Nordic Innovation

NORDIC INNOVATION REPORT 2014:10 // JANUARY 2014

North Atlantic Ocean Cluster Alliance

Building bridges in the North Atlantic

Nordic Innovation

North Atlantic Ocean Cluster Alliance

Building bridges in the North Atlantic

Authors:
Thor Sigfusson Ph.D.
Iceland Ocean Cluster
thor@ioc.is
+354 618 6200

Vilhjalmur Jens Arnason
Iceland Ocean Cluster
vja@ioc.is
+354 824 4378

March 2014

Nordic Innovation Publication 2014

NAOCA
Building bridges in the North Atlantic

Nordic Innovation Publication 2014:10
Nordic Innovation, Oslo 2014

ISBN 978-82-8277-074-3 (Print)
ISBN 978-82-8277-073-6 (Web)
(URL: http://norden.diva-portal.org)

Authors:
Thor Sigfusson Ph.D.
Vilhjalmur Jens Arnason

Publisher:
Nordic Innovation, Stensberggata 25,
NO-0170 Oslo, Norway
Phone: (+47) 22 61 44 00.
E-mail: info@nordicinnovation.org
www.nordicinnovation.org

All Nordic Innovation publications can be downloaded free of charge as pdf files from
http://norden.diva-portal.org

Cover photo: H:N Markaðssamskipti

Nordic Innovation
Stensberggata 25, NO-0170 Oslo,
Norway
Phone: +47 47 61 44 00
info@nordicinnovation.org
www.nordicinnovation.org

NORA
Bryggjubakki 12, FO-110 Tórshavn,
Faroe Islands
Phone: (+298) 306990
nora@nora.fo
www.nora.fo

Industry clusters around the North Atlantic have formed a lasting collaboration network, the NAOCA, North Atlantic Ocean Cluster Alliance.

The NAOCA work has resulted in cluster projects that cross borders and have clear results.

The projects include collaboration regarding a *"green fishing vessel"*, offshore energy in Greenland and project sharing between students and industry.

Project participants

Leslie OReilly, Managing Director,
Oceans Advance, Newfoundland, Canada

Niels Winther, Advisor, Vinnuhúsið,
Faroe Islands

Per Erik Dalen, Managing Director,
AAKP, Norway and Project Leader
at NCE Maritime

Robert Wolff, Adviser, Civ., Eng.
SINTEF, Norway

Steen Sabinsky, CEO, Maritime
Development Center of Europe, Denmark

Thor Sigfusson, Managing Director,
Iceland Ocean Cluster, Iceland

Tønnes “Kaka” Berthelsen,
Deputy Manager, KNAPK, Greenland

Vilhjálmur Jens Árnason, Project Manager,
Iceland Ocean Cluster, Iceland

Table of contents

List of figures and tables

Executive summary

There were two main goals of the project, one short term and the other long term. The primary short term goal was to build a strong and stable relationship with the clusters and high tech firms around the North Atlantic developing new solutions in niche markets. The long term goal was to build both a stronger identity of the North Atlantic regions as world class provider of technology for the marine sector and more cooperation in high-cost and high-risk production that take several years to develop and to market.

We have achieved our short term goal of building strong and long lasting relationships within the participating clusters. This was achieved by several meetings, conferences and other events in Iceland, Denmark, Greenland, Newfoundland and Norway. The strength of the relationship enabled us to work on several short term projects named *"the low hanging fruits"* that aid us in achieving our long term goal of a stronger identity and as a world class provider of technology for the marine sector. The low hanging fruits are: The Green Fishing Vessel with participation of companies from Iceland and Norway, development of Arctic Oil and Gas cluster in cooperation with Offshoreenergy (www.offshoreenergy.dk) in Denmark and their sister company in Greenland, Project sharing and Turning Waste into Value meeting series.

When looking at the low hanging fruits as a whole they all benefit the marine industry in one way or another. However when broken down it could be said that:

- The Green Fishing vessel benefits the high tech companies and ship builders
- Arctic oil & gas clusters benefits the countries and supporting companies in Greenland, Denmark and Iceland
- Project sharing benefits educational organizations, students and the industry which these students enter after their studies
- Turning waste into value has benefitted the fisheries surrounding the North Atlantic by increasing awareness and giving information about how much we could increase the value of each fish.

The long term goal is still a work in progress. The success of the low hanging fruits is a stepping stone in reaching a stronger identity and classifying the North Atlantic as a world class provider of technology for the marine sector.

At the initial stage of the NAOCA project, the most striking results of the mapping of the clusters were the complete lack of relationships between similar clusters in the North Atlantic. This has drastically changed with NAOCA and we are confident that further relationship building between the clusters will open up further doors for value creation in ocean related industries in the North Atlantic. To open channels between

the clusters has been fruitful as shown in the concrete projects which have been initiated.

NAOCA work in 2014 is possibly the best indication of the value seen in this organization. NAOCA´s leadership has been invited to Alaska, USA, Maine, USA and Portugal in 2014 and plans are already ahead with the next meeting of NAOCA in Aalborg, Denmark. We believe our work ahead is mainly to further enhance the interest of cluster managers from both sides of the North Atlantic to collaborate. This work has to be done through the clusters themselves and their members.

We have emphasized the opportunities in full utilization of marine products, which many clusters have been very interested in pursuing further. However, there is a need for a different mindset in industry in many of the countries. There is a need for a paradigm shift in this field, which will only realize if the clusters cooperate closer with each other and open a serious dialogue with policy makers on this crucial issue.

Introduction

The nations surrounding the North Atlantic have benefitted economically from one of the most resourceful oceans in the world (2.3 times the average catch of the world seas). These nations have seen the ocean both as a source of food and valuable minerals and as a vast highway for commerce. But are the countries in the north fully utilizing the opportunities, which the ocean may bring?

In recent years there has been a growing interest in ocean-related matters connected to research and new means of harvesting ocean resources. Oceans cover 71 percent of the earth's surface and support the life of nearly 50 percent of all species on earth. Fisheries and aquaculture provide 20 percent of the animal protein and five percent of total protein in the human diet. Ocean currents have a huge impact on the earth's ecosystem, climate and weather. The ocean is the key to transportation with more than 90 percent of the trade between countries being carried by ships and about half the communications between nations taking place through underwater cables. The world's oceans supply nations with energy and create a venue for recreation. Increased demand for food in the world can be met with ocean resources and it is in the ocean that we might find the cures too many diseases. Yet to a great extent this underwater world is unexplored and research on opportunities and threats associated with its resource use and abuse has been limited.

To capture new opportunities and move traditional industries forward, various marine/ocean clusters have been formed in the North Atlantic region, in Western Canada, Iceland, Scotland, Ireland, Norway, Denmark, Sweden, and Finland. Most of these clusters are based on the national or regional dimension of networks and enjoy assistance from various organizations and institutions. Many of these clusters have shown positive results, and yet research indicates that numerous small firms are still striving to penetrate global markets.

