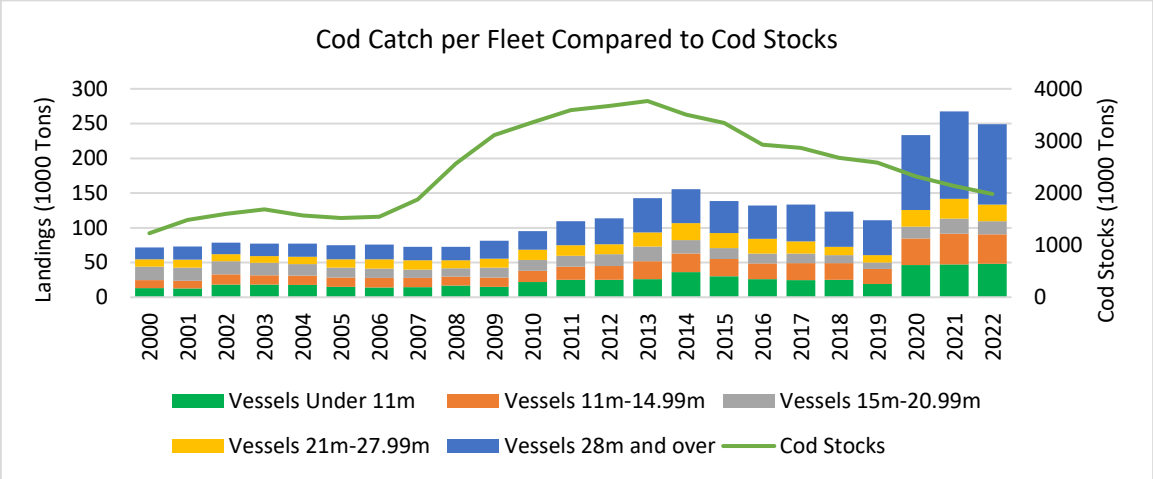


Figure 45 Correlation Between Cod Landings and Cod Stocks (Source: Fiskeridirektoratet, nd)

The number of vessels in all the fleets has declined by 58% since 2000. The more stable fleets are vessels between 11-14.99m and boats over 28m, which show a decline of 19% and 22%, respectively. The fleet of boats under 11m declined by 60%, vessels between 21m and 27.99m declined by 61%, and the fleet that dropped the most with 76% is the fleet between 15-20.99m, as illustrated in Figure 46.

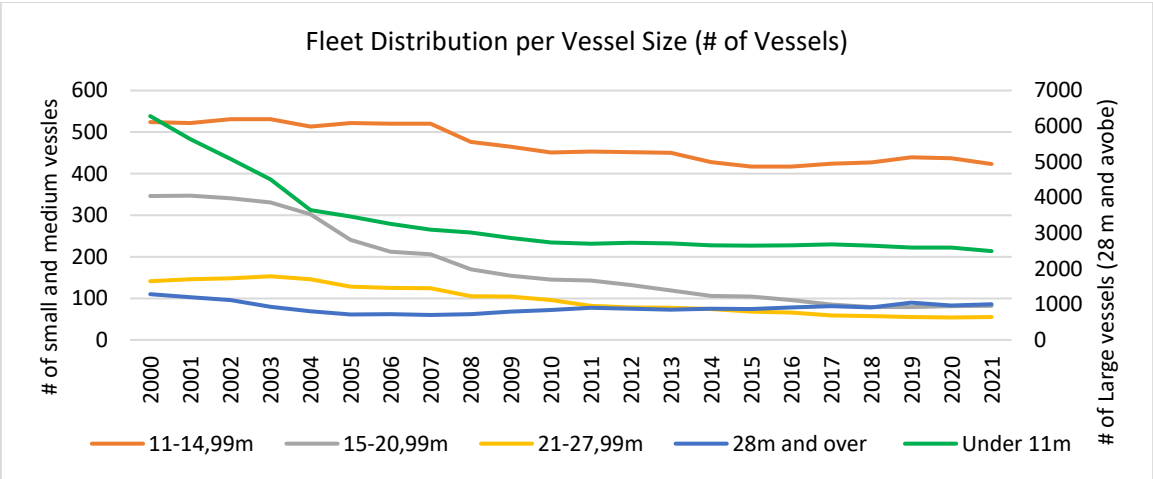


Figure 46 Decline in the # of Vessels per Fleet Size (Source: Fiskeridirektoratet, nd)

The decline in the number of vessels paired with the increment in the landings resulted in an average 6-fold increase in the landings per vessel for all the fleets, as shown in Figure 47.

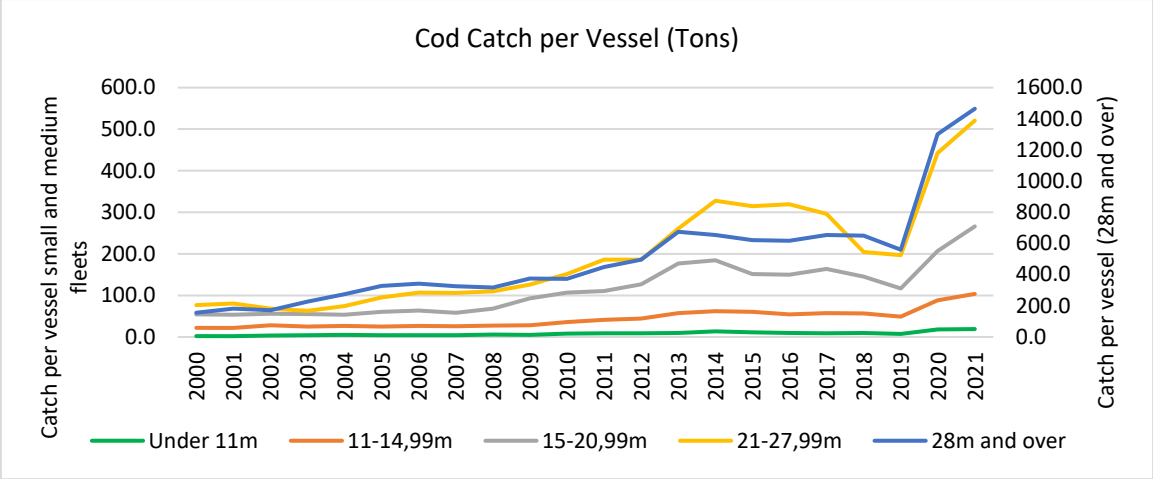


Figure 47 Cod Landings per Vessel (Source: Fiskeridirektoratet, nd)

The total cod sales follow a similar pattern to the cod landings. All fleets have grown cod sales since 2000, as illustrated in Figure 48. The cod sales show a higher average growth rate than the cod landings. The average cod landings growth for the fleets was 245%, while the average growth in cod sales was 586% in the same period. Likewise, the total cod sales per vessel have grown since 2000, as indicated in Figure 49. The average cod landings per vessel was 595%, while the average cod sales per vessel was 821%.

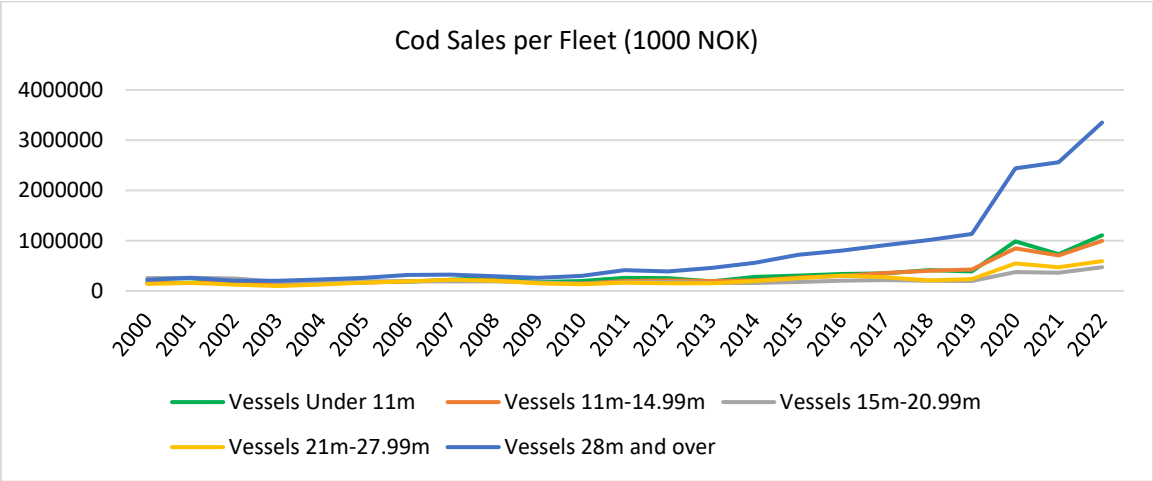


Figure 48 Cod Sales per Fleet (Source: Fiskeridirektoratet, nd)

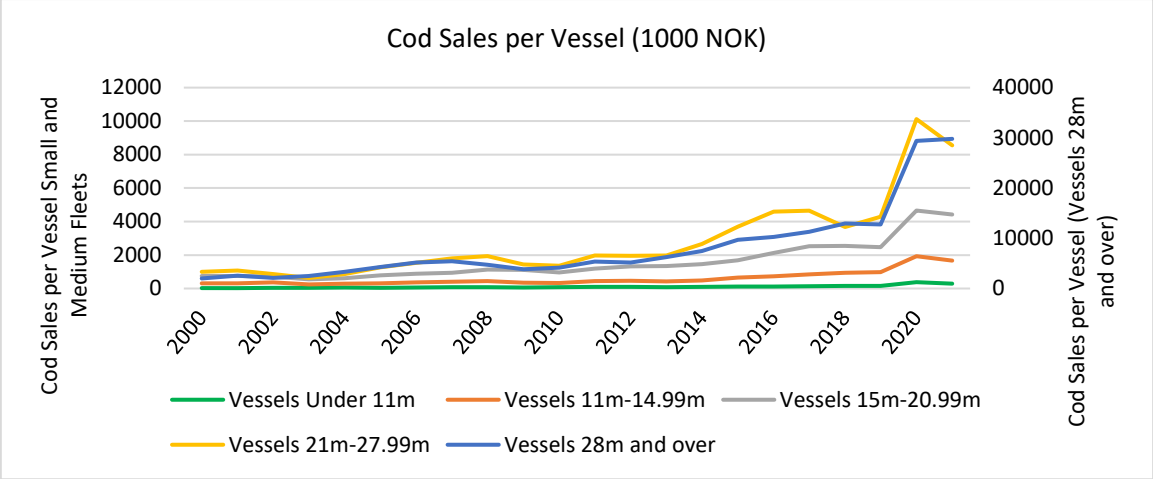


Figure 49 Cod Sales per Vessel (Source: Fiskeridirektoratet, nd)

To summarise, the cod landings increased by 2.64-fold in the fleet under 11m, while the cod sales grew by 5.7-fold. A similar trend is observed in most fleets, which shows a delta of about 2.34 between cod landings and cod sales. While the pattern of cod landings and cod sales per vessel is similar, the delta between cod landings and cod sales averages 1.35, as shown in Table XVIII.

Table XVIII Cod Landings and Cod Sales Growth Rates per Fleet (Source: Fiskeridirektoratet, nd)

Fleet	Cod Landings Growth	Cod Sales Growth	Catch Growth per Vessel	Sales Growth per Vessel	Delta Cod Landings and Sales	Delta Cod Landings and Sales per Vessel
Under 11 m	2.64	5.70	8.08	10.11	2.16	1.25
11-14,99 m	2.63	5.32	3.65	4.52	2.02	1.24
15-20,99 m	0.01	0.84	3.86	4.97	79.04	1.29
21-27,99 m	1.19	3.21	5.76	7.56	2.71	1.31
28 m and over	5.77	14.22	8.41	13.89	2.47	1.65

The differences in the price per kilogram may explain the difference between the growth rate of cod landings and cod sales. The price per kilogram fluctuates yearly, but since 2000, it shows an overall increment of 61%. In the same period, the cumulative inflation in Norway for Norwegian products was

52.4%. Price per kilogram adjustments overpassed the inflation by 8.6%, and there does not seem to be a correlation between these two indicators, as illustrated in Figure 50.

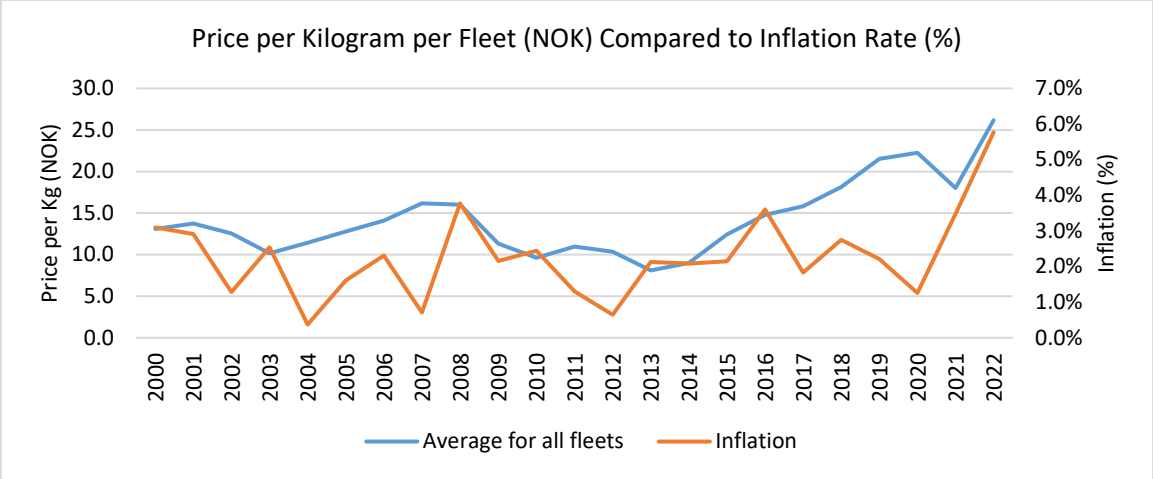


Figure 50 Price per kilogram (NOK) Compared to the Annualized Inflation Rate for Norwegian Products (%) (Source: Fiskeridirektoratet, nd; Statistisk Sentralbyrå, 2023)

Finally, the cod price per kilogram also shows differences between the fleet sizes; the fleet under 11m perceived, on average, one NOK less than the other fleets. The large fleet of 28m and over seems to benefit from a higher price per kg, as shown in Figure 51 and Figure 52.

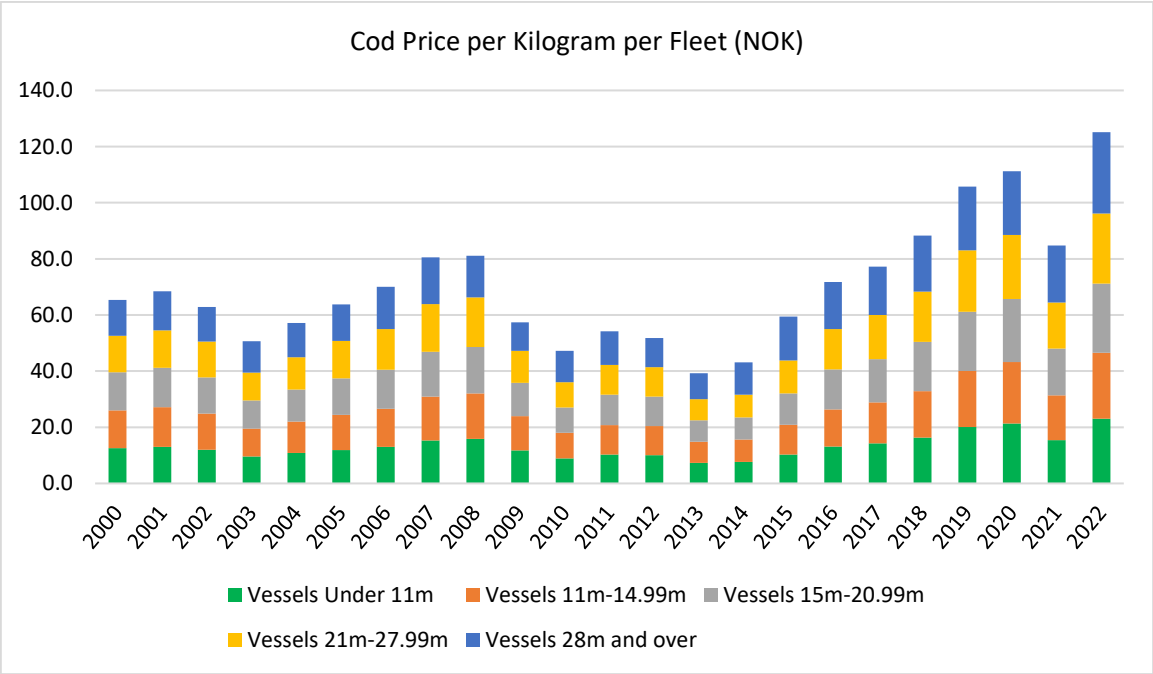


Figure 51 Cod Price per Kilogram per Fleet (Source: Fiskeridirektoratet, nd)

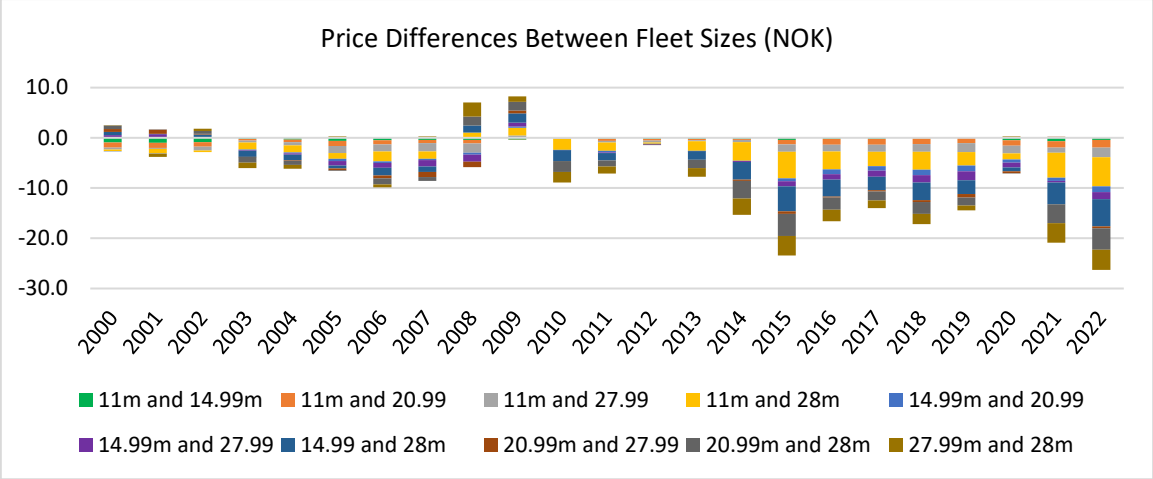


Figure 52 Price per kilogram Differences Between Fleet Sizes (Source: Fiskeridirektoratet, nd)

When comparing the price per kilogram with the fish stocks, there is a low correlation (0.19) between these two variables, as illustrated in Figure 53.

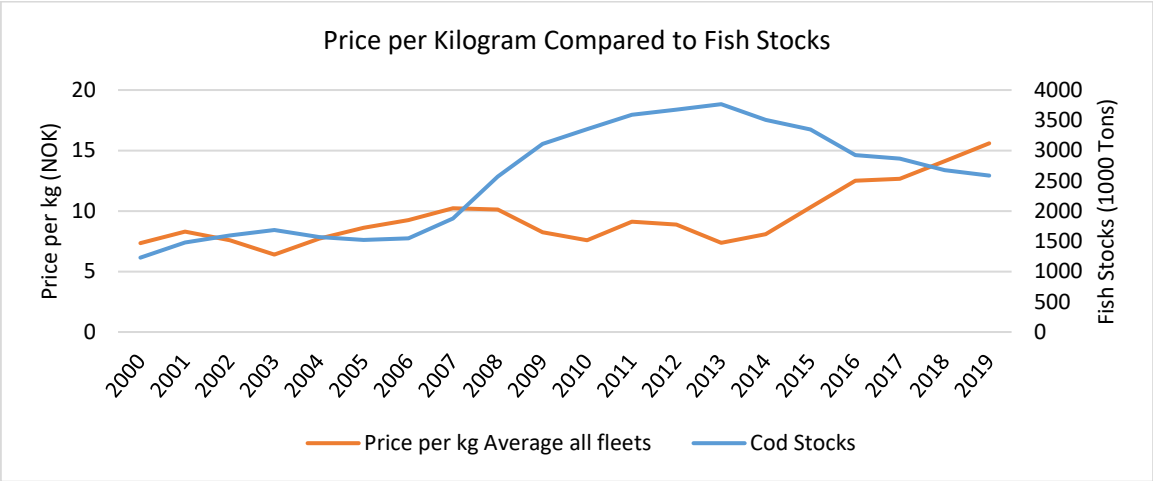


Figure 53 Correlation Between Fish Stocks and Price Per Kilogram (Source: Fiskeridirektoratet, nd)

In summary, all fleet sizes have shown growth since 2000. There are differences in the growth rates between the fleets. There is also a correlation between cod landings and cod stocks, but in terms of cod sales, the growth rates are higher than the cod landings. The price per kilogram plays a role in these differences. Finally, the adjustments on the price per kilogram do not correspond to the inflation rates, and since 2000, the price per kilogram has surpassed the cumulative inflation rate by 8.6%. These results seem to contradict the research question. However, the data also show a large displacement of vessels under 11m out of the fishing industry (60%) compared to a lower displacement of the large fleet (22%), indicating that small firms face a challenging environment to

survive and grow. The following section presents the analysis of firms' performance in Northern Norway.

4.2.- Firms' Performance in Northern Norway

The analysis from the previous section indicates differences in the performance of vessels in the different fleet sizes, particularly the small fleet of boats under 11m and the large fleet of vessels over 28m. This section builds on this analysis to evaluate the small firms and large firms in Northern Norway. The assumption is that small firms own one or two small vessels (below 11m), and large firms own one or several large vessels (28m or bigger).

The data for this analysis were taken from financial statements available at proff.no. The research's time frame is from 2000 to 2019, which covers the same period chosen for the macro analysis. Three variables were selected: revenue, profits, and assets, which are frequent in firm growth research (Bérubé and Rivard, 2020).

