The Nature and Prospects of Innovation in the Danish Maritime Cluster

Purpose

Innovation occurs on a global scale and has become increasingly important to the global economy. Economic globalization has reshaped the world economic order. (Commission of European Communities 2006) To stay competitive within this new world economic order, Europe must be more innovative. “These legitimate concerns must be turned into an opportunity to enhance Europe’s global economic competitiveness. The quicker it can react, the higher the chance of success and the greater prospect that its approach will serve as a global model. [...] the Commission is convinced that innovation in a broad sense is one of the main answers to citizens’ material concerns about their future.” (Commission of the European Communities 2006)

The Organization for European Economic Co-ordination (OECD 2005) has acknowledged the importance innovation plays in growth of output and productivity. The understanding of innovation activities has increased but is still lacking. “For example, as the world economy evolves, so does the process of innovation. Globalization has led to dramatic increases in access to information and new markets for firms. It has also resulted in greater international competition and in new organizational forms in order to manage global supply chains. Owing to advances in technologies and greater flows of information, knowledge is more and more viewed as a central driver of economic growth and innovation. Yet, we do not fully understand how these factors affect innovation. (OECD 2005)

Defining innovation and, subsequently, what is to be understood by innovation, is not always straightforward. “...the definition of what should be understood by innovative activity is subject to permanent theoretical debate. The literature distinguishes three spheres of innovation: ‘new for the company’, ‘new for the market’ and ‘new for the world’. So if, for example, a business imitates and existing product, the broader understanding of innovation leads us to conclude that this company may be considered innovative. A stricter reading, however, would lead to the opposite conclusion, as only activities falling into the ‘new for the market’ or ‘new for the world’ spheres would be considered innovative. Nevertheless, one needs to remember that for any company imitating an imitation requires a process of adaptation, which internally, may entail some forms of innovation in process and/or organization. The variety of forms that innovation can take and the nexus between such forms, suggest using pragmatic rather than theoretical criteria in defining the innovation process, as in the Organization for Economic Cooperation and Development’s (OECD) 1997 Oslo Manual...” (Altuzarra, Puerta and Serrano 2007)

“Globalization and the ease of transportation and communication have led to a surge of outsourcing in which companies have relocated many facilities to low-cost locations. However, these same forces have created the location paradox. Anything that can be efficiently sourced from a distance has essentially been nullified as a competitive advantage in advanced economies. [...] Although global sourcing mitigates disadvantages, it does not create advantages. Moreover, distant sourcing normally is a second-best
solution compared to accessing a competitive local cluster in terms of productivity and innovation. Paradoxically, the most enduring competitive advantages seem to be local” (Porter 2000) This suggests that any asset that can be otherwise mobilized beyond an entity’s boundaries, can no longer be considered to be adding to the competitive advantage of the entity. This leads us to consider immobile assets to examine their value as contributors to an entity’s competitive advantage.

Examining Denmark as the entity, we consider immobile assets within a cluster. Porter found evidence to support the theory that clusters play a role in economic development. (Porter 1998) “Proximity, arising from the co-location of companies, customers, suppliers, and other institutions, amplifies all of the pressures to innovate and upgrade [...] The presence of a well-developed cluster provides powerful benefits to productivity and the capacity to innovate that are hard to match by firms based elsewhere.” (Porter 2000) Additionally, innovation within a cluster is imperative to maintain competitive advantage. In the past, the task of innovation was typically considered one undertaken by research and development (R&D). Today, innovation is recognized as an ongoing process of continuous improvement to gain competitiveness. (Mytelka, Farinelli 2000). It is a process that involves several firms and organizations in collaboration with each other.

How do we develop and sustain the innovation within clusters necessary for firms to compete in global industries?

