Social capital and knowledge sharing in a maritime cluster

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Abstract

Title: Social capital and knowledge sharing advantages in a maritime cluster
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Theoretical foundation
Social capital theory is a label for diverse theories that share a focus on social relation as a source that can provide benefits to individuals or communities/regions. Within social capital theory there are different perspectives on social capital (Julien 2015). These perspectives differ with respect to the precise definition of social capital, the way in which social capital manifest itself within a community and the role that social capital plays in communities and for individuals. The communitarian perspective of social capital (Woolcock and Narayan 2000) focus on homogeneity between actors within a community where collective membership supports both individual and collective benefits, and the network view (Woolcock and Narayan 2000) focus the heterogeneity between actors in their position within a network of ties between actors. I will use the network perspective and use the definition and dimension proposed by Nahapiet and Ghoshal (1998).

Research gap
Ship-owners, shipyards and ship technology suppliers in western Norway specializing in developing and operation of tailored vessels for the oil and gas industry is described as a typical and complete cluster (Reve and Sasson 2012). Positive externalities of firms within clusters and industrial districts are well documented in the literature (Porter 1998, Molina-Morales and Martinez-Fernandez 2006). Cluster literature has increased its focus on externalities from social and relational resources (Molina-Morales and Martinez-Fernandez 2006). This calls for studies which targets social capitals contribution to positive externalities for cluster firms. Based on Nahapiet and Ghoshal (1998)’s definition of social capital and their conceptualization of social capital in a structural, relational and cognitive dimension I suggest measures of social capital drawn from the literature with specific relevance for a technological cluster. These measures and their use in the literature will provide a theoretical foundation for how social capital has been showed to contribute to knowledge sharing and innovation.

RQ: How does social capital contribute to performance in innovative shipbuilding within a cluster?

Theoretical arguments
My working hypothesis is that ship-owners within the cluster decides to locate its highly innovative
shipbuilding projects locally because of benefits obtained from social capital. Below I suggest three different causal relations between social capital and location of shipbuilding projects who can explain the observed pattern. (1) Social capital as an antecedent who have contributed to development of better solutions from cluster firms and contributed to competitive advantage for these firms. Clustering of such firms if they only operate within a cluster will contribute to comparative advantage at the cluster level. (2) Social capital as a knowledge sharing advantage in new projects, which reduces collaboration costs and improves innovation capabilities. (3) Social capital as a switching cost. Social capital takes time to develop and leaving a cluster network may therefore cause a reduction in social capital and advantages drawn from it.

Method

Literature review of social capital in general and social capital in combination with knowledge sharing and innovation in inter-firm relations. Document analysis of annual reports, cluster reports and statistics describing the local maritime cluster. Norwegian ship-owners fleet and location of system integrating yard from ship-owners, shipyards and naval architects web pages.

Results

Data for 450 Norwegian owned offshore support vessels show a pattern where the most diversified and novel prototypes are built within the local maritime cluster and less diversified more standardized vessels are built outside the local maritime cluster. Social capital as an antecedent for competitive advantage for individual firms supplying ship technology is a possible explanation, and several firms within the cluster are technology leaders with a dominant market position within their niches. This may still not be a god argument for locating shipbuilding projects within the cluster, since previously developed products, tend to, be offered, at any location. Social capital as a knowledge sharing advantage may have a positive effect on location of new projects within a cluster for cluster located ship-owners. If this solution has comparative advantages to ship-owner-location configurations outside this cluster, the cluster located ship-owners will have a competitive advantage to external ship-owners. The success of the Norwegian ship-owners operating innovative service vessels in the in the years before 2014 indicated that this was the case, and is more in line with alternative (2) than alternative (3) above.


SOCIAL CAPITAL AND KNOWLEDGE SHARING ADVANTAGES IN A MARITIME CLUSTER
Abstract
Social capital theory suggests that benefits from social capital may have a positive influence on knowledge sharing and innovation. Norwegian ship-owners decisions on building location for 456 shipbuilding projects show patterns which can be explained by high levels of social capital in the local maritime cluster. Data both shows a significant association between ship-owners cluster location and location of shipbuilding projects and project novelty and cluster location where high novelty projects are systematically located within the local maritime cluster. The author discusses three different causal relations between social capital and location of shipbuilding projects who can explain the observed pattern and the author suggests a causal explanation of social capital as a knowledge sharing advantage for non-cluster located Norwegian ship-owners tendency to locate novel projects within the cluster and more standardized projects abroad. For cluster located ship-owners tendency to locate both novel and more standardized projects locally, switching costs, is an alternative explanation for the observed pattern.

Introduction
Social capital theory is a label for diverse theories that share a focus on social relation as a source that can provide benefits to individuals or communities/regions. Within social capital theory there are different perspectives on social capital (Julien 2015). These perspectives differ with respect to the precise definition of social capital, the way in which social capital manifest itself within a community and the role that social capital plays in communities and for individuals. The communitarian perspective of social capital (Woolcock and Narayan 2000) focus on homogeneity between actors within a community where collective membership supports both individual and collective benefits, and the network view (Woolcock and Narayan 2000) focus the heterogeneity between actors in their position within a network of ties between actors.

Ship-owners, shipyards and ship technology suppliers in western Norway specializing in developing and operation of tailored vessels for the oil and gas industry is described as a typical and complete cluster (Reve and Sasson 2012). Positive externalities of firms within clusters and industrial districts are well documented in the literature (Porter 1998, Molina-Morales and Martinez-Fernandez 2006). Cluster literature has changed and increased its focus on externalities from social and relational resources (Molina-Morales and Martinez-Fernandez 2006). This calls for studies which targets social capitals contribution to positive externalities for cluster firms. Based on Nahapiet and Ghoshal (1998)’s definition of social capital and their conceptualization of social capital in a structural, relational and cognitive dimension I will describe and explain social capital within a context of a maritime cluster and consider how social capital can contribute to knowledge sharing and innovation.

RQ: How does social capital contribute to performance in innovative shipbuilding within a cluster?
I suggest three different causal relations between social capital and location of shipbuilding projects who can explain observed location patterns for Norwegian ship-owners. (1) Social capital as an antecedent who have contributed to development of better solutions from cluster firms and contributed to competitive advantage for these firms. Clustering of such firms if they only operate within a cluster will contribute to comparative advantage at the cluster level. (2) Social capital as a knowledge sharing advantage in new projects, which reduces collaboration costs and improves innovation capabilities. (3) Social capital as a switching cost. Social capital takes time to develop and leaving a cluster network may therefore cause a reduction in social capital and advantages drawn from it.