4.2.1.- Revenue Growth

The distributions of revenue growth of both large and small firms follow a similar pattern. However, the percentage of small firms with negative growth is higher than that of large firms. The percentage of large firms that show a revenue growth above 60% is higher than that of small firms, as indicated in the histogram of Figure 54. Most large firms (90%) show growth, compared to 70% of small firms.

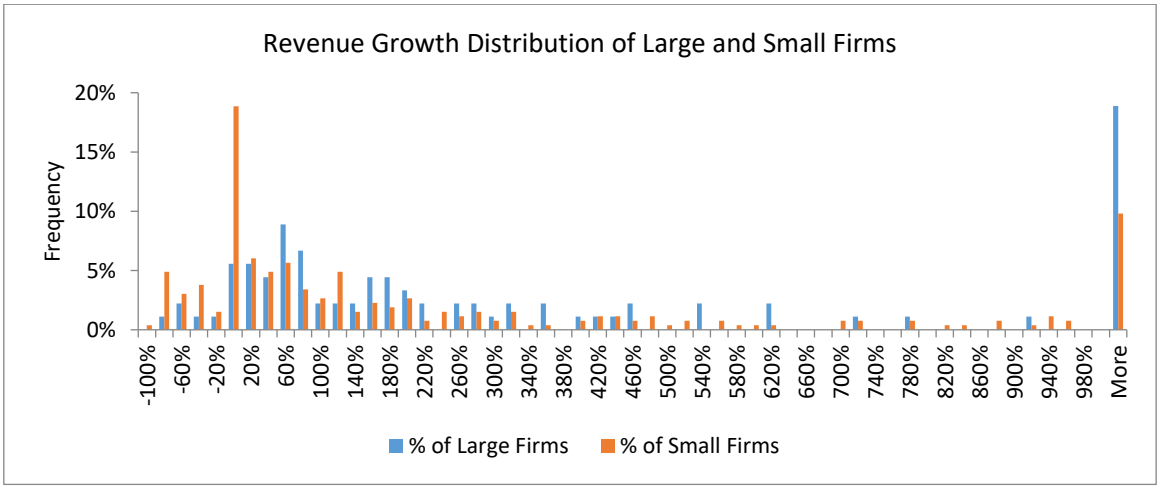


Figure 54 Distribution of Revenue Growth of Small and Large Firms (Source: Proff, nd)

Regarding the revenues, 25% of small firms show an annual revenue below NOK 500K in 2019, another 20% show revenues between NOK 500K and NOK 1000K, and the rest have revenues above NOK

1000K, as illustrated in Figure 55. The average operating cost of small firms is NOK 990K (Colman et al., 2021), which indicates that 45% of small firms may underperform.

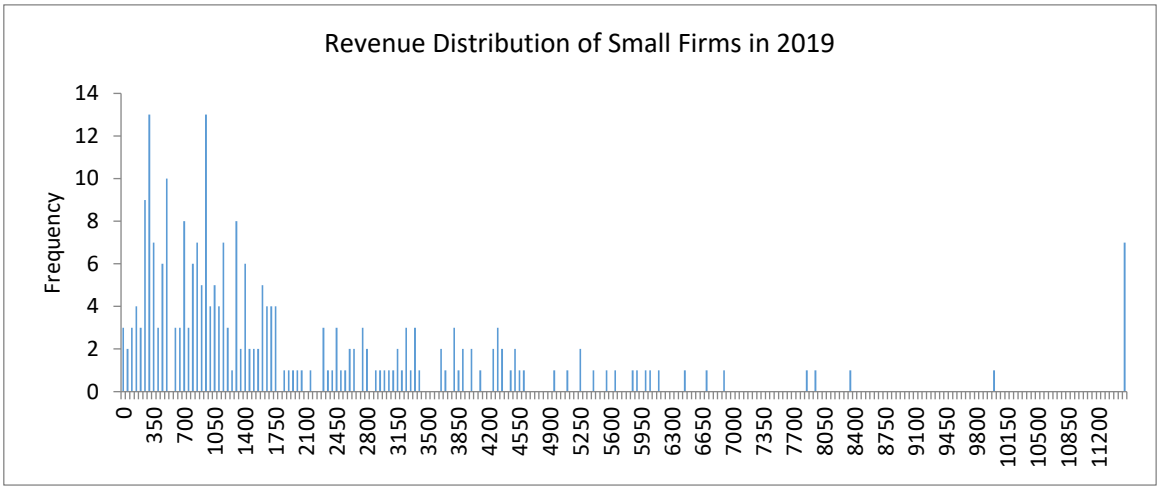


Figure 55 Revenue Distribution of Small Firms in 2019 (Source: proff, nd)

The analysis of the years of operation compared to the revenue growth shows a low correlation (only 0.028), represented graphically in the figure below. This low correlation indicates that small firms may sustain business for extended periods without growing. There is a conflict between these results and the analysis of large firms, which shows that age plays a role in growth.

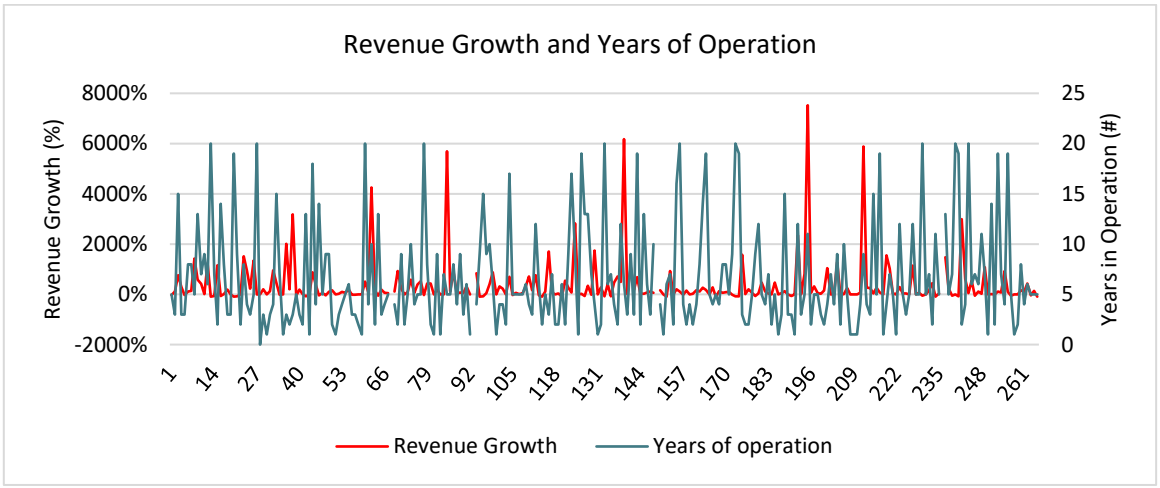


Figure 56 Correlation Between Years of Operation and Revenue Growth of Small Firms

The data indicate that revenue growth rates differ between 2000-2012, when fish stocks were rising, and between 2013-2019, when fish stocks were declining. The average revenue growth for both large and small firms in 2000-2012 was higher than in 2013-2019, as indicated in Table XIX.

Table XIX Average Revenue Growth Between 2000-2012 and 2013-2019

Average Revenue Growth Small Firms 2000-2012	3732%
Average Revenue Growth Small Firms 2013-2019	525%
Average Revenue Growth Large Firms 2000-2012	4423%
Average Revenue Growth Large Firms 2013-2019	369%

While the average revenue growth is higher in the period of fish stocks rise, the percentage of small firms that grew in this period is lower than in the period between 2013-2019; for large firms, the percentage is similar, as shown in Table XX.

Table XX Comparison of Firms with Positive Revenue Growth in the Periods 2000-2012 and 2013-2019

Percentage of Small Firms with Positive Revenue Growth 2000-2012	49%
Percentage of Small Firms with Positive Revenue Growth 2013-2019	70%
Percentage of Large Firms with Positive Revenue Growth 2000-2012	87%
Percentage of Large Firms with Positive Revenue Growth 2013-2019	86%

The next part of the analysis of revenue growth involved a mathematical calculation to evaluate the effects of fish stocks and price adjustments on the performance of small firms. For this analysis, the equation proposed by Coad (2007a) was used due to its relevancy to the research and relation to Gibrat's Law. The equation is shown below:

$$Log(X_{t,i}) = \propto + \beta Log[X_{t-1,i}] + \varepsilon_t \quad (1)$$

Equation 1 Coad's (2007a) equation to Represent Firm Growth

Where:

- X(t,i)= the size of the company i at time t, represented by the total revenue (sales)
- X(t-1,i)= the size of the company i in the previous period (t-1), also represented by the total revenue (sales)
- α = Firm growth Industry-Wide
- ε(t)= Economic Shock related to the fish stocks at time t
- β is the value estimated. When β is close to one, Gibrat's Law is in operation; if β < 1, small firms grow faster; when β > 1, larger firms grow faster (Sutton, 1997; Coad, 2007a; Bérubé and Rivard, 2020).

The data indicate that the price per kilo has been used to reduce the effects of the fish stock fluctuations, which may bias the results. Two variations of equation (1) were utilised to address this issue:

$$Log(X_{t,i}) = \alpha 1 + \beta Log[X_{t-1,i}] + \varepsilon_{1,t} \quad (1a)$$

Where α_1 is the growth in total sales and $\varepsilon_{(1,t)}$ is the fluctuations related to the price per kilo. The second equation is:

$$Log(X_{t,i}) = \alpha 2 + \beta Log[X_{t-1,i}] + \varepsilon_{2,t} \quad (1b)$$

Where α_2 is the growth of the fish stocks and $\varepsilon_{(2,t)}$ is the catch per vessel.

The analysis is split into two periods. The first one is from 2006 through 2012[29]. During this period, fish stocks were rising. The second period is from 2013 to 2019, when the fish stocks declined.

The equation (1a) results indicate that β < 1 in all cases. The results using equation (1b) indicate that β <1 when fish stocks are rising, but β >1 when fish stocks are in decline. This equation does not account for the price adjustments, which is probably a more accurate picture of the underlying growth behaviour of the firms in this industry. When fish stocks are rising, small firms show higher revenue growth, but when fish stocks are in decline, the growth rate decreases. The results are displayed in Table XXI.

Table XXI Impact of Fish Stocks on Firm Revenue Growth Using Coads' (2007a) Equation

Variables	**Results using Equation 1a ($)**		**Results using Equation 1b (Weight)**	
α	Growth in sales ($) *		Cod stocks growth (Tons) *	
ε	Growth of Price per Kilo ($) *		Catch per vessel (Tons) *	
β	**Period 2006-12**	**Period 2013-19**	**Period 2006-12**	**Period 2013-19**
	β <1	β <1	β <1	**β >1**

* These values were normalised to account for the fleet size (Small fleet and Large Fleet) to get more accurate results

An autocorrelation calculation of the revenue growth, using the total sales ($) and the total catch (Tons), was done to evaluate if the difference was related to the price adjustments. The results show

29 2006-2012 and 2013-2019 were selected for this part of the analysis to have the same number of years.

that small firms have lower autocorrelation than their larger peers. Small firms show a random behaviour compared to large firms that offer more stable performance.

Table XXII Autocorrelation Results

Firm Size	Periods of fish stock rise		Periods of fish stock decline	
	Total Sales ($)	Total Catch (Tons)	Total Sales ($)	Total Catch (Tons)
Small	0.38	0.46	**0.59**	-0.19
Large	0.46	0.61	**0.51**	0.49

In summary, there are differences in the revenue growth performance between small and large firms. The fish stocks seem to be impacting the revenue growth rates, and there are also differences in the performance between small firms. The data also indicate a low correlation between revenue growth and firm age.

The analysis of the revenue helped to start the identification of firms to select for the interviews. The sample was still too large, and additional variables needed to be included in the analysis to identify a manageable sample size. The following section describes in more detail the profitability growth of the firms.

4.2.2.- Profit Growth

The profitability analysis shows that small firms are less profitable than large firms, with a higher percentage of small firms with profit growth below 5%, as indicated in the histogram of Figure 57.

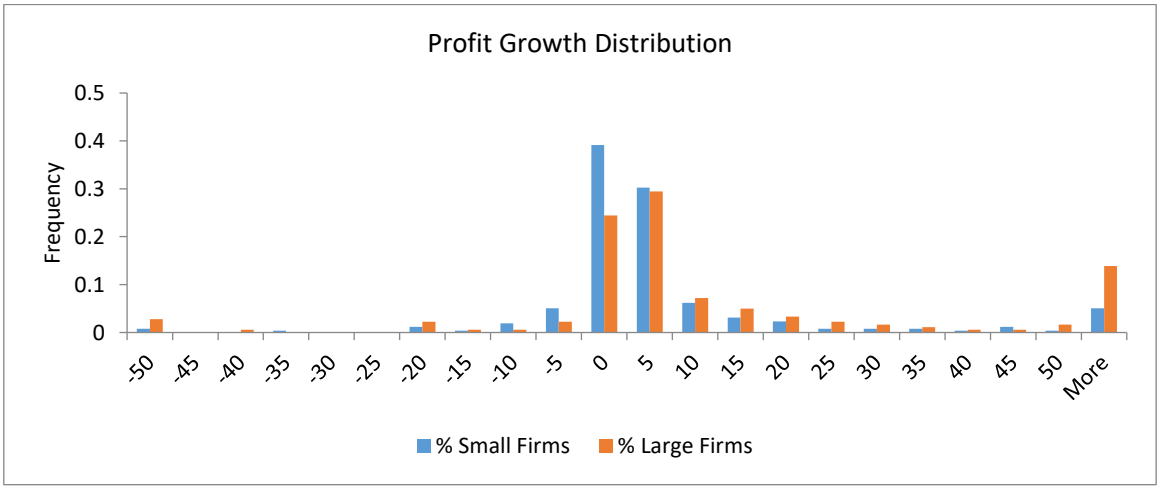


Figure 57 Profit Growth Distribution (Source: proff, nd)

Profits also show a significant variation, not only between the fleets but also within the groups. In the small firm sample, net income ranges between -1618 % and 113%, averaging a negative 17% in 2019. The average profits have been negative (Financial losses) in this group of small firms since 2013. The ratio of profitable and non-profitable firms in the small fleet was 1.05 in 2019 and not much better in the previous years. The large firms show better results; the profits range between -101% and 92%. The average net income in 2019 was 8%, and the results have been positive for most years since 2013[30]. The ratio of profitable and non-profitable firms was 4.35 in 2019 and steady in previous years, as illustrated in Figure 58.

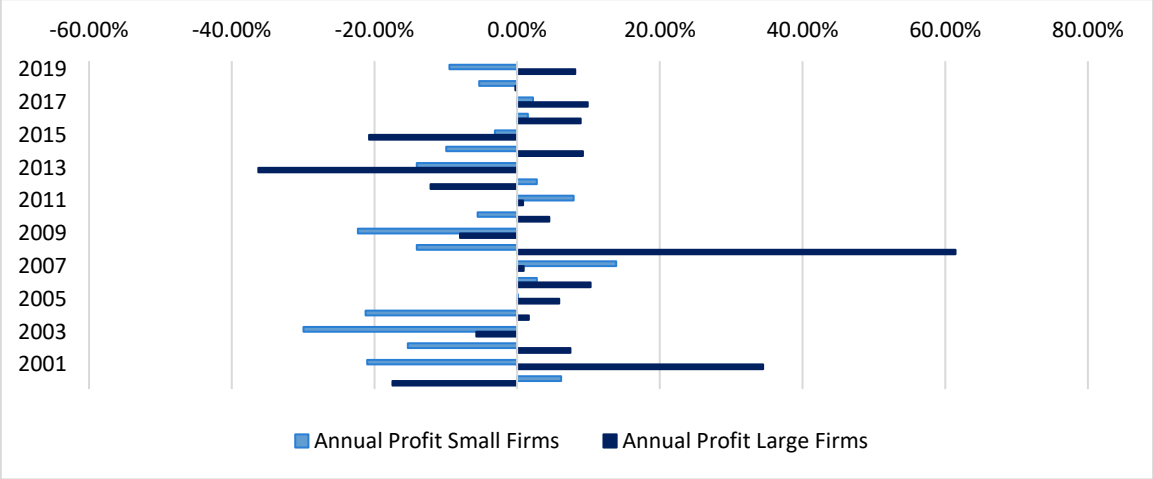


Figure 58 Annual Average Profits of Small and Large Firms (Source: proff, nd)

The sample of 265 small firms shows that 143 were profitable in 2018 or 2019 (the last year of available data). However, they do not sustain consistent profits year on year. An index was calculated based on the profitable years and years of operation to normalize the data. This index is called Profitable Index (PI) for the purpose of this thesis. This index is a ratio of lucrative years vs total years of operation. The data indicate that performance does not seem to be random. There is a group of firms that demonstrate consistent performance, with a PI of 100%; likewise, there is a group of firms that show a low PI, below 30%, as shown in the histogram of Figure 59.

30 2013 has been selected as a comparative point because fish stocks have been in decline since this year.

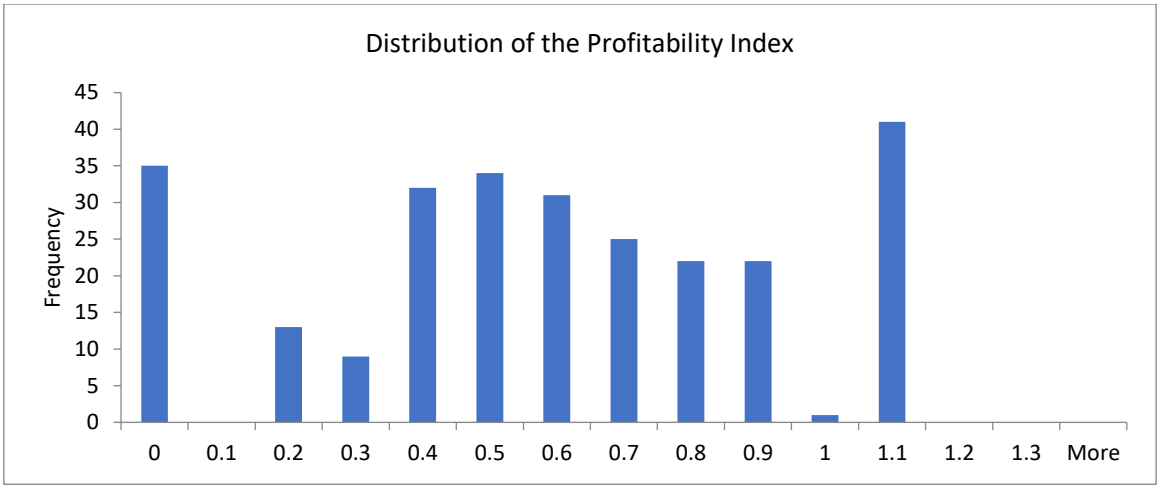


Figure 59 Distribution of the Profitability Index of Small Firms (Source: proff, nd)

This data alone may also mislead the analysis since it does not consider the sustainability of the performance. For example, one firm with one year of operation and a profit that year will have a PI of 100%, but this does not show if the firm will be profitable in the coming years. Therefore, an additional calculation was done to determine the PI vs the number of years in operation. The graph in Figure 60 shows that only 15 firms sustained profits for four years or more[31]. These firms are good candidates for the interview sample.

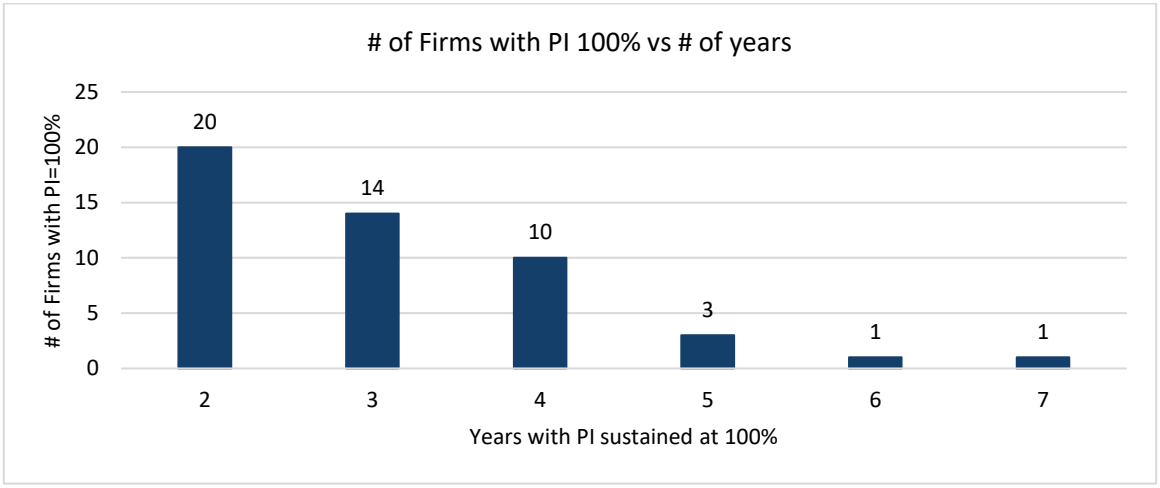


Figure 60 # of Firms with PI 100% vs # of years (Source: proff, nd)

The third variable analysed was asset growth, described in the next section.

31 4 years was chosen as a threshold to allow the first 1-3 years for star ups to stabilize. It is also a representative range to demonstrate sustainable performance (Kangasharju, 2000).

4.2.3.- Assets Growth

The asset growth follows a similar trend to the previous variables, where a higher percentage of large firms shows growth in assets by more than 3-fold. In contrast, a high percentage of small firms (30% or so) have reduced their assets, compared to less than 15% of large firms, as shown in Figure 61.

