Arbeidsnotat
Working Paper

2017:5

Lise Lillebrygfjeld Halse

Knowledge and forms of cooperation : a survey in the maritime cluster in North West Norway

Høgskolen i Molde
Vitenskapelig høgskole i logistikk

MØREFORSKING
MOLDE

Lise Lillebrygfjeld Halse

Knowledge and forms of cooperation : a survey in the maritime cluster in North West Norway

Arbeidsnotat / Working Paper 2017:5

Høgskolen i Molde
Vitenskapelig høgskole i logistikk

Molde University College
Specialized University in Logistics

Molde, Norway 2017

ISSN 1894-4078

ISBN 978-82-7962-226-0 (trykt)

ISBN 978-82-7962-227-7 (elektronisk)

Knowledge and forms of cooperation: a survey in the maritime cluster in North West Norway

Lise Lillebrygfjeld Halse (lise.l.halse@himolde.no)

Molde University College, Specialized University in Logistics

Faculty of Business Administration and Social Sciences

Innholdsfortegnelse

1 Introduction

This working paper presents the results of a survey performed in the Møre and Romsdal maritime cluster in Northwest Norway as a part of the Marco project[1]. The goal of this survey was to map the educational level, the need of competence of cluster companies, the sources of knowledge, and forms of cooperation in the cluster. The educational aspects of the survey will be presented in a separate report, while the present working paper focuses on global sourcing, sources of knowledge and aspects of cooperation between cluster companies. Prior to the survey, a theoretical study was carried out by the author, and laid the foundation for the preparation of the survey. The main focus of the research has been to study what kind of knowledge is considered important for cluster companies, and from which sources they acquire knowledge. Based on theory, we develop hypotheses concerning the relationship between forms of cooperation and outsourcing on one side and sources and forms of knowledge on the other. The results are presented with accompanying reflections.

2 Theory

2.1 Clusters and governance typologies

Since Porter (1990) rekindled Marshalls theory on localized industry (Marshall, 1920), researchers have increasingly paid attention to the geographical clustering of economic activities. Several researchers have sought to analyze and explain why companies in clusters exhibits increased competitiveness compared to companies outside clusters. The possibility for frequent face-to-face contact that the proximity allows for has often been put forward as an important explanatory factor. This informal form of contact between the companies and other institutions in the cluster eases knowledge and information transfer, problem-solving, and provides a good climate for product development and innovation (Ketelhöhn, 2006). A considerable part of the literature in this field have consequently focused on or assumed that relational contact between cluster companies is prominent, describing the "ideal" form of cluster organization. Several authors have, however, pointed out that clusters exhibits different inter-organizational governance patterns, and have categorized them based on the degree or form of cooperation between the companies in the cluster, or governance structures (Markusen, 1996; Iammarino and McCann, 2006). Markusen's typology of clusters is often referred to; Marshallian, Hub-and-spoke, Satellite, and State-anchored industrial districts, reflecting that cluster companies are different regarding size and power. This typology is based on empirical data

[1] The Marco project is financed by The Norwegian Research Council and 3 partner companies (Ulstein, Tingstad and Jets) through the Maroff programme.

collected from a number of industrial districts, focusing among other variables the firm size distribution, up-and downstream industrial linkages, degree of vertical disintegration and networks among district firms.

Governance typologies based on transaction cost theory have also been used on to make typologies reflecting the inter-organizational governance patters in clusters. Iammarino and McCann (2006) present a typology reflecting the nature of the firms in clusters, and the relationship between them. They separate between pure agglomeration, industrial complex, and social network. In the pure agglomeration model, the companies are atomistic and will continuously change their relations with other companies in the cluster based on price and cost considerations. This model is adopted by new economic geography models. The industrial complex is characterized by long-term and stable relations, involving predictable and frequent transactions (Iammarino and McCann, 2006). In this model, localization basically depends on transportation costs. In the social network model, the relations between companies are characterized by mutual trust, reducing interfirm transaction costs as opportunism is suppressed (Heide and John, 1992). This behavior is based on a common culture developed through shared history and experience of the members of the clusters.

Gereffi et al. (2005) address the recent development where supply chains are increasingly becoming more global. They separate between five governance types in global supply chains, where the governance types represent different degrees of explicit coordination and power asymmetry; market, modular, relational, captive and hierarchical. In the market type of governance, products specifications are simple, information exchange is mainly price information and there are a large number of possible suppliers. In modular value changes, the product complexity is greater, but it is possible to codify the information through the use of standards, which makes it possible to switch supplier easily. The relational form of governance corresponds to the network form of governance described above, and is characterized by informal coordination based on mutual dependence, loyalty and trust, which has its basis in a common culture, developed through shared history and experience of the agents. In captive value chains, the supplier is dependent on the much larger buyers, and is characterized by a high degree of control by lead firm. This mode of governance will emerge when products are complex, it is difficult to codify information, and the supplier capabilities are low (Gereffi *et al.*, 2005). The hierarchal type of governance corresponds to vertical integration of suppliers. This typology is not used specifically for cluster, but is appropriate when studying globalization of cluster value chains (Halse, 2012).

De Propis et al. (2008) divides between two types of governance in cluster when they are analyzing globalization of cluster production systems. Hierarchical governance is associated with cluster production networks were a few firms are in power imposing requirements on suppliers, while in heterarchical governance the decision making power is decentralized and shared among firms. They parallels this last

form of governance with "networks of mutual dependence" (Sacchetti and Sugden, 2003), where actions are reciprocal and mutually supportive.

Bell, Tracey and Heide (2009) introduce a model where interorganizational governance within regional cluster is related to two different governance mechanisms; relational and hierarchical governance. The relational corresponds to the relational, network form or heterarchical form of governance discussed above, while the hierarchical form of governance reassembles the captive form of governance in Gereffi et al.'s model (2005). The model presented by Bell et al. focuses on the interplay between the dominant form of governance in the cluster and the cluster macroculture. The cluster culture will affect the choice of governance and lead to a path dependent evolution of the cluster (Bell *et al.*, 2009; Halse, 2011).

As described above, the literature offers different form of governance typologies describing the cooperation between cluster companies, and with companies outside the cluster. A main premise in this paper is that the choice form of governance will have implications for knowledge exchange and innovation. This will be addressed in the following section.

2.2 Knowledge flow and innovation

Learning and knowledge flow have been regarded as some of the most important aspects explaining the success of clusters, which is reflected in the concepts of "learning regions" (Asheim, 1996), "open learning systems" (Belussi and Sedita, 2012), and "regional innovation systems" (Isaksen, 2001). This stream of literature claims that diffusion of new knowledge tends to occur more efficiently among actors that are closely located, and that learning and knowledge are key elements in the change of economic system (Asheim and Gertler, 2005). Tacit knowledge (Polanyi, 1967) is in this literature considered as being especially important for the innovative capacity of clusters, as it is in its nature context-specific and sticky. Since tacit knowledge is hard to codify and must be exchanged through face-to face contact, geographical proximity is considered as a prerequisite for exchange of this form of knowledge. As Gertler puts it: "*the key determinant of the geography of innovative activity*" (Gertler, 2003, p.79). A consequence of this reasoning is that the tacit and localized knowledge becomes increasingly important for companies' competitiveness, as codified knowledge in a global economy is more easily accessible (Asheim and Gertler, 2005).

The cluster literature has mainly performed analysis at the cluster level, treating companies internally to the cluster as similar entities and where the relational form of governance (Bell *et al.*, 2009), or network form of governance (Håkansson and Snehota, 2006; Isaksen and Kalsaas, 2009) is prominent, facilitating free

exchange of knowledge and information. The relational type of governance has been pointed out as particularly suited for transferring tacit knowledge and for mutual learning, and it is therefore favorable when products (or services) are complex and the related knowledge cannot be codified (Gereffi *et al.*, 2005). Local embeddedness of social and economic actors in clusters facilitate the diffusion and acquisition of tacit knowledge through institutional mechanisms as shared values and reputation (Audretsch, 1998).

However, and as discussed in the previous section, cluster companies may chose different forms of governance in their relations to other cluster companies. Intuitively we would assume that choosing other forms of governance than the relational form, would have consequences for the interexchange of knowledge between cluster companies. Parrilli and Sacchetti (2008) suggest there is a bidirectional interdependence between governance structures and learning processes. They claim that knowledge upgrading may occur in networks of direction and in hub-and-spoke clusters, when core firm establishes a long-term relationship with strategic partners (Parrilli and Sacchetti, 2008). However, to develop special competences and abilities at a regional level, it is necessary to develop in direction to a more horizontal form of governance. Isaksen and Kalsaas (2009) analyze possibilities for knowledge upgrading and innovation activities in global production networks, where they argue that firms' possibilities for learning and knowledge upgrading depends on how the network is governed. Pietrobelli and Rabelotti (2011) find that learning mechanisms can vary widely within the various forms of governance of global value chains (GVC), using the governance typology of Gereffi et al. (2005). In market form of governance the only shared information is in principle price information as the products are simple and easy to specify and evaluate (Gereffi *et al.*, 2005). Learning in this form of governance is limited to imitation (Pietrobelli and Rabellotti, 2011). In modular value chain, knowledge is transferred through the use of standard in which the suppers much comply. In this form of governance the learning and innovation process is not interactive between the supplier and the lead firm, but is accomplished independently by the supplier. In the relational governance type the linkages between companies are tight and frequently involve face-to-face interaction and mutual learning. In the captive (Gereffi *et al.*, 2005) or quasi-hierarchical (Isaksen and Kalsaas, 2009) form of governance, the supplier lack competence and is dependent on getting instructions from the lead firm on how to perform task and secure quality in the production. The knowledge transfers from the lead firm to the supplier, and the knowledge created is related to small-step improvements of processes and products through the requirements from the cluster company.

Kogut and Zander (1993) claimed that the less codifiable the technology is, the more likely the transfer will be in fully owned operations, explaining the boundary of the firm. In the hierarchical form of governance where the supplier is integrated into the lead company, several mechanisms of knowledge transfer may apply as transfer of staff, training, and imitation (Pietrobelli and Rabellotti, 2011). However, to what extent

knowledge is flowing in these linkages, and what kind of knowledge, depends on the power relation between the companies, the competence of the two companies, and the complexity of products or services. Gereffi et al (2005) claim that in hierarchical governance (ownership), the lead firm is in power and pose requirements on the supplier, which indicate that the knowledge flow goes from the lead firm to the supplier. However, the supplier may in some cases represent the innovative driver in the relationship (Isaksen and Kalsaas, 2009).

Based on the literature, we will in this paper focus on two main and different forms of governance. The relational and formalized, where the former is based on close relations, mutual dependence, loyalty and trust, facilitating transfer of tacit knowledge, while the latter is associated with higher degree of formalization in the relationship where the cluster firm is in lead regarding competence. Moreover, we want to study ownership as a form of governance towards foreign operations. However, we believe that this form of governance not necessarily implies good conditions for transferring tacit knowledge as Kogut and Zander (1993) believes, especially when there are large geographical distances between the companies. In the following, we present a number of hypotheses based on the theory described in this section.

3 Hypotheses and operationalization

3.1 Hypotheses

The theory chapter described how the mode of cooperation between companies inside the cluster as well as to global partners can be described through the use of the governance concept. Furthermore, we have shown that the mode of cooperation will affect knowledge exchange between the companies internally and externally to the cluster. A large part of the cluster literature is based on the assumption that the prominent form of governance in clusters is the relational form of governance. This means that we would expect that the relational form of governance would be more prominent in regional relationships than in global relationships:

H1: *The relational form of governance is more prominent in regional business relationship than in relationships with foreign companies.*

When relations to foreign companies are established, we would expect that the relationship with them over time will develop and be increasingly based on mutual trust and a relational form of governance (Macneil, 1978; Macneil, 1980; Bradach and Eccles, 1989). Hence we may expect that companies that have a large export share will rely more heavily on relational forms of governance

H2: *The higher foreign purchase and export share a cluster company has, the more it will rely on the relational form of governance in the relation to the foreign companies.*

Previous research has claimed that the relational form of governance facilitates exchange of synthetic knowledge in clusters or regions (Asheim and Isaksen, 2002; Bell et al., 2009). Hence, cluster companies that have their knowledge base in tacit or synthetic knowledge will use a relational form of governance towards other companies in the cluster:

H3: *Cluster companies that have a knowledge base characterized by tacit or synthetic knowledge, will display a relational form of governance in the relations to other cluster companies.*

When it comes to linkages to foreign companies, we would expect that companies that have sourced activities to foreign countries would consider knowledge from foreign sources as being more important compared to companies that have not sourced out activities.

H4: *Cluster companies that have outsourced activities to foreign countries considers foreign sources of knowledge as being more important than cluster companies that have not sourced out activities to foreign locations.*

Furthermore, we were also interested in investigating how ownership as a mode of governance in global value chain may affect knowledge flow. As described in the theory chapter, the literature is not clear how ownership as opposed to looser forms of governance may affect the relations and knowledge exchange. Following Kogut and Zander (1993) and Isaksen and Kalsaas (2009), we suggest that ownership will promote exchange of knowledge between companies compared to other forms of governance.

H5*: Companies with ownership as mode of governance (hierarchical) in the relationship with foreign companies, considers foreign sources of knowledge being more important compared to companies that have chosen other modes of governance (not ownership).*

The literature claims that it is more difficult to transfer tacit knowledge across larger geographical distances (Asheim and Isaksen, 2002; Bathelt *et al.*, 2004). We may expect that companies that consider tacit or synthetic knowledge being the most important will consider local knowledge being the most important source of knowledge, and draw less on knowledge from global sources:

H6: *Cluster companies that have their knowledge base in tacit or synthetic knowledge consider local sources of knowledge as being more important than global sources for knowledge acquisition.*

Furthermore, based on the above discussion we should expect that globalization leads to increased formalization:

H7: *Cluster companies that have outsourced chose formalized forms of governance compared to companies that have not outscored*

.

3.2 Operationalization

In this study, we investigate these hypotheses by studying the knowledge base of the cluster companies, we relate it to outsourcing and the form of governance internally, and to which sources of knowledge is considered being the most important. Due to the limitations in the length of the survey, it was decided to focus on a few central characteristics of the relationship between the companies internally to the cluster and to foreign business partners: the degree of formalization, the length of the relationship, closeness of interaction and trust. In the relationship with foreign companies, we wanted to find to what extent the relationship is organized through ownership, and what was the main reason for sourcing out activities that previously was performed inside the cluster.