Limited research has been conducted on networks within the ocean/marine clusters. Recent research by Sigfusson and Harris (2011)[1] conducted a study on the network relationships of high tech marine firms in comparison with high tech firms in other ICT industries. They found a significant difference in network capacity between these two sectors. Marine industry entrepreneurs were found to be less connected and under-utilized in network-based relationships within their industry compared to computer game entrepreneurs. Ocean/marine entrepreneurs were also found to have smaller networks

[1] Sigfusson and Harris. (2011). "Relationship portfolio strategies for internationalizing entrepreneurs: a resource-based approach". Submitted to The International Journal of Marketing Management

outside their home region. This may partly explain the relatively week ocean/marine-based clusters in many countries compared to other clusters.

Ocean related industries also face obstacles as they are generally depicted in the media as first and foremost fisheries. Ships are shown in strong winds with high waves and fishermen are presented as tough people working under extreme conditions. These simplistic pictures of the marine industry combined with the minimum media coverage of new industries, partly explains the lack of interest and knowledge in these sectors in many countries, especially among new generations. This may also explain why marine clusters, specifically clusters related to fisheries and related businesses, have not gained significant attention nor been in the spotlight of policy makers.

The lack of networking among the entrepreneurs and cooperation among industries may indicate that there are opportunities that have not been utilized - not least opportunities for future generations of highly educated people.

Individual clusters have shown interest in more harmonization as it may assist in strengthening the image of the North Atlantic marine market, both within the region as well as globally. Thus, there are significant opportunities in more benchmarking among ocean/marine clusters in the North Atlantic and in strengthening relationship networks in the ocean/marine sector.

North Atlantic Clusters as an opportunity

In the report *"Innovation in the Nordic marine sector"*[2] the Nordic countries are encouraged to increase cooperation amongst government, research and industry on a Nordic level. Various projects have been initiated in the North Atlantic in the ocean/marine sector which aims to increase cooperation. The issues raised have been regarding the environment, seabed research, fisheries etc. These projects have often consisted of partners from 2-3 countries and some have been focusing only on EU countries (such as mapping the EU west coast led by Ireland). For example, Ireland has worked with Canada in several projects. Academics in ocean affairs have also had various relations across the North Atlantic. However, to date industry activity in this area has been limited.

Working within the definition of a cluster as a 'localized network of specialized organizations, whose production processes are closely linked through the exchange of goods, service or knowledge' this project would examine how stronger cooperation or harmonization among the clusters in the North Atlantic may become a vehicle for improved performance for the North Atlantic marine/ocean related industries.
Among the questions considered in this project are:

- Could benchmarking among North Atlantic marine cluster and sharing of best practices strengthen ocean/marine industries and clusters?
- Could we build a sales network across the North Atlantic?
- Could a stronger image of the North Atlantic as a center of excellence in ocean related industries assist these firms in selling their products, etc.?

---

[1] NORA. (June 2009). "Innovation in the Nordic marine sector". http://www.matis.is/media/utgafa/krokur/innovation_in_the_nordic_marine_sector_final_report_web.pdf

While many marine/ocean clusters in the North Atlantic have mapped the industries involved and observed the strengths, weaknesses and opportunities of individual countries in developing ocean/marine, a project aiming to harmonize clusters and address the questions above for the North Atlantic ocean/marine sector has not been conducted. Thus, this research would provide both innovative and timely findings on how to develop stronger networks in the ocean/marine sector.

At the initial stage of the cluster, cluster members are often a heterogeneous group of relatively isolated industry actors. This has been evident in cluster research, including the ocean/marine sector. As the clusters develop, the group goes from being a loosely connected group of firms to become more organized.

With increased globalization, relatively small clusters in regions and across countries face the same problems:
- SMEs have limited possibilities to gain a foothold in the global market.
- Many firms have been very successful internationally but most are striving to make a living at home.

However, in terms of strengths many of these firms are providing services to local industry/government etc. that require world-class service/technology. This means that many of the small firms have developed products or services for very demanding customers and these products are therefore competitive in the global market.

The existing formula for success in the North Atlantic ocean/marine tech industry has not included a regional harmonization or strong cooperation among firms in the North Atlantic region. There may be an opportunity here; could harmonization increase relations among entrepreneurs who could strengthen their competitiveness in the global market and enhance the image of the North Atlantic region as a world-class provider of technology?

This project therefore seeks to utilize *"best practice models"* from successful cluster formations in other high tech sectors to develop a framework for the development of a North Atlantic Ocean cluster in the ocean/marine high tech sector. Here, significant work has been done in the field of benchmarking of clusters which will assist in this matter.

The project aims to bring together leaders from marine clusters in the North Atlantic region, to map the opportunities, to benchmark against other successful clusters, and to initiate further cooperation amongst the countries. The most important goal of the project revolves around the mapping and opening of new channels of communication and around the building of bridges between the countries. Other goals that might be looked at as beneficial for the participating countries are improving the image of the region, increasing innovation and cooperation in many areas such as education, security matters, and environmental issues, and utilizing resources more efficiently. More information can also make it easier to draft a general policy for the region, while stronger awareness of opportunities in the area might encourage growth and attract interest.

The project's core idea is to build long term cooperation between partners in the North Atlantic Ocean cluster with an emphasis on both business-to-business (B2B) and business to research (B2R) relations.

Mapping of cluster activities in the North Atlantic

The First phase of the project as proposed to Nordic Innovation and NORA was called *"The Harmonization stage"* which is the initial benchmarking of all marine clusters in the North Atlantic

In line with cluster analysis and the suggestions made by the report on Innovation in the Nordic Marine Sector, the initial report of the project entailed a comprehensive survey and analysis of clusters in the North Atlantic, discussing different competences in each country and subsector of industry and to analyze interviews with entrepreneurs and cluster managers in the region. This initial report was published in spring of 2012.

The initial work of the project was to map cluster activities in the North Atlantic and to a certain degree the marine-related industries in the different countries. The report was seen as a basis for further discussion about how to increase cooperation between the countries covered in the report.

In the report the focus was both on ocean-/marine-related clusters in industries connected to transport by sea and on the exploitation of resources in the ocean and beneath the seabed. The main emphasis was on marine-related food, energy, transportation, biotechnology and research.

All the Nordic countries along with Canada, Ireland, and Scotland are endowed with substantial coastlines; it comes as no surprise, then, that ocean accessibility has had an important effect on their economies and lives. A significant part of the population in these countries live next to the sea, a fact that often shapes their lives and the conditions, possibilities and challenges they face. Even though the distance between some of these countries is relatively short, the ocean is generally perceived as a barrier down through the centuries. In the report the view is different. The ocean is seen as something that unites these countries and is a source of shared interests and common approaches. Modern technology makes it easier than before to share ideas and thoughts with people further away and development in transportation technique is making our world a smaller place.

