

# Driving Innovation in the Icelandic Seafood Industry: A Case Study of the Iceland Ocean Cluster

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The goal of this paper is to analyze the factors associated with driving innovation in the Icelandic seafood industry. The motivation for this research comes from the urge to discern how alleged innovation agents such as clusters, incubators and accelerators actually drive innovation. The research is conducted by doing an explanatory case study to give insight into how the Iceland Ocean Cluster's operations affect innovation, in the specific context of Iceland. Furthermore, a framework was constructed highlighting the characteristics of the Iceland Ocean Cluster's operations and how these relate to driving innovation. With this method, the paper aims to answer the research question: *How can a cluster drive innovation in the seafood industry?* In essence, our research showed that the organization's contribution to innovation in the industry is threefold based on its operational characteristics. First, as an incubator it drives innovation by providing specific services which increase spin-off survival-rate. Second, as an accelerator it caters for new venture creation resulting in a high turnover rate of ideas. Third, as a cluster it contributes through knowledge spillovers from the geographical closeness and related industries of the firms in the cluster.

**Keywords:** innovation, incubation, acceleration, industry clusters, seafood industry

## I. INTRODUCTION

In the harbor of Reykjavik, close to the fisheries, the 'Iceland Ocean Cluster' is situated (henceforth IOC). The IOC is a cluster, *i.e.* a collection of interrelated companies. Moreover, they provide incubation services which aim to support firms to become successful. More recently, the IOC has started to offer acceleration services, *i.e.* time-limited programs to kick-start new venture processes by providing support and seed capital. The IOC's goal is to "*create value and discover new opportunities by connecting entrepreneurs, businesses and knowledge in the marine industries.*" (IOC n.d.), by providing a portfolio of services to the companies in the cluster.

The seafood industry is one of the pillars of the Icelandic economy. Fishing is a part of Iceland's heritage and the Icelandic people have depended on it for centuries. In 2010 the sector accounted for 6.3% of the nation's GDP and 39.3% of the its export revenues (Iceland Statistics 2018).

In recent years, innovation in the Icelandic marine sector was focused on marine technology *e.g.* fishing equipment, navigational techniques and fish detection instruments with the main objective to export world-class produce (Íslandsstofa n.d.b). Due to strict regulations and lack of innovation in the utilization of the resource, the industry has accumulated very high waste-rates. These rates are estimated to be 35% at consumer level (WorldFishing 2019). Until

recently, the catch was processed in a way that only utilized the edible parts of the fish and the rest was discarded. However, the regulations concerning fish harvest have changed in Iceland, allowing companies to use all of the harvest. The change in regulation created the opportunity for utilizing fish byproducts (WorldFishing 2020). This paved the way for innovation in the area of optimizing the complete use of the resource. For example, these byproducts can be used to make fish oils, which in turn can be used in the production of cosmetics. As Fisheries Minister Kristján Thór Júlíusson recently said, "*The significant progress in full utilization of marine raw materials is one of the strengths of the Icelandic seafood sector.*" (WorldFishing 2020) Therefore, innovation in the industry has changed from mainly focusing on the process innovation of changing how the fish products are created and delivered to its customers. Recently, product innovations have become more frequent, where the fish byproducts have been utilized to create novel products.

The progress in full utilization of the raw materials sparks product innovation in the versatile use of the fish byproducts and process innovation in harvesting the raw materials. The IOC aims to drive these types of innovations by investing in start-ups that operate in this specific area. As of 2018, the IOC have had over 100 different companies working at their offices in the harbor of Reykjavik and the company is still growing (Valli 2018). The purpose of this research

paper is to analyze and describe how a cluster can drive innovation in the seafood industry.

The research is conducted by doing a case study following a prescribed framework. First, in section II, the literature review will be covered. Section II elaborates on what research is already done in the areas of measuring industrial change and what effect incubators have on innovation. Additionally, the literature review outlines the definitions of terminology used throughout the paper and the theoretical framework used when answering the research question. In section III, the methodology, explains the research methods, including an elaboration on the context of the case study as well as an outline of the limitations of the research. Subsequently, in section IV, the findings are extracted from the case and are expanded on, this leads to the conclusions in section V.

