




Thesis

How institutions in the
Netherlands affect
entrepreneurship in
sustainable aquaculture

Rogier Oostenenk
1014029
25-08-2019



Human Geography; Economic Geography

Name: Rogier Oostenenk

Thesis Project Title: How institutions in the Netherlands affect the entrepreneurship in sustainable aquaculture

Supervisor: Arnoud Lagendijk

Abstract:

The Netherlands is known to be a world-class pioneer on the front of innovation on the subject of water. In the area of sustainable aquaculture however, the Netherlands is lacking. This research will determine why the Netherlands is lagging behind by focussing on the correlation between entrepreneurial activity and the development of the sustainable aquaculture sector. Both the variables are influenced by the institutional framework in the Netherlands and that correlation will be investigated as well. Therefore, the following research question is drafted:

What is the effect of the institutional framework on the development of sustainable aquaculture in the Netherlands?

The research will follow a mainly qualitative approach and will be focussed on the dependent variable of the development of sustainable aquaculture. The independent variable is entrepreneurial activity and the second independent variable is institutional framework conditions.

The institutional framework in the Netherlands is influencing entrepreneurial activity in a relatively positive way. Some of these institutions are even considered to be the best in the world. The normative and cultural-cognitive institutions are more supportive. Both of these institutions have a positive effect on the nascent entrepreneurship rate.

The institutions are affecting sustainable aquaculture in the Netherlands in a somewhat negative way. Government support programs have been lacking in both the European Union as in the Netherlands, although a change has been set in motion. Entry barriers and government regulation are hampering the aquaculture sector as well, although the government has indicated that reforms are on the way. The Dutch retail market for fish has changed in the last decade as the biggest retailers, the supermarkets, demand the ASC sustainability certificate from producers of aquaculture products. Other retailers in Europe are switching to the ASC-certificate as well. The switch to ASC-certified products comes from the increased demand from NGOs and consumers who want assurances that the products are produced with high standards for environmental and social sustainability. The retailers on the other hand do focus solely on a limited number of fish species that have a stable supply and have a high commercial value. The Dutch aquaculture sector on the other hand is focussed on other species for which there are no ASC-certificates.

So, although the institutional framework in the Netherlands is favourable towards entrepreneurship, the nascent entrepreneurship rate and the discontinuation rate in the aquaculture sector are levelled. The low nascent entrepreneurship rate and the difficulties with the requirement of having an ASC-certificate to have access to the largest part of the Dutch fish market, the entry barriers and issues with government support programs have kept the number of companies and thus the development of sustainable aquaculture in the Netherlands low compared with the total aquaculture sector in the Netherlands.

Keywords: innovation, sustainability, entrepreneurship, institutions, aquaculture.

Preface

This thesis will be the final step in my master study. Entrepreneurship has always fascinated me and starting my own business in the future is still one of my goals. This thesis gave me the opportunity to explore how institutions in the Netherlands are influencing entrepreneurship in general and more specific to one particular sector. Aquaculture is promising and with further research a bright future in sustainable aquaculture is possible in the Netherlands and the European Union. The thesis has been a challenging journey with struggles along the way. Nonetheless, the end result is finalised. This thesis could not be finished without the help of a few individuals I would like to thank.

First, I would like to thank my thesis supervisor from the Radboud University, prof. dr. Arnoud Lagendijk for his guidance, feedback and discussion opportunities. I would also like to thank Peter Eenshuistra for his feedback and discussion opportunities. I would like to thank the participants of the interviews as well as their input has supported this thesis.

Rogier Oostenenk, September 2019

Index

| | |
|--|----|
| 1. Introduction..... | 1 |
| 1.1 Research problem | 1 |
| 1.2 Relevance of the research | 3 |
| 1.3 Aims and objectives..... | 4 |
| 1.4 Research questions..... | 4 |
| 1.5 Scope | 5 |
| 1.6 Thesis structure | 5 |
| 2 Literature review and theory..... | 6 |
| 2.1 Defining the main concept | 6 |
| 2.1.1 Companies in sustainable aquaculture | 6 |
| 2.1.2 Aquaculture | 8 |
| 2.1.3 Sustainable aquaculture | 9 |
| 2.1.4 The theory of Tisdell on the development of (sustainable) aquaculture..... | 14 |
| 2.2 Institutions..... | 14 |
| 2.3 Entrepreneurship | 19 |
| 2.4 Mechanism of the influence of the institutional framework on aquaculture | 29 |
| 2.5 Research design..... | 30 |
| 2.6 Conclusion | 31 |
| 3 Operationalisation and methodological framework..... | 33 |
| 3.1 The sub-questions | 33 |
| 3.1.1 How is the institutional framework in the Netherlands influencing entrepreneurial activity and specifically towards starting sustainable businesses? | 33 |
| 3.1.2 How does the institutional framework in the Netherlands influence the number of companies?..... | 33 |
| 3.1.3 Which positive and negative effects does the institutional framework have on the development of aquaculture in the Netherlands? | 33 |
| 3.1.4 Which positive and negative effects does the institutional framework have on entrepreneurial activity in the development of aquaculture in the Netherlands?..... | 33 |
| 3.1.5 How many companies in the Netherlands focus their business model on sustainable aquaculture production? | 34 |
| 3.2 The effect of the institutional framework on sustainable aquaculture | 34 |
| 3.3 Development of sustainable aquaculture | 39 |
| 3.3.1 Sustainable aquaculture certificate..... | 39 |
| 3.3.2 The measurement of sustainable aquaculture | 39 |
| 3.3.3 Outcome range for companies in sustainable aquaculture in the Netherlands | 39 |
| 3.4 Data collection..... | 40 |

| | |
|---|----|
| 3.5 Data analysis..... | 40 |
| 3.5.1 Data sources | 42 |
| 3.5.2 Interviews | 42 |
| 3.6 Validity..... | 43 |
| 3.7 Reliability | 43 |
| 3.8 Conclusion | 44 |
| 4 Findings..... | 44 |
| 4.1 The institutional framework and its effect on the number of companies | 45 |
| 4.2 The institutional framework and its effect on aquaculture | 49 |
| 4.3 The institutional framework and its effect on entrepreneurship in sustainable aquaculture.... | 52 |
| 4.4 Companies in sustainable aquaculture | 54 |
| 4.5 Conclusion | 55 |
| 5 Conclusion and Recommendation..... | 56 |
| 5.1 Research conclusions | 56 |
| 5.2 Limitations of research..... | 57 |
| 5.3 Recommendation from research | 58 |
| 5.4 Recommendations for future research | 58 |
| 6 References | 60 |
| 7 Appendices | 71 |
| 7.1 Interviews | 71 |
| 7.2 Information regarding the other aquaculture certificates..... | 77 |

1. Introduction

1.1 Research problem

Water is essential for humans, animals, plants and ecosystems. Slightly more than 70 per cent of the surface of the Earth consists of water-covered areas, with the oceans containing 96.5 per cent of all Earth's water (U.S. Geological Survey, 2016). Considering that we know more about space than we do about our own oceans, it is believed that the oceans could help solve a lot of problems regarding climate change and might improve the sustainability of a lot of supply chains (Van Doorn, et al., 2015; Handwerk, 2016). Aquaculture is one of the activities which is regarded as important both for the production of food now and in the future by replacing normal fishery practices. Aquaculture is: "an industrial process of raising aquatic organisms up to final commercial production within properly partitioned aquatic areas, controlling the environmental factors and administering the life history of the organism positively and it has to be considered as an independent industry from the fisheries hitherto" (FAO, 1987). Sustainable aquaculture differs from normal aquaculture in the sense that the production process has to follow a given set of rules regarding ecological, economic and social-anthropological aspects of the environment throughout the complete supply chain. Particular requirements are that the feed used is all traceable and certified and that the use of medicines is discouraged (Frankic & Hershner, 2003). Sustainable aquaculture, has the possibility to improve food supply sustainability and counter climate change as the pressure on the ocean's declines. Healthy oceans are a key factor in countering climate change as they absorb more than one third of the CO₂ emissions worldwide (Boyd & McNevin, 2015; Rosane, 2019).

The Dutch government has set the targets regarding sustainability and aquaculture. The sustainability targets however, are far from being met in comparison with other European nations. The Dutch government has set a target regarding innovation as well, as it wants to be one of the most innovative nations in the world (Rijksoverheid, 2017).

The government of the Netherlands has set up a strategy regarding aquaculture. The ambitions do highlight the importance of sustainable aquaculture for the growing food demand worldwide. The ambitions however, mainly focus on increasing the production of the existing aquaculture companies in the Netherlands, which mainly operate with land-based artificial water basins. The plan does indicate the importance of the knowledge of aquaculture systems which is exported by companies from the Netherlands, but in terms of the development of sustainable aquaculture in new and incumbent companies it is rather limited and does not extend beyond setting up knowledge groups and technology sharing initiatives (Rijksoverheid, 2015; Verreth, 2018).

Aquaculture is an industrial process of raising aquatic organisms, such as fresh and salt water fish, aquatic plants and seaweed. Seaweed cultivation, which is an increasingly important part of aquaculture, is an excellent example of entrepreneurship on water. Seaweed cultivation is widely adopted in Asia, but is still in the infancy phase in Europe and the Netherlands. Seaweed applications are numerous and the ecological value of seaweed can create more sustainable supply chains (Rebours, et al., 2014). In the area of aquaculture in general, the case is slightly different. Aquaculture research has been done and is still being done on the possibilities of aquaculture in the Netherlands and this is supported by the government, but it is mainly focussed on biological and technological factors (FAO, 2007). Research on the current state of the aquaculture sector in the Netherlands has not been done in recent years and the number of people working in the sector and the production volume are estimates (CBS Statline, 2018; FAO, 2007). Most aquaculture in the Netherlands is focussed on mussels and less than 10 per cent is from inland aquaculture. The production of aquaculture has seen a decrease of roughly 50 per cent since 1999. In recent years the

production of aquaculture has been relatively stable (FAO, 2018; Smaal & Lucas, 1999). With the ambition of the European Union, the government of the Netherlands for the development of sustainable aquaculture and higher production of aquaculture together with the push by the large retailers to demand sustainability certificates from producers, one would argue that there should be an increase in production of aquaculture and sustainable aquaculture in the Netherlands (CBS, 2016; Rijksoverheid, 2015; Rijksoverheid, 2017; Verreth, 2018). Since August 2018 one company in the Netherlands is in possession of a sustainable aquaculture certificate, while worldwide there are nearly a thousand (ASC, 2018b). So, the push to more sustainable aquaculture production in the Netherlands has hardly started. There should be institutional barriers which explain this phenomenon and this research will identify those barriers. Aquaculture producers in the Netherlands argue that those barriers exist for most in the lack of species covered by sustainability certificates (Jonker, 2017; Perizonius, 2015; van der Poel, 2016).

Entrepreneurial research on the other hand is numerous and what institutions are affecting entrepreneurship are represented in the institutional framework of the Global Entrepreneurship Monitor (Reynolds, Hay, & Camp, 1999).

No research however, has been done on how entrepreneurial activity and the institutional framework are influencing the development of sustainable aquaculture in the Netherlands as there is only one company in the possession of an internationally recognized sustainability certificate (ASC, 2018b).

Research has been done on the correlation between the institutions, represented in the institutional framework in the Netherlands and entrepreneurship. The institutional framework in the Netherlands is rather favourable towards entrepreneurship. It supports both new and incumbent entrepreneurship (Herrington & Kew, 2017; The World Bank, 2018). The Netherlands is one of the top nations in Europe when it comes to entrepreneurship but in terms of innovation it is just average (Stam, et al., 2012).

The support of government institutions and other companies is important for the success of companies, especially companies in sectors where the so-called infant industry argument applies. These are sectors which are designated by the government as special interest sectors as they produce important national or societal goods and services, are in the infancy phase and need to be protected from large international competitors or operate in a fast-changing environment. The government is responsible for a healthy environment and to tackle climate change. The downside is that implementation of climate and sustainability actions depends largely on parties with an economic objective in mind. The benefits must outweigh the costs (van Doorn, et al., 2015). With this in mind and the ambition of both the European Union and the government of the Netherlands, one could argue that the infant industry argument should be applied to the aquaculture sector in the Netherlands to support the push towards sustainable production methods. Although the argument to designate the aquaculture sector as an infant industry, this is not the case in the Netherlands institutional barriers and incentives vary between the infant industry and incumbent industries. The aquaculture sector in the Netherlands thus does not gain the advantages of the infant industry argument (Shafaeddin, 2000). Another aim is to identify which incentives the aquaculture in the Netherlands wish to be able to produce in an acknowledged sustainable method.

Luckily, not all the sustainability initiatives have to be reliant on funding from third parties. Small-scale starting companies can acquire a loan to start an aquaculture farm at a smaller scale (van Dongen, 2017).

At this moment it is rather hard to determine what impact the policies from governments on ocean and waterway spatial planning have on companies when it comes to conducting activities or starting projects in sustainable aquaculture as there is the push to produce more in oceans and water than inland waters. Most oceans and waterway areas are designated for other purposes and dual-use planning is hardly considered anywhere (Bikker, et al., 2016; European Commission, 2016).

Therefore, the focus of this thesis is on why the development of aquaculture in the Netherlands is slow in comparison with the overall growth. To be more specific: the development of companies who focus their main business activities on sustainable aquaculture production. The research will only focus on the mainland of the Netherlands and not on the Caribbean Netherlands. The research will be conducted for its scientific and societal relevance. This research can help the society to acquire knowledge on why there is just limited progress in the development sustainable aquaculture and how to positively change that. Thus how to create a more sustainable economy in the area of aquaculture. This research will contribute on the scientific research as one of the first to investigate in Europe how institutions are influencing entrepreneurship in sustainable aquaculture as not much research has been done yet research has been done in this area.

1.2 Relevance of the research

Societal relevance

As land use is becoming scarcer a good opportunity is to look at the sea. Technological breakthroughs push the boundaries of human activities further from land. Research has shown that sustainable aquaculture can become a steady source of income which helps to produce sustainable food security and nutrition (Flannery, 2017; Rebours, et al., 2014). On the other hand, the notion that fish can be used as a key element in food security and nutrition strategies at national level is not implemented by many nations at this moment (Béné, et al., 2015). Aquaculture can provide elements as well for the production of other goods thus decreasing the pressure of land-use (Fleurence, 1999). With the even increasing world population the need for food grows. Most food production creates a burden on the environment. The increasing pressure is contributing to climate change. Sustainable aquaculture on the other hand can help to decrease the pressure on the environment and it can help to create healthy oceans where overfishing is no longer a problem. Healthier oceans can in turn help reduce the CO₂-levels in the atmosphere, which will benefit society (Boyd & McNevin, 2015; Rosane, 2019).

This research can be used by the government to develop better laws, regulations and policies to improve the entrepreneurial activity in the Netherlands for companies in sustainable aquaculture by using the conclusions and recommendations as a starting point in changing the institutional framework. Besides the foundation of the most suitable certificate, the factors from the institutional frameworks effecting the entrepreneurial activity and (sustainable) aquaculture will be identified and they can be used and changed to become more supportive.

Scientific relevance

In terms of scientific relevance this research can contribute to fill part of the knowledge gap of the aquaculture from both the producers as well as regulators. Managing aquaculture is regarded as a “wicked problem” by political scientists as there is a great extent of uncertainty and lack of solid knowledge to external factors influencing aquaculture production. Particular areas where this is the case are: environmental impacts, conflicts with other stakeholder’s interests and diseases. The constant changing nature of the aquaculture sector does not increase the certainty as established knowledge becomes irrelevant or obsolete when new innovative solutions emerge. The changes

mean that new research is needed time and again to align regulations and policy measures to assure a supportive institutional framework (Osmundsen, Almklov, & Tveterås, 2017).

Furthermore, this research will build upon the work of Fischer, Guttormsen & Smith (2016) in terms of which regulations push aquaculture producers to certain practices and activities which are not favourable for the production volume and aquaculture sector in general, which in this research are the barrier that comes with multi-use locations and the problems with the government support programs. The most common practices and activities where problems arise are: different government policies, changing knowledge, disease handling, company structures and size, technology changes, feed and pollution (Fischer, Guttormsen, & Smith, 2016; Osmundsen, Almklov, & Tveterås, 2017). Other researchers argue that even broader research is needed in the form of sociological and economic research to create a better understanding and guide investments and management decisions (Engle, D'Abramo, & Slater, 2017; Slater, D'Abramo, & Engle, 2018). The same researchers do however address the need for more research on innovative policy alternatives and mechanisms that increase the food production of aquaculture, but they need to address environmental concerns as well (Slater, D'Abramo, & Engle, 2018).

1.3 Aims and objectives

The aims and objectives of this research are mainly based on the scientific and social relevance outcomes through a structured process in funnelling down to the main issues of the state and thus development of sustainable aquaculture in the Netherlands. This leads to the following aims and objectives:

- The state of entrepreneurship in the Netherlands.
- Identify which institutions in the Netherlands are influencing entrepreneurship in the Netherlands.
- Identify how the institutional framework is influencing entrepreneurial activity in the Netherlands.
- Identify which institutions are influencing (sustainable) aquaculture in the Netherlands.
- Identify how both the institutional framework and the entrepreneurial activity are influencing (sustainable) aquaculture in the Netherlands.
- Identify which sustainability certificate is most applicable for the sustainable aquaculture sector in the Netherlands.
- Identify the current state of the sustainable aquaculture in the Netherlands.

1.4 Research questions

The main research question of the thesis will be:

What is the effect of the institutional framework on the development of sustainable aquaculture in the Netherlands?

Sub-questions will be used to form the basis to come to a conclusion of the main research question. The sub-research questions are:

- How many companies in the Netherlands focus their business model on sustainable aquaculture production?
- How is the institutional framework in the Netherlands influencing the entrepreneurial activity and specifically towards starting sustainable businesses?
- How does the institutional framework in the Netherlands influence the number of companies in aquaculture?

- Which positive and negative effects does the institutional framework have on the development of aquaculture in the Netherlands?
- Which positive and negative effects does the institutional framework have on entrepreneurial activity in the development of sustainable aquaculture in the Netherlands?

1.5 Scope

The scope of this thesis will be limited to the sustainable aquaculture in the Netherlands. Some of the institutions influencing entrepreneurship, sustainable aquaculture or entrepreneurship in sustainable aquaculture may not be limited to the Netherlands. The scope of the institutions is limited by the three pillars of institutions which have been identified by Scott (2014). These three pillars include the regulative, normative and cognitive-cultural pillars (Scott, 2014).

1.6 Thesis structure

This paragraph describes the structure of the thesis and offers a guideline for reading the thesis. The second section describes the theory and literature review. The section starts with a description of the concepts in the thesis and with a background of companies, aquaculture, entrepreneurship and institutions. It includes research from previous studies in the former fields, which are critically analysed. This section will form the starting point for the sections Findings, Discussion and Conclusion and Recommendations. The third section describes the operations and methodology which is used to conduct the research for this thesis. In the fourth section, the findings of the research regarding the sub-questions will be given. Section five will give the conclusion of this research and will include recommendations from the research, for future research. It will also include a reflection on the limitations of this research. Section six will include the appendixes used in this research and chapter eight will include the references.

2 Literature review and theory

In this section the literature review, theory, mechanism and the research design used in this thesis will be elaborated. The section will start with defining the main concept of aquaculture, what it is in general, what sustainable aquaculture is and how the development of both is influenced. In the second part of this section entrepreneurship is explained and the entrepreneurial activity which measures the current state of entrepreneurship will be elaborated. The third part of the section will explain what institutions are, what the institutional framework is and which institutions influence entrepreneurial activity and (sustainable) aquaculture through the institutional framework. The fourth part of this section will describe how both the entrepreneurial activity and the institutional framework influence the development of sustainable aquaculture through the mechanism. The last part of this section will focus on the research design of the thesis which is largely dependent on the theory used in the thesis.

2.1 Defining the main concept

The main concept of companies in sustainable aquaculture consists of three parts. The first is companies, the second is aquaculture and the third is sustainable aquaculture. Both will be explained in the following parts. The first part, 2.1.1, will describe what companies are, when they are considered to be companies and how entrepreneurship and the market influences the number of companies through the starting and closing of companies. The measurement of the number of companies is important for this research as it is used as an indicator for the development of (sustainable) aquaculture.

The second part, 2.1.2, will describe aquaculture in general and in the Netherlands. To understand how the institutions are affecting aquaculture in general and in the Netherlands, it is important to explain the context of aquaculture, its history and the theory of Tisdell regarding the development of aquaculture as all have influenced institutions and are influenced by the institutions.

The third part, 2.1.3, will describe the definition of sustainable aquaculture, the current state, trends and sustainability initiatives in sustainable aquaculture as all are influenced by institutions and influence institutions. The current state, trends and sustainability initiatives affect the development of sustainable aquaculture.

2.1.1 Companies in sustainable aquaculture

One of the main concepts of the research are companies which are active in the sustainable aquaculture. Starting companies and nascent entrepreneurs are seen as an indicator of how innovative a nation is, how entrepreneurial citizens are and how the development of a certain sector is progressing. This is indicated with the number of start-ups in multiple studies and it is measured with total early-stage entrepreneurship activity (TEA) and established business ownership. In this research both start-ups and incumbent companies will be included. In the Netherlands the number of start-ups is included in the number of starting companies. Therefore, for this research the definition of an active company is necessary. With the definition of an active company, research can be conducted on the precise number of companies in sustainable aquaculture as every company is obliged to register their main activities with the chamber of commerce, the *Belastingdienst* (the Dutch tax authority) as a food producer with the *Nederlandse Voedsel en Warenautoriteit* (the Dutch food authority) and lastly, they have to be in possession of a sustainability certificate.

The definition of a company is based on the term company defined by the Dutch chamber of commerce and the *Belastingdienst*. To meet the requirements to be an entrepreneur one must deliver goods or services, to ask a more than symbolic compensation and take part in trade (KvK,

n.d.). If one is an entrepreneur, that person is obliged to register their company. Thus being a starting company. If one is an entrepreneur in an already existing company, the registration of a new company is not always necessary. It is only necessary if the existing company opens a subsidiary at another location. The number of applications the chamber of commerce receives per year is the number of starting companies in a given year. Companies stay registered until they cease their economic activities (KvK, 2017).

Companies are formed by entrepreneurs when the institutional framework is favourable, as highlighted in the Global Entrepreneurship Monitor Conceptual Model in the section 2.2. In the conceptual model of the Global Entrepreneurship Monitor the number of companies fluctuates each year with nascent entrepreneurs adding to the number of companies and the discontinuation rate deducting the number of companies (Burns, 2016; Herrington & Kew, 2017). The number of companies in the Netherlands is thus affected by institutional framework related to entrepreneurship and entrepreneurial activity. Nascent entrepreneurship is influenced by the institutional framework in the GEM, whereas the discontinuation rate is influenced by changes in the institutional framework, but also by demographic and individual motives, such as personal reason or retirement (Burns, 2016; Herrington & Kew, 2017; Kelley, Singer, & Herrington, 2016; Singer, Herrington, & Menipaz, 2018).

Conjuncture cycles

The role of the market on the number of companies is less clear. The market growth fluctuates in cycles called conjuncture or business cycles (Fels, 2018; Mankiw & Taylor, 2014). Small and medium enterprises are less affected by conjuncture fluctuation than large enterprises. Large enterprises are focussed on export on a greater scale than small and medium enterprises. This is reflected in the revenue data where small and medium enterprises are less affected by a decreasing export caused by a low conjuncture. The reason behind this phenomenon is that small and medium enterprises depend to a higher extent on the domestic demand (CBS, 2010; Wekker, 2017). In a high conjuncture, private consumption, government spending, private investments and export rise. This results in growing revenues for companies, which is reflected in their data and producer confidence (Badir, 2018; Fels, 2018; Mankiw & Taylor, 2014).

In a low conjuncture entrepreneurial finance is indicated to be lower than in a high conjuncture, lower economic growth and less market confidence, which should lead to less business activity (Koellinger & Thurik, 2011). The Netherlands was in a low conjuncture since the financial crises of 2008 (CBS, 2017), however the number of companies in the Netherlands has been rising steadily since 2007 (CBS Statline, 2018). Since 2017, the Dutch economy is in a high conjuncture once again (CBS, 2017), but the growth in the number of companies is still stable (CBS Statline, 2018). This while the number of bankruptcies has risen during the low conjuncture in the Netherlands (Dalstra-van Emst, 2017). There is a difference in the motivation of the entrepreneurs. The motivation to start a company is now based on opportunity rather than on necessity (de Kok, et al., 2018; Singer, Herrington, & Menipaz, 2018). The switch from necessity to opportunity may be based on the opportunities entrepreneurs perceive in times of a higher conjuncture and therefore a growing market. Conjuncture cycles thus seem to have no direct effect on the number of companies in the Netherlands.

2.1.2 Aquaculture

It is necessary to indicate when a company is considered to be active in sustainable aquaculture. Therefore, in this paragraph aquaculture will be explained in general, its growth in recent years and the theory regarding factors influencing aquaculture will be described showing the change in recent years without the influence of the economic changes. There is still a debate on what sustainable aquaculture is. So, after the general explanation of aquaculture the issues regarding sustainable aquaculture will be described in the following paragraph.

To come to a definition of sustainable aquaculture it is important to first define aquaculture. The Food and Agriculture Organization of the United Nations defines aquaculture as: “Aquaculture is an industrial process of raising aquatic organisms up to final commercial production within properly partitioned aquatic areas, controlling the environmental factors and administering the life history of the organism positively and it has to be considered as an independent industry from the fisheries hitherto” (FAO, 1987). Culture fisheries or aquaculture are carried out in smaller water bodies which can be manipulated, be prepared for stocking, are fertilized and/or manured before, during and after the stocking and/or the fish are given extraneous food sources. Aquaculture can be exercised in inland water and in oceans and seas called marine areas. Inland waters however, do not have to be natural waters, it can be artificial waters as well (FAO, 1987).

History of aquaculture

Aquaculture has a long history and has been around for centuries, the first fish farming occurred in China around 500 BC. Aquaculture occurred much later than agriculture because aquaculture is heavily dependent on settled societies (Tisdell, 1994). Aquaculture in the Netherlands however, is relatively young. Aquaculture has only developed over the last 150 years and the focus was and still is mainly on shellfish, more specifically mussels. The shellfish aquaculture is located in the Dutch part of the Wadden Sea, the Oosterschelde and Lake Grevelingen (Smaal & Lucas, 1999). Aquaculture is a small sector in the Netherlands with around 60,000 tons produced every year since 2010 (FAO, 2018) and around 430 people work in the aquaculture farming sector as of 2007 (FAO, 2007). The notion that aquaculture plays a minor role in the Dutch economy is supported by the Dutch Ministry of Economic Affairs, Agriculture and Innovation, though it highlights that the Dutch aquaculture sector is mainly focussed on the export of knowledge and technology for aquaculture to the rest of the world (Ministry of Economic Affairs, Agriculture and Innovation, 2012).

Aquaculture in general

In certain areas around the world aquaculture is more developed than in other parts, but nonetheless aquaculture provided 43 per cent of the global seafood in 2013. This is up from 30.6 per cent in 1993 meaning that aquaculture has experienced an average 6.1 per cent annual growth. The total global aquaculture production in 2013 was 70.2 million metric tons and has grown to 80 million metric tons contributing to 46.8 per cent of the global fish supply. 30 million metric tons of aquatic plants were produced using aquaculture (FAO Statistics, 2016). Although the share of aquaculture fish is smaller than that of wild-caught fish, more than half of the global consumption of fish by humans stems from aquaculture production (CBS, 2015). In 2016, the 80 million metric tons of fish produced using aquaculture was worth 231.6 billion US dollars and the 30 million metric tons of aquatic plants was worth 11.7 billion US dollars (FAO Statistics, 2016). Most of the global aquaculture production is located in Asia. China is by a wide margin the largest aquaculture producer and produces 49.2 million metric tons or around 60 per cent of the total. India is the second largest producer but produces just a fraction of that of China with 5.7 million metric tons or 6 per cent. Following India are Indonesia, Vietnam and Bangladesh and these five nations account for roughly 79

per cent of the global aquaculture production (FAO Statistics, 2016; Potts, Wilkings, Lynch, & McFatridge, 2016). The same is the case with regards to the aquaculture production of aquatic plants. China is the largest producer, but the difference with the second largest producer, Indonesia, is less than 3 million metric tons. The gap with the third producer, the Philippines, however, is more than 10 million metric tons. These three nations with the South Korea, North Korea, Japan and Malaysia produce over 99 per cent of the aquatic plants in the total aquaculture sector (FAO Statistics, 2016). The total aquaculture production in the Netherlands was 62,940 metric tons, but the production used to be higher with a peak of 120,000 tons in 1999. The production level of 2016 is the highest in six years but is still below the levels of production dating back to 1957 (FAO, 2018). Of the aquaculture production since 1950, roughly 90 per cent originates from the production of mussels, just over 5,000 tons is from inland aquaculture (FAO, 2018; Smaal & Lucas, 1999). The top five globally produced species groups from aquaculture are: carp with 39 per cent, clams with 8 per cent, tilapia with 7 per cent, oysters with 7 per cent and shrimp/prawns with 6 per cent, as seen in figure 1 (Potts, Wilkings, Lynch, & McFatridge, 2016). In the Netherlands the top five produced species groups from aquaculture are: mussels, oysters, carp, tilapia and shrimp.