Outsourcing is addressed by asking the following question:

1. *Have your company in the last 15 years chosen to source out activities to foreign countries that previously was carried out in the company? (Question 3 in the appendix). The possible answers are:*
    - No
    - Yes, to foreign subsidiaries/departments in the company/group
    - Yes to foreign companies outside of the company/group
    - Yes, both to foreign subsidiary/department and to other foreign independent companies.

These answers also cover ownership as form of governance. However, ownership is also covered in another question:

2. *Does your company have ownership in foreign companies? (Question 4-6 in the appendix.)*

To find out how prominent relational governance is in the regional and global relationships (customer/supplier), we operationalized relational governance using of the following questions/claims (1- totally disagree, 5- strongly agree):

3. *It is very important with long-term relationship with foreign/regional customers/suppliers. (Questions 12d, 13d, 14d, 15d in appendix.)*
4. *Our deliveries to our regional/foreign customers/suppliers require close interaction between the parties. (Questions 12g, 13g, 14e, 15e in appendix.)*
5. *Our relationship with regional/foreign customers/suppliers is based on mutual trust. (Questions 12h, 13h, 14f, 15f in appendix.)*

The degree of formalization in the relationships with customers/suppliers is operationalized through the following statements (1- totally disagree, 5- strongly agree):

6. *It is important with a complete agreement as possible with our regional/foreign customers/suppliers. (Questions 12a, 13a, 14a, 15a in appendix.)*
7. *There are several aspects in the relations with foreign customers that are not regulated through agreements (reversed scale). (Questions 12b, 13b, 14b, 15b in appendix.)*

In order to map the knowledge concept, we first wanted to find what kind of knowledge is important for the cluster companies. We asked the respondents to consider a number of statements, were the goal was to find out whether we are dealing with analytical or synthetic knowledge (Asheim and Isaksen, 2002). The synthetic and analytical form of governance both contains elements of explicit and tacit knowledge, but the constitutions of these two are different. Analytical knowledge comprises a larger part of explicit knowledge and less tacit knowledge compared to the synthetic form of knowledge. Furthermore, synthetic knowledge represents a combination of practical experience and formal knowledge. Interviews as well as previous studies (Isaksen, 2009) have revealed that the knowledge in the cluster is mainly synthetic, but we wanted to test this is this study.

Tacit knowledge is operationalized through the following statements (1- totally disagree, 5- strongly agree):

8. *The knowledge can only be learnt by working together with others. (Question 8b in appendix.)*
9. *The knowledge is related to working experience. (Question 8d in appendix.)*
10. *The knowledge requires little formal education in order to apply. (Question 8c in appendix.)*
11. *The knowledge is possible to write down in procedures and manuals (reverse scale). (Question 8a in appendix.)*

In addition, two statements were presented in order to reflect the combinatory nature of synthetic knowledge:

12. *The knowledge is a combination of practical experience and formal technical education. (Question 8e in appendix.)*
13. *The knowledge is a combination of practical experience and formal administrative/economical education. (Question 8f in appendix.)*

In order investigate knowledge acquisition, we asked what kind of sources or channels for knowledge acquisition were important (1- not important, 5- very important):

14. *The relationship between supplier and customer regionally. (Question 9a in appendix.)*
15. *The relationship between supplier and customer internationally. (Question 9b in appendix.)*
16. *From foreign subsidiary. (Question 9c in appendix.)*
17. *From foreign parent company. (Question 9d in appendix.)*
18. *R & D institution in the county. (Question 9e in appendix.)*
19. *Informal meeting places in the region (county). (Question 9f in appendix.)*
20. *New employees from the region. (Question 9g in appendix.)*
21. *New employees from outside the region. (Question 9h in appendix.)*
22. *International cooperating partners. (Question 9i in appendix.)*
23. *Sales agents on foreign assignment. (Question 9j in appendix.)*
24. *Operators on foreign assignment. (Question 9k in appendix.)*
25. *Manager's travelling. (Question 9l in appendix.)*
26. *Employees' personal network. (Question 9m in appendix.)*
27. *Manager's personal network. (Question 9n in appendix.)*

4 The survey

A total of 123 questionnaires were sent to cluster companies. 64 of these replied, some after reminders by telephone, representing an overall response rate of 52 per cent. The respondents were categorized into 5 groups, which are the groups used by previous surveys in the cluster (Hervik *et al.*, 1998; Hervik and Oterhals, 2012), namely ship owners, ship yards, equipment suppliers and design companies. The overview of the groups provided by the last survey in the cluster performed by Møreforsking Hervik and Oterhals, 2012), is shown in table 1. In number, equipment suppliers represent the largest group of companies. The survey was sent out to all groups of companies. However, equipment suppliers represent a group containing a large number of small companies. The smallest companies were kept out of the survey for practical

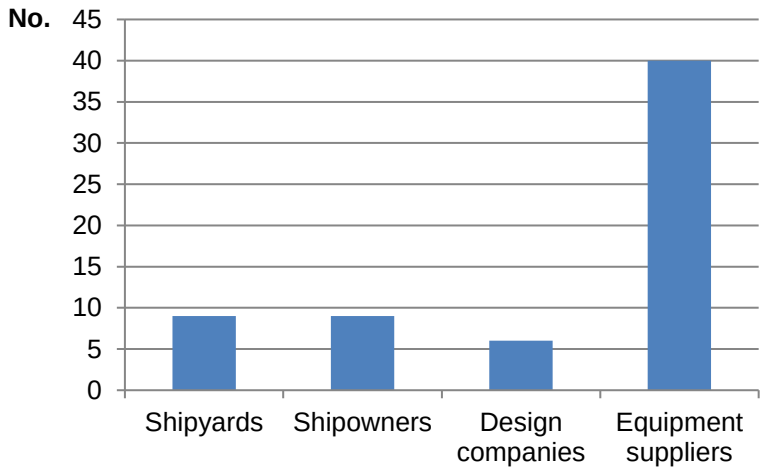
reasons. The response rate were 47 per cent for shipping companies, 64 per cent for shipyards, and 40 per cent for design companies, and 51 percent for equipment suppliers.

Table 1 The maritime cluster in Northwest Norway in numbers (Hervik and Oterhals, 2012).

	Number of companies	**Turn-over (billion NOK)**	**Man-years**	**Result (per cent)**
Shipping companies (ship owners)	19	13.5	7 230	14.0
Shipyards	14	13.2	4 000	8.9
Ship design consultants	15	1.1	490	17.4
Equipment producers	165	19.0	8 400	7.2
Sum	213	46.8	20 120	9.6

Furthermore, the cluster consists of several larger groups, comprising subsidiaries within different segments. These are treated as separate companies, which mean that several respondents may be a part of the same group having the same owners. The received questionnaires were distributed between the groups as shown in figure1.

Figure 1 Number of respondents within different categories of companies



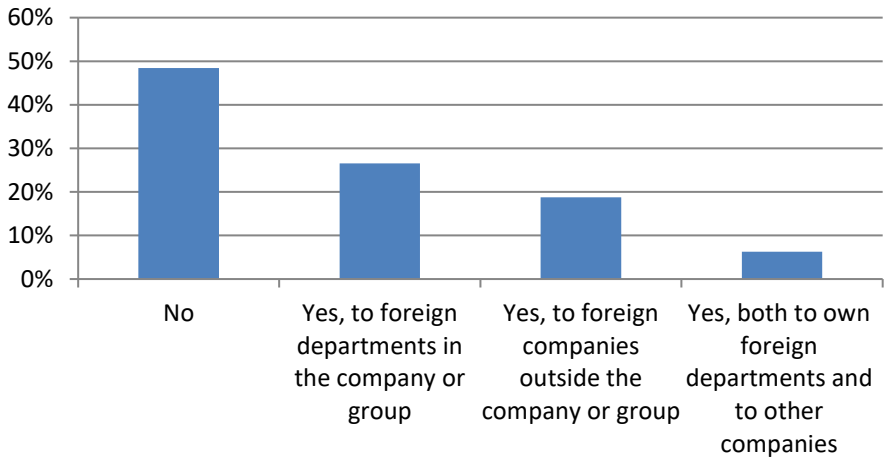
Because of the limited number of respondents and the nature of the questions, the analysis of the survey is mostly based on descriptive statistics. However, in order to test some of the hypothesis presented, bivariate analysis was also performed. Throughout the analysis, missing answers have been kept out.

5 Findings – descriptive statistics

5.1 Outsourcing

The respondents were asked whether they have chosen to source out activities that previously were performed by companies in Norway. The answers were distributed as shown in figure 2.

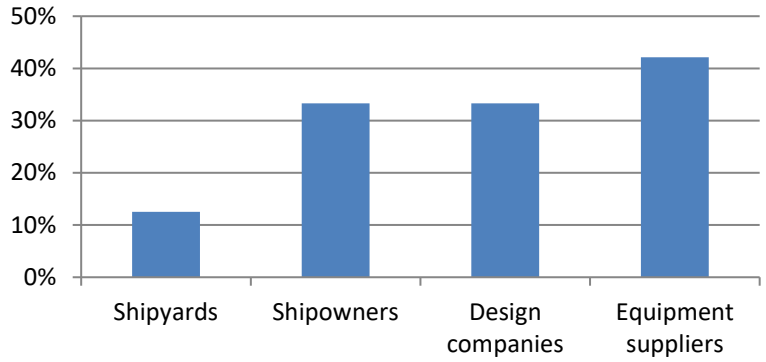
Figure 2 Outsourcing of activities that previously were performed inside the cluster



The findings reveal that 48 per cent of the companies have not outsourced any activities. Of those who have outsourced, the largest part has chosen ownership as choice of governance (27 per cent to subsidiaries or departments, 19 per cent to separate companies, and 6 per cent to both). One of the shipyards reports that they have ownership in foreign companies. The corresponding numbers for the other groups are as follows: 3 shipping companies, 2 design companies, and 16 equipment suppliers. This means that the equipment suppliers are slightly overrepresented regarding foreign ownership.

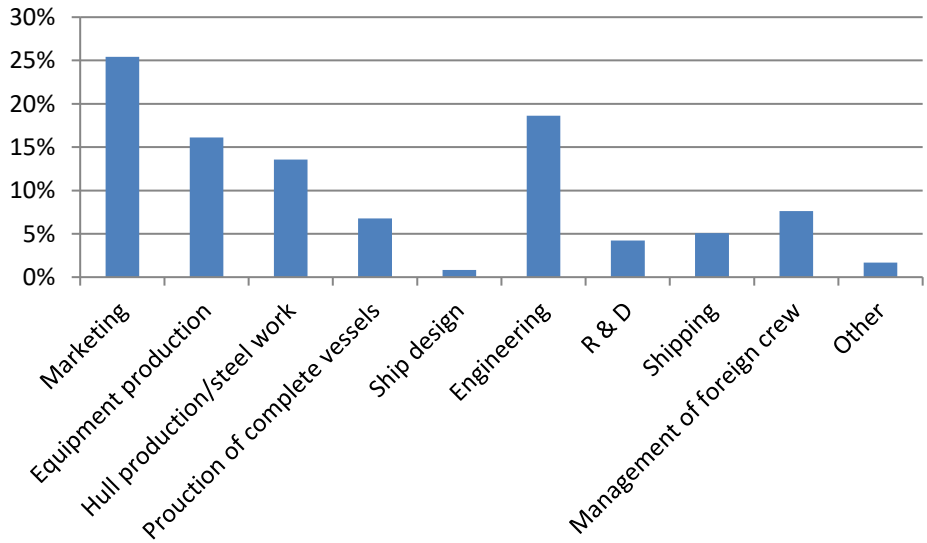
Figure 3 shows the percentage of the different groups of companies that have foreign ownership. However, these numbers does not tell anything about how much of the activities is organized through ownership.

Figure 3 Percentage of cluster companies having ownership in foreign countries



What kinds of activities are outsourced from the cluster? In figure 4 the respondents have indicated some possible activities that the cluster has outside the region:

Figure 4 Activities outsourced to foreign locations



The answers from the respondents show that foreign marketing and sales is important for cluster companies. A more surprising finding is that as many as 22 companies (34 per cent of the respondents) have outsourced engineering to foreign locations. Looking behind the number in

Figure 5 we see that 15 of the 22 positive replies of outsourcing of engineering come from equipment suppliers, 3 from shipyards and 4 design companies. The equipment suppliers also have the largest part of outsourcing of marketing and sales, and of production of equipment. 78 per cent of the shipyards have

outsourced steel work. This represents the construction of hull in East European countries. Only one company has outsourced ship design, and this is a shipping company.

Figure 5 Activities outsourced to foreign locations grouped by type of company (incidents).