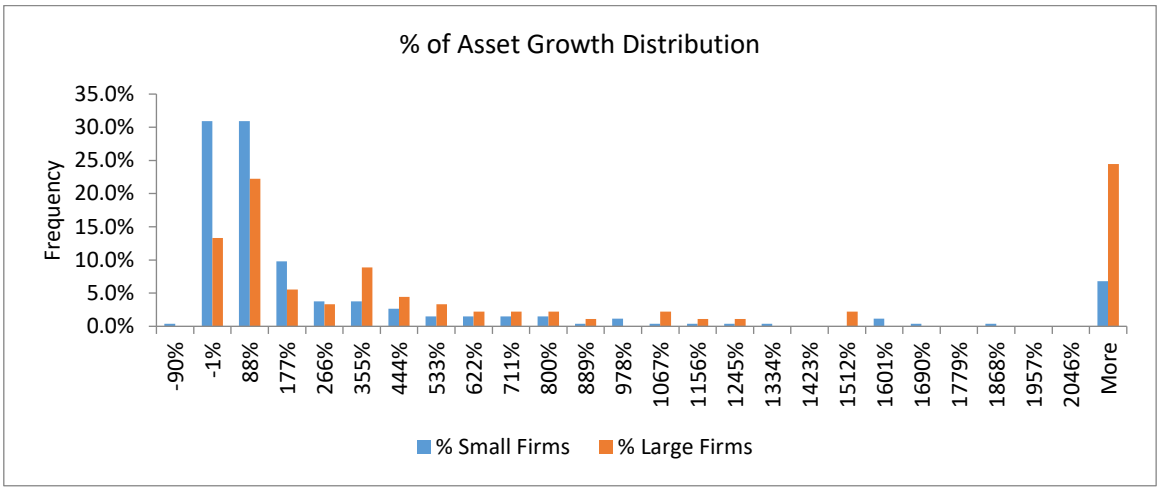


Figure 61 Percentage of Assets Growth Distribution (Source: proff, nd)

While revenue, profit, and asset growth have similar patterns, the Pearson correlation calculation shows a low correlation between them, as shown in Table XXIII.[32]

Table XXIII Pearson Correlation of Revenue, Profit, Asset Growth and Years of Operation

	Years Operating	***Rev Growth***	***Profit Growth***
Rev Growth	0.03	1.00	
Profit Growth	0.03	0.21	1.00
Profitability Index	0.07	0.02	0.12
Asset Growth	-0.03	-0.01	0.16

A concluding remark from this section is that large and small firms' performance differs in all the selected variables. There is also variation in the performance within the small firm's group. There is a low correlation between the variables analysed. A small firm may grow its revenue without purchasing

32 Due to the lack of normality of the dataset, the correlations were also calculated using the Spearman methodology of ranks, the results were similar.

additional assets. Likewise, small firms may remain in business for extended periods without increasing their revenues, assets, or profits.

4.2.4.- Selecting the Sample for the Interviews

Based on the variables analysed, the following criteria were used to select the sample of the interviews:

- **Revenue Growth.** Firms that have a growth > 0%
- **Profit Growth.** Firms that have a growth > 0%
- **Asset Growth**. Firms that have a growth > 0%
- **Profitability Index**. Firms that have a PI equal to 100%
- **Profitable Years**. Firms that sustained profits more at least four years

An equation composed of IF(AND) functions was used to select the firms from the dataset in Microsoft Excel. The results are shown in Table XX, indicating that nine firms met all criteria and were chosen as the interview sample.

[33]Table XXIV Firms Selected for the Semi-structured Interviews

Firm	Profitable Years	Revenue Growth	Profit Growth	PI	Assets Growth
Firm 1	5	83.6%	1895.2%	100.0%	364.3%
Firm 2	5	395.0%	846.6%	100.0%	255.8%
Firm 3	6	314.1%	294.7%	100.0%	289.0%
Firm 4	4	164.7%	15287.5%	100.0%	331.5%
Firm 5	4	119.0%	173.8%	100.0%	106.3%
Firm 6	7	55.8%	32200.0%	100.0%	217.6%
Firm 7	5	467.2%	1301.2%	100.0%	221.6%
Firm 8	5	29.0%	82.1%	100.0%	0.8%
Firm 9	4	99.4%	110.9%	100.0%	45.1%

33 The names of the selected firms are omitted for confidentiality.

As mentioned in the research design section, access to these firms proved difficult, and a snowball approach was adopted instead.

4.3.- Summary of the Quantitative Data Analysis

The secondary data provided a general insight into what is happening in the fishing industry in Northern Norway and supports the problem statement and research question. There seem to be mixed messages. On the one hand, the industry is growing, demand is increasing, and some firms perform well. On the other hand, other firms have erratic performance, and many small firms are exiting. The secondary data enabled the selection of firms for the interviews as part of the purposive sampling technique initially adopted.

5.- Chapter Five: Qualitative Data Analysis

The outcome of the qualitative data analysis was the development of a business model that could enable small firms to grow, shown in Figure 62. This section describes each element of this model.

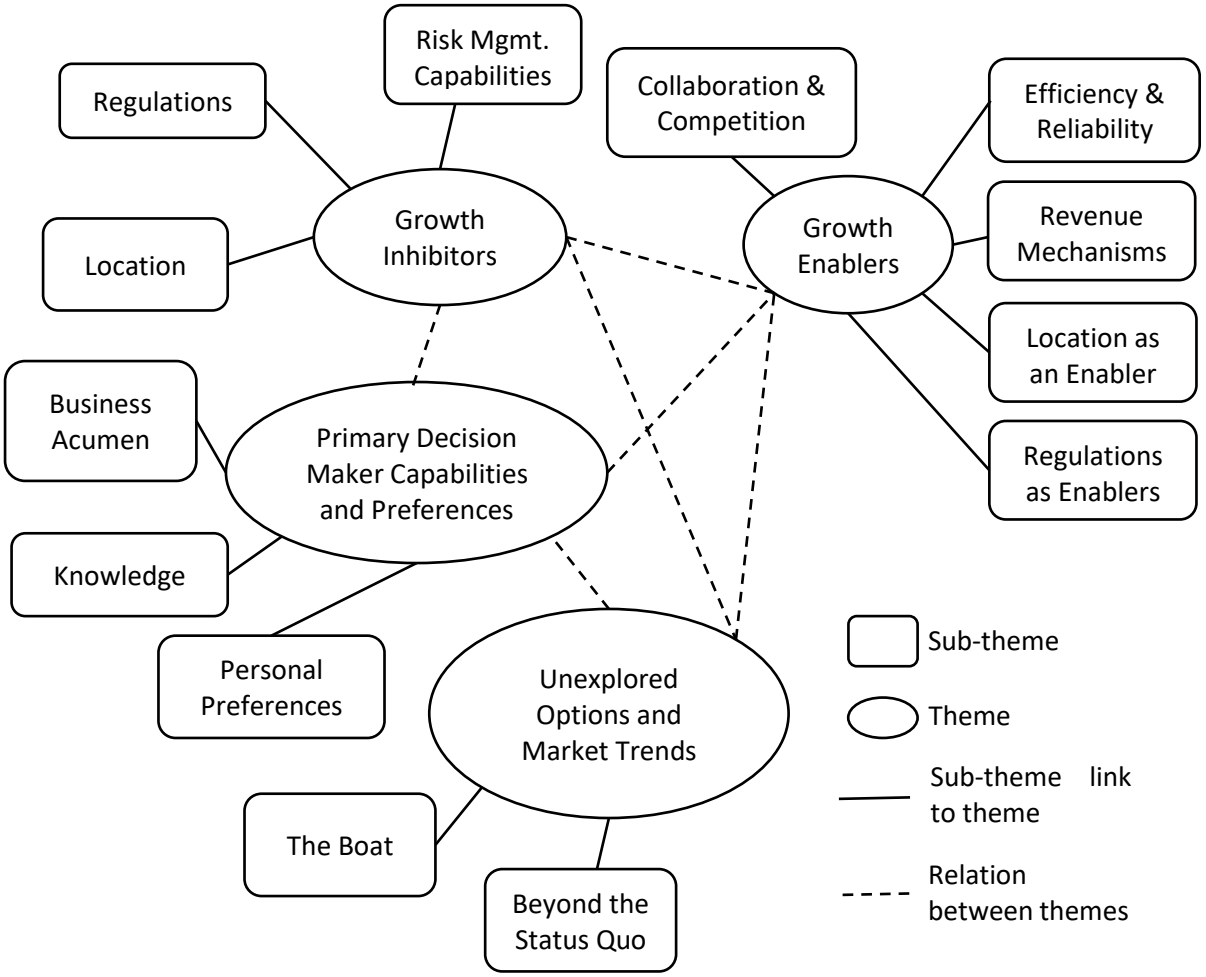


Figure 62 Grouped Sub-themes and Themes (Adapted from Braun and Clarke (2012) as presented in the worked example by Byrne (2021))

5.1.- Sub-Themes

This section describes each sub-theme with supporting extracts from the dataset, where needed.

5.1.1.- Sub-Theme 1 – Start-Up

The conditions, mechanisms, and drivers to start a firm were discussed in six of the seven interviews. This sub-theme includes different aspects; first, the entrepreneurial drive to become independent and to own a firm. The sense of ownership and satisfaction were evident during the discussions. Most of

the interviewees transitioned from employment to entrepreneurship. Family tradition plays a role in the decision. Growing up in a family that is already driving businesses in the fishing industry is an enabling factor to ease some or all the entry barriers, such as the inheritance of fishing rights or fishing vessels, which require otherwise significant upfront investments. The second aspect of this sub-theme is the start-up process. The industry is heavily regulated, and starting a firm demands a general understanding of the quota system, a certain level of networking, and money. How the firm starts may influence its growth path. General aspects to consider from this sub-theme include:

- The initial investment is relatively low if one would fish in the open quota, but getting a bigger boat and purchasing a closed quota requires significant initial capital.
- The data indicate that starting a small firm is triggered by different factors.
- Start-ups as a continuation of a family business, where quotas are already available, have an advantage. This family tradition also plays a role in the entrepreneurial decision.
- The psychological aspects of the transition to entrepreneurship (e.g., The satisfaction of owning the firm) did not come up as critical for growth in this sub-theme.

The growth of a firm may only start when it is established, so this sub-theme is particularly important since it is in the critical path of growth. However, it is outside the scope of the research question that implies the firm is already established and looks at the growth thereafter. This is the reason this sub-them was removed from the model.

The extracts shown in Table XXV are four examples supporting the analysis presented above for this sub-theme.

Table XXV Examples of Extracts to Support the Analysis of Start-Up Sub-theme

Article / Interview	**Extract**
A17	It has probably never been easier to establish yourself in an open group for a couple of fishermen under 30
A40	This was more expensive and bigger than I had thought. I already have a fish farm, and I have to expand there. I expect to invest around two million kroner. Then there is also a car with a driver who will transport the crayfish down to Trondheim

Article / Interview	Extract
I3	I work with a closed quota, I bought a quota 12 years ago, I paid 350,000 NOK, now it costs more than 6,000,000 NOK, it is amazing how much speculation there is with these quotas
I5	When I finished high school in 2014 (7 years ago), I started fishing full time, I have my own boat, a "shark" 10 meters long.

5.1.2.- Sub-Theme 2 – Location

The second sub-theme identified is related to the location. It has different perspectives. For a small firm in the first stage of the value chain (a firm with a small boat), being close to the fishing grounds is advantageous since it reduces commuting time and logistic costs and provides flexibility. From the perspective of a receiving facility or fish producer ashore, the location is vital. Being in the wrong place means fishing vessels will not stop to deliver their catch.

Another aspect related to the location is stability. The interviewees indicated that they fish in the same locations every year; there are some incentives to commute and fish in other areas such as Finnmark, but in general, they seem to agree that they fish close to where they live and avoid long distances, when possible.

Finally, certain restrictions affect the large fleet and small fleet differently. Big vessels in large firms have an advantage since they do not seem to have location constraints, while small vessels are not allowed to go to specific fishing grounds due to regulations. In summary, location plays a role in the growth of firms in the context studied.

The extracts shown in Table XXVI are four examples supporting the analysis presented above for this sub-theme.

Table XXVI Examples of Extracts to Support the Analysis of Location Sub-theme

Article / Interview	Extract
A10	It takes Kristiansen one annual trip to Henningsvær, as he has done every winter since 2001.

Article / Interview	Extract
A77	We are now working on building the factory we need. We do not have an overview of the costs yet, but it will probably be expensive. Among other things, we have to lay the seawater pipeline far out to sea to get the water clean and cold enough
I2	You have to go far out at sea and small boats do not have easy access to any of these fishing spots (for example Bjørnøy has a lot of haddock, but small boats are not allowed to fish there)
I4	When they finish here, they can also travel to Finnmark to fish a bonus 30% Cod when they fish for haddock and saithe. This can increase income as well, but we are not talking about a lot of money

5.1.3.- Sub-Theme 3 – Efficiency and Reliability

The importance of efficiency when running a fishing boat was highlighted by all the firm owners interviewed. A small firm depends on running an efficient operation at a low cost to make and sustain profits. The boat's maintenance plays a key role. Keeping the equipment in good condition to avoid breakdowns is vital to prevent unplanned expenses, such as emergencies at sea, or to ensure that the boat is always available when needed. The weather conditions in Northern Norway do not always allow fishers to go out at sea, so every good weather window available should be utilized, and if the boat is in a shipyard for repair, the firm may miss it, which in turn may incur additional costs, because they may have to commute to other locations to follow the migrating cod. The interviewees mentioned that the money spent in maintaining the boat is worthwhile and provides returns in the long term.

The vessel's age has a significant impact not only on the efficiency and reliability of the operations but also on the upgrading costs. An old vessel (10 years or older) may not meet all the minimum standards, and upgrading it could be expensive, like in the case of Firm A. These costs could easily exceed the budget and put the firm in potential financial distress. New government regulations may not always drive upgrades to the boat. Some firm owners may upgrade the engines and other equipment to reduce fuel consumption and operating costs.

While the interviewees have a favourable view of innovation and technology, not all saw this as a critical factor to grow the business. They concur that technology in the fishing industry has helped vessel owners streamline their operations on the large fleet, indicating that innovation is a crucial

element of firm growth. The interviewee in I6 presented a different perspective than the rest. For this person, technology is critical in the growth path, and the white fishing industry could benefit from adopting existing practices from the Salmon industry, which is technologically more advanced.

The fishing techniques used by the interviewees were different—some fish with nets, others with lines. The choice of fishing technique also impacts the operations' costs and efficiency. For instance, fishing with nets requires more hydraulic power, which uses more fuel. Also, fishing with nets requires two people, but it could also have advantages.

This sub-theme concludes that efficiency and reliability play a role in the firm's growth, and owners should keep a close eye on the maintenance of their vessels since it is closely linked to the costs of running a firm.

The extracts shown in Table XXVII are four examples supporting the analysis presented above for this sub-theme.

Table XXVII Examples of Extracts to Support the Analysis of Efficiency and Reliability Sub-theme

Article / Interview	Extract
A19	Here you see the 11-meter «Solheim», a hybrid jar with a battery pack of just over 50 kilowatt hours.
A32	After Enova launched a streamlined application process last autumn, they have distributed NOK 180 million to battery projects
I5	The large boats use a lot of technology that makes it easier and faster to fish. We fish with nets and that's OK.
I6	There are many skilled engineers who come up with new ideas and designs to improve production

5.1.4.- Sub-Theme 4 – Knowledge

As pointed out by the interviewees, understanding the fishing business is paramount for success and growth. Similar to the previous sub-themes, knowledge includes different aspects in the context of the research question. Firstly, knowing how to operate the fishing vessel; while this was not explicitly mentioned during the interviews, it was implied that the ability to handle the fishing vessel, make minor repairs, understand the navigation charts, and read weather conditions is part of the day-to-

day of a fisher. This knowledge can be acquired through formal education. Still, in most cases, it is tacit knowledge obtained through experience, which also includes knowing the location of the fishing grounds, migration patterns, seasonal changes, and so on.

Building a network came up during the interviews as an essential aspect. Networking is explained in more detail under the "collaboration" sub-theme, but what is valuable to mention is that the network is part of the knowledge a small firm owner should have. Another factor is the understanding of all the regulations. The fishing industry is heavily regulated, and there are frequent updates. Small firm owners must follow these updates and take necessary actions to avoid penalties and noncompliance issues. There are available resources online that ease this process.

Attention to detail is also related to knowledge, and understanding how to prioritize the information available and finding opportunities where others see problems provides an advantage.

People who have been in a family in the fishing business also have an advantage. They already have the experience, network and, in some cases, the necessary equipment. Tacit knowledge passes on from generation to generation and plays a role in the performance and growth of small firms.

The extracts shown in Table XXVIII are four examples supporting the analysis presented above for this sub-theme.

Table XXVIII Examples of Extracts to Support the Analysis of Knowledge Sub-theme

Article / Interview	**Extract**
A40	It will be difficult to get the crayfish down to the customers. We have to deliver them live to our customers, who are all over Europe. We will also look at the possibility of selling crayfish in Asia as well. Singapore, among others.
A59	For boat builders, these centimeters do not matter, the price for the newbuilding will be exactly the same. But in the future, the value of a boat with a quota above and below 11 meters can be enormous,
I4	I have worked in the fishing industry for many years and have held several management positions in fish receiving and producing facilities ashore

Article / Interview	Extract
I2	Knowledge is important if you want to become a fisherman, there is a lot to think about. Many fishermen are very good and do well. If you have money and want to invest it, you have to do it on something you are good at.

5.1.5.- Sub-Theme 5 – Business Acumen

The simplicity of the business model of a small firm in the first phase of the value chain may not be conducive to developing business acumen skills. Fishers like what they do, enjoy offshore fishing and are usually good at this, and they are knowledgeable about fishing. However, understanding the fundamentals of running and growing a business plays a role in the firm's growth and is a different skills set. Not all small firm owners have the administrative skills required to manage a growing a business, nor are they interested in acquiring these skills. During the interviews with the interviewee from Firm A, which is struggling financially, the company received a new loan to cover the upgrading costs, which has also changed the company's risk profile. On the other hand, established firm owners show how they manage to grow the business and have administrative skills to continue to grow. One example worth highlighting from the interviews is setting clear goals, having a long-term vision and strategy, and conducting regular business reviews; firms that do not establish these practices may not grow as fast or as much as other firms with a clear path forward.

Growth does not only depend on the administrative skills to run the business. Having the ability to read market conditions is also vital. Large amounts of information are readily available, but this data needs to be interpreted and translated into business actions. Decision-making based on factual data has been demonstrated to be a vehicle for successful growth, as indicated during the interviews.

The data show that the costs to run a small firm may be high and that revenues, if not managed properly, may not suffice. So, financial discipline is also a key factor. But more evidently, the capability to understand the simple financials of getting a loan or buying an additional quota. The interviews provide insight on certain conditions that should be met if a fisher acquires more fishing rights and asks the bank for a large sum of money. These conditions include the size of the vessel. Getting additional quota for a small fishing vessel may not be cost-effective.

A common trend in the interviews is the lack of sense of urgency to grow the business; companies are maintaining sustainable profits, which is perceived to be enough.

The extracts shown in Table XXIX are four examples supporting the analysis presented above for this sub-theme.

Table XXIX Examples of Extracts to Support the Analysis of Business Acumen Sub-theme

Article / Interview	Extract
A40	Jim Andre Lorentzen from Sørnesøya in Lurøy municipality thinks new and big about something small. In the summer, he will start a crayfish reception at his home place
A61	Fishing is a fantastic industry, and I am really amazed that more people do not see the opportunities there, says Jan A. Johnsen from Brønnøy
I6	I see the opportunities that the government entities/authorities present (put in front of me).
I2	The fishermen are good at what they do, and thrive at sea, but they are not businesspeople, they are not interested in management/administrative work that is required when running a growing business. So often they stick with a boat and are happy with their income.

5.1.6.- Sub-Theme 6 – Regulations

The quota system and allocation of fishing rights to firms in the fishing industry based on the boat sizes has a dual effect. On the one hand, it has helped to recover the fish stocks that were almost extinct in the 1980s. Without the constraints of a quota system, the fish would have disappeared entirely. On the other hand, it limits the revenue opportunities for the firms and, hence, their growth opportunities, which cannot rely only on the total fish caught. All interviewees demonstrated a good understanding of the quota system. There is a general acceptance, and firms have established mechanisms to comply with the Norwegian regulations and maintain profitable businesses.

The research question refers to the growth in an industry where the resource is in decline. While it could be argued that the resource is renewable and hence not in decline, the effects of the measures to avoid extinction clearly impact growth mechanisms. Price per kilo is adjusted based on the allocation of the quotas, but these adjustments are not always enough to maintain adequate revenues. Fluctuations in prices affect the players in the industry differently. Small firms in the first phase of the value chain cannot control the prices set by the authorities. Fishers can choose to fish different species, but the price at the receiving facilities is relatively homogenous. Receiving facilities

and onshore producers deal with varying price challenges; they are forced to buy the fish at the minimum price but cannot speculate too much when selling it to the final consumers since the fish is seen as a commodity.

A critical aspect of the regulations worth highlighting is the firm structure. Fifty-one per cent or more of a firm in the first phase of the value chain must be owned by a registered fisher. This structure impacts investment decisions since an investor must partner with the fisher and has no decision power over the firm. What is evident from the interviews is that firm growth is primarily organic. Firms do not usually grow by acquisition or external investments.

The regulations are at the cornerstone of the firm's growth, and the mechanisms adopted today are pretty different from the pre-quota era, where the growth was proportional to the fish caught and sold.

The extracts shown in Table XXX are four examples supporting the analysis presented above for this sub-theme.

Table XXX Examples of Extracts to Support the Analysis of Regulations Sub-theme

Article / Interview	**Extract**
A18	Many fishermen are not aware of the limitation in the Sami Parliament's subsidy scheme, and miss out on the opportunity for several hundred thousand in support of the boat purchase
A79	The so-called quota message that came, is in practice an abuse of power against the smallest fleet. It is incredible that it can go so quietly, and that a fisheries minister from the Conservative Party can let it pass. Even Red politicians I talk to think this is too wrong. I myself have been a Conservative man all my life, but I have been disappointed with the fisheries ministers we have had in recent years, I must say. They do not take the fisheries seriously. We also need a little predictability, he points out
I4	The fishing industry has a quota system, if you are a fisherman in Blad B, you can own a small boat (9-11 meters) and fish with an open quota (Group 2), you get a share of a total quota and do not have to pay for it. Those who fish with the open quota receive about 10 tons for Cod each year, and can fish for haddock, saithe and halibut as well.