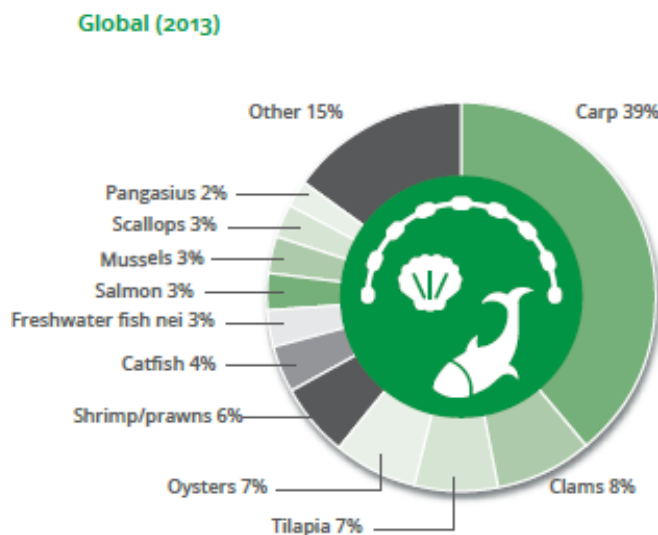


Figure 1 Global aquaculture production species
Source: Potts, Wilkings, Lynch, & McFatridge, 2016 p. 40.

Aquaculture has been around for centuries and has seen an increase in interest and production in the last 100 years. Tisdell has created a theory on the development of aquaculture which explains what factors affect the development. Aquaculture in the Netherlands has been relatively new and has seen a steady production since 2010. The production in the Netherlands is mainly focussed on mussels. In global aquaculture production the Netherlands is a miniscule producer.

2.1.3 Sustainable aquaculture

The definition of sustainable aquaculture differs among different scholars and actors and therefore it is vital for this research to conclude what is considered to be sustainable. Frankic and Hershner defined sustainability as a concept which is applicable to different practices (Frankic & Hershner, 2003). They argue that the practice of sustainable aquaculture can only be obtained when environmental conditions are solid and maintained and that this includes ecological, economic and social-anthropological aspects of the environment. They have a rather abstract definition as they argue that there are different types of aquaculture practices (Frankic & Hershner, 2003).

The World Bank has a slightly different definition for sustainable aquaculture. They argue that for aquaculture to be sustainable it requires: environmental sustainability, economic sustainability and social and community sustainability. They do argue however, that sustainable aquaculture is a dynamic definition and that it will vary with location, species, societal norms, knowledge and technology (The World Bank, 2014).

As there is no clear definition of sustainable aquaculture, different stakeholders in the aquaculture sector have created sustainability certificates which in their opinion best describe sustainable aquaculture practices. Certificates, according to Scott (2014), are part of the normative pillar of institutions.

Certificates in sustainable aquaculture

The push towards sustainability that is derived from the normative pillar, as argued by Scott (2014) are represented in the creation of different sustainability certificates for the aquaculture sector across the world. In total there are six different certificates for the production of aquaculture, set up by different entities which all have a part of the certificate focussing on environmental sustainability. The six certificates will be examined in the next paragraphs and it will be indicated if the certificate includes sustainability practices that are applicable for this research based on the production volume, sustainability aspects, acceptance of the certificates in the Netherlands both in the producing as the retail sector and the future development possibilities of the certificates. The Aquaculture Stewardship Council certificate is the most applicable for the Netherlands as the largest retailers in the Netherlands demand it. Therefore, this certificate will be thoroughly explained. A more in-depth description of the other five certificates can be found in the appendices.

Aquaculture Stewardship Council

The World-Wide Fund for Nature and the Sustainable Trade Initiative have developed their own independent certificate that indicates if the farmed fish or seaweed is produced in a sustainable manner. To issue the certificate and to monitor the sustainable aquaculture sector, both the World-Wide Fund for Nature and the Sustainable Trade Initiative have set up a joint NGO called the Aquaculture Stewardship Council in 2010 (Potts, Wilkings, Lynch, & McFatridge, 2016; WWF, n.d.). The certificate includes seven broad guidelines which have to be met before the certificate can be granted, ranging from fish farm to the retailer offering total transparency throughout the value chain. The seven guidelines include: compliance with laws and regulation, conservation of the natural environment and biodiversity, conservation of the water reserves, conservation of species diversity and the wild population, responsible use of animal feed and other resources, animal health (no unnecessary use of antibiotics and chemicals) and have an active policy regarding corporate social responsibility (ASC, 2017; WWF, n.d.). The ASC has developed nine main certificates for twelve specific species of fish, shellfish and seaweed with more specific certificates for subspecies of some of the main species. The species include: abalone, freshwater trout, salmon, pangasius, tilapia, shrimp, seriola and cobia, seaweed and bivalve (clams, mussels, oyster and scallop). At this moment the ASC is developing new certificates for other species such as seabass, seabream, meagre, flatfish and tropical marine finfish, looking at table 1 however, there are hardly any species which are native to the Netherlands or their production is just a fraction (ASC, 2017). A new certificate for feed is being developed as well so that the manufacturers of the feed have to be certified as well (ASC, 2017; ASC, 2018a). Between 2012 and 2015, the production of ASC-certified fish grew from 88,096 metric tons to 688,138 metric tons as is shown in table 1 (two species are excluded from the table as they were introduced after 2015). This makes the ASC the fastest growing sustainability initiative in recent years, with an average growth rate of 98 per cent per year. Approximately 70 per cent of the

ASC-certified production occurs in the developing world, whereas the rest of the production occurs in the developed world, as shown in table 2. In 2015, 77 per cent of the total ASC-certified products were sold in Europe especially in the Netherlands, Belgium and Germany (Potts, Wilkings, Lynch, & McFatridge, 2016). The production volume of the one company in the Netherlands which has the ASC-certificate, is still unclear (ASC, 2018b).

| Species group | Production volume (MT) | Proportion of total | Species | Production volume by species (MT) |
|----------------------|------------------------|---------------------|-----------|-----------------------------------|
| Salmon | 341,161 | 50% | Salmon | 341,161 |
| Tilapia | 147,919 | 21% | Tilapia | 147,919 |
| Pangasius | 144,555 | 21% | Pangasius | 144,555 |
| Shrimp/prawns | 41,092 | 6% | Shrimp | 41,092 |
| Trout | 6,735 | 1% | Trout | 6,735 |
| Others | 6,676 | 1% | Abalone | 1 |
| | | | Bivalves | 6,675 |
| Total | 688,138 | 100% | | 688,138 |

Table 1: ASC-certified aquaculture production per species group 2015.

Source: Potts, Wilkings, Lynch, & McFatridge, 2016. p. 41.

| Nation | Production volume (MT) | Proportion of total |
|------------------------|------------------------|---------------------|
| Vietnam | 191,720 | 28% |
| Norway | 161,448 | 24% |
| Chile | 85,455 | 13% |
| Indonesia | 67,320 | 10% |
| Australia | 33,839 | 5% |
| Honduras | 29,791 | 4% |
| Ecuador | 26,325 | 4% |
| Mexico | 21,864 | 3% |
| Costa Rica | 18,575 | 3% |
| Canada | 9,215 | 1% |
| Belize | 5,052 | 1% |
| Italy | 4,528 | 1% |
| Ireland | 4,369 | 1% |
| Malaysia | 3,605 | 1% |
| Scotland | 2,979 | <0.5% |
| Colombia | 2,222 | <0.5% |
| Denmark | 2,160 | <0.5% |
| China | 1,828 | <0.5% |
| Peru | 1,589 | <0.5% |
| Poland | 1,291 | <0.5% |
| England | 750 | <0.5% |
| South Africa | 298 | <0.5% |
| The Netherlands | 0 | 0% |
| Total | 688,139 | 100% |

Table 2: ASC-certified aquaculture production nations 2015.

Source: Potts, Wilkings, Lynch, & McFatridge, 2016. p. 42.

Guidelines

The feed guideline however, has both positive as negative aspects. Worldwide aquaculture is a fast-growing sector. Of all the fish which are farmed around 70 per cent of the fish are dependent on feed to complete or increase the speed of their production cycle (ASC, 2018a; Potts, Wilkings, Lynch, & McFatrige, 2016). The feed contains three main ingredients groups: marine ingredients, terrestrial plant ingredients and terrestrial animal ingredients. The use of any of those three ingredients however, puts extra pressure on the available resources. The goal for the guideline of feed is to create an ecosystem which helps to create a sustainable global feed standard. (ASC, 2018a). A negative aspect from the feed guideline however, is that the guideline still allows the use of marine ingredients supplied by wild harvest. This puts extra pressure on the already struggling fish stocks. The ACS has therefore indicated that if wild harvest is used in the marine ingredients, the wild harvest has to come from suppliers with the MSC certificate. This certificate is the counterpart of the ACS for the wild-caught fishery industry (Leidbitter, 2014c). The same negative aspect of the guideline is applicable to the terrestrial plant ingredients. The terrestrial plants which are mainly used in the feed are: wheat, corn, rice, canola, palm oil and soy. The ASC's design criteria for the feed focus on enabling feed manufacturers to choose their source material from existing certification programs where possible. The certifications programs which are used by the feed manufacturers should match the existing level of performance of the manufactures environmental, social and animal welfare standards and to create a mechanism which supports the improvements in schemes which are used for the supply of the certified ingredients. However, this does indicate that not all the ingredients are sourced from suppliers with a certificate. The main reason that the ASC does not indicate one certificate as obligatory is that there is no certificate that meets all the requirements of the ASC. The other reason is that the supply of ingredients stemming from producers which hold one of the certificates is not enough to supply the necessary feed for the whole aquaculture sector (Leadbitter, 2014b). Although the use of terrestrial animals in the feed is relatively small, the same issues arises as with the terrestrial plant ingredients. Besides the former issues, there are issues regarding water pollution and animal welfare as well (Leadbitter, 2014a).

Global Choice however, has identified a few setbacks in the ASC certificate process and indicated that four areas are prone to improvement. These areas are: audit report evidence, variance request, audit processes and stakeholder engagement. The audit report evidence highlights that certain statistics are not being registered: the variance request highlights the difference between ISEAL Code of Practice and the ASC certificates, the audit process has indicated that at this point the audit takes place when the fish farm is not at its biomass peak and that the stakeholder engagement has to increase to a diverter group of stakeholders (Roebuck & Wristen, 2017).

Other certificates

Although there has not been any ASC-certified produced aquaculture coming from the Netherlands it is the most suitable certificate for the Netherlands. This does not mean however that the other certificates did not have any impact in the Netherlands. The other five certificates are: Friends of the Sea (FOS), Best Aquaculture Practices (BAP), GLOBALG.A.P., organic and ChinaG.A.P. Although some of the producers in the Netherlands are in possession of the Friends of the Sea sustainability certificate, the certificate is not accepted by the largest aquaculture retailers in the Netherlands as being sustainable enough. This is the case with all the certificates except the ASC-certificate. Other factors on which the other certificates are considered not suitable for the development of sustainable aquaculture in the Netherlands is: the lack of species covered, the lack of transparency throughout the supply chain and the wrong geographic focus for the Netherlands.

Certified aquaculture

All the certificates account for 4.5 million metric tons of sustainable aquaculture, which is approximately 6 per cent of the global aquaculture production, but for approximately 16 per cent if China is excluded. The total value of the sustainable aquaculture production was US\$ 3.6 billion in 2013. GLOBALG.A.P. accounts for almost half of the certified production and ASC, BAP and FOS account for a near-equal portion of the rest of the sustainable aquaculture production. The production of certified aquaculture is mainly focussed in the developed world with Norway (25 per cent), Chile (19 per cent), Spain (9 per cent), Vietnam (8 per cent) and Italy (7 per cent) as the leading countries. The top three countries account for more than 50 per cent of the total and the top five account for 68 per cent. The distribution of the top five species is similar to the producing nations, the top five account for 88 per cent of the produced species and the top seven even account for 97 per cent. Salmon is by far the top produced species with 56 per cent, followed by pangasius with 10 per cent, mussels with 8 per cent, tilapia with 8 per cent and shrimp/prawns with 6 per cent. The certificates tend to focus on high value species and are the reason why the certified aquaculture sector is more concentrated than the global aquaculture sector (Potts, Wilkings, Lynch, & McFatridge, 2016).

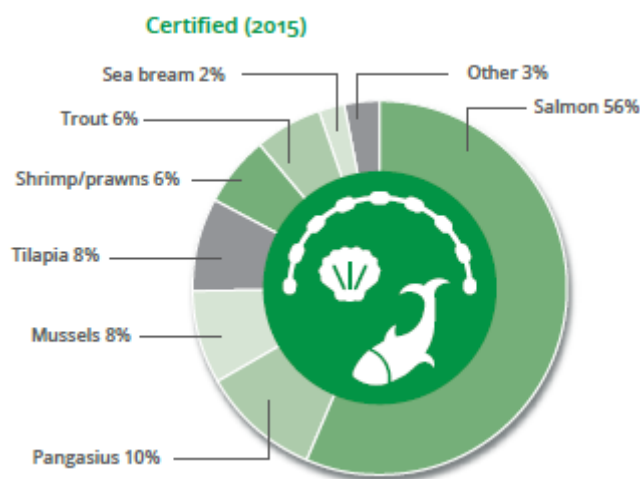


Figure 2 Sustainable aquaculture production species
Source: Potts, Wilkings, Lynch, & McFatridge, 2016 p. 40.

Some of the certificate initiatives are collaborating to reduce the administrative and practical obstacles to make the certification process easier and to allow companies to acquire different certifications. The cooperation between the ASC, BAP and the GLOBALG.A.P. is the best example (Holmyard, 2015).

Sustainable aquaculture market in the Netherlands

The Dutch sustainable aquaculture market is quite concentrated around the supermarkets, which account for 80 per cent of the total sale in fish, the other 20 per cent is sold by fishmongers (CBS, 2015). In 2011, all the supermarkets which are active in the Dutch market agreed that they would switch from conventional wild-caught fish to sustainably produced fish with either the ASC-certificate thus stemming from aquaculture or MSC-certificated wild-caught fish for which there is yet no ASC-certificate or aquaculture (CBS, 2016; Jonker, 2017; Perizonius, 2015; van der Poel, 2016) as long as the fish is not endangered (van der Poel, 2016). In the first instance the supermarkets set the goal to have completely switched to sustainable aquaculture and wild-caught fish in 2016, but that deadline has not been met. Still, the switch to sustainable sources of fish is progressing, in 2015

approximately 99 per cent of the pangasius and tilapia were ASC-certified and around 25 per cent of the trout was ASC-certified. In 2015, certificates for trout, shrimp/prawns and salmon were introduced and the supermarkets are still switching to the ASC-certified aquaculture of those species (CBS, 2016). More retailers in Europe start to demand ASC-certified fish and this is putting pressure on the aquaculture producers without ASC-certificates due to their limit size or because they produce a fish species for which there is no certificate (Dongen, 2017; Jonker, 2017). In 2014, all the pangasius and tilapia were imported. Around 30 per cent of the tilapia and 70 per cent of the pangasius are exported again to Germany, France and Belgium (CBS, 2015).

Sustainable aquaculture and what it is, is still part of an ongoing debate. Multiple groups have set up sustainability certificates in which certain practises are included which have to be met to be considered sustainable. Sustainable aquaculture production stemming from producers with one of those certificates is just a fraction of the total aquaculture production, accounting for just 6 per cent. In the Netherlands the largest part of the retail market is dominated by the supermarkets. The supermarkets have decided that the fish they offer for sale has to have an ASC-certificate. The certificate includes seven broad guidelines which have to be met before the certificate can be granted, ranging from fish farm to the retailer offering total transparency throughout the value chain. The ASC-certificate is applicable to 12 species of fish, shellfish and seaweed. The production of ASC-certified aquaculture has seen an annual growth of 98 per cent over recent years and 77 per cent of the products are sold in Europe.

2.1.4 The theory of Tisdell on the development of (sustainable) aquaculture

According to Tisdell (1994) aquaculture is influenced by four factors. These four factors are:

- socio-economic;
- biological;
- environmental;
- technology & scientific knowledge.

These four influences dictate whether aquaculture is beneficial or not. According to Tisdell, the socio-economic factors are in turn influenced by the legal system, political system, sociological or anthropological relationships and the economic demand, cost of production, property rights etc. The socio-economic factors thus resemble the institutional framework of the Global Entrepreneurship Monitor and forms the basis of entrepreneurship in (sustainable) aquaculture. The technology and scientific knowledge highlights if the required skill and technology is available for the next step in the development, resembling the regulative institution of R&D transfer from the GEM. Certain species are harder to produce in captivity and can therefore not be produced. This is part of the biological factors. The environmental factors influence how much space is available for aquaculture, the impact aquaculture will have on the ecological systems, etc. (Tisdell, 1994). This is resembling normative institutions which are influenced by sustainability. The only aspect of the institutional framework which measure the normative pillar is the cultural and social norms although they remain very broad and it is unclear if environmental motives are included (Scott, 2014). A push in the environmental factors of Tisdell towards more sustainability indicate that there should be more opportunities for the sustainable aquaculture sector (Tisdell, 1994).

2.2 Institutions

This part will explain what institutions are, what the definition is, the differences in institutions, how trends in (sustainable) aquaculture are linked to institutions and the theory of Tisdell and how long it takes for institutions to change. The definition of institutions is pretty consistent among research and therefore only a few definitions are given in the first paragraph of this part to support the notion of

consistency. Although there is consistency regarding the definition there are certain views on how institutions can be categorised and how they interact. The different views on the institutions are explained as one of the views will be used in this research to categorise trends in (sustainable) aquaculture. The categorisation of the trends in (sustainable) aquaculture is given as well. The last part will explain the time it takes for institutions to change. The timeframe of change in institutions highlights the effort and dedication needed for certain actions to be integrated in institutions and serves as a reminder of the difficulties of changing institutions in (sustainable) aquaculture and in general

What are institutions

Institutions are the reason why actors in a particular geographical area do what they do, meaning why do they decide to make certain decision regarding their actions. Their decision process is based on their individual or collective set goals, purposes and rationalities. Although the actions from the actors are generally purposeful, they may have unintended consequences. The institutional perspective is that actors are not predetermined to act completely rational or are utility-maximizing (Bathelt & Glückler, 2014), but what are institutions according to researchers? Bathelt and Glückler (2011) and Hartfiel and Hillman (1982) define institutions as forms of ongoing and relatively stable patterns of social practice based on mutual expectations that owe their existence to either purposeful constitution or unintentional emergence. North offers a different definition: "Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction" (North, 1990. p.3). Institutions thus provide a stable structure to everyday activities to reduce uncertainty, although institutions are not always efficient. The institutions structure societies so that human exchange is incentivised, being it social, economic or social. Institutions consist of both written and unwritten rules. Those institutions however, are a creation of humans and they grow and fade by human action (North, 1990).

North has made a crucial distinction between institutions and organisations. Organisations, like institutions, provide a structure to human interaction. So human interaction is influenced by both institutions and organisations, but organisations have developed according to the influence of the institutions as they are groups of individuals who are bound by some common purpose to achieve certain goals. Organisations are thus created under the rules of the institutions. Institutions on the other hand are influenced by individuals, but are not restricted by rules. Organisations can include political bodies, economic bodies, social bodies and educational bodies (North, 1990).

Formal and informal institutions

North (1990) has made the distinction between informal and formal institutions. Informal institutions define human daily interactions with other people, whether it is within the family, business activities or external relations. Informal institutions provide the governing structure and are primarily based on norms of behaviour, codes of conduct and conventions (North, 1990). Boettke and Coyne identified another source of informal institutions, which is culture (Boettke & Coyne, 2009). Informal institutions originate from socially transmitted information and are part of the heritage of a certain group otherwise described as culture. Culture according to North: "provides a language-based conceptual framework for encoding and interpreting the information that the senses are presenting to the brain" (North, 1990. p.37). Informal institutions, according to North consist of three aspects: extensions, elaborations, and modifications of formal rules, socially sanctioned and accepted norms of behaviour and those norms are internally enforced standards of conduct (North, 1990. p.40). Boettke and Coyne (2009) argue that informal institutions largely function due to the existence of

reciprocity and especially due to the central pillar of trust on which reciprocity leans (Boettke & Coyne, 2009).

Formal institutions derive from informal institutions in a lengthy and asymmetrical process from customs and traditions into written laws due to the move to increasingly complex societies (Boettke & Coyne, 2009; North, 1990). Societies become more complex due to advancements in technology and the improvements in legal systems all originating from the development of writing. Formal institutions, according to North (1990) cover everything from general rules to particular specifications from political, judicial and economic rules following the hierarchy from constitutions, to statutes and common laws, to certain bylaws all the way to individual contracts. Formal institutions when created efficiently, can increase the effectiveness of informal institutions. Formal institutions can lower the effort costs to enforce informal institutions and can aid in the possible creation for more complex exchange forms. Formal institutions are able to modify, revise or replace informal institutions (North, 1990). Rules, both formal and informal, are only binding when the formal and informal institutions are enforced. This is especially relevant for formal rules, if they are not grounded in informal institutions, they will not be self-enforcing. These rules will then need to be enforced through external parties such as government agencies, police and courts. However, when the formal rules are grounded in the informal institution it will considerably lower the cost of enforcing (Boettke & Coyne, 2009). The notions of Boettke and Coyne are supported by Suatet and is shown in figure 3 (Suatet, 2005).

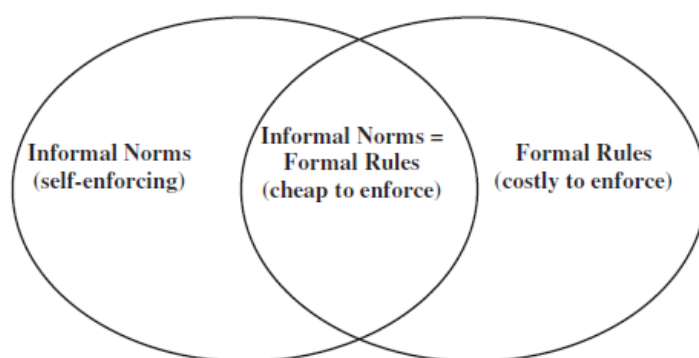


Figure 3: The relationship between informal and formal institutions.
Source: Suatet, 2005, p. 5.

The three institutional pillars

Scott (2014) has developed a different definition of institutions. According to Scott: "Institutions comprise regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life" (Scott, 2014. p.56). He elaborates that institutions are various, durable social frameworks which are constructed upon symbolic elements, material resources and social activities. Just as North, Scott argues that human behaviour both preserves and modifies institutions. According to Scott, institutions consist of three basic elements: regulative, normative, and cultural-cognitive elements, and these are the backbone of institutional structures which guide behaviour and resist change. Scott named the three elements as pillars as they form the support of the total institutional framework, see table 3 (Scott, 2014).

| | Regulative | Normative | Cultural-Cognitive |
|----------------------------|----------------------------|---------------------------------|--|
| Basis of compliance | Expedience | Social obligation | Taken-for-grantedness Shared understanding |
| Basis of order | Regulative rules | Binding experience | Constitutive schema |
| Mechanisms | Coercive | Normative | Mimetic |
| Logic | Instrumentality | Appropriateness | Orthodoxy |
| Indicators | Rules Laws Sanctions | Certifications Accreditation | Common beliefs Shared logics of action Isomorphism |
| Affect | Fear Guilt/Innocence | Shame/Honour | Certainty/Confusion |
| Basis of legitimacy | Legally sanctioned | Morally governed | Comprehensible Recognizable Culturally supported |

Table 3: Three Pillars of Institutions.

Source: Scott, 2014 p. 60.

The first pillar is the regulative pillar. The regulative pillar, which is acknowledged by all scholars although sometimes in a different name, constrains and regulates behaviour with regulatory processes, rule-setting, monitoring and sanctioning activities. The regulative pillar thus grants the capacity to establish rules, inspect the conformity of others to those rules and, if necessary, offers the possibility to reward or punish certain actions in an attempt to influence future behaviour (Scott, 2014). The regulative components of this pillar stem from governmental legislation and industrial standards and agreements (Bruton, Ahlstrom, & Li, 2010). The second pillar is the normative pillar, which constructs normative rules by adding a prescriptive, evaluative and obligatory dimension in social life (Scott, 2014) as well as for professional and organisational interaction (Bruton, Ahlstrom, & Li, 2010). The normative rules are based on values and norms. Scott defines those as: "Values are conceptions of preferred or desirable together with the construction of standards to which existing structures or behaviours can be compared and assessed. Norms specify how things should be done; they define legitimate means to pursue valued ends" (Scott, 2014. p.64). Scott does highlight that some values and norms are only applicable to certain members of a group, whereas other values and norms are applicable to all members of the group. Those certain members participate in different activities than the rest, which gives them specified social positions. This causes the prescriptions and normative expectations of the group to change regarding how the actors in those roles are supposed to behave. This does imply however, that those actors experience external pressure on their behaviour. Going against the values and norms of a group can lead to shame and dishonour while conforming to them and thus the expectations will lead to rewards and honour. The last pillar is the cultural-cognitive pillar, which highlights the shared conception that constitutes the social reality and creates the framework through which meaning is constructed by humans. Symbols, words, signs and gestures all have an effect on the meaning human beings attach to activities and objects. The meaning arises through interaction and is maintained and modified as humans try to make sense of the activities around them (Scott, 2014). The pillar cultural-cognitive has a double meaning and Scott describes that meaning as: "Our use of the hyphenated label cognitive-cultural emphasizes that internal interpretive processes are shaped by external cultural frameworks" (Scott, 2014. p.67). The compliance to the cultural-cognitive pillar occurs because the actions from this pillar are taken for

granted, they have become routines and humans barely think about it. The taken for granted also effects the direction of the economy in terms of innovation, the will to change and the risk people are willing to take (Bruton, Ahlstrom, & Li, 2010; Scott, 2014). This direction can sometimes be seen as a path taken between the past and the future. This path can lead to an inefficient outcome with little innovation and counter-productive decision based on institutional factors. When the path leads to inefficient outcomes it is called a lock-in (Vergne & Durand, 2010).

The institutional pillars and sustainable aquaculture certification

Looking back at the part 2.1.3, regarding sustainable aquaculture, the push towards sustainable in the last few decades, can be contributed to the normative pillar. This pillar specifies that a new norm, in this case sustainability, can be seen as a social obligation for a better future (European Commission, 2013). The indicator for this is the public demand for more sustainability in general and in aquaculture for the demand of a certificate for sustainable production (Bedolfe, 2017; Confino, 2011; Gittsham, 2015; Idle, 2017; Perizonius, 2015; van der Poel, 2016). The demand for sustainability certification is becoming more common worldwide and indicates that sustainability is indeed part of the normative institutions as it is not yet obligated by law (Beldolfe, 2017; Culliney, 2018; Michail, 2018; Mahmud, 2014).

The push towards more sustainability is seen in new regulation by the government of the Netherlands as well as they introduce new guidelines for animal welfare and can therefore be placed in the regulative pillar (Rijksoverheid, 2015; Rijksoverheid, 2017). The government has set laws regarding water quality in the Netherlands which thus means that water pollution by companies is limited by regulative means. The former does focus in limiting the use of medicines, especially antibiotics, in the food production (NVWA, n.d.; Rijksoverheid, n.d.). Small-scale starting companies can acquire a loan to start an aquaculture farm at a smaller scale, which is part of the government entrepreneurship programs and government policies support and relevance factor of the GEM and belong to the regulative pillar (van Dongen, 2017).

The institutional cultural-cognitive pillar can be recognized in the fact that the public lacked interest in aquaculture. This has led to misconception and misinformation on (sustainable) aquaculture which had to be readdressed by government agencies and the aquaculture sector to correct this. The lack of research created a gap in the know-how as well which did not help the development of aquaculture (Burbridge, Hendrick, Roth, & Rosenthal, 2001; Frankic & Hershner, 2003).

Hierarchy in institutions

Williamson (2000) has constructed institutional hierarchy, see table 4, in which he describes how long a change in an institution takes. He has made the hierarchy of four levels where level one requires the longest period of time for a change due to the greatest embeddedness and at level four the changes are continuous. Higher levels in the hierarchy will constrain the lower levels of the hierarchy. Level one of the hierarchies indicates the greatest embeddedness such as informal institutions, customs, traditions, norms and religion. The change of this level takes between a hundred and a thousand years. The second level of the hierarchy describes the institutional environment, meaning the formal rules of the game such as politic, judicial and bureaucratic environment. This level in the hierarchy requires between ten till a hundred years to change. The third level in the hierarchy is the governance, the play of the games focussing especially on contract and how the governance structures are aligned with those transactions. It takes between one to ten years to change. The lowest level, four, is the resource allocation and the employment. This is based on price and quantities, being direct incentives on which certain human behaviour is triggered. The changes at this level occur continuously (Williamson, 2000).

| Level | Type of institution | How long it takes to change |
|-------|---|-----------------------------|
| 1 | Embeddedness: informal institutions, customs, traditions, norms and religions. | 100 to 1000 years |
| 2 | Institutional environment: formal rules of the games – esp. property (polity, judiciary, bureaucracy) | 10 to 100 years |
| 3 | Governance: play of the game – esp. contract (aligning governance structure with transactions) | 1 to 10 years |
| 4 | Resource allocation and employment (prices and quantities: incentive alignment) | Continuous |

Table 4: Williamson institutional hierarchy.