There are strong cultural ties between all of these countries and collaboration among them has in general been stable and peaceful. Certain language barriers have obtained but as the number of those speaking English as a first or second language is substantial

in this area, communication between these countries has been relatively problem-free.

The countries covered in this project all share common values and display striking similarities in the shape and contour of their political landscapes. They all have relatively small, open economies with a high export-dependency. Furthermore, foreign trade constitutes an important part of their economic activity. All of these countries compete on markets that are dominated by much bigger nations with larger populations. Most of these countries have access to huge land and sea areas but are in general sparsely populated with an average population density of around 35 people per km^2. The combined population of all the countries in the North Atlantic Ocean cluster project is around 70 million, Canada being the largest with a population of 34 million. The composition of the population in these countries is in some ways different from the countries n the southern part of the developed world, were countries of the North Atlantic have a higher population percentage of young people than other highly developed regions. According to the concluding remarks in the report many opportunities can be created to increase cooperation between the countries, not only on a political level but on a business level as well. This can be done by combining forces and sharing know-how. Through that these nations can mutually benefit in manifold ways, forging new opportunities even as they acquire additional strengths when competing on international markets.

All of the countries have unique know-how about the ocean environment, or are in an optimal position to use ocean-related resources. They can share information about how to increase the utilization of resources and how to reduce waste or environmental impact. Some opportunities might reveal themselves in relation to better utilization of raw materials by collecting information on how to manage the fishing process more efficiently.

More extensive and insightful research might open up new avenues of possibilities regarding the production of food for human consumption and feed for aquaculture. The marine biotechnology sector is still in its infancy, and yet a plethora of opportunities exist that are linked to the development of pharmaceuticals, functional foods, cosmetics, agrichemicals, fine chemicals, proteins, and biofuels.

Increased demand for food in the world will, to a certain extent, be met with development in the aquaculture sector. The countries of the North Atlantic marine cluster are in possession of unique know-how and have singular access to space and resources in terms of ocean industries and their related sectors. They are therefore in a position to become key players in meeting this demand.

Finally, there is no doubt that a number of opportunities exist in the Arctic region. The potential for finding valuable natural resources will call for increased activity and accountability in the region. It is important to review the opportunities linked to new shipping routes in the area and for the relevant countries to work together to ensure a beneficial outcome for all those that live in nearby regions.

The marine sector has a bright future, but only if the right steps are taken to utilize available and yet-to-be discovered resources and only if, through cooperation, new measures are taken to grasp the opportunities that emerge with the on-going changes both in the marine environment and in the marketplace.

There are many opportunities for cooperation in marine-related affairs between the countries in the north. They may have different strengths and weaknesses, but their cultural ties are strong and there is a robust tradition of working together in many areas for mutually beneficial ends. The main conclusion of the mapping was that these countries face similar challenges but are equipped with unique know-how and experience enabling them to find common solutions and make them stronger when competing with other regions.

See Appendix 1 for the whole report.

Linking clusters and building relationships

1.1 The initiation in Iceland

Even though the project proposal had listed the participating clusters the relationship building between the clusters was the single most important task at this stage of the project. In line with the project description the first meeting of the group of clusters representatives was held in Reykjavik in May 2012. Those who attended the meeting were:

Olav Bardalen
(Innovation Norway),
Per Erik Dalen
(Kunnskapsparken Ålesund),
Robert Wolff
(SINTEF, Norway),
Tønnes *"Kaka"* Berthelsen
(Knapk, Greenland),
Leslie O`Reilly
(Ocean's Advance, Canada),
Niels Winther
(Vinnuhúsið, Faroe Islands),
Steen Sabinsky
(Maritime Denmark),
Thor Sigfusson
(Iceland Ocean Cluster),
Vilhjalmur Jens Arnason
(Iceland Ocean Cluster),
Elvar Knútur Valsson
(Ministry of Industry, Iceland),
Finnur Oddsson
(Chamber of Commerce, Iceland)
Eva Rún Michelsen
(Iceland Ocean Cluster).

Figure 1. Group photo at the Iceland Chamber of Commerce in May 2012.

At this meeting the main goal was to enhance further the personal relationships between cluster managers from different countries. The greatest challenge for cluster collaboration over borders is to be able to use the cluster model, mostly used within borders or regions, as a prototype for an international relationship building. In this project we explored the possibility to use the Ifor Williams cluster development model, which is mainly thought of as a typical regional cluster building, for the international cluster relationship building.

In line with the emphasis on relationship building this meeting focused on introducing the cluster's activities in different countries and to strengthen personal relationship between the participants.

At the meeting Mr. Vilhjalmur Jens Arnason presented to the group a working draft of the mapping of North Atlantic Ocean Clusters. The group made some comments and suggestions and decided to receive the final draft at the next meeting in Copenhagen in November 2012.

In general it can be said that the meeting was fruitful and informative with open minded debate and discussions about the possibilities, challenges, opportunities in business development, R&D, new technology, best practice, benchmarking and sharing of knowledge and know-how. The cluster managers agreed that the potential for growth and job creations is great, by building on existing strength at each Marine/Maritime Cluster and further develop new business opportunities, not yet discovered.

Topics discussed and identified for further evaluations at the meeting:
- New innovative products
- Transport and logistic – new shipping routes not yet utilized
- R&D bringing about and maintaining sustainable development in the processing of seafood and other recourses from the ocean
- Marketing the North Atlantic Seafood as one brand
- Think-tank – Young People in the North Atlantic Countries – New business not yet discovered.
- Competence and education development
- Mapping and benchmarking strength and opportunities
- Agriculture in the North Atlantic Ocean
- Oil, minerals, offshore wind, wave energy

The group had the opportunity to meet the President of Iceland Mr. Olafur Ragnar Grimsson at Bessastadir. The group introduced to the president the idea of increased collaboration between clusters in the North Atlantic and the opportunities in forming the North Atlantic Ocean Cluster Alliance (NAOCA). Figure 2 shows the group with the president at Bessastadir.

