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The economic importance of the Icelandic fisheries cluster—Understanding the role of fisheries in a small economy

Thor Sigfusson [b], Ragnar Arnason [c], Karyn Morrissey [a,*]

[a] School of Environmental Sciences, University of Liverpool, England
[b] Iceland Ocean Cluster, Ocean Cluster House, Reykjavik, Iceland
[c] Department of Economics, University of Iceland, Iceland

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ABSTRACT

Expansion and development of the fisheries sector was the driving force behind Iceland's economic transformation during the 20th century. However, the role of fisheries in national and regional economies is neither well documented nor understood. National accounts do not fully reflect the significant part played by the fisheries as they do not take into consideration the various ways economic activity in the fisheries sector affects other branches of the economy. The fisheries sector, which includes fishing and fish processing, has been established as a base industry within the Icelandic economy. Using data collected during 2010 and 2011 and cluster analysis techniques, this paper seeks to establish the economic importance of the fishing industry in Iceland. As a base industry, this paper finds that a wide range of companies have gradually developed to service the sector and through these interlinkages, the fisheries sector and its related operations can be viewed as an industry cluster.

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1. Introduction

Although fisheries account for less than 0.5% of the global economic product, they constitute an essential economic activity in many parts of the world [1,2], particularly in the sparsely populated but relatively affluent sub-Arctic regions of the globe and several coastal communities in Europe and North America. To date, however, the role of fisheries in national and regional economies is not well understood [3]. What has been established is that the fishing industry generally constitutes a base industry within regions [4,5]. Briefly stated; a base industry is an industry that is capable of operating without the support of other local industries [6–8]. As such, base industries are often founded on natural resources found in the region. Importantly, however, base industries generally create the economic conditions necessary for the emergence of subsequent industries to (i) serve the consumption needs of the labour employed in the base industry and their families and (ii) serve the industrial needs of the base industry both for inputs (backward linkages) and further processing of its outputs (forward linkages). These downstream and upstream industries, in turn, generate demand for further industries and so on [3]. Thus, a base industry, such as fisheries, may be expected to give rise to other production activities and, therefore, generate a value-added far above its direct contribution to the GDP.

Iceland generates approximately 2% of the global marine catch on average and operates one of the world's most efficient fishing industries [4]. The sector is widely believed to be the country's single most important industry [4]. This belief, however, is not immediately supported by the national economic statistics. According to the national accounts fisheries has only contributed between 7% and 10% of the Icelandic GDP over the past five years [9]. Whilst high compared to other international fishery sectors, these statistics do not accord with the perceived fundamental role of the sector in the Icelandic economy. An explanation for this is that the national accounts only measure the direct contribution of the fisheries to the economy, which is defined as the value-added generated within the fishing industry as a proportion of the overall value-added in the economy. This accounting method ignores the economic contribution of the sector via its backward and forward linkages to the wider Icelandic economy [3]. Indeed, this belief is confirmed by empirical studies of the Newfoundland, Icelandic and Finnish fisheries, which found that fisheries contributed much more to the GDP than their direct contribution (value-added in the fisheries themselves) suggested [4,5,10].

However, whilst these studies indicate the true contribution of the fisheries sector the results are presented at the aggregative level. What is missing from these studies is a more micro-oriented explanation delineating how fisheries production is

* Corresponding author.
E-mail addresses: thor@sjavarklasinn.is (T. Sigfusson), ragnara@hi.is (R. Arnason), Karyn.morrissey@liv.ac.uk (K. Morrissey).

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actually translated into value-added in other economic activities. This kind of description or economic map-making is importance for understanding the process by which the fisheries sector contribute to the overall economy. Only with a micro level understanding is it possible to identify the bottlenecks and hindrances that may stand in the way of this process and formulate an appropriate economic development policy. Thus, this paper attempts to further elucidate the contribution of the fishing industry to the GDP of Iceland by describing the structure of the fisheries cluster that has emerged around the basic fishing industry.

For the purpose of this analysis, the term fisheries cluster refers to the traditional fisheries sector and all the manufacturing- and service activities it supports, whether directly or indirectly. This includes manufacturing operations that initially served the domestic fisheries industry but have subsequently expanded into different markets both in Iceland and internationally. The paper is organized broadly as follows; Section 2 provides an overview of the data collection methodology. Section 3 presents an outline of the structure of the Icelandic fisheries sector and its relationship with other industries within the Icelandic economy. Utilising the survey data outlined in Section 2 and data from Statistics Iceland, Section 4 calculates the economic contribution of the fisheries cluster to the Icelandic economy. Section 5 discusses on the future development of the fisheries cluster and Section 6 offers some concluding comments.