To address this overall research question, I propose to examine the Danish Maritime Cluster as a case study. While the shipping industry, as the main driver of the Danish Maritime Cluster, is inherently international, it also has mobile assets (e.g., ships) as well as immobile assets (e.g., localized maritime know-how, institutional support). It serves as an ideal model for study. Kumar and Hoffman (2002, p.36) explain the global nature of shipping in stating: “A Greek owned vessel, built in Korea, may be chartered to a Danish operator, who employs Philippine seafarers via a Cypriot crewing agent, is registered in Panama, insured in the UK, and transports German made cargo in the name of a Swiss freight forwarder from a Dutch port to Argentina, through terminals that are concessioned to port operators from Hong Kong and Australia”. Denmark is not immune to effects of the global nature of shipping. At the end of 1986 and the through the first quarter of 1987, Denmark witnessed an alarming percentage of their merchant fleet being reflagged under open registry, influencing its significance as an essential contributor to the Danish balance of payments. (Iversen and Sornn-Friese 2007)

The Danish government has recognized, particularly given the innate complexity of the maritime industry, that it may be prudent to exact a focused plan for growth in the maritime sector of the Danish economy.

The Danish Government’s Action Plan for Growth in the maritime sector (Wijnolst 2006) rests on the three objectives; 1) Denmark should strive to become the most attractive place in Europe to operate international quality shipping, 2) Conditions for growth, dynamics and competitiveness across the Danish Maritime cluster should be enhanced, 3) Health, safety and environment measures on ships should be maintained and improved, so that Denmark develops as a leading maritime nation with an international focus and
quality shipping. It also focuses on seven areas, the most important one of which is innovation. Improving our understanding of innovation within the Danish Maritime Cluster will allow for more accurate evaluation of options, proposals and policies while determining the impact those decisions might have on the cluster and its competitiveness in the world marketplace.

“In order to develop policies that support innovation appropriately, it is necessary to better understand several critical aspects of the innovation process, such as innovation activities other than R&D the interactions among actors and the relevant knowledge flows. Policy development also requires further advances in the analysis of innovation, which in turn requires obtaining better information.” (OECD 2005)

We understand that each industry has unique characteristics, which makes it inaccurate to make assumptions based on general innovation theory. “It is apparent that any useful and coherent theory of innovation must recognize explicitly the factors that differ across industries.” (Nelson & Winter, 1975) Therefore, for us to clearly understand innovation within the maritime industry, we must examine the maritime industry itself. In this case, we will evaluate innovation in the Danish Maritime Cluster.

Research Questions

1. Which relationships within the Danish Maritime Cluster are the most innovative?

For example, there is a communication gap, within the shipping industry, between the shoreside personnel and the seagoing personnel. I suspect upon close examination one would find that there is very little innovation being produced by that tenuous relationship. It would be beneficial to examine what relationships within the Danish Maritime Cluster that cultivate, encourage and ultimately produce innovative products and processes. Schumpeter (1934) proposed five types of innovations: 1) Introduction of new products, 2) Introduction of new methods of production, 3) The opening of new markets 4) Development of new sources of supply for raw materials or other inputs and 6) The creation of new market structures in an industry. I initially propose to identify the linkages between entities within the cluster, and identify which relationships result in the most innovative outcomes. By identifying the most prolifically innovative relationships, it may be possible to find ways to improve weaker relationships.

To examine innovation within the cluster, we must first understand the definition of the Danish Maritime Cluster. Currently, literature states that the Danish Maritime Cluster is primarily centered on water transport and maritime services, but also includes shipbuilding, maritime equipment, and offshore oil and gas extraction. Secondary industries, to be included in the cluster evaluation, are the navy, offshore wind energy, commercial fishing and maritime recreation. It has been noted, however, that other forms of intermodal transport which might seem naturally related to this cluster (rail, trucking and aviation) are not included. (Sornn-Friesen, 2003) There is ongoing research into the definition and boundaries of the Danish Maritime Cluster. I intend to incorporate the refined definition in my research.
Finding ways in which to measure the most innovative clusters and the most innovative relationships within those clusters, brings us a step closer to understanding how to replicate, improve on and create the most innovative maritime cluster in the world.
thereby keeping Denmark on the leading edge in the world maritime field, country competition, competitiveness.

2. Since the container revolution the 1960s, what have been the major drivers of innovation within the Danish Maritime Cluster?

To more clearly understand what drives innovation within the Danish Maritime Cluster we shall begin by determining whether innovation is user-driven or research-driven and which is predominant in what areas within the cluster. “It is crucial to know why firms innovate.” (OECD 2005)

There are other considerations with regards to drivers of innovation within the Danish Maritime Cluster. For instance, Who/what typically triggers innovation within the Danish Maritime Cluster and to what extent do regulations and policies influence innovation? Does more demanding policy result in more innovation?