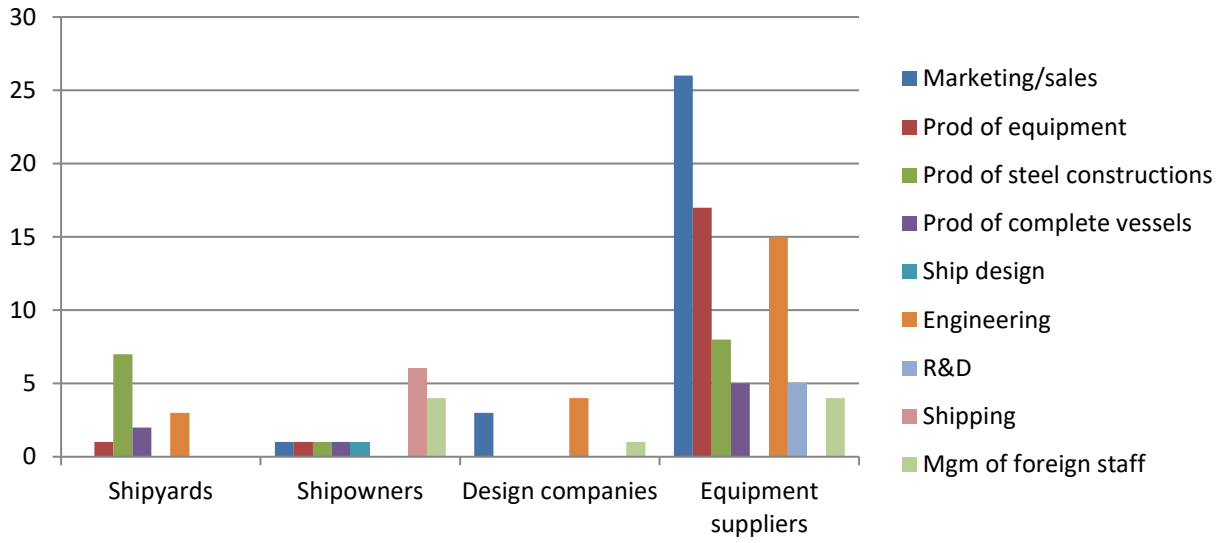
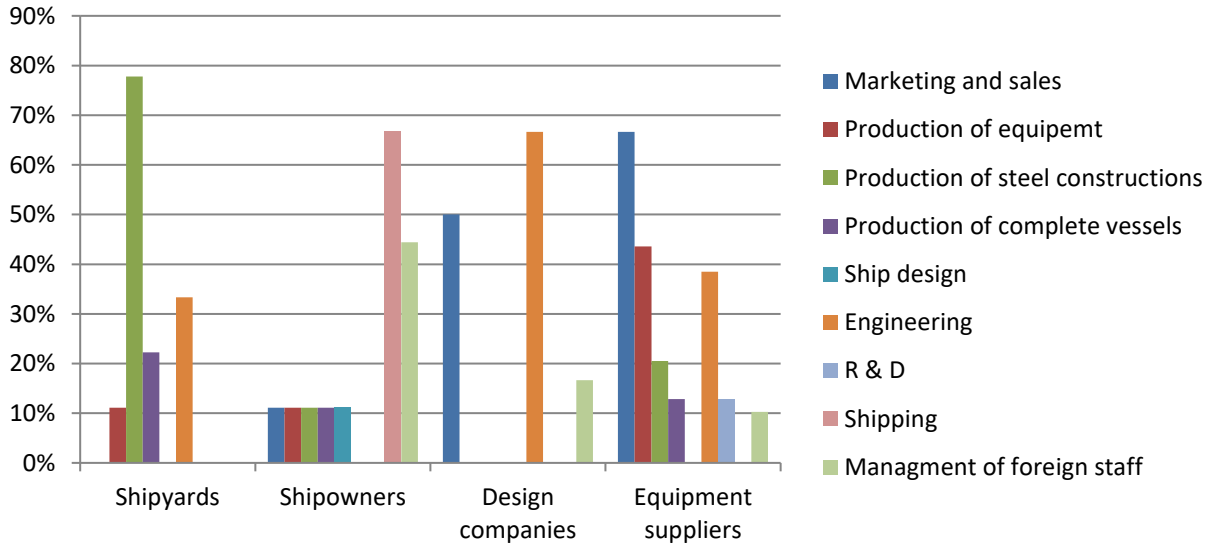


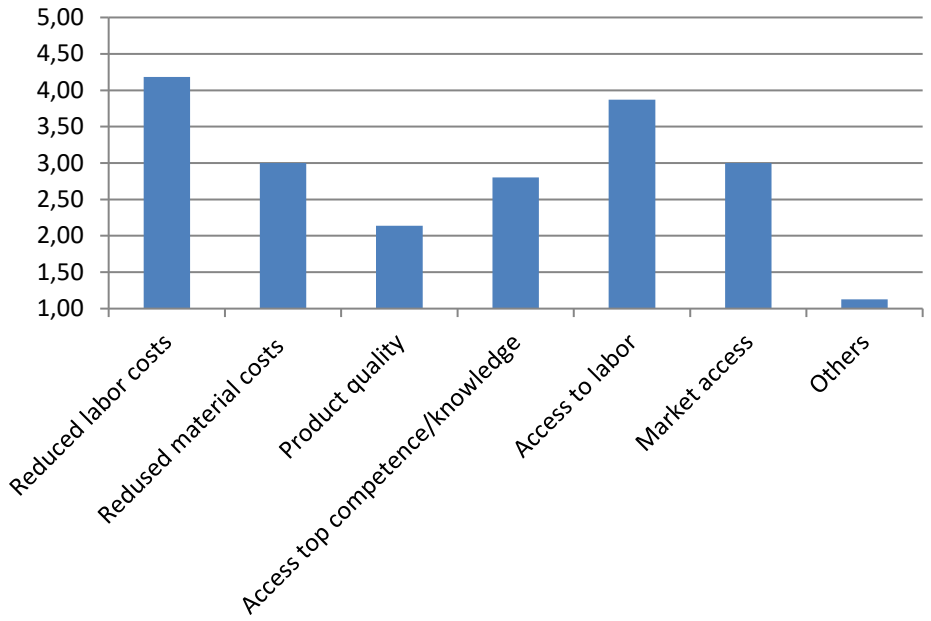
Figure 6 Activities outsourced to foreign locations grouped by type of company (percentage)



Furthermore, the respondents were asked for the reasons they had to outsource, which gave the answer presented in figure 7.

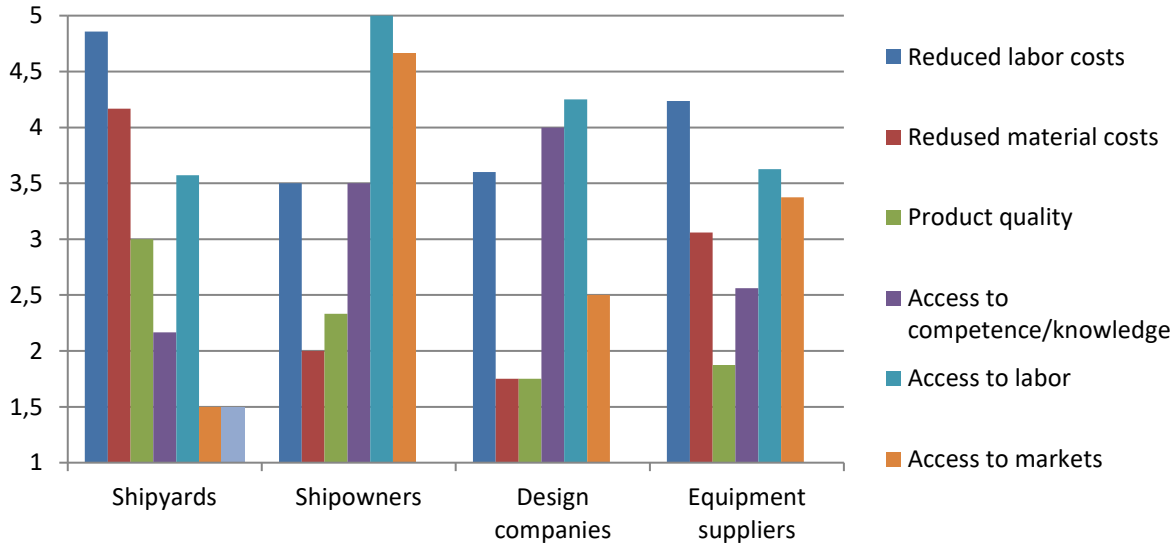
.

Figure 7 Explanations for outsourcing of activities to foreign locations.



In figure 7, we see that reduced labor costs and access to labor represents the most important arguments for outsourcing. Access to competence and knowledge is valued as a little below the middle score (2.8), which indicate that knowledge also represent an argument sourcing out activities. Of the companies that answered this question, the answers were distributed among the different groups of companies as shown in figure 8.

Figure 8 Explanations for outsourcing of activities for different groups of cluster companies.

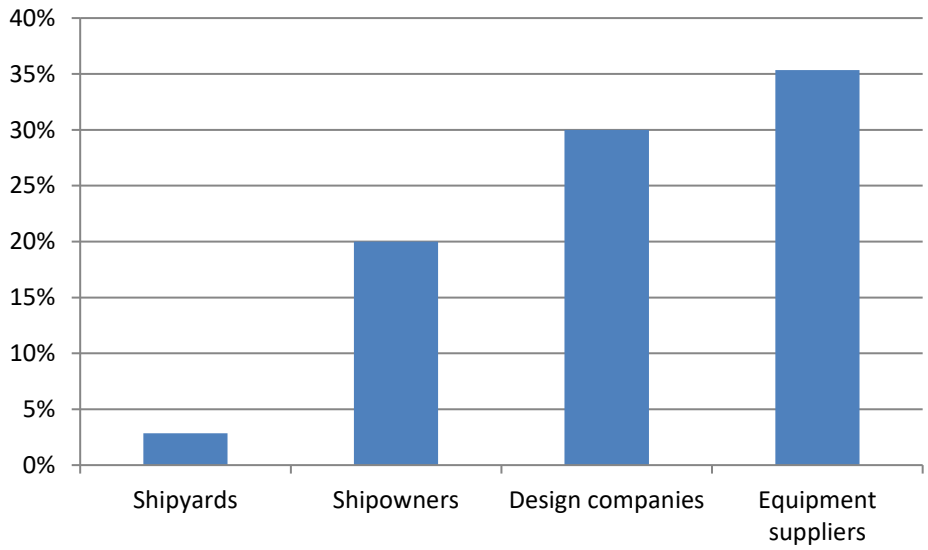


We can see that shipowners explains their outsourcing of activities with access to markets and access to labor, but also access to competence and reduces labor costs. This is not surprising, as shipowners are the group of companies that are at the downstream side of the supply chain, nearest the customers. They have to be active in many markets in order to achieve stable profit. For the other group, reduced labor costs is more prominent as an explanation for outsourcing. One should also note that design companies range access to knowledge and competence high. However, according to this survey, design companies are not sourcing out design, only marketing/sales, engineering and management of foreign staff (figure 5). The knowledge and competence they are searching is not related to design.

5.2 Export and purchasing

The respondents were asked about their export share and wherefrom they purchased. Regarding export, the mean vale of export was 29 per cent. As we can see from figure 9, this is not equally distributed among the group of companies. Equipment suppliers are exporting 35 per cent of their production, with design companies close behind with 30 per cent. These values are somewhat lower than reported in the last cluster survey from Møreforsking, where the export share was 39 and 49 per cent for equipment suppliers and design companies respectively. Only 20 per cent export reported from shipowners appears to be low, but we must keep in mind that there are few respondents in this group is low (5).

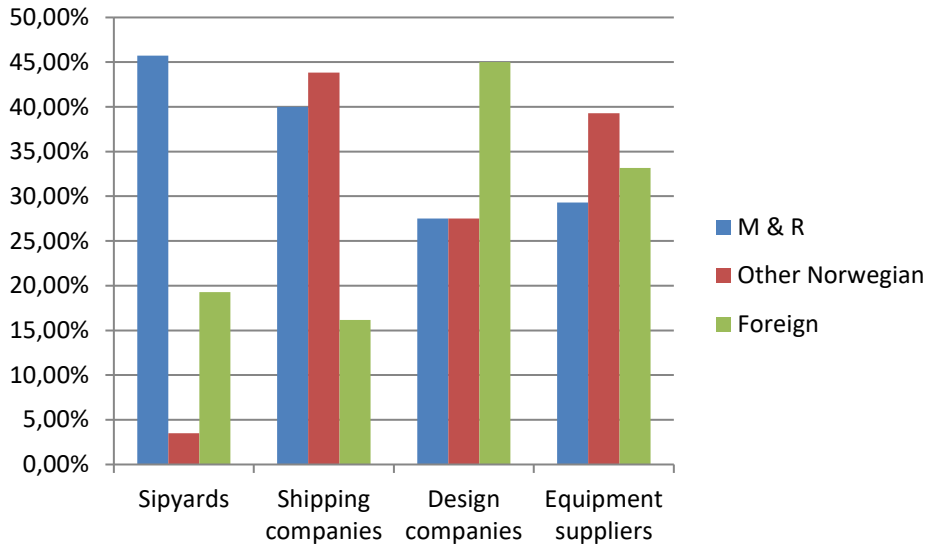
Figure 9 Export share sorted by type of company



Regarding purchase, the companies report on the average that 33 per cent in purchased from the region, 38 per cent from other Norwegian companies, and 30 per cent from foreign companies. Figure 10 shows the reported values of purchase for the different groups of companies. As we see, the shipyards and shipowners

purchase more than 45 and 40 per cent locally respectively, while design companies and equipment suppliers report 27 and 29 per cent respectively. These numbers coincides quite well with findings from surveys performed by Møreforsking. In the 2012 survey (Hervik *et al.*, 2012), equipment suppliers report that they purchase 27 per cent regionally, and shipyards report purchasing 37 per cent regionally. Here, the difference in purchase between our survey and the survey performed by Møreforsking may be caused by different respondents, which may give a large impact on the figures since this group is so small.

Figure 10 Purchase of products and services for different groups of companies

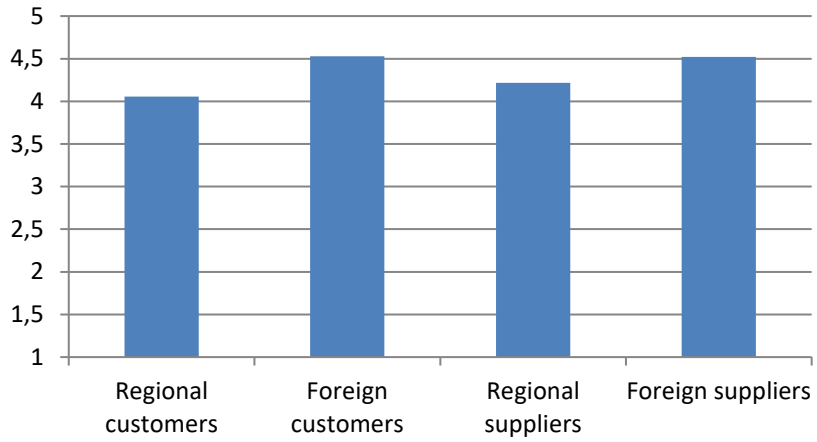


5.3 The relationship to regional and foreign business partners

Formalization

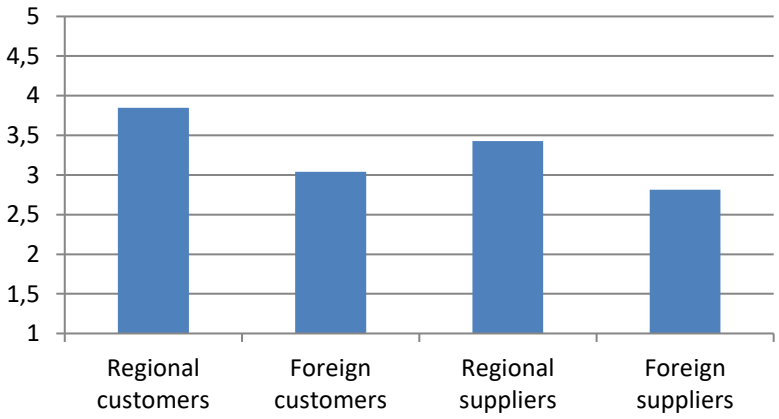
The respondents were asked how important it was with a complete agreement of contract in the relationship with their internal and foreign customers and suppliers. A Likert scale was used, ranging from "totally disagree" (2) to "totally agree" (5). Figure 11 give the general impression that complete contracts have become important, both internally in the cluster as well as in foreign business relations. However, we observe indications that having complete contract in foreign business relations is more important than in the global relations. The significance of this finding must be further investigated.