The next gives a short presentation of literature on clusters, innovation, network and knowledge transfer which I think have some intersection or overlap with social capital. The following sections provide a literature review of social capital, a presentation of the specific context, data, and finally a discussion with conclusions.

**Clusters, innovation, network theory and knowledge transfer**

*Clusters*

Porter defines clusters as: “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate.” (Porter 2000, p.15). This definition are broader than traditional industrial sectors by including interconnected companies from related sectors and institutions. Value systems of suppliers and buyers and common knowledge bases are keys to identify boundaries of clusters (Porter 2000).

Clusters contributes to unusual competitive success in particular business areas (Porter 2000). Clusters has provided important insights in the microeconomics of competition and the role of location in competitive advantage. Increasing globalization has changed the focus from logistics related advantages related to inputs from suppliers and output to customers into knowledge sharing advantages of clusters. (Porter 2000).

In traditional economic theory, production cost minimisation is the core of competition and comparative advantages of factors of production became decisive for competitive advantage. In the strategy field, competition is dynamic and dependent on innovation and strategic difference. (Porter 2000). “Close linkages with buyers, suppliers, and other institutions are important, not only to efficiency but also to the rate of improvement and innovation. Location affects competitive advantage through its influence on productivity and especially on productivity growth. Generic factor inputs themselves usually are abundant and readily accessed. Prosperity depends on the productivity with which factors are used and upgraded in a particular location.” (p.19)
Rivalry between competing firms is important and this rivalry has to shift from low wages to low total cost and differentiation based on high investments in skills and technology to be able to move from a low productivity to an advanced economy (Porter 2000).

According to Porter (2000) cluster advantages depends on: “personal relationships, face to face communication, and networks of individuals and institutions that interact.” (p.21) and “proximity, supply and technological linkages, and the repeated personal relationships and community ties fostering trust facilitates the information flow within clusters.” (p. 22) Molina-Morales and Martinez-Fernandez (2006), describes industrial districts as physical and relational space where externalities for firms are present, and their concept has similarities with Porters definition of clusters.

The relevance of geographical concentration has changed its role due to globalization. Firms opens up and interacts with distant markets and resources in combination with exploitation of advantages of local factors (Molina-Morales and Martinez-Fernandez 2006). “Previously located factors of production becomes globally available and, in consequence, they cannot be considered as the base of local competitive advantage. However, the pattern of specialization is remarkably stable.” (p. 506). (Maskell et al, 1998). Maskell and Malmberg, 1999 focus on Proximity as a factor contributing to tacit knowledge exchange, learning and innovation is then becoming the new explanation of clustered specialization advantages (Molina-Morales and Martinez-Fernandez 2006, Maskell 1998, Maskell and Malmberg 1999).

**Innovation**

Fagerberg et al. (2005) makes a distinction between invention and innovation: “Invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice.”

Crossan and Apaydin (2010), proposed a definition of innovation as: “production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome.” (Crossan and Apaydin 2010, p.1155). Scumpeter distinguished five types of innovation; new products, new methods of production, new sources of supply, exploitation of new markets, and new ways to organize business (Fagerberg et al. 2005).

Kline and Rosenberg (2010), introduced and criticized the linear model of innovation. In the linear model, innovation takes place in well-defined successive stages where scientific developments succeed development, production and marketing. Most innovation does not follow this pattern. Firms innovate because they see a commercial need, which they might meet by new combinations of existing knowledge. In many settings, the experience of users, not science are the most important source of innovation (Hippel 1988, von Hippel 1998). Innovation usually includes feedbacks and loops backwards from each stage in the linear
model making the process far from linear and even challenging the idea that innovation starts with new scientific knowledge (Kline and Rosenberg 2010).

The growing complexity of the knowledge bases necessary for innovation increases the importance of external or inter-firm sources for innovation activity and the capacity for absorbing knowledge from outside the firm is important for innovative firms (Fagerberg et al. 2005). Pavitt (1984), introduced a taxonomy separating two high tech sectors; ‘science based’ and ‘specialized suppliers’. The first where characterized by high levels of formal R&D and strong links to scientific knowledge where the second where characterized by capabilities of engineering and close interaction with users. The factors leading to innovation differs strongly between these two sectors (Pavitt 1984).

Lazonick (2005), focus learning as a core activity for innovative firms: “By definition, innovation requires learning about how to transform technologies and access markets in ways that generate higher quality, lower cost products. Learning is a social activity that renders the innovation process uncertain, cumulative, and collective (O’Sullivan 2000b).” (p. 30)

Schumpeter (1934) focused innovation as the result of an extraordinary individual causing disruptions among cost competing firms and saw this process as driving economic development. (Lazonick 2005). Later works focus’ advantages, in coordinating innovation activities (Penrose 1995) and accumulating organizational capabilities (Kogut and Zander 1996, Teece, Pisano, and Shuen 1997, Lazonick 2005).

Networks of innovators

During the 1990’s there where an increased reliance on external sources of R&D, notably universities, consortia and government labs, and greater collaboration with domestic and foreign competitors, and customers, in the development of new products and processes (Powell and Grodal 2005, Mowery 1989).

Powell and Grodal (2005) review empirical studies regarding contribution of networks to the innovative output of firms and looks at how the codification of knowledge influence what is transmitted through networks, and how different types of organizations promotes innovation from participation in networks.