Source: Williamson, 2000 p. 597.

In short, institutions provide stability and meaning to social life through regulative, normative and cultural-cognitive elements, alongside associated activities and resources. Institutions can be informal norms and formal rules, but the most efficient institutions have an overlap of the informal norms and formal rules which offers easy enforcement. Institutions can be distinguished in type where informal institutions require to a thousand years to change and everyday resource allocation and employment change continuously.

2.3 Entrepreneurship

Entrepreneurial activity is the second independent variable. The definition of entrepreneurship is still developing and therefore is elastic and scholars have identified different definitions. To measure entrepreneurship and the entrepreneurial activity stemming from entrepreneurship, it is necessary to define the concept of entrepreneurship. So first the different definitions of entrepreneurship will be discussed. After a clear definition of entrepreneurship, it is important to explain why and which entrepreneurship is considered important for economic development and development in general. Entrepreneurship however is not a phenomenon that simply exists. There are certain conditions which have to be present for entrepreneurship to happen mostly in terms of opportunities and therefore opportunities as a condition for entrepreneurship are explained.

After the definition of entrepreneurship, its importance and the conditions which are required it is necessary to explain how entrepreneurship and entrepreneurial activity can be measured and what method is used. To measure both the institutional framework conditions of the Global Entrepreneurship Monitor model will be used. The institutional framework conditions change and therefore identify specific areas of interest which will be more closely examined in this research to find specific changes that may form incentives and barriers for entrepreneurship, entrepreneurial activity and (sustainable) aquaculture. The *Doing Business* report is explained as it offers the specific changes that influence the institutional framework conditions.

What is entrepreneurship

A definition of entrepreneurship is given by Lipczynski, Wilson and Goddard (2013) and they describe entrepreneurship as a person or organisation who is constantly alert to new and unexploited opportunities to earn a profit and begin the changes that push the economy towards a new equilibrium (Lipczynski, Wilson, & Goddard, 2013). Another researcher stated the following definition: “entrepreneurship is the pursuit of opportunity beyond resources controlled” (Eisenmann, 2013). Pursuit in this definition means that the entrepreneur possesses a relentless focus. Entrepreneurs see a short window of opportunity as they have less resources at their disposal than established companies. Opportunity can entail four different meanings: pioneering a truly innovative

product, creating an improved or cheaper version of an existing product, creating a new business model or offering an existing product to new customer segments. Beyond resources controlled indicates that most entrepreneurs have to reach out to others to acquire the necessary resources for their business model to work. They do not control all the resources personally (Eisenmann, 2013). The last definition is used by the Harvard Business School as well. Burns (2016) describes entrepreneurship as creating new ventures or reviving old ones, inventing new products or target other customer segments or innovate new processes or improve old ones (Burns, 2016).

In short, the characteristics of entrepreneurship tend to differ somewhat among scholar (Acs, Astebro, Audretsch, & Robinson, 2016). Therefore, a common definition from the Global Entrepreneurship Monitor (GEM) is widely used by scholars (Angulo-Guerrero, Pérez-Moreno, & Abad-Guerrero, 2016). The Global Entrepreneurship Monitor defines entrepreneurship as an individual, a team of individuals or an incumbent business, which attempts at new business or new venture creation opportunities, such as self-employment, new business organisation or the development of an established business, indicates as nascent businesses. To measure this the GEM created a variable known as total entrepreneurial activity, which indicates how strong entrepreneurship is per nation.

The importance of entrepreneurship

Many scholars have highlighted the importance of entrepreneurship, regardless of the precise definition. These scholars argue that entrepreneurship is one of the main drivers of economic development: the business activities that flow out of entrepreneurship form a significant source of economic growth and job creation (Acs, Astebro, Audretsch, & Robinson, 2016; Schumpeter, 1934; van Stel, Carree, & Thurik, 2005). According to the Schumpeter effect, the notion that new firm formation through entrepreneurship reduces the rate of unemployment, should have a positive effect on the economic performance of a society (Bonnet & Le Pape, 2016). Oxenfeldt determined that unemployed individuals or those with limited wage prospects can have stronger incentives to become entrepreneurs in order to earn a living. This is the so-called refugee effect, which is increasing necessity entrepreneurship (Bonnet & Le Pape, 2016). Research from different scholars however, has indicated that not every type of entrepreneurship has a positive relationship on economic development. Opportunity entrepreneurship is more desirable for economic development than necessity entrepreneurship as opportunity entrepreneurship has a higher venture success, survival rates, job satisfaction and human capital endowment (Acs & Varga, 2005; Angulo-Guerrero, Pérez-Moreno, & Abad-Guerrero, 2016; Bonnet & Le Pape, 2016). Acs, Desai, and Hessels (2008) though have indicated that this notion is not necessarily right for certain developed nations (Acs, Desai, & Hessels, 2008).

Entrepreneurial opportunities

Although, it is rather clear what an opportunity is as explained in the former paragraphs, it remains unknown how these opportunities come into existence. North (1990) has a hypothesis of how opportunities are formed in entrepreneurship, he argues that entrepreneurs see opportunities in a society, where the opportunities in a society are formed by institutions and the standard constraints of economic theory. He argues that entrepreneurs change their environment as well by adapting to those opportunities by the organisations they form, which in turn influence the institutions (North, 1990).

Opportunity versus necessity entrepreneurship

The GEM does include a distinction for the reason why one has become an entrepreneur. It is either out of opportunity or out of necessity (Reynolds, Hay, & Camp, 1999). Opportunity entrepreneurship is renamed as improvement driven opportunity entrepreneurship in the newer GEM reports (Herrington & Kew, 2017). The opportunity entrepreneurs are linked to the identification of good business opportunities and the opportunity to earn more money or to work independently and they are thus pulled. Opportunity entrepreneurship involves innovation in an attempt to exploit new market niches. Necessity entrepreneurs start a new venture out of lack of better job opportunities or forced unemployment and are thus pushed. Necessity entrepreneurship in contrast to opportunity entrepreneurship is focussed on the established market and the entrepreneurs imitate incumbent businesses (Bonnet & Le Pape, 2016; Herrington & Kew, 2017; Reynolds, Hay, & Camp, 1999).

Entrepreneurial activities

Entrepreneurial activities vary among nations, which can be seen in the volume of necessity and opportunity entrepreneurship, the Total Early-stage Entrepreneurship (TEA), Entrepreneurial Employee Activity (EEA), established businesses rates and the total entrepreneurial activity which is the combination of the former three (Singer, Herrington, & Menipaz, 2018). In the GEM report TEA is defined as: "Percentage of the adult population between the ages of 18 and 64 years who are in the process of starting a business or already started a business (a nascent entrepreneur or owner-manager of a new business) which is less than 42 months old" (Singer, Herrington, & Menipaz, 2018, p. 107.). Entrepreneurial Employee Activity has been defined as: "Percentage of the adult population between the ages of 18 and 64 years who as employees have been involved in entrepreneurial activities such as developing or launching new goods or services, or setting up a new business unit, a new establishment or subsidiary" (Singer, Herrington, & Menipaz, 2018, p. 107.). Established Business Ownership rate is defined as: "Percentage of the adult population aged between 18 and 64 years who are currently an owner-manager of an established business, i.e. owning and managing a running business that has paid salaries, wages or any other payments to the owners for more than 42 months" (Singer, Herrington, & Menipaz, 2018, p. 107.). This is highlighted in the Global Entrepreneurship Monitor and it is mainly attributed to the different opportunities which present themselves in a certain nation and in the aspirations, attitudes, perceptions and intentions of entrepreneurs (Autio, 2007; Herrington & Kew, 2017).

Institutions influencing entrepreneurial activity

The opportunities alone are not the only factor influencing entrepreneurship and entrepreneurial activity. Opportunities are identified and taken at all the companies regardless of their size. Other factors, including institutions have an effect as well (North, 1990; Scott, 2014). Many scholars have identified institutions which according to them influence entrepreneurship. Sobel, Clark, and Lee (2007) have highlighted that economic freedom has a positive relationship with total entrepreneurial activity as have many other researchers (Baliamoune-Lutz, 2015; Boettke & Coyne, 2009; Fuentelsaz, González, Maícas, & Montero, 2015; North, 1990). Economic freedom mostly consists of property rights, the size of the government and government regulations which includes labour, tax, entry, market and business regulations. A higher level of economic freedom has a positive effect on entrepreneurship, which means that the labour, entry, market and business regulations are at a reasonable level which does not constrain entrepreneurship too much. With tax regulations this is slightly different, a lower tax regulation negatively affects opportunity entrepreneurship. One possible explanation is that lower taxes lead to lower state investments in infrastructure and other institutions thus leading to institutions which are less supportive of entrepreneurship (Fuentelsaz,

González, Maícas, & Montero, 2015). When tax levels are too high however, this will have a negative effect on both nascent entrepreneurship and established business ownership (Balioune-Lutz, 2015). An increase in property rights however, always positively influences entrepreneurship (Aidis, 2017; Estrin, Korosteleva, & Mickiewicz, 2013). Acemoglu and Robinson (2005) argue for a distinction in the property right institution with contracting institutions (courts) and property right institutions which protect citizens from government expropriation and they conclude that the latter is stronger correlated with economic performance. The authors argue that this is because if the government engages in expropriation or predation it is rather difficult for individuals to avoid as the abilities of the government normally exceed those of the individuals. With contracting institutions however, individuals can avoid predation by avoiding interaction with specific people or diminish the impact of predation through private mechanisms (Acemoglu & Robinson, 2005). The notion of economic freedom is thus rather broad, but most regulations which offer more business freedom have a positive relation with entrepreneurial activity and close to all researcher confirm this positive relation. They however, do argue that informal institutions are a determining factor for entrepreneurship as well. Informal institutions however, are less precise than the formal institutions. The informal institutions are based on normative behaviour and cognitive-cultural aspects and they can vary among individuals. The attitude in a society regarding entrepreneurship is the most significant (Aparicio, Urbano, & Audretsch, 2016; Muralidharan & Pathak, 2017; Urbano, Aparicio, & Audretsch, 2018). Other institutions which influence entrepreneurship are: corruption, social security, education, legitimacy of being a business owner, entrepreneurship as a career choice and social desirability of entrepreneurship in the economy (Aparicio, Urbano, & Audretsch, 2016; Powell & Rodet, 2012; Singer, Herrington, & Menipaz, 2018; Urbano, Aparicio, & Audretsch, 2018).

Knowing which institutions are influencing entrepreneurship is just one part. It is important to know how strong the institutions are present in a nation to conclude if they indeed are influencing entrepreneurship and its activity in a specific nation and how. The Global Entrepreneurship Monitor and the *Doing Business* report both measure certain institutions in nations around the world and they overlap with the institutions that were identified by researchers in the former paragraph. These two reports will be used to indicate the institutions affecting entrepreneurship and the entrepreneurial activity in general as there is no empirical data regarding entrepreneurship, its characteristics and the entrepreneurial activity for the aquaculture sector in the Netherlands. Empirical data from the Global Entrepreneurship Model is used to indicate the state of entrepreneurship and entrepreneurial activity in the Netherlands from recent years. This should indicate an increase or decrease in the number of companies in aquaculture and what institutions should have an effect on business activities of companies in the aquaculture sector.

Global Entrepreneurship Monitor

The Global Entrepreneurship Monitor measures different aspects in economies, which have been included in their yearly report on how strong these aspects affect entrepreneurship based on the GEM conceptual framework. The framework will be explained after the introduction of the two aspects. The first aspect is the Adult Population Survey and the second is the National Expert Survey. The Adult Population Survey identifies the entrepreneurial attitudes, activities and aspirations of individual members of 54 nations between the age of 18 and 64 years old and the survey is delivered to a minimum of 2,000 individuals who take part per nation. From the Adult Population Survey, it becomes clear how societal values and perceptions are formed in a particular nation and how they form the normative institutions. The societal values and perceptions are: if entrepreneurship is regarded as a good career choice for adults, receiving a high status as a successful entrepreneur, and if there is sufficient positive media attention for entrepreneurship in their nation. Individual

attributes of a potential entrepreneur, being the cultural-cognitive institutions, are included in the survey as well. They indicate whether individuals in a nation identify good opportunities to start a business in the area where they live, if they perceive themselves as having the required skill and knowledge to start a firm, the fear of failure rate of individuals indicate that they identify good opportunities but will not start a business as they fear to fail and the entrepreneurial intention of individuals in a nation. Entrepreneurial intent measures individuals who are latent entrepreneurs who intend to start a firm within three years. As seen in table 5, the informal institutions in the Netherlands have been relatively steady or have grown, meaning that they should have a positive effect on entrepreneurship and in turn should lead to an increase in the number of companies (GEM Consortium, 2017). In comparison with the 1970s and 1980s the perception of entrepreneurship has improved significantly (Spanjersberg, 2018). The entrepreneurial intentions however, are low in comparison with other nations with just 8.1 per cent having entrepreneurial intentions, hovering at a shared 46th place, well below the global average of 21.66, the average of nations with an innovation-driven economy with 15.2 and slightly below the regional average of 10.84 (GEM Consortium, 2017).

| Attitudes and perceptions | 2015 NL | 2016 NL | 2017 NL | 2015 average | 2016 average | 2017 average |
|---|----------------|----------------|----------------|---------------------|---------------------|---------------------|
| Entrepreneurship is seen as a good career choice | 79.20 | 77.90 | 81.00 | 60.92 | 62.82 | 61.60 |
| Entrepreneurs receive a high status | 64.50 | 60.20 | 67.20 | 67.73 | 68.88 | 68.50 |
| Perceived opportunities | 48.40 | 54.30 | 64.10 | 42.43 | 42.21 | 43.43 |
| Perceived capabilities | 40.60 | 41.20 | 44.60 | 50.50 | 50.32 | 48.86 |
| Fear of failure | 33.20 | 37.90 | 29.70 | 35.67 | 36.07 | 36.97 |
| Entrepreneurial intentions | 9.40 | 7.40 | 8.10 | 21.78 | 22.32 | 21.66 |

Table 5: Attitudes and perceptions from the Global Entrepreneurship Monitor 2015-2017

Motivational aspects are included with indicators as: necessity-based versus opportunity-based and if the economy is factor-, improvement-, or innovation driven. On the motivational aspect, the Netherlands ranks number one with a score of 10 when it comes to opportunity versus necessity motives, meaning that a ratio of ten times more entrepreneurs start a company based on improvement driven opportunity than out of necessity driven motives (Singer, Herrington, & Menipaz, 2018). Several demographic factors are included as well, such as gender, age and geographic location (Burns, 2016; Herrington & Kew, 2017; Kelley, Singer, & Herrington, 2016; Singer, Herrington, & Menipaz, 2018).

The Conceptual Model of the Global Entrepreneurship Monitor

The entrepreneurial framework and entrepreneurial activity in influence entrepreneurial output, indicated by new jobs, which can thus include new business creation and new value added, which is seen as socio-economic development (Herrington & Kew, 2017) and overlaps with the socio-economic factor in the theory of Tisdell (1994). Figure 4 shows the Global Entrepreneurship Monitor conceptual framework. The increase in regulative, normative and cultural-cognitive institutions should mean that entrepreneurial intent and entrepreneurial activity should be growing and positively affect the number of companies in the Netherlands in general (Herrington & Kew, 2017).

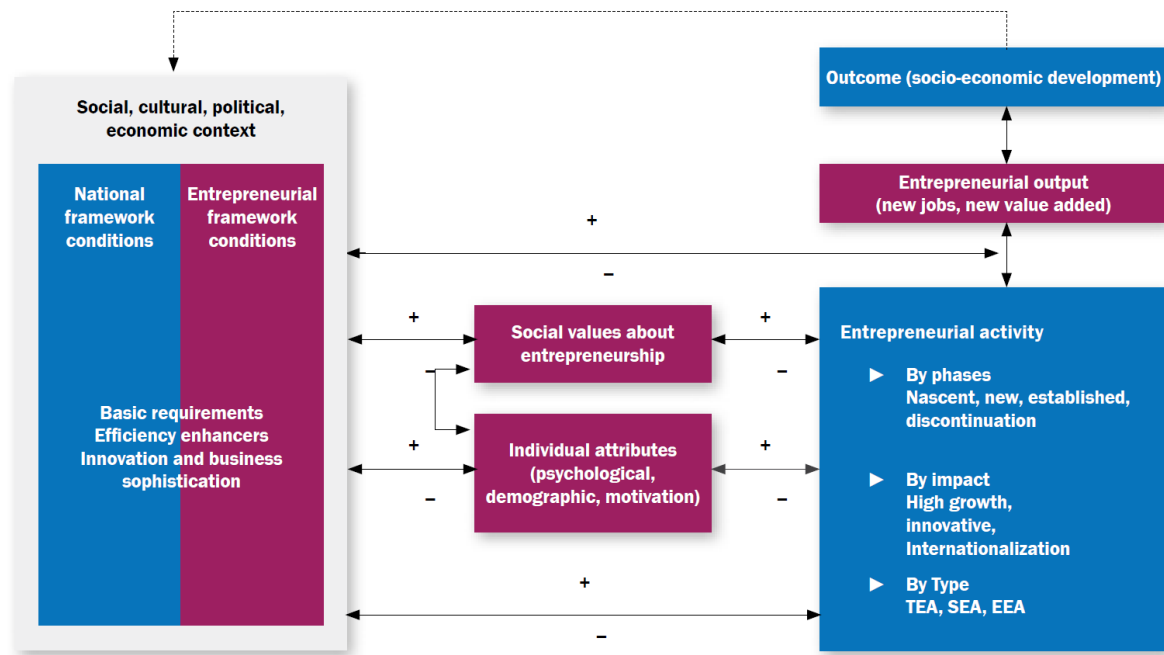


Figure 4 Global Entrepreneurship Monitor conceptual framework
Source: Herrington & Kew, 2017 p. 14.

The institutional framework

The institutional framework of the GEM uses different conditions which eventually conclude the score in entrepreneurial activity. For this research these conditions can be used to indicate if there was a change in the institutions affecting entrepreneurial activity. It does not however indicate the undelaying reason the score has changed. The scores are used as an indication on which conditions the research needs to focus to identify the reason for the change and how this is affecting the development of sustainable aquaculture and the entrepreneurial activity in the Netherlands.

The National Expert Survey from 2017 included 54 nations and the GEM has identified 12 conditions for the national and entrepreneurial framework which are given a score by 36 independent experts as to whether these conditions enhance or hinder new business creation, entrepreneurial opportunities, capacity and preferences. The higher the score, the better the conditions are for supporting entrepreneurship. The twelve conditions are: physical infrastructure, commercial and legal infrastructure, cultural and social norms, internal market dynamics, internal market burdens or entry regulation, entrepreneurship education at post-school stage, entrepreneurship education at school stage, government entrepreneurship programs, government policies (support and relevance), government policies (taxes and bureaucracy), entrepreneurial finance and research and development transfer. Each of these conditions will briefly be explained. After the explanation, the score change of these aspects will be given, see table 6, with an explanation of how this will affect entrepreneurship in the Netherlands based on entrepreneurial intent, TEA, EEA and established business ownership.

Physical infrastructure indicates the ease of access to physical resources such as internet, communication, land or space, transportation infrastructure and utilities. Commercial and legal infrastructure specifies the situation regarding property rights, contract enforcement, accounting, commercial and other legal services and institutions which support entrepreneurship. Cultural and social norms indicate whether there is support and acceptance of actions which can possibly lead to new business practices or activities that can potentially increase income and personal wealth (Herrington & Kew, 2017). Internal market dynamics indicate the market change from year to year,

to be more precise the dynamism of good and services for both the consumer and business-to-business market (Shukla, Bharti, & Dwivedi, 2012). Internal market burdens or entry regulation stipulate the ease of which new companies are free to enter existing markets. Entrepreneurship education at school stage indicates entrepreneurship education at primary and secondary schools in which pupils learn how to create and manage a small or medium enterprise. Entrepreneurship education at post-school stage indicate entrepreneurship education after secondary school available at business schools, university and college, etc. Government entrepreneurship programs describe the presence and quality of government programs, at all levels of the government, which assist small and medium enterprises. Government policies in support and relevance indicates if entrepreneurship is considered a relevant economic issue and if certain policies support entrepreneurship. Government policies in taxes and bureaucracy dictates if taxes and regulation are size-neutral or support new, small and medium enterprises. Entrepreneurial finance indicates the availability of financial resources for small and medium enterprises in both equity and debt but including grants and subsidies. Research and development transfer describe the possibilities which are offered to create new commercial opportunities to small and medium enterprises derived from national research and development (Singer, Herrington, & Menipaz, 2018).

Although the Global Entrepreneurship Monitor is considered the leading model in entrepreneurship research and data collection, there is criticism on the model. The most common criticism is that the model does not correctly reflects the reality in terms of growth in the number of companies. This is due to the time frame in which the research is conducted and the time it takes to publish the report. Other issues are regarding sampling, measurement and the use of the GEM data for analysis on the micro level. One of the main issues for entrepreneurship researchers is that there is no code book which describes the properties of the variables used in the framework (Bergmann, Mueller, & Schrettle, 2014). Data regarding early stage entrepreneurial activity in developed countries from the Global Entrepreneurship Monitor tends to differ from other data sets whereas the data tends to be higher for developing countries. Clear indications for an explanation for these differences in the data are not present (Acs, Desai, & Klapper, 2008).

More criticism is based on the theory used in the Global Entrepreneurship Model, as the model lacks theoretical grounding for some of the supposed associations between the framework conditions and the entrepreneurial activity. The framework conditions are correlated with the TEA the correlation and significance remain weak (Levie & Autio, 2007). Acs and Amorós argue that the Global Entrepreneurship Model is still in its development phase and that therefore not much progress has been made in theoretical studies related to the GEM (Acs & Amorós, 2008). With the maturation of the GEM more research will become available regarding the framework and the entrepreneurial activity stemming from the framework further improving the Global Entrepreneurship Model and its framework (Arias-Pérez & Lozada, 2017).

The institutional framework in the Netherlands

The regulative institutions in the Netherlands from the Global Entrepreneurship Monitor have been relatively steady or increased during the last three years as seen in table 6 alongside the global average. This increase should mean that there will be a positive effect on entrepreneurship and the social values regarding entrepreneurship, which in turn should have a positive influence on entrepreneurial activity in the Netherlands. The social values, the informal institutions, have increased in recent years as indicated on the former page. The ranking with other countries highlights that the Netherlands has one of the best scores, but even compared with the regional and innovation-driven economies, the Netherlands scores on average one point more per condition (GEM

Consortium, 2017), indicating that entrepreneurship should be thriving compared to other countries (Singer, Herrington, & Menipaz, 2018).

| Conditions | 2015 NL | 2016 NL | 2017 NL | 2015 average | 2016 average | 2017 average |
|---|------------|------------|------------|-----------------|-----------------|-----------------|
| Entrepreneurial finance | 5.74 | 5.22 | 6.01 | 2.53 | 2.53 | 2.6 |
| Government policies: support and relevance | 5.38 | 5.26 | 5.42 | 2.54 | 2.54 | 2.59 |
| Government policies: taxes and bureaucracy | 5.77 | 5.63 | 5.75 | 2.38 | 2.42 | 2.38 |
| Government entrepreneurship programs | 6.00 | 5.62 | 6.04 | 2.56 | 2.61 | 2.63 |
| Entrepreneurial education at school | 4.92 | 5.41 | 5.59 | 1.95 | 1.92 | 1.97 |
| Entrepreneurial education post-school | 5.61 | 5.85 | 6.18 | 2.77 | 2.78 | 2.87 |
| R&D transfer | 5.14 | 5.29 | 5.29 | 2.33 | 2.31 | 2.37 |
| Commercial and legal infrastructure | 5.91 | 5.82 | 6.21 | 2.97 | 2.96 | 2.94 |
| Internal market dynamics | 5.03 | 5.67 | 5.54 | 3.00 | 2.97 | 3.04 |
| Internal market burdens or entry regulation | 6.00 | 6.17 | 6.10 | 2.51 | 2.54 | 2.53 |
| Physical infrastructures | 7.41 | 7.98 | 7.81 | 3.76 | 3.86 | 3.84 |
| Cultural and social norms | 5.70 | 6.22 | 6.66 | 2.83 | 2.83 | 2.91 |

Table 6: The twelve conditions from the Global Entrepreneurship Monitor 2015-2017

Entrepreneurial activity in the Netherlands

These twelve conditions form the national and entrepreneurial framework conditions, otherwise known as the social, cultural, political and economic context. The framework interacts with social values towards entrepreneurship, individual attributes of entrepreneurs and forms the total institutional framework that affects entrepreneurial activity which is derived from the Adult Population Survey. The institutional framework is influencing entrepreneurial activity and vice versa. The entrepreneurial activity indicates the life cycle of ventures, being nascent, new firm, established firm or discontinuation of a firm and effects every company regardless of their size and focus (Burns, 2016; Herrington & Kew, 2017; Kelley, Singer, & Herrington, 2016; Singer, Herrington, & Menipaz, 2018). In table 7, the entrepreneurial activities in the Netherlands are shown.

| Entrepreneurship rating | 2015 | 2016 | 2017 |
|-------------------------------|------|-------|------|
| Nascent entrepreneurship rate | 4.3% | 5.7% | 4.7% |
| New Business rate | 3.0% | 5.4% | 5.4% |
| TEA | 7.2% | 11.0% | 9.9% |
| EEA | 6.3% | 7.6% | 7.6% |
| Established ownership rate | 9.9% | 10.2% | 8.6% |
| Discontinuation rate | 2.1% | 2.7% | 3.1% |

Table 7: Entrepreneurship rates from the Global Entrepreneurship Monitor 2015-2017

In 2017, the TEA was 9.9 per cent, but it is higher than the average innovation-driven economy and higher than the regional average. The TEA is the combination of nascent entrepreneurship and new business ownership rates which were 4.7 per cent and 5.4 per cent. The EEA was 7.6 per cent, but just as with the TEA it is higher than both regional as innovation-driven economies. The established business ownership rate was 8.6 per cent, but just as with the TEA and EEA the same goes for established business ownership. The discontinuation of businesses rate was 3.1 per cent.

Discontinuation motives vary and thus can be regarded as both positive or negative. Discontinuation with the motive of another opportunity or selling the business can be regarded as positive, while unprofitability and problems with financing can be regarded as negative. Just as the life cycle, entrepreneurial activity highlights the types of activity of firms, being high growth, innovation or internationalisation and the sector of activity, being Total Early-stage Entrepreneurship (TEA), Social Entrepreneurial Activity (SEA) or Employee Entrepreneurial Activity (EEA).

Entrepreneurial activity increase and decrease in the Netherlands

The institutional framework thus influences entrepreneurial activity stemming from entrepreneurship which in turn influence the number of companies in the Netherlands. In 2017, the nascent entrepreneurship rate was 4.7 per cent and the discontinuation rate was 3.1 per cent, indicating that the number of companies in the Netherlands should have increased with 1.6 per cent. As the Global Entrepreneurship Monitor is based on a survey the results differ with reality as the number of companies in the Netherlands grew with 5 per cent in 2017 (CBS, 2018). The main reasons for starting a company are the steady economic growth, the ease of acquiring work as a solo self-employed and the scarcity on the labour market allows certain professions to become solo self-employed which is more lucrative (ING, 2018). However, new business regulation in 2017, did seem to decrease the number of entrepreneurs due to bureaucracy and extra risk associated with particularly being solo self-employed, whereas in the years before the same lack of that business regulation contributed to an enormous growth of sole proprietary ownership and solo self-employed (CBS, 2018; Ruijven-Rojek, 2017).

Doing Business report

The World Bank Group reports on the state of doing business in 190 nations around the world based on the opinion of 13,000 individuals worldwide every year. The yearly report is called *Doing Business* and, in the report, aspects are measured regarding business regulation and their implications on the establishment of firms and their operations, ranking all nations to offer a comparison. The report offers a summary of all the regulative change of the institutions per nation. In the report there are eleven factors which influence entrepreneurship: labour market regulation, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, trading across borders, paying taxes, enforcing contracts, resolving insolvency and starting a business. The eleven factors will be shortly explained.