Article / Interview	Extract
I2	Norway has different rules than, for example, Iceland, where most of the fishermen work for large companies. These companies own the entire quota. Icelanders come to Norway to fish, but as foreigners, they cannot own a boat larger than 15m

5.1.7.- Sub-Theme 7 – Collaboration and Competition

The dynamics of the fishing industry enable players to have a harmonic relationship. The competition in the first phase of the value chain is not direct, meaning firms are not competing for a position in the marketplace. They are not contesting on pricing or product quality, which enables a proficient level of collaboration at this stage. At the early establishment of Firm A, building a network was essential to gain knowledge of the fishing ground locations, regulations, and other practical aspects of the fishing business. Firm A collaborated with other fishers to fish together, which is good as a safety measure and a mechanism to gain knowledge.

Collaboration comes in different forms, for instance, fishing together to reduce safety risks or share knowledge. Small firms develop partnerships with fishing facilities and onshore producers. The interviews indicate that fishers tend to deliver fish at the same places in the fjord, indicating a symbiotic relationship.

Roles and responsibilities are well defined. There is also good collaboration between stakeholders across the value chain. As indicated during the interviews, some firms in the first phase have established partnerships with fish producers to sell their product and benefit from higher pricing. As the firm integrates vertically into the second phase of the supply chain, it gets closer to the final consumer in the value chain. In this phase, competition increases, and external market conditions may have a more significant impact on the firms' performance.

As mentioned before, firms in the fishing industry tend to grow organically. The mechanisms of horizontal and vertical integration are further discussed in the next section. Still, at this point, there is an indication that collaboration is a critical factor that enables firm growth. The fishing industry is relatively closed. Players do not easily open up to outsiders. This feature is probably one of the most significant entry barriers. Building trust is a way to overcome this challenge. Doing business ethically and showing goodwill makes a big difference in being accepted in the fishing network.

Outside the scope of the research question, a topic discussed during the interviews is collaboration at a country level, for instance, between Norway, Russia and other European countries. Norway plays a

crucial role in the international trading of fish products, and maintaining a good partnership and fair trading deals may help the firms in the industry to perform better and grow over time.

The extracts shown in Table XXXI are four examples supporting the analysis presented above for this sub-theme.

Table XXXI Examples of Extracts to Support the Analysis of Collaboration and Competition Sub-theme

Article / Interview	Extract
A23	Three of the weekly seafood flights go with Qatar Airlines to Doha for further distribution to Asia
A24	We have cages, and have entered into agreements with two boats for delivery. It will not happen until March 1 at the earliest. This will allow us to deliver fresh cod over a longer period of time
I4	Fish receiving and production facilities ashore compete for fish
I3	It is possible to fish and drive a fishing receiving and producing facility ashore, but then there is very little time left over. It is best that the players in the value chain stick to their part and instead maintain good collaboration.

5.1.8.- Sub-Theme 8 – Revenue Generation Mechanisms

Revenue is one of the most used indicators in studies of firm growth. Firms in the fishing industry can generate revenues and expand in diverse ways. The most common is increasing the revenue by fishing more than one species. All the interviewees highlighted this growth mechanism. While cod is the most commercial fish, it is also heavily regulated, and allocated quotas are insufficient to grow the revenue yearly. So, to increase revenues, small firms can fish other species, some within the quota system, some unregulated; this is a common practice.

Small firms usually deliver fresh fish without any processing. Diversification into other products may include vertical integration, requiring additional permits from the health and hygiene authorities. None of the interviewees has chosen this path since the perceived benefits do not outweigh the needed efforts. Firms may also decide to expand and produce or catch different species, such as seaweed or shells; this requires alternative techniques and equipment. As highlighted during the interviews, receiving facilities are not all equipped to purchase these species.

New trends are emerging in the fishing industry. Fish products are becoming popular in the food and other industries like cosmetics and pharmaceuticals. The use of fish protein powder as a growing market was mentioned during the interviews. Small firms in the first phase of the value chain may not have the capabilities or knowledge to produce these products. Still, there could be partnerships and further collaboration with players ashore to make these innovative goods. There was consensus about this among the interviewees.

Most small firms have grown organically through horizontal integration by adding more fishing capacity. When the conditions are right, this growth business model works fine; for example, the acquisition of additional quotas at present is much more expensive than in the 1990s, even when removing the effects of inflation. Some interviewees presented the expansion of a family business in the last 30 years using this model. Expanding the business horizontally with the purchase of additional boats and quotas requires extensive capital investment and increases the risk profile of a small firm.

When fishing with nets, other species are often caught. Still, today, there is not much commercial use for these species, which represents a missed opportunity, as pointed out during the interviews. It also highlighted the opportunity to sell fish heads separately, an area that is still in a premature phase.

There is also an opportunity to make money buying and selling quotas, as commented during the interviews, but it is not a common practice. Fishers are typically focused on fishing activities and may not always be up for the speculations of trading quotas in the markets.

Growth opportunities are limited for a small firm. The boat size is a constraint. The open quota does not offer much growth room, and buying additional fishing rights for a small boat does not provide an ample financial uptake. The earlier the firm owner expands the business onshore, where the opportunities lie, the quicker the firm could grow, as indicated in the interviews. This model is not standard, requiring different skill sets and the will to do it.

Another aspect mentioned during the interviews is the leftover of a quota. The allocated quota is not always fished up; it could be transferred to other firms and help their revenue generation. However, this model is not a common practice. Besides, the remaining quotas are for species with difficult access to small boats, so this growth model may only be relevant for larger firms.

It can be seen how vital generating additional revenue is for the growth pattern of a small firm, but current constraints make it difficult and may explain the displacement of the small fleet by the larger vessels.

The extracts shown in Table XXXII are four examples supporting the analysis presented above for this sub-theme.

Table XXXII Examples of Extracts to Support the Analysis of Revenue Generation Mechanisms Sub-theme

Article / Interview	Extract
A7	Of this, haddock is the largest with 326 tons, while cod accounted for 202 tons. In addition, just over 55 tons of other species have been caught, with 30 tons of blue halibut as the largest single species
A118	The extra crab keeps the boats in operation
I4	It is not uncommon for fishermen who own one or two boats to have fish production ashore, the risk of the raw material is reduced
I6	I bought a quota for NOK 1.1 million, and I sold it for NOK 6 million in 2018

5.1.9.- Sub-Theme 9 – Personal Preferences

Growing a firm starts with the personal will to do so. A small firm owner should take this decision since it involves additional risks in most cases, different activities and potentially lifestyle changes. Apart from one of the interviewees, none of the others indicated that this desire to grow is common among small firm owners. If the business generates consistent profits, the players are satisfied. A small firm owner in the first phase of the supply chain enjoys a work-life balance. The fishing season is a few months during the winter, leaving the rest of the year open for other activities. Some interviewees enjoy fixing the house since it is an excellent activity to pass the time when no fishing occurs. The current business model for this group of small firms may be enough to sustain a profitable business with limited growth. Some take additional part-time jobs to supplement their total income, like the case of Firm A, which runs several unrelated activities.

All interviewees indicated the importance of enjoying life at sea, and the self-actualization for this group may not necessarily be building a large company but simply the satisfaction of owning a small firm with steady profits and a good work-life balance. While religious beliefs were mentioned during the interviews, this area does not seem relevant to the research question.

The extracts shown in Table XXXIII are four examples supporting the analysis presented above for this sub-theme.

Table XXXIII Examples of Extracts to Support the Analysis of Personal Preferences Sub-theme

Article / Interview	Extract
A53	Basically, Tor Arne Jørgensen is a car mechanic and machine driver. But after fishing a bit with others, he liked the fishing profession so much that he took the chance to invest in his own boat
A61	I praise myself happily every day for having good health and being allowed to do what I want. And that's fishing. Then I am incredibly happy for everything I have been involved in the organization's work over the years. I have not had leisure problems over the years, so to speak, he jokes to Kyst og Fjord
I3	I thrive, I think it's a great profession
I6	I also have a strong belief that if you help others, it pays off in the long run . It's not money I love the most, I like helping people. I could have earned a lot more

5.1.10.- Sub-Theme 10 – Risk Management Capabilities

Risk is vast, but in the context of the research question, a few factors can be highlighted. The interviewees mentioned that the quota system does not guarantee the firms a minimum quantity of fish. Even those with a closed quota are not given any guarantees, just that they will receive specific allocations. Uncertainty is higher for those with open quotas since their allocation is not guaranteed. The prices then oscillate with a certain proportion to the total allocation available, but not to the extent required to maintain previous revenue levels.

The research question implies that the decline in the fish stocks limits firm growth. The effects are not direct, though. The quota system has enabled the fish species to stabilize. Apart from the coastal cod, which seems to be in steep decline, the migrating cod remains stable, the same as other species. It was mentioned in the interviews that the problem is not to catch the fish; the limitations are on the shoreside at the fishing receiving facilities and producers, which may present an opportunity for growth.

Climate change impacts migration patterns, as indicated by the biology field literature. Still, these new patterns do not seem to be affecting the performance or growth of small firms in the fishing industry. None of the interviewees show concerns about global warming, and there is no sense of urgency to make drastic changes to current practices. The environmental risks discussed during the interviews

relate to producing dry fish, which requires specific environmental conditions such as the right temperature and humidity.

The risk profile of firms in the fishing industry is different in the different stages of the supply chain. As indicated in the interviews, the risk is relatively low for firms in the first stage of the value chain, provided they can maintain a reasonable financial performance and keep manageable debt levels. Firms operating ashore face higher financial risks since they are more exposed to external market fluctuations. Bankruptcy is usual in these firms.

While risk is low, small firms are displaced by larger ones that have optimised their operations through technology and benefit from having a certain level of vertical integration on board (i.e., they can produce fish products, frozen filets, canned products, and so on). There may be a risk that the demographics of the fishing fleet end up like in Iceland, where most fishers work as employees in large firms. Current regulations offer good conditions to the employees, who could have an income similar to that of the firm owners.

Fish farming, a way to mitigate the decline in fish stocks, is almost impossible for a small firm to start due to the significant capital investment required and demands from the regulators. Aquaculture has been a remarkable success in the Salmon industry, and the white fish industry could follow a similar pattern. Still, again, this may only benefit large firms with financial power.

The extracts shown in Table XXXIV are four examples supporting the analysis presented above for this sub-theme.

Table XXXIV Examples of Extracts to Support the Analysis of Risk Management Capabilities Sub-theme

Article / Interview	**Extract**
A25	After delivering a positive 2019, the company entered 2020 with optimism. However, the load of weak financial results we gained before 2019 became too heavy to carry when we suddenly had to deal with the corona situation
A98	This may mean restrictions on which areas we can fish, because there are chances of bycatch of species that the EU believes are threatened
I5	The fjord cod is a little harder to find, there are many who can catch it

Article / Interview	Extract
I2	There are also many dry and salt fish producers who have problems, the fish can be destroyed while hanging if the temperature is not quite right, or if there are flies, etc. They can lose money.

5.1.11.- Sub-Theme 11 – Location as an Enabler

The location was described as a barrier to growth in the Sub-theme 2. Apart from interviewee I2, who mentioned that fishers are used to travelling to various locations to fish, the other participants do not see the benefit of long transits. The data from the articles expands on the standpoint from interview I2 and supports the location as an enabler, in addition to the constraint, depending on the circumstances and preferences of the parties involved, as indicated in the articles A4 and A10:

- "The boat has made several trips far north in the sea, including spinner fishing at Bjørnøya and shrimp trawling at Svalbard." (A4) (Jenssen, 2021d, p.08)
- "It takes Kristiansen one annual trip to Henningsvær, as he has done every winter since 2001" (A10) (Erlandsen, 2021d, p.16)

The statements support the comments from interviewee I2, indicating that the transit to remote fishing grounds is a common practice and enables the firms to generate additional revenue.

Likewise, articles A1 and A2 both indicate that fishing in different locations is not a barrier to growth but rather an enabler to increase revenue, and supports previous discussions about species diversification:

- "Has sailed many and long trips in the past year, including out to the Russian border and the famous field "Banana" (A1) (Jenssen, 2021a, p.5)
- "The operational plan on board the "…" consists of net operation offshore close to home in Møre from February until the end of the summer, before it is rigged to fish with line and further north. Cod and saithe make up the largest share of the catch … in addition to a large selection of other species" (A3) (Jenssen, 2021c, p.7)

In the firm's growth process, the owner should keep in mind the location to determine when it is an inhibiter or when it could be used as an enabler.

5.1.12.- Sub-Theme 12 – Regulations as Enablers

The general sentiment of regulations during the interviews is that, while accepted, the interviewees perceived them as a barrier. Regulations are closely related to the quota system, which is an evident barrier of entry and growth due to the excessive capital investment required. However, this is not always the case, and in several instances the data from the articles show how regulations can become enablers of growth. For instance, the rule about 51% ownership for the fishers could hinder investors, but on the other hand, can enable these fishers, normally small firm owners, to leverage this rule to grow their business through vertical integration, lowering workforce costs, etc. Another good example is the incentives like subsidies offered by the government, which could be embraced to increase revenues.

The thesis revolves around the standpoint that fish stocks are constrained, and the quota system does not allow carte blanche for the firms to catch as much as they would like to increase their revenue. While the interviewees recognize the importance of the quota system to avoid extinction, they see the regulations as inhibitors of growth. There are, however, some instances in which regulations play an enabling role with a direct impact on firms' growth, as indicated in the following articles:

- "The state wanted to help, and blessed it all with quota bonuses, i.e. for every kilo of cod you caught this way, you got half a kilo in extra quota. The quota bonus, which in the example above corresponds to a 50 per cent bonus, was to compensate for the extra time spent on board. As this form of capture became commonplace and the market, the supposedly higher market price would mean that the bonus could lapse. But it was not that simple" (A75) (Erlandsen, 2021a, p.19)
- "One-way driving. Vertical integration takes place in many industries, but in the fishing industry, the Participant Act provides for one-way driving: While land companies are not allowed to own more than 50 percent of a fishing vessel, it is completely free the other way. Over time, this has led to the growth of several large fisher-owned companies on land, several of them with significant involvement in processing." (A108) (Jenssen, 2021l, p.16)

There are incentives, and the regulations provide some protection to small firm owners. In such instances, they could enable growth. During the interviews, vertical integration was discussed as a mechanism to grow a firm and provide a fisherman the advantage over a non-fisherman investor. Those who take such advantage could boost their firms.

5.1.13.- Sub-Theme 13 – Beyond the Status Quo

Challenging market conditions, like the pandemic, forced firms to innovate and see beyond their current state. For example, a fisher that dries fish and sells it to restaurants, when these closed during the COVID-19, the alternatives left were to either pause the sales or to go beyond these groups of customers and deliver a product that would be ready for them, as indicated in the article A114:

- "The dry fish producers are now winning back the Italians with pot-ready stockfish products … Several pot-ready products in the shops have increased sales of not only dry fish, but also clip fish and salted fish, reports the Norwegian Seafood Council … Traditionally, dry fish in Italy have largely been sold at fish markets, fish shops and local fish dealers. The selection in the grocery stores has been small. In addition, a lot of stockfish has been eaten in restaurants, and it is mainly "mamma" or "nonna" (grandmother) who is responsible for the traditional dry fish dinners that require dilution and plenty of time. Then came the corona pandemic, the fishmongers pulled down the gates and the restaurant doors were closed. All food was bought in the store and prepared at home, with the exception of ready-made food that could still be delivered to the door" (A114) (K&F, 2021b, p.18)

In this example, the customer portfolio increased, which drove a rise in product offerings. In a model of growth for a small firm, capabilities should be developed to diversify the product portfolio beyond the conventional fresh or dry fish, which has kept many of these firms afloat for a long time. Small firm owners in the first phase of the supply chain have the raw product and could either develop the skills and build the necessary capabilities or partner with shoreside businesses; the latter was the preference from the interviews, but the article's data challenged the status quo.

The importance of product diversification to minimize the effects of price volatility is also discussed:

- "The closure of British waters means that mackerel fishing starts earlier, and this suits customers in Egypt and Ghana very well." (A67) (Jenssen, 2021h, p.10)
- "African markets are becoming increasingly important for clipfish exporters" (A69) (Antonsen, 2021b, p.11)
- "Airborne mackerel to Japan." (A92) (K&F, 2021d, p.11)
- "The value of frozen cod, on the other hand, has declined over the past month. Although the volume increased by 13 percent compared to the same month last year, the value fell by seven percent … Throughout the pandemic, the Portuguese have had an increase in domestic consumption of clipfish." (A56) (Ingilæ, 2021b, p.14)

It can be inferred from these articles that challenging the status quo enables firms to overcome challenges. During the interviews, diversification was limited to fishing additional species. The articles provide more information. The diversification of products does not stop at adding some additional items for a different set of customers. Diversifying beyond the status quo is more than this; the information lies beneath the surface in the articles. There is a massive growth in the aquaculture industry, which represents a high risk for producers of wild white fish, but it is also an opportunity:

- "Based on the plans of the companies that have the most specific plans for cod farming, Kyst og Fjord has estimated that the cod farmers will have an annual harvest quantity of 80,000 tons within 2025" (A21) (Jenssen, 2021i, p.6)
- "This stage is a new milestone for Norcod on the way to the production target of 25,000 tons of farmed cod by 2025. We are on schedule and following the plan, says Eriksen" (A16) (Jenssen, 2021j, p.7)

The production of white-farmed fish in 2020 was around 3000 tons (Fiskeridirektoratet, nd), so the forecasted production may have a massive disruption in the market. Supplying raw materials for these large aquaculture firms is a potential opportunity to grow with them, as indirectly indicated in this article:

- "We are constantly working to reduce the load on marine species. But this is a development that will happen over time. We buy algae flour and algae oil already today, these are very nutritious raw materials, which in nature are the food source for just redfish" (A22) (Jenssen, 2021k, p.8.)

Another area of growth is partnership beyond the conventional stakeholders in the supply chain and seeking either governmental support for research or working together with research bodies to improve the utilisation of the catch and increase the value per kilo, as indicated in these articles:

- "A molecule the researchers have made the "cocktail" is worth 8500 kroner per gram. The starting point is the environment and sustainability. Ensuring that we make full use of absolutely all of the resources we harvest from nature, says … in Nofima in an article Nofima has made about the values that can hide in the fish hatchery." (A12) (K&F, 2021c, p.22)
- "In the Snowmap project, the researchers also looked at the potential for value increase of residual raw materials Shells and intestines – from snow crab. More products are being produced. Based on hydrolysis of shells with intestines became a maximum dividend of 43.7 percent protein and 37.4 grams of fat per kilogram from the raw material achieved." (A13) (Johansen, 2021b, p.18).

The Norwegian fish is famous worldwide, to the point that several countries use it as one of the ingredients in their traditional dishes, as indicated in these articles:

- "The Italians are so fond of dry fish that it is considered one of the country's national dishes, has its own stamp, festivals and knightly arrangements, and top chefs from restaurants with both two and three Michelin stars volunteer as dry fish ambassadors." (A114) (K&F, 2021b, p.18)
- "In Jamaica, people like to eat clipfish for breakfast … It is rare for a country to have a national dish that is based exclusively on foreign ingredients." (A14) (Antonsen, 2021a, p.5)

The strong tradition represents an excellent opportunity to develop a long-term partnership beyond the purely commercial trading of fish and fish products. In this article, Antonsen (2021a) mentions collaboration between Norway and Jamaica to raise awareness about the origins of the fish, how to handle it, and so on. A model of firm growth that includes these aspects may bring robustness and business sustainability.

Environmental sustainability is another area that is disrupting the industry, and while it is a risk due to new governmental regulations and restrictions, it could also open opportunities. For instance, strengthen collaboration with local players:

- "All our products are local, a short way from their natural environment." (A62) (Ellingsen, 2021b, p.14)

This article emphasizes the trend of local products, reduction of CO_2 emissions and so on. A small player could benefit from this to enter a niche market for environmentally minded customers. Small firms may also profit from acquiring governmental incentives and subsidies to upgrade their fleet. The current trend may promote this, as shown in these articles:

- "Emission-free operation is the future, and through greater use of emission-free technology" (A78) (Kiil, 2021, p30)
- "Today, Båtsfjord appears as the fishing capital, but I am willing to claim that Båtsfjord is now becoming the environmental capital. We are all impressed by what we have seen and heard here in Båtsfjord. What strikes me, at least, is that people are willing to change, but it will cost. The state should also to a greater extent support small and medium-sized enterprises that want restructuring and a green shift." (A80) (Hildonen, 2021, p.4)

In summary, this sub-theme presents opportunities for growth beyond current practices. The overall sentiment from the interviews was that current practices are OK and most interviewees are not seeing beyond. This sub-theme is not just about innovation, or diversification, or collaboration, it is about

taking a leap into the unknow, beyond the comfort zone of current practices. While it is not easy for a small firm to embark on some of these journeys, firms need to change their existing business models to enable growth. The opportunities are latent, as mentioned in the interview I6; it is just a matter of identifying and pursuing them.

5.1.14.- Sub-Theme 14 – The Boat

Firms in the first phase of the supply chain depend on their fishing boats to generate revenue. For a small firm owner, the selection of the ship is an essential decision since it will determine the firm's performance. This item was discussed with interviewee I4, who clearly described how acquiring a quota for a small vessel is not always profitable. This article states:

- “The value of the fishing boat "…" has probably been two million kroner higher as a result of the two centimetres (cm). Now boats of 11.01 meters are being built instead of 10.99. It can give an extra gain of two million kroner. This year, a 10-11 meter cod quota goes for NOK 4.3 million, if the quota is on a boat under 11 meters. But if the quota is on a boat over 11 meters, the price is quickly a couple of million higher, says Nofima researcher …. - This is because boats over 11 meters can be used as a structural object. But not those under 11. A little depending on what happens in the future, this can make a huge difference, he says.” (A59) (Erlandsen, 2021b, p.8)

The firm owner must be aware of the quota regulations to make the right decision. Operationally, the difference of 2cm is neglectable, but it has a significant financial implication. A typical growth model for a small firm is to start with one boat and expand by acquiring additional vessels and quotas. The article A79 relates to a small firm owner who has grown a firm organically with this model:

- “One of his active boats is under eleven meters, while two between twelve and 13 meters. Herein lies some of the key to the coastal fishing fleet of the future, according to himself.” (A79) (Ellingsen, 2021c, p.20)
- “This must be introduced on boats up to 13 meters. It is too small with 11 meters today. Even if the difference is only a few meters, it makes up a lot. It is on the smallest boats that the accidents happen. So while we may get a few fewer boats from such a structure, it's worth it” (A79) (Ellingsen, 2021c, p.20)

The article emphasizes that the 13-meter vessel is the right size for a small fishing vessel and that a boat below 11 meters is too small. Boat builders have seen this as a business opportunity:

- “This is the yard's second boat in the new 11-meter series, and May Britt Hansen reports great interest in the new model. - We will probably make some of these in the future, says …” (A105) (Erlandsen, 2021c, p.23)

Another aspect of the fishing vessel is the age. Old boats are not as efficient as the new ones, and they tend to require a lot more maintenance, which is an additional cost and time for the vessel at the shipyard for repair. The design of the new vessels takes several factors into account, for instance, the capability to transport live catch, which is also a business model that could increase the rentability of the company. The following article reflects this:

- “The boat, which is 14.96 meters long, has a quota for whitefish, but also coastal mackerel and NVG herring are included in the operating basis. The pelagic fisheries have been considered. The boat has three so-called RSW tanks for 70 cubic meters. It enables herring or "Flipper" to have a capacity for catches of up to 50 tons of herring or mackerel. The boat can also carry live catches. Fishing with nets and spinners in the boat, which is top class when it comes to modern equipment.” (A35) (K&F, 2021e, p.38)

These discussions support the findings from interviews with Firm A, which has a vessel that is too small and old. This sub-theme could have been included in one of the sub-themes from the interviews, but due to the impact of the boat selection on firm growth, it deserves to stay as a standalone sub-theme.

