

## **Entrepreneurial Alertness and Innovation: Innovation Networks in the Oslo Region of Norway**

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### **Cite as:**

Solesvik, M. and Gulbrandsen, M. (2012). Entrepreneurial alertness and innovation: Innovation networks in the Oslo Region in Norway. Paper presented at the *XXI RENT Conference* in Lyon, November 21-23, 2012.

## **Abstract**

The paper attempts to close a research gap related to remoteness of pure innovation and pure entrepreneurship research streams. In this study, we use theoretical concepts from the entrepreneurship research (i.e., entrepreneurial dynamism and entrepreneurial alertness) and attempt to analyze interaction between the actors in the regional networks in the Oslo region of Norway. The study derives several propositions which will be subsequently tested in the further quantitative studies.

## **1. Introduction**

Norway is a high-cost country. Innovation activities in firms and regions are a main component leading to competitive advantage of the Norwegian industries in the world economy. Public support for innovation in firms has a long prehistory in Norway. In the early 1960s an important emphasis was found on workplace democracy and worker participation in introduction of new technology. This strand of support has later moved towards productivity, innovation and currently a focus on regional cluster. The present program, called “VRI” (an acronym for “support mechanisms for regional innovation”) backs innovation initiatives favoring open innovation in fifteen regions. Each region has allocated several priority areas. The priority areas for innovation development reflect traditionally strong cluster in each particular region. The goal of VRI in Norway is ”to develop knowledge and ability to interaction and innovation processes in the regions and advance research-based innovation in the Norwegian economy” (VRI Program plan 2010:5). A main emphasis is on closer cooperation among universities and R&D institutions, local governments, firms and organizations.

Innovation and entrepreneurship are two terms which are often used together. Recent special issue in the *Research Policy* raised a question about common roots and closeness of two fields of research: innovation and entrepreneurship (Fagerberg et al., 2012). However, the research in innovation and research in entrepreneurship are still rather far away from each other on closer inspection (Clausen et al., 2012). This study aims to make a step in closing this gap and uses theories of entrepreneurship research to study firm-level innovation in Oslo and Akershus region which embraces the capital of Norway and the region around it. The study focuses on firms which are members of four key VRI-funded networks in the Oslo-Akershus region operating in health sector (eHealth) and medical technology (MedTech), renewable energy (OREEC) and marine life science (MareLife). The research question that will guide this study is: Can the characteristics of key R&D employees, firms’ membership in innovative networks, and the external environment be used to explain a firm’s innovativeness? The results of this study will have implications for policy makers, practitioners, and scholars.

The paper is organized as follows. The next section we describe the context. In Section 3, we present the theoretical background for the research. In Section 4, we make conclusions, present implications for policy-makers and practitioners, and make links to further research.

## **2. Context: VRI in Oslo and Akershus (OA) region**

Oslo and Akershus region embraces the capital of Norway and the region around it. Priority areas for innovation development are not rigid for the whole period of VRI but

can be reconsidered during the phase change. The goals of the VRI in Oslo-Akershus region are to improve interaction across the priority innovation networks, to create a learning arena in the region and exchange experience with other regional R&D and innovation projects. Other goals include mobilization and stimulation of R&D-based innovation in the clusters and networks through interaction among firms and among firms and research institutions (VRI, 2001: 2).

Focus areas of VRI I were Information and Communication Technologies (VRI ICT), maritime industry (OMN), renewable energy (OEERC) and marine life science (MareLife). Focus areas of VRI II are health sector (eHealth) and medical technology (MedTech), renewable energy (OEERC) and marine life science (MareLife). Main characteristics and activities of these four networks are summarized in Table 1. Priority areas in phase II (2011-2013) for Oslo-Akershus region are described as follows.

### *2.1. Marine Life (MareLife)*

MareLife is a project aimed to support and develop innovations in the sphere of aquaculture, fishery and sea food, as well as promote innovative technological and organizational methods of production and marketing.

There are 46 members in MareLife network including fishing companies, aquaculture and seafood producers, manufacturers of ingredients and R&D institutions. Each member contributes with an annual fee. Additional sources of finance include the funds from the Norwegian Research Council and other public means.

Main achievements (2008-2010): The network is involved in more than forty R&D projects within marine life. The results of their work were used in forming the Norwegian maritime policy and report 'The Coastland Norway'. The network was involved in consolidation of the maritime competence, improved quality of marine products, fishing and environmental technology, as well as improved research in health and quality of fish farm products. The next steps include the further improvement of innovation work in the priority areas, to achieve synergy effect from the increased collaboration within the network, and to develop an international innovation area in the region (Resultatrapport VRI 2008-2010: VRI OA).