“For organizations in rapidly developing fields, heterogeneity in the portfolio of collaborators allows firms to learn from a wide stock of knowledge. Organizations with broader networks are exposed to more experiences, different competencies, and added opportunities. (Beckman and Haunschild, 2002). Such access create as an environment in which “creative abrasion”, the synthesis that is developed from multiple points of view, is more likely to occur. In this view, “innovation occurs at the boundaries between mind sets, not within the provincial territory of one knowledge and skill base” (Leonard-Barton, 1995, p. 62)” (Powell and Grodal 2005, p.59)
Network theory has provided distinctions between dense networks with high levels of trust, and weak-tie networks that provide access to novel, non-redundant information useful in understanding the innovation process (Powell and Grodal 2005). Strong relationship tend to include stronger commitment, which leads to more knowledge sharing. “Parties that develop a broader bandwidth for communication are, in turn, more capable of transferring complex knowledge.” (Powell and Grodal 2005, p.60). A strong interpersonal tie is a person with whom you interact frequently, while a weak tie is “an acquaintance, or a friend of a friend” (Granovetter 1973). Strong ties based on common interests, does not primarily contribute with new information, but reinforces or increases the depth of existing views and knowledge. Weak ties have a longer reach and are more likely to introduce novelty and different ideas. (Powell and Grodal 2005)

Prior interaction between network actors, are thought, to influence innovation, which points to the relevance of relation attributes that takes time to develop such as trust and cognitive understandings (Powell and Grodal 2005). “A key advantage of close-knit networks may be due to their superior ability to transfer tacit knowledge (Van Wijk, Van den Bosch, and Volberda, 2003). In an analysis of the exchange of information across project teams in a large multinational computer company, Hansen (1999) also illustrated that complex knowledge is transferred most easily through tightly knit networks.” (Powell and Grodal 2005, p. 66) Powell and Grodal (2005) differentiate four types of networks based on duration and forms of governance; informal networks based on shared experience; temporary project networks formed to perform specific tasks; regional networks where spatial and knowledge agglomeration helps sustain a common community; and business networks based on strategic alliances. They argue that these dimensions are not mutually exclusive, and primarily provides a framework to position networks with respect to all four dimensions. (Powell and Grodal 2005)

Knowledge
Knowledge transfer is central to the innovation process. Two different ways of knowledge-transfer influencing innovation is common in the literature. Knowledge as a complementary asset where collaborating actors have complementary capabilities which together improves the outcome from co-production compared to doing it alone (Mowery, Oxley, and Silverman 1996). Another way of knowledge sharing is, when existing information from different actors is recombined in novel ways. Novelty can be an unanticipated result of reconfiguration existing knowledge and solutions to solve new problems. (Powell and Grodal 2005)

Explicit or codified knowledge is easy to transfer and tend to be universally available at a low cost (Boisot, Han, and MacMillan 2007). Tacit knowledge on the other hand is hard to codify and thereby demands other procedures to learn. Tacit knowledge demands more trial and error learning or learning by using to be able to combine knowledge in new settings. Knowledge can be so ‘sticky’ (von Hippel 1998) that knowledge will not be accessible at an acceptable cost. (Powell and Grodal 2005)
The ability to exchange tacit knowledge is higher for long lived alliances than for short run alliances (Simonin 1999). “Older alliances develop a common language and shared mental models between partners, suggesting a learning curve within alliances where the negative effects of lack of experience and knowledge complexity subside as the alliance matures. Thus as an alliance ages and participation develop relations-specific understanding, there is the opportunity to convey more subtle forms of information more effectively. Complex tacit knowledge can become more explicit as partners develop a wider bandwidth of communication.” (Powell and Grodal 2005, p.75).

Social capital

Social capital is a widely used concept in many different types of analysis. The literature on social capital agrees on the core idea of relations as a source that may provide benefits, but there are many different definitions in the literature. From its inception as a concept in the 80-ties it has developed into a large field of causal theories today.

In 2002 Adler and Kwon described social capital as an umbrella concept being in an emergent excitement. (Adler and Kwon 2002), while Woolcock eight years later described it as largely routinized. (Seok-Woo and Adler 2014, Woolcock 2010). “Our overall assessment is that social capital has matured- from a concept into a whole field of research.” (Seok-Woo and Adler 2014, p.412)

Authors has applied the concept of social capital in a multitude of different research fields including management, sociology, political science, economics, psychology, educational and health studies. The literature on social capital agrees on the significance of relationships as a source of social action but there is no consensus about the precise definition of social capital (Nahapiet and Ghoshal 1998) Adler and Kwon, 2002; 2014).

Social capital has its base in sociology and the theories of social capital can be rooted back to two different “schools of thought” within sociology; critical theory and functionalist theory. Pierre Bordieu is part of the critical theory school and his contributions to social capital is associated with this view while most of the American sociologists working on social capital is part of the functionalist theory stream.

Critical theory

Critical theory is based, in a Western European Marxist tradition known as the Frankfurt school where Horkheimer made a significant contribution with his 1937 essay *Traditional and Critical Theory*. Critical theory is aiming at changing the society in contrast to traditional theory aiming at understanding and explaining the world. A critical theory seeks human emancipation. Max Horkheimer described a theory as critical insofar as it seeks "to liberate human beings from the circumstances that enslave them. (Horkheimer 1982, p. 244). In the
critical theory tradition social capital is seen as an exclusive class good. (Bordieu, 1986, Julien, 2014).

*Functionalist theory*

Functionalist theory is another major theoretical perspective in sociology with origins in works of Durkheim. According to functionalist theory, society is composed of social institutions performing ‘functions’ for the sake of the whole society. The whole society is like and organism where different organs contributes to a larger whole and develops to fulfill the needs of the overall system. (Crossman 2017)

Woolcock and Narayan categorized social capital in four sub-streams; communitarianism, the network view, institutional view and the synergy view. (Woolcock and Narayan 2000)

*Communitarianism*

The communitarian view looks at how certain groups develop social capital as a collective asset (Lin, 1999) and holds that its effects are solely positive for a community. (Julien, 2014)

The *American Communitarian* tradition is part of a functionalist theoretic tradition, described as an integrative or Durkheimian view of social relations. (Lin, 1999, 2001, Julien, 2014). American communitarianism is rooted in works of Granovetter (1973) and Coleman (1988). American Communitarianism sees social capital as a public good and not as a class good. By imposing this perspective the elements of exclusion, distinction and restriction to access are overlooked (Julien, 2014). American Communitarianism focus’ the role of shared knowledge, norms and values for civic engagement and community prosperity. A community focus has led to the focus on social capital as a public good. “As a public good, social capital depends on the good will of specific individuals who invest in and sustain the collective resources. Therefore norms, shared values and trust are necessary in sustaining social capital.” (Julien, 2014, p.357)

Coleman contributed to American Communitarianism by (1) his focus on social capital as a public good\(^1\), which contributes to human capital, (2) the norm of the selflessness of the individual for the sake of the collectivity, and (3) the potential for information sharing that resides in social relations. (Coleman, 1998, 1990, Julien, 2014).