The case is derived from a recently published book about the IOC's history, written by its CEO, Thor Sigfusson. The book is titled *'The New Fish Wave: How To Ignite The Seafood Industry'* where Sigfusson tries to answer the question: *"Can we inspire other seafood nations to follow the Icelandic example: creating more value in seafood through innovation and collaboration?"*. This paper uses examples from the book and puts them into perspective of the underlying theory. Ultimately this paper aims to explore how exactly a cluster can drive different forms of innovation in the seafood industry in Iceland.

## II. LITERATURE REVIEW

In the light of understanding the nature of the IOC's work a few concepts associated with the organization's operations will be outlined. Taking literature and the IOC's operations into consideration, the following terms will be described; innovation, incubation, acceleration and clusters. Additionally, in their respective subsections it will be discussed how incubation, acceleration and clusters relate to driving innovation. After constructing global understanding of the terminology and illuminating the different interpretations found in literature, the subsection *Theoretical Framework* derives a set of key indicators from the *Innovation, Incubation, Acceleration and Clusters* subsections which will be used in section IV, *Findings*, to analyze the case study data.

### A. Innovation

Bessant and Tidd (2013) define innovation in the following manner: *"Innovation is a process of turning opportunity into new ideas and of putting these into widely used practice."* Using this definition as point of departure, the term can be categorized into four areas of innovation. Francis and Bessant (2005) describe innovation in this way by breaking it down into

four distinct parts. Namely, product, process, position and paradigm. First, product innovation entails changes in the offering which the company provides its customers. Whether the product is a tangible good or intangible service, the focus is on changes in the product itself. Second, process innovation describes the changes in how the company creates and delivers products to its customers. Third, position innovation describes how an established product, created and delivered by an established process is offered to a new market in a new context. Hence, changes in the company's market position. Last, the paradigm innovation describes the changes in the company's business model by reframing the underlying mental model, *i.e.* the paradigm, of the product, process and market position.

### B. Incubation

The definition of incubation used in this paper is from the European Commission:

*"A business incubator is an organization that accelerates and systematizes the process of creating successful enterprises by providing them with a comprehensive and integrated range of support, including: Incubator space, business support services and clustering and networking opportunities."*

(European Commission 2002, p. 9)

It is important to point out that different terms for the same concept of the incubator are used interchangeably in research (Theodorakopoulos et al. 2014, p. 604). Some examples of these are "science parks" and "hubs". Hence, the definition of the incubation process is inconsistent throughout the literature as seen in table I.

TABLE I: Incubation Definitions.

International Business Innovation Association (2016)	<i>"Incubators typically charge monthly program fees or membership dues in exchange for office/desk space and access to program offerings. Incubators offer programs to member companies that typically include mentoring, education/training, and informal learning opportunities. Incubators also host events to provide networking and learning opportunities for both member companies and the local community. Member companies are usually required to apply to ensure they meet the incubator's criteria or mission (industry, stage of company, founder demographics, etc.). Incubators usually have graduation policies based on achievement of agreed-upon milestones, growth metrics or time-based stipulations. Typically, companies join incubators on a rolling basis (non-cohort), and are able to reside in the incubator for 1-3 years."</i>
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Hackett and Dilts (2004)	<i>"A business incubator is a shared office-space facility that seeks to provide its incubatees (i.e. portfolio – or client or tenant companies) with a strategic value-adding intervention system (i.e. business incubation) of monitoring and business assistance."</i>
Smilor and Gill (1986)	<i>"The business incubator seeks to effectively link talent, technology, capital, and know-how in order to leverage entrepreneurial talent and to accelerate the development of new companies."</i>

While the common definition of the process of incubation is ambiguous, researchers have tried to analyze the effectiveness of incubation. Incubation effectiveness has been assessed using different key performance indicators (KPIs) in hundreds of different incubators. Examples of some of these KPIs are "jobs created", "clustering effects" and "cost subsidies". However, researchers have not reached an agreement on which indicators are most effective nor on the quality or scale of efficiency in incubation operations. (Theodorakopoulos et al. 2014, p. 606)

According to some researchers, very little evidence has been found for business incubator's contribution to innovation activity or startup performance. However, some researchers suggest that the reason lies in the scarce theory surrounding business incubators, making them hard to analyze (Bruneel et al. 2012, p. 110). Others suggest that business incubation has been shown to indicate the potential to drive economic development (Theodorakopoulos et al. 2014, p. 603). Theodorakopoulos suggests that this potential has undoubtedly sparked the worldwide appeal for the practice.