Labour market regulation indicates the flexibility in the employment regulation and the job quality in a specific nation but it is not included in the ranking of 2018. Dealing with construction permits is measured by the number of procedures which are necessary, the time it takes to complete all the procedures, the cost to complete all formalities and the quality control and safety mechanisms which are integrated in the construction permitting system. The Netherlands ranks 76th of the 190 nations, which indicates that 75 other nations are doing better. Getting electricity indicates the number of procedures, the time which it takes and the costs to get connected to the central electrical grid, the reliability of the energy supply and the transparency of the energy tariffs. Registering property highlights the number of procedures, the times it takes to register property, the cost to transfer property to the company and the quality of the land administration system. Getting credit describes the collateral laws and credit information systems. Protecting minority investors is measured by the rights of minority shareholders in related-party transactions and in corporate governance. Trading across borders indicates the time it takes to handle the administrative burden for cross-border trade, the time it takes for border compliance, the cost to export for both the documentary compliance and the border compliance, the time it takes to import product based on both documentary compliance and border compliance and the cost of imports. Trading across borders is the best result of the Netherlands as it outperforms all other nations with rank one. Paying taxes is measured in the number of tax payments per year, the time it takes to finalise the taxes, the total tax contribution rate and post-filing processes. Paying taxes is relatively easy in the Netherlands. Enforcing contracts describes the time it takes to resolve a commercial dispute in court, the cost of enforcing a contract dispute and the quality of the judicial process for commercial disputes. Resolving insolvency indicates the time it takes to resolve insolvency, the cost of the insolvency, the recovery rate for commercial insolvency and the strength of the regulation regarding insolvency. Resolving insolvency is rather easy in the Netherlands compared with other nations. Starting a business is measured by the number of procedures that are necessary, the time which is needed, the cost of the procedures and the minimum capital that is required to start a limited liability company. Overall the Netherlands is ranked at place 32 in the ease of doing business overall (The World Bank, 2018). The *Doing Business* report thus mainly focusses on government policies and according to the distinction made by Scott in institutions, can be attributed to regulative pillar (Scott, 2014).

Entrepreneurship in this research

Entrepreneurship has been defined many times in history by different scholars, although the definitions vary somewhat, the main message is rather clear. Therefore, most scholars now accept the definitions used in the Global Entrepreneurship Monitor, which defines it as an individual, a team of individuals or an incumbent business, which attempts at new business or new venture creation opportunities, such as self-employment, new business organisation or the development of an established business, indicates as nascent businesses. The Global Entrepreneurship Monitor does include an institutional framework which influences entrepreneurship. The institutions in the framework are regulative, normative and cultural-cognitive institutions. The framework affects entrepreneurship and in the Global Entrepreneurship Monitor entrepreneurship is measured as entrepreneurial activity. The former highlights the status of entrepreneurship in a country and correlates it with entrepreneurial output and socio-economic development. The *Doing Business* report highlights changes in the regulative institutions when an entrepreneur wants to start a business.

The number of companies is influenced by institutions and the change in institutions. The change is reflected through the conceptual model of the Global Entrepreneurship Model as the institutions change the nascent entrepreneurship rate and the discontinuation rate. The nascent

entrepreneurship rate indicates the increase in the number of companies and the discontinuation rate describes the decrease in the number of companies. The conceptual model of the GEM offers an indication, but does not necessarily in line reality in terms of the measured difference in the number of companies.

2.4 Mechanism of the influence of the institutional framework on aquaculture

Institutions do not only affect nascent company but affect entrepreneurship as a whole in the type of company as well as the focus of the company. No research however, has focussed on how the institutional framework conditions and entrepreneurial activity are influencing the number of nascent and established companies in sustainable aquaculture and the development of aquaculture in the Netherlands. In this research the theory of Tisdell and the Global Entrepreneurship Monitor will be combined to explain the development of (sustainable) aquaculture as many factors of both theories overlap with each other.

Multiple factors influence the development of (sustainable) aquaculture. Biological factors like instable growth patterns of fish, disease risk and biological requirements of species. Biological requirements are water temperature, feed, space and other environmental factors that certain species require in their habitat. For the variety of biological differences between species, certain species are less or not suitable in aquaculture cultivation and therefore biological factors are not included in this research. Some of the factors however, are derived from institutions and overlap with the institutions which influence entrepreneurship, in this instance the socio-economic factors and they fall in all three the pillars. One of the most important regulative socio-economic factors is economic freedom, which consists of many other institutions such as market, labour, tax, entry and business regulations. Others include property rights, investor protection and access to capital. Normative and cultural-cognitive institutions can affect entrepreneurship as well and especially the attitude of a society towards entrepreneurship is significant. Other normative and cultural-cognitive institutions affecting entrepreneurship are education, social security, corruption, legitimacy of being a business owner, the desirability of entrepreneurship in an economy and whether entrepreneurship is regarded as a good career choice. The knowledge and scientific research factors, that are used in Tisdell's model, overlap with the R&D institution from the GEM institutional framework, but the theory of Tisdell is not only focussed on entrepreneurship knowledge but on knowledge of (sustainable) aquaculture as well. The environmental factors influencing the development of aquaculture are derived from regulative, normative and cultural-cognitive institutions, although the normative institutions weigh the heaviest. This include cultural shifts in norms and values regarding the traceability of the production process, animal welfare and environmental and societal impact of business practices. Therefore, the influencing institutions have been included in the institutional framework conditions. The institutional changes in the factors influencing the development of (sustainable) aquaculture can be positive or negative. If a change is positive it will become an incentive for entrepreneurs to change in the direction that support the development of (sustainable) aquaculture. If on the other hand it is a negative change it will become a barrier and will hinder the development of (sustainable) aquaculture.

Research has shown that entrepreneurship and especially entrepreneurial activity has an influence on the number of nascent companies and established companies in a specific region, in this case the Netherlands. Some institutions which are present in a specific area have an influence on the number of nascent and established companies and the development of certain industry sectors. Knowing which institutions influence entrepreneurship and thus entrepreneurial activity is the first step in the mechanism of combining the theory of the former paragraphs. The second is how the institutions are affecting the number of companies in general through entrepreneurial activity. All of the institutions

influencing entrepreneurial activity have been integrated into the conceptual model of the Global Entrepreneurship Monitor which forms the institutional framework where each influencing institution is separated and called a framework condition. All of these institutional conditions are called the institutional framework conditions and in short for this research the institutional framework. The authors of the GEM argue that the number of companies in a given country, in this case the Netherlands, changes by the nascent entrepreneurship rate and the discontinuation rate, where the former has a positive effect on the number of companies and the latter a negative effect and if the same fluctuation in the number of companies can be observed in the aquaculture sector in the Netherlands as well.

The independent variable in this research are the institutional framework conditions, both local and non-local if applicable. The institutional framework influences the relationship between entrepreneurship and the number of companies in sustainable aquaculture and this will be elaborated using the different types of institutions and their underlying effect on entrepreneurship through the changes in the Global Entrepreneurship Monitor. The institutional framework conditions in turn have an influence on the development of sustainable aquaculture through: the socio-economic, environmental and technology and scientific knowledge factors which greatly overlap with the Global Entrepreneurship Monitor. These factors create barriers or incentives for the development of sustainable aquaculture. The institutional framework is changing and is increasing the demand of more sustainable products and this is reflected in the three factors influencing sustainable aquaculture. Therefore, the following conceptual model is constructed to show the relationship between the variables of this research which can be found in figure 5.

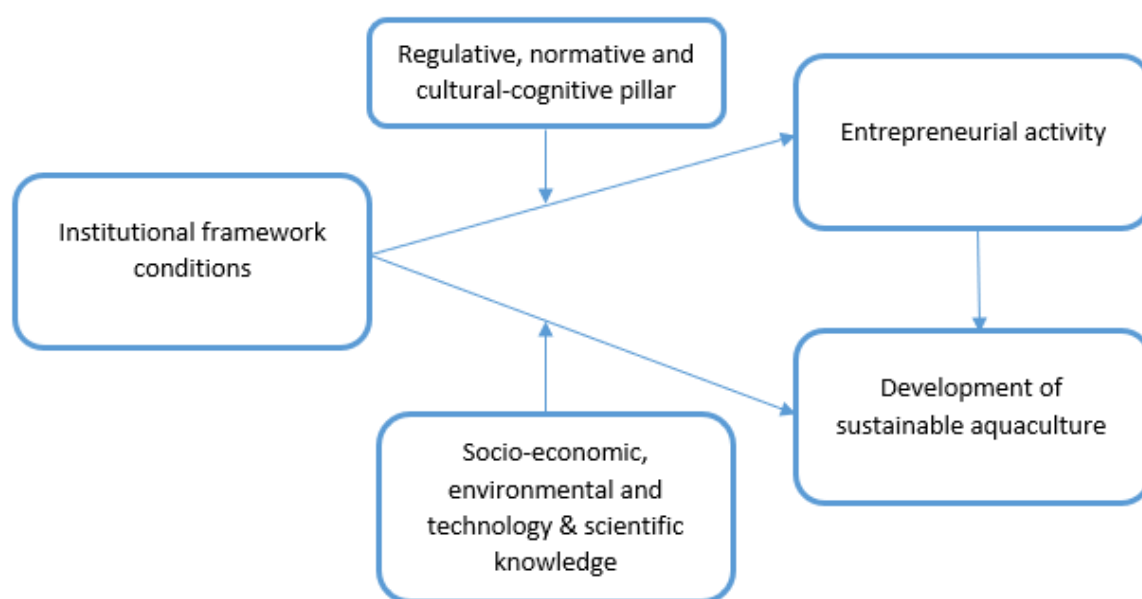


Figure 5: The conceptual model and the mechanism between the variables

2.5 Research design

The aim of this research was to determine what factors have an influence on the entrepreneurship in companies who focus on the production of sustainable aquaculture products. The research has been constructed around three main variables. The first variable is the dependent variable of the number of companies in sustainable aquaculture. The second independent variable is entrepreneurship. The third and independent variable is institutions. For this research a mixed methods approach was

chosen as the research strategy. This offers the possibility to explain in depth the trends and development in sustainable aquaculture, companies operating in sustainable aquaculture, entrepreneurship and the institutions influencing them, when either the qualitative or quantitative approach can facilitate the other approach to aid the research (Bryman & Bell, 2007). In this research the mixed approach is used to check if the institutional framework conditions of the Global Entrepreneurship Monitor conceptual model do in fact influence the entrepreneurial activity in the aquaculture sector and in general in the Netherlands. The change in the entrepreneurial activity data should change in the way that the Global Entrepreneurship Monitor predicts. An increase of the institutional framework conditions should lead to an increase in the entrepreneurial activity whereas a decrease of the institutional framework conditions should lead to a decrease of entrepreneurial activity.

To identify some of the institutional barriers, the case study approach has been applied to use specific cases as they focussed on factors influencing aquaculture production of certain species in cross country examinations (Saunders, Lewis, & Thornhill, 2016). This research has followed a deductive approach as it followed researched theories of entrepreneurship and the model of Tisdell (1994) as the basis of this research and uses these theories to answer the main research question. The research has been qualitative and has focussed on desk-research and interviews as these tools provide understanding and deeper insight into the research questions as for the underlying reasons, motivations and opinions. The qualitative research is able to underline the informal institutions, the normative and cultural-cognitive pillars of Scott (2014) as they are found to influence entrepreneurship (Aparicio, Urbano, & Audretsch, 2016; Muralidharan & Pathak, 2017; North, 1990; Reynolds, Hay, & Camp, 1999; Scott, 2014; Urbano, Aparicio, & Audretsch, 2018) and the development of aquaculture (Tisdell, 1994).

2.6 Conclusion

In this section aquaculture, sustainable aquaculture, institutions and entrepreneurship have been introduced. Following this introduction, the mechanism has been described and how the theory and the mechanism have shaped the research design of this thesis.

Sustainable aquaculture is still up for debate as different groups have come up with different sustainability certificate for the aquaculture sector. The certificates all focus on environmental issues, but some include social and economic issues as well. Sustainable aquaculture production is just 6 per cent of the total aquaculture production, but the demand is rising. In the Netherlands the fish retail market is dominated by the supermarkets and all the fish they sell has to be certified and aquaculture it has to be ASC-certified. ASC-certificates have been created for twelve species being it fish, shellfish or seaweed.

Tisdell has created the theory of the development of (sustainable) aquaculture. In this theory he argues that biological, environmental, technology and scientific knowledge and socio-economic factors are influencing the development of (sustainable) aquaculture. One of these, the socio-economic factor overlaps with the institutional framework of the Global Entrepreneurship Monitor and thus affects entrepreneurship in aquaculture alongside the technology and scientific knowledge factor of Tisdell's theory. Environmental factors in turn resemble the normative institutions and are greatly influenced by sustainability. The biological factors are excluded in this research.

Institutions provide meaning and stability to social life through elements that can be divided into regulative, normative and cultural-cognitive elements. Entrepreneurial activity affects the number of companies in a country, more specifically the nascent entrepreneurship rate and the discontinuation rate. The nascent entrepreneurship rate indicates how many new entrepreneurs are in the process of

creating a new company thus indicating that the number of companies in a country will increase. The discontinuation rate on the other hand indicates the opposite, a decrease in the number of companies. With a discontinuation of a company the entrepreneur can start another company, this is not measured in the GEM. Discontinuation can thus be considered both negative and positive. Some institutions which are present in a specific area have an influence on the number of nascent and established companies. Scholars have created the Global Entrepreneurship Model as a generic theory.

In this research the generic theory of the Global Entrepreneurship Monitor is used as there is no research regarding entrepreneurship and the aquaculture sector in the Netherlands. The Global Entrepreneurship Model measures the institutions that influence entrepreneurship in general in a given country being it regulative, normative or cultural-cognitive through the institutional framework conditions. The conceptual model in the GEM indicates that the institutions form the institutional framework which influence entrepreneurship. Entrepreneurship in turn is measured as the entrepreneurial activity in a given country. Most of the institutional framework overlaps with the socio-economical, technology and scientific knowledge and environmental factors that influence the development of (sustainable) aquaculture. The institutional framework thus affects both entrepreneurial activity as well as the development of (sustainable) aquaculture and offers an indication regarding entrepreneurship in the aquaculture sector in the Netherlands.

As most of the theory and research is qualitative this had implications for the research design and this meant that the mixed methods approach and the deductive approach are chosen.

3 Operationalisation and methodological framework

In this section, the operationalisation and the methodological framework will be clarified. Each of the sub-questions will have a range of possible answers based on the data collection and is scoped by the research design of this thesis. The parts will follow the same structure as the order of the sub-questions. First a more detailed description is given regarding the aims and goals of the sub-questions. The second part will highlight the answer range of how the institutional framework is influencing the development sustainable aquaculture. The second part describes the answer range for how institutions are affecting companies which focus their main activities on sustainable aquaculture production. The fourth part elaborates on the data collection, research instruments and the methods used to analyse the data. The last two parts of this section describe the validity and reliability of the research methods used in this thesis.

3.1 The sub-questions

3.1.1 How is the institutional framework in the Netherlands influencing entrepreneurial activity and specifically towards starting sustainable businesses?

The institutional framework presented in the Global Entrepreneurship Model will be used to elaborate on the factors influencing sustainable entrepreneurial activity in the Netherlands in general as no specific former research has been conducted on the institutional framework affecting the entrepreneurial activity in the (sustainable) aquaculture sector in the Netherlands. The entrepreneurial activity indicates how entrepreneurs are influenced in their business decisions and whether the institutional framework is supportive or not for growth in the entrepreneurial activity.

3.1.2 How does the institutional framework in the Netherlands influence the number of companies?

The institutional framework presented in the Global Entrepreneurship Model has an effect on the number of companies in the Netherlands through its influence on the entrepreneurial activity. The increase or decrease in the number of companies in the Netherlands reflects a trend which should be similar to the fluctuation of companies active in the aquaculture production in the Netherlands. If this is not the case, it is important to identify the factors that indicate why the fluctuation is not similar.

3.1.3 Which positive and negative effects does the institutional framework have on the development of aquaculture in the Netherlands?

The institutional framework from the Global Entrepreneurship Monitor overlaps with the framework presented by Tisdell on the development of aquaculture. For this question the factors in the institutional framework from both the GEM and Tisdell will be combined to conclude which specific factors are influencing the development of aquaculture to generate a general overview of effects in the sector. These factors are shown in figure 6 on page 36.

3.1.4 Which positive and negative effects does the institutional framework have on entrepreneurial activity in the development of aquaculture in the Netherlands?

The institutional framework presented in the Global Entrepreneurship Monitor measures the effect of the framework on the entrepreneurial activity. The entrepreneurial activity and the institutional framework presented in the Global Entrepreneurship Monitor and the framework of Tisdell both influence the development of sustainable aquaculture. Although the frameworks do resemble each other on certain aspects there are differences in the frameworks and the depth in which they investigate the factors. Therefore, this sub-question uses part of the findings of earlier sub-questions

and the more in-depth factors from the framework that investigate the development of sustainable aquaculture in the Netherlands.

3.1.5 How many companies in the Netherlands focus their business model on sustainable aquaculture production?

The advances in the development of sustainable aquaculture is hard to measure is quantitative measures. In a qualitative sense advances in the development in sustainable aquaculture is somewhat easier to measure in research and certificate developments, but for the development to be practical and thus effective companies need to be able to obtain sustainability certificates. Therefore, the number of sustainable aquaculture production companies who are in possession of this certificate will be the measurement of will the development of sustainable aquaculture in the Netherlands is in real terms.

3.2 The effect of the institutional framework on sustainable aquaculture

To come to a transparent outcome to the qualitative sub-questions of how institutions are affecting the development of aquaculture and sustainable aquaculture in the Netherlands, it is imperative that the range of possible outcomes to the questions is defined. The first step is to identify if the institutions do indeed affect the development of sustainable aquaculture and how to measure the institutions. The number of companies in the GEM report is indicated with the so-called total early-stage entrepreneurship activity (TEA) and established business ownership, whereas as in the *Doing Business* report only the ease of doing business is measured. Institutions do affect the former two measurements. The measurement for the institutions, TEA and established business ownership will be a statistic derived from the GEM and Doing Business reports and will give a score of how strong they are. Institutions however, are hard to measure and exactly what is an institution is up to debate. To be able to measure them in this research the factors of the institutional framework will be used as the institutions which affect the development of aquaculture and the entrepreneurial climate. As each factor has a score it offers the possibility to use the as a measurement. To be able to detect differences and compare the institutions each factor of the institutional framework present in the Netherlands is compared with the score of former years.

The next step is to identify how the institutional framework is affecting the development of sustainable aquaculture, but how is the development of sustainable aquaculture measured.

The qualitative outcome thus will be how the institutional framework is affecting the development of sustainable aquaculture funnelled down from the number of companies in general and in aquaculture. The effect of the institutional framework on (sustainable) aquaculture is determined by the theory of Tisdell (1994). Tisdell has argued (see section 2.1.2) that the development of aquaculture is determined by four main factors. The biological factor is not considered an institution and is therefore not included in this research. The other three, technology and scientific knowledge, environmental factors and the socio-economic factors are part of the institutional framework or part of institutions. A change in one of these three will have a positive or negative effect on aquaculture. Progress in technology and scientific knowledge will therefore be considered an increase of an institution and will have a positive effect on aquaculture and this overlaps with the factor of R&D transfer of the institutional framework of the GEM. Environmental factors are related to sustainability and every push towards more sustainability will have a positive effect on sustainable aquaculture as long as it is applicable for all species and this overlaps with the factor of cultural and social norms of the institutional framework of the GEM. Changes in the socio-economic factors are closely related to the changes in the *Doing Business* report and other mainly regulative institutions of the institutional framework of the GEM. For technology and scientific knowledge and environmental

factors specific phenomenon, derived from the theory of Tisdell (1994), are explained for the development of sustainable aquaculture as well. Therefore, the same operationalisation is used as the *Doing Business* report and the GEM in the former paragraph to come to measurable indicators for the three factors of Tisdell's theory. What an increase and a decrease is of the development of sustainable aquaculture is and how it is measured, is summarised in figure 6.

| | Technology and scientific knowledge | Environmental factors | Socio-economic factors |
|---|--|---|--|
| An increase in the score, an extra barrier in doing business or a specific phenomenon and the effect on the development of sustainable aquaculture | <ul style="list-style-type: none"> - Better government policies in the support and relevance sector can offer more incentives to setup knowledge groups, innovation platforms, research and innovation in technologies. - The R&D transfer factor indicates that it is easier to share research, technology and knowledge between companies and thus offers the possibilities for companies to increase the sustainability of their processes. Knowledge groups and innovation platforms are prime examples. - Advances in technologies used in the aquaculture production such as basins, feeds and water filters can be regarded as advances in the development of sustainable aquaculture. - Advances in technologies will lead to more research on the effect of the new technologies which in turn will help create new insights that benefit the development of aquaculture. | <ul style="list-style-type: none"> - The cultural and social factor with the focus on sustainability and sustainable food production will push the sustainability requirements higher and thus help the aquaculture sector to develop more sustainable processes and products (incumbent companies who do not comply will gradually be phased out as demand for their product is fading). - New species added to the ASC-certificate can be regarded as an advance in the development of sustainable aquaculture. - The recent push to integrate nature and the economy has led to new insights that both can co-exist and can support each other. This will push for more sustainable processes for both the economy and nature which will positively affect sustainable aquaculture. - The push towards more traceability will give an incentive for the development of sustainable aquaculture as processes throughout the supply chain become known. This will require producers to adjust their processes to minimum standards and thus reduce improper processes. | <ul style="list-style-type: none"> - The entrepreneurial finance factor score indicates that it is easier to gain capital for investments. This offers the possibility to invest in equipment, knowledge and education to increase the sustainability in processes (includes the getting credit from the <i>Doing Business</i> report). - The government policies in the support and relevance factor indicates that the government offers more incentives to companies to take certain actions or grants business permissions. If these incentives have the aim to promote sustainability, it offers companies the support to invest in more sustainability options for their processes in forms as subsidies and grants. - The government policies in taxes and bureaucracy offers a tax break to companies and relieves the burden of bureaucracy. This offers companies extra capital to invest more in sustainability and less bureaucracy to produce sustainable aquaculture and to do business (includes the construction permits, getting electricity, registering property, paying taxes and starting a business from the <i>Doing Business</i> report). - The government entrepreneurship programs assist small and medium companies to setup their companies and to increase efficiency via knowledge groups or consultancy groups. - The commercial and legal infrastructure indicates that the law protects the investments made by companies and can help them in retaining their edge of sustainability in their processes against illicit actions (includes protecting minority investors, enforcing contracts and resolving insolvency from the <i>Doing Business</i> report). |

| | | | |
|--|---|---|---|
| | | | <p>- The internal market dynamics indicate that companies have better access to offer their products on the market (includes trading across borders from the <i>Doing Business</i> report).</p> <p>- The internal market burden or entry regulations indicate that it is easier to enter the market. For sustainable aquaculture this is reflected in better spatial planning by the government for dual-use locations and production locations.</p> <p>- The physical infrastructures indicate that companies have less or no problem in the availability of needed physical infrastructure to increase their sustainability.</p> |
| | Technology and scientific knowledge | Environmental factors | Socio-economic factors |
| A decrease in the score, an extra barrier in doing business or a specific phenomenon and the effect on the development of sustainable aquaculture | <p>- If government policies in the support and relevance sector decrease it can create more barriers to for knowledge groups, innovation platforms, research and innovation in technologies.</p> <p>- The R&D transfer factor indicates that it is harder to share research, technology and knowledge between companies and thus reduces the possibilities for companies to increase the sustainability of their processes.</p> | <p>- The cultural and social factor where the focus on sustainability decreases, will hinder the development as companies lack the incentive to create sustainable processes. This will further increase when the focus is shifted on growing the economy at higher environmental costs.</p> <p>- A decline in traceability will have a negative effect on the development of sustainable aquaculture as processes throughout the supply chain become less known. Producers do not have to adjust their processes to minimum standards which can lead to an increase of improper processes which are not sustainable.</p> | <p>- The entrepreneurial finance factor score indicates that it is harder to gain capital for investments. This limits the possibility to invest in equipment, knowledge and education to increase the sustainability in processes (includes the getting credit from the <i>Doing Business</i> report).</p> <p>- The government policies in the support and relevance factor indicates that the government offers less incentives to companies to take certain actions or give less business permissions. If these incentives had the aim to promote sustainability, it now limits the support to invest in more sustainability options for the company its processes.</p> <p>- The government policies in taxes and bureaucracy limits tax breaks to companies and increases the burden of bureaucracy. This limits the ability of companies to invest more in sustainability and adds to the bureaucracy to produce sustainable aquaculture and do business (includes the construction permits, getting electricity, registering property, paying taxes and starting a business from the <i>Doing Business</i> report).</p> |

| | | | |
|--|--|--|--|
| | | | <ul style="list-style-type: none"> - The government entrepreneurship programs indicate that small and medium companies need to do more by themselves to increase efficiency and setup their companies. - The commercial and legal infrastructure indicates that the law offers less protection for the investments made by companies and it could take their edge on sustainability in their processes by illicit actions (includes protecting minority investors, enforcing contracts and resolving insolvency from the <i>Doing Business</i> report). - The internal market dynamics indicate that companies have limited market access with their products (includes trading across borders from the <i>Doing Business</i> report). - The internal market burden or entry regulations indicate that it is harder to enter the market. For sustainable aquaculture this is reflected in worse spatial planning by the government for dual-use locations and production locations. - The physical infrastructures indicate that companies have (more) problems in the availability of needed physical infrastructure to increase their sustainability. |
|--|--|--|--|

Figure 6 Summary of factors influencing the development of sustainable aquaculture

The number of companies can be counted beforehand, but future estimates on the number of companies can be made based on the change of the institutional framework influencing entrepreneurship and entrepreneurial activity. An increase in the institutional framework of the Global Entrepreneurship Monitor indicates that there will be an increase in entrepreneurship and entrepreneurial activity and more specifically the nascent entrepreneurship rate and thereby increase the number of companies. A decrease in the institutional framework conditions indicates that the nascent entrepreneurship rate will decrease and the discontinuation rate will increase and eventually lead to a decrease in the number of companies.

3.3 Development of sustainable aquaculture

How to measure development is rather difficult. For the development of a country the gross national product or gross national income is used. This however is not applicable to measure the development of aquaculture and more importantly not for the development of sustainable aquaculture. For this research, it is necessary to be able to measure the development of sustainable aquaculture.

3.3.1 Sustainable aquaculture certificate

Although there are six different sustainable aquaculture certificates, just one can be applicable for this research as the focus is on the Netherlands. By identifying the largest market stakeholders and identify their preference in certificates it is possible to say which certificate is most applicable in the Netherlands. Furthermore, it is important to research which of the certificates have been based on higher codes of conducts from other international bodies as they include more aspects.

3.3.2 The measurement of sustainable aquaculture

To have a measurement for this research, the number of aquaculture producers in the Netherlands with an ASC sustainability certificate will be used. An increase in the number of aquaculture producers with an ASC-certificate indicates that the development of sustainable aquaculture in the Netherlands is rising. The reason why the number of aquaculture producers is chosen as a measurement, is that the number can be rising due to different factors. Companies can invest in their processes to meet the requirements of the ASC-certificate, they can switch to species which are covered by the ASC-certificate (the production process needs to meet the requirements of the ASC-certificate as well) or new species can be added to the ASC-certificate which aquaculture producers in the Netherlands already produce which meet the ASC-certificate requirements in their processes.

3.3.3 Outcome range for companies in sustainable aquaculture in the Netherlands

For the reasons mentioned the certificate which is used in this research is the ASC-certificate, as it dominates the market in the Netherlands and it is growing both in volume and in species covered by the certificate. Companies which operate in the aquaculture sector as producers thus need to have the most applicable certificate, being the ASC-certificate, before they are considered to be sustainable aquaculture producers for this research. The outcome of the research for the question: *How many companies in the Netherlands focus their business model on sustainable aquaculture?* will be quantifiable as a whole number ranging from zero to the maximum number of companies active in aquaculture in the Netherlands.

3.4 Data collection

Most of the data collection was based on literature research via desk research and by interviews with respondents. Some of the literature research has come from secondary sources as other parts of the data have come from primary sources. The primary sources were mostly gathered by the database research. The literature review of gathering statistical data, results and insights regarding entrepreneurship, institutions, the sustainability certificates on the development of the aquaculture sector in the Netherlands. These were the first search terms and were used alone or combined. The articles found offered the possibility to use the snowball method to identify other promising sources and search queries for further data. These sources and search queries in turn led to the ASC, aquaculture stewardship council, GEM and Global Entrepreneurship Monitor. Important sources that were used are mentioned in part 3.2.1 although other sources have been used to a lesser extend as well.

3.5 Data analysis

The data was analysed by comparing the statistic on a yearly basis and to identify changes in the institutional framework which could explain the variations in the data. The causes of the variation were examined as well by finding additional insights which concluded if the cause was indeed correlated to the variation found or that the correlation was weak. Results and insights found in the literature have been compared to similar findings to ensure its validity. Statistical data was mainly gathered via the data sources mentioned in part 3.2.1.

The current institutional framework in the Netherlands was determined by literature research as it has an effect on the entrepreneurial activity and sustainable aquaculture both as a stimulant and as depressant. The process by which this was done was to use generic theories, such as the theory of Tisdell, the GEM and the *Doing Business* report, which suggested that there would be a correlation based on former research.