\(^1\) Public goods in economics are non-rivalrous and non-excludable. Non-rivalrous implies that one person’s consumption does not reduce the benefit of another’s consumption and non-excludable implies that when one person consumes, it is impossible to prevent another consuming too. This strict definition is sometimes relaxed when using the concept in philosophical and political science, more like public interest and common good where a public good is present when collective public value exceeds the sum of individual costs. (Morell 2009)
Loury (1997), used the idea of social capital, in differential access to opportunities through social connections for minority and non-majority youths. This conceptualization differs from Bourdieu’s individualistic model, and has more in common with Coleman’s communitarian view, although it provides a highly exclusive access to social capital like Bourdieu’s conceptualization. Coleman built on Loury in a more refined analysis of the same process.

“For example, the possibility of malfeasance within the tightly knit community of Jewish diamond traders in New York City is minimized by the dense ties among its members and the ready threat of ostracism against violators. The existence of such a strong norm is then appropriable by all members of the community, facilitating transactions without recourse to cumbersome legal contracts. (Coleman 1988a:S99)” (Portes, 1998, p.6)

The need for closure or density versus sparse networks and structural characteristics is another controversy regarding social capital. Bourdieu saw social capital as part of a class structure where the basic distinction where between insiders and outsiders, with closure or closed borders between the classes. Bourdieu focus was on similarities between members of a group and did not focus difference between positions within a group. (Bourdieu 1986) Coleman, although not based in a class model of society also focused closure as a distinctive prerequisite for social capital. (Coleman, 1990)

Bourdieu, Loury and Coleman analysis of social capital is grounded on relationships between an individual actor and a group, and the focus has been on potential benefit accruing to their membership in social structures. Putnam went above this restriction and introduced social capital as a concept describing civickness in communities such as towns, cities or countries. Putnam sees social capital as a feature of the collective of social organizations and not individual members of social organizations. (Portes, 1998)

“Putnam describes social capital as the networks, norms, and trust that exist in a social organization that enable coordination and cooperation toward shared objectives.” (Julien, 2014) (Putnam 1993, 1995). Working together is easier in societies with a large stock of social capital, and this is enabled through better coordination of human and physical capital that a community possess. Putnam does not see social capital as a private property of any individual, but rather as a collective, public good.

The American Communitarian conception of social capital in the way it is used by Putnam, is criticized for its inability to distinguish and identify the resources or benefits obtained through social capital from the ability to obtain or enact them. (Portes, 1998, Woolcock, 1998).

The network view
While the communitarian view focus’ homogeneity between actors within a community where collective membership supports both individual and collective benefits, the network...
view focus the heterogeneity between actors in their position within a network of ties between actors. (Julien, 2015) The network view accepts the collective sources from within community civic activity, but also focus external ties to actors outside of the community. (Woolcock and Narayan 2000) (Burt 1993)

Granovetter made an early contribution to this view in his *The strength of weak ties* (Granovetter, 1973). Burt took this forward when he later introduced bridges and structural holes (Granovetter, 1973; Burt, 1992; Lin, 1999).

Granovetter defined boundary spanning ties, as ties *bridging* out of a community and upheld such ties role in information dispersion to a wider community. These ties where analyzed and compared with bonding ties, described as internal ties within closed communities. (Julien, 2014)

Whereas Coleman and Loury focuses dense networks and closure, Burt describes parts of a structure with relative absence of ties labeled “structural holes”. (Burt, 1992, Portes 1998). Structural holes provides the opportunity for actors to obtain a strategic position in a network structure by being the only link between weakly related or unrelated parts of an overall structure.

Another stream of work is related to potential and mobilized social ties, and focus on the distinction between having social ties and using them. Researchers have examined different factors influencing when potential ties are used. Higher density networks increases the likelihood of using ties. (Hurlbert, Haines and Beggs; Kwon and Adler, 2014). Distance and physical space has increased attention in the network literature. (Adams, Faust and Lovasi, 2012). Actors located close to each other, and having the opportunity to frequent face to face contact are more likely to interact which is shown to increases the ability to innovate in R&D laboratories. (Allen, 1977; Kwon and Adler, 2014).

*Institutional view*
In the institutional view, vitality of community networks and civil society is seen as a product of institutional environment including political and legal institutions (Woolcock and Narayan 2000). Authors using this view sees social capital as dependent of institutional environment and the capacity of social groups to act in a collective interest depends on the formal institutions (North, 1990). Knack and Keefer (1997), used this approach to study how government performance and social division effected economic performance in different countries.

*Synergy view*
Some writers also focus a synergy view, which combines the network and institutional view. Evans (1992, 1995, 1996), concludes that synergy between government and citizen action is based on complementarity and embeddedness. Complementarity relates to mutually
supportive relations between public and private actors. Embeddedness refers to the structure and nature of ties connecting citizens and public officials. (Woolcock and Narayan 2000),

Motivation and trust
Recipients in transactions mediated by social capital is motivated by the immediate benefits of social capital, but what is motivating the donors of social capital in the absence of immediate and certain returns? The existence of ties does not alone explain why donors will contribute.

Explicit consideration of motivation is in contrast with theoretical perspectives of formalistic network sociology who posits motivation as an effect of network structure (Burt, 1992) and rational actor perspective where actors are motivated by self-interest only.

The idea that motivation was a separate source of social capital and not merely a contingency factor is supported in Putnam’s (1993) where norms and trust where included in social capital. There are ambiguity in the literature about what it is with shared norms that enables social capital. Putnam appears to focus norms whose content is close to trust and trustworthiness (Adler and Kwon, 2002).


Negative consequences of social capital
Social capital can have less desirable consequences. Portes describes four possible negative consequences of social capital: “exclusions of outsiders, excess claims on group members, restrictions on individual freedoms, and downward levelling norms.” (Portes, 1998, p. 15). Exclusion of outsiders is a two-sided sward. The positive effect for community members, implicitly discriminates outsiders from the same benefits. Excess claims on group members will be the case if solidarity is so strong that entrepreneurial success does not favour the entrepreneur due to obligations of redistribution from other community members causing a lack of incentives and free rider challenges. Restrictions on individual freedom is the traditional dilemma between individual freedom and solidarity or tradition. Downward levelling norms is when community norms is in conflict with wider community norms and therefore counterproductive and not to the best interest of individual community members. (Portes, 1998)

Individual and collective levels of analysis
Bourdieu (1983, 1986) and Coleman (1998, 1990) have discussed the individual versus the collective view in detail and Putnam (1993, 1995) has used the collective view in empirical work at society level.