Research has shown that business incubators offer their respective incubatees, also called '*tenant firms*', because of their tenant-landlord connection to the incubator, a range of services from physical infrastructure, networking and supporting business services. Furthermore, some business incubator's business services give the tenant firms the opportunity to get into contact with venture capitalists to aid the startups in getting capital (Bruneel et al. 2012, p. 110). Bruneel et al. look at business incubators at a three dimensional level, focusing on the portfolio of the incubation services provided. Namely, these dimensions are economies of scale, learning and networking theories (Bruneel et al. 2012, p. 110).

First, the infrastructure is the core and most basic function which all business incubators have in common. Providing the tenant firms with basic infrastructural means such as conference rooms, cafeterias and reception. The sharing of these common resources decreases the overhead costs for each firm so that all firms in the aggregation benefit through economies of scale (Bruneel et al. 2012, p. 110).

Second, incubators also contribute to their tenant firm's learning by providing them with knowledge services, a second dimension in an incubator's value proposition. By providing coaching and training to young firms, incubators attempt to accelerate learning to increase capabilities and the formation of routines (Bruneel et al. 2012, p. 112). Hence, the incubators try to substitute the slow process of experiential learning.

Third, incubators facilitate tenant firms with access to pre-established networks, namely network exploitation. These services allow tenant firms to access a range of potential stakeholders relatively easily as well as providing the possibility of physical interaction between different tenant firms within the incubator. Additionally, Bruneel et al. suggest that the need for individual network establishment is greatly decreased when tenant firms are provided an established network by the business incubator (Bruneel et al. 2012, p. 112).

In addition to the three dimensions, Bruneel et al. also discuss an interesting topic, the effect of serial entrepreneurs on the innovative drivers in an incubator. Arguably, an incubator with multiple serial entrepreneurs should have vastly more experience with innovation than newcomers to the community.

### C. Acceleration

Accelerators have many similarities to incubators, the definition of the term acceleration used in this paper is as follows:

*"... [accelerators] help ventures define and build their initial products, identify promising customer segments, and secure resources, including capital and employees. More specifically, accelerator programs are programs of limited duration lasting about three months that help cohorts of startups with the new venture process. They usually provide a small amount of seed capital, plus working space. They also offer a plethora of networking opportunities, with both peer ventures and mentors, who might be successful entrepreneurs, program graduates, venture capitalists, angel investors, or even corporate executives. Finally, most programs end with a grand event, a "demo day" where ventures pitch to a large audience of qualified investors."*

(Cohen 2013, p. 19)

The seed capital provided by the accelerator increases the host company's stake in the tenant firms this is a major difference when comparing accelerators to incubators. Moreover, the accelerator's business model is built around investments in candidate

firms, compared to incubation which generates revenues from rent. In turn, this increases the competition for candidate selection in accelerators. (Cohen 2013, p. 20)

Dempwolf et al. (2015) divides accelerators into different categories by its main characteristics. The IOC is of the type 'Innovation Accelerator' which is characterized by the following:

- *Identifying cohorts of promising startup companies with rapid, high-growth potential.*
- *Making seed-stage investments in those companies in exchange for equity.*
- *Engaging in innovation-acceleration activities with these companies to help them obtain next-stage funding.*
- *Cashing out for a profit when these companies are acquired or have successful IPOs.*

Dempwolf et al. (2015)

In section IV, *Findings*, the characteristics will be linked to the specific case of the IOC and their relation to innovation.

#### D. Clusters

The IOC has the characteristics of a cluster. “A strong collection of related companies located in a small geographical area” (Baptista and Swann 1998, p. 525). In order for a cluster to exist, Jacobs and De Man (1996) suggest the need for:

- *A spatial concentration of economic activity*
- *The presence of horizontal and vertical relations between connected industries*
- *The existence of inter-firm cooperation and collaboration*
- *The presence of a central actor such as a university or a research center*

Doloreux and Shearmur (2009)

These are the requirements for a cluster to exist. In this specific case, the IOC meets all the requirements which will be elaborated on further in section IV, *Findings*.