The maritime industry is currently responding to tremendous amount of regulatory changes on the international level. Compliance is required to maintain a competitive advantage within the industry. Innovation plays a key role in complying with these new regulations. What motivates the adoption of new innovation; International policy as established by the International Maritime Organization (IMO), domestic policy, or profits? Does the Danish Maritime Cluster primarily innovate because it is forced to in order to stay competitive? Or does it innovate because it is inspired to?

Is there justification for investing in “proactive” innovation (as opposed to “reactive”, where innovation is as a result of new international or national policies-as with GMDSS) within the maritime cluster? If it is so determined, what is the best way to encourage and cultivate a fervently innovative culture within The Danish Maritime Cluster?

I think we will find that with the Danish Maritime Cluster must initially be prodded by policy in order to innovate. However, once the economic benefits are realized, as a result of having taken quick action to innovate, the actors will continue to be motivated to actively innovate within the cluster. Nonetheless, I do believe we may find that there is still a reluctance to invest in proactive innovation.

2nd paper “Major drivers of innovation within the Danish Maritime Cluster”

New Technology: Does the Danish maritime cluster seek out new technologies? If so, what criteria do they use to justify adoption? If the maritime culture is not nimble enough to adopt new technology and take these risks, why would outsiders innovate (when the probability of success is so low)? Who in the cluster (or outside the cluster) would take these risks? If so, what motivates them to do so?

There is literature on cluster networks in relation to pipeline theory that I would like to take a look at for this section.
3. Does the Danish Maritime cluster respond to new policy with innovation more readily than other countries (ie; Norway, Sweden, UK, U.S. and China) and how does this have an effect on its ability to keep or gain market share?

Internationally, the maritime industry has undergone major policy changes over the last few decades (Sturmey 1986). Understanding that international regulations and policies are necessary to maintain a healthy, vibrant industry, it nevertheless burdens the entrepreneur with the responsibility of finding ways to implement these new policies and regulations. Has the Danish corporation been tremendously agile or just a little bit quicker to implement than next country? This will require identifying and considering maritime clusters in other countries in relation to the Danish Maritime Cluster. When examining how quickly the firms within the cluster respond to innovation, we shall also examine whether the cluster resists adoption or if they are slow to adopt.

I believe we will see that Demark readily responds to policy with innovation. We may also find that while policy spurs innovation, it also creates an inertia that helps foster continued innovation.

I would also like to look at the motivation for innovation. Are they more likely to innovate when it is policy driven or market driven?

3rd paper “Innovation in response to policy within the Danish Maritime Cluster”
Methodology

The questions posed will be addressed using a combination of methods. The methods being 1) expert opinion at a) the cluster level and b) the industry level, and 2) Surveys. The advantages of gaining expert opinion is that the industry experts are "agents who know the region’s industries in terms of basic practice, supply chains, current investment patterns and potential opportunities for new products..." (Stough, Stimson and Roberts 1997, p. 2) It can be, however, difficult to gain information in a way that is systematic enough to realize generalizable findings, particularly on a regional level. (Roberts and Stimson 1998) One also runs the risk of overestimating “the accuracy of strongly held opinions among key stakeholder and to forget the multitude of potential biases affecting each expert’s views, as well as each expert’s limited field of experience within the broader economy.” (Roberts and Stimson 1998) In addition, there is little in the way of research with regards to combining opinion data with secondary economic data. “For example, if we envision a two-stage cluster analysis with a quantitative regional "scan" preceding a qualitative investigation (including the collection of expert opinions), how does one effectively merge findings from the two stages in a way that generates insight greater than the sum of the parts?” (Roberts and Stimson 1998)

While addressing these challenges, I shall identify and target key industries, based on the outcome of the interviews with the industry experts, and interview relevant individuals within those industries. Finally, based on the information gathered via the aforementioned methods, quantitative justification surveys shall be utilized. Descriptive statistics shall be used where possible.
References


Commission of the European Communities. (2006). *Communication From the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Putting knowledge into practice: A broad-based innovation strategy for the EU*.


The Danish Shipowners Association  