Most scholars agree that social capital is both an individual and a collective good since it may benefit both individuals and groups. This causes some methodological challenges if collective goods like trust, culture and norms are defined as social capital. Such civic qualities may then be part of both social capital itself and positive outcomes of social capital and cause tautological challenges. (Lin, 1999).

This controversy is present in Coleman’s remark that “social capital is defined by its function”. Coleman, 1990, p. 302. Which some critics take for a pure tautology, where social capital exists when and if it works. (Lin, 1999; Portes, 1998) “Equating social capital with the resources acquired through it can easily lead to tautological statements.” (Portes, 1998, p. 5)

**Definition of social capital**
Definitions of social capital vary in what sources they include in the concept. From a narrow definition, including only the network structure (Burt, 1992; Baker, 1990). To a wider definition, including also social relation characteristics of the ties or connections (Laury, 1992; Bourdieu, 1985; Woolcock, 1998; Fukuyama, 1997; Putnam, 1995; Portes, 1998). And the broadest definition, including also potential resources related to actor abilities located in the nodes of a network (Nahapiet and Ghoshal, 1998; Coleman, 1990). (Adler and Kwon, 2002).

Nahapiet and Ghoshal’s working within the field of organizational theory and management proposed the following definition of social capital as: "the sum of the actual and potential resources embedded within, available through, derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network" (1998: 243). Their definition includes all three dimensions of aspects in social capital (structural, relational and cognitive) which, to a large extent, is parallel to the group of sources (opportunity, motivation and ability) defined by Adler and Kwon.

**Dimensions of social capital**
Nahapiet and Ghoshal (1998), categorized facets associated with social capital in three distinct clusters or dimensions; structural, relational and cognitive social capital.

Seok-Woo and Adler (2014), also describes three groups of aspects or facets of social capital; (1) opportunities provided by the network structure of relations, (2) the motivational forces in norms and values contained and shared in social networks, and (3) the relational abilities within the network (Adler and Kwon 2002, Seok-Woo and Adler 2014).
Seok-Woo and Adler (2014), uses the label motivation for a group of aspects of social capital much similar to the relational dimension of Nahapiet and Ghoshal (1998). All four aspects of relational social capital mentioned by Nahapiet and Ghoshal (1998) can be recognized under the category of motivation in Adler and Kwon (2002). In 2014 they mention four sources of motivation for social capital; trust, norms, values and community membership which I consider to have strong similarities to Nahapiet and Ghoshal (1998)’s trust, norm, obligation and identification.

Adler and Kwon (2002), uses ‘abilities’ about social capital “that could be mobilized via their social relations. This description has similarities and differences from Nahapiet and Ghoshal’s cognitive dimension of social capital describes as; “resources providing shared representations, interpretations and systems of meaning.” (p. 244). Adler and Kwon’s description opens for group level resources related to diversification and specialization between members in a group, while Nahapiet and Ghoshal’ relates cognitive social capital to ease of communication due to similarities between group members. Nahapiet and Ghoshal did focus on social capital in an organizational or firm setting, while Adler and Kwon had a general focus.

Using the opportunity, motivation and ability group of sources from Adler and Kwon to categorize aspects of social capital and holding on to the definition of social capital by Nahapiet and Ghoshal categorize the aspects of social capital in the following three dimensions.

**Opportunity (structural social capital)**
The network structure is seen as the only constituent of social capital in the narrow view (Burt, 1992), while it is a necessary part of social capital providing opportunities for benefits in a wider definition which also includes relational aspects of social capital.

Network structure is about the quality of the network ties like their frequency, intensity, multiplexity and configuration. Configuration considers aspects like direct and indirect ties, closeness (Coleman, 1988), bridges and structural holes (Burt, 1992). Indirect ties gives access to your connections connections. (Adler and Kwon, 2002)

Other aspects of social capital that falls into this dimension of social capital is the presence or absence of network ties and their structure in terms of measures like density, connectivity, hierarchy, and appropriability.

**Motivation (relational social capital)**
The term “relational embeddedness” describes personal relationships developed over time based on contacts and experience with each other. (Granovetter, 1992). This concept focus on particular relations such as acquaintance and friendship, that influence behavior. *Relational social capital*, is described as those resources developed through relationships and parallel to behavioral embeddedness and “actor bonds” (La Rocca and Snehota 2014).
Nahapiet and Ghoshal (1998), describes four categories of relational social capital; trust, norms, obligations and identification (Nahapiet and Ghoshal 1998).

Trust might be defined as a belief that “the result of somebody's intended action will be appropriable from our point of view”, (Misztal 2013, p.9). Seminal authors within the field of social capital demonstrates that high trust relationships encourages social exchange and collaboration. (Putnam 1993, Kramer 1999, Glaeser et al. 2000).

Trust has several aspects; belief in the good intent of others, belief in their competence and capability, belief in their reliability, and belief in their perceived openness (Nahapiet and Ghoshal 1998).

“Boisot highlights the importance of interpersonal trust for knowledge creation in contexts of high ambiguity and uncertainty: "When the message is uncodified, trust has to reside in the quality of the personal relationships that bind the parties through shared values and expectations rather than the intrinsic plausibility of the message” (1995: 153).” (Nahapiet and Ghoshal 1998, p.255)

Trust depends on previous experience from interaction and collaboration and motivates further collaboration. Collaboration over time may lead to the development of generalized norms of cooperation, which also strengthen the willingness to interact. (Nahapiet and Ghoshal 1998)

A norm is a principle of right action binding upon the members of a group and serving to guide, control, or regulate proper and acceptable behavior and can contribute to effective exchange and communication (Kramer 1999). Coleman (1990) distinguished obligations from generalized norms, seeing the first as a personal obligation of reciprocity such that favors has to be repaid in one form or the other (Nahapiet and Ghoshal 1998). Identification is a characteristic where individuals see themselves as one with another person or group (Nahapiet and Ghoshal 1998). Identification with a group or collective enhances concern for collective processes and outcomes (Kramer 1999). Identification acts as a resource influencing the anticipation of value resulting from exchange and the motivation to contribute to group outcomes.

Ability (cognitive social capital)

Nahapiet and Ghoshal (1998), argues for a third dimension of social capital in addition to the structural and relational dimension.