#### E. Theoretical Framework

Previously, an overview of the terminology and literature has been made. Next, a framework will be created to analyze the specific case of the IOC. The framework is shown in Figure 1.

First, this framework aims to analyze how the IOC relates to the definitions of an incubator, accelerator and cluster. Second, it aims to give insight into how literature correlates the presence of these characteristics with driving innovation.

In their respective subsections, the definitions of an incubator, accelerator, cluster and their characteristics are explained. Subsequently, the characteristics and metrics for driving innovation will now be discussed. Figure 1 shows three main characteristics of driving innovation as found in literature.

First, a driver for innovation is the high turnover of ideas. Research indicates the transformation of ideas into feasible businesses is closely related with innovation. The most feasible ideas are sometimes referred to as ‘low-hanging fruits’. Sigfusson defines the low-hanging fruits as “*projects which could result in concrete output within 6-12 months*” (Sigfusson 2020, p. 72). When considering the selection processes for these ideas, the corresponding theoretical connection can be made to the selection process innovation accelerators use for potential ventures. However, there is a gap in the literature on peer-reviewed evidence for ways to improve the selection criteria for such selection processes (Helbing and Baliatti 2011, p. 102). Furthermore, Yin and Luo (2018) suggest that managerial decision making is inherently implicit when it comes to such selection. This may warrant further research into the connection between the selection of viable young firms to ensure high turnover rates. In conclusion, high turnover rates are an indicator of innovation, but there is a gap in literature where it comes to selection criteria for feasible ideas. Meanwhile, a high turnover of feasible ideas is one of the main goals of accelerators. Accelerators aim to achieve this goal by working with cohorts of promising startups, acquiring a part of the company shares with seed-stage investments and cashing out when it is profitable to do so.

Second, as Caiazza (2014) suggests, the learning and network effects which characterize an incubator help reduce the risk of their tenant firms failing, which is illustrated by the following quote:

*“Greater uncertainty associated with a technology increases the risks inherent in the development of spin-offs, therefore incubator services help to reduce this uncertainty, increasing the chances of the spin-offs’ survival.”*

(Caiazza 2014, p. 1067)

Third, an important factor of clusters is the possibility of knowledge spillovers. These spillovers occur

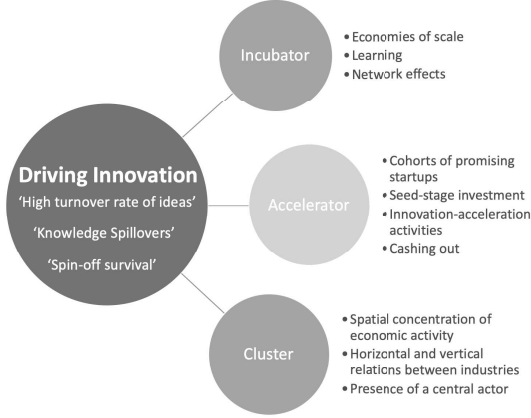


FIG. 1. Theoretical framework which is derived from the literature review

when closely linked firms in a cluster cause new knowledge to flow from one firm to another as a side-effect of physical closeness when *e.g.* researching and developing new technologies (Baptista and Swann 1998, p. 526). By using regional employment data, Baptista and Swann (1998) suggest that clusters' success is mainly because of these knowledge spillovers. The regions which develop from the clustering effect gather an increasing amount of technological knowledge which spills over and in turn attracts even more innovators (Baptista and Swann 1998, p. 538). Moreover, the role of clusters in an industry has shown to increase the whole industrial employment and patent growth (Delgado et al. 2014, p. 1785). Additionally, clusters which show a saturation of firms in related industries yielded the firms a higher probability to innovate (Baptista and Swann 1998, p. 538).

All in all, the literature shows that multiple characteristics of incubation, acceleration and clusters are closely correlated with drivers for innovation. When the research background is put into context with the IOC this raises the question '*How can a cluster drive innovation in the seafood industry?*' Section III discusses the methodology that is used to answer this research question.

### III. METHODOLOGY

This paper adopted an explanatory case study method, which is considered to be a suitable strategy for analyzing, understanding and describing a phenomenon in its context (Bonoma et al. 1981). The research aims to analyze the driving factors of innovation in the context of the seafood industry. Specifically, the paper focuses on one particular cluster in Iceland and how it can drive innovation.

