INNOVATION IN THE NORDIC-BALTIC SEA REGION

A Case for Regional Cooperation

Dr. Sylvia Schwaag Serger and Emily Wise Hansson

VINNOVA

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About IKED:
IKED is an independent, non-profit association and international organisation focusing on the emerging issues of the knowledge-based economy.

IKED specialises in activities linking the primary actors forming the knowledge-based economy: government, industry, academia and civil society. The organisation engages in international networks, arranges policy forums and policy reviews, and works with partners aiming for reforms and concrete actions in support of the development and use of knowledge.

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HIGHLIGHTS

- Increasingly, economic growth and competitiveness are driven by the ability to innovate. Innovative ability, in turn, is dependent on the successful interaction between firms, universities and the public sector.
- Linkages between these three main actor groups (firms, academia and government) exist on many levels: local/regional, national and international. The term *innovation system* refers to the importance of these multiple forms of interactions for catalyzing innovation and improving economic performance.
- The latest progress reports on European competitiveness and the Lisbon agreement highlight the importance of connecting the different economic actors, both in tangible (e.g. infrastructure and communication networks) and intangible (e.g. forming a common vision among the various stakeholders) ways. The fastest-growing regions are those that have most successfully managed to integrate - within the region and into the international competitive system.
- The Nordic countries are world leaders in innovation and competitiveness indicators; the Baltic countries, Poland and Russia exhibit remarkable dynamism and momentum for change - with high GDP growth and the strongest improvements in many innovation indicators. The region shares strong historical ties, growing trade and FDI flows, and increasing interest in forming a common platform for discussion, policy exchange and action in the field of innovation.
- The eleven countries of the region constitute a diverse mix of strengths, experiences and approaches to common issues. Each country has a unique profile. For example: Denmark exhibits its entrepreneurial spirit by continually testing new approaches to public-private partnerships (in a newly formed innovation council and in a venture capital fund), but is often confronted with a lack of political consensus on the policy level. Norway has succeeded in establishing an inclusive, consensus-oriented forum for developing innovation policy, but is uncertain how to transform/upgrade its industrial structure and reduce its economic dependency on the oil industry. Estonia has shown impressive performance in its transition to a market economy (in economic growth, institutional stability, and sustained improvement in many of the innovation indicators). However, there is concern over Estonia's medium-term ability to maintain this performance and find its own competitive niche - as high dependency on trade, FDI and other factors are outside of its national sphere of influence.
- There are indications that the Nordic-Baltic Sea region can develop to become a world-leading region for innovation. Common values, structures and priorities in the areas of health, environment and the balance between economic growth and quality of life form a strong platform on which to build. The unique national profiles provide an impressive source of experience and viewpoints from which to draw. There is a clear opportunity both for policy learning and for cooperating on

concrete key issues and initiatives, and thus to improve the innovative strength and (economic) performance of the region as a whole.

- In order to realise the above-described potential, different approaches are required. The creation of a structured process, in which all key stakeholders can develop a shared understanding of key issues and possible actions, can help the individual countries, and the region as a whole, move forward.
- The cooperation should not only be inclusive, structured and analytically-based, but also be anchored with key decision-makers, linked to existing institutions and policy processes, and facilitated by a neutral party in order to encourage open discussion and bridge the traditional national perspectives.

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I. INTRODUCTION

The world economy has undergone a number of profound changes in recent decades. The collapse in the costs of diffusing and using information, the shortening of product cycles, driven both by an accelerating pace of technological change and rapidly shifting consumer patterns, the progressing internationalization and liberalization of exchanges and interactions (commercial, financial, cultural, etc.) are some of the developments that are transforming the determinants of competitiveness and wealth creation. These ongoing structural changes are reshaping societies, summed up in terms such as *information society*, *knowledge economy*, *new economy, globalization*, and so on.

In the last few years, the concept of innovation driving economic growth and competitiveness has gained increased visibility. In this context, it is important to point out that innovation is not just about creating high-tech products or companies. Nor is it just about research which leads to the creation of new products. Innovation refers to new processes and ways of doing things, as much as it does to new products.

