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Collaboration for Innovation in a Big City Region

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Abstract

This paper investigates how a regional innovation network can promote the development of innovation and commercialization through collaboration. In this process, connecting fruitful partners is essential. The paper addresses inter-organizational network facilitation of the matchmaking process between an entrepreneur and a venture capitalist. It is argued that collaborative success depends on (i) the competence of the network facilitator in handling the partnering process, (ii) the size of the network, (iii) the strategic partner match, and (iv) entrepreneur maturity. It seems that inventors and investors who engage in such regional innovation networks are more likely to reach commercialization faster than if they did not engage with the network. Literature of open innovation, big city regions, and inter-organizational knowledge networks, make up the theoretical framework for examining how the dynamics among collaborators spur innovation and regional value creation. The empirical case constitutes a combination of industry participants, government, and R&D in the leading maritime cluster of Oslo Akershus, Norway. The benefits to be gained from this paper are insights into innovation through collaboration in a big city regional network, with particular emphasis on the partnering process between inventors, investors, and innovation policy executors.

Key words: Innovation, collaboration, big city region, network facilitation, knowledge network, learning, matchmaking

INTRODUCTION

Innovation can, simply stated, be seen as new ways of making and/or doing things (Fagerberg et al. 2005). And knowledge and collaboration are seen as foundations for innovation, with globalization as one main driver (e.g. Lundvall 1992; Nooteboom & Stam 2008; Gustavsen et al. 2010). Yet, increased globalization has in fact made regional innovation more important. This has led to the claim that regions, and particularly metropolises and big city regions, are important drivers of innovation and growth (Scott 2001). Some regions are more capable of developing and implementing innovations, and region-specific characteristics (including institutions) may be underlying forces (Scott 2001). During the last decades, new concepts have been launched to incorporate this view, e.g.: clusters (Porter 1990), innovative milieux (Camagni 1991), regional innovation systems (Cooke 2001; Lundvall et al. 2009), high-tech areas (Keeble & Wilkinson 1999), big city regions (Florida 2004; Pålshaugen 2010) learning regions and regional development (Asheim 1996; Asheim et al. 2006). These studies concentrate on the analysis of well performing regions, dealing with the questions of why such industries concentrate in particular locations, which kinds of linkages and networks exist, and to which extent knowledge spillovers (Bottazzi & Peri 2003) can be observed. As a result, regional innovation focuses on high tech, knowledge based or “creative” industries, the building up of research excellence, attraction of global companies, and stimulation of spin-offs (Tödtling & Trippel 2005). As an alternative, rather than looking at (contextual) characteristics at region- and system levels, this paper focuses on what is really going on at a micro activity level within an inter-organizational network in terms of network facilitation of collaboration for innovation.

In today’s complex and rapidly changing world, the idea of ‘open innovation’ has gained widespread interest (Chesbrough 2006). It suggests that organizations should not innovate in isolation, but in collaboration with others. Current literature portrays innovation as interactive learning processes between many actors (e.g. Fagerberg et al. 2005). ‘Interactive’ means that the knowledge and innovation do not come from one place or one actor (e.g. from research and then passed on in one direction for example to industry). To the contrary, ideas, competence, and innovations emerge through a complex interplay of relations and mutual trust. Strategies for increased innovative ability, thus, have to focus on the development of productive constellations of collaboration (Finsrud 2007). Therefore, innovation through collaboration is at the core of what creates development, and the focus of this paper.

As an extension of the idea of collaboration, there is a growing attention to the importance of inter-organizational relationships and networks for the innovative capacity of organizations as well as means for regional development. As products, processes, services, and technologies are becoming increasingly globalized and complex, organizations find it frequently more necessary to conduct their innovation activities in networks. Today, few final products or services reach the consumer or the user without depending on a number of organisations acting together (Nooteboom & Stam 2008), and more and more frequently the contributing organizations are located in geographical regions (Lundvall et al. 2009). Such networks are interesting to study because they, in scientific literature as well as by practitioners and politicians alike, are described as - and believed to be - highly beneficial to innovation and value creation. However, after carefully reviewing research on inter-organizational networks and innovation, Nooteboom and Stam (2008) concludes that network research (i) focuses mainly on innovation generation and (ii) is more oriented to the early phases of the innovation process (exploration, R&D) than to the commercialization and exploitation stage, and much research is devoted to how innovative networks and clusters function (e.g. Freeman 1991; Hoang & Antoncic 2003; Asheim et al. 2006). Yet, less is known theoretically and empirically about how they facilitate innovation through collaboration in light of micro-level analyses of actions and interactions of the actors involved (Nooteboom & Stam 2008).