Recently, a book was published by Thor Sigfusson the CEO of the IOC. The title of the book is '*The*

*New Fish Wave*' and gives a complete overview of the activities of the cluster in the context of the seafood industry in Iceland. Therefore, it is very suitable to collect qualitative data from the book and use it as a source of information directly from the core of the cluster. It is presumed that the views displayed in the book are aligned with, and representative for those of the cluster.

Furthermore, the within-case data is analyzed through the theoretical framework that is constructed in section II, the literature review. In attempt to explain how the cluster can drive innovation, the strategy of 'Building Explanations' is used. Yin (1981) suggest this analysis consists of three parts:

- *An accurate rendition of the facts of the case*
- *Some consideration of alternative explanations of these facts*
- *A conclusion based on the single explanation that appears most congruent with the facts*

Section IV, *Findings*, is structured according to this strategy. Relevant facts and patterns are extracted from the book and coupled with the relevant literature. Additionally, alternative explanations of the findings are taken into consideration.

However, there are limitations to this method. One of the downfalls of this method is that the search for an explanation becomes a type of pattern-matching process (Haas and Kraft 1982). To illustrate, the book published by the CEO of the IOC is taken as main point of reference, therefore the perspectives in which the research question is analyzed are limited.

The nature of this paper is an explanatory case study which aims to give insight into a phenomenon in a specific context, namely how the IOC drives innovation in the Icelandic seafood industry. Therefore, the need for conclusions which can be generalized and put into a broader perspective are inessential.

### IV. FINDINGS

To understand the various operations of the IOC and their relation to driving innovation, the framework previously illustrated in figure 1, section II (E) *Theoretical Framework*, will be supported and elaborated on with examples from the case. This section will begin with discussing the framework with examples from the qualitative case data and subsequently the following topics will be illustrated: incubation, acceleration and clusters. Additionally, in their respective parts, it will be discussed and illustrated how incubation, acceleration and clusters relate to driving innovation.

The IOC has been incubating several young firms at their physical office space on the docks of Reykjavik. There, they provide infrastructure from young

firms such as meeting rooms and a reception, an essential value proposition for an incubator as Bruneel et al. (2012) have found. Consequently, the tenant firms benefit from the advantages of economies of scale accommodated by the IOC. Furthermore, they have opened a food hall on the ground floor of the offices, open to the public for lunch and dinner. The food hall concept has given multiple entrepreneurs the opportunity to open up restaurants and catering services at a "coworking space for foodies" as the IOC calls it (Sigfusson 2020, p. 95). By doing so, the organization has created a similar value proposition for the entrepreneurs in the food service industry as it does to tenant firms in their offices and creates additional networking effects in the process. This is supported by the fact that 70% of the companies which are part of the IOC have collaborated together (Sigfusson 2020, 138). As a result of the IOC's unfaltering efforts to provide tenant firms with the benefits of incubation services, *i.e.* economies of scale, learning and network effects, they reduce the risk of spin-off failure.

In recent years the IOC has been pivoting towards acceleration. In 2018 they went on a quest to find more entrepreneurs in a collaborative effort with Icelandic Startups. The IOC wanted to pivot more towards accelerating innovative startups to increase their investment portfolio and move towards active acceleration which has increased their financial strength (Sigfusson 2020, p. 85).

However, this strategy has shown to be complex to implement in an established industry like the Icelandic seafood sector. When focusing on operations, the IOC's complementary strategy in line with their shift towards acceleration is to focus efforts on low-hanging fruits. The IOC's strategy would be to support cohorts of young companies encompassing a higher probability of success within the next year by providing innovation-acceleration activities. Conversely, some of these low-hanging fruits were founded by incumbent companies in the industry in association with the IOC. An example of such a spinoff is 'Ocean Excellence' (OE), founded by three different leading organizations in the fishing industry. OE's initial concept was to provide solutions for small fisheries around the world, a niche consultancy focusing on fisheries wanting to make profit from prior waste. All in all, the IOC focuses on the one hand on cohorts of promising startups with ideas that are categorized as low-hanging fruits. On the other hand, it has proven to be difficult to execute this strategy solely with startups. Therefore, large players in the industry occasionally step in to realize the ideas in co-operation with the IOC. Despite this, the main goal of creating high turnover rates of ideas by focusing on low-hanging fruits remains unchanged.