Figure 11 The importance of complete contracts in business relationship internally to the cluster and with foreign business partner (1- totally disagree, 5- strongly agree).



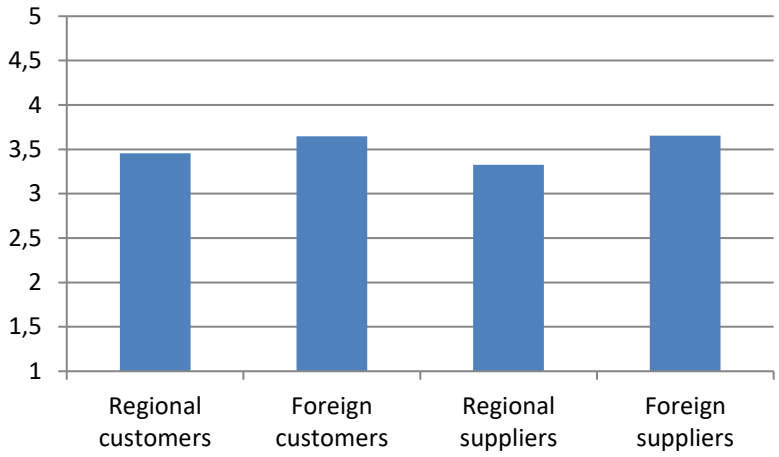
When asked whether there are several aspects in the relationship with regional and foreign companies that is not regulated in contracts, the results are not as clear as the question above. Nevertheless, the results indicate that it is more important to regulate relationships with foreign companies through agreements, compared to with regional customers and suppliers. This coincides with the findings presented in figure 11.

Figure 12 Aspects of relationship are not regulated in contracts (1- totally disagree, 5- strongly agree).



Regarding the scope of contracts, the respondents do not seem to have a clear opining that it has been increased the last years see figure 13. We can see that it is a small tendency in the opinion that the scope of the contracts has increased more in relations to foreign customers and suppliers compared to regional.

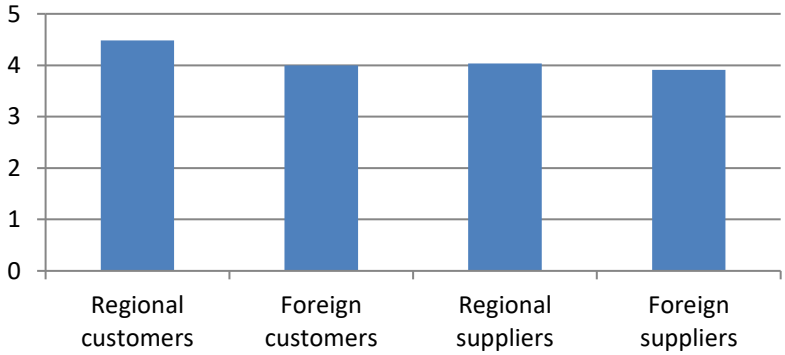
Figure 13 The scope of contracts have increased the last years (1- totally disagree, 5- strongly agree).



Relations

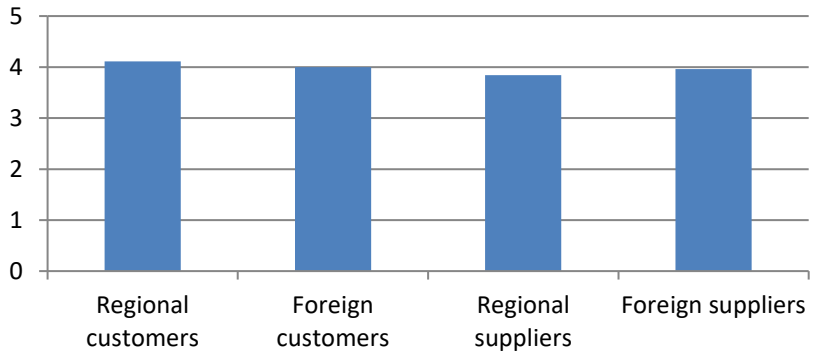
Long-term relationships are of vital importance in foreign and regional customer, and supplier relationships, see figure 14. There is a small indication that long-term relationships mean more for the respondent's relationship to regional customers than to foreign customers and suppliers, and to regional suppliers.

Figure 14 Long-term relationship is of vital importance (1- totally disagree, 5- strongly agree).



Regarding the question whether the relationship with customers and suppliers requires close interaction, coincide mainly with the answer in the previous question: it is considered important both in regional and foreign relations, both small differences between these two groups (figure 15).

Figure 15 Our deliveries require close interaction between the parties (1- totally disagree, 5- strongly agree).

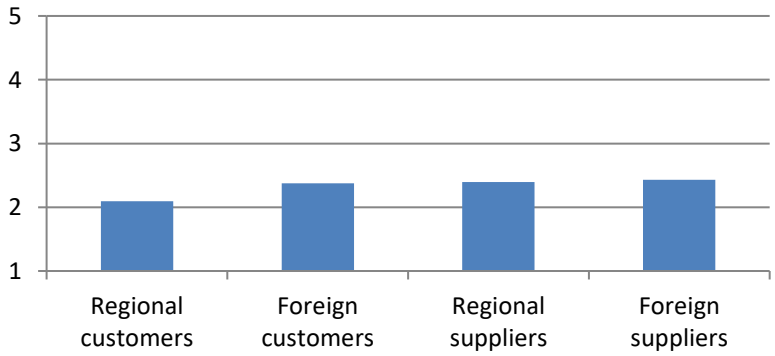


Trust appears as being important both in relations to regional as well as foreign suppliers and customers. However, trust is more important in the regional relationship than in the foreign, see figure 16.

Figure 16 The relationship is based on mutual trust (1- totally disagree, 5- strongly agree).

We were also interesting finding out whether personal relations have become less important in the last years. The respondents reported that this was not the case, as we can see from figure 17.

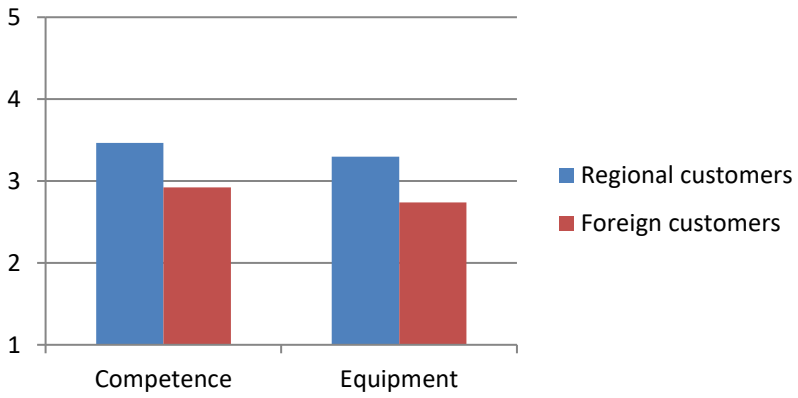
Figure 17 The importance of personal relations with our regional/foreign suppliers/customers has reduced the last years (1- totally disagree, 5- strongly agree).



Specific assets

In transaction cost theory, an important parameter is whether the supplier has made investments in personnel (competence), or equipment in order to adapt to customers. Figure 18 shows the respondent's answers to whether they had invested in equipment or competence in order to adapt to the customer. The results from the survey indicate that this it is not typical for this industry to do special adaptations to certain customers, which also reflect that suppliers are delivering to many different customers, not only one. Investments in equipment and competence are more common in the relations to regional customers compared to foreign customers.

Figure 18 Investments in specific assets for regional and foreign customers

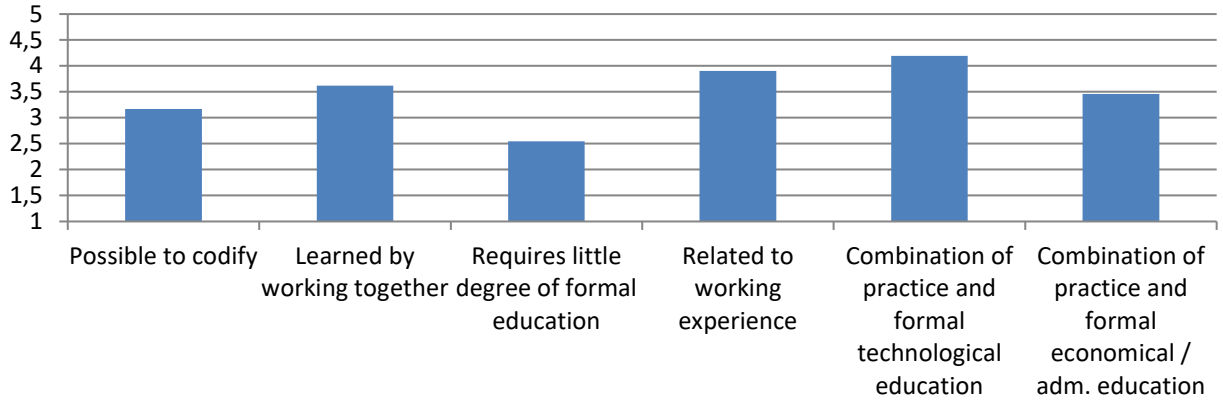


Suppliers of equipment are in particular relevant for this aspect of relationship with customer. Narrowing the respondents to this group of companies, we found that doing investments in equipment was more common in the regional context than for other groups, and that investment in competence in the relationship with foreign customers was not very common.

5.4 Arenas for knowledge acquisition

First, we wanted to find the nature of the knowledge base in the cluster. With reference to the theoretical division between tacit and explicit knowledge, we presented the respondents to some statements describing the form of knowledge, which they answered to what extent these statements were consistent with their view, ranging from "totally disagree" (1) to "totally agree" (5). The results are presented in figure 19 below. The results indicate that the knowledge base is predominately synthetic, were working experience combined with formal knowledge is essential. This is corresponds well to the findings in previous study (Isaksen, 2009). The results also reveal that it is difficult to make a division between tacit and explicit knowledge, but have to look upon these constructs as coexisting and mutually interdependent.

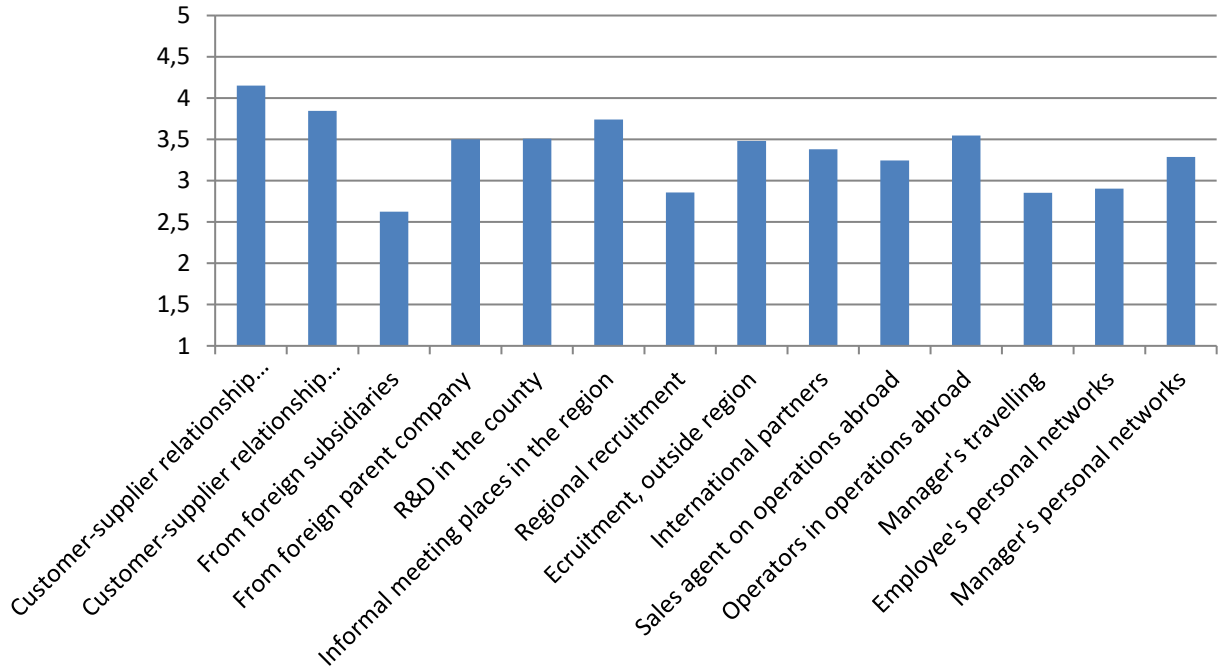
Figure 19 Characteristics of knowledge relevant for cluster company (1 – totally disagree, 5 – strongly agree.