Within the frames of the above perspectives, this paper qualitatively investigates a highly successful collaborative innovation project between one innovation network called Oslo Maritime Network (OMN), the start-up company Advanced Marine Coatings (AMC), the venture capitalist BW Gas, and Connect Springboard, a foundation assisting entrepreneurs in refining their business through a process called Springboard®. This paper reports from the context of the Norwegian maritime cluster, which is among the world leading and based in the Oslo Akershus region.

Focus is on the success factors that brought the project together by means of facilitation (by OMN) and Springboard (together with CONNECT) which teams up small talent start ups (in this case AMC) with financial investors (in this case BW Gas), and the innovation process that followed from mid- and late phase testing to market. The product innovation created in this project is the use of a new type of coating on ship hulls as well as inside ships based on nano technology that makes the ship go faster at sea but with the same amount of fuel/energy

and which demands less maintenance. This means huge savings and cost benefits for the shipping industry.

The paper is structured as follows. Next, the literature on open innovation, regional innovation in big city regions, and inter-organizational knowledge networks, is reviewed. Thereafter, the research methods and the case are addressed before presenting the empirical findings. Finally, conclusions and implications from the study are outlined.

LITERATURE

Open innovation and collaboration

This paper is inspired by the literature on open innovation. Open innovation is defined as “the purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology” (Chesbrough, 2006:1). Hence, internal ideas can be taken to market through external channels, outside the current businesses of the firm, to generate traditional value, which is the case of the start-up company AMC.

Open innovation is almost by definition related to the establishment of ties of innovating firms with other organizations. Companies are increasingly forced to team up with other companies to develop or absorb new technologies, commercialize new products, services, or processes or simply to stay in touch with the latest technological developments. This way, the innovation processes become increasingly *collaborative processes*. In line with Brøgger (2007), collaboration in this context is not referred to in romantic terms as seeing collaboration purely as something nice and enjoyable - although easy to agree that these are good virtues. Rather, collaboration in this study refers to the opportunities that lie in taking advantage of existing and potential future resources and circumstances in order to join forces for mutual benefits in innovation.

Thus, inter-organizational networks and other non-arm's-length transactions between organizations are important. However, firms may differ in their knowledge-sharing intensity with different partners. That is, some collaborations or alliances can be identified as particularly crucial to a firm's innovation. In that case, the firm may decide to maximize

knowledge exchange by establishing more frequent and deeper ties, as well as more open knowledge-sharing routines in order to maximize absorptive capacity (Cohen & Levinthal 1990). In such efforts, studies show that geographic proximity in general and big city regions in particular promote innovation (e.g. Scott 2001), as is further discussed below.

Regional innovation in big city regions

Typically, regions represent competitive environments and market concentration. They depend on innovation as a source of economic sustainability and growth. Innovations must be commercialized to contribute to the local economy. As such, regions need to create processes that foster innovation and shepherd the early stages of an innovation's diffusion (Scott et al. 2001).

Regions may have several options to restructure their economies. A key option is to diversify into new fields while building on existing regional assets. There is increasing awareness that the long-term development of regions depends on their ability to diversify into new economic applications and new sectors while building on their current knowledge base. It means that regional economies that branch into new direction may be more stable in the long run than those that start from scratch (Nooteboom & Stam 2008).

Regional knowledge sharing favors localized learning between firms (Nooteboom & Stam 2008). One way to establish this is to develop major innovations that are triggered by knowledge spillovers between different sections in a region (Henderson et al. 1995). However, effective knowledge sharing requires absorptive capacity (Cohen & Levinthal 1990) and external knowledge that is close to one's own knowledge base. In other words, sectors need to be of 'related variety' (Boschma 2005), i.e. related or complementary in terms of competences to enable effective knowledge sharing - but not too similar in order to avoid cognitive lock-in (Nooteboom & Stam 2008). It is regional specialization in related variety that enhances real innovations. So, major innovations are more likely to occur when knowledge spills over between sectors, rather than within one sector, but only as long as the sectors are related (Boschma 2005). Due to scale, foundations and sources for related variety as an important source for regional innovation are often greater in metropolises and big city regions compared to smaller regions (Scott 2001).