To illustrate how clusters can affect industries at a greater scale, the seafood industry and its surrounding industries are examined. Thor Sigfusson, the CEO of the IOC discusses the economics of affecting indus-

tries outward from the 'base industry' (Sigfusson 2020, p. 43). He uses the definition of a base industry by Roy et al. (2009).

*"The economic base is an industry or a collection of industries that is disproportionately important to a region's economy in the sense that other economic industries depend on the operation of the economic base, but not vice versa, at least not to the same extent."*

Therefore, the effect of driving innovation in the base industry as well as the depending industries, can potentially grow the economic well-being at a much larger scale. An illustration of the base industry and surrounding industries can be seen in figure 2. Focusing on the base industry exclusively can take away from the effect that innovation has in an organization such as the IOC. Mainly because many of the companies working in the IOC are working on business developments surrounding the base industry of fisheries and related food processing, but their value propositions do not directly belong to the seafood industry.

An example of this phenomenon can be seen in the value propositions from many of the companies in the IOC, *e.g.* companies working in cosmetics utilize fish-byproducts and grew from within the IOC but do not belong to the base industry. However, their operation is closely linked to companies inside the base industry, such as the fisheries themselves. This example illustrates the horizontal and vertical relations between connected industries as suggested in subsection II (D), *Clusters*. Additionally, the fact that the IOC operates from one central location and has a dependent companies in the region shows the concentration of economic activity and the role the IOC takes as a central actor in the cluster. These indicators follow the prerequisites as suggested by Jacobs and De Man (1996) for

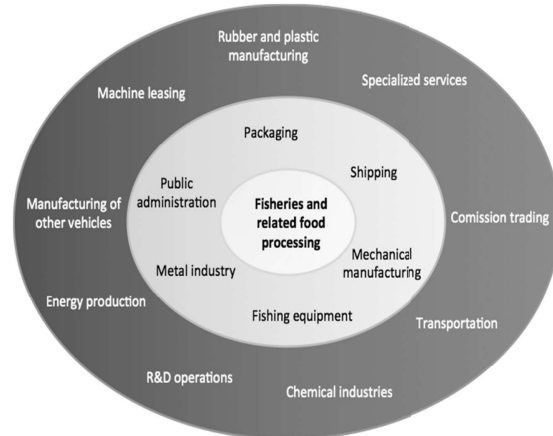


FIG. 2. Base industry and depending industries. Figure extracted from (Sigfusson et al. 2013, p. 102)

the existence of a cluster.

Furthermore, it is inadequate to measure the effect of a cluster only by its base industry. As was suggested in the introduction, the fishing industry is responsible for 6.3% of the GDP, this statistic is only taking the base industry into consideration. When taking the peripheral industries that are closely connected to the base industry into account, the industry is contributing around 25-35% to the GDP (Sigfusson 2020). The difference between the direct and indirect contribution to the GDP is a strong indication for the network effects that take place in the industry.

Another factor closely associated with incubation is the formation of localized networks between actors in a cluster (Baptista and Swann 1998, p. 528). This is where the commonalities between incubation and the clustering of related companies can be seen more clearly. Furthermore, the networking effect on innovation has suggested that networking can be an alternative to research and development in product innovation as opposed to being a complementary input (Love et al. 1997, p. 58).

Correspondingly, one of the characteristics of a cluster is the formation of localized networks between actors in a cluster, also referred to as horizontal and vertical relations. Before the existence of the IOC in Iceland, the networking connectivity between actors in the fishing and seafood industry seems to have been scarce. The thought of cooperating with others existed but taking the action to actually *'pick up the phone and dialing'* seldom took place (Sigfusson 2020, p. 35). The IOC grew from the networking effects that were so unknowingly appreciated at the time in the industry. By connecting incumbent firms in the industry with each other and of course the young firms, many of whom were utilizing the incubation services from the IOC, an ecosystem of related companies appeared with a common meeting ground at the IOC. This clustering in a small geographical area has led to knowledge spillover between various small fisheries. An example of this phenomenon can be seen in the process of catching mackarel off the coast of Iceland. Under the roof of the IOC, multiple small fisheries came together and found a way to cooperate regarding the process of catching mackarel and ensuring its highest quality from catch to delivery. Hence, leading to process innovation. Furthermore, they collaborated on a collective marketing and sales promotion, strengthening the global image of Icelandic mackarel and linking it to sustainable and ecological fishing (Sigfusson 2020, p. 90).