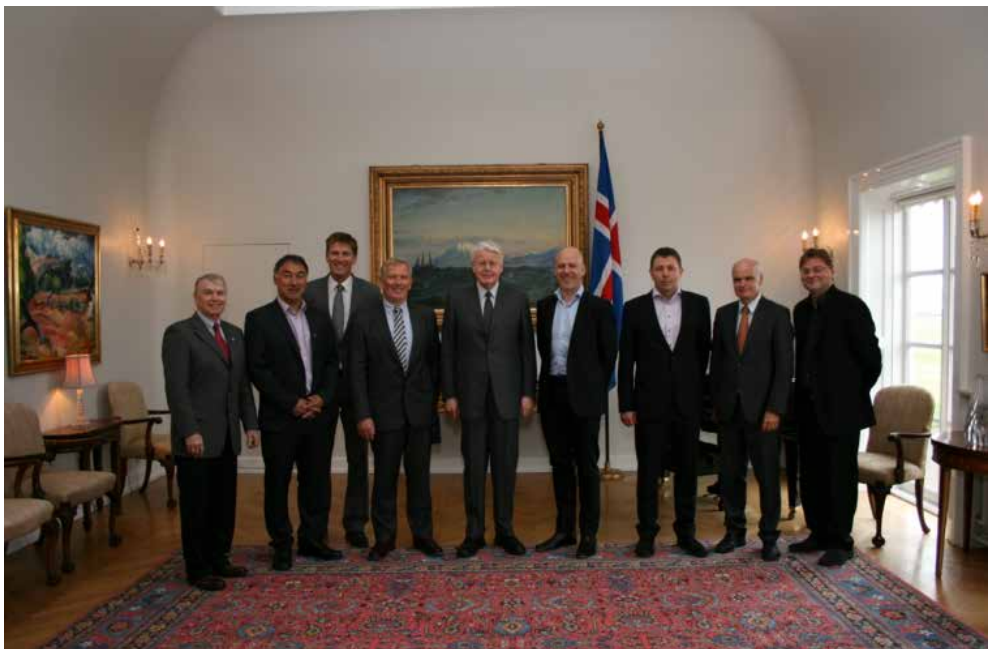

Figure 2. The NAOCA group with the President Mr. Olafur Ragnar Grimsson in May 2012.

From May 2012 until November 2012 (next meeting of NAOCA) the Iceland Ocean Cluster team continued working on the mapping of the North Atlantic Clusters and the planning of the next meeting in Copenhagen.

1.2 Low Hanging Fruits

In the initial project proposal the second phase of the project was called *"The low hanging fruits"*- seeking the opportunities for cooperation?

This is in line with the most important part of the Ifor Williams model in relations to the relationship building between clusters. Through the concept of the *"low hanging fruits"*, emphasis is on possible projects, which can lead to positive results in a fairly short period of time.

The mission of the Copenhagen meeting on November 20th 2012 was to see whether the group was ready to move into the low hanging fruits stage of cluster collaboration. In the beginning of the meeting the emphasis was however on introducing the work of individual clusters, a short update of developments since the last meeting in Reykjavik.

All the representatives, Olav Bardalen (Innovation Norway), Robert Wolff (SINTEF), Tønnes *"Kaka"* Berthelsen (Knapk), Niels Winther (Vinnuhúsið), Steen Sabinsky (Maritime Denmark), Thor Sigfusson (Iceland Ocean Cluster), Jan Boyesen (Maritime Denmark), Hanne Vågsheyg (Denmark) and Eva Rún Michelsen (Iceland Ocean Cluster), introduced their cluster work. The participants also reflected on the initial relationship building between the clusters, which had been developed since the Reykjavik meeting in May.

The working group was presented with the final report on the mapping of the North Atlantic Clusters. The report included an overview of best practices, analysis of the weaknesses and strengths of individual clusters and opportunities.

The working group then prepared a list of suggestions regarding projects that could increase cooperation among clusters in areas likely to result in visible and positive results for industries and R&D in the region. These could be mutual cooperation in international trade exhibitions, finder's fee agreements, web groups among entrepreneurs in the region, concrete test projects among high tech firms to solve current issues in the fisheries industry, aquaculture etc. It was decided that these projects would be discussed further in the next meeting in Ålesund.

The meeting was partly formed as a B2B meeting between individual clusters. The participants were encouraged to come up with a short to do list after each meeting and by that the low hanging fruits should be clarified. The results of the B2B discussions are shown in Figure 3, page 21.

Many issues were addressed during these meetings. One of them was the establishment of formal ocean clusters in the Faroe Islands and Greenland but these countries do not yet have formal ocean related clusters. In both these countries fisheries are regarded as one of the cornerstones of the economy but the importance of other ocean related activities are growing. There is more traffic associated with cruise ship tourism and both countries may have a future in servicing offshore oil production. In the Faroe Islands the aquaculture sector has been gaining strength and steps have been taken to strengthen the shipping industry. Forming industry clusters in these countries could lead to further enhancing relationships with industry clusters that already exist in most Nordic countries and Canada and can open access to increased communication and knowledge sharing.

Another issue high on the agenda was better utilization of by-products of fish and means of increasing awareness regarding fish by-products and the opportunities they can provide for the ocean economies around the North Atlantic. With increased

catch limitations and focus on sustainable fishing around the world, the urge for total utilization of fish resources has never been stronger. Most fishing nations utilize 50-60% of each fish landed, but a growing part of fisheries are now striving to make use of every ounce of raw material. Raw materials previously disposed of as waste are now being turned into valuable products. This is a huge issue for the countries were many communities in Canada, Faroe Islands, Greenland, Iceland and Norway rely heavily on fisheries. In general, an overall aim of every nation in the North Atlantic should be to increase utilization of fish stocks and create more value out of the limited fish catch.

Finally, matters associated with education, development of skills and how to attract people to the marine industries, especially young people, were discussed. Working to develop maritime education at all levels is of vital importance for these industries, and among the benefits of increased cluster cooperation is better ability to support innovation and knowledge sharing.

One of the projects that were presented by the Iceland Ocean Cluster to attract and involve young people was the idea of *"Project sharing"* or in Icelandic *"Verkefnamiðlun"*. The cluster was working on a website to connect students with skills and knowledge and businesses with projects. Following the meeting both the Faroese and Danish representatives started working on creating a similar platform for their countries.

	Denmark	Iceland	Norway	Faroe Islands	Greenland	Canada
Denmark	X	100% club Transportation Green ship Possible grants Project sharing	Transportation, short sea	Possible assistance regarding Froese Ocean Cluster	GOC relationships	Offshore, assisting/enable SME's value chain LNG terminals
Iceland	100% club Transportation Green ship Possible grants Project sharing	X	Innovation express on cooperation 100% club Herring & cod enzyme development	Faroese Ocean Cluster continued collaboration	Greenland Ocean Custer Planned visit to Greenland this summer	Possible visit to Iceland by a NL delegation
Norway	Transportation, short sea	Innovation express on cooperation 100% club Herring & cod enzyme development	X	Using byproducts of pelagic fisheries	Enzymes	Direct contact CA & NO
Faroe Islands	Possible assistance regarding Froese Ocean Cluster	Faroese Ocean Cluster continued collaboration	Using byproducts of pelagic fisheries	X	Sharing info on cluster forming process	Smart fish project
Greenland	GOC relationships	Greenland Ocean Custer Planned visit to Greenland this summer	Enzymes	Sharing info on cluster forming process	X	Consulting regarding GOC
Canada	Offshore, assisting/enable SME's value chain LNG terminals	Possible visit to Iceland by a NL delegation	Direct contact CA & NO Arctic	Smart fish project	Consulting regarding GOC	X

Figure 3. Results of B2B meeting in Copenhagen, November 2012.

