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# The future role of the research institutes

Norway has unique opportunities to establish sustainable knowledge-based businesses in collaboration with the EU.

## Introduction

The EU's strategy is to develop leading international European innovation networks, and Norway has several businesses that can act as key network hubs. As a global economic block, Europe is increasingly lagging behind Asia and America, and the EU views this challenge as its principal *raison d'être*<sup>1</sup>. EU strategies for addressing this challenge open the door to major opportunities for Norway. The rapid development of the European Research Area (ERA)<sup>2</sup> is leading to major changes which, with the help of proper political initiatives, will lay the foundation for new, knowledge-based wealth creation in Norway.

The Norwegian research institutes will continue to play a key role in the domestic arena. Norway possesses a business structure comprising a high proportion of small and medium-sized businesses whose future innovation processes will continue to benefit from active collaboration with the research institutes. In addition, Norway shares with other countries regional research needs which in the future will also be addressed to a large extent by its domestic research organisations.

This article addresses those elements of the research institutes' future functions which do not represent a direct extension of their current roles. It also describes the research institutes' key role in the European innovation arena, and concludes with recommendations to the Norwegian authorities as how we can make the most of the opportunities.

## Key development trends

The future is uncertain, but there are a number of clearly defined development trends which are likely to continue. One of these is *globalisation*, which in practice entails that in many respects the relevance of national frontiers and the physical distance between organisations is reduced. A second development trend is the *increased complexity* inherent in products and services. The result of this is that the innovation system is becoming increasingly grounded in the concept of *open innovation*. Open innovation entails that principally we are making use of research and development taking place outside the business premises, and are exporting the results we have already exploited or do not wish to exploit<sup>3</sup>.

Key characteristics of open innovation include working in networks and specialisation. Today, this commonly takes place via the utilisation of global innovation networks, and only to lesser extent within the boundaries of individual countries. Consequently, a limited number of regions develop into hubs within the global innovation networks<sup>4</sup>. The hubs represent a geographical concentration of companies and research institutes within a given sector, field of technology or value chain.

## Globalisation and Europe

As far as Europe is concerned, these development trends generate major challenges, firstly because the countries themselves are small in a global context, and secondly because there is only lim-

<sup>1</sup> *Seeing through the hallucinations: Britain and Europe in the 21st century*, J. M. Barroso, 2006

<sup>2</sup> *SINTEF's posisjon i det europeiske forskningsområdet*, (SINTEF's position in the European Research Area. In Norwegian), Ernst H. Kristiansen, 2010

<sup>3</sup> *Open Innovation: Researching a New Paradigm*, H. Chesbrough, et al., eds., Oxford University Press, 2006

<sup>4</sup> *The new age of innovation: driving cocreated value through global networks*, C. K. Prahalad, M. S. Krishnan, McGraw-Hill, 2008

ited coordination at the European level. An overall target is thus to achieve a better distribution of research work across Europe as a whole. This will mean that unlike the current situation, not all countries will be able to carry out research into almost anything.

In the context of global competition, and in order to secure its future prosperity, it is essential that Europe succeeds with this strategy. Since Europe does not possess a strong central power base, this development must take place by means of a collaborative effort between the EU's central administration and its member countries<sup>5</sup>. The various European countries entertain ambitions to become hubs within the innovation network in fields where they feel they are particularly well qualified. For certain European regions, the achievement of hub status will provide major opportunities for increased wealth creation. We are thus entering a period during which it will emerge which European regions will assume dominance within key business areas, and the regions themselves are busily positioning themselves in order to claim roles corresponding to their respective aspirations.

This development has considerable significance for individual European countries, and not least for Norway. Norway is well qualified to assume a leading role in both a European and global context within a small number of fields among which energy and the environment<sup>6</sup>, and the maritime cluster<sup>7</sup>, represent the most conspicuous candidates<sup>8</sup>.