> *Innovation is viewed as a multi-dimensional concept, which goes beyond technological innovation to encompass, for example, new means of distribution, marketing or design. Innovation is thus not only limited to high tech sectors of the economy, but rather an omnipresent driver for growth.*
>
> (Erkki Liikanen, EU Commissioner for Enterprise and Information Society)

Furthermore, the generation of new knowledge and ideas is not a guarantor of, or sufficient condition for, successful innovation. The fruitful interaction between and among firms, academia and the public sector is critical for transforming new knowledge and ideas into commercially viable products, economic growth and improved living standards. The importance of these interactions is captured in the concept of *innovation systems*. Finally, innovation should not be seen as limited to the lab or research institute, but must also extend to the student, the entrepreneur, the growing company, and even the public sector.

The growing importance of the ability of firms, institutions and countries to innovate has far-reaching implications for strategy or policy choices, both in the private and public sector. The key question is what policymakers, private sector leaders, academics, and entrepreneurs can do, both separately and acting together in an *innovation system*, to catalyze innovation (and hence growth and increased competitiveness) in their economies.

The countries of the Nordic and Baltic Sea region[1] are all facing challenges to their long-term economic growth and competitiveness. The Nordic countries, despite their leading position on innovation and technology indicators, are confronted with a number of issues which pose serious potential threats to the stability and long-term viability of their social welfare systems and economic development in the coming decades (Dreyer Lassen et.al. (2002)). Germany, too, is experiencing sluggish economic growth and concerns over its long-term competitive-

1 Eleven countries (or regions within countries) including: Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Poland, Norway, Russia, and Sweden.

ness. The Baltic countries, Poland and Russia are in various phases of transitioning from planned to market economies, undergoing massive restructuring of financial systems, educational and institutional structures, and information and communication infrastructure. While these countries are generally experiencing high growth and rapid convergence to levels of neighbouring countries in the region, there is concern over the sustainability of these changes. Will these countries be able to maintain this momentum and dynamism in the longer-term?

Both the Nordic and Baltic Sea countries are looking to innovation and innovation policy as pivotal for tackling the structural challenges facing their economies. In addition to their common search for innovation policy solutions and close traditional cultural links, the Baltic and Nordic countries share many other priorities and interests: they are striving for sustainable economic development around the Baltic and North Seas, most of them are small, open economies (with the exception of Poland, Germany and Russia which have large domestic markets), they have close commercial ties with each other, and tend to have well-educated labour forces.

Furthermore, there are numerous indications, firstly, of complementarities and synergy potentials of the economic strengths of the countries in this region, and, secondly, of more or less developed linkages between these countries' innovation systems. In light of these factors, and, given the end of the East-West division of Europe, there may now be a historic opportunity to strengthen the conditions that could enable the Nordic-Baltic Sea region to become an economically strong, highly integrated and dynamic region, characterised and connected by regional specialisation processes, cross-border clusters and public-private partnerships, and large foreign direct investment flows.

The countries within the Nordic-Baltic Sea region stand to benefit significantly from exchanging policy views and experiences regarding innovation and enterprise development, and from discussing and agreeing on common initiatives and policy solutions for strengthening their innovation systems and the overall competitiveness of the Nordic and Baltic Sea countries. Such cooperation could enhance the benefits of the regional economic integration of the Nordic-Baltic Sea area.

The purpose of this paper is to introduce a wide audience to (i) the concept of innovation; (ii) the current innovation performance, policies, and governance in the Nordic-Baltic Sea Region; and (iii) the potential of regional cooperation for strengthening innovation. The report, prepared in connection with the Baltic Development Forum's 2004 summit in Hamburg, presents a basic overview of innovation in the region, and introduces issues that will be addressed in more depth over the course of the coming year. A follow-up report will be prepared for next year's summit in Stockholm, presenting a more detailed assessment of some of the issues introduced here.

The report is structured as follows. After explaining innovation and the importance of innovation policy, we present a brief overview of innovation indicators, institutions and issues in the Nordic-Baltic Sea region. We then identify some of the opportunities to strengthening innovation on a broader, regional basis, and, finally, consider some conditions for increasing regional cooperation on innovation and enterprise development.

II. INNOVATION – A PRIMER

Innovation can be defined as "the successful production, assimilation and exploitation of novelty in the economic and social spheres" (see European Commission (2003f), p.5). At firm level, innovation is driven by market pressures and opportunities. Thus, "[e]nterprises are spurred to innovate by pressures and challenges, notably competition and the desire to create new market space" (European Commission (2003f), p.5).