In the GEM report the regulative institutions were measured on a Likert scale ranging from one to nine, where a score of one or two indicate that the conditions form a constraint on entrepreneurship whereas a score of eight or nine indicate that institutions strongly promote entrepreneurship. The informal institutions were measured in percentages ranging from zero to one hundred per cent. An increase in the score or percentage will mean that the institutions have increased and that has a positive effect on entrepreneurship and vice versa.

In the *Doing Business* report the regulative institutions were measured using the best scoring nation as a benchmark to see how big the gap is between other nations. In this research however, not the score is determining if the institutions have changed. The *Doing Business* report includes the changes made by each government on each of the aspects measured in the report. These changes indicate if an institution has increased or decreased based on the relief or burden it creates for businesses. If a change relieves a business by making it easier to conduct business activities, it was interpreted as an increase in the institution affecting entrepreneurship. On the other hand, if it was an extra burden by new regulation, it indicated that the effect of the institution on entrepreneurship was less positive.

Thus, the change of factors in the institutional framework can be positive and negative. A positive change of the institutional framework was measured as:

- An increase in one of the institutional framework scores of the GEM
- A change in policy which relieves the burden of doing business in the *Doing Business* report.

A negative change of the institutional framework was measured as:

- A decrease in one of the institutional framework scores of the GEM
- A change in policy which increases the burden of doing business in the *Doing Business* report.

It was hard to conclude whether all the changes of all the factors in the institutional framework were positive or negative for the framework in general. To come to an indication, the positive and negative were counted separately and the sum of the negative changes was deducted from the sum of the positive changes. A change in the score indicated that the sentiment of the respondents and experts of the Global Entrepreneurship Monitor had changed. Therefore, the underlying cause of this change was identified for each of the changes if that was possible via desk research or interviews. These changes gave an indication whether the change would have an effect on factors influencing the development of sustainable aquaculture as well and formed a barrier or an incentive. By using the factors of the theory of Tisdell it was possible to research in specific areas that would influence the development of aquaculture. Part of socio-economic factors of Tisdell's theory overlap with the GEM. The three factors of Tisdell's theory that have been used are: technology and scientific knowledge, environmental factors and socio-economic factors. Each of these factors was measured by different indicators and they could be positive or negative for the development of sustainable aquaculture.

- The technology and scientific knowledge factor were measured using indicators. Positive indicators were: setting up new knowledge sharing groups, innovation platforms, innovation in technologies used in the production process of sustainable aquaculture, new scientific research in sustainable aquaculture and progress in research and development transfer among organisations.

Negative indicators were: problems with knowledge sharing groups and innovation platforms, less innovation in technologies, no new scientific research and regulations which create barriers in the transfer of research and development among organisations.

- The environmental factor was measured using the indicators. Positive indicators were: pushes towards more sustainability requirements for aquaculture productions processes throughout the supply chain, new added species to the ASC-certificates, new insights and methods to integrate nature and economy in a supporting manner and the push towards more traceability.

Negative indicators were: changes where sustainability becomes less important and thus hindering the development of sustainable aquaculture and a decline in the push for traceability where processes become less known.

- The socio-economic factor was measured using the indicators. Positive indicators were: easier access to finance capital for investments, government support policies which promote sustainability in the aquaculture sector, government policies which offer tax breaks and relieve the bureaucracy burden, better government programs which support entrepreneurship, positive changes in the commercial and legal infrastructure that support company's rights and possibilities, better internal market opportunities to trade across borders, make it easier to start a company and enter the market and better physical infrastructure which companies can take advantage of.

Negative indicators were: harder access to finance capital for investments, less government support policies which promote sustainability in the aquaculture sector, government policies which increase taxes and the bureaucracy burden, a decrease in government programs which support entrepreneurship, a deterioration in the commercial and legal infrastructure

decreasing the rights and possibilities of companies, less internal market opportunities to trade across borders, making it harder to start a company and more entry barriers to the market and a deterioration physical infrastructure which companies can take advantage of.

Some of the changes however had a more severe impact than others and therefore qualitative research articles were used to comment on some of the changes to indicate the severity of their impact.

In the identification of which companies operate in sustainable aquaculture in the Netherlands, it was important to be transparent in how these companies were selected. In section two the different certificates to identify sustainable aquaculture have been described. The next step was to make a distinction between all the companies who have been granted such a certificate, as most certificates are granted throughout the supply chain and this research is focussed on the sustainable aquaculture producers and not the retailers or processing companies. Therefore, the database of the Aquaculture Stewardship Council was used to identify companies which have their key activities in the sustainable aquaculture production and can thus be recognized as sustainable aquaculture farms.

Once the suggested factors influencing the entrepreneurial activity and the development of aquaculture had been identified based on the generic theories, other sources were used to support or dismiss the correlation between the factors and the development of aquaculture and entrepreneurial activity. The correlations from the other articles were based on desk research via case studies and correlation coefficient research of other researchers, and interviews for this research.

3.5.1 Data sources

Sources which have been used are:

- Centraal Bureau voor de Statistiek (Central Agency for Statistics or Statistics Netherlands)
- Kamer van Koophandel (Chamber of Commerce)
- Nederlandse Voedsel en Waren Autoriteit
- Wageningen University and Research
- Global Entrepreneurship Monitor
- International Monetary Fund
- Aquaculture Stewardship Council
- Food and Agriculture Organization of the United Nations
- EUROSTAT
- European Union
- Rijksoverheid

3.5.2 Interviews

The interviews were used to support the results that were found in other sources. Although the GEM and the theory of Tisdell argue that the institutional framework does influence entrepreneurial activity and the development of (sustainable) aquaculture, it does not mean that all those institutions are present in the Netherlands. Common factors of the institutional framework can have an effect on the development of aquaculture and entrepreneurial activity, but are they perceived as such in the Netherlands. The first interviewee was a professor in aquaculture, the second was a business consultant in law and regulation and the third was an entrepreneur with a medium sized enterprise.

The interviewees were selected using a non-probability approach. In total four parties were asked to participate in the interview. Two of the four were selected on ground of convenience as they were

personal acquaintances known to be an entrepreneur and a business consultant respectively. The other two parties invited for the interviews were the company Kingfish and the current professor of aquaculture at the Wageningen University via self-selection (Saunders, Lewis, & Thornhill, 2016). A non-response came from the former party, where the latter party led to the connection of the former professor of aquaculture at the Wageningen University who had a more suitable schedule to conduct the interview with.

The interviews were non-standard and semi-structured to get a more comparable result, but still gave the opportunity for additional input as this approach is most suited for qualitative research (Bryman & Bell, 2007). During the interviews the structure changed from interview to interview because the experts had questions of their own, they had different background and they were specialised in different fields.

The interviews did however follow a pattern, semi-structured, to question how the institutional framework in the Netherlands from the GEM and the theory of Tisdell, was influencing the development of aquaculture and the entrepreneurial activity. Using the transcripts from the interviews, a comparison was made with the results found in other sources. This comparison was done by using the aspects described in section 2 to the terminology used in the answers of the interviewees. Some of the questions in the interviews were specifically asked to conclude if the other used sources which were used first, were correct according to the interviewees. The interviews with questions and answers can be found in the appendix.

3.6 Validity

The research is cross-sectional in nature and this will have a negative effect on the internal validity. The timespan of the research is limited and therefore a longitudinal research is out of the question. To increase the internal validity, the data sets which have been used will come from a few general sources which have a reliable research history. The methods and processes that have been used have been explained to increase the validity of the causal relationship between the variables.

Triangulation has been used to increase the validity by using different independent sources for the theories, results and interpretations which have been presented in this research. The use of triangulations thus increases validity and in this case there were different literature sources which have been validated using interviews (Bryman & Bell, 2007; Saunders, Lewis, & Thornhill, 2016).

The external validity of this research is rather limited. The research is limited to the Netherlands. The generalization of this research will be uncertain and can probably not be generalized to other nations as every nation has a different institutional framework and entrepreneurial activity. Some factors of the institutional framework can be the same in other nations, notably in nations in Europe where the European Union has designated sustainable aquaculture as an important sector for further development and the similarities of sustainability certificate rules for producing companies (Bryman & Bell, 2007).

3.7 Reliability

The research design has a great influence on the reliability of the research. The cross-sectional research reliability is lower than the longitudinal research reliability. Due to the limited time span of a cross-sectional research, the variables can change over time giving other results if the research is repeated. To increase the reliability, data have been used from selected sources, which will still exist in the future and will most likely use the same methods for their data collection (Saunders, Lewis, & Thornhill, 2016).

3.8 Conclusion

In this section the operationalisation and the methodological framework have been described. The first part explained the process of how data leads to certain outcomes. The process of interpreting the Global Entrepreneurship Monitor and its data has been explained. If there is an increase in one of the scores of the institutional framework that should be reflected in the entrepreneurial activity in form of an increase in one of the scores. A decrease in the institutional framework conditions indicates the opposite. Changes in the *Doing Business* report explain the change of the institutions and indicate whether it relieves the entrepreneurs or not. With the theory of Tisdell the development process of aquaculture is explained and what the effect of institutions is in this theory. The process of determining the effect of changes in the institutional framework and the number of companies is described as well. So, for an increase in the development of sustainable aquaculture to happen a positive change in socio-economic, environmental or technology and scientific knowledge have to happen.

The number of companies in sustainable aquaculture in the Netherlands and the process of getting that figure is described in the last part of this section as the companies have to be ASC-certified. This last part of the section has explained that the research design has been created around the three variables institutions, entrepreneurship and the number of companies in sustainable aquaculture. A case study with a deductive approach and qualitative in nature offered the best possibilities to provide in depth answers to the main question and sub-questions of this research. The mechanism describes the relationship between the three variables, where institutions is the independent variable, entrepreneurship the second independent variable and the number of companies in sustainable aquaculture the dependent variable. In this research certain institutions affect entrepreneurship through the GEM conceptual model and institutional framework. Entrepreneurship in turn affects the number of companies through the nascent entrepreneurship rate and the discontinuation rate. Institutions have an effect on aquaculture through the theory of Tisdell and in combination with the GEM conceptual model the institutions influence the number of companies in sustainable aquaculture.

The data is collected through literature research and interviews to strengthen the validity. The validity is increased further by triangulation. To strengthen the reliability of the research data has been used from sources which will exist in the future.

4 Findings

In this section the findings will be described. The first part will highlight how institutions are influencing the number of companies in the Netherlands. The second part will describe the effect of the institutional framework on aquaculture. The third explains the effect of the institutional framework on sustainable aquaculture. It will focus specifically on how sustainability is influenced by the institutional framework and how this is reflected in the aquaculture sector. The last part will conclude how the development of sustainable aquaculture is progressing through the number of

farms that are present in the aquaculture sector in the Netherlands and are in possession of an ASC sustainability certificate.

4.1 The institutional framework and its effect on the number of companies

For a decent comparison it is helpful to indicate whether the institutions have changed in the last few years in both regulations derived from *Doing Business* reports dating back five years, changes in the Global Entrepreneurship Monitor dating back three years and other sources regarding changes witnessed in the Global Entrepreneurship Monitor. This is whether they have become more supportive or obstructive. Firstly, the change in institutions will be described. Secondly the change in TEA, established business ownership, discontinuation of businesses and the total number of companies will be highlighted. The discontinuation rate will be explained using the discontinuation motives. Finally, the effect of the institutions on the number of companies will be discussed as will irregularities.

In 2013, four institutions in the Netherlands from the *Doing Business* report changed: the government changed the rules for starting a business, the requirement for a declaration of non-objection by the Ministry of Justice was dropped, making it easier to start a business (van Dijk, 2011; The World Bank, 2013). The second change was that dealing with construction permits became less complicated by merging several approvals and introducing an online application system (BRIS, 2018; The World Bank, 2013). The third change was that the investor protection was increased by passing a law regulating the approval of related-party transactions (The World Bank, 2013). The last change was a decrease in the burden of trading across borders by implementing a new web-based system for cargo release (Beerens, 2014; The World Bank, 2013).

In 2014, two institutions improved by policy changes from the government. The first was that the minimum required capital to start a business was reduced to zero (Pals, 2012; The World Bank, 2014). The second change was regarding registering property making the transfer of property more efficient by the implementation of a new system (Kadaster, 2012; The World Bank, 2014). One institution was weakened by the government with the implementation of the Collection of State Taxes Act which grants priority to tax claims over secured creditors' claims. This weakened the institution of getting credit (The World Bank, 2014; VNG, 2012).

In 2015 no policy change of the government has affected the institutions (The World Bank, 2015). In 2016 however, the government increased employer-paid labour contributions, raised road taxes, property taxes and polder board taxes. This is considered as a decrease in the institution of paying taxes (ADP, 2016; Newmark, 2015; The World Bank, 2016)

In 2017, two institutions were changed. The first was an increase of the institution of paying taxes, although there was a small decrease as well. The government made taxes less costly by lowering certain rates for the employers. An online system for the payment of corporate tax was implemented as well. On the other hand, the government made paying certain taxes costlier by increasing motor taxes, polder board taxes and the increase of rates for the disablement insurance contribution paid by the employers (ADP, 2017; Scherff, 2017; UVW, 2017). Although not measured with a score in the *Doing Business* report, the institution regarding labour market regulation has increased by the reduction of the maximum duration fixed-term contracts from 36 to 24 months. On the other hand, the government did introduce severance pay for redundancy dismissals for employees who had at least 24 months of continuous employment (The World Bank, 2017).

In 2018 the Netherlands have improved access to credit information by decreasing the minimum loan amount which had to be included in the credit bureau's database. This helps creating a better risk

profile for entrepreneurs and can give them more access to credit. This was the only reform which aim was to make it easier to do business (Nibud, 2016; The World Bank, 2018), on the other hand changes have been made to make it more difficult to do business with the increase of insurance contributions paid by employers (ADP, 2018; UWV, 2018).

Using the data from the Global Entrepreneurship Monitors from 2015 to 2017, the positive change in the scores of the institutions affecting entrepreneurship can be used to implicate that this would lead to more entrepreneurial activity which in turn should mean that the number of companies is rising. The changes in scores of the institutional framework alone do not explain why they have happened. Therefore, other sources have been used to elaborate why the scores have changed.

The attitudes regarding entrepreneurship have all recovered in 2017 from the decrease measured in the period of 2015 and 2016. The perceptions regarding perceived opportunities and capabilities have all improved. Entrepreneurial intentions have decreased compared with 2015 but have increased compared with 2016 (de Kok, et al., 2018; Singer, Herrington, & Menipaz, 2018). Entrepreneurial intentions have grown since 2008 when the entrepreneurial intention was only 5.3 per cent. The fear of failure has seen a decreased as well and is now at the lowest level since 2011 (de Kok, et al., 2018).

The twelve conditions from the Global Entrepreneurship Monitors of the period 2015 to 2017 have been relatively stable with only slight changes, as mentioned in section 2.3, table 4. In total eight out of the twelve conditions have improved; one has remained the same and three have scored slightly worse than in 2016. The lowest score in 2017 was R&D transfer but has increased a bit since 2015. Entrepreneurial finance however, has had the largest improvement of all the conditions with a growth of nearly 0,8. Compared with 2015 however, all have increased except for the government policies regarding taxes and bureaucracy (de Kok, et al., 2018; Singer, Herrington, & Menipaz, 2018). Two respondents of the interviews argued that government policies in taxes and bureaucracy are the limiting institution in business activity in established businesses in general. New rules and legislation, to be more precise, are hampering business operations, which supports the meaning of the score of government policies regarding taxes and bureaucracy (Spanjersberg, 2018; van der Woude, 2018). One of the respondents did say that legislation on the other hand, tends to be rather stable in the Netherlands (Spanjersberg, 2018). The arguments of both respondents are visible in the score of the institutional framework conditions as well (de Kok, et al., 2018; Singer, Herrington, & Menipaz, 2018). Government entrepreneurship programs are important for nascent entrepreneurship as they offer a lot of support for start-up companies as one of the interviewees mentioned (Spanjersberg, 2018)

The Total early-stage Entrepreneurial Activity (TEA) rate is slightly down compared to 2016, but has increased compared to 2015. The decrease in TEA stems from the relatively strong decrease of necessity entrepreneurship. This means that more wage jobs have become available in the economy of the Netherlands (de Kok, et al., 2018). The Entrepreneurial Employee Activity (EEA) has been stable since 2016 before it increased compared to 2015. Established ownership has decreased after the increase of 2016. The discontinuation rate has slightly increased (GEM Consortium, 2017; de Kok, et al., 2018; Singer, Herrington, & Menipaz, 2018).

The GEM does have a distinction in the discontinuation rate where the distinction is based on an exit with a business closure or an exit without a business closure. In 2015, 80 per cent of the discontinuation rate was caused by business closure and 20 per cent without a business closure. In 2016 those figures were 78 per cent and 22 per cent whereas in 2017 they were 68 per cent and 32 per cent (GEM Consortium, 2017; de Kok, et al., 2018; Singer, Herrington, & Menipaz, 2018). This indicates that more entrepreneurs that exit their business are selling the company.

Two possible reasons can explain the increase of continuation of the business while the entrepreneurs quit. The first is that the number of entrepreneurs who transfer their business have increased. This however, seems far-fetched as the motive to sell is just 1.1 per cent, see table 8. The second, and more likely possibility is that many entrepreneurs have started a business in a group or team and just one of the entrepreneurs decides to leave while the other continues the business (de Kok, et al., 2018). The discontinuation rate is explained using the motivation from the entrepreneurs who have stepped away from their business. Some of the entrepreneurs will exit because of personal reasons such as other opportunities, retirement or undisclosed personal reasons. Some discontinue due to institutional reasons such as problems acquiring capital, unprofitability or bureaucracy (Burns, 2016; Herrington & Kew, 2017; Kelley, Singer, & Herrington, 2016; Singer, Herrington, & Menipaz, 2018). As can be concluded from table 8, the selling of the business is hardly the reason as a motive for discontinuation. Unprofitability is decreasing rapidly since 2015, which is probably reflecting a positive business cycle. The problems with finance have increased with almost 15 per cent whereas bureaucracy has increased with more than 30 per cent indicating that tax policies or regulation burdens are to blame (GEM Consortium, 2017; de Kok, et al., 2018; Singer, Herrington, & Menipaz, 2018). One of the main reasons can be attributed to the new DBA law (wet Deregulerend Beoordeling Arbeidsrelaties) regarding the position of the solo self-employed and their clients. This has created uncertainty for the solo self-employed and their clients regarding the labour market regulation and thus more risk for the clients, leading to fewer assignments for the solo self-employed (de Kok, et al., 2018). On the other hand, the *Doing Business* report, which only considers limited liability enterprises has not indicated that there were policy changes which affected institutions for limited liability companies (The World Bank, 2018).

| Discontinuation motivation | 2015 | 2016 | 2017 |
|-----------------------------------|-------------|-------------|-------------|
| Sold the business | 0.0 | 0.0 | 1.1 |
| Unprofitable | 50.5 | 38.7 | 15.2 |
| Problems with finance | 5.3 | 1.7 | 16.1 |
| Another opportunity | 22.0 | 19.7 | 17.5 |
| Exit | 1.0 | 10.4 | 3.2 |
| Retirement | 5.1 | 7.2 | 0.0 |
| Personal reasons | 14.2 | 21.2 | 11.6 |
| Incident | 0.0 | 0.0 | 0.0 |
| Bureaucracy | 1.9 | 1.1 | 35.3 |

Table 8: Discontinuation motives from the Global Entrepreneurship Monitor 2015-2017.

Since the first quarter of 2007 the total number of companies has increased with more than 700,000 to slightly more than 1.7 million. The number of companies increased despite the financial crisis. The total number of companies however, does include both necessity and opportunity entrepreneurship.

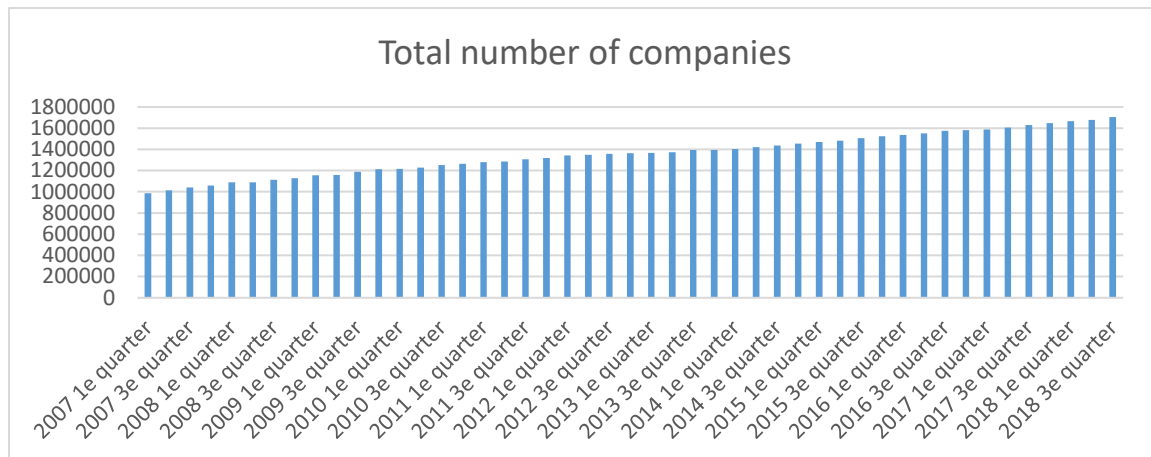


Figure 7: Total number of companies.
Source: CBS Statline

Overall there has been a steady growth in the number of companies in the Netherlands with an increase of the strength of the institutional framework associated with influencing the number of companies through entrepreneurship. Although the conceptual model from the Global Entrepreneurship Model has indicated that there would be a growth in the number of companies of 1.6 per cent (de Kok, et al., 2018; Singer, Herrington, & Menipaz, 2018) the actual growth in 2017 was 5 per cent (CBS, 2018). The informal institutions seem to have caused the number of companies to keep growing during the financial crisis as they were pretty stable. The economic growth of recent years seems to increase the amount of opportunity entrepreneurs and thus disfavours necessity entrepreneurship (Acs & Varga, 2005; Angulo-Guerrero, Pérez-Moreno, & Abad-Guerrero, 2016; Bonnet & Le Pape, 2016 de Kok, et al., 2018).

Business regulation did seem to be the main factor for entrepreneurs to discontinue their business as the new DBA law adds to the bureaucracy and risk associated acquiring work particularly for solo self-employed. Whereas in the years before the same lack of business regulation contributed to an enormous growth of sole proprietary ownership and solo self-employed. Overall there was a growth in the number of solo self-employed (CBS, 2018; Ruijven-Rojek, 2017). In 2018, the number of companies keeps increasing and especially the solo self-employed as the economic growth continues, the relative ease with which solo self-employed can acquire work and the scarcity on the labour market offers opportunities to the solo self-employed (CBS, 2018; ING, 2018).

Conclusion

In this paragraph the effect of institutions on entrepreneurship has been discussed. First the changes in institutions relevant to entrepreneurship have been discussed. In general, the Netherlands has changed quite a few regulative institutions to support entrepreneurship, besides the few changes that had a negative effect. The institutional framework of the GEM has mostly increased in the last few years and that increase is, on the other hand, not reflected in the entrepreneurial activity in the Netherlands. The entrepreneurial activity is slightly lower. The discontinuation rate has slightly increased although that does not indicate a negative trend. The motives for the discontinuation have changed in recent years and the former most common reason for closure of unprofitability has decreased due to the growing economy. Although the changes in regulative institutions indicate that they should have a positive effect as they are considered incentives, the motives in the discontinuation rate indicate otherwise as bureaucracy and regulation are now the main motive for discontinuation and are thus the main barriers. The overall entrepreneurial activity on the other hand does indicate that there should be an increase in the number of companies in the Netherlands

as there are plenty of incentives. This is reflected in the increase in the number of companies in the Netherlands although the indication from the entrepreneurial activity does differ from the exact number of new companies. The increase in the number of companies is mainly attributed to solo self-employed.

4.2 The institutional framework and its effect on aquaculture

In recent years the number of companies in the aquaculture production sector has been relatively stable (CBS Statline, 2018). Institutions influence how aquaculture is perceived, how it develops the entrepreneurs in aquaculture and the number of companies in the aquaculture production sector. The effect of the institutions will be described using the three pillars of Scott (2014). The first pillar describes the regulative institutions and how these institutions effect aquaculture in the Netherlands. The second pillar explains how normative institutions affect aquaculture in the Netherlands and the cultural-cognitive pillar describes how institutions are influencing aquaculture in the Netherlands.

Regulative

The European Union has assigned high priority to the development of aquaculture in Europe, but has had little attention for the economic performance of the sector. The European Union has reformed the Common Fishery Policy with the aim of boosting growth in the aquaculture sector using strategic guidelines, common priorities and knowledge exchange and so create incentives for the development of aquaculture. One other important reform is the weight that aquaculture has been granted in the proposal of the European Maritime and Fisheries Fund (European Commission, 2016; Guillen, Natale, & Polanco, 2015). These reforms are made to compensate for stagnating and sometimes even declining fishery supply and to support income and employment in the coastal and rural areas of the European Union. Based on the economic performance of the aquaculture sector however, the economic performance remains rather uncertain compared to other sectors in the European Union, although the sector does show some improvement since the end of the financial crisis (Guillen, Natale, & Polanco, 2015). The push to include aquaculture into the European Maritime and Fisheries Fund is a change from the older policies in which aquaculture was isolated and the important linkages and integrated system approach was thus neglected (Frankic & Hershner, 2003).

The government of the Netherlands has acknowledged that the aquaculture sector in the Netherlands is rather small. The market is focussed on regional retailers. The strategic focus of the government is that the aquaculture sector has to focus on a modest increase in production and sales for regional retailers and not for the worldwide demand increase of seafood. The government in the Netherlands does acknowledge the increasing importance of seaweed aquaculture for both consumption and other use but a strategic vision is lacking in terms of growth (Rijksoverheid, 2015). The sector however, does focus on the export of knowledge and technology which is highlighted in the national policy for aquaculture. The two main characteristics of the policy are innovation and collaboration and this is highlighted in three pillars which support the policy. The first pillar is the Fishery Innovation Platform in which representatives of NGOs, the government, scientist and fifteen members of the fishery sector are included. The aim of the platform is to create solutions for problems in both the fishery and aquaculture sector. The second pillar was based on the European Fishery Fund, which is now integrated in the European Maritime and Fisheries Fund. The fund is used for innovation projects and to support chain collaboration. The third and last pillar is the creation of fourteen knowledge networks. Each of these groups consists of fishers and aquaculture producers who form challenges, questions, solutions and answers and are supported by advisers from the national government and scientists (Ministry of Economic Affairs, Agriculture and Innovation, 2012). The advantages of involving fishers and aquaculture producers in the process include: taking

different viewpoints and values into account, by the former thus creating common understanding, establishing trust between the actors, it enhances cooperation, it helps improve the quality of decisions and it enhances the legitimacy of government policies and decisions. In the Netherlands this participation is indeed the case, on the European level however, this is not the case. Regulation stemming from the European Union has to be implemented by the member states and followed by the fishers and the aquaculture producers, while they are not part of the decision-making process (Pita, Chuenpagdee, & Pierce, 2012).

In the Netherlands the shellfish aquaculture has been around for 150 years, but due to recent changes in the regulation, no new shellfish aquaculture farms are allowed anymore if the farms use wild caught shellfish eggs for their production caught by their own ship (Ministerie van Landbouw, Natuurbeheer en Visserij, 1993; Smaal & Lucas, 1999).

Another institution influencing entrepreneurship and aquaculture producers in Europe and the Netherlands is the entry barriers and the government regulations. Most of the aquaculture producers are small and medium enterprises and they are disproportionately affected by the relative weight of regulation and administration costs compared to the turnover and the number of employees. This can be ten times costlier for SMEs than for large companies (de Zwaan, 2018; European Commission, 2013; OECD, 2003). This notion that small and medium enterprises are disproportionately affected is confirmed by one of the respondents from the interviews (Spanjersberg, 2018). Besides normal entry burdens and government regulation, producers of food or substances of food have to comply with extra regulation stemming from the European Union General Food Law. Besides the General Food Law, extra regulation is affecting aquaculture producers on issues as hygiene, trade/labelling, additives and undesirable substance alongside the Regulation Official Control. The Regulation Official Control monitors any infringements of the regulations (van den Burg, et al., 2013; Vloemans, 2011).

Entry burden for off-shore aquaculture producers which have an interest in multi-use locations (off-shore wind farms, etc.) is that the operators of those locations, typical energy companies, are reluctant as the risks increases with multiple use, which increases their insurance premiums. Another entry burden is that with new innovations techniques tend to change, especially with seaweed aquaculture, which has a negative effect on the availability of insurance and the insurance premiums. Another entry barrier in off-shore aquaculture is that in the spatial plans of the Netherlands in the North Sea there is no area designated for aquaculture. Policy makers and regulators have not been challenged to handle requests for permits and subsidies and a regulatory framework for this is missing (Bikker, et al., 2016; European Commission, 2016), but the Dutch government has indicated that these burdens will be eliminated (European Commission, n.d.).