Furthermore, the respondents were asked what arenas were important for their knowledge acquisition, ranging from "Not important" (1) to "Very important" (5). The answers were distributed as shown in

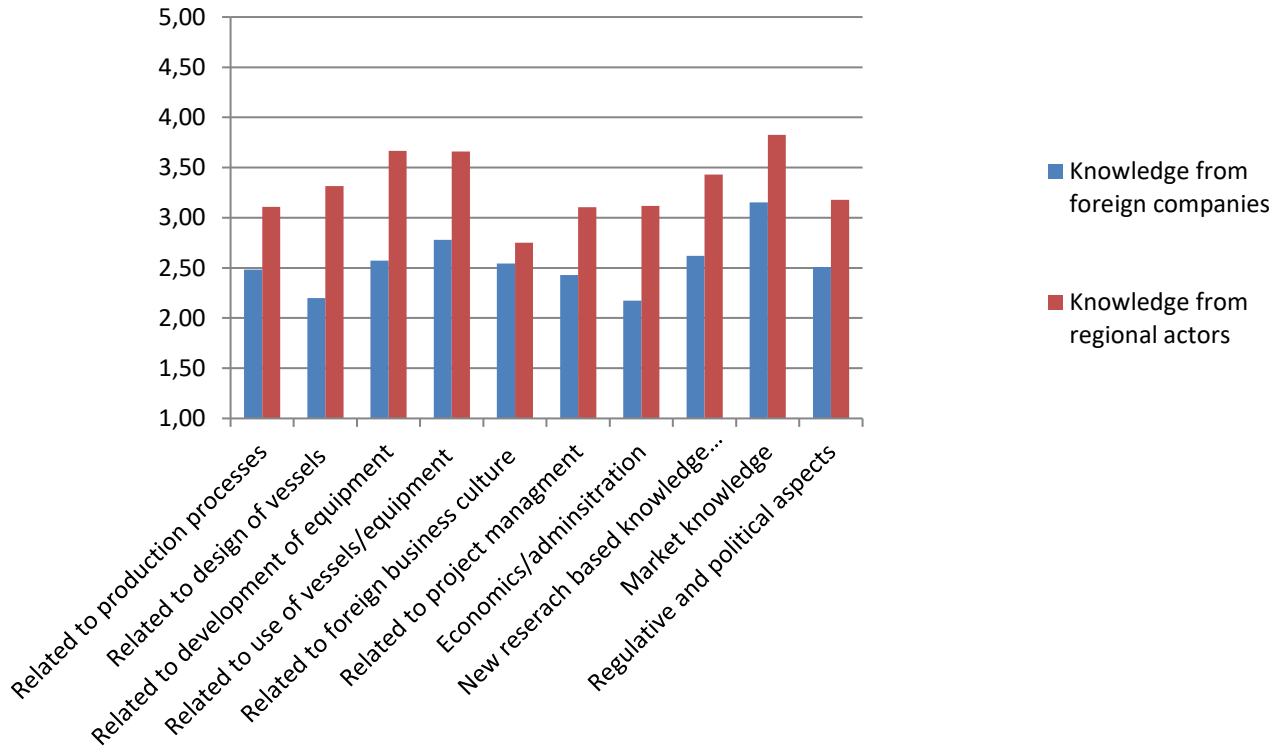
Figure 20. No alternatives stand out as much more important than others, reflecting that cluster companies acquire knowledge from many different sources. Local and global customer-supplier relationships together with informal meeting places are considered the most important as sources of knowledge.

Figure 20 Sources of knowledge acquisition (1 – not important, 5- very important).



The respondents were also asked what kind of knowledge they acquire from local and global sources, where they ranked the different forms of knowledge from "not important/relevant" (1) to "very important" (5). The results are shown in figure 21. Knowledge from foreign companies is in general considered as being less important than knowledge acquired from local actors. The difference is largest regarding design of vessels and development of equipment. Only market knowledge acquired from foreign companies is considered ad being above medium important (3).

Figure 21 Knowledge is acquired from foreign companies and regional actors (1 – not important, 5- very important).



When crossing the findings regarding channels and forms of knowledge acquired from the cluster and from foreign companies, we find that cluster companies with foreign ownership in general considers knowledge from foreign companies being of higher importance than those without ownership (average: 3.0 / 2.3). Furthermore, cluster companies with foreign ownership consider knowledge from foreign companies being of equal importance compared to those without ownership (average: 3.3/3.3). The companies without foreign ownership value local knowledge related to production processes and design of vessels being more important with companies with foreign ownership. We can extract some findings that deserve special attention:

The following aspects are more important for companies with no foreign ownership compared to companies with foreign ownership:

- The relationship between supplier and customer regionally (4.3/4.0)
- Informal meetings in the region (3.8/3.5)
- More important for companies with foreign ownership compared to companies with no foreign ownership:
- The relationship between supplier and customer internationally (4.0/3.7)
- Foreign subsidiaries (3.4/1.8)
- Foreign parent companies (2.4/1.7)
- New employees from outside the region (3.6/3.3)
- International cooperation partners (4.1/2.8)

The findings indicate that companies with foreign ownership are somewhat less inward looking than companies with foreign ownership and used the external linkages for acquiring knowledge. However, one should note that only relationships between suppliers and customers globally are considered being relatively important (4.0).

In order to get a more fine-grained picture we crossed the channels of knowledge with the different groups of companies and got the following findings: Figure 22 shows the regional channels of knowledge acquisition crossed with type of company. We see that customer-supplier relationship and informal meeting places in the region is considered as the most important for shipyards. Informal meeting places in the region are not considered as important for the other groups of companies, but have still a score over 3.5 for all. For shipowners, R&D in the county plays an important role. This can be explained by referring to the new simulation centre nearby Ålesund University College, where vessel operators can practice advanced operation of vessels in harsh weather conditions. Manager's personal networks are also considered important in this group of companies. For design companies, manger's personal network is considered as especially important (4.6). Employees' networks are also important (4.2), which indicate that an important source of knowledge is personal professional networks for this type of company. Correlating this finding with the finding that design companies have the highest education level, with 19.7 35.7 per cent at master and bachelor level, respectively, this finding may reflect that personal networks as source of knowledge means more for companies with higher educated staff. This should be investigated further. Managers' and employees' personal networks are also important for equipment suppliers, but here customer-supplier relationship is considered almost as important as manager's networks.

Figure 22 Regional sources of knowledge (1 – not important, 5- very important).

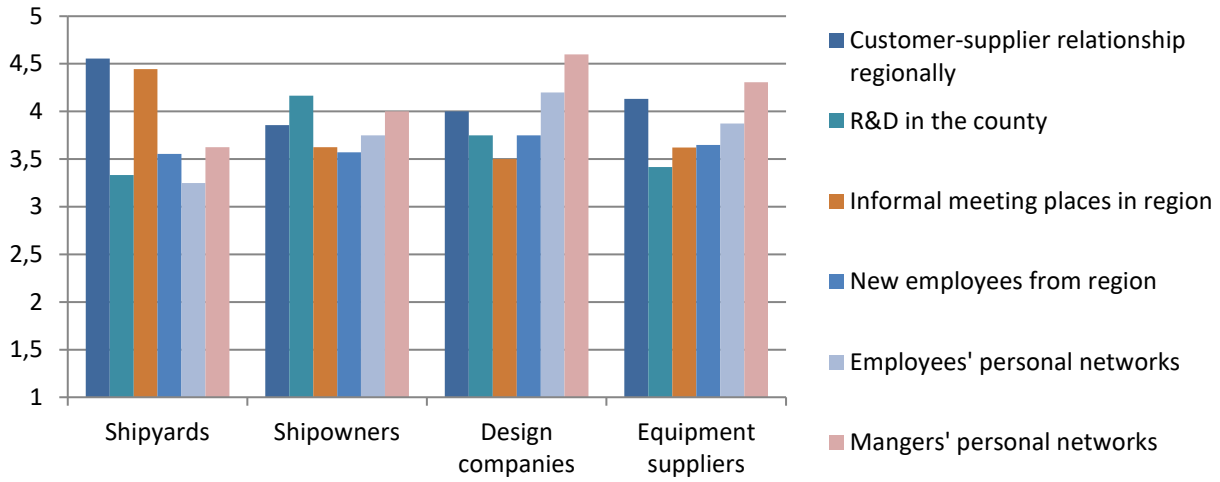
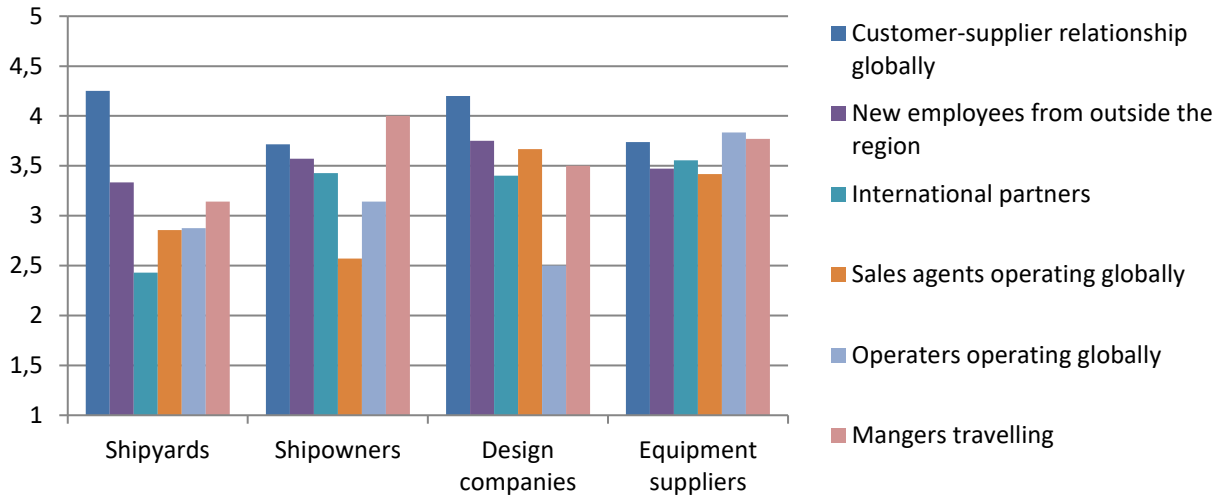


Figure 23 shows the global sources of knowledge crossed with types of companies in the cluster. Knowledge from foreign subsidiaries and parent companies has been removed, as it is only relevant for a smaller part of the respondents. The general level of importance is lower in this graph compared with the local sources of knowledge. For shipyards and design companies, global customer- supplier relationships stand out as the most important source of global knowledge. It is interesting that design companies consider global customer-supplier relationships as slightly more important than the local ones as sources of knowledge. The small number of answers in this group (5) makes it difficult to draw firm conclusions. Furthermore, managers' travelling activities is considered quite important as a source of knowledge for shipowners in particular, but also for equipment suppliers and design companies. It is also worth noting that recruitment of employees from outside the region is considered as an important source of knowledge these three groups, at the same level as internal recruitment.

Figure 23 Global sources of knowledge (1 – not important, 5- very important).



6 Analysis

Here, the hypotheses deduced from theory are being discussed based on the findings in the survey.

H1: *The relational form of governance is more prominent in regional business relationship than in relationships with foreign companies.*

In this survey, the relational form of governance is measured by using questions 3-5 in chapter 3.2. A new variable based on these three questions were established, reflecting the average score on these three questions. Furthermore, the survey divided between global/local suppliers/customers when asking these questions. In order to capture the local/global dimension, suppliers and customers were merged when testing this hypothesis. The importance of global relationships was considered to be 3.9 (1-little importance, 5-great importance), while the regional received a score of 4.0.

We attain some more information when we divide between customers and suppliers in the regional/global relationships. The importance of relationships to regional customers is considered to be 4.3, while the relationship with global customers still receives a score of 3.9 (Table 2). When it comes to suppliers, foreign suppliers even receive a slightly higher score than regional; 3.8 and 3.7 for global and regional suppliers respectively. The difference in evaluation of customers and suppliers is interesting, and may reflect the importance of having a close relationship with local customers. However, in the group of respondents suppliers are of great number, and it is natural that they consider customer relationship as being of

importance as opposed to their suppliers (being sub-suppliers to focal firm). In order to find out more about this, we must study the different categories of companies (Table 2).

Table 2 Relations to regional/foreign suppliers/customers for different groups of companies. The measures are the average of the answers ((1- totally disagree, 5- strongly agree)on the questions reflecting the relations towards the different groups (questions 3-5 in section 3.2).

	Shipyards	Shipowners	Design companies	Equipment suppliers	Total
Relations, regional suppliers	3.6	4.0	3.0	3.8	3.7
Relations, regional customers	4.4	4.1	4.4	4.4	4.3
Relations, regional -total	4.0	4.1	3.7	4.0	4.0
Relations, global suppliers	3.5	3.4	3.1	4.0	3.8
Relations, global customers	3.4	3.7	3.4	4.1	3.9
Relations, global - total	3.4	3.7	3.2	4.1	3.9

The table shows that there are differences between the groups of companies regarding how they consider the importance of their relationships to local and global companies. The design companies stands out as considering relationships being of less importance than the other groups, except of their relations to regional customers. What is worth noting here is that regional customers are considered as being more important than global customers. The same tendency can be observed in the replies from shipyards. Shipowners that are more globally oriented, does not display this difference between local and global customers. Not surprisingly, equipment suppliers consider the relationship with foreign companies as being as important, or even more important than local relationships. Regional customers are still more important than foreign customers, but when it comes to suppliers, foreign suppliers are considered as being more important than the regional ones. This can be explained by the looking at the findings for outsourcing, where suppliers have considerable outsourcing of different activities to foreign countries (figure 6), and having most frequently ownership in foreign companies (figure 3).

We may conclude that the relational form of governance is more prominent towards regional customers compared to global customers, and that this finding does not significantly differ between the different groups of companies.

Regarding the hypothesis, we can conclude that the relational form of governance is more prominent towards regional customers than in the relationships with foreign customers. For suppliers, we find no substantial difference.

H2: *The higher foreign purchase and export share a cluster company has, the more it will rely on the relational form of governance in the relation to the foreign companies.*

This hypothesis was testing by correlation foreign purchase and export share with the constructed variable reflecting relational governance towards foreign customers/suppliers. In table 3 the correlations between foreign purchase and export share and relations towards foreign customers and suppliers are shown, respectively.

Table 3 Correlation (Pearson) between foreign purchase and export share and relations towards foreign customers and suppliers.

	Relations foreign customers	**Relations foreign suppliers**	**Relations foreign customers & suppliers**
Export share	0.49	0.266	0.42
Foreign purchase	0.15	0.31	0.23

An interesting finding is that the correlation between foreign customers and export share is very strong, and that we do not find so strong correlation between foreign purchase and relation to foreign suppliers. Hence, these findings support the hypothesis that there is a positive correlation between foreign trade and relational governance towards foreign companies.

A correlation analysis was also performed between export share and regional relations, to see whether investment in foreign relationship develops at the expense of regional relationships.