In conclusion, the qualitative case data that was retrieved from the book *'The New Fish Wave: How To Ignite The Seafood Industry'* revealed the relation

of the IOC to driving innovation in the region. The data was analyzed using the framework which was derived in section II, Literature Review.

## V. CONCLUSIONS AND FURTHER RESEARCH

The findings show that the IOC's business model is by definition not solely a cluster, an incubator or an accelerator. It comprises factors from all models to create something novel on the docks of Reykjavik. By analyzing the organization's operations it becomes apparent that the IOC's foundation lies in networking with companies in the base industry. The literature shows this networking characteristic of a cluster has a beneficial effect on innovation. Furthermore, the case illustrates that with the organization's numerous operational activities, it contributes to both process and product innovation. However, the findings did not indicate the presence of paradigm or position innovation in the IOC's operations.

The organization began as a cluster by Porter's definition and subsequently incorporated incubation activities. Most recently, the organization has initiated another pivot into the world of acceleration. Ultimately, these different operations all indicate an enhancement of innovation in the region.

To summarize, by combining the different value propositions of a cluster, an incubator and an accelerator, the IOC contributes to innovation in three different ways:

- A high turnover rate of ideas enhances innovation in the geographical region through acceleration.
- Knowledge spillovers take place between the base- and peripheral industries as a side effect of cluster characteristics.
- Increase in spin-off survival rate due to incubation services.

For further research, it would be valuable to extend the research to a multiple-case study. For example, by examining multiple clusters with similar characteristics in different geographical regions. As a result, multiple perspectives are included. This would give a more objective and complete answer to the research question. Additionally, it would be valuable to further investigate the role of incubators, accelerators and clusters when looking at paradigm and position innovation.

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Bonoma, T. V., Eisenhardt, K. M. and Yin, R. K. (1981), 'The Case Study Crisis : Some Answers Author ( s ) : Robert K . Yin Source : Administrative Science Quarterly , Vol . 26 , No . 1 ( Mar . , 1981 ) , pp . 58-65 Published by : Sage Publications , Inc . on behalf of the Johnson Graduate School of Management , C' , *Journal of Marketing Research (JMR)* **26**(1), 199–208.

Bruneel, J., Ratinho, T., Clarysse, B. and Groen, A. (2012), 'The evolution of Business incubators: Comparing demand and supply of business incubation services across different incubator generations', *Technovation* **32**(2), 110–121.

**URL:** <http://dx.doi.org/10.1016/j.technovation.2011.11.003>

Caiazza, R. (2014), 'Benchmarking of business incubators', *Benchmarking* **21**(6), 1062–1069.

Cohen, S. (2013), 'What Do Accelerators Do? Insights from Incubators and Angels', *Innovations: Technology, Governance, Globalization* **8**(3-4), 19–25.

Delgado, M., Porter, M. E. and Stern, S. (2014), 'Clusters, convergence, and economic performance', *Research Policy* **43**(10), 1785–1799.

**URL:** <http://dx.doi.org/10.1016/j.respol.2014.05.007>

Dempwolf, C. S., Auer, J. and D'Ippolito, M. (2015), 'Innovation accelerators: Defining characteristics among startup assistance organizations', *Small Business Innovators: Insights From Accelerators, Additive Manufacturing and Supply Chain Analysis* (October), 93–142.

Doloreux, D. and Shearmur, R. (2009), 'Maritime clusters in diverse regional contexts: The case of Canada', *Marine Policy* **33**(3), 520–527.

European Commission (2002), Benchmarking of Business Incubators, Technical report.

Francis, D. and Bessant, J. (2005), 'Targeting innovation and implications for capability development', *Technovation* **25**(3), 171–183.

Haas, D. F. and Kraft, D. H. (1982), *Experimental and Quasi-Experimental Designs for Research in Information Science*.