Normative

The relationship between nature and economy is changing. For years it was common to protect vulnerable areas against economic activities. In recent years however, a shift is noticeable in which it becomes more common to integrate nature and economy so that synergy is created and both nature and economy can benefit from one another. This has led to the so-called green entrepreneurship (Juniper, 2013; van den Burg, et al., 2016).

Although the aquaculture sector in the Netherlands is well organised (FAO, 2007; Verreth, 2018), there have been issues regarding the use of subsidies for innovation in fish species, fair competition in land-based aquaculture and with collaboration (Rijksoverheid, 2015; van Dongen, 2017). After one of the farmers switched the fish species produced to a species more economical beneficial after receiving a subsidy other farmers were not pleased, arguing that it was not appropriate and even starting a law suit which stated that the farmer misused the subsidy (van Dongen, 2017).

Aquaculture has become a new area of interest for the increasing demand for food worldwide. Many researchers conclude that aquaculture can be the solution or part of the solution to solve world hunger and that it can cope with the increasing food demand (Béné, et al., 2015; FAO, 1987; Frankic & Hershner, 2003) and this is supported by one of the respondents of the interviews (Verreth, 2018). Some researchers even suggest that aquaculture can reduce climate change as new uses for seaweed are becoming clear (Battaglia, 2016; Flannery, 2017; Kinley, de Nys, Vucko, Machado, & Tomkins, 2016; Machado, Magnusson, Paul, de Nys, & Tomkins, 2014).

Cultural-cognitive

Research regarding aquaculture in the Netherlands has become more common in recent years. This research is focussed on the technical possibilities of marine aquaculture, but on the application of the aquaculture products as well (Bikker, et al., 2016). Economic feasibility studies are becoming more common as well. One shortcoming of the current research however, is that it does not conclude whether seaweed aquaculture in open water can be economically feasible when it improves the ecosystem as it is hard to reap the financial benefits as an entrepreneur (Bikker, et al., 2016; van den Burg, et al., 2016). Before the research in aquaculture became more common, the public lacked interest in aquaculture and this had led to misconception and misinformation which had to be readdressed by government agencies and the aquaculture sector to correct this. The lack of research created a gap in the know-how as well which did not help the development of aquaculture (Burbridge, Hendrick, Roth, & Rosenthal, 2001; Frankic & Hershner, 2003). If through this research the knowledge gap is closed, the same might happen as in 1975, when the Agricultural College of Wageningen started to conduct research to close the knowledge gap experienced then. The closed knowledge gap and skills gained by graduates from the Agricultural College led to the start of many new aquaculture farms in the Netherlands which can be partly attributed to this group of highly trained university graduates (Bager, 2011; FAO, 2007). The closing of the gap is confirmed by one of the respondents of the interview as he was part of it (Verreth, 2018).

Another factor influencing aquaculture is the increasing demand of convenience products. Convenience products are easy to prepare, but healthy as well. Consumers in the Northwest of Europe tend to have less knowledge of preparing fish and therefore fish which is easy to prepare is becoming more common. Locally produced products are becoming more demanded as well (Rijksoverheid, 2015; Skoda, 2017).

Conclusion

The institutions influencing entrepreneurship are changing. There is a switch in the regulative institutions compared to the past when aquaculture was not given a high priority. Both the European Union and the Netherlands have given a high priority to the development of aquaculture and try to create incentives to support the development. This is translated into a new vision and support programs originating from the governments and the promises to tackle burdensome regulations and remove barriers. Companies in the aquaculture sector in the Netherlands still face entry burdens which are especially worrisome for small and medium enterprises. Other barriers for companies are the insurance premiums which tend to be high. The normative institutions have changed as well. There have been some issues regarding fair competition, innovation and collaboration. The extra interest in aquaculture comes from changing attitudes towards the relationship between economy and nature and the belief that aquaculture can help to solve global sustainability issues. The cultural-cognitive institutions have changed as more research is being conducted in aquaculture. The extra research can help spark extra interest in aquaculture and can become an incentive. The

increasing demand in convenience products is reinforcing the interest in aquaculture and is considered an incentive.

4.3 The institutional framework and its effect on entrepreneurship in sustainable aquaculture

Regulations

The government of the Netherlands is creating husbandry criteria which are specially developed for species farmed in the Netherlands and these criteria are offered to the ASC for further use to help them create certificates for those species produced in the Netherlands (European Commission, n.d.). This strategy is derived from the strategy of the European Union in supporting sustainable aquaculture development. The first step in the European strategy is to help the sector become more competitive through support of research and development to produce efficiently and environmentally friendly (European Commission, 2013; Seixas, Bostock, & Eleftheriou, 2012). The second step is to ensure that the current aquaculture sector becomes and remains sustainable by using environmentally friendly production methods. The last step is to create a business-friendly environment within the European Union. On the other hand, there is no legislation of what exactly sustainable is besides the fact of complying with the current regulation (Seixas, Bostock, & Eleftheriou, 2012).

Normative

The sustainability certificates are increasingly important in the aquaculture sector (Rijksoverheid, 2015; Verreth, 2018). Demand from consumers, NGOs and retailers for assurances that the products they purchase have been produced with high standards regarding environment and social sustainability is increasing (European Commission, 2013). This is highlighted in case of the Dutch supermarkets, which sell 80 per cent of the fish in the Netherlands (CBS, 2015). All the supermarkets which are active in the Netherlands agreed that they would switch from conventional caught wild fish to sustainable produced fish with either the ASC-certificate thus stemming from aquaculture or MSC-certificate wild caught fish for which there is yet no ASC-certificate or aquaculture (CBS, 2016; Jonker, 2017; Perizonius, 2015; van der Poel, 2016) as long as the fish is not endangered (van der Poel, 2016). With the increasing demand for sustainable certified products, the prediction is that organisations without a sustainability certificate would lose their right of existence for the (larger) retail and foodservice companies (Rijksoverheid, 2015). Other retailers in Europe are switching to the ASC-certificate for their fish as well (Dongen, 2017; Jonker, 2017). Besides the market focus the ASC-certificate is the only certification which complies with the International Social and Environmental Accreditation and Labelling Code of Good Practice for Setting Social and Environmental Standards (ISEAL, 2018).

In the last ten years the increased demand for sustainable produced food products in the four largest European markets has been greater than the increase of non-organic food. As mentioned before, large retailers such as supermarket have played an important role in this change (European Commission, 2013; Potts, Wilkings, Lynch, & McFatridge, 2016). The retailers on the other hand only focus on a limited number of species groups that have a stable supply and have a high commercial value (Potts, Wilkings, Lynch, & McFatridge, 2016). The notion that the retailers have a rather limited scope was confirmed by one of the respondents of the interviews (Verreth, 2018). Many of the aquaculture producers in Europe recognise the need for sustainability, both social and environmental. Therefore, the majority participate in a variety of voluntary standards, but just several of those standards are independent certificates with oversight and audits (Seixas, Bostock, & Eleftheriou, 2012) as they require extra effort and capital (Potts, Wilkings, Lynch, & McFatridge,

2016). The other problem is that there are no certificates available for every species, which leads to a smaller market for the producer and keeps them from acquiring a sustainability certificate (van Dongen, 2017) and this problem is confirmed by respondents of the interviews (Verreth, 2018).

At the moment there is a consensus that private sustainability standards in the seafood sector have arisen because of the failure of public institutions to monitor and manage seafood sustainability. The standards on the other hand need public institutions as the resources used in seafood production are public property and thus fall under public regulation. Nations have the legal responsibility to control and manage their water, being it inland, coastal or sea and to create a sustainable economy. For this management, nations need data and management structures, which in turn are used by the private sustainability standard organisation to create sustainability certificates. Certificates are thus created by market-based organisations which try to create a consensus among multiple international stakeholder groups, focussing both on sustainability and on the economic interests. Both the private sustainability standards and the national governments have a greater need to cooperate with one another as both can benefit as both former research and interviews taken for this research support this (Potts, Wilkings, Lynch, & McFatridge, 2016; Verreth, 2018).

The majority of the certified fish product is sold in supermarkets. Fish mongers tend to argue that they do not believe in the certificate, the consumer does not want it or that it is too expensive to obtain a certificate. To acquire a certificate, the seller has to store certified products separately from non-certified products. What they tend to see as too much of a burden. A new trend however, is group certification via a group manager who performs the certification process of a number of retailers at once making it easier and less costly (Olthuis, 2015; van der Poel, 2016).

Animal welfare is becoming increasingly important in the European Union and therefore the European Commission has created a strategy for the protection and welfare of animals. Part of this strategy is to change legislation to inform consumers about production methods, the creation of regulation regarding animal welfare and regulation regarding skills of personnel who interact with the animals. Animal welfare is increasingly important in aquaculture as well and to protect and increase animal welfare the European Aquaculture Technology and Innovation Platform has identified three goals. The first is the creation of welfare indicators, the second is to gain insight in suboptimal conditions of welfare in short term and long term and the third is to create a management system to reduce the stress of fish (Ministry of Economic Affairs, 2014; Rijksoverheid, 2015).

In the Netherlands there is an increasing interest in the use of residual flows. Waste from the production of aquaculture can be used in different applications, just as waste from the other agriculture sectors can be used in the aquaculture sector. Only if it is sustainable and traceable which is a requirement for obtaining the sustainability certificates. The benefits of using residual flows is that they can create extra revenue or can lower the cost of operating (Bastein, Roelofs, Rietveld, & Hoogendoorn, 2013; Rijksoverheid, 2015; Verreth, 2018).

Cultural-cognitive

Besides the increasing attention given to sustainability certification, there is an increase in the need of information and communication regarding the origins and production of seafood. The traceability is becoming more important. The traceability creates the option to get a better insight into the production process, but helps with food safety as well. Traceability helps maintaining the quality of the product and can thus help with the positioning of the product (Baltussen, et al., 2017; Rijksoverheid, 2015) and this notion is supported by one of the respondents of the interviews (Verreth, 2018).

The European Commission does recognise the importance of certificates, just as the government of the Netherlands, as it can differentiate aquaculture products stemming from the European Union (European Commission, 2013; European Commission, n.d.) and it can help increase the societal acceptance of the European aquaculture sector and its products as that is relatively low in Europe (Burbridge, Hendrick, Roth, & Rosenthal, 2001; European Commission, 2013; Frankic & Hershner, 2003).

Conclusion

The institutions affecting sustainable aquaculture have changed although the change takes time depending on the level of the institutions as explained in part 2.2.

The increase in sustainable produced aquaculture by the main retailers in the market is reflected in the normative institutions as the demand for sustainable products is rising faster than the demand in non-sustainable produced food and is an incentive for sustainable aquaculture producers. Producers without the ASC-certificate tend to lose their right to existence in the future and demand for their product will diminish which forms a barrier, although the producers do recognise the need for sustainability. So, although it can be a barrier for companies which cannot change it can be regarded as a potential incentive for companies willing and able to change thus increasing the development of sustainable aquaculture as more companies become active in the sector.

The main problem and thus barrier with the ASC-certificate however, is that it is only applicable to twelve species and most species produced in the Netherlands are not included in the ASC-certificates. The Dutch government has acknowledged the importance of sustainable aquaculture and more specifically the ASC-certificate. The Dutch government has set up a program to support the development of the certificate for new species produced in the Netherlands. This can eventually become an incentive for the sustainable aquaculture sector in the Netherlands as more product opportunities arise.

Other issues are that not all the companies in the chain recognise the need or that they find the certification process too burdensome or expensive which can be considered as a barrier. Animal welfare is getting increased attention in Europe which can be seen as an incentive as it strengthens the push towards sustainability. Changes in the cultural-cognitive institutions focus on the traceability of products and the increasing importance of that and the European Union argues that certificates and the traceability can help position of sustainable aquaculture in Europe and can form an incentive for the development of sustainable aquaculture.

4.4 Companies in sustainable aquaculture

The results show that in the Netherlands the aquaculture sector is rather small compared to Europe's biggest aquaculture nations and especially in comparison with the rest of the world (FAO, 2018). The Netherlands is the sixth largest producer in Europe (Eurostat, 2018), but almost none of the producers are active in the certified sustainable aquaculture. In the Netherlands 50 companies are active in the marine aquaculture, 91 companies in the mussel aquaculture and 37 in the oyster aquaculture. Worldwide the ASC has issued 688 certificates to sustainable aquaculture farms, 1647 certificates to suppliers and 5555 certificates for sustainable produced aquaculture products (28-08-2018).

Only one fish producer, Kingfish Zeeland B.V. in the Netherlands has acquired the ASC-certificate on August the 20th 2018 for the production of *Seriola lalandi* otherwise known as Yellowtail amberjack. No other company is certified, in the process of being certified or was ever certified (ASC, 2018b). The number of companies which have activities in the sustainable aquaculture sector is somewhat

larger with 166 companies, but in this instance the activities range from processing, packaging, repacking, harvest, conservation, storage, trading, wholesale and retail to the customers. A relatively large proportion of the 5555 certified sustainable produced aquaculture products are sold in the Netherlands with almost a quarter of the total quantity being sold in the Netherlands, some of these products are sold in other mainly Northern European nations as well (ASC, 2018c).

In the Netherlands there is just one sustainable aquaculture producer which produces the Yellowtail amberjack. The number of companies which have certificates to trade or process sustainable aquaculture product is larger with 166 companies and the number of ASC-certified products sold in the Netherlands is 5555.

4.5 Conclusion

In this section the result of four of the sub-questions has been answered. The effect of institutions on the number of companies has been explained. The institutional framework which affects entrepreneurship and thereby the entrepreneurial activity in the Netherlands indicates that the number of companies in the Netherlands should be rising based on the nascent entrepreneurship rate, the discontinuation rate and the presence of incentives for entrepreneurial activity. Although the prediction of the rate from the Global Entrepreneurship Models conceptual framework was not correct, the model was correct that the number of companies in the Netherlands would rise based on the regulative and normative pillars.

The institutions have affected aquaculture in the Netherlands in a more positive way than in the past. Aquaculture development has been given priority by the government and is now considered a possible tool to fight climate change and contribute to the increasing global food demand and this is reflected in the increasing amount of research in aquaculture. This change can be traced to the incentives created in the Netherlands and Europe for the development of aquaculture. Aquaculture does face some barriers in the Netherlands although changes are promised.

Certain institutions are having a positive effect on sustainable aquaculture and form incentives. Sustainability is ever more demanded in Europe and the Netherlands and that is reflected in incentives for the development of the sustainable aquaculture sector. Retailers are demanding the ASC-certificate for the aquaculture products they sell which indicates that it falls under the normative pillar.

The ASC-certificate has some barriers however, as there are nearly no certificates for the aquaculture species produced in the Netherlands. The producers in the Netherlands acknowledge the need for sustainability which is reflected in the processes. The lack of species covered creates a barrier for the development of sustainable aquaculture. The process of acquiring an ASC-certificate is seen as burdensome by some in the value chain and they therefore argue against obtaining an ASC-certificate which forms a barrier as well. These barriers fall under the normative pillar.

5 Conclusion and Recommendation

In the first part of this section the main research question will be answered. The second part will describe the limitations of this research. The third part will give recommendations based on this research for both the institutions and for the companies active in aquaculture in the Netherlands. The last part will recommend steps for future research on sustainable aquaculture in the Netherlands.

5.1 Research conclusions

The main research question is: *“What is the effect of the institutional framework and entrepreneurship on the development of sustainable aquaculture in the Netherlands”*? The findings on the sub-questions have been used to come to the conclusion of the main research question..

The institutions, being regulative, normative or cultural-cognitive from the institutional framework affect entrepreneurship and entrepreneurial activity as indicated in the mechanism and illustrated in the upper part of figure 6 with the sub-questions 5.1 and 5.2. The current entrepreneurial conditions of the Dutch aquaculture market are unknown. The generic state of entrepreneurship in the Netherlands is known and therefore the generic state has been used in the description of the state of the Dutch aquaculture sector. Despite the criticism on the theory behind the institutional framework and the effect on entrepreneurship and entrepreneurial activity, it has offered the possibility to draw conclusion in this research if they were supported by the interviews. The institutional framework in the Netherlands has a positive effect on entrepreneurship and the entrepreneurial activity and this is supported by the interviews. Although the entrepreneurial activity and more particular the nascent entrepreneurship and discontinuation rate have shown a slight decrease, it still indicates at favourable conditions, which means that the number of new companies is expected to grow through incentives. The increase, though missing the exact rate, is accurate in terms of growth or decline. This is the effect of the institutional framework on entrepreneurial activity and the number of companies in general. The change in the number of companies should be reflected in the number of companies in the sustainable aquaculture production as well although other factors need to be taken into account. To answer the main research question, it was necessary to identify how institutions shape aquaculture and sustainable aquaculture in the Netherlands, which is described in the mechanism and illustrated in the lower part of figure 8 with sub-question 5.3.

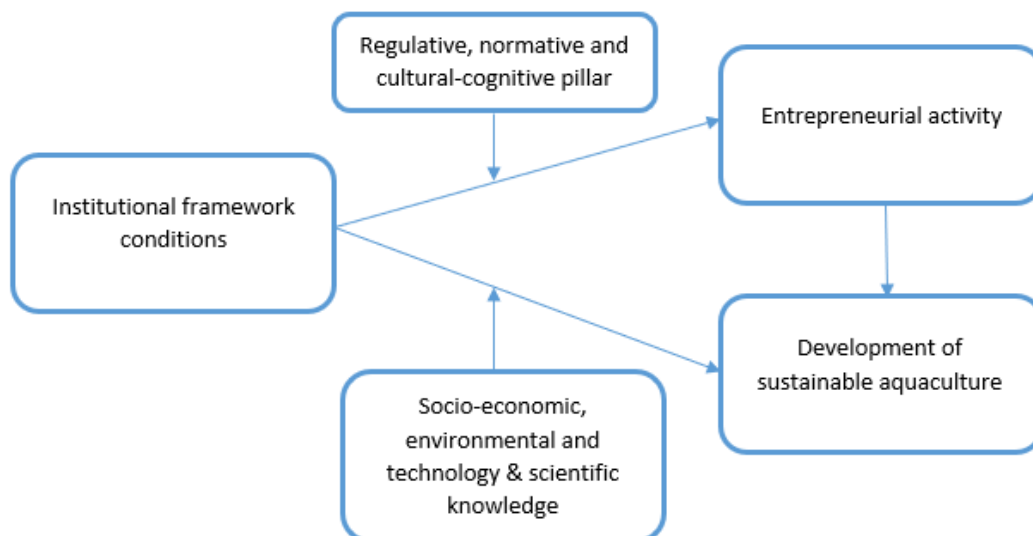


Figure 8 The sub-questions integrated in the mechanism

According to the mechanism, biological factors, environmental factors, socio-economic factors and technology and scientific knowledge influence the development of (sustainable) aquaculture in terms of incentives and barriers. The biological factors include and exclude species which are suitable for production of aquaculture in the Netherlands both inland and outland. The environmental factors are included in the strategy of government of the Netherlands regarding aquaculture and the demand of the ASC-certificate from the supermarkets. These mainly reflect the push for sustainability in the production process originating from normative institutions. Technological and scientific developments have an overlap with the R&D institutional framework condition for entrepreneurship. However, the focus is on knowledge of sustainable aquaculture as well, which is becoming greater and has attracted more interest in recent years. The problems are the political system and the economic demands are part of the socio-economic factor in the institutional framework that affects entrepreneurship.

The institutions that have been identified to influence aquaculture in the Netherlands have become more supportive of aquaculture than in the past and thus offer more incentives as concluded on the literature research and interviews. Entry burdens and insurance premiums do however, still form an obstacle for starting and established companies in the aquaculture production and thus are still barriers. One of the main changes in the institutional framework is the push to more sustainability in the production process of aquaculture which is supported by the interviews. This is reflected in the push from supermarkets as they demand an ASC-certificate from producers of aquaculture to be able to sell their product in the supermarkets. The change from the supermarkets has pushed farms without an ASC-certificate out of the most lucrative market in the Netherlands and now is a barrier, but can become an incentive as the push to acquire an ASC-certificate becomes greater.

The shortcoming of ASC-certification in the Netherlands is that it only covers twelve main species and most of those species are not produced by the aquaculture sector in the Netherlands. According to desk research and one respondent of the interviews, the lack of species covered by the ASC is the main barrier regarding the development of certified sustainable aquaculture in the existing aquaculture sector in the Netherlands. The main issue exists despite the fact that aquaculture producers in the Netherlands indicate that they deem sustainability important. The importance of sustainability is reflected in their production process although the aquaculture producers cannot obtain sustainability certificates. The government in the Netherlands is trying to assist in the development of the ASC-certificate to include more species which exist and are produced in the Netherlands.

At this moment only one aquaculture producer has acquired the ASC-certificate. The lack of suitable ASC-certificates for fish produced in the Dutch aquaculture sector and the entry burdens and regulation in the Netherlands has kept the number of companies in sustainable aquaculture in the Netherlands at one, which is low compared with the total aquaculture sector in the Netherlands which consists of around 150 companies.

5.2 Limitations of research

This research is based on aquaculture, more specifically sustainable aquaculture, the companies in this sector and their production. Company information regarding production, income and profit are outdated most of the time or not available at all as small companies do not have to submit an income statement for publication to the *Belastingdienst* (the Dutch equivalent of the IRS). Production volumes are unclear as well, both the FOA and the ASC do not have the exact volume per nation or per farm.

The most significant limitation of this research was the shortage of empirical data regarding the state of aquaculture in the Netherlands. The estimated production volume, revenue streams and the number of companies active in the production of aquaculture are the only data that is available. Start-up companies which are not yet producing for consumers on the other hand are unknown, just as the number of employees in existing companies, the revenue streams per company, the investment needs, the current production methods etc. The lack of data has limited the in-depth analysis of the Dutch aquaculture sector and thereby the sustainability processes the companies have undertaken besides the current sustainability certificates are unknown.

Fluctuations in the institutions have been highlighted in the theoretical framework, but the reason for the fluctuations have not been examined thoroughly although they might have an impact on entrepreneurship in general. The institutions are immense and examining the cause of all the fluctuations would require too much time and it would expand the scope too much.

Biological factors which exclude or include certain species to be produced in sustainable aquaculture in the Netherlands have not been examined. Certain species require open water or other specifications in their growth process which are (not) available in the Netherlands.

The Global Entrepreneurship Monitor does measure nascent entrepreneurship rate and the discontinuation rate. However, an entrepreneur who Discontinue as an entrepreneur can only fill in that he is discontinuing his business while he is starting a new business after the discontinuation of his former company. This is a limitation in the model as someone can be starting a new company while he is discontinuing the other business. The same argument goes for an entrepreneur who owns and operates a company, in the GEM an entrepreneur can only have one company, which is not a reflection of the reality.

5.3 Recommendation from research

This research with its conclusion supports certain recommendations both for the government to change certain regulative institutions and for the aquaculture sector in the Netherlands. The new government program which supports research and collaboration is believed to positively affect the development of aquaculture and sustainable aquaculture. The programs both support and slightly pressure the Aquaculture Stewardship Council to develop new certificates based on species which are cultivated in the Netherlands (European Commission, n.d.).

Group certification is becoming more common. Certification with a group indicates that a group of producers request that an independent organisation will audit them all to acquire ASC-certificates for their respective species. The whole process is handled by a group manager who performs the certification process of a number of retailers at once making it easier and less costly (Olthuis, 2015; van der Poel, 2016).

The Netherlands has quite a large share of the aquaculture sector which focus on shellfish production, more specific mussels. None of those companies however, is in possession of an ASC-certificate as all use the old method of catching mussels in the sea to hatch them at their own production locations. This is not deemed sustainable and therefore a good opportunity lies in the creation of a mussel farm which breeds smaller mussels to be sold to the hatcheries as they will be limited to increasing stricter regulation of catching wild mussels over time (Smaal & Lucas, 1999).

5.4 Recommendations for future research

The creation of sustainability certificates takes time as research, economic interests and other interests have to be integrated in the certificate. Future research can indicate how best to facilitate the creation of more ASC-certificates for species produced in the Netherlands and around the globe.

The creation of certificates is an ongoing process. Certificates for other species are being developed at this moment. With the creation, broad guidelines are becoming clear, if these would already be communicated it will help to prepare producers for the switch to certified sustainable production. Future research should indicate how to facilitate the aquaculture sector to switch to sustainable aquaculture both for species for which there is a certificate and for producers who produce products for which there is not yet a certificate.

Multi-use of locations will become more common in the future. Important is that the government has an indication of how a regulative framework can be created, used and evaluated and how this framework supports the multi-use of locations in the most effective manner. The framework has to handle the burdens of property rights, taxes, insurance and liability to. Multi-use locations which span across borders are a possibility as well, especially in the European Union.

The theory of Tisdell with the four factors which he has identified are very broad and have not been updated, while many changes have occurred. With the link to the institutional framework of the GEM more measurable variables have been identified. These variables on the other hand due change in the future and future research in other variables in each of these factors should be examined.

Further research regarding the institutional framework of the GEM is advisable as the factors in the framework are broad. The outcomes give a pretty good indication of trends in entrepreneurial activity although the real change in the total number of companies is different. More research to conclude whether the entrepreneurial activity represents every sector of the economy is advisable as well as the sectors tend to differ.

6 References

- Acemoglu, D., & Robinson, J. (2005). *The Economic Origins of Dictatorship and Democracy*. Cambridge: Cambridge University Press.
- Acs, Z. J., & Amorós, J. E. (2008). Introduction: The startup process. *Estudios de Economía*, 35(2), 121-132.
- Acs, Z. J., Desai, S., & Klapper, L. F. (2008). What does "entrepreneurship" data really show? *Small Business Economics*, 31, 265-281. doi:10.1007/s11187-008-9137-7
- Acs, Z., & Varga, A. (2005). Entrepreneurship, Agglomeration and Technological Change. *Small Business Economics*, 24(3), 323-334.
- Acs, Z., Astebro, T., Audretsch, D., & Robinson, D. T. (2016). Public policy to promote entrepreneurship: a call to arms. *Small Business Economics*, 35-51. doi:10.1007/s11187-016-9712-2
- Acs, Z., Desai, S., & Hessels, J. (2008). Entrepreneurship, economic development and institutions. *Small Business Economics*, 219-234.
- ADP. (2016, January 6). *ADP: Werkgeverslasten stijgen in 2016*. Retrieved from Automatic Data Processing: <https://www.adp.nl/over-adp/persberichten/2016/01-06-werkgeverslasten-stijgen-in-2016/>
- ADP. (2017, January 5). *Werkgeverslasten dalen in meeste gevallen in 2017*. Retrieved from Automatic Data Processing: <https://www.adp.nl/over-adp/persberichten/2017/01-05-lonen-2017-werkgeverslasten-dalen/>
- ADP. (2018, January 4). *Kosten voor arbeid stijgen in 2018*. Retrieved from Automatic Data Processing: <https://www.adp.nl/over-adp/persberichten/2018/01-04-kosten-voor-arbeid-stijgen-in-2018/>
- Aidis, R. (2017). *Do institutions matter for entrepreneurial development?* Washington: IZA World of Labor.
- Angulo-Guerrero, M. J., Pérez-Moreno, S., & Abad-Guerrero, I. M. (2016). How economic freedom affects opportunity and necessity entrepreneurship in the OECD countries. *Journal of Business Research*, 30-37.
- Aparicio, S., Urbano, D., & Audretsch, D. (2016). Institutional factors, opportunity entrepreneurship and economic growth: Panel data evidence. *Technological Forecasting & Social Change*(102), 45-61.
- Arias-Pérez, J., & Lozada, N. (2017). Innovation Research Based on Global Entrepreneurship Monitor (GEM) Project: Review of the Last Decade. *Mediterranean Journal of Social Sciences*, 131-140.
- ASC. (2017). *Our standards*. Retrieved June 13, 2018, from Aquaculture Stewardship Council: <https://www.asc-aqua.org/what-we-do/our-standards/>
- ASC. (2018a). *Feed*. Retrieved June 13, 2018, from Aquaculture Stewardship Council: <https://www.asc-aqua.org/what-we-do/our-standards/feed-standard/>
- ASC. (2018b, August 20). *Find a farm*. Retrieved from Aquaculture Stewardship Council: <http://asc.force.com/Certificates/>

- ASC. (2018c). *Find a product*. Retrieved from Aquaculture Stewardship Council: <https://www.asc-aqua.org/what-you-can-do/take-action/find-a-product/>
- Autio, E. (2007). *Global Entrepreneurship Monitor 2007*. Wellesley and London: Babson College and London Business School.
- Badir, M. (2018, February 8). *Dutch economy approaching the top of the business cycle*. Retrieved from Rabobank: <https://economics.rabobank.com/publications/2018/february/dutch-economy-approaching-the-top-of-the-business-cycle/>
- Bager, T. (2011). Entrepreneurship education and new venture creation: A comprehensive approach. In K. Hindle, & K. Klyver, *Handbook of Research on New Venture Creation* (pp. 299-315). Cheltenham: Edward Elgar Publishing Limited.
- Baliamoune-Lutz, M. (2015). Taxes and Entrepreneurship in OECD Countries. *Contemporary Economic Policy*, 33(2), 369-380.
- Baltussen, W., Ruijs, M., Bondt, N., van Haaster-de Winter, M., Hoste, R., Immink, V., . . . Splinter, G. (2017). *Transparantie in de varkensketen*. Wageningen: Wageningen Economic Research.
- Bastein, T., Roelofs, E., Rietveld, E., & Hoogendoorn, A. (2013). *Kansen voor circulaire economie in Nederland*. Delft: TNO.
- Bathelt, H., & Glückler, J. (2014). Institutional change in economic geography. *Progress in Human Geography*, 340-363.
- Battaglia, M. (2016, October 12). *Seaweed could hold the key to cutting methane emissions from cow burps*. Retrieved from The Conversation: <http://theconversation.com/seaweed-could-hold-the-key-to-cutting-methane-emissions-from-cow-burps-66498>
- Bedolfe, S. (2017, June 16). *What's certified sustainable seafood, and does it actually help the ocean?* Retrieved from Oceana: <https://oceana.org/blog/what%E2%80%99s-certified-sustainable-seafood-and-does-it-actually-help-ocean>
- Beerens, H. (2014, September 29). *Export dit jaar niet leuker, wel makkelijker*. Retrieved from Logistiek: <https://www.logistiek.nl/distributie/nieuws/2014/09/export-dit-jaar-niet-leuker-wel-makkelijker-10145450?vakmedianet-approve-cookies=1>
- Béné, C., Barange, M., Subasinghe, R., Pinstруп-Andersen, P., Merino, G., Hemre, G.-I., & Williams, M. (2015). Feeding 9 billion by 2050 - Putting fish back on the menu. *Food Security*, 261-274. Retrieved June 13, 2018, from <https://link.springer.com/content/pdf/10.1007%2Fs12571-015-0427-z.pdf>
- Berges, J. A., Franklin, D. J., & Harrison, P. J. (2001). Evolution of an artificial seawater medium: improvements in enriched seawater, artificial water over the last two decades. *Journal of Phycology*, 1138-1145.
- Bergmann, H., Mueller, S., & Schrettle, T. (2014). The Use of Global Entrepreneurship Monitor Data in Academic Research: A critical Inventory and Future Potentials. *International Journal of Entrepreneurial Venturing*, 6(3), 1-43.
- Bikker, P., Blaauw, R., Brandenburg, W., van den Burg, S., Dijkstra, J., van Duren, L., . . . van der Werf, A. (2016). *North-Sea-Weed-Chain*. Den Haag: TNO.