Table 4 Correlation (Pearson) between export share and foreign purchase and relations to regional customers and suppliers

	Relations regional customers & suppliers
Export share	0.19
Foreign purchase	-0.02

The result indicates that development of foreign relationships does not "crowd out" relations with regional companies. On the contrary, there is a positive relationship between export share and relations to regional customers and suppliers.

H3: *Cluster companies that have a knowledge base characterized by tacit or synthetic knowledge, will display a relational form of governance in the relations to other cluster companies.*

The tacit knowledge was measured using questions 8-11 in chapter 3.2. These were combined to a single variable. The combinatory nature of synthetic knowledge was measured using questions 10-11. The mean score of the variable reflecting tacit knowledge was correlated with the variable reflecting regional relational governance (questions 1-3 for regional suppliers/customers). When doing reliability test on the

questions reflecting synthetic knowledge, we found that the reliability test indicated that the four questions didn't correlate sufficiently to reflect the same variable. We then did the correlation test between the variable reflecting relational regional governance (suppliers/customers) and each separate question reflecting synthetic knowledge, and got the result presented in table 5.

Table 5 Correlation (Pearson) between variable reflecting relational governance regionally and questions related to tacit knowledge

Question	Description	Regional relational governance
8	The knowledge can only be learnt by working together with others	0.235
9	The knowledge is related to working experience	0.276
10	The knowledge requires little formal education in order to apply	0.010
11	The knowledge is possible to write down in procedures and manuals (negative scale)	-0.051

Here, we see that questions 6 and 7 are correlated to the variable reflecting relational form of governance towards regional customers and suppliers. However, both these correlations are relatively weak. Question 8 and 9 shows a weak negative correlation which can mean that formal knowledge is considered important no matter how the transfer takes place. This result reflects that tacit knowledge does not normally exist alone, but is intertwined with explicit knowledge, especially in a society where written documentation is considered important.

The questions 12 and 13 reflect the combinatory nature of synthetic knowledge. The correlations between regional relational governance and the answers to these questions are presented in table 6.

Table 6 Correlation (Pearson) between variable reflecting relational governance regionally and questions related to the combinatory nature of synthetic knowledge

Question	Description	Regional relational governance
12	The knowledge is a combination of practical experience and formal technical education	0.166
13	The knowledge is a combination of practical experience and formal administrative/economical education	0.246

Here, the replies on question 13 correlate significantly with the variable reflecting regional relational governance. However, it is a bit surprising that question 12 does not correlate to the same extent, especially since technical education traditionally has played an important role in the cluster.

This hypothesis can be further examined by examining the correlation between formalization in the relationship with regional customers/suppliers and the knowledge base. As expected this correlation is negative, but very weak (-0.084).

In order to get an impression of what correlations mean, we did the same correlation analysis with relational governance globally and the same variables reflecting tacit knowledge:

Table 7 Correlation (Pearson) between variable reflecting relational governance globally and questions related to tacit knowledge

Question	Description	Global relational governance
8	The knowledge can only be learnt by working together with others	0.059
9	The knowledge is related to working experience	0.287
10	The knowledge requires little formal education in order to apply	0.078
11	The knowledge is possible to write down in procedures and manuals (negative scale)	-0.236

Here, we see that the correlation between relational governance with foreign suppliers and customers and question 8 is much lower than for regional relations (Table 5), while being at the same level in question 9. The lower correlation coefficient in question 8 may indicate that it is in general difficult to work together in global relations due to geographical distance, while the stronger positive correlation in question 9 can be interpreted as that working experience is important when having relations to both regional actors and foreign companies.

From the above, we cannot totally confirm hypothesis 2. There is considerable correlation between two of the questions (8 and 9) reflecting a synthetic knowledge base and a relational form of governance towards regional customers/suppliers. The other questions display no significant correlation. The ambiguity of the answers means that it is not possible to reject the hypothesis.

We now consider the following hypotheses:

H4: *Cluster companies that have outsourced activities to foreign countries considers foreign sources of knowledge as being more important than cluster companies that have not sourced out activities to foreign locations.*

H5: *Companies with ownership as mode of governance (hierarchical) in the relationship with foreign companies, considers foreign sources of knowledge being more important compared to companies that have chosen other modes of governance (not ownership).*

In order to investigate these hypotheses we compare the group regarding outsourcing (question 1) with sources of knowledge (questions 14-27). The groups of outsourcing are categorized as the following:

- NO: Have not outsourced
- FD: have outsourced to foreign subsidiary department
- FIC: have outsourced to foreign independent companies
- FD&FIC: Have outsourced both to subsidiary/department and to other foreign independent companies

Table 8 Outsourcing and sources of knowledge (1-not important, 5-very important)

Question	Description	No	FD	FIC	FD& FIC	Yes	Mean
15	Customer /supplier relationship internationally	3.6	3.8	4.3	4.7	4.0	3.8
16	Foreign subsidiary	2.1	3.4	2.0	2.5	3.1	2.6
17	Foreign parent company	1.7	2.4	2.0	3.0	2.4	2.0
18	New employees from companies outside the region	3.6	3.3	3.3	3.8	3.6	3.5
19	International partners	3.4	3.7	2.7	4.5	3.4	3.4
23	Sales agents on foreign assignment	3.2	2.8	3.7	4.7	3.3	3.3
24	Operators on foreign assignment	3.5	3.6	3.4	4.3	3.6	3.6
25	Managers travelling	3.8	3.7	3.5	3.7	3.6	3.7
	Mean	3.2	3.4	3.3	4.0	3.4	

There is a small difference (0.2) between those who have sourced out comparing to those who have not sourced out, regarding how they consider the importance of foreign knowledge, when seeing all sources of knowledge as a whole. This is not very substantial. This may be an expression that also those companies that haven't outsourced are quite international, especially on the downstream side of the supply chain. Global sourcing is often related to sourcing of activities on the upstream side of the supply chain. However, knowledge may be acquired from global cooperating partners on the downstream side of the supply chain. In figure 21 we see that knowledge associated with the market side scores higher in global relationships than knowledge associated with production.

From the average number we may conclude that there is a tendency that companies that has ownership in foreign companies value foreign knowledge sources as somewhat more important compared to companies without foreign ownership, but the difference is marginal (0.1). However, if we look at question, that is how important the respondent considers knowledge coming from foreign customer/suppliers, knowledge coming from foreign departments is not considered as being important as compared to companies outside

the group. The reason for this may be that "customers/suppliers" in the question are not considered as being outside the group per definition, so this crossing of variables makes no sense. Furthermore, questions 14 and 15 may also be considered not relevant for companies that not are part of a larger group.

More relevant is question 22 then, where knowledge coming from international cooperation partners is to be considered by the respondent. Here, companies with foreign departments within the company considered knowledge coming from international business partners as being more important compared with those having outsourced to foreign companies outside the group. Surprisingly, the respondents that has reported no outsourcing considers the knowledge acquired from foreign business partners as being more important than those companies having outsourced activities to foreign companies. These results may indicate that also companies without activities outsourced to foreign countries have important relations to international partners. A source of error here may also be that subsidiaries are not interpreted as "business partners", making this crossing and comparison perhaps meaningless.

Questions 23 and 24 consider knowledge acquisition with the use of sales agents and operators. Companies that have outsourced to companies outside the group consider sales agents as channel of knowledge as being more important compared to the companies who have outsourced to foreign subsidiaries, or that have not outsourced. A different picture emerges when looking at operators on foreign assignments. Here, companies that have outsourced through foreign ownership consider this source of knowledge as being more important than those who has outsourced to independent foreign companies or have not outsourced.

In question 25 the importance of managers' travelling as a source of knowledge is considered. Here companies that have outsourced to foreign departments score higher than those who has outsourced to foreign companies outside the group. However, also here we see that those companies that has not outsourced value this source of knowledge somewhat higher compared to companies that have outsourced.

The questionnaire also contained questions regarding foreign ownership, without associating this to outsourcing. Crossed with foreign sources of knowledge, the following was found (table 9):

Table 9 Ownership and knowledge acquisition (1-not important, 5-very important)

	Question no.							
Foreign ownership	**15**	**16**	**17**	**22**	**23**	**24**	**25**	**Average**
No	3.5	1.5	1.6	2.6	2.8	3.1	3.6	2.7
Yes	3.7	3	2.4	4	3.5	3.5	3.9	3.5

Here we see a clearer tendency that companies that has foreign ownership value knowledge acquired from foreign sources as more important than those without foreign ownership. Especially the relations to international cooperation partners (question 22) this difference is substantial. However, as the group without foreign ownership includes those who has not outsourced at all, and those who has outsourced to independent foreign companies, the comparison with table 8 is not straightforward.

In total, the results from this part of the survey is too uncertain and ambiguous to conclude whether companies that have outsourced activities to foreign locations consider foreign sources as being more important than companies that haven't outsourced activities, and whether ownership as mode of governance facilitate knowledge exchange the most. This can be explained by arguing that companies that have not outsourced still have relations with foreign actors, especially on the downstream side of the supply chain towards customers.

H6: *Cluster companies that have their knowledge base in tacit or synthetic knowledge consider local sources of knowledge as being more important than global sources for knowledge acquisition.*

In order to measure local sources of knowledge, we use questions 14, 18, 19, 20, 26 and 27 in chapter 3.2. These were combined into one variable. For global sources of knowledge, we used questions 15, 16, 17, 21, 22, 23, 24 and 25, which also were combined into one variable. These were separately correlated with the variable reflecting tacit knowledge with the following result:

Table 10 Correlation (Pearson) between variable reflecting tacit knowledge and global/regional sources of knowledge

	Global sources of knowledge	**Local sources of knowledge**
Tacit knowledge	-0.140	0.072

Both these correlations are weak, and we have to dig deeper into the questions in order to find some pattern. Another challenge is that the constructed variable reflecting tacit knowledge did not pass the reliability test. Hence with did the correlations with the separate questions reflecting tacit knowledge:

Table 11 Correlation (Pearson) between question reflecting regional sources of knowledge and tacit knowledge

Question		8. Working together	9. Related to working experience	10. Requires little formal education	11. Not possible to write down
14.	The relationship between supplier and customer regionally	0.102	0.122	0.368	0.078
18.	R & D institutions in the county	-0.072	0.084	0.244	-0.305
19.	Informal meeting places in the region	-0.158	0.049	0.139	-0.067
20.	New employees from the region	-0.253	-0.012	0.105	-0.225
26.	Employees' personal network	0.159	0.341	0.182	0.239
27.	Managers' personal network	0.009	0.093	0.191	0.307

Some of the correlations in Table 11 will be discussed in the following: We see a clear correlation (0.368) between questions 10 and 14, which imply that those who considers the relationship between supplier and customer locally as being important, also tend to characterize knowledge as requiring little formal education. What is more surprising is the positive correlation (0.244) between question 10 and 18, which should imply that those who regard regional R &D institutions as being important sources of knowledge also characterize knowledge as requiring little formal education. The negative correlation (-0.305) between question 11 and 18 is in that sense as expected: Those who regard regional R &D institutions as being important sources of knowledge also characterize knowledge as being possible to write down in manuals and procedures (possible to codify). Furthermore we have a negative correlation between questions 8 and 20 (-0.253), which also is a bit unexpected. Those who regard recruitment of employees from the region as important source of knowledge, tend to characterize knowledge as being learnt by working together. The positive correlation (0.341) between questions 9 and 26 implies that those who considers personal networks as being an important source of knowledge end to characterize knowledge as related to working experience. Both questions 26 and 27 are positively correlated (0.239 and 0.307) with question 11, which means that those who consider employees' and managers' personal networks as an important source of knowledge also tend to characterize knowledge as not possible to write down. This is may be an expression of the tacit nature of networks.

We did the same correlation tests with the question reflection global sources of knowledge, shown in table 12

Table 12 Correlation between question reflecting global sources of knowledge and tacit knowledge

Question	Description	8. Working together	9. Related to working experiences	10. Requires little formal education	11. Not possible to write down
15	Customer /supplier relationship internationally	0.116	0.076	-0.048	0.056
16	Foreign subsidiary	0.105	-0.126	-0.120	0.020
17	Foreign parent company	0.094	0	-0.142	0.061
21	New employees from companies outside the region	-0.193	-0.072	-0.052	-204
22	International partners	0.136	0.046	0.050	-0.127
23	Sales agents on foreign assignment	-0.214	-0.118	-0.057	-0.365
24	Operators on foreign assignment	-0.198	-0.059	0.138	-0.488
25	Managers travelling	-0.022	-0.055	0.234	-0.225

Most of the correlations between the questions in table 12 are weak, indicating that there is no clear correlation between questions reflecting tacit knowledge and how the respondents consider foreign sources of knowledge. We comment on them that are round and above 0.2. The companies that consider sales agents and operators on foreign assignment as an important source of knowledge tend to not consider it to be necessary to work together in order to develop knowledge that is important for the company (correlation -0.214 and -0.198). Furthermore, the companies that consider operators on foreign assignment and managers travelling as important sources of knowledge tend to characterize knowledge as being possible to codify.

From the correlation analyses above it is difficult to conclude regarding hypothesis 5, as it is difficult to see a clear pattern from the data. It may be more informative to refer to the descriptive statistics in chapter 5.4: From figure 21 we see that knowledge acquired from regional companies is considered being more important than knowledge acquired from foreign sources. As the findings from the questions regarding tacit knowledge is ambiguous and uncertain, it may be a better approach to base the analysis on previous published documentation that the knowledge base in the cluster is synthetic (Isaksen, 2009), which we also have a strong indication of from interviews performed in the cluster. From this, we may infer that there is a stronger connection between tacit knowledge and local knowledge sources compared to foreign knowledge sources. However, the result from this survey does not give a clear indication of this.

H7: *Cluster companies that have outsourced chose formalized forms of governance compared to companies that have not outscored.*

Here the questions 6 and 7 in chapter 3.2 are used to reflect formalized forms of governance, and question 1 reflects outsourcing. The question 6 and 7 is asked for global/regional suppliers/customers, and the answers on questions concerning regional and foreign customers/suppliers summed and averaged before held up against the replies on question 1.