“The third dimension of social capital, which we label the "cognitive dimension," refers to those resources providing shared representations, interpretations, and systems of meaning among parties (Cicourel, 1973). We have identified this cluster separately because we believe
it represents an important set of assets not yet discussed in the mainstream literature on social capital but the significance of which is receiving substantial attention in the strategy domain (Conner & Prahalad, 1996; Grant, 1996; Kogut & Zander, 1992, 1996). These resources also represent facets of particular importance in the context of our consideration of intellectual capital, including shared language and codes (Arrow, 1974; Cicourel, 1973; Monteverde, 1995) and shared narratives (Orr, 1990).” (Nahapiet and Ghoshal, 1998, p. 244)

Adler and Kwon provides an example of the importance of what they label ability: “The importance of ability in the theory of social capital can be easily understood through an example. If I am a product design engineer, my ties to my manufacturing-engineering colleagues afford me valuable opportunities for getting rapid and reliable advice on the manufacturability of proposed product designs. Clearly, however, even if I have an extensive network of ties with these colleagues, and even if their motivations incline them to help me, these ties are of little use if my colleagues lack the requisite manufacturability assessment expertise.” (Adler and Kwon, 2002, p. 26)

Meaningful communication depends on shared language and vocabulary and through sharing of collective narratives. These aspects of shared cognition “facilitates the creation of intellectual capital especially through their impact on combination capability.” (Nahapiet and Ghoshal 1998, p.253)

Emergence of shared narratives including development of myths, stories and metaphors, also contribute to creation of, exchange of and preservation of rich sets of meaning in communities. “Orr (1990) demonstrates how narrative in the form of stories, full of seemingly insignificant details, facilitates the exchanging of practice and tacit experience between technicians, thereby enabling the discovery and development of improved practice.”

Cognitive social capital is the least developed and most controversial dimension of social capital. The narrow camp excludes it as part of social capital, and sees it as a complementary variable, while the broad camp argues that at narrow definition will loose contact with reality and loose causal power. (Adler and Kwon).

**Context**

The county of Møre and Romsdal enjoys a strategic position close to the North Sea with rich fishing, oil and gas resources, which have contributed to a concentration of maritime industry in the county. Large investments in the oil and gas industry, which enabled the exploitation of oil in deeper waters and harsher weather conditions made way for more expensive and innovative offshore service vessels (OSV’s) in the maritime industry. Sailing officers and crewmembers have interacted with ship owners, shipyards and ship technology suppliers to develop experienced based innovations for high-end offshore vessels. This resulted in great expansion within the whole Norwegian maritime industry. Reve and Sasson (2012), describes the maritime cluster in Møre and Romsdal as one of the most prosperous in Norway during this period. Local ship-
owners suggests that the way companies in the maritime cluster cooperate is contributing to competitive advantage for the local maritime cluster in building the most complex innovative shipbuilding projects.

Since mid-2015, the ship-owners in the offshore segment have found themselves in deep trouble due to overcapacity, and new contracts in this segment are rare. Less activity in the oil and gas industry means that shipyards and suppliers in the shipbuilding value chain must adapt to a new situation by focusing on other segments of shipbuilding such as fisheries, offshore wind and cruising.

The maritime cluster in Møre and Romsdal consists of 215 firms; 19 ship-owners, 14 shipyards, 13 design companies and 169 ship technology suppliers. Together these firms employ about 20,000 workers within a county with a population of about 250,000 and most firms are located in agglomerations within the county where the maritime clustering will be higher (Hervik et al. 2012).

According to the Norwegian Ship-owners association the Norwegian offshore fleet is the worlds second largest and its most modern specializing in deep water operations which demands larger vessels with capabilities to operate in harsh weather conditions. Value creation increased from 8.3 billion NOK in 2004 to 28.8 billion NOK in 2011. More than half of operating revenues is from foreign markets and one of four offshore vessels in Brazil is Norwegian owned.

The cluster has evolved gradually over long time implying that several actors has a long common or related history. A high concentration of actors from one industry within a small community has led to identification implies some collective responsibilities.

Different actors has different roles within the maritime cluster network and different characteristics of their network structure. Ship technology suppliers may choose to operate within rather closed communities with shipyards within the cluster or engage in external ties with world wide customers. Shipyards have both a network of closed ties with suppliers and may have a more open network with design companies and ship owners. Design companies can take the role of brokers or boundary spanners between ship-owners, shipyards and ship technology suppliers. Ship-owners supply offshore services in a global marked with customer ties spanning the boundaries of the local maritime cluster.

Shipbuilding projects
Each shipbuilding project constitutes a temporal project network formally regulated by contracts between customer (ship-owner) and shipyard based on a conceptual design and contract design. Shipyards take the role of system integrator and subcontracts both complex coordination intensive tasks and standard purchases. The temporal limitations of contracts
contributes too frequent renegotiations of contractual relationships, but collaborating firms tend to continue relationship when entering new projects.

Knowledge base
The local maritime cluster has evolved over decades in an environment with many persons and firms involved in activities at sea and the development of new solutions based on their demand for improvements and novel solutions. Today this cluster has a high concentration of persons using equipment, vessels and performing multi-actor operations related to deep-sea oil and gas operations. Firms involved in development and production of tailored solutions for maritime use has evolved and clustered in the area providing a concentration of individuals and firms with engineering and production skills related to this industry. Experience from previous projects has contributed to organizational knowledge useful in multi-firm interaction in new projects.

The local university college is an integrated part of the local maritime cluster. Education and training of deck (navigation) officers and naval architects given at the local campus, has traditionally contributed to strong relations between actors within the local maritime cluster. Training facilities with ship operation simulators where initially used to train future deck officers in navigation of vessels. Simulators is developed further into virtual reality environments where weather conditions, vessel characteristics and bridge control systems are simulated in virtual environments close to real operation conditions. Operators can then train in virtual environments at real operations like installing new seabed oil installations using virtual simulations of vessels and components previously developed or under development. Previously virtual vessels where developed to simulate existing vessels operation in different tasks related to oilfield operations, and where used to train experienced crews in specific demanding operations. This technology has now developed into virtual prototyping where potential users can test conceptual designs in virtual reality, before they decide to build the vessel or develop new ship technology components. Simulation training of crews from oilfield operations in different parts of the world and virtual prototyping of new ideas together with demanding customers has become a core activity within the local maritime cluster who contributes to close interaction with demanding customers both from within and outside of the local maritime cluster.
Data

I have collected data for owner, design company, shipyard, year of build and vessel categories for 456 vessels in the Norwegian owned fleet of offshore vessels. This covers more than 90% of the total stock of Norwegian owned offshore vessels. Ship-owners where identified from the webpages of the Norwegian ship-owning association and the regional maritime cluster organization. Ship-owners fleet of vessels with vessel names and some specifications where available on ship-owners webpages for all vessels. Remaining data where collected from presentations of new-builds in maritime magazine articles covering the baptizing ceremony of new vessels, and vessel lists presenting all previous building projects from shipyards and naval architects.