Hackett, S. and Dilts, D. (2004), 'A systematic review of business incubation research', *The Journal of Technology Transfer* **Vol. 29**(1), p. 57.

Helbing, D. and Ballesteri, S. (2011), 'How to create an innovation accelerator', *European Physical Journal: Special Topics* **195**(1), 101–136.

Iceland Statistics (2018), 'Iceland in figures 2018'.

**URL:** <https://issuu.com/hagstofa/docs/iceland-in-figures-2018>

International Business Innovation Association (2016), 'Operational Definitions'.

**URL:** <https://inbia.org/wp-content/uploads/2016/09/InBIA-Industry-Terms.pdf?x84587>

IOC (n.d.), 'What We Do'.

**URL:** <http://www.sjavarklasinn.is/en/about/>

Íslandsstofa (n.d.a), 'Economy & Infrastructure'.

**URL:** <https://www.iceland.is/the-big-picture/economy-infrastructure>

infrastructure

Íslandsstofa (n.d.b), 'Fisheries'.

**URL:** <https://www.iceland.is/trade-invest/fisheries>

Jacobs, D. and De Man, A.-P. (1996), 'Clusters, industrial policy and firm strategy', *Technology Analysis & Strategic Management* **8**(4), 425–438.

**URL:** <https://doi.org/10.1080/09537329608522461>

Love, J. H., Roper, S. and Northern Ireland Economic Research, C. (1997), 'The determinants of innovation : R&D, technology transfer and networking effects', *Working paper / Northern Ireland Economic Research Centre ; no.31* (1982), 27p.

Pittaway, L., Robertson, M., Munir, K., Denyer, D. and Neely, A. (2004), 'Networking and innovation: a systematic review of the evidence', *International Journal of Management Reviews* **5/6**(3&4), 137–168.

**URL:** <http://dx.doi.org/10.1111/j.1460-8545.2004.00101.x>

Roy, N., Arnason, R. and Schrank, W. E. (2009), 'The Identification of Economic Base Industries, with an Application to the Newfoundland Fishing Industry', *Land Economics* (85), 675–691.

Sigfusson, T. (2020), *The New Fish Wave*, Leete's Island Books.

Sigfusson, T., Arnason, R. and Morrissey, K. (2013), 'The economic importance of the Icelandic fisheries cluster- Understanding the role of fisheries in a small economy', *Marine Policy* **39**(1), 154–161.

**URL:** <http://dx.doi.org/10.1016/j.marpol.2012.10.015>

Smilor, R. and Gill, M. (1986), *The New Business Incubator Linking Talent, Technology, Capital, and Know-how*, Lexington Books, Lexington, MA.

Theodorakopoulos, N., Kakabadse, N. K. and McGowan, C. (2014), 'What matters in business incubation? A literature review and a suggestion for situated theorising', *Journal of Small Business and Enterprise Development* **21**(4), 602–622.

Valli (2018), 'Yfir 100 fyrirtæki komin í Sjávarklasann'.

**URL:** <https://borgarblod.is/2018/09/23/yfir-100-fyrirtaeki-komin-i-sjavarklasann/>

Voisey, P., Gornall, L., Jones, P. and Thomas, B. (2006), 'The measurement of success in a business incubation project', *Journal of Small Business and Enterprise Development* **13**(3), 454–468.

WorldFishing (2019), 'Fish Waste For Profit 2019'.

**URL:** <https://www.worldfishing.net/news101/industry-news/fish-waste-for-profit-2019>

WorldFishing (2020), 'Iceland Licenses Fish Waste For Production'.

**URL:** <https://www.worldfishing.net/news101/industry-news/iceland-licenses-fish-waste-for-production>

Yin, B. and Luo, J. (2018), 'How do accelerators select startups? Shifting decision criteria across stages', *IEEE Transactions on Engineering Management* **65**(4), 574–589.

Yin, R. K. (1981), 'The Case Study Crisis : Some Answers Author ( s ) : Robert K . Yin Source : Administrative Science Quarterly , Vol . 26 , No . 1 ( Mar . , 1981 ) , pp . 58-65 Published by : Sage Publications , Inc . on behalf of the Johnson Graduate School of Management , C' , *Journal of Marketing Research (JMR)* **26**(1), 199–208.