Table 13 Formalized governance and outsourcing

	Outsourcing					
Description	**No**	**FD**	**FIC**	**FD&FIC**	**Yes**	**Mean**
Formalized regional	3.2	3.2	3.4	3.3	3.3	3.3
Formalized foreign	3.7	3.9	3.9	3.2	3.9	3.8
Mean	3.5	3.6	3.6	3.3	3.6	

The result presented in table 13 shows that foreign relationships are in general more formalized than regional relationships. However, there is no large difference between those companies that have outsourced compared with those who have not. However, as discussed in chapter 7.1, the two questions reflecting formalization do not meet the requirement for reliability. The analysis is therefore performed focusing on question 6, concerning the completeness of agreements towards regional/foreign customers/suppliers:

Table 14 Completeness of agreements and outsourcing.

	Outsourcing					
Question	**No**	**FD**	**FIC**	**FD&FIC**	**Yes**	**Mean**
Completeness regional customers	4.2	3.8	4.2	4.0	4.0	4.1
Completeness regional suppliers	3.9	3.6	4.1	4.3	3.9	3.9
Completeness foreign customers	4.6	4.6	4.7	3.0	4.5	4.5
Completeness foreign suppliers	4.4	4.5	4.9	4.0	4.6	4.5
Mean	4.3	4.1	4.5	3.9	4.2	

From table 14 we see that there on average is no big difference between those companies that have outsourced, compared to those who have not outsourced, when it comes to the completeness of agreements with regional/foreign suppliers/customers. Furthermore, we see that the findings indicate a lower formalization compared to those who have outsourced to independent companies. Surprisingly, companies having not sourced out to foreign countries have a higher score on formalizing compared with them who have outsourced through ownership. Looking at the results in Table 14, we see that this is in particular prominent in the relations to regional customers and suppliers. This indicate that companies that have outsourced activities to foreign companies through ownership, are less concerned about formalization

regionally than those having kept activities in their companies. This is not in line with the suggested hypothesis 6.

Hence, hypothesis 6 cannot be supported based on answers from this survey. However, as commented in chapter 5.4 and shown in Figure 11 and Figure 12, the relationships with foreign suppliers and customers are in general more formalized than with regional suppliers and customers.

7 Validity and reliability

7.1 Reliability

Reliability refers to the consistency of a measure (Bryman and Cramer, 2011), and entail often two aspects – external and internal reliability. External reliability refers to the degree of consistency of a measure over time, where test-retest is a way to check this. Internal reliability refers to whether the experiment itself is carried out in a satisfactory way. In particular, whether the indicators used are reflecting the specific constructs to be measured, and whether the scales and items making up the scales are internally consistent. In this survey, a test-retest is not possible to carry out. Regarding this form of internal validity, a reliability analysis among the different questions that constitute a variable has been carried out in the following.

Formalization

The following question reflects this variable:

6. It is important with a complete agreement as possible with regional/foreign customers/suppliers (1- totally disagree, 5- strongly agree).
7. There are several aspects in the relations with regional/foreign customers/suppliers that are not regulated in contracts (1- totally disagree, 5- strongly agree) (invert scale)

These questions were asked for the relations to regional and foreign customers and suppliers. Doing the reliability analysis, we find the following for Cronbach's alpha:

- Regional customers: 0.081
- Foreign customers: -0.403
- Regional suppliers: 0.392
- Foreign suppliers: 0.089

We see that these two questions do not satisfy the requirements of internal validity. One of the reasons may be that the respondents were confused about the inverted scale. Consequently, we have treated these separately, and focus on the first question.

Relational governance

The following questions were asked to investigate this variable:

3. It is very important with long-term relationship with foreign/regional customers/suppliers (1- totally disagree, 5- strongly agree).
4. Our deliveries to our regional/foreign customers/suppliers require close interaction between the parties (1- totally disagree, 5- strongly agree).
5. Our relationship with regional/foreign customers/suppliers is based on mutual trust (1- totally disagree, 5- strongly agree).

These questions were asked for the relations to regional and foreign customers and suppliers. Doing the reliability analysis, we find the following for Cronbach's alpha:

- Regional customers: 0.819
- Foreign customers: 0.811
- Regional suppliers: 0.782
- Foreign suppliers: 0.734

We see that for all relations 1-4, the requirements of internal validity regarding the three items is satisfied (the result should be 0.7 or above (Bryman and Cramer, 2011)).

Type of knowledge

Tacit knowledge was operationalized through the following statements (1- totally disagree, 5- strongly agree):

- The knowledge can only be learnt by working together with others
- The knowledge is related to working experience
- The knowledge requires little formal education in order to apply
- The knowledge is possible to write down in procedures and manuals (negative scale)

The reliability test gave a Cronbach's alpha of 0.36, which is too low, indicating that these four questions (items) do no correlate sufficiently to reflect the same variable (tacit knowledge).This may be a reflection

that the construct of tacit knowledge more an analytical construction than a real life construct. Tacit and explicit knowledge is intertwined and depend on each other, making it difficult to separate (Lam, 2000).

Inter-coder reliability is also an aspect to be considered. The result of this survey was coded by one researcher (main author of this paper), and the coding scheme is consequently consistently interpreted.

7.2 Validity

Validity is concerned about whether a measure really measures the concept that it purports to measure (Bryman and Cramer, 2011). The face validity of the questions in the survey was secured by getting comments from other researcher and by performing a pretest among two of the respondents, and a researcher outside the projects read through the questions and made comments. Furthermore, by deducing the hypotheses from established theory, the construct validity has been sought assured. However, the survey has some weaknesses that will be discussed in the following.

Sampling

For practical reasons the survey was limited to the largest equipment suppliers in the cluster. This means that this group of companies is not correctly represented in this survey. Furthermore, the other groups of companies; shipowners, shipyards and design companies are relatively small compared to the group of equipment suppliers. Consequently, the results of the survey on cluster level will be heavily colored by the answers from the equipment suppliers. However, based on interviews and general knowledge of the cluster, we know that there are some companies in the cluster that play an important role regarding cooperation both within the cluster, and also have strong international linkages. Understanding the strategies and choices of these companies will be of vital importance for understanding the dynamism of the cluster. This aspect will not be captured in the present survey where each company is given equal weight. The result of this survey will therefore *contribute* to the understanding of the cluster combined with the main data collection, which has been performed through interviews of the focal companies in the cluster.

Another point is that in most cases it is the manager of the companies that has received the questionnaire, which may lead to some bias in the responses. Knowledge exchange takes place at all levels of employees, and it may be the case that managers experience this in another way than employees that are more practically and technologically oriented.

The questionnaire

The questionnaire has some weaknesses that will be addressed in the following:

- This survey has no question reflecting that cluster companies has changed supplier from cluster companies to foreign companies. This kind of "outsourcing" from the cluster is not captured by this survey.
- Due to human error, a group of questions were found to have got inverted scale compared to the related groups of questions. These were the questions regarding relations to foreign customers. Through the coding of the answers in SPSS, all answers on this group of questions were carefully reviewed. Most replies were filled out by the respondents as if it was the correct scale. Some respondents that had discovered this error, had commented or changed their answers which made it very visible what their correct answer should be. This was taking into consideration when coding these answers.
- Some of the variables have too few items than required to performed rigorous statistical analysis of the replies. However, the questionnaire was primarily prepared in order to gain general and descriptive knowledge about the cluster, and there were also limitation regarding the length of the survey. Furthermore, the questionnaire was prepared within time constraint, which resulted in a lower quality than could be achieved with more time available.

7.2.1 General comments

The sample in this survey was not randomized, but rather strategic. This means that it is not possible to generalize to the whole cluster or to other clusters, and the concept of statistical significance has no relevance here. The main purpose was to get a broader picture of the aspects covered by the survey that is difficult to get through interviews. Having said that, it is clear that this survey suffer from the same problem as many other surveys, in that the questions so not reflect the issues the respondents are concerned about, that some respondents cross out the survey more or less randomly when the questions does not capture issues they are concerned about.

8 Summary and conclusion

In the following, the findings in this survey will briefly discussed and some conclusions will be made where possible.

The descriptive statistics in chapter 5 gives us some general tendencies regarding foreign sourcing, cluster governance and knowledge flow. First, we see that almost half of the respondents (48 per cent) have not sourced out activities that previously were carried out by the company. However, we have not captured whether companies have changed from regional suppliers to foreign suppliers. We can get an impression of this by looking at surveys performed previously in the cluster. From Hervik et al (2012) we see that suppliers which is the largest group in the cluster in number, purchase 38 per cent from foreign suppliers in value. We do not have historical data regarding the purchase of suppliers, but we know that shipyards purchase 37 per cent from regional suppliers (Hervik et al., 2012). The regional purchase of shipyards was 40 per cent in 2001 (Hervik, 2001), which means that this figure has not changed much the last decade with intensified globalization.

Of the companies that have outsourced, most (63 per cent) have sourced out to companies they have ownership in (foreign departments in the company or group), or a combination of ownership and sourcing to other companies. 37 per cent have sourced out to independent companies. Marketing and sales together with engineering emerges as the activities most companies report having outsourced. However, the survey does not reveal the extent of the outsourcing of the different activities with respect to economic figures. A surprising finding was that as many as 22 companies (34 per cent) have outsourced engineering. Reduced labor cost and access to labor are listed as the most important reasons for outsourcing. Access to knowledge is not considered as an important reason for outsourcing for shipyards and equipment suppliers. Shipowners and design companies list this as more important.

Regarding formalization in relationship, complete contracts are being considered important both in relationships with other cluster companies and towards foreign companies, however somewhat more important in relationship with foreign companies. At the same time long-term relations as well as close interaction, are considered as being important both in the relationship to regional and foreign companies. Trust is also considered as being important, both in relationships with regional and foreign companies. However, we got indications that trust plays a more important role in regional relationships compared to foreign relationships. The respondents gave a relative clear answer that the importance of personal relationship has not been reduced the last years.

The respondent's answers to the questions reflecting the forms of knowledge confirms previous studies where it has been concluded that the maritime cluster has a synthetic knowledge base (Isaksen, 2009), and where the respondents in particular have scored relatively high on the statements that the knowledge is a combination of practice and formal technological knowledge. Customer-supplier relationship both regionally and internationally emerges as the most important source of knowledge. However regional customer-supplier relationships are considered more important than relationships to foreign companies. The regional customer-supplier relationship is in particular important for shipyards, together with informal meeting places in the regions. For equipment suppliers and design companies, personal networks are rated as the most important sources of knowledge. These result support previous findings that the networking is very important for exchanging knowledge internally in the cluster. When asked where knowledge is sourced from, the respondents in general give a higher score to regional sources of knowledge compared to foreign sources of knowledge. However, we could not find clear support for the hypothesis that those who have sourced out considers foreign sources of knowledge as being more important than those who has not sourced out. This may be interpreted in different ways. One is that outsourcing is not important for foreign knowledge sourcing, and that knowledge from foreign sources comes mainly through relations to customers, which is supported by the findings shown in figure 20-23. We find a correlation of 0.29 between foreign customer-supplier relationship as a source of knowledge and export share, and of 0.57 between international cooperation partners as source of knowledge and export share, which confirms this conclusion.

In this survey, we have no clear indication that ownership as choice of governance towards foreign companies facilitates knowledge exchange compared to other choices of governance. However as the result is ambiguous, we cannot reject the hypothesis either.

We found that there where a correlation between two of the question reflecting tacit knowledge and relational governance towards regional customers and suppliers. This indicates that the relational form of governance is important for transfer of tacit knowledge. Furthermore, the analysis of the survey reveals that the relational form of governance is more prominent in the relationship with regional customers, compared to the relationship with foreign customers. However, as companies increasingly trades with foreign companies, relational forms of governance develop in these linkages, which in this analysis was evidenced by a strong positive correlation between foreign trade (export and foreign purchase), and relational form of governance in the relations to foreign customers and suppliers.

9 References

Asheim, B., T. and Isaksen, A. (2002), "Regional Innovation Systems: The Integration of Local 'Sticky' and Global 'Ubiquitous' Knowledge", *Journal of Technology Transfer*, Vol. 27, No. 1, pp.77-86.

Asheim, B.T. (1996), "Industrial districts as 'learning regions': A condition for prosperity", *European Planning Studies*, Vol. 4, No. 4, pp.379-400.

Asheim, B.T. and Gertler, M.S. (2005), "The geography of innovation: regional innovation systems", in Fagerberg, J., et al. (Eds.) *The Oxford handbook of innovation*. Oxford University Press, Oxford.

Audretsch, D.B. (1998), "Agglomeration and the location of innovative activity", *Oxford Review of Economic Policy*, Vol. 14, No. 2, pp.18-29.

Bathelt, H., Malmberg, A. and Maskell, P. (2004), "Clusters and knowledge: Local buzz, global pipelines and the process of knowledge creation", *Progress in Human Geography*, Vol. 28, No. 1, pp.31-56.

Bell, S., J., Tracey, P. and Heide, J.B. (2009), "The Organization of Regional Clusters", *Academy of Management. The Academy of Management Review*, Vol. 34, No. 4, pp.623-642.

Belussi, F. and Sedita, S.R. (2012), "Industrial Districts as Open Learning Systems: Combining Emergent and Deliberate Knowledge Structures", *Regional Studies*, Vol. 46, No. 2, pp.165-184.

Bradach, J.L. and Eccles, R.G. (1989), "Price, Authority, and Trust: From Ideal Types to Plural Forms", *Annual Review of Sociology*, Vol. 15, No. pp.97.

Bryman, A. and Cramer, D. (2011), *Quantitative data analysis with IBM SPSS 17, 18 and 19 : a guide for social scientists*, Routledge, London.

De Propris, L., Menghinello, S. and Sugden, R. (2008), "The internationalisation of production systems: embeddedness, openness and governance", *Entrepreneurship and Regional Development*, Vol. 20, No. 6, pp.493.

Gereffi, G., Humphrey, J. and Sturgeon, T. (2005), "The governance of global value chains", *Review of International Political Economy*, Vol. 12, No. 1, pp.78-104.

Gertler, M.S. (2003), "Tacit knowledge and the economic geography of context, or The undefinable tacitness of being (there)", *Journal of Economic Geography*, Vol. 3, No. 1, pp.75-99.

Håkansson, H. and Snehota, I. (2006), "No business is an island: The network concept of business strategy", *Scandinavian Journal of Management*, Vol. 22, No. 3, pp.256-270.

Halse, L.L. (2011), Governance and transformation of clusters: theoretical models and the case of the maritime cluster in Mid-West Norway. *18th EurOMA Conference*, July 3-6, at Cambridge, UK.