Table 1 shows a summary of the data for each ship-owner, weather the ship-owner did choose to build in Norway or abroad and three vessel categories; anchor handling tug supply (AHTS), platform support vessel (PSV), and seismic/ subsea vessels.
Table 1 Norwegian owned offshore support vessels

<table>
<thead>
<tr>
<th></th>
<th>AHTS Abroad</th>
<th>AHTS Domestic</th>
<th>PSV Abroad</th>
<th>PSV Domestic</th>
<th>Seismic/Subsea Abroad</th>
<th>Seismic/Subsea Domestic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Sea Supply</td>
<td>10</td>
<td>5</td>
<td>23</td>
<td>2</td>
<td></td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>DOF</td>
<td>13</td>
<td>6</td>
<td>25</td>
<td>5</td>
<td>18</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>Eidesvik Offshore</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farstad</td>
<td>5</td>
<td>27</td>
<td>6</td>
<td>20</td>
<td>4</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>GC Rieber Shipping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Golden Energy</td>
<td></td>
<td></td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Havila Shipping ASA</td>
<td></td>
<td></td>
<td>4</td>
<td>5</td>
<td>12</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>Island Offshore</td>
<td>3</td>
<td></td>
<td>18</td>
<td>1</td>
<td>10</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>Olympic Shipping</td>
<td>4</td>
<td></td>
<td>8</td>
<td></td>
<td>9</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>Rem Offshore ASA</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Sanco Shipping AS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siem Offshore</td>
<td>6</td>
<td></td>
<td>10</td>
<td>2</td>
<td>8</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Simon Møkster</td>
<td>2</td>
<td>5</td>
<td>13</td>
<td></td>
<td>4</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Solstad Offshore</td>
<td>5</td>
<td>14</td>
<td>1</td>
<td>8</td>
<td>2</td>
<td>16</td>
<td>46</td>
</tr>
<tr>
<td>Vestland Offshore</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Viking Supply Ships</td>
<td></td>
<td></td>
<td>4</td>
<td>4</td>
<td>5</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Volstad Maritime</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Østensjø</td>
<td>3</td>
<td></td>
<td>2</td>
<td></td>
<td>3</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41</strong></td>
<td><strong>70</strong></td>
<td><strong>52</strong></td>
<td><strong>152</strong></td>
<td><strong>19</strong></td>
<td><strong>122</strong></td>
<td><strong>456</strong></td>
</tr>
</tbody>
</table>

Supplemental data where collected from document analysis of annual reports and regional cluster reports with statistical descriptions of the local maritime cluster.

**Discussion**

*Location decision*

Ship-owners decide where to locate their shipbuilding projects based on a set of expectations of advantages and disadvantages of suppliers and locations. A rational decision will be based on optimization of project parameters like expected costs, quality, delivery time and uncertainty in these expectations. Social capital is expected to influence the location decision by having an expected positive effect on collaboration, knowledge sharing and innovation. According to social capital theory, the value of these effects will increase when projects include more collaboration, knowledge sharing and innovation like in shipbuilding projects with high degree of novelty.

For a ship-owner located within the maritime cluster social capital from relations to other cluster firms is supposed to be higher than for ship-owners located outside of the cluster.

Social capital theory then prescribes an effect with positive performance effects form social capital and this could make cluster located ship- owners to be more eager to locate
shipbuilding projects within the local maritime cluster than ship-owners located outside the cluster.

Shipbuilding projects involves many inter-firm relations in addition to the relation between ship-owner and system integration yard. The multiple relations between system integration yard and specialized suppliers and social capital in these relations also influences project performance. Norwegian ship-owners located outside of the local maritime cluster, probably have less social capital contained in their relations with cluster companies than cluster located ship-owners, but it might still be sufficient to influence location decisions. Location decisions for Norwegian ship-owners located outside of the maritime cluster is influenced by social capital from their direct ties to cluster companies and expectations of advantages from social capital in cluster internal relations.

Social capital advantages may contribute to compensate local cluster disadvantages like higher hourly wage costs. The social capital advantage is higher in innovative projects demanding development of novel solutions. In such projects, there will be an increasing need for collaboration and knowledge sharing where social capital is useful.

Within this specialized shipbuilding environment there are more or less novel and tailored segments of vessels. Platform supply vessels (PSV’s) has become rather standardized products while Subsea vessels (where the number of functional requirement dimensions that is tailored to customer needs are much higher) hardly has established any standard vessel. Building a subsea vessel therefore usually involves more novelty in modules and overall design. This increases interdependency and need for collaboration in both the planning and building phase of a new project. If social capital is influencing the location decision of new vessels it would be expected that the value appropriated from social capital is higher for subsea vessels than for PSV’s and having a positive effect on locating production in Norway.

During the years from 2010 to 2014, Norwegian ship-owners built 158 new offshore support vessels. There is a significant association between ship-owner location and building location which corresponds to the anticipated effect of social capital on localization decisions mentioned above. Cluster located Norwegian ship-owners built 6 of 61 vessels (9,8 %) abroad and the remaining 90 % in Norway. Ship-owners located in other parts of Norway built 50 of 97 vessels (51,5 %) abroad, and the remaining 48,5 % in Norway. (Table 2)

There is a similar significant association between vessel categories and building location for vessels built by Norwegian ship-owners located outside of the local cluster. From a total of 97 vessels 84 % of AHTS and 52 % of PSV where built abroad while 24 % of Subsea vessels where built abroad. The data gives statistical support of the anticipated positive effect of social capital on locating the most innovative vessel categories within the local maritime cluster.
This data show a pattern in localization decisions where positive effects of an anticipated high level of social capital provides one possible explanation.