Innovation is not a new phenomenon. Companies have always looked to new products, processes or services as a means of improving productivity and profitability. However, whereas traditionally innovation has been taken for granted or viewed as an *exogenous* variable ('you either have it or you don't'), in recent decades enterprises and governments alike have increasingly recognized, firstly, the importance of innovative capacity for competitiveness, economic growth and prosperity, and, secondly, that innovative performance is *endogenous*, in the sense that it is significantly influenced by policies, business strategies, and framework conditions.

The heightened focus on innovation can be explained by a number of factors. One such factor is the shortening of product cycles, driven by the accelerating pace of technological development, on the one hand, and the growing volatility of consumer patterns, on the other hand. The increasing rate of change puts growing pressure on companies' ability to innovate. As stated by the European Commission:

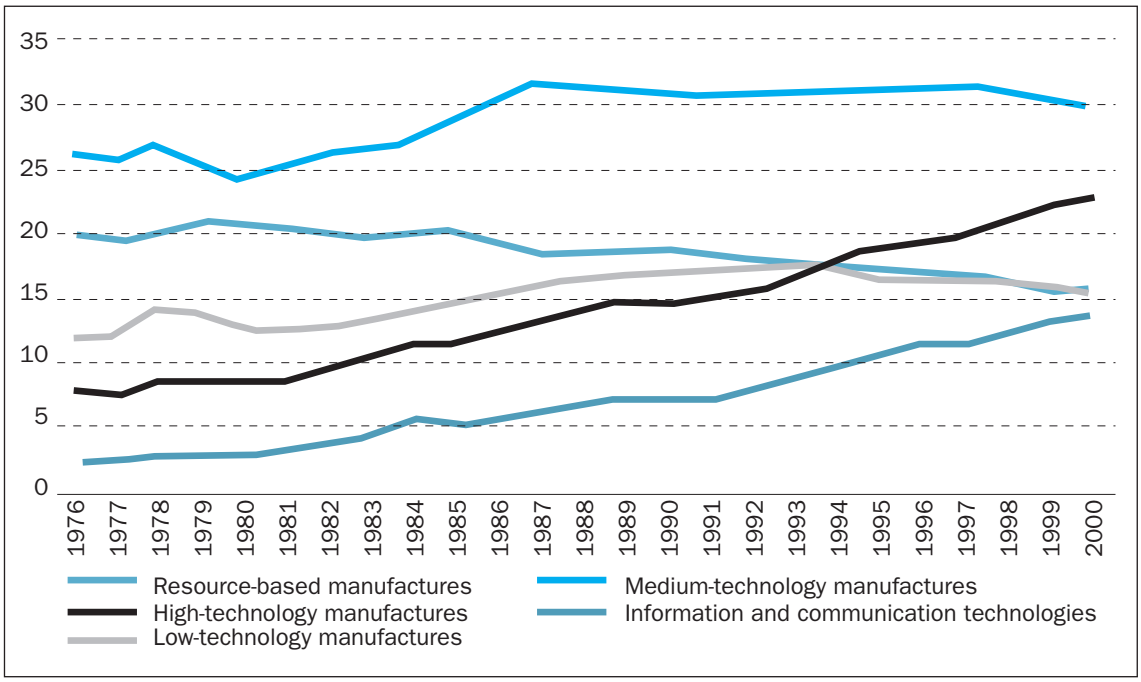
> *In many business sectors, an enterprise that allows itself to lag behind in the race to generate new or improved goods and services, and better ways to produce or run them, is putting its future on the line.* (European Commission (2003f), p.6).

As a result, the speed and efficiency with which innovation is diffused through the economy becomes increasingly instrumental to productivity, economic growth and prosperity (ibid.).

The growing significance of innovation is reflected in indicators of international trade, sectoral growth, and firm performance, which show that products and production processes that engage technology and skills intensively are on the advance (Drucker, 1993). This trend is reflected, among other things, in the rapid increase in the share of world trade made up of high-technology products (see Figure 1).