But what characterizes a big city region? Big city regions increasingly function as essential spatial nodes of the global economy and as distinctive political actors on the world stage. In fact, rather than being dissolved away as social and geographic objects by processes of globalization, city regions are becoming increasingly central to modern life, and all so because globalization in combination with various technological shifts has reactivated their significance as bases of all forms of productive activity, no matter whether in manufacturing or services, in high tech or low tech sectors (Scott et al. 2001). The concept of *big city region* can be traced back to the notions of world cities (Hall 1966; Friedmann & Wolff 1982) and global cities (Sassen 1991). Sassen (2001) distinguishes between global cities and global city regions, arguing that the former represents a more limited set of phenomena and are bound by a narrower spatial circumference. As such, the essential feature of the global city, are its functions as a center of information-intensive business and financial activities, and its role as a dense locus of power and inequality. Global city regions are global cities plus additional tracts of surrounding territory, giving them a more complex but also less sharply focused social identity. Camagni (2001) and Friedmann (2001) advance the discussion by providing synoptic accounts of the multiple synergies that run through global city regions and that constitute their competitive advantages. Camagni (2001) makes the point that economic competition can occur between territories just as much as it can between firms in the sense that city regions represent composites or collectivities of externalities and complementary public goods, and these constitute important foundations of regional competitive advantage. As such they deeply affect the attractiveness of any given region to mobile capital investments and they represent a critical element of individual firms' abilities to contest wider markets. A region's competitive advantage resides not so much in natural resources as it does in forms of social and political organization (Porter 2001).

Today, there are more than 300 city regions around the world with populations greater than one million (Hall 2001). Everywhere, these city regions are expanding vigorously and they also present many deep challenges. At least twenty city regions have populations in excess of ten million. The Oslo Akershus region has a population of 1,5 mill inhabitants. However, it is not population size as such that defines a city region. The Loughborough Group "GaWC" inventory of world cities have rated cities in terms of world-cityness based on scores of prime, major, or minor center status. This resulted in a classification of four categories: Alpha world cities, Beta world cities, Gamma world cities, and a category of cities with strong, some, or minimal evidence of world-city formation. We find Oslo in the last category with *some*

evidence of world-city formation (Hall 2001). Therefore, based on this classification and the above discussion of the concepts of cities, I have chosen to refer to the Oslo Akershus region as a big city region.

Broader regional (and national innovation systems) (Lundvall 1992) often incorporate *clusters*. According to Chesbrough (2006), open innovation benefits may be more readily achieved in regional clusters, since the effect on innovation is magnified by geographic proximity. Such clusters are defined as ‘geographic concentrations of interconnected companies and institutions in a particular field’ (Porter 1998:78). In this respect, the Norwegian maritime cluster provides a good example. Norway is a small country of 4,8 mill inhabitants located quite remote from most global city regions and metropolises, but with Europe’s highest educated population. Despite high costs of labor and other basic inputs, the country controls 10 % of all sea-borne trade in the world.

Norway has the fifth largest merchant fleet in the world, and its maritime industry is built on expertise developed from centuries as a shipping nation, with Oslo as the main centre. Oslo Akershus based companies are among the world leaders in several shipping segments and specialized maritime services, like car transport, petroleum and chemical tankers, equipment supply and management support, classification and risk management, maritime insurance, ship broking, ship financing, maritime law, specialized research and education providers, and an array of other related industries (e.g. offshore oil and gas production). Says Morits Skaugen, CEO IM Skaugen and Chairman of the Oslo Maritime Network: “*Compared to other shipping centers around the world, the cluster environment in the Oslo region is the most complete*” (cited at www.oslo.teknopol.no). These actors stay connected within and across sectors through a variety of professional interest organizations. Hence, the Oslo Akershus maritime cluster is fully in line with Campbell’s (2008) argument that competitive regions typically operate within knowledge networks, where local knowledge, learning, and creativity are accepted as parts of the software infrastructure of big city regions (cited in Schoonmaker & Carayannis 2010:51). In this respect and to this region, Oslo Maritime Network plays an important role as an inter-organizational knowledge network. Thus, a review of relevant literature on inter-organizational knowledge networks follows.