5.2.- Themes

This data analysis phase is interpretative; each theme and its components are described below.

5.2.1.- Theme 1 – Growth Inhibitors

The first theme combines the identified growth inhibitors. These are environmental and firm factors that, if not managed properly, may negatively impact the growth of a small firm in the fishing industry.

The first factor that relates to this theme is the location. There are three aspects of the location that could inhibit growth, first, the proximity to the fishing grounds since been too far means more commuting and this translates into higher fuel costs, which impacts the profitability of the firms; also, the location in some cases opens opportunities for incentives, so registering the firm in the wrong place may be a missed opportunity to leverage government subsidies and additional quota rights; second, if the small fishing firm integrates vertically and starts receiving and producing fish products, the location is a must, not being in the right place means fishing vessels may not stop to deliver their catch; and third, small vessels are limited in terms of how far offshore they can travel to, not only due to physical limitations, but also due to maritime and local regulations. These factors are summarised in Figure 63.

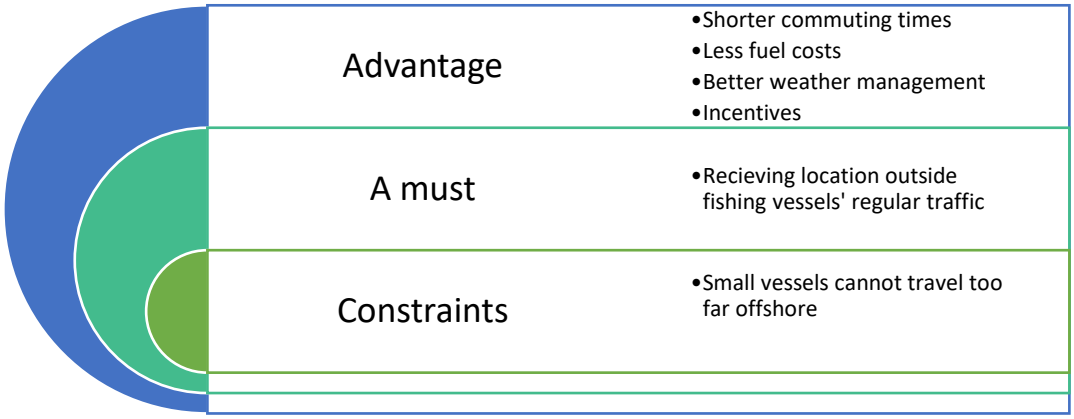


Figure 63 Factors Related to the Location and Linked to Theme 1

In summary, the location plays a significant role, but this constraint is easy to manage in the context of a small firm in the first phase of the value chain. This point must be taken very seriously if a firm's growth strategy includes vertical integration and starting a facility ashore.

The second group of barriers to growth are regulations. There are four elements that relate to regulations that firms need to manage to avoid stalling their growth journey. First, the quota system, this factor is very complex and there are so many details that could derail a firms' performance, such as what species can be caught and delivered together, and regular government memos that could lead to penalties if not actioned timely. Second, the regulations related to the firm structure, the 51% ownership requirement for the fishers, if a non-fisher decides to embark in this business, growing the firm may be quickly hindered by this rule; third, the protection of local workforce and minimum wages, the rule that foreigners cannot own a vessel above 15 meters long is a critical limitation for foreign investors. This aspect of the regulations directly impacts an investment decision and hence limits the options for raising funds, which a firm would need to grow. In most cases, these funds are increased through debt rather than equity, forcing an organic growth model. Debt will also change the risk profile

of a small firm and may put it in financial distress should conditions change. Also, the current salary structure in which crew members earn as much as the vessel owners may also impact the profitability a firm. Fourth, regulatory bodies control the unit price. Authorities set annual quotas for the whole fleet. Those who have bought fishing rights are secured a certain amount, and those who operate with the open quotas get what is left. The price per kilogram fluctuates together with these quota allocations, but not at a 1:1 ratio. The data show that between 2020 and 2021, there was a difference of about 7% between the price and quota allocation, which impacted firms' revenue. Price fluctuations may have a significant impact on firms' performance and hence growth. These factors are summarised in Figure 64.

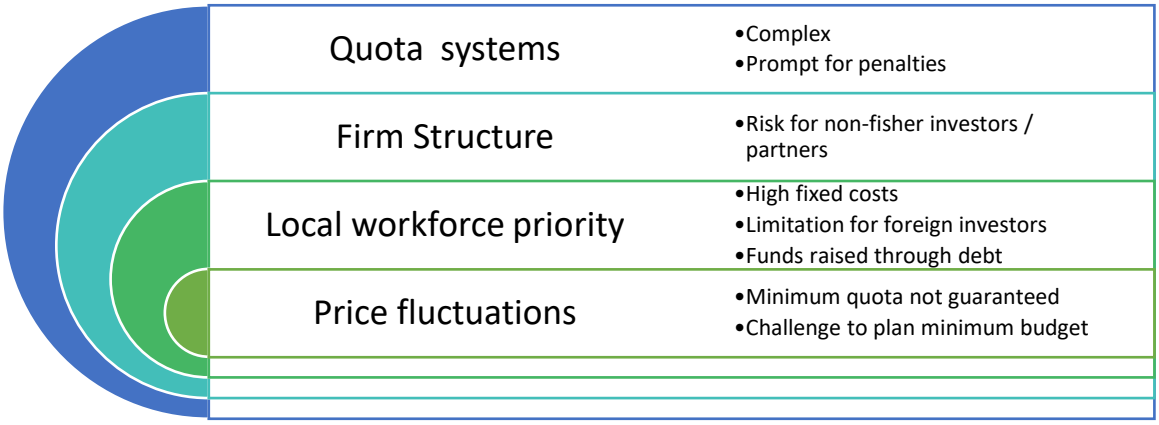


Figure 64 Factors Related to Regulations and Linked to Theme 1

In summary, regulations play a role in a firm's growth. Firm owners have no control over these regulations, but they can design a growth model to manage them.

The third topic contributing to this theme is risk management capabilities. All items presented in every theme could be associated to risk management. However, risks in this theme are related to five elements. First, environmental risks such as global warming that could impact fish migration patterns, or the increase in temperature during the winter impacting the process and hence quality of products like dried fish. Second, the decline in fish stocks, coastal species are over fished and due to other environmental conditions, may disappear. Third, small fleet displacement by the large fleets that benefit from economies of scale and more efficient and cost-effective systems. Fourth, the change in risk profile of the firms as they integrate vertically in the supply chain, which if not managed properly, may lead to financial distress. And fifth, fish farming, it is evident form the salmon industry that wild fishing has declined significantly, this may also happen in the white fish industry, which may drive more small players out of business. These factors are summarised in Figure 65.

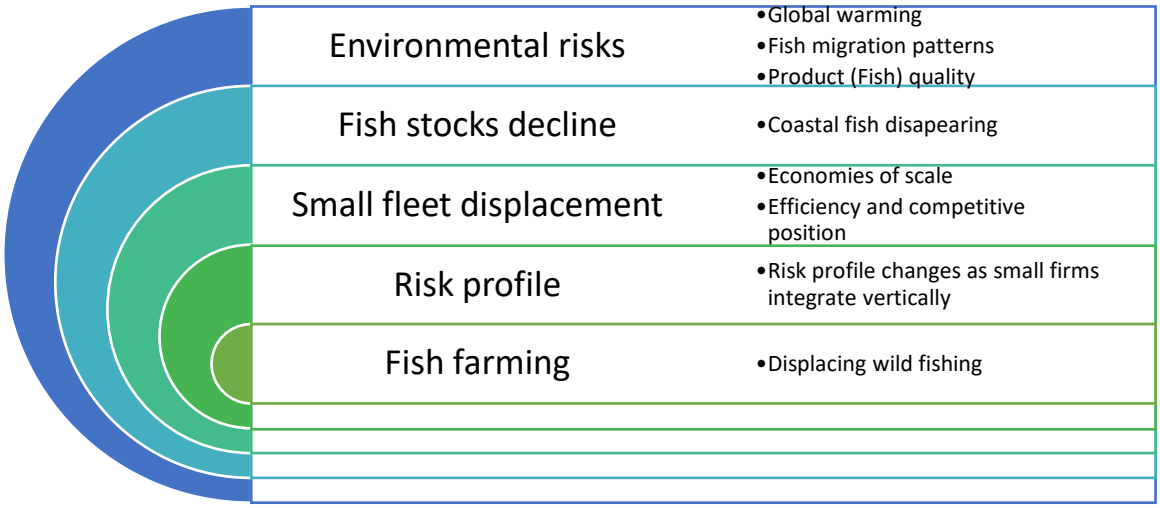


Figure 65 Factors Related to Risk Management Capabilities and Linked to Theme 1

Risks must be rigorously managed if a small firm owner decides to grow using this model. The growth inhibitors theme is closely interrelated with the other three themes.

5.2.2.- Theme 2 – Growth Enablers

This theme includes the environmental and firm factors that could enable a small firm to growth.

The first factor of this theme relates to collaboration and competition. There are three elements in this factor. The first one is collaboration, which is a critical enabler of growth. Building a network and collaborating with other stakeholders effectively sustain a good business and grow the firm. Collaboration is possible in this industry due to the structure, clear roles and responsibilities and sense that there is enough for all. Instead of competing, working together is a better way to achieve results that could benefit all instead of just a few. These dynamics are complex, though; the fishing industry is not easy to break into and players need to understand how to manage the interactions. Second, the roles and responsibilities, as mentioned, they are clearly defined in the industry and leveraging this to identify partnership opportunities is also vital. And finally, ethics and trust, the market structure allows for a fair play and keeping integrity has been identified as an enabler for a small firm to build credibility in the industry. These factors are summarised in Figure 66.

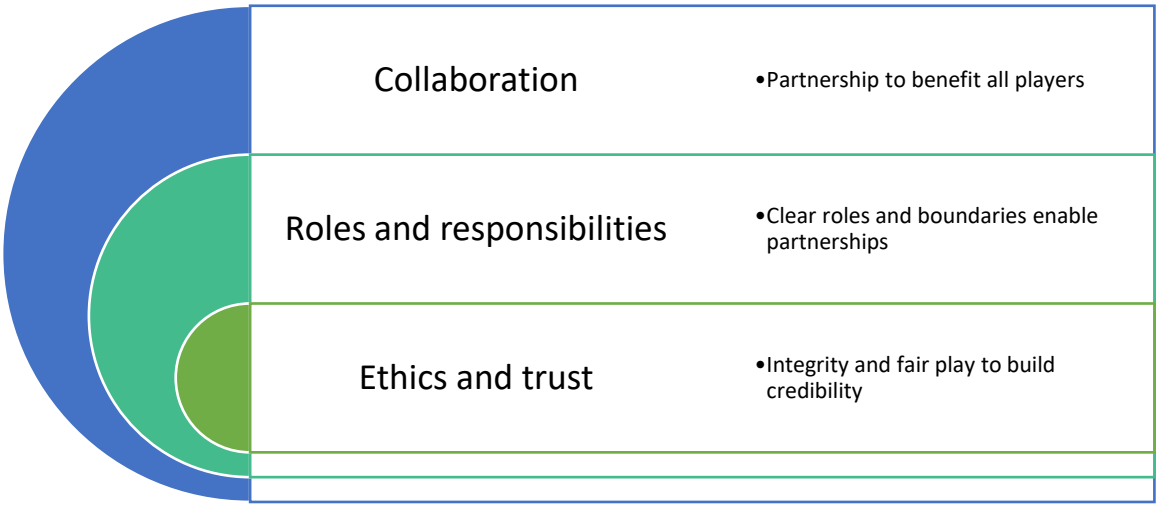


Figure 66 Factors Related to Collaboration and Competition and Linked to Theme 2

The second factor relates to efficiency and reliability and has two elements. First, maintenance and operating costs, investing in maintenance is vital to keep the boat in good condition and ensure the vessel is available during the whole fishing season. Also, to avoid breakdowns at sea, which could be expensive. Second, innovation, regular upgrades to the vessel's equipment enables more efficient operations, as well as ensuring the vessel meets minimum regulatory requirements. The adoption of innovative solutions from different industries such as salmon farming could also drive growth for small firms. These factors are summarised in Figure 67.

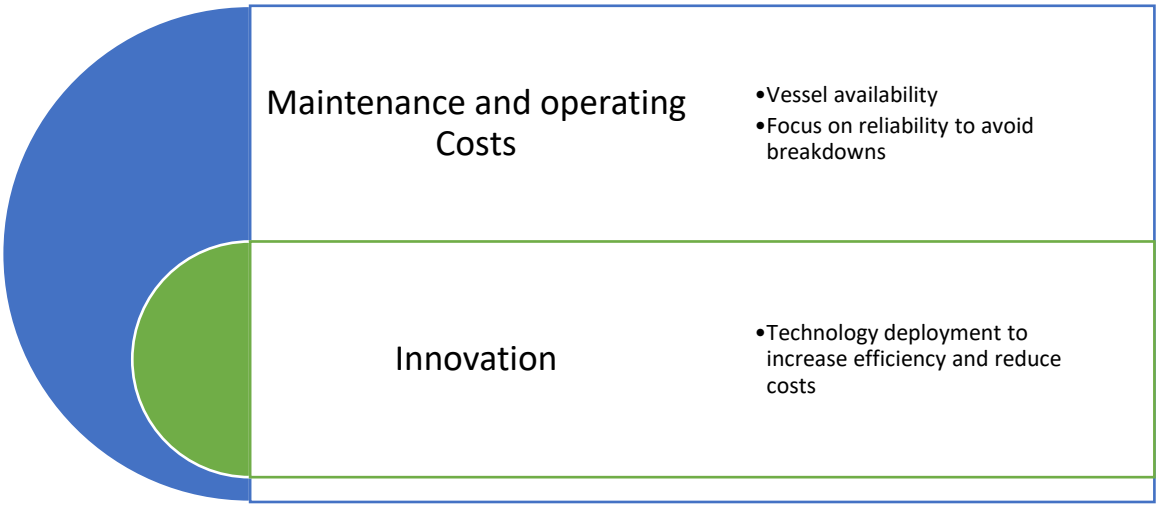


Figure 67 Factors Related to Efficiency and Reliability and Linked to Theme 2

The third factor in this theme is crucial since it relates to revenue generation mechanisms. There are four main mechanisms. The first one is diversification, in this context the bulk of the discussions pivots around diversifying by fishing additional species. Diversification also involves adding additional products, for most small firms the primary income is the sale of fresh fish, more revenue could also come from semi processed fish like dried or salted fish, which small firms could sell at a higher price. The second opportunity to increase revenue is the management of the quotas, there are occasions to trade unused quotas, or to invest in quotas and sell them at a later stage benefiting from a capital gain. Related to quotas, it is also possible to continue fishing certain species even after the quota has been fulfilled, when such species are captured together with other ones. The third element relates to integration, both vertical and horizontal. The most common one is horizontal integration, or simply organic growth, where small firms acquire additional quota rights, or purchase additional fishing vessels. Vertical integration is less common, since it requires expanding across the value chain, which means establishing businesses ashore and brings additional risks to the firm's profile. Finally, the fourth element is also common and relates to expanding the firms' core business into other industries such as hospitality, construction, and freelancing, to general additional income; the seasonal feature of the fishing industry enables small firm owners to do additional activities as a revenue stream. These mechanisms are summarised in Figure 68.

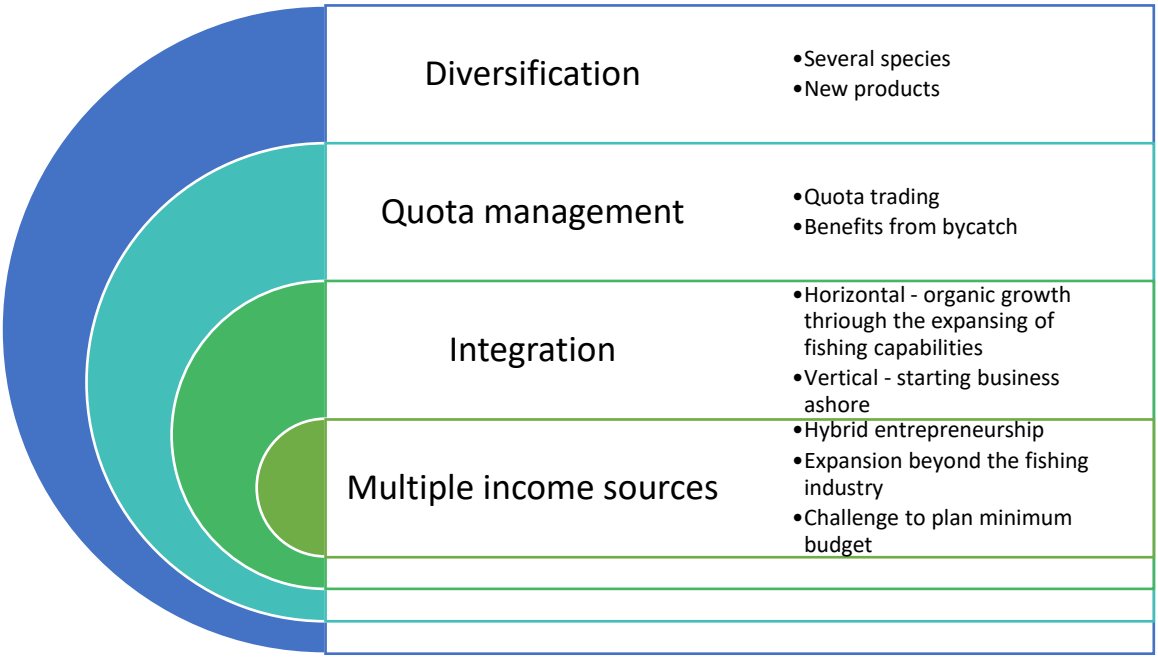


Figure 68 Factors Related to Revenue Mechanisms and Linked to Theme 2

The interviewees echoed the message that these revenue mechanisms require additional effort and capabilities, which in most cases is not deemed beneficial and firms default in the "as is" status,

maintaining the status quo, which limits growth. Those who broke this paradigm are the ones who manage to grow their firms.

While location and regulations were already described as growth inhibitors, they are also factors that could enable growth. Firms could proactively use these as enablers, for example, moving the firm to a region that offers additional benefits (e.g. Finnmark), or leverage regulations to actively manage additional income like subsidies and government incentives. This theme is also interrelated with the other three themes.

5.2.3.- Theme 3 – Primary Decision Maker Capabilities and Preferences

A firm owner's (or person managing the business) entrepreneurial capabilities and preferences are critical in the growth cycle. The interviewees demonstrated a proficient understanding of the fishing business, the regulations, how to operate and maintain the boats, where to fish, and how to fish, but what is missing? Why aren't all of them growing their firms? This theme captures a reflective analysis to evaluate where the gap lies.

First, the willingness to exert more efforts to increase revenues and hence grow the firms. There is a general sentiment of satisfaction by keeping the firms with steady profits, giving priority to the lifestyle or work-life balance. The fishing business has strong ties to family tradition, which may hinder change. The second aspect relates to the knowledge to run the fishing vessels, where to fish, fishing techniques, regulations, this is a make or break in this business and also linked to the generational aspects, where tacit knowledge has been passed on from previous generations. This factor alone does not enable growth but is fundamental to maintain the business running. The third aspect is the administrative and acumen skills required when the firms grow. Some fishers do not have the skills, nor the will to acquire them, to understand all the risk management and financial implications of a growing business. One key finding in this research is how the risk profile changes as the firms grow, so the ability to manage this transition is paramount for growth. Another enabler of growth is partnering with shoreside businesses to place the catch directly at the consumers. An alternative is to gain knowledge and sell directly without the intermediary. However, this requires different skills and a better understanding of the final consumers' expectations and distinct set of regulations.

The factors related to this theme are summarized in Figure 69.