### Open innovation in Europe

The European innovation networks represent arenas for open innovation. The industrial sector forms the largest and most important organisational grouping because it is here that the majority of wealth is generated and captured. In order to survive in the short-term, it is essential that industrial companies offer products and services that are in demand at competitive prices. Their long-term survival requires that they employ parallel innovation processes from which they develop new or improved products and services that can be competitive in the future.

It is no secret that it is irrational for industrial companies to invest the high level of resources regarded as optimal from a socio-economic perspective<sup>9</sup>. The aim of open innovation is to achieve costs savings by drawing on research carried out outside the premises of the business itself. Open innovation allows us to bring together the disparate and sometimes contradictory considerations (paradoxes) linked to investment in research, such as:

- It is not possible to develop a framework for the creation of a market driven by supply and demand that regulates the level and focus of research activities<sup>9</sup>
- We achieve the highest levels of socio-economic efficiency by managing know-how as a common resource and by permitting free access to all those who are able to exploit it<sup>10</sup>, e.g. by prompt publication in open literature.
- It is irrational for an industrial company to fund research that is published in the open literature before it has exploited the results in the form of the development of new products and services
- It is frequently impossible to patent the research results which

form the basis of specific, wealth-generating industrial applications.

- It is often possible to protect the specific know-how required as the basis for the provision of certain products and services.

The core concept behind open innovation is to move major components of research into an area to which there is free access to all or, as appropriate, to a consortium of stakeholders. Open innovation thus has the potential to generate considerable costs savings for industrial companies by allowing them greater access to ideas and large economies of scale, while at the same time achieving high levels of socio-economic efficiency because the know-how developed is shared among many. Seen in this light, both the industrial companies and society as a whole have a common interest in carrying open innovation forward. A major and crucially important part of this exercise is to bring together a grouping of industrial organisations within which all parties achieve costs savings. This will depend on finding an adequate level of common interests and issues to the extent that the savings achieved by participating in a coordinated research activity outweigh the costs incurred by the coordination process and the possible costs incurred if the know-how should leak to competitors.

Open innovation is nothing new. Norway and other European countries have been working with open innovation on a domestic scale to a greater or lesser extent for many years. In Norway, the oil and gas sector has been a benchmark exponent for open innovation. The Research Council of Norway acts as a key facilitator for open innovation, in particular by means of initiatives such as Knowledge-Building Projects with User Involvement (KMB), Centres for Research-Based Innovation (SFI) and Centres for Social Science-Related Energy Research (FME). Open innovation is also carried out at a European level as part of the EU Framework Programme for Research and Development. However, the scope of this initiative has so far been limited in comparison to activities carried out under the auspices of individual member countries.

### The role of the research institutes

As time passes, the distinction between basic and applied research is gradually being erased, and developments in the direction of open innovation powerfully reinforce and accelerate this trend. This is due to higher levels of specialisation and the fact that an increasing proportion of research is published very quickly. This has promoted changes in the way in which research providers allocate their respective roles. Traditionally, the comparative advantage enjoyed by the universities as providers of basic research funded by the public purse has been linked to the fact that they publish their results in the open literature.

The research institutes also want to publish, but their opportunities to do so are constrained by closed innovation processes. In an open innovation environment, the research institutes obtain a comparative advantage because they operate both in the restrictive and non-restrictive arenas.

It is a fact that the research institutes have a crucial role in open innovation activities carried on in Europe<sup>11</sup>. They act as *network en-*

<sup>5</sup> In this context, Norway can be regarded as a member country.

<sup>6</sup> During this century, renewable energy and environmental technology will constitute the largest global growth market.

<sup>7</sup> Maritime businesses, shipping, seafood and biomarine businesses.