Inter-organizational knowledge networks

Inter-organizational networks are often part of larger clusters and regions. They act as a signal of membership in a local community of knowledge, and collaboration takes place through social relations and interactions (Nooteboom & Stam 2008). Network ties positively influence firm innovation (e.g. Shan et al 1994). Research shows that different types of ties can transfer different types of knowledge. Hence, firms involved in multiple types of ties are more innovative than those that engage in a single type of tie (e.g. Powell et al 1999). However, being member of an inter-organizational network does not account for a company's success, but is dependent on good organization by the way the firms integrate its external relations. Inter-organizational networks provide a durable structure for inter-firm relations, which both enable and constrain interactions. The fact that individual relations between companies are 'embedded' in a broader network also leads to the formation of more complex typologies. Networks are especially well suited to knowledge-intensive industries where joint problem solving is paramount: networks foster problem solving and learning mechanisms (Powell et al 1996). At the same time, inter-organizational networks have to handle the risk of becoming closed to outside knowledge or overembedded.

In inter-organizational networks, companies with complementary capabilities or positions in the value system have to be fully committed to cooperate. Creating value cannot be done unilaterally based on the efforts of a single, focal firm, nor can it be done without keeping the different and divergent interests of all collaborating partners in mind (Nooteboom & Stam 2008). Precisely because network members are likely to attach different meanings to the same concepts and operate with different problem solving procedures, codes of conduct etc., this in turn might lead to severe communication problems, distrust, delays, cost-overruns, and innovation failure. This makes collaboration challenging and trust becomes essential. The development of trust is likely to be at the forefront in newly established networks where people have to start out by finding and getting to know each other. However, the ability to communicate and collaborate with people who think differently may grow with the accumulation of knowledge and experience in such collaboration. Therefore, innovation is more likely found in mature networks of trust and openness (Nooteboom & Stam 2008).

However, while Chesbrough (2006) focuses on the portfolio of network ties managed by the firm, this paper addresses how a particular network manages a variety of private and public organizational ties for the benefit of innovation in the Oslo region. Such regional innovation networks are better characterized by collaboration among academia, government, and industry (triple helix) for the purposes of fostering and accelerating innovation (e.g. Tödtling & Trippel

2005). The focus and purpose of these networks is to drive economic development through increased commercialized innovation, derived from internal and external research and development (R&D), financial resources, and other support programs such as publicly and privately funded research programs etc. While much research has been devoted to this triple helix constellation (e.g. Tödtling & Trippel 2005), there has been less focus on other key players like public sector institutions and not least venture capitalists even though external capital and paths to market are often decisive for the success of small start-up companies. In addition, a more recent actor seems to play an increasingly central role in orchestrating regional innovation, namely resources with the purpose of being the government's prolonged arm in the actual facilitation and implementation of innovation in regions. OMN is an example of the latter. OMN is the knowledge network of the Oslo Akershus maritime cluster and one of five key priority clusters in the region administrated by Oslo Teknopol, an inter-authority company owned by Oslo municipality and Akershus county municipality. Oslo Teknopol aims to stimulate innovation and promote Norway's capital region in terms of knowledge, talent, and investment. At least to my knowledge, little research exists on this area and even less has been done on the facilitation of inventor-investor matchmaking in inter-organizational networks like OMN.

Based on this review, the coupling between open innovation and collaboration in big city inter-organizational knowledge networks seems to be a fruitful approach to study the topic under investigation. For this purpose, a qualitative research method is well suited.

METHOD

Since the purpose of this study is to understand relationships, a qualitative research design is chosen. A case-study approach applying an exploratory design is well suited because the study focuses on collaboration for innovation as these processes unfold between a number of key actors in a regional knowledge network. This research project is part of a larger study financed by the Programme for regional R&D and Innovation (VRI) of the Research Council of Norway. VRI is the Council's main support mechanism for research and innovation in Norway's regions. The primary goal is to encourage innovation, knowledge development, and added value through regional cooperation and a strengthened research and development effort within and for the regions. With a time-frame of ten years (2007-2017), it is designed to promote greater regional collaboration between trade and industry, R&D institutions and the

government authorities, and to establish close ties to other national and international network and innovation measures (www.forskningsradet.no).

The author has been involved in VRI from the beginning and in its predecessor the national research programme Value Creation 2010. OMN is partly funded by VRI, and I have worked closely with the OMN secretariat and its members for over two years. I have been to numerous OMN arrangements and seminars, and I have interviewed most of its members about issues of innovation as part of the VRI program. From this substantial material, a selection must be made. Therefore, this paper will focus on the work of the OMN as a network facilitator for innovation illustrated through the matchmaking process of AMC and BW Gas.