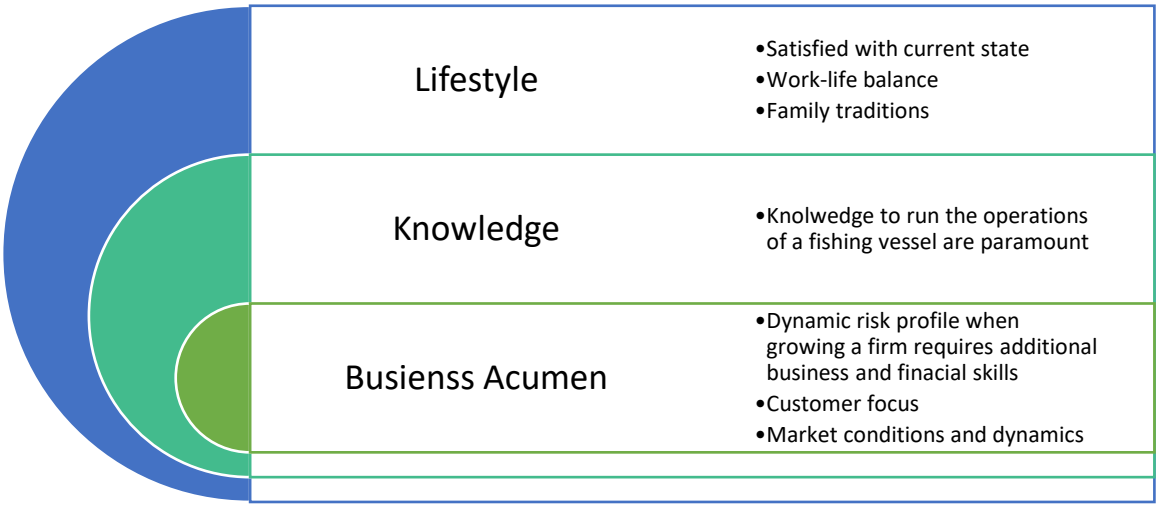


Figure 69 Factors Related to Personal Preferences, Knowledge, and Business Acumen and Linked to Theme 3

5.2.4.- Theme 4 – Unexplored Options and Market Trends

This theme emerged from the articles data. The articles revealed that new market trends represent risks, such as the growth in aquaculture or environmental sustainability, but also offer opportunities to small firm owners. The ability of these stakeholders to identify such opportunities and embrace change is vital to their firms' growth, provided they are willing to do so.

The first element of this theme is seeing beyond the status quo. The previous themes cover almost all the aspects of growing a small firm, they talk about diversification, risk management, increasing the value per kilogram of the fish, partnership, innovation, integration, and so on, but there are latent aspects that are not obvious and they could make a big difference in the growth journey. The first one is to identify how to enter a market that is currently dominated by large firms like aquaculture. While big firms have the advantage of more significant cash flows and investment capabilities, small firms can also embark on some areas dominated by these large firms, such as crab farming. The articles show the demand for king crab is doubling and that some small firms have managed to secure farming rights, which accelerated their growth profile. Aquaculture also requires feedstock, so small firms may diversify beyond fish species and start production of algae and seaweed products that could not only be used as feedstock, but also have a massive commercial value. Partnership in this category is also beyond the common vertical integration and opens opportunities for small players to embark in research and development to find full use of all the fish parts and rather than getting a 25 NOK per kilogram, they could produce products used in the cosmetics and pharmaceutical industries that could multiply the value significantly (one example is the sale of fish protein for 8500 NOK per gram). None

of these options were discussed during the interviews, which opens a great opportunity in a business model of a small firm.

The second factor is the boat. While it could be embedded in the other themes, this element has two parts. The first aspect was discussed in the interviews, which is the maintenance, vessel upgrades, and general relationship between the vessel and the quotas. The second aspect comes from the articles and is specific to how selecting the right vessel size could make a substantial difference in the revenue stream of the firm. A sample quoted is the two centimetres that operationally are negligible but related to the quota make a big impact in the potential allocation and provide a financial advantage. The vessel is the core of the business and deserves its own category in the growth model.

The factors related to this theme are summarized in Figure 70.

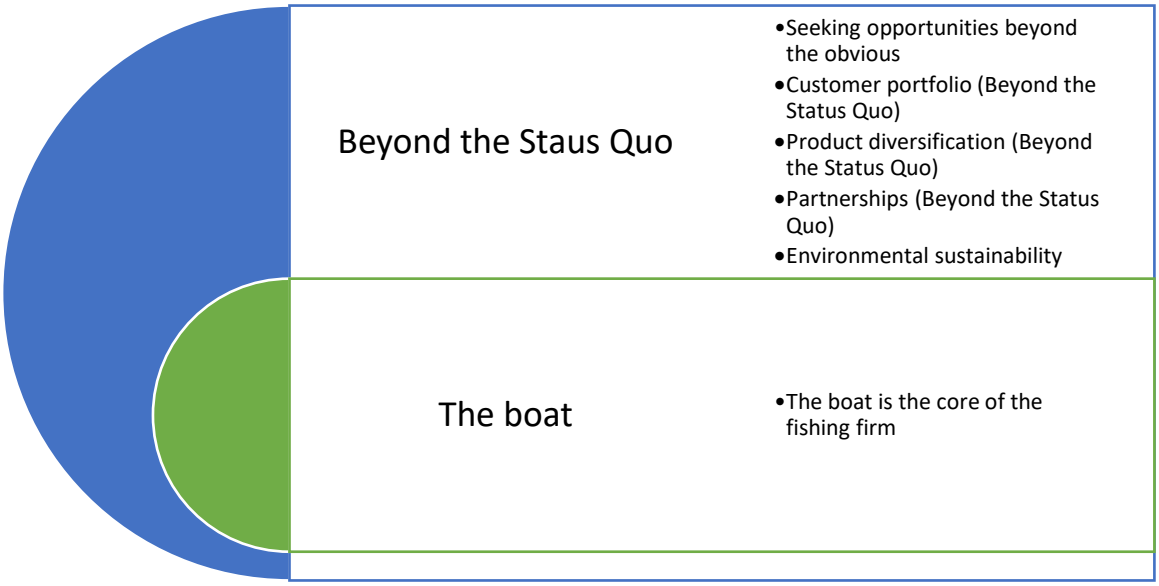


Figure 70 Factors Related to the Boat and Beyond Status Quo and Linked to Theme 4

This theme has the potential to accelerate the growth of small firms.

5.3.- Summary of the Qualitative Data Analysis

The qualitative data provide insights into the fishing industry's challenges for small firms and how to overcome these challenges to sustain profits and grow the businesses. There is consensus among the interviewees and articles regarding these issues, and various options exist to address these challenges.

The qualitative data analysis yielded 98 codes grouped into 14 sub-themes. These sub-themes were further analysed, and four themes were developed. The first theme describes environmental and firm factors that could hinder growth. The second theme indicates how these challenges could be overcome. There are different ways to enable a small firm to grow. The data yielded many well-known

practices in operational excellence, such as efficiency, lowering costs, adopting new technology to optimize operations, diversifying by fishing more species, trading the quotas, etc. But what came up as one of the critical enablers of growth is collaboration. All interviewees mentioned that building a network and collaborating with other stakeholders effectively sustain a good business and grow the firm. The structure of the fishing industry enables competing firms to partner and succeed together. An expansion model through vertical integration will allow small firms in the first phase of the value chain to reach final consumers, yielding a higher return per kilogram of fish caught.

The third theme concerns the primary decision maker's capabilities and preferences. The data show the importance of personal preferences in firm growth. Knowledge about the fishing industry is vital, as is the business acumen of firm owners. Firms that grow beyond their initial state in the first phase of the supply chain will require additional administrative and business skills from the individuals managing the company. The data also show that risk is dynamic and as the firms grow, the risk profile changes. The primary decision makers must have the skills to manage these dynamic risks. The traditional fishing practice of fishing and delivering fresh catch to the receiving facilities does not enable growth, mainly when additional fishing rights are unreasonably expensive. The fishing industry is growing, there are new trends, and small firm owners that align with this quickly will benefit from the industry's growth rate. Many small firm owners are content with this model.

The fourth theme shows the importance of seeing beyond the current state. The fishing industry has strong traditions, players have clear roles and responsibilities, and the supply chain structure is well established. To grow, a firm must adopt a flexible business model and embark on areas not explored by small firms, such as partnerships with research entities to increase the value per kilo of the catch. For instance, producing products such as fish proteins or other species such as seaweed and shells, which are used as raw materials in manufacturing pharmaceutical and cosmetic products, could yield additional revenue for small firms. Another area is to evaluate how a model to align with environmental sustainability could enable a firm to increase its profitability. A small firm could vertically integrate to reach a different portfolio of customers. Finally, the boat selection is paramount since it sits at the core of the firm's growth. Data show that the choice of boat size and age play a key role in the firm's growth.

The qualitative data enabled the development of a business model to grow small firms in the fishing industry.

6.- Chapter Six - Discussion

This chapter outlines the output of the research. It starts with discussing the quantitative data research findings, contrasting and comparing them to existing literature (Miller and Tsang, 2010). The second section of the chapter is a narrative of the qualitative data. This section presents areas where existing theories are supported, challenged, or new elements emerge to develop new theoretical frameworks. The final section of this chapter proposes a business model of growth for small firms in the primary sector, explaining the rationale of the elements of the model and its relation to existing theoretical frameworks. This chapter brings together the outcome of the quantitative and qualitative data analysis presented in Chapters 4 and 5, respectively.

6.1.- Discussions of Quantitative Data Research Findings

As described in the literature review, there are three prime theories related to this research: Gordon's (1954) Common Property Resource, Penrose's (1959) Growth of the Firm, and Gibrat's (1931) Law of Proportional Effects. In addition, Hotelling's (1931) Theory of Exhaustive Resources also plays a role in firms' growth in the fishing industry. Hence, this section offers a descriptive discussion of the quantitative data concerning these frameworks.

The quantitative data show apparent differences in the firms' performance, all exposed to similar macroeconomics and natural resource constraints, supporting Penrose's standpoint on firm growth. While the secondary data analysis may lead to rejecting a hypothesis that firm growth follows a random effect and is independent of internal and external resources, the conclusion is not that evident. Numerous factors of the industry such as the price adjustments, challenge this outcome and indicate that Gibrat's (1931) Law of Proportional Effect is partly valid in the fishing industry in Northern Norway, supporting previous studies (Lotti et al., 2003, 2009).

Growth rates of small and large firms differ, indicating a priori that Gibrat's law does not hold in this industry. On the other hand, the performance of small firms was still fluctuating year on year before 2013, despite the rise in fish stocks. The apparent lack of correlation between firm performance and fish stocks as an economic shock supports Gibrat's law. Another observation relates to the Profitability Index (PI), which indicates that performance does not seem random. A group of firms demonstrates consistent performance, with a PI of 100%; likewise, there is a group of firms that shows a low PI, below 30%. These findings support Penrose's perspective on resource management since the performance of firms of comparable size exposed to similar conditions varies, inferring that their performance depends on how well they manage their resources.

The data also indicate that fish stock variations impact firm growth, but current mechanisms of adjusting the price per kilo of fish based on allocated quotas are masking this effect. These price adjustments support Hotelling's law and influence the output of Gibrat's equation. When removed, the data show that the growth pattern of small firms varies with the rise or decline of fish stocks, validating Gibrat's Law. This effect is also validated since revenue growth rates when the fish stocks were rising were higher than when the fish stocks were declining.

In conclusion, the statistical analysis shows a mix of findings regarding Gibrat's Law. On the one hand, the growth rates between firms are different, and this does not support Gibrat's theoretical framework, in which growth is independent of firm size. On the other hand, the economic shock, identified as the fish stocks, shows a random behaviour correlated to company growth, which supports Gibrat's Law. The performance of small firms is mixed, supporting Penrose's Resource-Based-View theory, where firms have a collection of physical and administrative resources at their disposal, and growth is not random but a result of managing such resources (Penrose, 1959). Finally, Gordon's theory of Common Property Resource is evident throughout, governing the establishment of fish quotas.

6.2.- Discussions of Qualitative Data Research Findings

The qualitative data provide insights into the fishing industry challenges for small firms and how to overcome these challenges to sustain profits and grow the businesses. The qualitative data enable building a business model for small firms' growth, with the following components:

- Growth Inhibitors
- Enablers of Growth
- Primary Decision Maker Capabilities and Preferences
- Unexplored Options and Market Trends

This section presents an analysis of each element concerning the literature reviewed.

6.2.1.- Growth Inhibitors

The qualitative data findings highlight the effects of the location on firm growth. In 1776, Adam Smith referred to the importance of the location of raw materials to reduce transportation costs. Ricardo (1817) also mentions that in the primary sector, as the land degrades, farmers need to find new places to harvest, which could be linked to the location. Other authors, such as Dunning (2001), Audretsch and Dohse (2007), Dunning and Lundan (2008), Niskanen and Niskanen (2007), Davidsson et al. (2010), and Bastesen and Vatne (2014), have also recognized the importance of the location for firm growth.

However, the discussions are general. The results of this research go deeper and show that the location of a small firm is a crucial factor in its growth model. At inception, small firms benefit from being close to the fishing grounds. The quota allocation is also a function of the location. Registering a firm in regions where the government provides additional incentives is a suitable alternative to increase the catch of diverse species, such as the king crab, which is gaining market attention. This approach boosts revenues. These findings support previous literature, adding to the theory of Firm Growth by Penrose (1959), who recognizes the proximity to the resources as a competitive advantage. The data show how the location changes the risk profile of a firm as the firm grows. The data also reveal that small firms may grow through vertical integration. As the firm grows and expands ashore, the location shifts from a beneficial factor to a critical element in the business model.

The findings indicate that the prime inhibitor of growth for a small firm relates to the availability of natural resources, supporting the prognosis of economists such as Malthus (1798), Mill (1848), Ricardo (1821), Hotelling (1931), and Barnett and Morse (1963), that natural resource scarcity would impact the financial performance of firms. In this research, the discussions about natural resource scarcity relate to regulations and quota allocations, supplementing the Common Property Resource theory proposed by Gordon (1954). Penrose (1959) recognizes that investments are critical to firm growth. The data show that regulations are a barrier for a small firm to raise funds through equity since most of the shares in the firm must be owned by the registered fisher, making it less attractive for investors. Finally, the discussions around the price per kilo are also a key finding. The research indicates that regulated prices constrain the growth of small firms, partially supporting Gibrat's Law of Proportional Effects and partially aligning with Hotelling's (1931) theory. The fact that the prices do not have a direct proportional relation with the allocated quotas results in fluctuating and unpredicted revenues year on year, negatively impacting small firms' performance. The data do not support previous findings regarding price adjustments to mitigate risk, as Lindkvist (2010) indicated. In summary, the constraints inherited by resource scarcity negatively impact firm growth.

Previous research proposes models to manage business growth in industries in decline, such as Hopenhayn (1992), who presents a model of firm growth dynamics based on productivity shocks, assuming a declining demand, arguing that as the demand decreases, firms will eventually take an exit decision, or Ghemawat and Nalebuff (1990) who propose that firms would reduce their production capacities as demand decreases to stay competitive until they make the ultimate decision to exit. None of these options came up as viable in this research because the demand for fish is still increasing. What is in decline, or constrained, are the fish stocks. So, the results of this research open a new path in the literature on natural resource scarcity and economics.

Regulations protect the environment and fishers. Previous research challenges the structure of current rules. It proposes that the governability of the fisheries should be more flexible and sensitive to the needs of the small fisheries (Jentoft and Chuenpagdee, 2015), who challenge the coercive approach proposed by Hardin (1968). The data partially support the collaborative approach to managing the regulations. However, the issue of governability did not figure as a critical inhibitor of growth. Small firm owners seem satisfied with the status quo and current regulations.

The findings show that while a small firm in the first phase of the supply chain has a low-risk profile, the owner's capabilities to identify and evaluate risks are paramount, as it is his(or her) desire to grow the firm. As a firm expands, so does its risk profile and firms in the subsequent phases of the supply chain must adopt different risk management strategies to sustain and increase their revenues. The risk progression in the growth cycle of a small firm is novel in the literature. Another finding relates to the Closed-Loop Supply Change (CLSC) theory proposed by Guide and Van Wassenhove (2006), where firms may choose different raw materials as the existing ones go extinct. In the research context, the alternative materials relate to other species. The data indicate that adding redundancy by purchasing additional quota rights is too expensive for a small firm and not cost-effective if a fishing boat is under 11 meters long. This finding supplements the works of Chopra and Sodhi (2004), Manuj and Mentzer (2008), and Hannesson (2017). A well-known mitigation measure in the risk management literature is transferring the risks through insurance. Still, the data do not support this since insurance is not an adequate mechanism to manage the natural resource scarcity risk, as Rees (2005) and Sethi (2010) mentioned.

In summary, the research uncovers inhibitors of firm growth, some of which support previous frameworks, while others are new findings from the abductive research.

6.2.2.- Growth Enablers

This section discusses the findings related to actions firm owners take or could bring to overcome the growth barriers.

Managing risk is a critical element of firm growth. Risk is a vast topic. Entrepreneurial ground theories such as Cantillon (1755), Smith (1776), and Knight (1921) describe the relationship between risk and profits and introduce different mechanisms to manage risk, like transferring it through insurance, avoiding the risk, or mitigating it. The findings show that the first two options are unfavourable for firm growth, supporting Sethi (2010). Penrose (1959) argues that growth depends on how entrepreneurs accept and manage risks. In the research context, risk relates to natural resource scarcity. The findings support previous research on how to handle this risk, like fishing on new grounds,

purchasing additional fishing quotas (Chopra and Sodhi, 2004), building flexibility in the supply chain (Manuj and Mentzer, 2008), establishing cooperative models to influence the quota management and pricing (Rees, 2005), to mention a few examples. The findings show how the risk profile of firms changes as they integrate vertically into the supply chain. Many small firm owners do not want to take additional risks and hence stall the growth of their firms, supporting the argument about risk propensity (Penrose, 1959; Stewart et al., 1999; Stewart et al., 2001; Miner and Raju, 2004).

In addition to managing risks, another important finding is that collaboration is one of the biggest enablers of growth for a small firm. While authors such as Jentoft (1985), Clark (2006), and Guide and Van Wassenhove (2006) identify establishing fishing cooperatives as a mitigation measure, betting on the cooperative model as the solution to the fisheries crises, this research yields a different output. The structure of the fishing industry presents an excellent opportunity for the players across the supply chain to work together. This finding supplements the cooperative alliances model that Penrose (1959) and Richardson (2003) present as a strategy to enable firm growth through vertical integration. According to Deutsch (1949), firms competing could also benefit from working together to achieve a common goal; the key is to find the right balance. Harvesting a shared resource pool drives competition and cooperation (Barnes et al., 2017). From the data, a conclusion that could be inferred is that this is highly feasible in this industry. Fishers can access the raw product; the fishing receivers and producers need it in their production cycles. Fishers could vertically integrate or establish partnerships with the producers; both options impact the risk profile. While the data supplement the works of Yamamoto (1995) regarding identifying the areas for collaboration, the aspects linked to the industry's maturity did not stand out from the results.

Efficiency is another enabler of growth. The findings support the argument that firms that operate more efficiently grow faster and get more value per unit of effort presented by Hymer and Pashigian (1962), Jovanovic (1979, 1982), Wernerfelt (1984), Boonstra et al. (2018), among others. The choice of boats and regular maintenance to improve productivity are examples of actions taken by firm owners to run their businesses more efficiently and increase profits. Efficiency is a condition of firm growth, and inefficient firms exit the market (Jovanovic, 1982).

Another mechanism to improve revenues and enable growth yielded from the research is diversification. Fishers must seek a way to increase revenue, which could be done by raising the value per kilo of fish or by getting more fish with the allocated fishing rights. The data show that the price per kilo of fresh fish is regulated and linked to the allocated quotas, following Hotelling's (1931) theory. The findings indicate that the central area of diversification is fishing various species to take the most advantage of the allocated quotas. Other options include trading the fishing quotas, taking advantage

of unfished catches, or using the by-catch as a source of revenue. To do this, firms must increase their efforts and spend more time at sea throughout the year. This finding is aligned with Gordon's (1954) theory. Diversifying to fish various species has a different connotation to the diversification presented by Penrose (1959) or Porter (1980) since the main goal is not to obtain a competitive advantage. Previous research indicates that the diversification of products started gaining attention as a mechanism to increase the value per kilo of the captured fish (Agnello, 1983; Jeffs and Liyanage, 2005; Colman et al., 2020). The findings of this research continue to expand this literature trend. Another area of diversification is growing the business outside the core fishing activities to increase revenue streams (Slee, 1987; Rønning and Kolvereid, 2006; Merrien et al., 2008; Førde, 2009). The findings support current debates in this area and the literature on hybrid entrepreneurship (Wennberg et al.,2007; Folta et al., 2010). Finally, previous studies mention the importance of creating a marketing strategy for small firms and that this is often difficult (Beverland and Lockshin, 2006). The data concur with these previous findings.

Integration in the value chain is another factor enabling firms to increase their revenue. This integration could be horizontal or vertical. Penrose (1959) refers to vertical integration as a venue to grow because it may enable players to produce cheaper or acquire knowledge, among other benefits. The data support Penrose's standpoint of vertical integration to gain knowledge. A firm in the first phase of the value chain may not have access to the network of final customers or consumers nor the capabilities to produce fish products to meet customer demands; this could be achieved through vertical integration and, as mentioned above, partnerships with companies in different phases of the value chain. While Penrose (1959) did not place much weight on horizontal integration, this was the most common type of integration as a venue of growth shown in the findings, where a fisher buys additional boats and quotas. This type of integration is often related to acquiring managerial resources (Penrose, 1959). Some firms expand to hire personnel to fill knowledge gaps. Another trend in the literature is stakeholder integration, particularly with customers and environmental sustainability, as presented by Stern et al. (1999) and Stern (2000) in the Value Belief Norm theory, and Douvere and Ehler (2009) in the Marine Spatial Planning. The findings partially support this standpoint, where fishers may seek environmental stewardship certification, such as the Marine Stewardship Council (MSC), but regulations mainly drive this.

Innovation has been an enabler of growth for firms in different sectors (Penrose, 1959), including the fishing industry (Colman et al., 2020). The data support the Diffusion of Innovation theory proposed by Tarde (1890, 1902) and Rogers (1962), where fishers upgrade their boats to make them safer and improve efficiency. The traditional theory of competition, where firms with a lower cost base have a competitive advantage, is not fully applicable in the context of the first phase of the fishing industry

supply chain. Instead, the data supplement the X-Efficiency theory proposed by Leibstein (1966, 1978, 1978b), which relies on the entrepreneur to identify and fill market gaps and imperfections (Long, 1983). The research expands on the Creative Disruption theory proposed by Schumpeter (1934); the results show that innovation in the fishing industry is not limited to developing new technologies. There are other areas, such as collaboration, where the actors must innovate to solve common problems (Aslesen, 1999; Pavlovich and Akoorie, 2010). The results supplement these previous findings.

Regulations are a central theme in the literature of the primary sector. They are often seen as a necessary evil. Previous research describes how essential regulations are to control trading and competition (Cournot, 1838; Smith, 1776; Hardin, 1968; Porter, 1980; Hess and Ostrom, 2007; Low and Weiler, 2012; Schulz, 2018; Frischmann et al., 2019). The findings of this research continue to support the need to manage the common resources. In most cases, data indicate that regulations hinder growth and need to be addressed accordingly to benefit small firms, supporting the position of Jentoft et al. (1998). Some authors have put a positive twist to the regulations, such as Everett and Watson (1998) and Maurstad (2000), who argue that firms' success depends on how well they align their business plans with the regulations. This research brings new light to this topic, where firms could use regulations as a growth mechanism.