Halse, L.L. (2012), Globalization and supply chain governance: the Maritime cluster in North West Norway. *POM 4th World Conference & 19th International Annual EurOMA Conference*, 1th-5th July, at Amsterdam, The Netherlands.

Heide, J.B. and John, G. (1992), "Do Norms Matter in Marketing Relationships?", *Journal of Marketing*, Vol. 56, No. 2, pp.32.

Hervik, A. 2001. '*Utviklingen i maritime næringer i Møre og Romsdal: status 2001*', Molde, Møreforsking Molde AS.

Hervik, A., Nesset, E. and Opdal, Ø. 1998. '*Utviklingen i maritime næringer i Møre og Romsdal*', Molde, Møreforsking Molde AS.

Hervik, A. and Oterhals, O. (2012), NCE Klyngeanalysen 2012. *Status og veien videre 2012 - NCE Maritime*, 23. september, at Ålesund.

Hervik, A., Oterhals, O., Bergem, B.G. and Johannessen, G. (2012), *NCE Maritime klyngeanalyse 2012 : status for maritime næringer i Møre og Romsdal,* Møreforsking Molde AS, Molde.

Iammarino, S. and Mccann, P. (2006), "The structure and evolution of industrial clusters: Transactions, technology and knowledge spillovers", *Research policy,* Vol. 35, No. 7, pp.1018-1036.

Isaksen, A. (2001), "Building Regional Innovation Systems: Is endogenous industrial development possible in the global economy?", *Canadian Journal of Regional Science,* Vol. XXIV, No. 1, pp.101-120.

Isaksen, A. (2009), "Innovation Dynamics of Global Competitive Regional Clusters: The Case of the Norwegian Centres of Expertise", *Regional Studies,* Vol. 43, No. 9, pp.1155-1166.

Isaksen, A. and Kalsaas, B. (2009), "Suppliers and Strategies for Upgrading in Global Production Networks: The Case of a Supplier to the Global Automotive Industry in a High-cost Location", *European Planning Studies,* Vol. 17, No. 4, pp.569-585.

Ketelhöhn, N. (2006), "The role of clusters as sources of dynamic externalities in the US semiconductor industry", *Journal of Economic Geography,* Vol. 6, No. 5, pp.679.

Kogut, B. and Zander, U. (1993), "Knowledge of the firm and the evolutionary theory of the multinational corporation", *Journal of International Business Studies,* Vol. 24, No. 4, pp.625-625.

Lam, A. (2000), "Tacit knowledge, organizational learning and societal institutions: An integrated framework", *Organization Studies,* Vol. 21, No. 3, pp.487-513.

Macneil, I.R. (1978), "Contracts: Adjustments of long-term economic relations under classical, neoclassical and relational contract law", *Northwestern University Law Review,* Vol. 72, No. 6, pp.854-905.

Macneil, I.R. (1980), *The new social contract: an inquiry into modern contractual relations,* Yale University Press, New Haven.

Markusen, A. (1996), "Sticky places in slippery space: A typology of industrial districts", *Economic Geography,* Vol. 72, No. 3, pp.293-313.

Marshall, A. (1920), *Principles of Economics,* Macmillan, London

Parrilli, M. and Sacchetti, S. (2008), "Linking learning with governance in networks and clusters: key issues for analysis and policy", *Entrepreneurship and Regional Development,* Vol. 20, No. 4, pp.387-408.

Pietrobelli, C. and Rabellotti, R. (2011), "Global Value Chains Meet Innovation Systems: Are There Learning Opportunities for Developing Countries?", *World Development,* Vol. 39, No. 7, pp.1261-1269.

Polanyi, M. (1967), *The tacit dimension,* Doubleday, Garden City, N. Y.

Porter, M.E. (1990), *The Competitive Advantage of Nations,* Free Press,

Sacchetti, S. and Sugden, R. (2003), "The Governance of Networks and Economic Power: The Nature and Impact of Subcontracting Relationships", *Journal of Economic Surveys,* Vol. 17, No. 5, pp.669–692.

10 Appendix

Questionnaire (translated and renumbered)

1. *Companies' export share:.....%*

2. *Companies' purchase of goods and services:*
   a. *From companies in Møre and Romsdal: _____%*
   b. *From other companies in Norway _____%*
   c. *From companies outside of Norway: _____%*

3. *Have your company in the last 15 years chosen to source out activities to foreign countries that previously was carried out in the company?*

☐ No

☐ Yes, to foreign subsidiaries/departments in the company/group

☐ Yes to foreign companies outside of the company/group

☐ Yes, both to foreign subsidiary/department and to other foreign independent companies.

   a. *If yes, what was the reason(s) for moving activities abroad?*

	Not important 1	2	3	4	Very important 5
a. Reduced labor costs	☐	☐	☐	☐	☐
b. Reduced material costs	☐	☐	☐	☐	☐
c. Product quality	☐	☐	☐	☐	☐
d. Access to competence/knowledge	☐	☐	☐	☐	☐
f. Access to labor	☐	☐	☐	☐	☐
g. Access to markets	☐	☐	☐	☐	☐
h. Other (indicate) ……..	☐	☐	☐	☐	☐

4. *Does the company have ownership in foreign companies?* ☐ *Yes* ☐ *No*

5. *If yes, number of companies:……..*

6. *If yes, which countries? ……..*

7. *What activities have your company outside of Norway? (Several answers are possible)*
   a) Marketing and sales ☐
   b) Production of equipment ☐
   c) Production of steel constructions ☐
   d) Production of complete vessels ☐
   e) Ship design ☐
   f) Engineering ☐
   g) R & D ☐
   h) Shipping ☐
   i) Management of foreign staff (crew) ☐
   j) Other (indicate)…….. ☐

8. *Indicate to what extent the following statements describe knowledge that is important for your company:*

	Totally disagree 1	2	3	4	Strongly agree 5	No meaning
a. The knowledge is possible to write down in procedures and manuals	☐	☐	☐	☐	☐	☐
b. The knowledge can only be learnt by working together with others	☐	☐	☐	☐	☐	☐
c. The knowledge requires little formal education in order to apply	☐	☐	☐	☐	☐	☐
d. The knowledge is related to working experience	☐	☐	☐	☐	☐	☐
e. The knowledge is a combination of practical experience and formal technical education	☐	☐	☐	☐	☐	☐
f. The knowledge is a combination of practical experience and formal administrative/economical education	☐	☐	☐	☐	☐	☐
g. Other (indicate)…….	☐	☐	☐	☐	☐	☐

9. What arenas are important or you companies' knowledge acquisition?

	Not important 1	2	3	4	Very important 5	No meaning
a. The relationship between supplier and customer regionally	☐	☐	☐	☐	☐	☐
b. The relationship between supplier and customer internationally	☐	☐	☐	☐	☐	☐
c. From foreign subsidiary	☐	☐	☐	☐	☐	☐
d. From foreign parent company	☐	☐	☐	☐	☐	☐
e. R & D institutions in the county	☐	☐	☐	☐	☐	☐
f. Informal meeting placed in the region (county)	☐	☐	☐	☐	☐	☐
g. New employees from the region	☐	☐	☐	☐	☐	☐
h. New employees from outside the region	☐	☐	☐	☐	☐	☐
i. International cooperating partners	☐	☐	☐	☐	☐	☐
j. Sales agents on foreign assignment	☐	☐	☐	☐	☐	☐
k. Operators on foreign assignment	☐	☐	☐	☐	☐	☐
l. Manger's travelling	☐	☐	☐	☐	☐	☐
m. Employees' personal network	☐	☐	☐	☐	☐	☐
n. Managers' personal network	☐	☐	☐	☐	☐	☐
o. Other (indicate)…….	☐	☐	☐	☐	☐	☐

10. What type of knowledge is acquired from foreign companies?

	Not important/ irrelevant 1	2	3	4	Very important 5	Do not know
a. Knowledge related to production processes	☐	☐	☐	☐	☐	☐
b. Knowledge related to design of vessels	☐	☐	☐	☐	☐	☐

c. Knowledge related to further development of ship equipment	☐	☐	☐	☐	☐	☐
d. Knowledge related to use of vessel/equipment	☐	☐	☐	☐	☐	☐
e. Knowledge related to local culture of international cooperating partners	☐	☐	☐	☐	☐	☐
f. Knowledge related to project management	☐	☐	☐	☐	☐	☐
g. Knowledge related to economy/administration	☐	☐	☐	☐	☐	☐
h. New science based knowledge within shipbuilding/equipment	☐	☐	☐	☐	☐	☐
i. Market knowledge	☐	☐	☐	☐	☐	☐
j. Knowledge concerning legal and political aspects	☐	☐	☐	☐	☐	☐
k. Other (indicate)…….	☐	☐	☐	☐	☐	☐

11. What type of knowledge is acquired from actors in the region (county of Møre and Romsdal)?

	Ikke viktig/ irrelevant 1	2	3	4	Svært viktig 5	Vet ikke
a. Knowledge related to production processes	☐	☐	☐	☐	☐	☐
b. Knowledge related to design of vessels	☐	☐	☐	☐	☐	☐
c. Knowledge related to further development of ship equipment	☐	☐	☐	☐	☐	☐
d. Knowledge related to use of vessel/equipment	☐	☐	☐	☐	☐	☐
e. Knowledge related to local culture of international cooperating partners	☐	☐	☐	☐	☐	☐
f. Knowledge related to project management	☐	☐	☐	☐	☐	☐
g. Knowledge related to economy/administration	☐	☐	☐	☐	☐	☐
h. New science based knowledge within shipbuilding/equipment	☐	☐	☐	☐	☐	☐
i. Market knowledge	☐	☐	☐	☐	☐	☐
j. Knowledge concerning legal and political aspects	☐	☐	☐	☐	☐	☐

k. Other (indicate)…….	☐	☐	☐	☐	☐	☐

*12. To what extent do you agree to the following statements regarding the companies' relationship with **regional customers**:*

	Totally disagree 1	2	3	4	Strongly agree 5	No meaning
a. It is important with a complete agreement as possible in the relationship with our regional customers.	☐	☐	☐	☐	☐	☐
b. There are several aspects concerning the relationship with regional customers that are not regulated through agreements.	☐	☐	☐	☐	☐	☐
c. The contact with our regional customers has increased in scope the last years.	☐	☐	☐	☐	☐	☐
d. It is very important with long-term relations with our regional customers.	☐	☐	☐	☐	☐	☐
e. The company has done investments in competence in order to adapt to a larger regional customer.	☐	☐	☐	☐	☐	☐
f. The company has done investments in equipment in order to adapt to a larger regional customer.	☐	☐	☐	☐	☐	☐
g. Our deliveries to our regional customers require close interaction between the parties	☐	☐	☐	☐	☐	☐
h. Our relationship to regional customers is based on mutual trust.	☐	☐	☐	☐	☐	☐
i. The importance of personal relations to our regional customers has been reduced the last years	☐	☐	☐	☐	☐	☐

*13. To what extent do you agree to the following statements regarding the companies' relationship with **foreign customers**:*

	Totally disagree 1	2	3	4	Strongly agree 5	No meaning
a. It is important with a complete agreement as possible in the relationship with our foreign customers.	☐	☐	☐	☐	☐	☐

b. There are several aspects concerning the relationship with foreign customers that are not regulated through agreements.	☐	☐	☐	☐	☐	☐
c. The contact with our foreign customers has increased in scope the last years.	☐	☐	☐	☐	☐	☐
d. It is very important with long-term relations with our foreign customers.	☐	☐	☐	☐	☐	☐
e. The company has done investments in competence in order to adapt to a larger foreign customer.	☐	☐	☐	☐	☐	☐
f. The company has done investments in equipment in order to adapt to a larger foreign customer.	☐	☐	☐	☐	☐	☐
g. Our deliveries to our foreign customers require close interaction between the parties	☐	☐	☐	☐	☐	☐
h. Our relationship to foreign customers is based on mutual trust.	☐	☐	☐	☐	☐	☐
i. The importance of personal relations to our foreign customers has been reduced the last years	☐	☐	☐	☐	☐	☐

14. To what extent do you agree to the following statements regarding the companies' relationship with ***regional suppliers****:*

	Totally disagree 1	2	3	4	Strongly agree 5	No meaning
a. It is important with a complete agreement as possible in the relationship with our regional suppliers.	☐	☐	☐	☐	☐	☐
b. There are several aspects concerning the relationship with regional suppliers that are not regulated through agreements.	☐	☐	☐	☐	☐	☐
c. The contact with our regional suppliers has increased in scope the last years.	☐	☐	☐	☐	☐	☐
d. It is very important with long-term relations with our regional suppliers.	☐	☐	☐	☐	☐	☐
e. Our deliveries to our regional suppliers require close interaction between the parties	☐	☐	☐	☐	☐	☐
f. Our relationship to regional suppliers is based on mutual trust.	☐	☐	☐	☐	☐	☐

g. The importance of personal relations to our regional suppliers has been reduced the last years	☐	☐	☐	☐	☐	☐

*15. To what extent do you agree to the following statements regarding the companies' relationship with **foreign suppliers**:*

	Totally disagree 1	2	3	4	Strongly agree 5	No meaning
a. It is important with a complete agreement as possible in the relationship with our foreign suppliers.	☐	☐	☐	☐	☐	☐
b. There are several aspects concerning the relationship with foreign suppliers that are not regulated through agreements.	☐	☐	☐	☐	☐	☐
c. The contact with our foreign suppliers has increased in scope the last years.	☐	☐	☐	☐	☐	☐
d. It is very important with long-term relations with our foreign suppliers.	☐	☐	☐	☐	☐	☐
e. Our deliveries to our foreign suppliers require close interaction between the parties	☐	☐	☐	☐	☐	☐
f. Our relationship to foreign suppliers is based on mutual trust.	☐	☐	☐	☐	☐	☐
g. The importance of personal relations to our foreign suppliers has been reduced the last years	☐	☐	☐	☐	☐	☐

Høgskolen i Molde
PO.Box 2110
N-6402 Molde
Norway
Tel.: +47 71 21 40 00
Fax: +47 71 21 41 00
post@himolde.no
www.himolde.no

Møreforsking Molde AS
Britvegen 4
N-6411 MOLDE
Norway
Tel.: +47 71 21 42 90
Fax: +47 71 21 42 99
mfm@himolde.no
www.mfm.no