The primary source of data collection is semi-structured *interviews* conducted with key informants from the four main organizations, one from OMN (the network facilitator), the two founders of AMC, one representing the venture capitalist, and one from CONNECT. The interviews were all tape recorded and transcribed verbatim in order to enhance validity. Following Yin (2009), each interview was first analyzed as a stand-alone, within case before comparisons were made across interviews in order to gain the overall picture. To strengthen the credibility of the study, quotations are frequently used in the presentation of the empirical material. *Written material* represents another data source. Documents, archival records, and internet web sites were used to build up a background understanding of each organization. In addition, there is substantial electronically available material of the work and activities of OMN, as well as media publicity and news coverage of the partnering between AMC and BW Gas. This material has been studied thoroughly and is actively used in the analysis to enlighten as well as compare interview statements. A third source of data is *observations*. The author was not present at the specific AMC springboard arrangement. In an attempt to compensate, I have observed two other OMN Connect springboard arrangements, the process and the method applied. This was very helpful in understanding the springboard process and particularly useful because the procedure and the organization are very much the same each time. Hence, even though each springboard is unique, there is a certain degree of transferability, particularly in understanding how it works methodologically. These observation experiences were used as reference point for analysis and better understanding of interviewees' springboard descriptions.

In order to illustrate network collaboration and the inventor-investor matchmaking process, the empirical part will focus on a few critical incidents, organized under the following headings: (i) the role of OMN, (ii) the start-up company, (iii) gearing up for springboard, (iv) actually finding a partner, and (v) hitting the market.

EMPIRICAL FINDINGS OF THE MATCHMAKING PROCESS

The role of OMN

Oslo Maritime Network was established in 2005 based on the existence of a strong maritime cluster, however with a great potential for improved optimization in terms of collaboration across sectors and in a triple helix constellation. OMN is a non-profit collaborative network organization gathering members from all segments of the maritime cluster in Norway's capital region. The network has over 60 member organizations and focuses on three areas of collaboration: Innovation, Competence, and Marketing. In order to better realize the innovation potential in the cluster, OMN initiated cooperation with CONNECT Springboard®. CONNECT is a non-profit organization helping entrepreneurs speed up their commercialization process and prepare them to meet investors and industrial partners. The idea was to bring together OMN's knowledge of the maritime cluster, its needs and opportunities with CONNECT Springboard's competence of business and inventor-investor assessment. This way, OMN Springboard was born, a partnership that turned out to be of great importance to accelerate the region's maritime innovation potential. Says the OMN advisor: *"What we pay CONNECT to do is to enhance and safeguard the quality of the business foundation of the start-up company, so that we don't stumble because of that at a later stage. When this is made clear early on, we can proceed and investor capital can be spent on investments that lead to real innovation"*. By joining forces, their reach in terms of network contacts would not only grow larger, but more importantly, enhance in complementary ways. One of the first start-up companies on the OMN Springboard was AMC.

The AMC start-up company

Advanced Marine Coatings was founded in 2005 as a joint venture between two small start-ups. The entrepreneurs of each of these firms had worked together on a project of another type

of business idea. Now, the two founders decided to embark on an entirely new type of project, namely to pursue environmentally friendly coating systems for ships based on nano technology, as they believed such technology would have many unique properties. Among others, such technology would replace large parts of the solvents at the same time as they reinforced the materials offered. Their very smooth surfaces with minimal surface roughness provide low friction in water and correspondingly reduced emissions of CO₂, NO_x, etc. The result is more than 10 % lower energy consumption for ships. In addition, the dirt-repellent and almost self-cleaning surfaces significantly reduce the cleaning needs. Nano reinforcing material provides up to 10 times greater durability than conventional solvent, as it contains epoxy coating systems with extreme durability and resistance to cracking and flaking compared to traditional hard coat, as well as self polishing anti-fouling systems (www.amcoat.no). This means prolonged time span between each time the ship has to dock for maintenance. In total, the nano coating (which is not much more expensive than the existing ones) means reduced costs and more environmental friendly operation at sea.