- Boettke, P. J., & Coyne, C. J. (2009). Context Matters: Institutions and Entrepreneurship. *Foundations and Trends in Entrepreneurship*, 5(3), 135-209.
- Bonnet, J., & Le Pape, N. (2016). Labor Market and Successful Entrepreneurship. In J. Bonnet, M. Dejardin, & D. García-Pérez-De-Lema, *Exploring the Entrepreneurial Society Institutions, Behaviors and Outcomes* (pp. 101-114). Caen: Edward Elgar.
doi:10.4337/9781783472666.00015
- Boyd, C. E., & McNevin, A. A. (2015). *Aquaculture, Resource Use, and the Environment*. New Jersey: Wiley-Blackwell.
- BRIS. (2018). *Hoofdstuk 9 Overgangs- en slotbepalingen*. Retrieved from BRIS Bouwbesluitonline: https://www.bouwbesluitonline.nl/Inhoud/docs/wet/bb2012_nvt/artikelsgewijs/hfd9
- Bruton, G. D., Ahlstrom, D., & Li, H.-L. (2010). Institutional Theory and Entrepreneurship: Where Are We Now and Where Do We Need to Move in the Future. *Entrepreneurship Theory and Practice*, 34(3), 421-440.
- Bryman, A., & Bell, E. (2007). *Business Research Methods*. Oxford: Oxford University Press.
- Burbridge, P., Hendrick, V., Roth, E., & Rosenthal, H. (2001). Social and economic policy issues relevant to marine aquaculture. *Journal of Applied Ichthyology*, 194-206.
- Burns, P. (2016). *Entrepreneurship and Small Business*. London: Palgrave.
- CBS. (2010, December 1). *Grote bedrijven conjunctuurgevoeliger dan midden- en kleinbedrijf*. Retrieved from Centraal Bureau voor de Statistiek: <https://www.cbs.nl/nl-nl/nieuws/2010/48/grote-bedrijven-conjunctuurgevoeliger-dan-midden-en-kleinbedrijf>
- CBS. (2015, October 20). *Achtergrondinformatie en handelsstromen (kweekvis, 2015)*. Retrieved from CBS: <https://www.cbs.nl/nl-nl/achtergrond/2015/43/achtergrondinformatie-en-handelsstromen--kweekvis-2015-->
- CBS. (2016). *Kweekvis*. Retrieved from Centraal Bureau voor de Statistiek: <https://www.cbs.nl/nl-nl/economie/landbouw/monitor-duurzame-agro-grondstoffen-2016/grondstoffen/kweekvis>
- CBS. (2017, December 20). *CBS-conjunctuurbeeld: nu en 10 jaar geleden*. Retrieved from Centraal Bureau voor de Statistiek: <https://www.cbs.nl/nl-nl/nieuws/2017/51/cbs-conjunctuurbeeld-nu-en-10-jaar-geleden>
- CBS. (2018, January 22). *Aantal bedrijven met 5 procent gegroeid*. Retrieved from Centraal Bureau voor de Statistiek: <https://www.cbs.nl/nl-nl/nieuws/2018/04/aantal-bedrijven-met-5-procent-gegroeid>
- CBS Statline. (2018, September 14). *Bedrijven: bedrijfstak*. Retrieved from CBS Statline: <https://opendata.cbs.nl/statline/#/CBS/nl/dataset/81589ned/table?ts=1537874770381>
- Confino, J. (2011, September 21). *Companies must push harder for sustainable growth*. Retrieved from The Guardian: <https://www.theguardian.com/sustainable-business/blog/businesses-social-environmental-impact-sustainable-growth>
- Culliney, K. (2018, July 13). *Sustainable palm oil in LATAM: The challenge is convincing brands to join the push, says RSPO*. Retrieved from Food Navigator LATAM: <https://www.foodnavigator-latam.com/Article/2018/07/13/Sustainable-palm-oil-in-LATAM-The-challenge-is-convincing-brands-to-join-the-push-says-RSPO>

- Dalstra- van Emst, M. (2017, December 12). *Schommelingen faillissementen groter in Nederland*. Retrieved from Atradius: <https://atradius.nl/pers/schommelingen-faillissementen-groter-in-nederland.html>
- de Kok, J., Kruithof, B., Snijders, J., van der Graaf, A., van Stel, A., & van der Zeijden, P. (2018). *Global Entrepreneurship Monitor the Netherlands 2017*. Zoetermeer: Panteia.
- de Zwaan, I. (2018, August 3). *De Mosselman knokt om de familietraditie overeind te houden: 'Er bestaat niet zoiets als een mosselkwekersschool'*. Retrieved from de Volkskrant: <https://www.volkskrant.nl/nieuws-achtergrond/de-mosselman-knokt-om-de-familietraditie-overeind-te-houden-er-bestaat-niet-zoiets-als-een-mosselkwekersschool-~b237bb87/>
- Eisenmann, T. R. (2013, January 10). *Entrepreneurship: A Working Definition*. Retrieved from Harvard Business Review: <https://hbr.org/2013/01/what-is-entrepreneurship>
- Engle, C., D'Abramo, L. R., & Slater, M. J. (2017). Aquaculture 2050. *Journal of the World Aquaculture Society*, 1-5.
- Estrin, S., Korosteleva, J., & Mickiewicz, T. (2013). Which institutions encourage entrepreneurial growth aspirations? *Journal of Business Venturing*, 28, 564-580.
- European Commission. (2013). *Strategic Guidelines for the sustainable development of EU aquaculture*. Brussels: European Commission.
- European Commission. (2016). *Aquaculture in the EU*. Brussels: European Commission.
- European Commission. (n.d.). *The Netherlands: Multiannual national plan for the development of sustainable aquaculture an overview*. Brussels: European Commission.
- Eurostat. (2018, June 26). *Production from aquaculture excluding hatcheries and nurseries (from 2008 onwards)* . Retrieved from Eurostat: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=fish_aq2a&lang=en
- FAO. (1987, April). *Introduction to aquaculture*. Retrieved from Food and Agriculture Organization of the United Nations: <http://www.fao.org/docrep/field/003/ac169e/ac169e00.htm>
- FAO. (2007, July 11). *National Aquaculture Sector Overview Netherlands*. Retrieved from Food and Agriculture Organization of the United Nations: http://www.fao.org/fishery/countrysector/naso_netherlands/en
- FAO. (2018). *Global Aquaculture Production*. (Fisheries and Aquaculture Department, Producer) Retrieved July 18, 2018, from Food and Agriculture Organization of the United Nations: http://www.fao.org/figis/servlet/SQServlet?file=/usr/local/tomcat/8.5.16/figis/webapps/figis/temp/hqp_1745287408323101387.xml&outtype=html
- FAO Statistics. (2016). *Fishery and Aquaculture Statistics*. Rome: Food and Agriculture Organization of the United Nations.
- Fels, J. (2018, April 16). *Time for investors to prepare for the next cycle*. Retrieved from Financial Times: <https://www.ft.com/content/05d2639e-414b-11e8-803a-295c97e6fd0b>
- Fischer, C., Guttormsen, A. G., & Smith, M. D. (2016). *Disease Risk and Market Structure in Salmon Aquaculture*. Aberdeen: IIFET.

- Flannery, T. (2017, July 31). *How farming giant seaweed can feed fish and fix the climate*. Retrieved from The Conversation: <https://theconversation.com/how-farming-giant-seaweed-can-feed-fish-and-fix-the-climate-81761>
- Fleurence, J. (1999). Seaweed proteins: biochemical, nutritional aspects and potential uses. *Trends in Food Science & Technology*, 25-28.
- Fotedar, R. K., & Phillips, B. F. (2011). *Recent advances and new species in aquaculture*. Chichester: Wiley-Blackwell.
- Frankic, A., & Hershner, C. (2003). Sustainable aquaculture: developing the promise of aquaculture. *Aquaculture International*, 517-530.
- Fuentelsaz, L., González, C., Maicas, J. P., & Montero, J. (2015). How different formal institutions affect opportunity and necessity entrepreneurship. *Business Research Quarterly*(18), 246-258.
- GAA. (2016). *About GAA*. Retrieved from Global Aquaculture Alliance: <https://www.aquaculturealliance.org/>
- GAA. (2017). *BAP Standards Development Process*. Retrieved from Global Aquaculture Alliance: <https://www.bapcertification.org/Standards>
- GEM Consortium. (2017). *Entrepreneurial Behaviour and Attitudes*. Retrieved from Global Entrepreneurship Monitor Consortium: <https://www.gemconsortium.org/country-profile/92>
- Gittsham, M. (2015, February 4). *More big businesses push for stricter environmental regulations*. Retrieved from The Guardian: <https://www.theguardian.com/sustainable-business/2015/feb/04/business-manifesto-sustainability-guidelines-climate-policy>
- Guillen, J., Natale, F., & Polanco, J. M. (2015). Estimating the economic performance of the EU aquaculture sector. *Aquaculture International*, 23, 1387-1400. doi:10.1007/s10499-015-9891-x
- Handwerk, B. (2016). *Sustainable Earth: Oceans*. Retrieved from National Geographic: <http://environment.nationalgeographic.com/environment/sustainable-earth/oceans/>
- Hartfiel, G., & Hillman, H.-K. (1982). *Wörterbuch der Soziologie*. Stuttgart: Kröner.
- Herrington, M., & Kew, P. (2017). *Global Entrepreneurship Monitor 2016/2017*. Babson Park and London: Global Entrepreneurship Research Association.
- Holmyard, N. (2015, January 21). *ASC's Chris Nannes talks responsible aquaculture, certification plans*. Retrieved from Seafood Source: <https://www.seafoodsource.com/features/asc-s-chris-nannes-talks-responsible-aquaculture-certification-plans>
- Idle, T. (2017, January 24). *Davos 2017: So, what happened to push sustainability further?* Retrieved from Virgin: <https://www.virgin.com/virgin-unite/davos-2017-so-what-happened-push-sustainability-further>
- ING. (2018, September 19). *Meer vrijheid, minder zekerheid*. Retrieved from ING: <https://www.ing.nl/zakelijk/kennis-over-de-economie/onze-economie/de-nederlandse-economie/publicaties/veel-animo-voor-ondernemerschap.html>

- ISEAL . (2018). *Aquaculture Stewardship Council (ASC)*. Retrieved from ISEAL Alliance:
<https://www.isealliance.org/community-members/aquaculture-stewardship-council-asc>
- Jak, R. (2013, October 1). Grenzen in Zee. Wageningen, Gelderland, The Netherlands.
- Jonker, M. (2017, July 27). *Nederlandse duurzame vis komt niet in supermarkt*. Retrieved from EenVandaag: <https://eenvandaag.avrotros.nl/item/nederlandse-duurzame-vis-komt-niet-in-supermarkt/>
- Juniper, T. (2013, January 9). *Why the economy needs nature*. Retrieved from The Guardian:
<https://www.theguardian.com/environment/blog/2013/jan/09/economy-nature>
- Kadaster. (2012). *Modeldocumentatie Informatiemodel Kadaster 2.1 FINAL*. Amsterdam: Kadaster.
- Kelley, D., Singer, S., & Herrington, M. (2016). *Global Entrepreneurship Monitor 2015-2016*. Babson Park and London: The Global Entrepreneurship Research Association.
- Kinley, R. D., de Nys, R., Vucko, M. J., Machado, L., & Tomkins, N. W. (2016). The red macroalgae *Asparagopsis taxiformis* is a potent natural antimethanogenic that reduces methane production during in vitro fermentation with rumen fluid. *Animal Production Science*, 56, 282-289.
- KvK. (2017, January). *Bedrijfsleven 2016*. Retrieved from Kamer van Koophandel:
https://www.kvk.nl/download/Jaaroverzicht%20Bedrijfsleven%20Nederland%202016%20versie%20US7_tcm109-433766.pdf
- KvK. (n.d.). *Wanneer heb ik een onderneming?* Retrieved from Kamer van Koophandel:
<https://www.kvk.nl/inschrijven-en-wijzigen/inschrijven-bij-de-kamer-van-koophandel/moet-ik-mijn-bedrijf-inschrijven/criteria-van-een-onderneming/>
- Leadbitter, D. (2014a). *White paper - Terrestrial Animal Ingredients*. ASC Responsible Feed Project. London/Utrecht: Aquaculture Stewardship Council. Retrieved from https://www.asc-aqua.org/wp-content/uploads/2017/07/Animal-Ingredients_v1.0.pdf
- Leadbitter, D. (2014b). *White paper - Terrestrial Plant Ingredients*. ASC Responsible Feed Project. London/Utrecht: Aquaculture Stewardship Council. Retrieved from https://www.asc-aqua.org/wp-content/uploads/2017/07/Plant-Ingredients_v1.0.pdf
- Leidbitter, D. (2014c). *White paper - Marine Ingredients*. London/Utrecht: ACS. Retrieved from https://www.asc-aqua.org/wp-content/uploads/2017/07/Marine-Ingredients_v1.0.pdf
- Levie, J., & Autio, E. (2007). Entrepreneurial Framework Conditions and National-Level Entrepreneurial Activity: Seven-Year Panel Study. *Third Global Entrepreneurship Research Conference* (pp. 1-39). Washington D.C.: Goergo Mason University.
- Lipczynski, J., Wilson, J. O., & Goddard, J. (2013). *Industrial Organization: Competition, Strategy & Policy*. London: Pearson Education Limited.
- Machado, L., Magnusson, M., Paul, N. A., de Nys, R., & Tomkins, N. (2014). Effects of Marine and Freshwater Macroalgae on In Vitro Total Gas and Methane Production. *PLOS*, 9(1). Retrieved from <https://doi.org/10.1371/journal.pone.0085289>
- Mahmud, S. (2014, November 10). *Malaysia's push for sustainable palm oil succes*. Retrieved from Global AgInvesting: <http://www.globalaginvesting.com/malaysiaos-push-for-sustainable-palm-oil-success/>

- Mankiw, N. G., & Taylor, M. P. (2014). *Marcoeconomics*. Andover: Cengage Learning EMEA.
- Marsh, C. (2013). *Business and Financial Models*. London: Kogan Page.
- Michail, N. (2018, May 3). *Certification schemes are holding back true sustainability, says report*. Retrieved from Food Navigator: <https://www.foodnavigator.com/Article/2018/05/03/Certification-schemes-are-holding-back-true-sustainability-says-report>
- Ministerie van Landbouw, Natuurbeheer en Visserij. (1993). *Vissen naar evenwicht*. Den Haag: Ministerie van Landbouw, Natuurbeheer en Visserij.
- Ministry of Defence. (2017, July 4). *Nederlandse grenzen op de Noordzee*. Retrieved from Ministerie van Defensie: <https://www.defensie.nl/onderwerpen/hydrografie/maritieme-zones-en-zeegrenzen/nederlandse-grenzen-op-de-noordzee>
- Ministry of Economic Affairs. (2014, April 4). Toezeggingen notaoverleg Dierenwelzijn. Den Haag, Zuid Holland, Netherlands. Retrieved from <http://edepot.wur.nl/299556>
- Ministry of Economic Affairs, Agriculture and Innovation. (2012, September). *Aquaculture Special. Berichten*, 38(9), pp. 1-31.
- Muralidharan, E., & Pathak, S. (2017). Informal institutions and international entrepreneurship. *International Business Review*(26), 288-302.
- Newmark, Z. (2015, December 25). *Nearly 60 Netherlands law changes take effect in 2016*. Retrieved from NL Times: <https://nltimes.nl/2015/12/25/nearly-60-netherlands-law-changes-take-effect-2016>
- Nibud. (2016, November 2). *Kredietregistratie bij BKR per 1 december uitgebreid*. Retrieved from Nibud: <https://www.nibud.nl/beroepsmatig/kredietregistratie-bkr-per-1-december-uitgebreid/>
- North, D. (1990). *Institutions, Institutional change and economic performance*. Cambridge: Cambridge University Press.
- NVWA. (n.d.). *Aangescherpte regels antibioticumgebruik dieren*. Retrieved from Nederlandse Voedsel- en Warenautoriteit: <https://www.nvwa.nl/onderwerpen/antibiotica-in-de-veehouderij/aangescherpte-regels-antibioticumgebruik-dieren>
- OECD. (2003). *Entrepreneurship and Local Economic Development*. Paris: Organisation for Economic co-operation and Development.
- Olthuis, L. (2015, November 26). Is de visboer op zijn blauwe ogen te vertrouwen? *de Volkskrant*.
- Osmundsen, T. C., Almklov, P., & Tveterås, R. (2017). Fish farmers and regulators coping with the wickedness of aquaculture. *Aquaculture Economics & Management*, 1-21. doi:10.1080/13657305.2017.1262476
- Pals, B. (2012, Juli 31). *Geen startkapitaal meer nodig bij nieuwe vorm Flex BV*. Retrieved from TaxiPro: <https://www.taxipro.nl/ondernemen/2012/07/31/geen-startkapitaal-meer-nodig-bij-nieuwe-vorm-flex-bv/>

- Perizonius, M. (2015, November 26). *Waar haal je duurzame vis? Niet bij de viswinkel*. Retrieved from Wel Ingelichte Kringen: <http://www.welingelichtekringen.nl/gezond/523211/waar-haal-je-duurzame-vis-niet-bij-de-viswinkel.html>
- Pita, C., Chuenpagdee, T., & Pierce, G. J. (2012). Participatory issues in fisheries governance in Europe. *Management of Environmental Quality*, 23(4), 347-361.
doi:10.1108/14777831211232209
- Potts, J., Wilkings, A., Lynch, M., & McFatridge, S. (2016). *State of Sustainability Initiatives Review: Standards and the Blue Economy*. Winnipeg, Canada: International Institute for Sustainable Development.
- Powell, B., & Rodet, C. S. (2012). Praise and profits: Cultural and institutional determinants of entrepreneurship. *Journal of Private Enterprise*, 27(2), 19-42.
- Rebours, C., Marinho-Soriano, E., Zertuche-González, J., Hayashi, L., Vásquez, J. A., Kradolfer, P., . . . Robledo, D. (2014). Seaweeds: an opportunity for wealth and sustainable livelihood for coastal communities. *Journal of Applied Phycology*, 1939-1951.
- Reynolds, P., Hay, M., & Camp, S. (1999). *Global entrepreneurship monitor*. Kansas City: Kauffman Center for Entrepreneurial Leadership.
- Rijksoverheid. (2015). *Nationaal Strategisch Plan Aquacultuur 2014-2020*. Den Haag: Rijksoverheid.
- Rijksoverheid. (2017). *Rijksoverheid stimuleert innovatie*. Retrieved from Rijksoverheid: <https://www.rijksoverheid.nl/onderwerpen/ondernemen-en-innovatie/rijksoverheid-stimuleert-innovatie>
- Rijksoverheid. (n.d.). *Waterkwaliteit*. Retrieved from Rijksoverheid: <https://www.rijksoverheid.nl/onderwerpen/water/waterkwaliteit>
- Rijkswaterstaat. (n.d.). *Vaarwegenoverzicht*. Retrieved from Rijkswaterstaat: <https://www.rijkswaterstaat.nl/water/vaarwegenoverzicht>
- Roebuck, K., & Wristen, K. (2017). *AQUACULTURE STEWARDSHIP COUNCIL (ASC) CERTIFICATION IN CANADA: Technical Report*. Montreal: SeaChoice .
- Rollason, C., Turner, P., & Yeates, D. (2014). *Business Analysis*. Swindon: BCS Learning & Development Limited.
- Rosane, O. (2019, March 19). *Oceans absorb almost 1/3 of global CO2 emissions, but at what cost?* Retrieved from World Economic Forum: <https://www.weforum.org/agenda/2019/03/oceans-do-us-a-huge-service-by-absorbing-nearly-a-third-of-global-co2-emissions-but-at-what-cost>
- Ruijven-Rojek, A. v. (2017, April 28). *Oorzaken groei zzp-adviseurs en kleine administratiekantoren*. Retrieved from Wolters Kluwer: <https://blogs.taxnl.wolterskluwer.com/deonlineaccountant/oorzaken-groei-zzp-adviseurs-en-kleine-administratiekantoren>
- Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research Business Methods for Business Students*. Harlow: Pearson.

- Scherff, H. (2017, January 5). *HOOFDLIJNEN BELASTINGWIJZIGINGEN 2017 VOOR PARTICULIEREN*. Retrieved from Ostraka: <https://www.ostraka.nl/Nieuws/2016/Belastingwijzigingen-2017-voor-particulieren.html>
- Schumpeter, J. A. (1934). *The Theory of Economic Development*. New Brunswick and London: Transaction Publishers.
- Scott, W. (2014). *Institutions and organizations; Ideas, Interests, and Identities*. London: Sage Publications, Inc.
- Seixas, S. I., Bostock, J., & Eleftheriou, M. (2012). Promoting sustainable aquaculture: Building the capacity of local institutions and online teaching (elearning). *Management of Environmental Quality: An International Journal*, 23(4), 434-450. doi:10.1108/14777831211232245
- Shafaeddin, M. (2000, July). *What did Frederick List actually Say?* Retrieved from United Nations Conference on Trade and Development: https://unctad.org/en/Docs/dp_149.en.pdf
- Shukla, S., Bharti, P., & Dwivedi, A. (2012). *Entrepreneurial Framework Condition in India: Perception of National Experts*. Ahmedabad: GEM India Consortium.
- Singer, S., Herrington, M., & Menipaz, E. (2018). *Global Entrepreneurship Monitor 2017/2018*. Babson Park and London: the Global Entrepreneurship Research Association.
- Skoda, E. (2017, October 4). *On-The-Go: The Trend That's Here To Stay*. Retrieved from Packaging Europe: <https://packagingeurope.com/on-the-go-food-convenience-trend/>
- Slater, M., D'Abramo, L., & Engle, C. R. (2018, January 16). *Aquaculture Research Priorities for the Next Decade: A Global Perspective*. Retrieved from World Aquaculture Society: <https://www.was.org/articles/Aquaculture-Research-Priorities-for-the-Next-Decade-A-Global-Perspective.aspx>
- Smaal, A., & Lucas, L. (1999). Regulation and monitoring of marine aquaculture in The Netherlands. *Journal of Applied Ichthyology*, 187-191.
- Stam, E., Bosma, N., van Witteloostuijn, A., de Jong, J., Bogaert, S., Edwards, N., & Jaspers, F. (2012). *Ambitious Entrepreneurship*. The Hague: Advisory Council for Science and Technology Policy.
- Suatet, F. (2005). *The Role of Institutions in Entrepreneurship: Implications for Development Policy*. Arlington, VA: Mercatus Center, George Mason University.
- The World Bank. (2013). *Doing Business 2013*. Washington: The World Bank Group.
- The World Bank. (2014). *Doing Business 2014*. Washington: The World Bank Group.
- The World Bank. (2014, February 5). *Sustainable Aquaculture*. Retrieved from The World Bank: <http://www.worldbank.org/en/topic/environment/brief/sustainable-aquaculture>
- The World Bank. (2015). *Doing Business 2015*. Washington: The World Bank Group.
- The World Bank. (2016). *Doing Business 2016*. Washington: The World Bank Group.
- The World Bank. (2017). *Doing Business 2017*. Washington: The World Bank Group.
- The World Bank. (2018). *Doing Business 2018*. Washington: The World Bank Group.

- Tisdell, C. A. (1994). Socioeconomic considerations in the development of aquaculture. *Socioeconomics of Aquaculture* (pp. 1-13). Tungkang: Tungkang Marine Laboratory.
- U.S. Geological Survey. (2016, December 2). *How much water is there on, in, and above the Earth?* Retrieved from United States Geological Survey: <https://water.usgs.gov/edu/earthhowmuch.html>
- United Nations. (1982). *The United Nations Convention on the Law of the Sea*. Montego Bay: United Nations. Retrieved from United Nations: http://www.un.org/Depts/los/convention_agreements/convention_historical_perspective.htm
- Urbano, D., Aparicio, S., & Audretsch, D. (2018). Twenty-five years of research on institutions, entrepreneurship, and economic growth: what has been learned? *Small Business Economics*, 1-29.
- UVW. (2017). *Waterschapsbelastingen 2017*. Den Haag: Unie van Waterschappen.
- UWV. (2018, September 3). *Gunstige economische ontwikkeling zorgt voor stabiele werkgeverspremies WGA en ZW*. Retrieved from UWV: <https://www.uwv.nl/overuwv/pers/persberichten/2018/gunstige-economische-ontwikkeling-zorgt-voor-stabiele-werkgeverspremies-wga-en-zw.aspx>
- van den Burg, S., Jak, R., Smits, M.-J., de Blaeij, A., Rood, T., Blanken, H., & Martens, S. (2016). *Zeewier en natuurlijk kapitaal*. Wageningen: LEI Wageningen University & Research. doi:10.18174/380299
- van den Burg, S., Stuiver, M., Veenstra, F., Bikker, P., Contreras, A. L., Palstra, A., . . . van Raamsdonk, L. (2013). *A Triple P review of the feasibility of sustainable offshore seaweed production in the North Sea*. Wageningen: Wageningen University .
- van der Poel, R. (2016, February 2). *Welke vis kun je nog wél eten?* Retrieved from NRC: <https://www.nrc.nl/nieuws/2016/02/02/visverwarring-1583747-a777237>
- van der Woude, D. (2018, December 12). Factors influencing entrepreneurship. (R. Oostenenk, Interviewer)
- van Dijk, F. (2011, May 27). *Oprichten BV en NV eenvoudiger per 1 juli 2011*. Retrieved from Kennedy Van der Laan: <https://kvdI.com/artikelen/oprichten-bv-en-nv-eenvoudiger-per-1-juli-2011>
- van Dongen, A. (2017, July 19). *Duurzame vis van Brabantse vispioniers blijkt onverkoopbaar*. Retrieved from Algemeen Dagblad: <https://www.ad.nl/economie/duurzame-vis-van-brabantse-vispioniers-blijkt-onverkoopbaar~a45912ff/>
- van Doorn, E., Friedland, R., Jenisch, U., Kronfeld-Goharani, U., Lutter, S., Ott, K., . . . Visbeck, M. (2015). *World Ocean Review 2015*. Hamburg: maribus gGmbH.
- van Stel, A., Carree, M., & Thurik, R. (2005). The Effect of Entrepreneurial Activity on National Economic Growth. *Small Business Economics*, 24(3), 311-321. doi:10.1007/s11187-005-1996-6
- VanDoorne. (2016). *Social Entrepreneurship*. Retrieved from Van Doorne: <https://www.vandoorne.com/globalassets/bijlagen-nieuwsberichten/2016/brochure-social-entrepreneurship-2016.pdf>

- Vergne, J.-P., & Durand, R. (2010). The Missing Link Between the Theory and Empirics of Path Dependence: Conceptual Clarification, Testability Issue, and Methodological Implications. *Journal of Management Studies*, 47(4), 736-759.
- Verreth, J. (2018, December 17). Trends and developments of aquaculture in the Netherlands. (R. Oostenenk, Interviewer)
- Vloemans, P. (2011, July 19). *Van boer tot bord*. Retrieved from De Groene Amsterdammer: <https://www.groene.nl/artikel/van-boer-tot-bord>
- VNG. (2012). *Wijziging regeling invorderingsrente*. Den Haag: Vereniging van Nederlandse Gemeenten.
- Wekker, R. (2017). *A Business Cycle Tracer for Small and Medium Sized Enterprises*. Zoetermeer: Centraal Bureau voor de Statistiek.
- Wiel, E. a. (2013, October 16). *Het geheim van Dutch entrepreneurship*. Retrieved from Graydon: <https://www.graydon.nl/blog/het-geheim-van-dutch-entrepreneurship>
- Williamson, O. (2000). 'The new institutional economics: Taking stock, looking ahead'. *Journal of Economic Literature*, 38, 595-613.
- WWF. (n.d.). *Viskeurmerk ASC*. Retrieved June 13, 2018, from Wereld Natuur Fonds: <https://www.wnf.nl/wat-wnf-doet/onze-aanpak/grondstoffen-en-keurmerken/vis-asc.htm>

7 Appendices

7.1 Interviews

Interview prof. dr. Johan Verreth Wageningen University 17-12-2018

This interview was a semi-structured interview around three questions. The interview was open and questions were asked both ways. Therefore, only the answers surrounding the three questions will be given.