To summarize, firms have at their disposal a variety of mechanisms to grow, such as managing the risks of scarcity through collaboration, diversification, and integration, or to run their fishing vessels efficiently and reliably, or to innovate and finally, to leverage on regulations as drivers rather than constraints.

6.2.3.- Primary Decision Maker Capabilities and Preferences

Another outcome of the qualitative data is the entrepreneur's role in growing a firm. The findings coincide with previous research, showing that the primary decision maker's (e.g., firm owners, manager) capabilities and personal preferences are principal factors for firm growth (Mill, 1848; Kihlstrom and Laffont, 1979; Penrose, 1959; Shane et al., 2003). The data challenge previous viewpoints, like the underlying assumption that the prime motive is financial growth, as proposed by Penrose (1959). The data show that in several cases, firm owners choose a better work-life balance over the development of their firms, adding to the body of knowledge on Occupational Choice proposed by Miller (1984) and De Wit and Van Winden (1989). Work-life balance is a driving factor for several firm owners. They enjoy fishing as an activity but are happy to do it for a short time during the year and do other things during the remaining months, achieving psychological well-being (Liles, 1974;

Brockhaus, 1980). These findings also support the Self-Actualization theory presented by McClelland (1961).

The data show that firm growth relates to the capabilities of the entrepreneurs, confirming Penrose's standpoint of the importance of firm managers administering the company's resources. The firm owner's knowledge and experience play a crucial role in managing risks and reducing uncertainty, supplementing the work of Fraser and Greene (2006). Previous research proposes that identifying opportunities is an essential competency for entrepreneurial success (Shane and Venkataraman, 2000). During the interviews, it was evident that family tradition and the transfer of fishing boats and quotas play a significant role in the entrepreneurial decision and the success of a start-up, supporting the work of Dunn and Holtz-Eakin (2000) about the importance of intergenerational transfer of financial assets, but more crucial the transfer of business knowledge between generations. The data indicate that capabilities are not limited to technical knowledge of the fishing industry but also business administration competencies necessary to grow a business. This finding supplements the works of Acs et al. (2009), who, expanding on Dunn and Holtz-Eakin (2000), refer to acquired knowledge as the technical endogenously grown knowledge developed by a firm. The context of Acs et al.'s research was in Research and Development companies, so this research supplements their work by demonstrating the importance of acquired knowledge in a different industry. The research partially supports the Knowledge Spill Over theory presented by Frederiksen et al. (2016), in which they maintain that knowledge is learned, not passed through the generations.

The importance of knowledge has been identified by several authors (Penrose, 1959; Cohen and Levinthal, 1990; Fraser and Greene, 2006; Johnsen et al., 2009a; Alvemar, 2015). In this context, this knowledge refers to regulations, boat operations, the location of fishing grounds, the type of fish available, and innovation. An area still under-developed in the literature is the knowledge and capabilities of the small firm owner to achieve a successful vertical integration of its firm. The data also show that income is a principal factor for entrepreneurs. The literature indicates that players in this industry hold multiple jobs as a means for risk-hedging since the duality helps to manage income risks (Parker, 1996, 1997; Kimmel and Smith, 2001; Raffiee and Feng, 2014), supporting the theory of options by Wennberg et al.,(2007) and the concept of hybrid entrepreneurship proposed by Folta et al. (2010).

Moreover, firms may invest more capital to increase revenues, but this is not always easy for small firms due to capital constraints (Townsend, 1985). The data present a new perspective on this element, the financial discipline of the firm owner. The findings show that in specific periods, a firm may get large sums of money from the bulk sale of fish; it is tempting for the owners to use this money

for personal purposes. Storey (2011) recognizes the importance of firm owners avoiding taking large bank loans for personal use. While Penrose (1959) makes abundant reference to the financials of the firms, the firm owner's personal discipline is still under-represented in the literature.

Penrose (1959) describes growth from the firm's standpoint. The findings of this research bring a different angle to Penrose's work by adding the perspective of the firm owner, building on the Intelligence Career Framework presented by DeFillippi and Arthur (1994), Van den Born and Van Witteloostuijn (2013), which is an area that could open opportunities for further research. Other aspects discussed are not fully supported by any revised theories, such as effort, passion, religious belief, and optimism. The data show how these elements relate to the firm growth, but neither Gibrat (1931) nor Penrose (1959) mention these in their theories.

In summary, the qualitative data supplement existing frameworks and place the entrepreneur in a protagonist role for firm growth while opening new venues for future research.

6.2.4.- Unexplored Options and Market Trends

Penrose (1959) recognizes the importance of entering new markets for firm growth. The strategies of firm growth related to differentiation described by Porter (1980) and the theory of Niche proposed by Henderson (1989) support Penrose's standpoint. This research presents a novel element to the debates in this body of knowledge by adding the environmental sustainability challenges and natural resource scarcity as an accelerating factor in a firm's growth model. The data show that firms that challenge the status quo and break the traditional practices have a better chance to grow. The creative destruction innovative cycles in the fishing industry have enabled players to find new alternatives to challenges. The current cycle relates to getting the most value per kilo or product (Colman et al., 2020). In an industry where the prices are regulated, a niche may be the only perceived way to grow. Still, this research's results indicate other viable options, such as leveraging environmental sustainability.

Gordon (1954) describes how exploiting common natural resources leads to a point where efforts do not yield enough benefits. The research shows that small firms could grow when they manage to increase the price per kilo of the catch. This point relates to the body of knowledge on environmental sustainability and emerging theories such as the natural Resource-Based-View proposed by Hart (1995), the Value Belief Norm developed by Stern et al. (1999) and Stern (2000), or the Blue Growth described by Boonstra et al. (2018), where firms that align their strategies with the environmental efforts increase their probability to sustain long term growth. However, the eco-friendly approach discussed in the literature addresses the back end of the process (e.g., disposal), as Hart (1995) described in his Natural Resource-Based-View theory, not the front end or exploitation of the natural

resource. The strategies discussed to align profitability with environmental stewardship have ignored the front end of the process, or extraction of the natural resource, which is a key finding of this research and contribution to existing knowledge.

There are five areas firms could include in their business models to overcome the natural resource constraint and gain more value per kilo. These areas include:

- Customer portfolio (Beyond the status quo)
- Product diversification (Beyond the status quo)
- Partnerships (Beyond the status quo)
- Environmental sustainability
- Boat selection

The research shows that the current business models of small firms in the fishing industry lack flexibility. Penrose (1959) mentions that diversification arises from identifying opportunities in collaboration with customers. If one takes this as an example, the customer portfolio of the small firms is the fish receivers and producers ashore; a traditional approach will not enable growth. The proposal is for a small firm to go beyond this and seek partnerships with customers further down in the value chain, like the final fish consumers, or reach customers outside the industry. Using fish as a raw product in other applications is a latent opportunity to accelerate the growth curve.

Another latent area for partnership is research. Large firms mainly have access to research entities, but a small firm could break the current paradigm and identify a symbiotic relationship with these players. The increase in value per kilo of catch should be prioritised for a small firm. Small firms cannot control the price per kilo if they continue to sell fresh fish as per the current state. The only way to increase it is to identify other applications using innovation. This solution supports the value network proposed by Christensen (1997).

Environmental sustainability is another example. At present, regulations are driving decisions. This reactive approach is passive for growth. The opportunity lies in identifying new products, for example, algae and kelp, which are well-known for their capabilities to capture CO_2 and can provide a sustainable business to collaborate with fish farmers, who need these products as feedstock. Finally, the boat selection came up as a critical element of growth. The knowledge of regulations, government subsidies, and business models enables the firm owners to select the right boat for their operations.

In summary, firms must challenge the status quo to evaluate unexplored areas. However, this is not easy for small firms, and the default may continue with the current growth limitations.

6.3.- Proposed Business Model and Future Considerations

The representation of the business model proposed as the outcome of this research encompasses four elements (themes) interconnected with each other with dashed lines. Each element has several variables (sub-themes) associated to them, as illustrated in Figure 71.

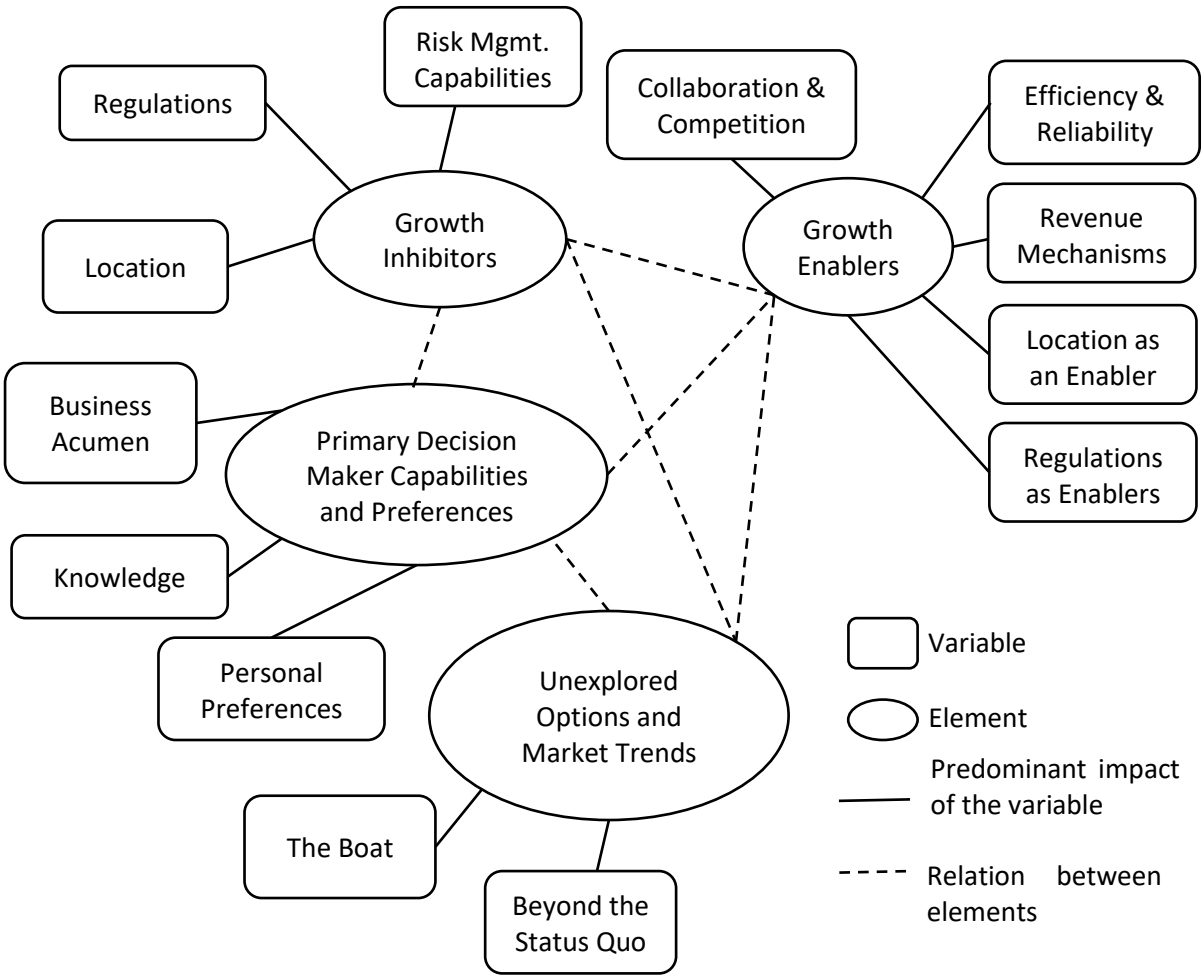


Figure 71 Proposed Business Model ((Adapted from Braun and Clarke (2012) as presented in the worked example by Byrne (2021)))

The element **Growth Inhibitors** contains three variables: **Location, Regulations, and Risk Management Capabilities**. As indicated in the qualitative data analysis, the predominant impact of these variables is negative to firm growth and hence placed as inhibitors. However, this may not always be the case, and these variables may work in a continuum, in which under different circumstances they may either hinder growth or enable it. The same analogy applies to the variables of the element of **Growth Enablers**.

The variables of the **Primary Decision Maker Capabilities and Preferences** element relate to the individuals and influence the other two elements. Hence, these variables cannot be represented in the same way. For instance, the individual may have business acumen skills, in which case this could positively impact other variables such as the revenue mechanisms. Likewise, if the individual is willing to take the extra effort and seek growth, this could also have a positive impact in the other variables like the collaboration and competition. The element of **Primary Decision Maker Capabilities and Preferences** works as a dial to move the variables of **Inhibitors** and **Enablers** to either side of the spectrum.

The representation of the model can be updated as illustrated in Figure 72, in which each variable was placed in a continuum. The dominant positions are based on the outcome of the analysis of the qualitative data. From the data the overall tendency of small firms is inclined to Stay "as is." When the variables **Beyond the Status Quo** and **The Boat** are incorporated, they may act as an accelerator of growth, pushing the overall dominant position of the firm towards the Grow position.

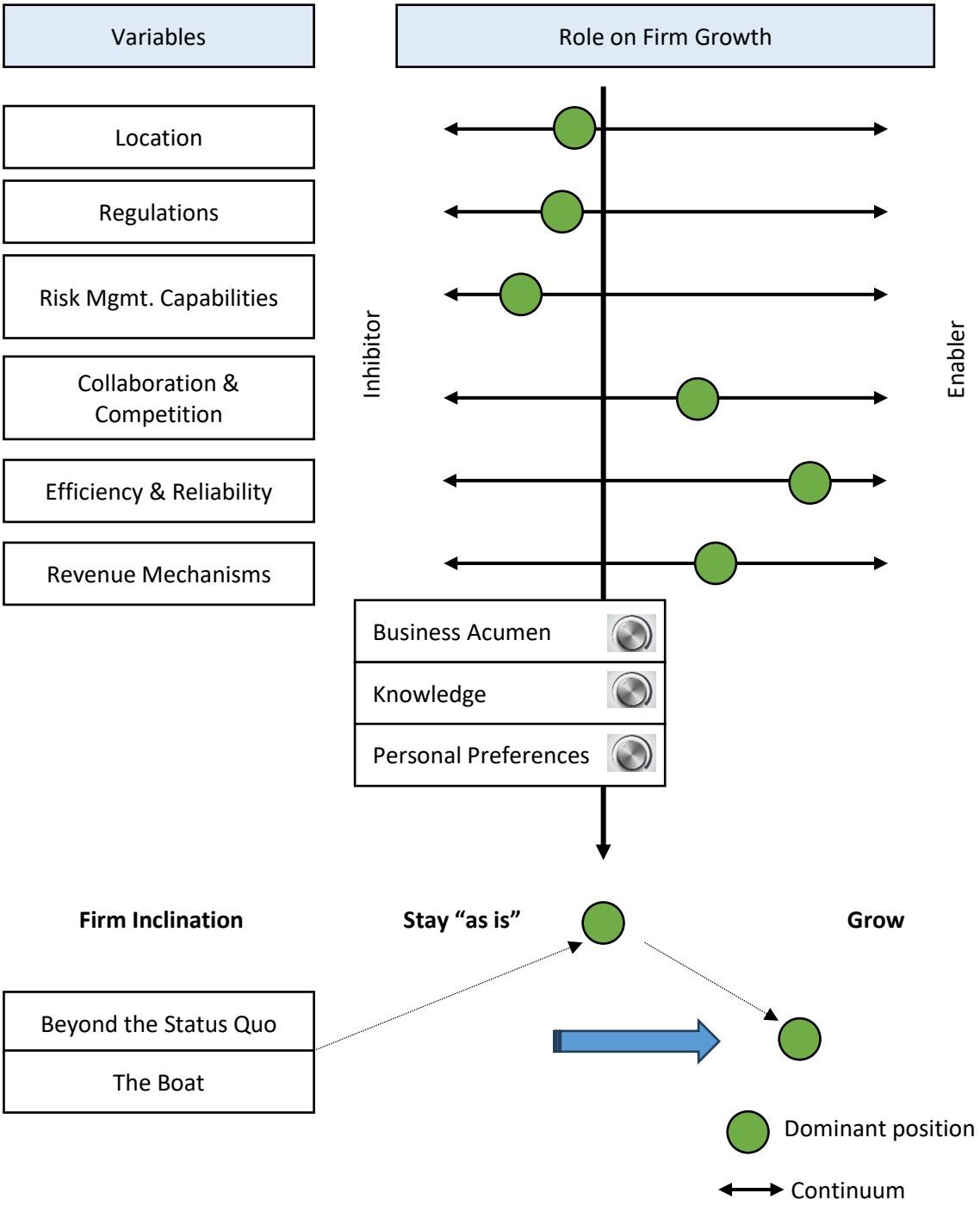


Figure 72 Proposed Business Model Represented in a Continuum (Adapted from Harwood et al., 2009)

7.- Chapter Seven – Conclusion and Future Research

7.1.- Introduction

This chapter presents the conclusions of the research. It starts with a description on how the research objectives were achieved summarizing the outcomes, followed by the formulation of the contribution to knowledge and management practices. The last section of this chapter includes the research limitations and future research.

7.2.- Research Objectives

The research explores and evaluates factors shaping small firms' growth in Northern Norway's fishing industry. The research also explores the literature on firm growth concerning natural resource scarcity, two literature streams that have historically been treated independently. The literature reviewed focuses on the research question to describe factors that drive firm growth in the context of the fishing industry. Factors shaping firm growth were sorted into three groups.

The first group is internal to the firms. It includes innovation, risk management, the firm's characteristics (e.g., age and size, organizational and ownership structure, finances and liquidity), strategy, competition, and niche. The second group is external to the firms and includes environmental factors such as natural resource scarcity, regulations, environmental sustainability, and creative destruction. The third group comprises firm owners' characteristics such as entrepreneurial orientation, motivation, and capabilities. Each group has a different impact on firm growth and is intertwined.

This research contributes to the current gap in the literature in which the existing solutions to supply chain scarcity such as replacing raw materials or closed supply chain loop do not apply to the extraction of fish and solutions to grow small firms in the fishing sector.

The literature review looked at the elements of the research question, highlighted in different colours below and represented in the diagram of Figure 12. This research focuses on the intersection of these elements, shown at the centre of the chart.

How can small firms grow in an industry where the natural resource is in decline?

The thesis maps existing theories to the elements of the research question, as shown in Table IV in the literature review chapter. This approach is novel since it brings together different literature streams, enabling researchers to study the intersections of such theories, such as the theories of small firms, firm growth, and natural resource scarcity, which outline the research output. The discussion chapter

presents narratives of the research findings concerning the literature. The prime conclusion from this objective is that the growth of small firms in the fishing industry is counterintuitive; a model of fishing more to increase revenues is not always feasible, and firms must find alternative solutions to increase the value per kilo of fish to enable growth.

The research includes data from 265 large and 90 small firms operating in Northern Norway. It provides a general insight into what is happening in the fishing industry in Northern Norway and supports the problem statement and research question. First, the data corroborate the challenge for small firm growth as fish stocks have declined since 2013. Second, the data provide insights into revenue, profit, and asset growth.

Regarding revenue, there are differences in the revenue growth performance between small and large firms. The fish stocks seem to be impacting the revenue growth rates, and there are also differences in the performance between small firms. The data also indicate a low correlation between revenue growth and firm age. Regarding profits, the data also suggest a significant variation between large and small firms and within these groups. In general, small firms struggle to maintain profits. Regarding asset growth, a higher percentage of large firms show growth in assets, while small firms tend to reduce their assets, and no correlation between revenue, profit, and asset growth was observed.

The research shows how year-on-year price per kilogram fluctuations do not support Hotelling's (1931) standpoint and mask the random effect of the fish stocks, described in detail in section "4.- Chapter Four: Quantitative Data Analysis." The main takeaway drawn from this section is that both Gibrat's (1931) and Penrose's (1959) theories, while mutually exclusive in the literature, are valid in the context studied.

In summary, there seem to be mixed messages. On the one hand, the industry is growing, demand is increasing, and some firms perform well. On the other hand, some firms have erratic performance, and many small firms are exiting the market

The following objectives were set to achieve the aim of the research:

7.2.1.- Evaluate how internal factors to the firms, such as innovation, risk management, organizational structure, and finances, impact firm growth

This objective was accomplished in "2.- Chapter Two: Literature Review," and "4.- Chapter Four: Quantitative Data Analysis," by evaluating existing literature and analysing quantitative data.

From the internal factors review, a conclusion is drawn that innovation plays a crucial role in firm growth. Innovation in this industry takes a different pattern than in other sectors; it is not only related

to developing high-tech solutions, but innovative ideas also relate to how things are done. Mainstream theories such as creative destruction are evident in the fishing industry, which has undergone several disruptive cycles since 1960. The variability and unpredictability of fish supply force fisheries to diversify their product portfolio. Diversification is not limited to a new product or a niche; it expands to moving away from the core fishing business and into other activities for revenue generation. Another conclusion is that embracing innovation depends on local governance and regional features.

Risk management is explored as another internal factor and relates to how firms in the fishing industry mitigate risks connected to natural resource scarcity, which differ between the different stages of the supply chain; for firms in the extraction stage of the supply chain, mitigations include optimizing efficiency, acquiring additional quota, fish alternative species, establishing cooperating models, among other solutions. While ample literature discusses supply chain management and natural resource scarcity, there is still limited knowledge of strategies companies heavily dependent on natural resources can embrace to grow their businesses.

Regarding the characteristics of firms, several conclusions can be drawn. First, the performance of large and small firms differs. The former benefit from economies of scale and tend to have more stable performance, while the latter has a higher exposure to fluctuating market conditions. Age is another factor that impacts performance. The firm's and the entrepreneur's age are often related to experience and knowledge and influence firm growth; however, findings in this area are mixed. Second, the organizational structure and ownership status also play a role in the development of firms. For instance, centralized organizations, as do privately owned firms, tend to perform better. The organizational structure offers limited value in answering the research question since most small firms are privately owned and have just a few employees. Third, access to financial resources enables firm growth. This aspect is also related to the financial literacy of small firm owners, as additional credits increase the firms' risk profile and, if poorly managed, could adversely affect firm performance. Finally, how firms adapt their strategies to challenges such as environmental sustainability also plays a role in firm growth.