<sup>8</sup> *Hva kan Norge lære verden?*, (What has Norway to teach the world? In Norwegian), F. Winther, et al, Kronikk Aftenposten 22.10.2009

<sup>9</sup> *Economic Welfare and the Allocation of Resources for Invention*, K. J. Arrow, 1959

<sup>10</sup> *The Simple Economics of Basic Scientific Research*, R. R. Nelson, 1959



entrepreneurs which assemble and link together consortia made up of industrial companies and R&D providers. Together with the universities and the industrial sector, the research institutes also make important contributions towards shaping research policies. Among Norwegian organisations, the research institutes exert a dominant role in the open innovation arena, both on the domestic front and in relation to the EU. Even though the Norwegian research institutes were not established with this aim in mind, they possess the optimal attributes<sup>12</sup> to enable them to assume the role of network entrepreneurs in an international open innovation arena.

### Norwegian opportunities in Europe

The current landmark event now opening the door for new and major opportunities is that the EU is preparing the ground for a massive increase in open innovation which will take place principally in the form of collaborative initiatives between the EU and its member countries. This development entails enormous opportunities for increased wealth creation in Norway.

#### Recommendations

In order to release this potential, Norway must create an environment that is attractive for the establishment of innovation hubs<sup>13</sup> within the fields in which Norway is especially qualified to assume key positions.

In order to make a success of this, it is essential that the Norwegian authorities are proactive and visible in the relevant European arenas. They must understand the processes, identify Norwegian opportunities, strategically position Norwegian interests, and get the relevant Norwegian organisations involved. SINTEF believes that the Research Council of Norway has understood this at all levels within its organisation, and that in the course of a relatively short time has established an exceptionally expert and functional organisation dedicated to addressing these issues. In SINTEF's opinion it is crucially important that the Research Council of Norway is granted terms of reference that provide it with the opportunity to continue and develop this work.

Another key qualification permitting Norway to create innovation hubs is that we possess organisations that can assemble and maintain such a network. In both the energy and maritime sectors Norway possesses recognised research institutes that are making their mark in competitive European and global environments. These institutes are already major international network entrepreneurs in their respective fields. The technical-industrial Norwegian research institutes operate under terms of reference that are entirely different from those in other European countries<sup>11</sup>. This is a true barrier that prevents Norway from taking advantage of the great opportunities on offer to us. In this context, the author refers to the article addressing SINTEF's position in the European Research Area<sup>2</sup>. SINTEF recommends that the Norwegian research institutes obtain terms of reference on a par with other European countries as soon as possible.



**The EU is focusing on promoting Europe's global competitiveness by developing concentrated innovation networks that include both industrial companies and research institutes. The figure illustrates one such possible development of an innovation network within a predefined field. Norway should aspire to become a network hub within selected fields since this provides opportunities for sustainable and knowledge-based business development.**

<sup>11</sup> *Europeiske forskningsinstitutter*, (European research institutions. In English), Ernst H. Kristiansen, 2010

<sup>12</sup> Independent non-profit project organisations which depend on winning research projects on the basis of competitive tenders, are involved in integrated collaboration between academia and the industrial sector, and which are familiar with handling both restricted and openly available information.

<sup>13</sup> *Et kunnskapsbasert Norge: Et agendasettende nasjonalt forskningsprosjekt*. (A knowledge-based Norway: an agenda-setting national research project. In Norwegian). Torger Reve, 2009.

In fields where Norway has ambitions to establish European innovation hubs, the authorities must ensure that the research institutes maintain a high international standard. It is in the nature of things that the focus must be directed towards certain selected fields. SINTEF believes that a major emphasis on competitive tendering processes by which only the best projects are successful, is essential in order to guarantee efficiency and international competitiveness among the Norwegian research providers.

In addition to factors such as the technical quality of the research,

its relevance on an international scale, innovation potential and the potential for wealth creation, greater focus must be directed than before on robust international industrial consortia. SINTEF recommends that the Norwegian authorities establish relevant targets and strategies within the fields in which Norway can make its mark on the international stage. This is vital both for Norway's position in Europe, and for its future growth in prosperity. The issue thus concerns several of the technical ministries. The Research Council of Norway should assume a key role in this work.