The growing interest in innovation is partially linked to a fundamental shift in economic policy orientation in many industrialized countries. As a result of the traumatic experiences and at times devastating consequences associated with hyperinflation and currency instability in the 20th century, throughout most of the past century, economic policy has focused on macroeconomic stability as the key guarantor of growth and prosperity. In recent decades, however, there has been a growing realization of the importance of microeconomic conditions. The low growth and economic stagnation experienced by a number of EU Member States, at a time of general economic stability, underline that countries cannot rely on favourable framework conditions alone to ensure competitiveness and growth. Thus, in addition to macroeconomic stability, growth and prosperity are now seen to depend crucially on

Figure 1: Changes in the Composition of International Manufactured Trade (according to technology)



Source: UNCTAD (2002)

the ability of individuals and organizations to generate, access and utilize knowledge and information.

As a result, researchers and decision-makers from both the public and private sector have become greatly interested in understanding what drives innovation, and what firms and countries can do to strengthen innovative performance.

Firms are at the core of successful innovation. As stated in a recent publication by the European Commission:

> *Since it is through enterprises that the economic benefit of the successful exploitation of novelty is captured, the enterprise is at the heart of the innovation process. Innovation must have its ultimate effect on enterprises: their behaviour, capabilities and operating environment. It is the enterprise that organizes the creation of value.* (European Commission (2003f))

At firm level, innovation increases competitiveness in two ways. Firstly, innovation can lead to greater productivity, and thus competitiveness, through improved production, organisation, distribution and other processes. The development and introduction of the assembly line, just-in-time or lean management are classic examples of innovation in production, organisation and distribution. Secondly, innovation can lead to new products, services or strategies (including marketing or financing strategies) which allow companies to secure

existing market shares and/or penetrate new markets or market segments. In practice, the two kinds are not mutually exclusive, but the emphasis may vary across different kinds of economic activities.

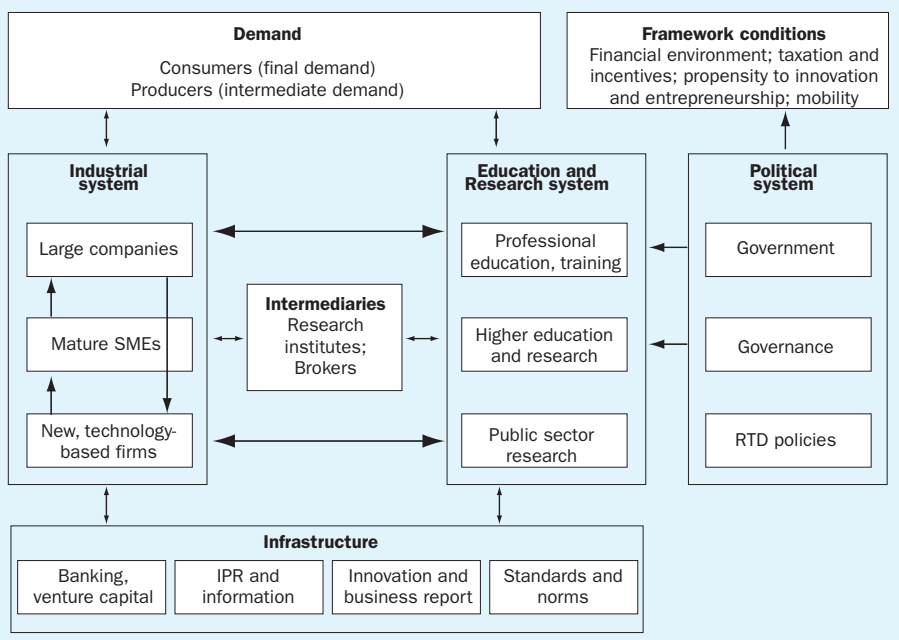
Innovation and Innovation Systems

The European Commission officially defines innovation as the renewal and enlargement of the range of products and services and the associated markets; the establishment of new methods of production, supply and distribution; the introduction of changes in management, work organization, and the working conditions and skills of the workforce (European Commission (COM 1995/688)). Traditional perspectives have viewed innovation as closely related to science and technology. These aspects have not become less important as seen, for instance, from the increased frequency of scientific references in patents (OECD (2003)). On the other hand, innovation can take many forms, including commercialisation of science and technology as well as the development and implementation of new ideas more generally, as in the form of organizational change or inventing new ways of doing things.