At the meeting in Copenhagen in November, an alliance was established between the parties, called North Atlantic Ocean Cluster Alliance or NAOCA. The mission of NAOCA is to promote and enhance cooperation and collaboration between respective clusters and their members achieving a *"network of networks"* for the mutual benefit of all parties. Log on to www.sjavarklasinn.is/naoca for more information.

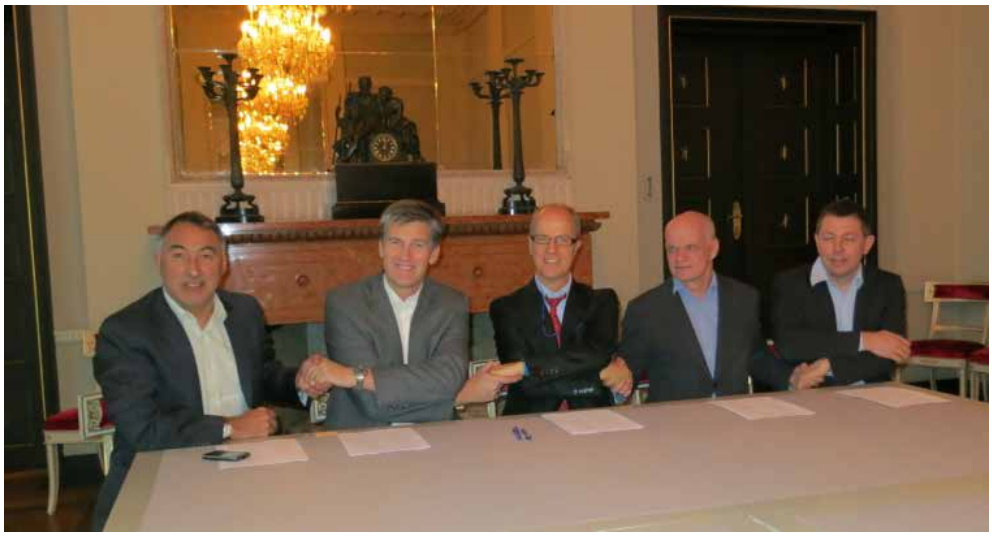

Figure 4. NAOCA memorandum signed in Copenahgen, November 2012.

The initiation of NAOCA received a widespread coverage in the Nordic and partly international media and interest from various international organizations (see Appendix 2 for all media coverage). The memorandum states that:

> *The mission of the North Atlantic Ocean Cluster Alliance (NAOCA) is to promote and enhance cooperation and collaboration between respective clusters and their members achieving a "network of networks" for the mutual benefit of all Parties.*
>
> *The Parties to this agreement will work together in identifying areas where members of respective clusters can collaborate to develop and implement initiatives related to information sharing, research and development, partnerships and business development opportunities.*
>
> *NAOCA is a mediator which emphasizes on increasing cooperation among clusters and other interested parties where – where cooperation which can increase value is needed.*

The new cluster alliance identified areas where members of the cluster should collaborate in the future. For example this can happen through development projects in areas such as: Green maritime / marine technology, expertise, training and education, oil and gas, technological fishing and fishing equipment, aquaculture, transport and logistics in the North Atlantic, local cluster developments, service in the cruise industry, etc.

1.3 Further networking in Norway

The mission of the Ålesund, Norway meeting, which took place at NCE Maritime in Ålesunds Kunnskapspark in April 2013, was to further strengthen the network and evaluate the initial collaboration projects between clusters. In line with previous meetings, the Ålesund meeting began with an introduction to individual cluster work where the representatives from all the clusters described their work.

Attendees at this meeting were: Thor Sigfusson (Iceland Ocean Cluster), Leslie O'Reilley (Oceans Advance), Hanna Vágsheyg (Maritime Development Center of Europe), Robert Wolff (SINTEF), Niels Winther (Vinnuhúsið), Frank Emblen (Ålesund Kunnskapspark), Eva Rún Michelsen (Iceland Ocean Cluster), Tønnes *"Kaka"* Berthelsen (KNAPK), Olav Bardalen (Innovation Norway), Oddvar Skarbø (NCE Maritime), Per Erik Dalen (Ålesund Kunnskapspark).

As in Copenhagen, the meeting was partly formed as a B2B meeting between individual clusters. The participants were encouraged to come up with a short to do list after each meeting and by that the low hanging fruits should be clarified. At the B2B meetings in Ålesund, the members identified fields that are showing business potential and where two or more parties in the cluster are to gain from increased cooperation and knowledge sharing. These include areas such as: off-shore, aquaculture, ship building, shipping and transport, full utilization and more.

The results of the B2B discussions are shown in Figure 8 on page 25.

Snapshots of activities in Norway

Figure 5. Group presentation at Rolls Royce, Ålesund.

Figure 6. Meeting at Ålesund Kunnskapspark

Figure 7. Meeting at Ålesund Kunnskapspark.

	Denmark	Iceland	Norway	Greenland	Faroe Islands
Denmark	X	Green marine – send Steen Logistics - Jan Education	Super maritime cluster Education	Education Cruise Tourism – services – safety – logistics	Possible joint application in relation to education
Iceland	Green marine – send Steen Logistics - Jan Education	X	Education compass – send to Olav + FHF By-products FHF	Start mapping – industry and key players for cluster Material in print	Application for Nordic Council on Faroese Cluster
Norway	Super maritime cluster Education	Education compass – send to Olav + FHF By-products FHF	X	SINTEF – Seal project Oil & gas and fishery – Omegaland	Link to Northern Norway Faroese cluster - Olav
Greenland	Education Cruise Tourism – services – safety - logistics	Start mapping – industry and key players for cluster Material in print	SINTEF – Seal project Oil & gas and fishery – Omegaland	X	Sharing experiences on cluster formation
Faroe Islands	Possible joint application in relation to education	Application for Nordic Council re. Faroese Cluster	Link to Northern Norway Faroese cluster – Olav	Sharing experience on cluster formation	X

Figure 8. Results of B2B discussions in Ålesund, Norway.

The results of the low hanging fruit strategy

The third and final phase of the project was called *"The Vision"*- getting the message out about our strength.

The working group decided that the emphasis of the project would be on the results of the low hanging fruits strategy. These successful projects were to evoke interest in cooperation among the North Atlantic nations, particularly in the ocean/marine high tech sector. By observing the media coverage of the projects and the meetings initiated by NAOCA it can be stated that NAOCA has received a relatively high profile in the media in its fairly short life span.