### *2.2. Renewable energy (OREEC)*

Renewable energy is a priority area in innovation development of Oslo and Akershus region as well as other Norwegian regions and the EU countries. OREEC consist of 33 firms and organizations representing firms developing and promoting alternative energy sources, R&D firms, two universities and nine university colleges, banks, and a law firm. The network has five priority areas: (1) renewable energy sources (such as wind, sun, water, and hydrogen); (2) bioenergy; (3) energy from the garbage and garbage utilization; (4) climate technology; and (5) effective use of energy (OREEC, 2012).

**Table 1.** Main networks supported by VRI

	<i>OEERC</i>	<i>MareLife</i>	<i>Oslo MedTech</i>	<i>eHelse</i>
Establishment	<b>200X</b>	2005	2009	2011
Sphere/Cluster	Energy saving, renewable energy	Acquaculture, fishery, and sea food	Medtech industry	ICT solutions for medical industry
Number of member organizations	33	46	90	90
Goals	To increase (a) innovation pace, (b) opportunities for enterprises, (c) value creation.	To improve cooperation between members in common research projects; to facilitate commercialization of innovative ideas, and to acquire finance from public sources for R&D projects within marine research and innovation.	To develop R&D and innovation medtech projects; to improve knowledge and skills of medtech companies in OA region; to increase R&D and innovation activities of hospitals in OA region; to promote regional medtech cluster in international markets.	To stimulate interaction between hospitals, regional governments, R&D institutions and eHealth firms; and to develop effective ICT solutions for the healthcare sector.
Activities	Competence development in networks Personal mobility Pre-projects 'Lighthouse projects' Matchmaking between investors and technology entrepreneurs Innovation projects	Competence development in networks Pre-projects Dialog conferences and learning arena	Competence development in networks Personal mobility and industrial PhDs Pre-projects Breakfast seminars Pilot projects Seminars Development and testing of new products and solutions	Competence development in networks Personal mobility Pre-projects Dialog conferences & workshops Regional learning arena
Budget (2011-13), MNOK	3,194	3,258	3,990	3,737
Sources of finance	Membership fee Research Council of Norway	Membership fee Research Council of Norway Other innovation funds	Membership fee Research Council of Norway	Membership fee Research Council of Norway
Web-page	<a href="http://www.oreec.no">http://www.oreec.no</a>	<a href="http://www.marelife.org">http://www.marelife.org</a>	<a href="http://www.oslomedtech.no">http://www.oslomedtech.no</a>	

- OA – Oslo and Akershus region

Main achievements (2008-2010): The network organized 22 conferences and workshops. Thirteen pre-projects and eight projects have been granted external funds. Three international cooperation agreements are signed with other large city regions (Boston, Copenhagen, and Nice). The members of the network have been lecturing at the university colleges and high schools and some students were employed by member firms. The member firms and organizations report that they have learned from the activities in the network. The next steps include to continue development of innovative products, carry out conferences and workshops, introduce industrial PhD, continue matchmaking between actors in the cluster, and search additional grants for R&D projects.

### *2.3. Oslo MedTech*

The priority working area of this network is support of the local healthcare industry in order to make it more effective and competitive. The network aims as well to improve international position of the medtech firms in the international market. Oslo MedTech had 90 members from hospitals, R&D organizations, medtech firms, e-Health, technology transfer and service firms, suppliers, investors, and design & manufacturing firms.

Oslo MedTech has got ARENA-status which means financial support to establish the cluster in OA region. The planned activities for VRI-II period are introducing competence development activities for member firms and organizations and to attract external funding for financing of R&D at member firms. In January 2012, members of Oslo MedTech has got grants for total amount NOK 21.5 millions (Oslo MedTech, 2012). The network plans to introduce industrial PhD projects, knowledge exchange between universities and R&D institutions and medical industries and hospitals, and wider involvement of bachelor and master students to cooperation with R&D institutions and firms.

### *2.4. E-Health*

The priority area of the e-Health project is application of ICT technology and solutions in the healthcare sector in order to solve existing and future problems which face the Norwegian healthcare industry now and in the future. This should be achieved through closer cooperation between universities and R&D institutions, hospitals, regional communities, and ICT firms which intent to develop wireless and sensor technologies, systems for monitoring for people with limited abilities, and better document control over hospital patients under and after visits.

E-health project is a sub-project of Oslo MedTech network. E-health had 90 members from hospitals, R&D organizations, medtech firms, e-Health, technology transfer and service firms, suppliers, investors, and design & manufacturing firms.