Table 2 Norwegian vessels built 2010 - 2014 owned by cluster located ship-owners (M&R), and ship-owners located elsewhere in Norway (other Norwegian), vessel categories, and location of build

<table>
<thead>
<tr>
<th></th>
<th>Abroad</th>
<th>Domestic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M&amp;R</strong></td>
<td>6</td>
<td>55</td>
<td>61</td>
</tr>
<tr>
<td>AHTS</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>PSV</td>
<td>6</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>Seismic</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Subsea</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td><strong>Other Norwegian</strong></td>
<td>50</td>
<td>47</td>
<td>97</td>
</tr>
<tr>
<td>AHTS</td>
<td>18</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>PSV</td>
<td>24</td>
<td>22</td>
<td>46</td>
</tr>
<tr>
<td>Seismic</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Subsea</td>
<td>6</td>
<td>19</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>56</td>
<td>102</td>
<td>158</td>
</tr>
</tbody>
</table>

Note: A Chi square tests rejected both the hypothesis of no significant association between ship-owner location and building location (p<0,001), and the hypothesis of no significant association between vessel category and building location for non-cluster located Norwegian ship-owners (p<0,001).

My working hypothesis is that Norwegian ship-owners decides to locate its highly innovative shipbuilding projects locally because of benefits obtained from social capital.

Standardization reduces uncertainty and the need for communication. Productive gain of social capital will diminish and contribute to lower switching costs. Innovative projects with high level of uncertainty will increase the productive gain from social capital and increase switching costs.

I suggest three different causal relations between social capital and location of shipbuilding projects who can explain the observed pattern. (1) Social capital as an antecedent who have contributed to development of better solutions from cluster firms and contributed to competitive advantage for these firms. Clustering of such firms if they only operate within a cluster will contribute to comparative advantage at the cluster level. (2) Social capital as a knowledge sharing advantage in new projects, which reduces collaboration costs and improves innovation capabilities. (3) Social capital as a switching cost. Social capital takes time to develop and leaving a cluster network may therefore cause a reduction in social capital and advantages drawn from it.
Social capital as an antecedent for competitive advantage for individual firms supplying ship technology is a possible explanation, and some firms within the cluster are technology leaders with a dominant market position within their niches. This is not a strong argument for locating shipbuilding projects within the cluster, since previously developed products, tend to, be offered, at any location.

Ship technology suppliers who has developed products with a leading position provides their solutions to ship-owners and shipyards independent of location. Aftermarket and service arrangements to global customers has also contributed to globalize their products and services. Rolls Royce Marine is the largest actor in this category of firms within the local maritime cluster. They offer sales and support to shipbuilding locations all over the world and aftersales to vessels independent of location. Suppliers offer components, modules and ship technology globally in competitive markets. Norwegian ship-owners building vessels in remote locations request many of the same modules from the same suppliers, independent of where system integration is located.

For ship technology suppliers, social capital is an antecedent for competitive advantage, as long as competitive advantage of products and market positions are results of previous achievements. Shipyards within the local maritime cluster does not profit much from these advantages if products are equally available in other locations. For shipyards, social capital is to a much lesser degree an antecedent for competitive advantage.

Social capital as a knowledge sharing advantage will provide more benefits the more tacit knowledge exchange and problem solving related to development of new and uncertain innovations a project requires. For ship-owners located outside the local maritime cluster there may be social capital related advantages from interactions between the other project team members, but advantages will probably be greater for cluster located ship-owners with social capital from stronger or more direct links to other cluster firms.

If project configurations with both ship-owner and shipyard located within the maritime cluster has advantages in shipbuilding projects performance, this could provide cluster located ship-owners with a competitive advantage in their overall shipping activity. The success of the cluster located ship-owners operating innovative service vessels in the the years before 2014 indicated that this was the case, and supports social capital as an knowledge sharing advantage in new products.

Social capital theory prescribes a positive effect on knowledge sharing, efficiency in collaborative tasks and innovation. The value of these advantages will depend on how important novelty and innovativeness is for the specific project. For localization within the local cluster to be competitive, the value of positive effect caused by social capital (and other location advantages) must be larger than location disadvantages caused by other factors.
Switching cost arise in most non-spot market transactions simply because byers have to spend resources identifying alternative suppliers and evaluating their offers. Such switching cost increase as information cost increases. Switching cost also arise from technical complementarities in products, from incompatibility in interfaces among sub systems in products etc. Switching suppliers includes switching parts, and consequences or switching costs increases heavily if there are interdependencies with other parts or subsystems in what is becoming a final system. However, in buyer supplier relations that have high elements of discovery and innovation switching cost also arise due to reduction or loss of social capital and the benefits it has provided.

The benefits a ship-owner can draw on his social capital causes switching costs when switching to actors or locations where he initially has lower social capital. If changing location is a more competitive solution in the long run this extra benefit from social capital in the short run can be a danger causing late adaption to a new competitive environment where todays advantage from benefits of social capital by building within the local maritime cluster may be a disadvantage in the long run.

When ship-owners and system integration yards evaluates potential contract partners they must consider both general advantages of suppliers (available also to buyers without previous relations) and relation specific advantages based on existing relationship with this supplier. If all other factors are equal, cost advantages from lower wage levels must exceed expected loss of advantage from choosing a partner with less social capital. A ship-owner or shipyard who is switching partners will probably experience switching costs due to an initial reduction of social capital. Social capital will increase over time also in new relations, but take several projects to develop. Expectations for collaboration in multiple shipbuilding projects will therefore increase the willingness to accept these kind of switching costs for an initial project with a new partner.

One way to separate social capital as a switching cost from social capital as a knowledge sharing advantage for ship-owners ordering new vessels is to look at competitiveness of ship-owners choosing different strategies. If ship-owners are equally or more competitive in the long run, by selecting building locations outside the local cluster the tendency to stick with the cluster can be seen as social capital causing switching costs. If ship-owners sticking within the cluster, are more competitive, this gives some support for social capital as a knowledge sharing advantage. The pattern where Norwegian ship-owners outside the local maritime cluster locate their standardized projects abroad and more innovative projects in Norway gives some support for an assumption that social capital provides knowledge sharing advantages for innovative vessels. The tendency for cluster located ship-owners to allocate nearly all their projects in Norway can indicate that social capital provides switching costs without providing excess benefits for cluster located ship-owners compared to Norwegian ship-owners located outside of the local cluster.