The concrete projects executed as a part of the NAOCA project are the following:

The Green Fishing Vessel
The Green Fishing Vessel project is a spinoff from an Iceland Ocean Cluster initiative called the Green Marine Technology (www.greenmarinetechnology.is), but a number of Icelandic technology firms collaborate under that networking umbrella. Many of these companies are leaders in their field. Through the Green Fishing Vessel project the companies are given the opportunity to work with Norwegian firms in ship design/ building industries. The overall goal of the project is to increase cooperation between companies in these two countries. This is seen as a joint initiative to develop *"the green fishing vessel"* by increasing energy efficiency, reducing operational costs and in general to ensure that the vessel and its activities will have less impact on the environment.

The overall plan was to initiate a network of SME technology firms through meetings and company visits. The idea was to use the B2B platform to connect Norwegian and Icelandic companies, establish contacts and allow the Norwegian and Icelandic firms to exchange ideas. The first visit was made in November 2013 by a delegation of eight technology firms from Iceland to Ålesund, Norway. The companies met representatives from several tech companies in Ålesund.

It can be stated that both the Norwegian and the Icelandic representatives were very pleased with the trip and new contacts were formed to strengthen relationship between the countries. As a result of the visit of the Icelandic delegation to Ålesund the operation manager of Havfisk in Ålesund was invited to Iceland to give a speech about the building of new Havfisk trawlers in Norway and to explore opportunities for

closer cooperation. Another objective of the project was to strengthen the Icelandic technology group itself and to prepare them for the challenging times ahead through the development and marketing of the Green Fishing Vessel.

The project received a small grant from BSR – Innovation express in fall 2013.

1.4 Project Sharing (www.leinkjan.fo and www.verkefnamidlun.is)
During the meeting of the working committee in Copenhagen in November 2012 this project was presented by the Iceland Ocean Cluster, but the main goal was to attract and involve young people. At the time the cluster was working on a website to connect students with skills and knowledge and businesses with projects. Following the meeting both the Faroese and Danish representatives started working on creating a similar platform for their countries.

In February 2013 the Icelandic version was launched on *"Career Day"* at the University of Reykjavik. Four months later the Faroese version, www.leinkjan.fo was up and running in the Faroe Islands. The Danish version has not been completed at this time.

The goal is to have all parties of the North Atlantic Ocean Alliance with a similar platform in every country which could then be connected together, offering international projects for all students and possibly internships. This would strengthen the connection between the countries and offer students new opportunities for real projects abroad.

For more information on the Faroese project sharing visit www.leinkjan.fo
and for the Icelandic version visit www.verkefnamidlun.is

Developing "Arctic Oil & Gas Clusters"
A group within the Iceland Ocean Cluster, linked to oil and gas, started in 2013 cooperation with the Danish oil and gas cluster, Offshoreenergy.dk. The Danish cluster, with about 270 companies and organizations within its operations, has a sister cluster in Greenland, Offshore Greenland, which will also be working with the Iceland Ocean Cluster on this project.

The partnership will aim to exploit the knowledge of Danish companies in the field of oil industry and the experience of Icelandic companies in diverse activities under difficult conditions in Greenland. This should lead to increased connectivity of SMEs in the countries and increase activities in Greenland. This project also received funding BSR – Innovation express.

The overall goal for the project is to develop opportunities related to Arctic Oil & Gas projects by linking oil and gas industry and knowledge centers in Denmark, Greenland and Iceland. The objective is also to develop oil and gas cluster to ensure that these countries will enjoy their fair share of the huge Arctic exploration activities associated with oil and gas. All activities are to be performed in the context of *"Arctic Oil & Gas Cluster".*

The overall plan for the project is to:
- Define and report on Greenland and Iceland Arctic oil and gas SMEs and knowledge centers

- Bring together Greenland and Iceland Arctic oil and gas SMEs and knowledge centers in *"Arctic Oil & Gas Cluster*"
- Defining and reporting on Arctic oil & gas skills and needs at Greenland and Iceland Arctic oil & gas SMEs and knowledge centers organized in *"Arctic Oil & Gas Cluster"*
- Defining and reporting on further development areas to improve Arctic oil & gas business skills in *"Arctic Oil & Gas Cluster*" and writing follow up application to relevant fund

It was decided that Offshoreenergy.dk would devote a dedicated project manager during the project period and form a joint project steering committee for joint oversight and management of planned activities. The project started in August 2013 and is ongoing. Expected number of SMEs and knowledge centers to be included in *"Arctic Oil & Gas Cluster"* and other events are from Greenland 25+ and from Iceland 25+. A number of meetings have been scheduled but the first meeting took place in Kolding in Denmark in September 2013.

Those who attended the meeting were the following: Thor Sigfusson and Mar Sveinbjörnsson (Iceland Ocean Cluster), Peter Blach and Allan Christensen (Offshoreenergy DK) and Henrik Rafn (Offshoreenergy GR).

The meeting started with the introduction of participants and their organizations. Then the participants discussed the plan for further collaboration and agreed upon the following plan:

a) The key to the success of the project is that it is as much *"hands on"* as possible, meaning that the purpose of all the meetings is to observe the needs of the project and the skills that individual countries can provide. There will be emphasis on bottom up and keeping it simple, meet regularly and effectively and wrap up with a sound working plan which emphasizes skills and needs and potential business from each country. A workshop is planned for the wrap up.

b) The initial work is a short analysis about needs and skills – 2-3 page summary from each country. There will be mapping of the skills which Icelandic companies can bring to the table. A similar analysis regarding Denmark will be made and there will also be a short analysis about the needs and the skills from the Greenland side.

The next meeting is planned in Nuuk in Greenland with a group of Icelandic companies. The purpose of the meeting is to initiate possible first networking, introducing the idea to Icelandic participants observing the oil and gas potential in Greenland and develop further relationships. The next step is to engage the Icelandic businesses and strengthen relationships. At that stage the *"Needs/skills summary"* will be introduced and discussed. Same approach would then apply to Denmark. The final stage is a planned workshop in 2014 with emphasis on getting together business people from the three countries that will, through a workshop session, build further relationships and continue climbing the learning curve regarding oil and gas.

1.5 Turning Waste into Value

Turning Waste Into Value is a series of meetings that took place in the winter of 2012-2013 in several cities across the North Atlantic. The Iceland Ocean Cluster and Codland (Iceland) held the meetings jointly in collaboration with institutions in

each hosting country. The series had two primary aims. The first aim was to provide opportunities for businesses, institutions and academia to network and discuss ways to increase the utilization of by-products of fish. The second aim of the series was to increase awareness regarding fish by-products and the opportunities they can provide for the ocean economies around the North Atlantic.