The interview started with an introduction of the research of this thesis, the research setup and some basic information about my personal life and education of the interviewer (I). The respondent (R) was happy to help with the research. The interviewer then gave a summary of the lay-out of the interview and began with the interview.

(I): what are the current trends and developments in aquaculture in the Netherlands?

(R): Aquaculture became more common in the eighties. Wageningen University started with a bachelor in aquaculture. Wageningen University started the bachelor after the FAO stated that aquaculture would become one of the main sources of food in the future. Many of the graduates later worked in the aquaculture sector. Many started their own aquaculture company, although they were not always that professional. This led to an increase in the number of companies in the aquaculture sector as well as an increase in the production volume. In total, around 10,000 tons were produced of which 4,000 was eel and 4,000 was catfish.

With the financial crisis of 2008, troubles were arising in the aquaculture sector in the Netherlands. Financing the business activities became a problem and several companies were forced to sell their business or quit. There were problems with the eel production and the pangasius started to be imported. Some companies started to create a new hybrid specie of the catfish with subsidies from the government which intensified the competition even more. With the increasing competition and the trouble of acquiring capital, dozens of companies were declared bankrupt.

Currently there are quite a few consolidations within the aquaculture sector. Companies are working together and start to form a block to compete with other countries. Even now however companies in the aquaculture production need a good marketing mix in order for their company to survive and be profitable. In recent years different new species are being produced as well.

There is still the threat of misinformation regarding aquaculture products. The misconception of many is that aquaculture products are force feed animals which are close to factory produced fish. However, this is far from reality. This misconception is being challenged by producers by operating completely transparent. The transparency can be a problem as well as many fish are held in captivity. This can be interpreted as cruel and factory like production. Therefore, there is a need for a very particular but hard balance between transparency and economics to tackle the misconception.

(I): What are the current policy changes from the European Union and the government in the Netherlands?

(R): In 2002, the Netherlands issued their first aquaculture policy. The policy was mainly focussed on the way the fish should be slaughtered. This has remained the main focus of the aquaculture policy until 5 years ago when a more ambitious policy and vision were created with the main pillars stemming from the vision of the European Union. The European fishery fund enables interested companies a means to finance their innovation projects. To be able to have access the interest party has to submit a plan which is measured for its sustainability, rentability and knowledge creation and

sharing. The vision of the Dutch government is now focussed on cooperation, knowledge gathering and knowledge sharing.

Both the European Union as the government of the Netherlands have acknowledged the significance of certificates. The certificates help them as they are responsible for the food quality and safety. The European Union and the government of the Netherlands on the other hand cannot create legislation on what sustainable is exactly.

(I): There are different sustainability certificates. In the Netherlands the ASC-certificate is the most common, but is this the most fitting?

(R): In 2010 and 2011, I advised Ahold and the other main supermarkets with their push for more sustainable produced fish. First the focus was mainly on salmon as it is the most profitable, later other were included as well and the goal was to offer only sustainable caught and produced fish in 2013. This deadline was not reached and was changed to 2015. The ASC-certificate however was not created yet and the Marine Stewardship Council did not want to create a certificate for aquaculture. The decision was made to create a new group financed by the IDH (Sustainable Trade Initiative) as well as advised by the IDH and the World Wildlife Fund. Then the ASC created the first certificates and later developed more. Although this is the most far reaching and reliable certificate alongside the MSC-certificate, there are some issues with the certificates. There are problems with the feed requirements as they are still allowed to use ingredients which can be consumed by humans as well. Other problems are the use of anti-biotics and the influence of market parties. Smaller aquaculture producers have influenced the guidelines and succeeded in making them less strict. Stricter guidelines however, will force innovation. Aquaculture producers will have to innovate to meet the guidelines and to compete with each other. The smaller producers thus unable the need for stronger innovation.

Another issue is that there are existing aquaculture producers. They argue that stricter guidelines need investments, which cost capital. This will be transferred in the price and that will dismay retailers.

An issue particular for the ASC-certificates in the Netherlands, is that most species produced in the Netherlands fall outside the current ASC-certificates. The ASC needs to keep innovating both in the species covered by their certificates as in the guidelines. Stricter guidelines will push to an even more sustainable aquaculture value chain decreasing the pressure on natural resources.

A truly aspiring push would be to integrate residual flows in the certificates so that only products which are not applicable for human consumption may be used as feed and that garbage in the production process is re-used for other sustainable purposes. Another good development would be that the ASC will look at the protein retention rate for each fish species and would push for the higher protein retention species as they are more ecological responsible.

Interview Chris Spanjersberg KPMG Meijburg & Co 14-12-2018

This interview was a semi-structured interview around seven questions. The interview was open and questions were asked both ways. Therefore, only the answers surrounding the seven questions will be given.

The interview started with an introduction of the research of this thesis, the research setup and some basic information about my personal life and education of the interviewer (I). The respondent (R) was happy to help with the research. The interviewer then gave a summary of the lay-out of the interview and began with the interview.

(I): Where do you work?

(R): I work at Meijburg & Co, which is part of KPMG.

(I): What is your function?

(R): Originally, I'm tax lawyer, but I specialise in tax consultancy for business organisations.

(I): What factors are influencing the business activities of your customers in the Netherlands?

(R): Regulations in the Netherlands are in comparison with other countries rather heavy. Companies need permits for their offices, have to comply with fiscal legislation and permits to operate in the Netherlands if they are international organisations. However, the legislation can also be seen as an advantage. Companies know the legislation and know what is expected from them. They can prepare for it. The government in the Netherlands is considered to be trustworthy. In other countries bribes can be necessary to obtain certain permits or written legislation tend to be different the actual legislation. For nascent entrepreneurs this can be difficult however, as they do not have the capital to hire specialist to help them with all the legislation.

A positive factor in the Netherlands is the infrastructure and the logistics. Roads are in near perfect shape, the internet is fast and reliable, there are multiple big shipping ports and airports are nearby.

Fiscal legislation is rather favourable as well, although the current fiscal policies have to change as demanded by the European Union. The *Belastingdienst* made fiscal arrangements with larger companies in which their tax was agreed. That is not allowed anymore as it is seen as giving companies an advantage on other companies.

In general, the Netherlands has the reputation of having a stable law system. Changes in regulation and law use to be small and the path is rather transparent so companies know what is expected and can prepare.

In the Netherlands the availability of highly skilled personnel is an advantage as well, which can help companies to start a location in the Netherlands.

The Brexit will probably have a negative impact. Businesses don't know what they can expect as the British government has no clear outline of how the Brexit will look like. Certain agreements such as those involving tax will remain the same, but for customs it will probably be a disaster if there is no agreement. We will have a traffic jam beginning in Germany.

(I): What according to you, is the most disrupting factor in the Netherlands for companies?

(R): The fact that the *Belastingdienst* is not allowed to make tax arrangements with companies anymore. This is going to have a negative effect on the business climate. Especially multinational companies will now tend to choose for another European countries to place their regional

headquarters. The Netherlands and Ireland used to make this tax agreements but the Dutch government is following the new rules very strictly as the tax agreements are disfavoured by the Dutch citizens. Ireland however, has a less strict direction and made a new legislation in which they do follow the new European rules, but still keep the ability to make certain tax agreements. So, in my opinion this is going to be reflected in the decreasing number of multinational companies coming to the Netherlands.

(I): What would help support entrepreneurship in the Netherlands?

(R): For starters, small and medium enterprises a more flexible labour regulation would be beneficial. Salary payments form one of the largest expenses for most companies. For smaller companies, problems with employees can create a real problem. A more flexible regulation can help smaller companies in growing, both in employees as in business activities.

(I): Which factors are influencing starting companies in the Netherlands?

(R): Government programs are supporting entrepreneurship in the Netherlands. The government has created special start-up programmes which help nascent entrepreneurs in setting up their business. The *Kamer van Koophandel*, municipalities and some banks are offering the same programs and offer programmes for the exchange of knowledge and experiences.

The start-up process itself is rather easy as well. It does not take a lot of time anymore. Fiscal policies tend to support nascent entrepreneurs as well with a lower tax rate and tax reductions. The government offers subsidies for new companies to support research and innovation.

Labour legislation can sometimes be a problem if the company is looking to expand.

(I): In your opinion, how is entrepreneurship perceived in the Netherlands?

(R): Now a days it is positive. When I was studying in the seventies and eighties, entrepreneurs were perceived as rather strange and shady figures with louche import and export businesses. On the other hand, I think even at that time they were underappreciated. Nowadays entrepreneurs are seen as the motor of the economy. Being an entrepreneur is much more respected and appreciated. Society has become more individualistic so making your own living is now much more respected and appreciated.

Interview Dick van der Woude Pro4All 12-12-2018 11:30

This interview was a semi-structured interview around eleven questions. The interview was open and questions were asked both ways. Therefore, only the answers surrounding the eleven questions will be given.

The interview started with an introduction of the research of this thesis, the research setup and some basic information about my personal life and education of the interviewer (I). The respondent (R) was happy to help with the research. The interviewer then gave a summary of the lay-out of the interview and began with the interview.

The first three questions were general questions regarding the company.

(I): What is the core business of the company?

(R): The core business of the company is the offering of cloud software support services to companies who operate in construction. The companies range from architects and building companies to installation suppliers, service maintenance and building contractors. We offer them the possibility to use our software in the offices but on-site as well.

(I): How many people are working in the company.

(R): Since this week 53.

(I): When was the company started?

(R): The company was originally started at the 1st of September 2001.

(I): What was the reason for starting the company?

(R): I used to work at another company where I quit my work. After a few years I was bored and I had an idea and saw an opportunity for an innovation in the building sector. The first few years were hard as there was a recession and most companies were reluctant to believe in internet solutions especially cloud solutions. WIFI was not even available. You can argue that it was too early for my idea to succeed. The building sector is traditional. At that moment I started working somewhere else to support my company. When the new recession hit it took some time for the building sector to financially notice that. When they noticed the recession, they started to innovate and my company started to grow. It took twelve years before the company made the first profit.

(I): What entry burdens did you encounter when you started the company?

(R): For the start of my company I did not encounter any obstacles. I started a limited liability enterprise and funded it with my own capital.

(I): Which processes in starting the company were easy to complete?

(R): For me all the processes were rather easy. I did not encounter any obstacles as I started with a great team. So, we had no legal obstacles, no financial obstacles but just the recession and traditional customer sector were hindering the growth of the company.

(I): Which external factors have a positive influence on business activities at this moment?

(R): Now the economy is growing again, we notice that companies are too busy to innovate. Only the professional businesses keep innovating and that is our target market.

(I): Which factors are having a negative influence on business activities?

(R): With our current growth and the growing economy I notice that it is hard to find suitable space for my company to keep growing. I don't need that much space and all that smaller space is rented out already. Only the larger buildings are still available and that is just too much for now as I do not want the company to grow that much in terms of employees.

Another factor is the new legislation regarding General Data Protection Regulation. The new regulation is too complicated. I have implemented the new regulation in my company and now customers want me to use their GDPR which forms an extra obstacle and hinders business activity. The regulation is too far-fetched and too bureaucratic in my opinion.

The last factor which still has a negative effect on our business activity is that most building sites have no access to internet yet, so our service cannot be used optimal. We are building a portable WIFI, but that will still take some time.

(I): What would be a reason to discontinue the company?

(R): At this moment I would not want to think about discontinuing the company. The market is growing and the company is doing well. Even if a new recession will strike, I believe that the company will still be growing as we are the most innovative company that offers software cloud services in the building sector.

Besides, I feel responsible for my employees and I cannot think of a reason to abandon them. The only reason in the future can be that I don't feel like running the company anymore, but then I would not discontinue the company.

(I): In your opinion, what is the image of entrepreneurship in the Netherlands?

(R): I don't really know. I do not bother what other people think. I do what I like and they can have their opinion about it but it would not influence me. My company is based on responsibility and I have created a matrix organisation without a hierarchy. I can leave the company for a month and nobody would call me because they all know what they are supposed to do and what their responsibilities are.

Sometimes when I show acquaintances the company they are stunned and impressed on how the company is formed, how it looks and how it operates.

(I): In your opinion, what would further support entrepreneurship in the Netherlands?

(R): Labour regulations in the Netherlands force employers to pay for the sick leave of their employees for up to two years. If an employee gets sick and the company is not to blame, I find it rather strange that the company is obliged to pay for that. In my opinion that has to change to support entrepreneurship.

Another factor I think has to change is the expense allowance scheme. I organise events for my employees and I have to pay an 80 per cent tax on that to the government while the only thing I try to do is to bond my employees, motivate them and to keep them healthy. This is just milking the entrepreneurs for extra tax revenue.

Another point of improvement can be that the new lower educate entrepreneurs can find it hard to find their way in all the regulation and bureaucracy. So, I would argue that more support event by the KvK are necessary to support them. For higher educated entrepreneurs this would probably be less of an issue as they would likely have some sort of entrepreneurship education somewhere in their career and life.

7.2 Information regarding the other aquaculture certificates

Friend of the Sea (FOS)

Another type of certificate for sustainable aquaculture is the Friend of the Sea (FOS) certificate and it was founded in 2008. The certificate covers a broader range of species than the ASC-certificate, but only three species account for over 75 per cent of the total certified production. These three species are mussels, trout and salmon and each specie has certificates for their respective subspecies. In 2014 about 700,000 metric tons of certified aquaculture was produced and in 2015 it grew to 750,000 metric tons, making it the second largest source of certified aquaculture. Between 2008 and 2015 the average annual growth was 47 per cent. The FOS certificate does not only cover aquaculture but also covers wild catch. This overlap provides the FOS to transform both sectors in terms of supply between the two. More specifically it can develop an internal market in which certified wild catch is used in the production of certified aquaculture. The main problem however, for the development of an internal market, is that aquaculture accounts for less than 10 per cent of the total FOS-certified production. Mussels account for 47 per cent whereas trout accounts for 24 per cent and salmon for the other 13 per cent. The production of the certified aquaculture is almost entirely based in the developed world where Spain and Italy account for 84 per cent of the global certified production. The third largest producers, which is Greece, only accounts for 3 per cent and the Netherlands account for less than 0.5 per cent. In total sixteen nations have aquaculture farms which are FOS-certified. The FOS-certified product is sold in fourteen nations, although the market is focussed almost entirely on Italy, Spain and Switzerland. The limited focus of the retail market is a limiting factor on the success and further development of the FOS-certificate. If the FOS-certificate wants to maintain its current size, progress and relevance at a global level, it has to invest in the development of global demand of their products (Potts, Wilkings, Lynch, & McFatridge, 2016).

FOS-certified aquaculture per species group in terms of volume in 2014.

| Species group | Production volume (mt) | Proportion of total | Species | Production volume by species (mt) |
|---------------|------------------------|---------------------|-------------------------|-----------------------------------|
| Mussels | 329,815 | 47% | Blue mussel | 9,938 |
| | | | Chilean mussel | 14,908 |
| | | | Mediterranean mussel | 304,969 |
| Trout | 166,468 | 24% | Brook trout | 79,507 |
| | | | Rainbow trout | 86,961 |
| Salmon | 89,446 | 13% | Arctic char | 79,507 |
| | | | Atlantic salmon | 9,938 |
| Sea bream | 29,815 | 4% | Gilthead sea bream | 24,846 |
| | | | Sea bream | 4,969 |
| Pangasius | 7,454 | 1% | Pangasius | 7,454 |
| Shrimp/prawns | 5,687 | 1% | Black tiger prawn | 3,102 |
| | | | Whiteleg shrimp | 2,585 |
| Oysters | 4,969 | 1% | Flat oysters nei | 2,485 |
| | | | Pacific cupped oyster | 2,485 |
| Cod | 2,5 | <0.5% | Atlantic cod | 2,5 |
| Clams | 2,485 | <0.5% | Venus clams nei | 2,485 |
| Scallops | 2,485 | <0.5% | Peruvian calico scallop | 2,485 |
| Other | 58,877 | 8% | Adriatic sturgeon | 125 |
| | | | Beluga sturgeon | 42 |
| | | | Danube sturgeon | 86 |
| | | | European sea bass | 32,3 |
| | | | Meagre | 9,938 |
| | | | Abalone | 2,485 |
| | | | Red drum | 2,485 |
| | | | Senegalese sole | 800 |
| | | | Siberian sturgeon | 125 |
| | | | Stellate sturgeon | 42 |
| | | | Sterlet sturgeon | 42 |
| | | | Striped bass | 2,485 |
| | | | Turbot | 5,400 |
| | | | White sturgeon | 42 |
| | | | Yellowtail amberjack | 2,485 |
| Total | 700,000 | 100% | | 700,000 |

Table 9: FOS-certified aquaculture production per species in 2014.

Source: Potts, Wilkings, Lynch, & McFatridge, 2016. p. 44.

FOS-certified aquaculture production per nation in 2014

| Nation | Production volume (mt) | Proportion of total |
|----------------|------------------------|---------------------|
| Spain | 313,737 | 45% |
| Italy | 271,238 | 39% |
| Greece | 19,877 | 3% |
| Chile | 14,908 | 2% |
| United Kingdom | 12,423 | 2% |
| Australia | 12,423 | 2% |
| Vietnam | 10,139 | 1% |
| France | 9,938 | 1% |
| Turkey | 9,938 | 1% |
| Norway | 7,469 | 1% |
| Mauritius | 4,969 | 1% |
| Tunisia | 4,969 | 1% |
| Netherlands | 2,485 | <0,5% |
| Peru | 2,485 | <0,5% |
| South Africa | 2,485 | <0,5% |
| India | 517 | <0,5% |
| Total | 700,000 | 100% |

Table 10: FOS-certified aquaculture production per nation in 2014.

Source: Potts, Wilkings, Lynch, & McFatridge, 2016. p. 45.

Best Aquaculture Practices (BAP)

The third certificate for aquaculture is the Best Aquaculture Practices, otherwise known as BAP. BAP was developed in 2004 by the Global Aquaculture Alliance (GAA) (Potts, Wilkings, Lynch, & McFatridge, 2016). The GAA is a non-governmental, industry led trade organisation with the focus on education and leadership in responsible aquaculture (GAA, 2016), on integration of hazard analysis and critical control point in food safety standards. The BAP standards have been developed with specific support of twelve companies which primarily are supplying the U.S. market in response to the GLOBALG.A.P. and thus has resembled GLOBALG.A.P. in fully integrated safety, health and sustainability standards (Potts, Wilkings, Lynch, & McFatridge, 2016). Those twelve companies form one third of the 12-member Standards Oversight Committee which supervise the development and updates to the BAP standards. The rest of the Standards Oversight Committee consist of another one third conservation groups and one third academia (GAA, 2017). The standards of the BAP are focused three species: salmon, mussels and finfish and crustaceans. Besides the specific specie standards there are standards for the total supply chain. Due to the fact that the BAP is supported by the industry it has seen a tremendous growth with 159,316 metric tons of aquaculture produced in 2008 to 711,827 metric tons of aquaculture produced in 2013. Three species account for more than 90 per cent of the BAP-certified aquaculture production with salmon accounting for 56 per cent, tilapia (belonging to the finfish and crustaceans' group) accounting for 20 per cent and shrimps and prawns accounting for 19 per. The high concentration of production in specific species highlights that the industry was one of the main participants in the development of the BAP. The production of the BAP-certified aquaculture takes place in twenty nations with 68 per cent being produced in three countries. Chile with 28 per cent, Canada with 22 per cent and China with 18 per cent. The produced BAP-certified aquaculture has to be sold through reported retailers, which are 34 in total and they are located either in the United States or in Canada. The focus of BAP remains on North America and

this in the long term will generate limitations in terms of growth. Therefore Potts, Wilkings, Lynch and McFatridge opt to combine both the BAP and the GLOBALG.A.P. as they are already both used by some aquaculture producers and thus can be used as expansion options for both respective production bases through shared technical assistance efforts and mutual recognition (Potts, Wilkings, Lynch, & McFatridge, 2016).

BAP-certified aquaculture production per species in 2013.

| Species group | Production volume (mt) | Proportion of total | Species group |
|----------------|------------------------|---------------------|-------------------------|
| Salmon | 396,662 | 56% | Salmon |
| Tilapia | 139,567 | 20% | Finfish and crustaceans |
| Shrimps/prawns | 134,529 | 19% | Mussels |
| Pangasius | 38,732 | 5% | Finfish and crustaceans |
| Catfish | 2,337 | <0.5% | Finfish and crustaceans |
| Total | 711,827 | 100% | |

Table 11: BAP-certified aquaculture production per species in 2013.

Source: Potts, Wilkings, Lynch, & McFatridge, 2016. p. 46.

BAP-certified aquaculture production per nation in 2013.

| Nation | Production volume (mt) | Proportion of total |
|---------------|------------------------|---------------------|
| Chile | 198,572 | 28% |
| Canada | 155,898 | 22% |
| China | 130,330 | 18% |
| Vietnam | 48,710 | 7% |
| Ecuador | 31,909 | 4% |
| Indonesia | 30,943 | 4% |
| Thailand | 29,208 | 4% |
| Australia | 26,650 | 4% |
| New Zealand | 9,646 | 1% |
| Colombia | 9,174 | 1% |
| Costa Rica | 9,154 | 1% |
| United States | 8,233 | 1% |
| Honduras | 7,986 | 1% |
| India | 3,484 | <0.5% |
| Malaysia | 2,914 | <0.5% |
| Guatemala | 2,431 | <0.5% |
| Bangladesh | 1,873 | <0.5% |
| Belize | 1,812 | <0.5% |
| El Salvador | 1,800 | <0.5% |
| Nicaragua | 1,100 | <0.5% |
| Total | 711,827 | 100% |

Table 12: BAP-certified aquaculture production per nation in 2013.
Source: Potts, Wilkings, Lynch, & McFatridge, 2016. p. 47.

GLOBALG.A.P.

The GLOBALG.A.P. or first known as the EUREPGAP was developed in 1997 by the Euro-Retailer Produce Group. The group, which consists of major retailers in the European market, was seeking to develop a certificate which would ensure them that their supply chain would meet the stricter food safety requirements within the European Union. EUREPGAP was rebranded to the GLOBALG.A.P. in 2007 and the abbreviation stands for Global Partnership for Good Agriculture Practice and as the name suggests it had its initial focus on agriculture. In 2004 the standard was launched for aquaculture as well at a global scale. The rebranding was part of the growing global importance of the standard to other parts of the world. Although the standard started with the focus on food safety the focus does include sustainability as well. The GLOBALG.A.P. is used for the production of seven species groups and eight categories for other species. The seven species are: salmon, pangasius, shrimp/prawns, trout, seabream, bass and meagre. Salmon is by far the largest species group in

terms of production volume with approximately 79 per cent of the total production. In terms of aquaculture production GLOBALG.A.P. is the largest of all the certificates. In 2015, the total production of GLOBALG.A.P. was around 2.1 million metric tons, which is approximately 3 per cent of the total aquaculture production. In the period 2008 till 2015 the average growth was 29 per cent per year, although this was a decrease of approximately 500,000 metric tons between 2011 and 2012 due to stricter standards. In 2013, the production loss had been made up. The two largest producers are Norway and Chile with the former producing 44 per cent and the latter 25 per cent of the total GLOBALG.A.P.-certified aquaculture. The overall position of the GLOBALG.A.P. in comparison with the other certificates can be explained by the prior development of the GLOBALG.A.P. The GLOBALG.A.P. was the first which offered both producers and retailers a certificate which indicated that the production complied with health and safety regulations, but focussed on sustainability as well and the GLOBALG.A.P. certificate has a relatively mature status. The certificate has a strong base for further growth as it is the biggest certificate, has a wide species coverage range, a wide distribution base of the production and has had a relatively constant growth rate in past several years. The one downside of this certificate is that it is a distribution-based certificate. There is no label on the packaging and end-consumers do not know if the product has been produced with the GLOBALG.A.P. certificate (Potts, Wilkings, Lynch, & McFatridge, 2016).

GLOBALG.A.P.-certified aquaculture production per species in 2015.

| Species | Production volume by species (mt) |
|---------------------------|--|
| Atlantic salmon | 1,655,250 |
| Pangasius | 102,700 |
| Whiteleg shrimp | 94,504 |
| Rainbow trout | 90,943 |
| Gilthead sea bream | 57,776 |
| European sea bass | 74,723 |
| Meagre | 4,764 |
| Others | 20,707 |
| | 2,101,367 |

*Table 13: GLOBALG.A.P.-certified aquaculture production per species group in 2015.
Source: Potts, Wilkings, Lynch, & McFatridge, 2016. p. 48.*

GLOBALG.A.P.-certified aquaculture production per county in 2015

| Nation | Production volume (mt) | Proportion of total |
|----------------|------------------------|---------------------|
| Norway | 930,952 | 44% |
| Chile | 518,380 | 25% |
| United Kingdom | 162,506 | 8% |
| Vietnam | 120,045 | 6% |
| Turkey | 112,917 | 5% |
| Spain | 42,511 | 2% |
| Ecuador | 9,809 | <0,5% |
| Other | 204,247 | 10% |
| Total | 2,101,367 | 100% |

Table 14: GLOBALG.A.P.-certified aquaculture production per nation in 2015.

Source: Potts, Wilkings, Lynch, & McFatridge, 2016. p. 49.

Organic

The organic certificate is a certificate which is not species bound. The first species to acquire an organic certification was carp in Germany in 1995 and it was issued by the International Federation of Organic Aquaculture Movements (IFOAM). The IFOAM has approved the final version of the organic certificate in 2005. Organic aquaculture production differs from organic livestock and poultry. For livestock and poultry to be organic they can only be fed organic feed. With organic aquaculture this is not the case, organic aquaculture fish can be fed wild-caught fish as long as that wild-caught fish is certified under sustainability standards such as the FOS or MSC. The organic certificate is decentralised in nature and therefore data and information regarding species groups, production quantities and nation origins are lacking. The most recent data suggest that in 2013 200,000 metric tons of organic certified aquaculture was produced up from roughly 50,000 metric tons in 2008. Almost 160,000 metric tons of the organic certified aquaculture produced in 2013 was attributed to unknown species groups, being roughly 81 per cent of the total. The second largest species group is salmon with 16,317 metric tons accounting for 8 per cent of the total. What is known is the leading producing nation, which is China. China is believed to produce around 116,000 metric tons accounting for 59 per cent of the total organic certified aquaculture in 2013. Following China is Norway with 32,000 metric tons or roughly 16 per cent of the total and third is Ireland with 16,314 metric tons or 8 per cent of the total in 2013 (both the table with production per species groups and per nation can be found in the appendix). The organic certificate is the only certificate initiative with significant Chinese production as China accounts for approximately 60 per cent of the worldwide aquaculture production (Potts, Wilkings, Lynch, & McFatridge, 2016).

ChinaG.A.P.

The last certificate is the ChinaG.A.P.-certificate. It is a government led initiative founded in 2005 and it has issued its first certificate in 2008. The certificate was based on the GLOBALG.A.P. but since its start has not been modified to conform with the updated practices of the GLOBALG.A.P. In 2013 an estimated 3,090 metric tons of certified aquaculture products was produced, accounting for less than 0.1 per cent of the total global certified sustainable aquaculture. One of the main issues with this certificate however, is that no data on species distribution is published and it thus is not clear which species are included in this certificate. Another issue is that the strategic direction of the certificate is not clear. This means that it is not clear what the sustainability and marketing strategies are in this certificate (Potts, Wilkings, Lynch, & McFatridge, 2016).