In order to reach their goal, AMC bought the exclusive rights to exploit a Finnish, patented technology to disperse and dissolve carbon nano tube lumps in liquid polymers in marine coatings. The development of the Green Ocean coating has taken place since 2006, followed by several years of testing of the coating in relevant R&D milieus in Norway, Finland, Poland, and South Africa. The tests showed promising results, but AMC needed more funding to finance further product development and commercialization. Says one of the entrepreneurs: *“What we wanted was an industrial investor with maritime competence not a pure commercial one”*. Via contacts in Innovation Norway¹ as well as through personal contacts in the maritime cluster, AMC came in touch with OMN. AMC was put on the list of potential Springboard candidates and passed the first review.

Gearing up for springboard

The matchmaking process began. OMN arranged many meetings with AMC in order to gain an understanding of their potential and to understand their needs and prospects, and to prepare

¹ Innovation Norway promotes nationwide industrial development profitable to both the business economy and Norway's national economy, and helps release the potential of different districts and regions by contributing towards innovation, internationalization, and promotion (www.innovasjon Norge.no).

them for Springboard together with CONNECT. CONNECT's main activity is assisting start-up companies and entrepreneurs in refining their business and financial strategies through a process called Springboard®. The entrepreneurs present their business plan before a group of business, marketing, and management experts in order to improve their strategies and increase their chances of commercial success. The expert panel is selected especially for each entrepreneur helping entrepreneurs solve problems and identify opportunities, as well as providing practical advice on what actions should be taken to tap into these opportunities. In addition pre-springboards are organized for entrepreneurs with more immature business ideas and post-springboard for following up entrepreneurs. The composition of the panel is critical to find the right match. Therefore, OMN made sure the panel consisted of many potential venture capitalists with interests concurrent with those of AMC. *“Our task is to offer the entrepreneurs the best possible exposure and make sure things happen. We do careful research and selection of panel experts that we believe will make a good match vis a vis the entrepreneur. Here, we benefit from our large network pool and the fact that we know people who know people”* (advisor OMN). At the Springboard and afterwards, it is up to the panel participants to show interest. At the Springboard, particularly one participant was highly intrigued by the presentation. *“You could actually see his enthusiasm grow as he kept on asking question after question”* (OMN advisor). The participant represented BW Gas, a leading global provider of gas marine transportation services. The company is the largest owner and operator of liquefied petroleum gas (LPG) carriers and one of the largest independent owners and operators of liquefied natural gas (LNG) carriers. The company owns, part-owns and/or operates a fleet of 65 vessels (www.bwgas.com).

Actually finding a partner

The Springboard competition in the beginning of 2008 was the first meeting between AMC and BW Gas. Afterwards followed a range of meetings between AMC and BW Gas, and between these two and third parties such as technology experts, researchers etc. All along, OMN was involved and facilitated the meetings and the process in order to ensure progress. These follow-up activities of OMN were highly important in order to keep the process going in a direction of continuous information exchange, collaboration, and trust. The process that followed circled around collaboration on what and how. OMN listened to the concerns of both parties and invited relevant expertise in order to sort out the challenges. The entrepreneurs knew they had something exciting but had a need to get their product positively confirmed,

i.e. that others also saw the same potential as them. But they did lack the business know-how, the functional expertise, and the research necessary to bring the product to the next level.

BW Gas' concern was also to have the product confirmed and to investigate more about its properties and qualities. Says the interviewee: *"We simply wanted to find out more about the tests"* (investor BW Gas). A large part of what they brought into the collaboration was the opportunities they offered to test out the coating on real boats in real operation at sea. AMC got to paint first one of their ships while at dock in Spain, and based on the good results, several more. This way, the paint was tested both under and above the water line, to see how the coating behaved in real water environments. The tests confirmed less use of fuel/energy, but they still faced the problem of sea plants growing on the surface. So they used it as an opportunity to also test cleaning of the surface. This operation was easy compared to traditional, existing coatings, and they made another step forward to test new compositions of ingredients to further improve the anti-fouling.

Naturally, another important part was the business side of it. Was the start-up company credible? OMN and CONNECT helped evaluating the start-up company due to their experience with the maritime sector and with start-ups. Says the OMN advisor: *"CONNECT is very experienced and has good methods to reveal risks and avoid dangers. They can smell from a long distance who (of the entrepreneurs) are mature or not. They see it more often and faster"*. In the case of AMC, both entrepreneurs were eager, result oriented, and experienced enough *"to sleep well at night even in stormy weather"* (advisor OMN). They wanted to *"run as fast as they could to keep their first mover advantage, but were not willing to accept whatever. They would rather stumble because they ran too fast than be hindered by other complications"* (advisor OMN).