Three meetings related to the project have taken place, in:

Greenland: Sisimiut, October 6th, 2012 (Polar Fish trade fair)
Mr. Arnar Jonsson, project manager at the Iceland Ocean Cluster and Pall Gislason with Ocean Excellence held a presentation for KNAPK and others. Greenlanders are very enthusiastic about full utilization of the cod and many questions were raised regarding the presentations. Mr. Jonsson and Mr. Gislason spent a few days in Greenland where they met with representatives from the Chamber of Commerce in Greenland, the permanent secretary in the Ministry of Fisheries and presented their ideas to the parliament and government of Greenland.

Newfoundland: St. John's, November 8th, 2012
Event hosted by the Canadian Centre for Fisheries Innovation. Around 50 guests attended. Representatives from the Iceland Ocean Cluster presented the Icelandic experience of utilizing by-products, and demonstrated how other nations could benefit from Icelandic processing methods. With signs of the Canadian cod stock steadily recovering, Canadians have increasingly become interested in complete utilization of fish.

Iceland: Reykjavik, November 7th, 2013 - Two For One
Meeting at the Iceland Ocean Cluster with the Minister of Fisheries in Iceland on how to double the value of each fish landed under the slogan "Two For One". Over 100 guests attended the meeting, which was chaired by the Minister of Fisheries in Iceland. At the meeting nine speakers had short presentations where the focus was mostly on new and innovative products made from fish skin or other by-products from fish. Lively discussions about the environment for new development and innovation within the fishing industry followed.

1.6 Other venues
The NAOCA collaboration has been invited to participate in several conferences around the North Atlantic, including the following:

TCI Annual Global Conference in Kolding
Steen Sabinsky, a member of NAOCA, held a presentation at the TCI Annual Global Conference in Kolding in September 2013 with the title *"The value and lesson to learn in a Transatlantic Cluster Cooperation"*. Steen received very good responses and feedback from the audience and questions from parties in the USA regarding possible participation in the project.

Meeting of Icelandic Cluster Managers in Norway
In November 2013 several Icelandic Cluster Managers who received the Bronze label for Cluster Mangement Excellence were invited to Innovation Norway to attend a seminar on cluster governance and learn more about how the clusters work at the Norwegian Centres of Expertise. This was a two day program where

Eva Run Michelsen represented the Iceland Ocean Cluster as well as the NAOCA collaboration. Olav Bardalen was also an attendee and the duet was able to spread the word about the progress of NAOCA and how the participating clusters have gained from the collaboration over the past two years, such as the Project Sharig platform, Green Fishing Vessel and Arctic Oil and Gas clusters.

SEE BEYOND THE SEA, Turku – Finland

The Iceland Ocean Cluster participated in the conference See Beyond The Sea in Turku, Finland on November 26-27, 2013 on behalf of NAOCA. Haukur Mar Gestsson, economist at the Iceland Ocean Cluster participated on behalf of NAOCA and introduced the work and progress of the NAOCA collaboration. The method of using cluster development in establishing international cooperation caught the attention of other participants. Several connections were made during the conference, which has expanded the network.

Evaluating results

NAOCA
The results of the project for the past two years have been phenomenal and exceeded our expectations. The first thing the project managed to finalize was the formal establishment and structuring of the North Atlantic Ocean Cluster Alliance, an active and lasting collaboration between clusters, firms and institutions in the Nordics and Newfoundland, Canada.

The establishment of NAOCA has proved that methods traditionally used in local cluster development can be transferred to international cooperation development. Tactics such as focusing on "low hanging fruits" have succeeded to rapidly yield visible and tangible results and formed cross-border relationships and trust.

We firmly believe that the NAOCA case study can serve as a model in global development of international cooperation and is a strong basis for further cooperation across the North Atlantic Ocean.

Increased awareness of ocean resource utilization in the North Atlantic
The goal of increasing awareness and spreading knowledge on completely utilizing the ocean resources in the North Atlantic has been a main concern in the project. The NAOCA project and other projects resulting from the collaboration have gained widespread media coverage around the world with utilization of fish by-products as one of the main ideas presented. The Turning Waste into Value meeting series across the North Atlantic, with the aim of spreading knowledge on the use of fish by-products, has progressed this goal.

Furthermore, we have had special meetings with ministers of the governments of Iceland and Greenland discussing opportunities in increased fish utilization and have sensed their strong will in supporting this task in the future. Additionally, marine clusters beyond the North Atlantic (e.g. from Alaska and Maine, USA) have expressed their interest connecting with NAOCA and utilizing North Atlantic knowledge, both in by-product utilization and cluster development.

Please see Annex 2 for the full list of media coverage for the past two years.

Low hanging fruits
A number of successful "low hanging fruit" projects have been initiated as a result of the alliance. These projects have already been discussed earlier.

The Green Fishing Vessel
The Green Fishing Vessel project is a huge success story of cluster collaboration, both regionally and across countries. The first step of the project was to form a group (sub-cluster) of ten relatively small Icelandic high tech engineering and fishing gear companies providing environmentally sound solutions. This sub-cluster has now made valuable networking connections with the fishing industry in Norway. This market connection has the potential to be of great commercial importance for both industries and could enhance the development and implementation of "green" solutions in the fishing industry in the North Atlantic. This project is immensely promising for the industries in both countries and the natural environment.

Project Sharing (Leinkjan.fo and verkefnamidlun.is)
A missing link between students and the business sector has proved a common concern in many marine industries around the North Atlantic. One of this project's tasks has been developing a web site, Project sharing, that enables students to do work for companies, be it small school projects, final projects or summer jobs.

Project sharing has so far been implemented in Iceland (www.verkefnamidlun.is) and the Faroe Islands (www.leinkjan.fo). A Danish version is in the making as well. The Icelandic version contains just under 100 available projects and at least 20 projects are known to have been finalized. The newer Faroese version contains 15 projects. Project Sharing is a lasting and growing product of the collabortion, showing tangible results and has the potential to expand and reach other industries.

Developing "Arctic Oil & Gas Clusters"
The objective of this project is to develop an oil and gas cluster to link relevant players in Greenland, Iceland and Denmark for the purpose of knowledge sharing, further progressing their skill-set, and to ensure that these countries will enjoy their fair share of the huge Arctic exploration activities associated with oil and gas. Network building and knowledge sharing in this field will prove valuable, enhancing best practice in natural resource utilization in areas were matters of security, sustainability and environmental protection are of great importance. On all of these subjects cooperation across borders is needed and the creation of an Arctic oil and gas cluster establishes a platform for such cooperation.

Turning Waste into Value
Opportunities to expand the value of constrained resources lie everywhere in the North Atlantic. Turning Waste into Value is an effort dedicated to better utilization of fish by-products, both for economic and environmental purposes. This combination of economic efficiency and environmental protection will be an important factor of the responsible resource management model of the future.