7.2.2.- Evaluate how environmental or external factors such as natural resource scarcity, regulations, and environmental sustainability impact the firm's growth

This objective was achieved in "2.- Chapter Two: Literature Review" and "5.- Chapter Five: Qualitative Data Analysis" by evaluating existing literature and analysing qualitative data from the eight semi-structured interviews and 124 professional trade publications articles.

The second group of factors is external to the firms where natural resource scarcity is the prime discussion, governed by the theory of Common Property Resource and how regulations in the fishing industry impact the performance of fishing firms. The research also shows how the focus on the environment is shifting fishing firms to find alternative solutions to their revenue streams in line with global trends to grow and maintain competitive advantage. Regulations have been identified as growth enablers since they protect natural resources from extinction. They are also growth barriers since restrictions mean fisheries are not free to fish what they want in unlimited quantities.

Literature on environmental sustainability is growing, and while there is ample research in this field, there are still areas under-represented in the literature. Small firms in the fishing industry have been reactive in responding to governmental requirements and have missed the opportunities that embracing environmental sustainability could bring to the growth of their firms. This research investigates how firms could leverage environmental sustainability challenges to drive performance and growth, as indicated in "2.5.- Environmental Factors" and "6.2.4.- Unexplored Options and Market Trends" of this thesis.

7.2.3.- Evaluate how the primary decision-maker preferences and decisions impact firm growth

Like the previous objective, this one was accomplished in "2.- Chapter Two: Literature Review," and "5.- Chapter Five: Qualitative Data Analysis," with the evaluation of existing literature and the analysis of qualitative data from the eight semi-structured interviews and 124 professional trade publications articles.

The primary decision-maker preferences and decisions have an impact on firm growth. Entrepreneurs' characteristics and orientation influence small firms' performance in the fishing industry. The research shows that growing a firm in this industry requires additional efforts, administrative capabilities, and financial understanding, and in many cases, there is a lack of will to do so or acquire such capabilities; owners are content with the status quo and decide to refrain from growing their businesses. Life–work balance also plays a role in such decisions since managing the seasonal fishing activities of one or two small fishing vessels provides more flexibility to spend time doing activities at home, unlike managing medium and large businesses, especially if vertically integrated in the supply chain, that require more time during the whole year.

7.2.4.- Empirically explore how small firms in Northern Norway manage their fishing businesses to maintain sustainable profits and growth

This objective was achieved in "5.- Chapter Five: Qualitative Data Analysis." The qualitative data provide insights into the fishing industry's challenges for small firms and how to overcome these challenges to sustain profits and grow businesses.

The qualitative data analysis yielded a model with four themes. The first theme describes environmental and firm factors that could hinder growth. The second theme indicates how these challenges could be overcome. There are different ways to enable a small firm to grow. The data yielded many well-known practices in operational excellence, such as efficiency, lowering costs, adopting new technology to optimize operations, diversifying by fishing more species, trading the quotas, etc. But what came up as one of the critical enablers of growth is collaboration. All interviewees mentioned that building a network and collaborating with other stakeholders effectively sustain a good business and grow the firm. The structure of the fishing industry enables competing firms to partner and succeed together. An expansion model through vertical integration will allow small firms in the first phase of the value chain to reach final consumers, yielding a higher return per kilogram of fish caught.

The third theme concerns the primary decision-maker's capabilities and preferences. The data show the importance of personal preferences in firm growth. Knowledge about the fishing industry is vital, as is the business acumen of firm owners. Firms that grow beyond their initial state in the first phase of the supply chain will require additional administrative and business skills from the individuals managing the company. The data also show that risk is dynamic, and as firms grow, their risk profiles change. The primary decision-makers must have the skills to manage these dynamic risks. The traditional fishing practice of fishing and delivering fresh catch to the receiving facilities does not enable growth, mainly when additional fishing rights are unreasonably expensive. The fishing industry is growing, and there are new trends. Small firm owners who align with this quickly will benefit from the industry's growth rate. Many small firm owners are content with their current state.

The fourth theme shows the importance of seeing beyond the current state. The fishing industry has strong traditions, players have clear roles and responsibilities, and the supply chain structure is well established. To grow, a firm must adopt a flexible business model and embark on areas not explored by small firms, such as partnerships with research entities to increase the value per kilo of the catch. For instance, producing products such as fish proteins or other species such as seaweed and shells, which are used as raw materials in manufacturing pharmaceutical and cosmetic products, could yield additional revenue for small firms. Another area is to evaluate how a model that aligns with

environmental sustainability could enable a firm to increase its profitability. A small firm could vertically integrate to reach a different portfolio of customers. Finally, the boat selection is paramount since it sits at the core of the firm's growth. Data show that the choice of boat size and age play a vital role in the firm's growth.

The qualitative data enabled the development of a business model to grow small firms in the fishing industry, contributing to this research's knowledge and management practices.

7.3.- Contribution to Knowledge

The proposed business model, described in "6.- Chapter Six - Discussion," is the main contribution to knowledge of this research. The model, illustrated in Figure 72, is composed of several variables deduced from the qualitative data analysis. The variables are represented in a continuum and explained below:

- The first group of variables are **Location, Regulations, and Risk Management Capabilities**. They have a predominant negative impact on firm growth. Regarding **Location**, three aspects of the location could inhibit growth: the proximity to the fishing grounds, the location of the receiving facility, and the limitations related to how far small vessels can travel offshore to fish. Regarding **Regulations**, four elements could hinder growth: the quota system, the regulations associated with the firm structure, the protection of the local workforce and minimum wages, and the regulatory bodies' control of the unit price. Regarding **Risk Management Capabilities**, there are five elements to consider: environmental risks such as global warming, the decline in fish stocks, small fleet displacement by the large fleets that benefit from economies of scale and more efficient and cost-effective systems, and the change in the risk profile of the firms as they integrate vertically in the supply chain. In the model, these variables are represented in a continuum because, adequately addressed, they could also positively impact firm growth.
- The second group of variables are **Collaboration & Competition, Efficiency & Reliability, and Revenue Mechanisms**, which are predominantly growth enablers. Regarding **Collaboration & Competition**, there are three elements: collaboration, a critical enabler of growth, roles and responsibilities. Leveraging this to identify partnership opportunities is vital, and ethics and trust are enablers for a small firm to build credibility in the industry. Regarding **Efficiency & Reliability,** there are two elements: maintenance and operating costs to keep the boat in good condition and avoid costly breakdowns at sea, and innovation since regular upgrades to the vessel's equipment enable more efficient operations. Regarding **Revenue Mechanisms,** there are four: diversification, in this context, the bulk of the discussions pivots around diversifying

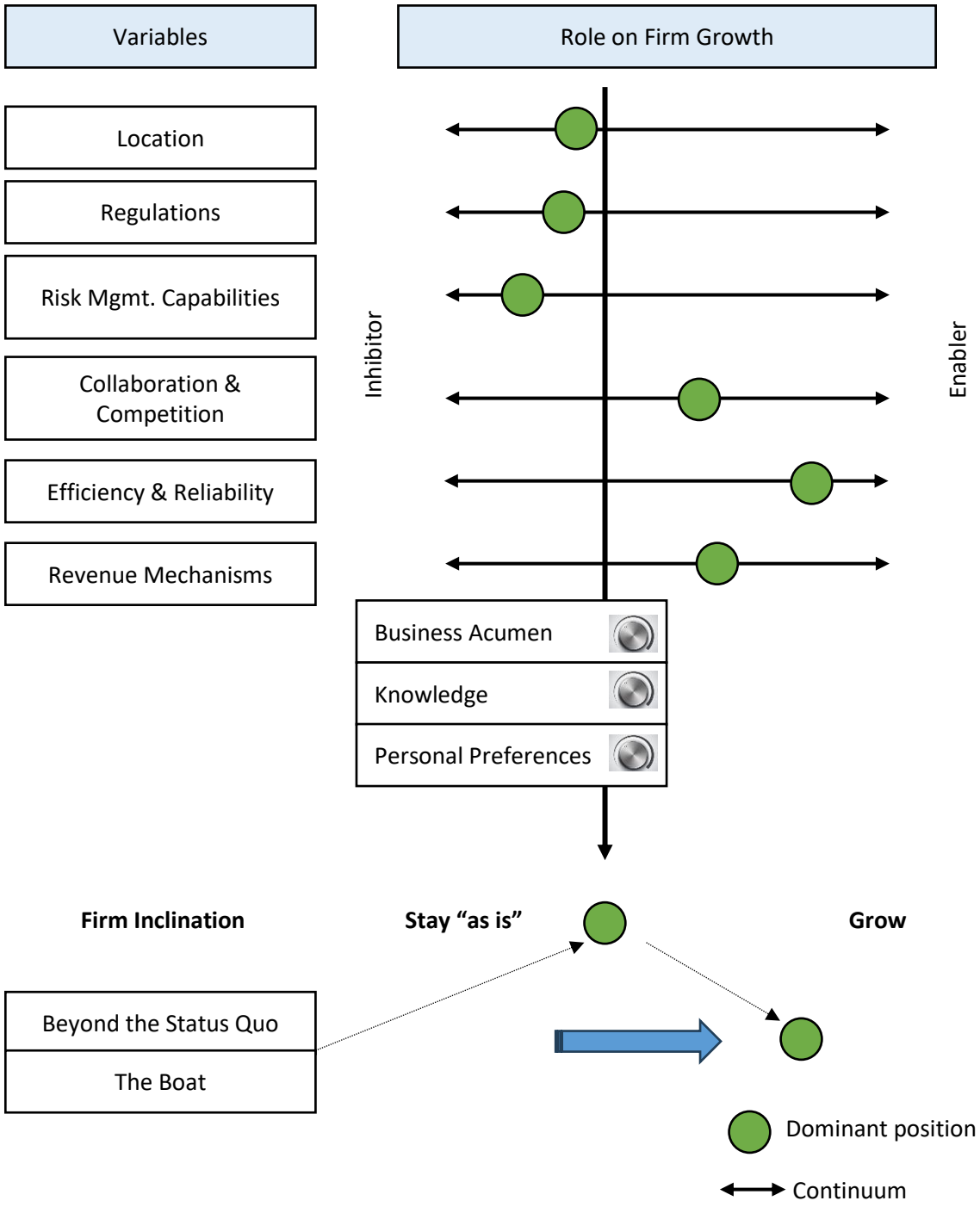
by fishing additional species, trading quotas, integration, both vertical and horizontal, and expanding the firm's core business into other industries such as hospitality, construction, and freelancing, to generate additional income. Like the previous group, these variables are also represented in a continuum; if not correctly leveraged, they could negatively impact growth.

- The third group of variables is **Business Acumen, Knowledge,** and **Personal Preferences**. They relate to the firm owners or primary decision-makers and influence the two groups above. Hence, these variables cannot be represented in the same way. For instance, the individual may have business acumen skills, which could positively impact other variables such as revenue mechanisms. Likewise, if the individual is willing to take the extra effort and seek growth, this could also positively affect variables like collaboration and competition. These variables work as dials to move the variables of **Inhibitors** and **Enablers** to either side of the spectrum.
- The fourth group of variables is **Beyond the Status Quo** and **The Boat.** The research shows that the overall tendency of small firms is inclined to stay "as is." When the variables **Beyond the Status Quo** and **The Boat** are incorporated, they may act as an accelerator of growth, pushing the overall dominant position of the firm towards the growth position. For example, small firms willing to increase their revenue would typically increase the amount of fish they deliver to the producers. By doing this, which requires additional costs to acquire new quotas and time at sea, the firms can increase the revenue proportionally to the new amount caught. Still, the sale price usually remains similar (e.g. 35 NOK/kg). Instead, if the firms choose to utilize their current fish differently and partner with other entities to produce different products (e.g. raw material for cosmetics), they could earn a premium for their catch (e.g. 8,500 NOK/kg). Another accelerating factor is specific to how selecting the correct vessel size could make a substantial difference in the firm's revenue stream. A difference of two centimetres in the boat size is operationally negligible, but it is related to the quota, as it dramatically impacts potential allocation and provides a financial advantage.

The proposed model can be transferrable to other industries of the primary sector such as farming and forestry, which face similar challenges. Future research may include testing the model in these industries.

7.4.- Contribution to Management Practices

The proposed business model (shown below) also represents the contribution to practical management.



Small firms can leverage the model's variables and adjust their business practices to grow. For example, the model shows that location, regulations, and risk management capabilities tend to hinder growth. The firm owner could develop a strategy to address this, such as registering the firm in Finmark since this location in Northern Norway offers additional benefits, or choose carefully the location of a fish receiving facility based on the most common routes fishing vessels take when they come back from the sea, or developing a comprehensive risk register with clear mitigation measures and controls to ensure risk is managed as the firm growths.

Likewise, the research shows that collaboration is a driver of growth. The firm could actively seek partnerships to increase the value per kilogram of fish by collaborating with researchers and the government to produce additional products from the catch, such as raw materials for the cosmetics industry. The firm must remain vigilant of the basics, like keeping low operating costs, adhering to new regulations to avoid costly fines, and keeping the boat well maintained and in good condition to prevent downtime. The firm also needs to consider factors such as boat size and age when adding new vessels to the existing fleet since these factors may significantly impact the allocation of quotas and boat reliability.

Small firm owners, or primary decision makers, should develop business acumen and administrative skills since they are required as the firm grows and integrates in the other value chain phases. New entrants can also leverage the collaboration to learn about the fishing industry, fishing grounds, fishing techniques, and other practices that former generations have used successfully.

The fishing industry is growing, and there are new opportunities and challenges. Small firm owners who align with this will benefit from the industry's growth rate. The traditional practice of fishing and delivering fresh catch to the receiving facilities does not enable growth, and firms may need to contest the status quo to overcome the challenges. Primary decision-makers could adopt the proposed business model to shape their businesses.

This research is the first to offer practical considerations in a business model small firms in the fishing industry in Northern Norway can leverage to grow. The scope of this research did not include other geographical areas, but the elements of the model are generic. They could be adopted by small firms in different countries facing similar challenges.

7.5.- Research Limitations and Future Research

This research has various limitations, grouped as follows:

- **The time horizon of the research**. The main objective of the thesis is to explore and evaluate factors shaping small firms' growth in Northern Norway's fishing industry. The secondary data contain the historical performance of firms in the region selected for the research and provide longitudinal insight. Similarly, the data from the articles cover one year (12 months from January to December) to evaluate the seasonal features of the discussions. However, the interview data are punctual and do not include a follow-up with the interviewees. The research was not designed to be action research and did not include following up on the recommendations to evaluate their efficacy. Adding a longitudinal time horizon would have significantly extended the time required to complete the research.

- **Interview sampling technique**. Another methodological limitation is the sampling strategy. As initially planned, a purposive strategy could not be adopted due to a lack of access to the identified firms. This limitation was addressed with the shift to a snowball strategy. While the interviews reached saturation, this limitation was addressed with the addition of articles data in the qualitative data set, which was also helpful in tackling the limitation related to the sample size and reducing researcher bias.
- **Regional scope of the research**. While the fishing industry in Norway plays an important role in fish production worldwide, challenges that small fishing firms face in this region may differ in other geographical locations. The business model of growth presented in this research has not been tested to determine the effectiveness of the different elements to enable small firm growth in the fishing industry. This research was conducted in the context of the fishing industry in Northern Norway, where enablers and growth barriers may not have the same impact as in other regions of the world. However, the literature review was not limited to Norway, which enabled the evaluation of discussions of similar challenges in different countries, minimizing the impact of this limitation.

It is worth mentioning that these limitations do not detract from meeting the objectives of this research and answering the research question. Some of the design limitations of this research open opportunities for future work, for example:

- The variables of the proposed model could be tested in deductive or action research to evaluate the effectiveness of the proposed theoretical model.
- The research could expand into a broader context, for instance, a different fishing region, to evaluate what elements of the model could be transferable and to continue building a business model that firms across geographical borders could use.
- Future research could advance the proposed mathematical model and develop a range of values for α and β_n. These values could account for regional features, species types, fleet sizes, governmental regulations, etc. The proposed model is novel in this field, and there is room to continue expanding it to improve its accuracy in the region of this research and other areas worldwide.

"Small firm growth will continue to be a topic of interest due to its impact on economic growth. Natural resource scarcity will continue to be challenging due to population growth and other environmental challenges. I hope that this research will wake the curiosity of other peers, so this research field continues to expand and benefit many small players out there" Pablo Colman

7.5.1.- Mathematical Representation of the Business Model for Firm Growth in the Fishing Industry – Opportunity for Future Research

Before describing a mathematical representation of the proposed business model, this section starts with a summary of other existing growth models encountered in the literature that served as a reference.

Mathematical modelling is often used in economic literature, for example, the use of the equation developed by Paul Douglas and Charles Cobb (Lewis, 2023), which measures the output of production based on input variables (e.g., labour and capital) with its respective elasticity constants, as shown below:

$$Y = AK^{\delta}L^{\delta-1}$$

Equation 2 Cobb-Douglas Equation

Where:

- Y = Output
- A = Constant known as the total factor productivity
- K = Capital or total assets
- L = Labour or total workforce
- δ = Elasticity of output

This equation has been used to model firm and economic growth by several authors such as Ayres (2001), Dolev and Kimhi (2010), Abed (2022), and Catacutan (2022).

Another common mathematical representation of firm growth is a regression model like the one shown below.

$$Log\ F_i(t) = \alpha + g(t) + \sum \beta_i Log(F_i(t-1))$$

Equation 3 Common Firm Growth Model (Adapted from Geroski, 2002)

Where:

- $\mathrm{F_i(t)} = \text{Firm size at current time}$
- $\mathrm{F_i(t-1)} = \text{Previous firm size}$
- $\alpha = \text{Market factors}$

- g(t) = Firm Growth rate
- $\beta_i = \text{Growth determinat factor}$

This equation includes three elements, first, the randomness of the market as indicated by Gibrat (1931), second the internal factors to the firm as described by Penrose (1959), and finally other determinants of firm growth. Several authors like Mansfield (1962), Acs and Audretsch (1990), Zhou and De Wit (2009), Geroski (2002), and Nunes et al. (2013) have used similar models to represent firm growth.

These previous models serve as the foundation of the one proposed in this research. The variables described in "6.3.- Proposed Business Model and Future Considerations" and illustrated in Figure 71 and Figure 72 were compiled to develop a mathematical model using the growth regression equation proposed by Zhou and De Wit (2009) as the basis due to its relevancy, simplicity, and representation in the literature of firm growth.

$$Firm\ Growth = \alpha + \beta_1 Determinant + \beta_2 Barrier + \beta_3 Control$$

Equation 4 Growth Equation Proposed by Zhou and De Wit (2009)

The themes identified in this research could be used as the elements in the equation, as follows:

$$Firm\ Growth = \alpha + \beta_1 Growth\ Enablers + \beta_2 Growth\ Inhibitors + \beta_3 Primary\ Decision\ Maker\ Capabilities\ and\ Preferences$$

Equation 5 Towards a Business Model for Firm Growth in the Fishing Industry - Part I

This approach, though, leaves the equation incomplete. The element of **primary decision maker capabilities and preferences** are influencing factors and should not be treated in the same way as enablers and inhibitors. Instead, they could be represented as a common denominator of the growth function, as shown below:

$$G = \alpha + \frac{\beta_1 Growth\ Enablers + \beta_2 Growth\ Barries}{\beta_3 Firm\ Ower\ Capabilities\ and\ Preferences}$$

Equation 6 Towards a Business Model for Firm Growth in the Fishing Industry - Part II

In this equation:

- G = Firm Growth
- α = Random disruptions in the market, which could be related to the fluctuations in the quota allocation, as well as other market conditions impacting the price per kilogram of fish caught

- β_1= Sum of multiplier factors related to the enablers of growth
- β_2 = Sum of the multiplier factors related to the growth inhibitors
- β_3 = Sum of the multiplier factors related to the primary decision maker

From the data, the unexplored options and market trend's theme could be considered as an accelerating factor and added to the equation as follows:

$$G = \alpha + (\frac{\beta_1 Growth\ Enablers + \beta_2 Growth\ Barries}{\beta_3 Firm\ Ower\ Capabilities\ and\ Preferences})^{\wedge \beta_4 Unexplored\ Options\ and\ Market\ Trends}$$

Equation 7 Final Business Model for Firm Growth in the Fishing Industry - Proposed

α in these equations is supported by the randomness of the markets proposed by Gibrat (1931).

Where:

- $Growth\ Enablers = \beta_{1,1} Collaboration\ and\ Competition + \beta_{1,2} Revenue\ Mechanisms + \beta_{1,3} Efficiency\ and\ Reliability + \beta_{1,4} Location\ as\ an\ Enabler + \beta_{1,5} Regulations\ as\ an\ Enabler$
- $Growth\ Inhibitors = \beta_{2,1} Risks\ Mgmt. + \beta_{2,2} Regulations + \beta_{2,3} Location$
- $Primary\ Decision\ Maker\ Capabilities\ and\ Preferences = \beta_{3,1} Personal\ Preferences + \beta_{3,2} Knowledge + \beta_{2,3} Business\ Acumen$
- $Unexplored\ Options\ and\ Market\ Trends = \beta_{4,1} Beyond\ the\ Status\ Quo + \beta_{4,2} Boat\ Selection$

The impact of the variables of this equation is not equal, and hence, the multipliers could be ordered as per their priority, where:

$$\beta_{1,n} > \beta_{1,n+1}$$

$$\beta_{2,n} > \beta_{2,n+1}$$

$$\beta_{3,n} < \beta_{3,n+1}$$

$$\beta_{4,n} > \beta_{4,n+1}$$

Equation 8 Priority of the Multipliers

Most growth models encountered in the literature represent growth as a function of several variables in linear equations. This research took a novel approach by designating two variables as exponentials to illustrate the accelerated impact these variables may have on growth. This model is conceptual

based on the qualitative data extracted for this research, but it has not been fully developed nor tested to account for all mathematical possibilities. The original design of this thesis did not include testing this mathematical equation. This model is conceptual, and the scope of this thesis did not include the full development of the mathematical equation to account for all possible variables.

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