The project will has planned the following activities for the VRI-II period: mapping demand of the local healthcare industries in e-Health solutions; competence development among the members; carry out dialog conferences and establish a learning place for actors in the healthcare industry. The project aims to attract external finance means from different Norwegian and European public funds to facilitate innovation development in e-Health area.

### **3. Prior work**

#### *3.1. Entrepreneurial alertness*

The research model is presented in Fig. 1. Despite the volume of research focusing on factors associated with the ability of firms to innovate, there is still insufficient knowledge about the role of different factors influencing on the firm's innovativeness. Entrepreneurial alertness is one of the scarcely researched areas of innovation studies. Entrepreneurial alertness refers to “an attitude of receptiveness to available, but hitherto overlooked, opportunities” Kirzner (1997:72). Three different elements of entrepreneurial alertness are known: scanning and search, association and connection, and evaluation and judgment (Tang et al., 2012). It has been argued that entrepreneurial alertness positively related with innovation (Yu, 2001). This study further develops knowledge base on entrepreneurial alertness and seeks empirical support related to its link with firm-level innovativeness.

Prior knowledge is significantly related to alertness and alertness is positively associated with firm's innovativeness (Tang et al., 2012). In this study, we would like to go further and to explore whether knowledge sharing among firms, universities and government organizations (supported by VRI regional innovation development program) positively influence on alertness development and thus on innovativeness. This discussion leads to the following proposition:

*Proposition 1: The higher the level of entrepreneurial alertness, the greater the number of innovations adopted by their new ventures.*

*Proposition 2: The higher the level of entrepreneurial alertness, the greater the extent to which these innovations are radical rather than incremental in nature.*

#### *3.2. Regional innovation networks*

Increasing of organization's capability to generate innovations positively influences on competitiveness (Baron and Tang, 2011; Katila, 2002). Human, social and organizational capital influences on innovative capabilities (Subramanian and Youndt, 2005). The Governments of many countries pays a lot of attention to support of innovation networks (Harmaakorpi and Melkas, 2005). It is believed that high knowledge level among practitioners helps them to be more aware of different innovation approaches. Thus governments try to improve the knowledge and competence level through the various kinds of support measures (i.e., competence brokering, mobility schemes, dialog conferences, and pre-project funding). The following propositions are derived:

*Proposition 3: Membership in innovative networks is positively and significantly associated with an entrepreneurial alertness; and an entrepreneurial alertness will be positively and significantly associated with innovation.*

*Proposition 4: Knowledge sharing in innovative networks is positively and significantly associated with an entrepreneurial alertness; and an entrepreneurial alertness will be positively and significantly associated with innovation.*

*Proposition 5: Training and experience is positively and significantly associated with an entrepreneurial alertness; and an entrepreneurial alertness will be positively and significantly associated with innovation.*