Turning Waste into Value is a success already. The subject of by-products and better utilization is now on the agenda of the government of Iceland and Greenland, companies utilizing by-products have had positive media coverage and are growing stronger, and

with the help of policy makers they can change the fishing industry in the North Atlantic to become a leading resource industry in the world were substantial economic gains are obtained while permanently preserving and strengthening the resource itself.

Developing the Greenland Ocean Cluster and Faroese Ocean Cluster
The development of these two national clusters is underway as a result of this project. Interest from public and private organizations in both countries is promising and collaborators within the NAOCA network and their partners are dedicated to establish and formalize these clusters in the near future.

Overall the NAOCA project has been a success, paving the way for collaboration across borders and the ocean; expanding the network of all participants, establishing a platform for knowledge sharing and creating new business opportunities in the ocean-related industries. Challenges lie ahead in the North Atlantic and the Arctic, but economic growth and business development through sustainable and responsible measures can be achieved in the region. Collaboration of different stakeholders across borders will prove necessary to the realization of this prosperous future. The NAOCA - our mission and the diverse projects we take on - is our contribution to that end.

Appendix

Appendix 1 – Report: Mapping of Cluster Activities in the North Atlantic

http://sjavarklasinn.is/en/wp-content/uploads/2012/07/North-Atlantic-Ocean-Clusters-report.pdf

Appendix 2 – Media Coverage for NAOCA

2012

Meeting in May 2012

Det Maritime Denmark, 31.5.2012
http://www.detmaritimedanmark.dk/nyheder/42073.html
www.sjavarklasinn.is May 2012
http://www.sjavarklasinn.is/en/sjavarklasar-vid-nordur-atlantshaf-funda-i-reykjavik/
www.sjavarklasinn.is, May 2012
http://www.sjavarklasinn.is/en/fundur-sjavarklasa-a-nordur-atlantshafi-hvetur-til-aukins-samstarfs-a-nordur-atlantshafi/

Initial mapping report in August 2012

Morgunblaðið, 21.8.2012
http://www.mbl.is/vidskipti/frettir/2012/08/21/samstarf_um_atlantshaf_mikilvaegt/
Viðskiptablaðið, 20.8.2012
http://www.vb.is/frettir/75305/
www.sjavarklasinn.is, August 2012
http://www.sjavarklasinn.is/en/skyrsla-nordur-atlantshaf/

Meeting in November 2012 and Establishment of NAOCA – November 2012

Maritime Denmark, 23.10.2012
http://www.maritimedanmark.dk/?Id=16161
www.sjavarklasinn.is, Novermber 2012
http://www.sjavarklasinn.is/en/stofnun-samstarfsvettvangs-sjavarklasa-vid-nordur-atlantshaf/
Útvegsblaðið, 26.11.2012
http://www.utvegsbladid.is/frettir1/item/624-norr%C3%A6nir-sj%C3%A1varklasar-%C3%AD-samvinnu.html

Maritime Denmark, 21.11.2012
http://www.maritimedanmark.dk/?Id=16566
Shippingwatch, 21.11.2012
http://shippingwatch.dk/Rederier/article4916198.ece
Sofart, 21.11.2012
http://www.soefart.dk/?art=1978
Netmatch, 21.11.2012
http://www.netmatch.nu/nyheder/north-atlantic-ocean-cluster-alliance.html
Danmarks transport tidende, 21.11.2012
http://www.transporttidende.com/index.php/dtt/artikel/nordiske_maritime_klynger_gar_sammen/
Qalorsaq, 24.11.2012
http://www.qalorsaq.gl/index.php/indland/206-nunat-imarsiortortallit-qaninnerusumik-suleqatigiilerput.html

2013
'Two for One' meeting. 07.11.2013 - National Radio of Iceland
http://www.ruv.is/frett/100-falda-verdmaeti-thorsksins
NAOCA meeting in Ålesund. 02.06.2013 – OceansAdvance
http://www.oceansadvance.net/press-releases/atlantic-ocean-clusters-meet-%C3%A5lesund-norway

2014
'Why clusters aid competitiveness'. 01.28. 2014 - Canadian sailings:
http://www.canadiansailings.ca/?p=8011

Abstract

Key words:
Clusters, North Atlantic, NAOCA, Collaboration, Networking, Iceland Ocean Cluster.

Abstract:
The aim of the project was to map cluster activities in the North Atlantic, compare best practices, build relationships between countries around the North Atlantic and start working on joint projects between the collaborating countries. The main results are several ongoing projects such as 'The Green Fishing Vessel', development of 'Arctic Oil & Gas Clusters' and 'Project Sharing' in Iceland and the Faroe Islands. Other results of the cooperation include great media coverage of marine related businesses in the North Atlantic, government recognition of the importance of the ocean clusters and collaboration between countries in the North Atlantic.

Series title, number and report code of publication:
Nordic Innovation Publication 2015:10

Authors: Thor Sigfusson Ph.D, Vilhjalmur Jens Arnason.

Organisation: Oceans Advance, Newfoundland, Canada; Vinnuhúsið, Faroe Islands; AAKP, Norway; NCE Maritime; SINTEF, Norway; Maritime Development Center of Europe, Denmark; Iceland Ocean Cluster, Iceland; KNAPK, Greenland.

Title: North Atlantic Ocean Cluster Alliance
Building bridges in the North Atlantic

Abstract:
The aim of the project was to map cluster activities in the North Atlantic, compare best practices, build relationships between countries around the North Atlantic and start working on joint projects between the collaborating countries. The main results are several ongoing projects such as 'The Green Fishing Vessel', development of 'Arctic Oil & Gas Clusters' and 'Project Sharing' in Iceland and the Faroe Islands. Other results of the cooperation include great media coverage of marine related businesses in the North Atlantic, government recognition of the importance of the ocean clusters and collaboration between countries in the North Atlantic.

ISBN
ISBN 978-82-8277-074-3 (Print)
ISBN 978-82-8277-073-6 (Web)
(URL: http://norden.diva-portal.org)

Language:
English

Name of Nordic Innovation programme:
Nordic Marine Innovation Programme

Date:
May 2014

Name of project:
North Atlantic Marine Cluster Project

Project acronym:
NAOCA

Nordic Innovation project number:
11058

Pages:
37

Keywords:
Clusters, North Atlantic, NAOCA, Collaboration, Networking, Iceland Ocean Cluster.

Publisher:
Nordic Innovation
Stensberggata 25, NO-0170 Oslo, Norway
Phone: +47 – 47 61 44 00
info@nordicinnovation.org
www.nordicinnovation.org

Main contact person:
Thor Sigfusson Ph.D.
Iceland Ocean Cluster
Grandagardur 16, 101 Reykjavik, Iceland
Phone: +354 618 6200
thor@ioc.is

norden

Nordic Innovation