2. Data and methodology

Industrial data on fisheries may be broken down into three broad categories [11,12]. Type 1 data is data that is collected by public bodies and available in the public domain. It generally refers to industrial aggregates and is therefore often publically available. Type 2 data is data that is also publicly collected but is not released into the public domain. This data is at a lower industrial or geographical classification and is therefore considered confidential. Type 3 data is data that is not available in the public domain. This category contains many types of data. Often they refer to particular companies and are highly confidential but not always.

This paper primarily uses Type 1 and Type 3 data. The Type 1 data is collected from Statistics Iceland and covers the direct contribution of each sector within the Icelandic fisheries cluster. However, to calculate the indirect contribution of the cluster, collection of Type 3 data was necessary. This was obtained by direct collection of information from the companies in the form of surveys and interviews when necessary. This data collection involved contacting a representative sample of large and small companies in the fisheries sector, together controlling more than 20% of the total catch quota in Icelandic fishing waters. These companies were initially contacted via telephone. A detailed survey was administrated which sought to identify and quantify all purchases made by these companies from other companies which may be considered within the fisheries cluster in Iceland. The firms provided the researchers with a list of all purchases in 2010 allowing the identification of trading linkages between the firms. The companies which provided goods and services to the fisheries firms were then classified according to the company classification system used by Statistics Iceland (ÍSAT 95). This establishes both the connections and value of these connections within the fisheries cluster.

A further survey was administrated to 110 companies in eight of the major categories identified as supplying the fisheries sector. Of the 110 companies 72 participated in the survey. Through this survey, information was obtained on the revenues, human resources use and scope of operation of each company. On this basis, it was possible to estimate the total income in these sectors and the share of their revenues that can be traced to business dealings with the traditional fisheries sector. To increase the validity of our findings, individual interviews were conducted with experts in ocean related industries [13]. Five experts were interviewed. These included the CEOs of the two largest fisheries companies in Iceland, a board member of the largest food processing technology firm in Iceland, a specialist at the Federation of Industry and a specialist in a venture fund with extensive knowledge in the fisheries field. These interviewees conveyed what they felt were the most important business relationships in the fisheries cluster and how they perceived the development of the cluster. These expert views turned out to be largely in accordance with the numerical data collected in previous phases of the data collection.

3. The fisheries Cluster: Structure and interrelationships

Drawing on the data collected as described in Section 2, Fig. 1 presents an overview of the Icelandic fisheries cluster. The core of the cluster, referred to as the *fishing industry*, consists of fisheries, fish processing and fish marketing. It should be noted that while these three industries provide the core of the cluster, the harvesting sector alone is the actual economic base as the processing and marketing of the fish depends totally on the landings. Closely linked to the fishing industry, core of the fisheries cluster, is a collection of industries that provides the sector with resources and services. These industries form the inner circle around the fisheries sector and include; the packaging industry, fishing gear manufacture, shipping/haulage operations, diverse mechanical manufacture, the metal industry and public administration. These industries have emerged due to commercial demand from the fisheries sector and administrative requirements. Public administration encompasses services provided to industries by the state, e.g., the research, enforcement of the fisheries management system, harbour operations and administration by ministries and municipalities. Numerous industries are more loosely connected to the fishing industry but should nevertheless be included in the fisheries cluster, at least in part. These industries have been placed in the outer circle in Fig. 1. They include; the manufacture of rubber and plastic goods, machine leasing, energy production and utilities, R&D operations, chemical industries, commission trading and various specialised services which range from technical consultancy services to auditing, management consultancy services and financial services of various types.

The industries presented in Fig. 1 are not only connected to the base industry, the fisheries sector, they are also inter-connected as well as being connected to other industries outside the fisheries cluster. Thus, for example, manufacturers of rubber and plastic goods enjoy benefits from the chemical industry, mechanical manufacturers and the metal industries. These connections are apparent in the trading of goods and services between the sectors, on which data has been collected for the purpose of this paper. They are also very important but much less apparent in the specialist knowledge that forms within the industries and flows between them through information exchanges which very often informal and not subject to payment and therefore do not appear in the firms' accounts. The same applies to human resources in the form specialised labour which is trained by individual firms and subsequently forms a labour pool that is drawn upon by all the companies in the cluster.

Fig. 2 indicates the extensive relations between the industries in the fisheries cluster. One can see that the extent of the connections is both considerable and varied and that the industries within the cluster form sub-clusters. For instance, shipbuilding, shipping/haulage and transportation are industries that form a range of interactive

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