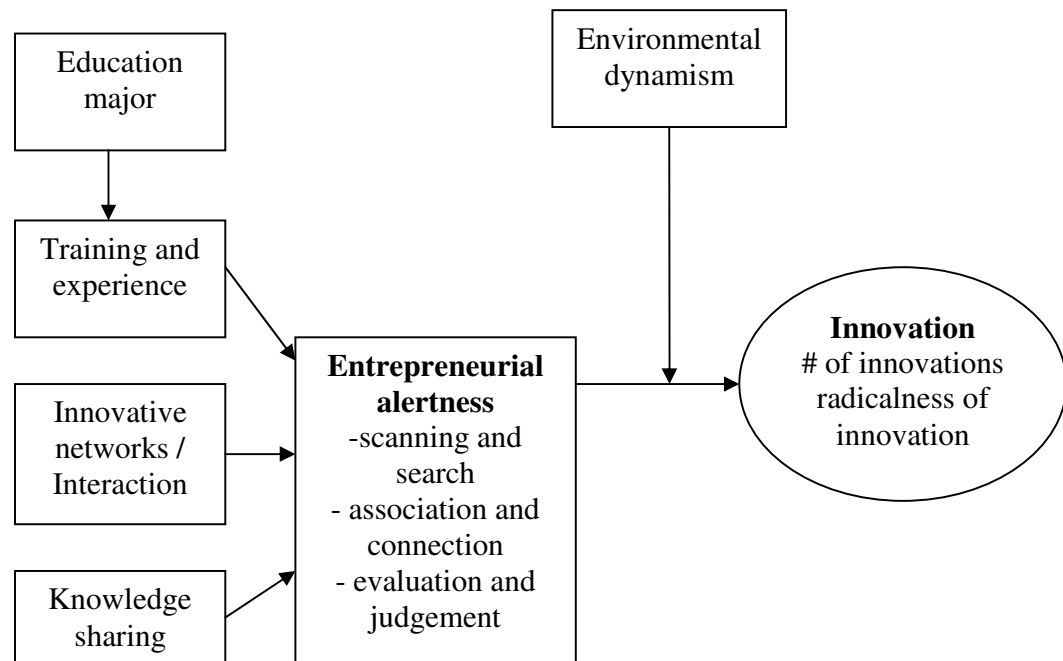


Fig. 1. Research model

### 3.2. Environmental dynamism

This research will explore moderating role of environmental dynamism on relationship between entrepreneurial alertness and innovation. Environmental dynamism referred to “perceived frequency of change and turnover in the marketing forces of the external / task environment” (Sohi, 1996: 50). The moderating role between different factors and innovation is empirically supported, i.e. between creativity and innovation (Baron and Tang, 2011). Some research suggest that entrepreneurs in more dynamic environments are more alert (Yu, 1997). Miles et al. (2000) suggested that environmental dynamism related to frequency of market strategy change, rate of obsolescence of the firm’s products and services, predictability of competitors’ actions, predictability of consumer tastes, and frequency of changes in firm’s product technology.

Thus, we derive the following propositions:

*Proposition 6: Environmental dynamism moderates the relationship between entrepreneurial alertness and innovativeness, such that this relationship is stronger in highly dynamic than in more stable environments.*

#### **4. Conclusions**

Propositions 1 and 2 are concerned with the relationship between entrepreneurial alertness and (a) number of new product and/or services introduced during the last 5 years, and (b) radicalness of innovation. Propositions 3-5 propose to check the possible mediation effect of entrepreneurial alertness between education major, membership in innovative networks, knowledge sharing in innovative networks and innovativeness. Proposition 6 checks the moderating effect of environmental dynamism.

##### *4.1. Implications*

The results from this research will provide policy-makers and practitioners with additional insights into the key interaction and knowledge-sharing factors associated with the entrepreneurial alertness and innovation development on a firm level. Regional Innovation and R&D Support Program introduced in Norway in 2007. The policy-makers interested in measuring the effect of the introduced innovation support measures. This study will help them to estimate the effect of various kinds of support (i.e., competence brokering, mobility schemes, dialog conferences, and pre-project funding). The results may help policy-makers to design unique training and support programs for innovation-oriented firms. The study will be interesting for practitioners willing to increase the innovation ability of their firms. Practitioners will benefit from empirical data on which previous knowledge, education, and training are associated with entrepreneurial alertness and innovation capabilities of (R&D) managers and employees. Practitioners will also benefit from information whether participation of firms employees in different types of knowledge sharing programs supported by the Government associated with innovativeness.

Finally, the results of the study will be useful for entrepreneurship and innovation scholars. The results will provide empirical evidence for a link (or not) between entrepreneurial alertness and innovation. This link has been suggested by previous research (Tang et al., 2012) but no empirical support has been provided.

##### *4.2. Value*

The study will add to the existing knowledge base in innovation, interaction within networks, entrepreneurial alertness and environmental dynamism. The novel contribution of this study is synthesis of several theoretical views into one model. The study also will add to understanding of the role of entrepreneurial alertness in innovativeness. Further research might use multiple hierarchical regressions to examine the effects of independent and control variables on innovativeness and to check the direct and mediation effects of educational majors, prior knowledge, participation in networks, membership in networks, entrepreneurial alertness and environmental dynamism. The derived propositions will be tested in three steps, following a procedure suggested by Baron and Kenny (1986) using multiple hierarchical regressions. We will check the first condition that states that the independent variable must affect the mediator. Condition



two that the independent variable must affect the dependent variable will be checked next. Then we will test the third condition (Baron and Kenny, 1986), suggesting that the mediator (entrepreneurial alertness) must affect the dependent variable.

The findings will highlight whether environmental dynamism moderates or not relationship between alertness and innovativeness. The study will check the mediating role of entrepreneurial alertness between previous knowledge, participation in knowledge sharing programs supported by the Government, membership in innovation networks and innovativeness of the firms. The important contribution of this study is an attempt to link individual-level variables with organizational-level variables. In order for the field to develop further, there is a need in both quantitative and qualitative research. This study intends to provide a background for the quantitative study on a possible link between prior knowledge, training and participation in networks and knowledge sharing activities and entrepreneurial alertness, and a possible relationship between alertness and innovation by firms in four priority clusters. Further research might be qualitative. Qualitative study can be designed to answer *how* and *why* questions related to the issues which will be explored in this research.

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