Another question was the scale and scope of the market. And while BW Gas investigated market opportunities, AMC did what they could to look even better in front of the potential investor: *"We hired a consulting company to further dress up the bride. This was very useful as we once again analyzed our business plan according to what we now had achieved in terms of test results, as well as our knowledge of BW Gas and how to team up together"* (entrepreneur AMC).

In 2009, BW Gas had just established an investment fund of 250 million USD for investment in environmental friendly shipping related technology. The fund was a direct consequence of a battle resulting in additional tax imposed by the Government on the shipping industry.

Later, the Supreme Court upheld the ship owners claim that the tax was against the law. Yet, BW Gas decided to sustain the fund and its objectives, and AMC became the first company to invest in. BW Gas gained majority shares in the company and has invested several tens of million NOK - and the predicted economic return is huge.

As a result of investing in this contact, BW Gas invited AMC into their house in order to sit close to each other. This again is a confirmation of trust, as the OMN advisor put it *“You don’t let anyone into your house unless you know them and trust them”*.

Hitting the market

The nano based coating is now under production in quite large scale and for sale on the international market. And buyers have tested out the coating on their own vessels before buying the product. Much has happened during an unusual short time span for a start-up company to reach commercialization in such large scale. *“Without Springboard and OMN we would not have gotten this far this fast!”* (entrepreneur AMC). However, when looking back, one entrepreneur says with a smile: *“Luckily, we didn’t know the shipping industry beforehand. If we did, I don’t even think we would have made a shot. It’s such a conservative industry. They are so reluctant to try out new things, even though they have huge financial muscles if they want to. You know, they’re pedlars and extremely stingy”*. The entrepreneurs’ positive and go-ahead spirit have overcome frustration and obstacles, and the founders are now during fall 2010 about to gradually withdraw as a new managing director is employed by BW Gas with the right competence to take the firm commercially forward in terms of product differentiation, sale, and distribution.

Overall, this process has achieved what OMN works for, namely a knowledge-based innovation resulting in a growth in the region for and with the actors in the region. This project benefits the cluster as knowledge and results float back to the region even though much of the testing has taken place elsewhere. The collaboration stays in the region, and BW Gas can make money and reinvest in the cluster. Such as successful project can be difficult to copy, as the OMN advisor is fully aware of: *“To make this happen during two years is really something to strive for in the future”*.

CONCLUSION

This paper has investigated how a knowledge-based innovation network in a big city region has promoted the development of innovation and commercialization through collaboration and facilitation of a matchmaking process between an inventor and an investor.

In this facilitation process, the main success factors seem to be the *specific and complementary competence* of all four parties, OMN on facilitation and maritime cluster knowledge, CONNECT on start-ups and business understanding, AMC on entrepreneur maturity and a unique product idea of commercialization potential, and BW Gas on shipping and maritime needs. And crucial to make these competences work together, complement, and benefit each other is the continuous collaboration process facilitated by the maritime network. This also shows the importance of making meeting places and couplings of related variety within the same maritime cluster.

In addition, the *size of the network* is important and not least to have *the big and well known companies onboard*, i.e. those with resources and competences to be in front and make things happen. According to Chesbrough (2006), an optimal open innovation strategy would exploit multiple ties to multiple types of institutions. In addition, this study shows that not only is a large pool of ties important, but even more so, the size of the tie institutions matters. The findings also support literature on big city regions as drivers of innovation and economic growth. But most decisive is the strategic partner match. Here planning of composition and access to network contacts are essential in order to gather a certain critical mass of potential partners to “choose” from. Afterwards, facilitation of follow-up activities is important to keep a promising project going and progressing.

The study supports the notion that inventors and investors who engage in regional innovation networks are more likely to reach commercialization faster than if they did not engage with such a network. And that the source of value creation lies in networks of firms and the configuration of their roles in these networks (Bettis, 1998; Dyer & Nobeoka, 2000; Gulati et al., 2000), as well as their *match of complementary competences*, as shown in this paper.

This present study adds to literature on the practice of open innovation through collaboration at a micro actor level. From these findings, opportunities for future research can be found in relations of knowledge flows, inter-organizational networks and geography, and the practice of open innovation and collaboration in comparative environments.

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