> *In many enterprises, the focus is not on technological aspects but on innovative ways to improve their position in the market* (European Commission (2003f), p.6). *Also, leaders in technology development are not necessarily leaders in technology adoption.* (ibid., p.8)

Rather than being a one-dimensional, linear process leading from certain input factors, innovation is the result of efforts by multiple actors, and is enhanced by their constructive interactions (see Figure 2 below). The concept of innovation has evolved from a linear model having R&D as the starting point, to the systemic model in which innovation arises from complex interactions between individuals, organisations and their operating environment (European Commission (2003a)). Structures and organisations that allow for effective exchange of information between stakeholder groups throughout the science and market development processes have a potential for greatly value-enhancing innovations. Further, the notion of an innovation system aims to capture the way in which various actors and functions interact in shaping performance in this area (Freeman (1987); Lundvall (1992)). It also serves to broaden the scope of the policymaker to encompass the factors and reforms that may be most important for freeing up the potential for innovation, irrespective of in which policy domain they are found (Metcalfe (1995)).

Figure 2: Innovation System Model



Source: Arnold et.al. (2003)

Based on the innovation system approach, innovation policy is a horizontal policy approach encompassing a wide range of areas and instruments and cutting across traditional policy domains. Areas that could be mentioned in this context are public research funding, industrial R&D support, patent legislation, ICT infrastructure and deployment, education and training, policy frameworks for networks and clustering, taxation, social policies, etc.

The Importance of Innovation

From a firm perspective, innovation leads to new products, processes and services which allow a firm to reduce its production costs, access new markets or market segments (either by being able to offer new products and services or through new distribution or marketing channels and systems), or develop new ways of doing things. Beyond the direct impact on the innovating firm, innovative activities of individual firms contribute to increased productivity, growth of existing firms, firm start-ups and employment. In addition to its effects on economic performance and competitiveness, business innovation / innovative companies "may provide society with new socially beneficial products, processes and services, inventions that may contribute to the solution of important social, cultural or environmental problems" (Koch et.al. (2003), p.5). Furthermore, innovative companies augment the general competence base in their field, and trigger learning processes which may benefit, or spill over into, other areas or sectors. In a recent article, Sena highlights the fact that innovations have multiple spill-over effects in an economy: individual firms' innovations facilitate the dissemination of knowledge throughout an economy, leading to an increase in the total stock of knowledge available to an economy. This, in turn, results in greater entrepreneurial activity

and increased competition between firms, which induces firms to use innovations to maintain a competitive advantage and a steady flow of profits (Sena (2004), p.F313).

Innovation is viewed as the key to growth and competitiveness in modern capitalist economies (Sena (2004)). The Lisbon agreement launched by the European Council in March 2000 made the enhancement of innovation a cornerstone in its strategy to meet the target of becoming the most competitive and dynamic knowledge-based economy by the end of the decade (European Commission (2003a), p.4).

Innovation is important not only for the individual firm but also for society at large (through its multiple spill-over effects), and for the role it plays in strengthening national economies. Investments in innovation have an impact on national economic growth and long-term competitiveness. These investments include everything from *improvements in education systems* (improving skill-levels) and *broadened information and communication technology (ICT) infrastructure* (encouraging access to and the spread of knowledge), to *strengthened cooperation between science and industry* (increasing applicability of research and the possibility to commercialize results) and *ameliorated policymaking and governance structures* (managing priorities and holding everything together). It is essential to develop an understanding of the various actors that are engaged – what drives each one of them and how they can strengthen each other through constructive interactions. Thus, just as important as it is to understand that innovation is comprised of many elements, it is imperative to grasp the concept that no ***one*** of these elements holds the key to increased innovation – leading to greater productivity and competitiveness. Given the importance of innovation for competitiveness, and the systemic nature of innovation and the need for governments to have a holistic view, coordination and priority-setting become essential.

Measuring Innovation

In order to set priorities for innovation policy, governments must understand what is being measured, and how their economic performance and innovative strength compare relative to appropriate benchmarks. In Europe, the primary instrument for measuring innovative strength is the *Trend Chart on Innovation in Europe* - which provides collection, updating, analysis and dissemination of information in innovation policies (and indicators) at national and EU level. One component of the Trend Chart is the *European Innovation Scoreboard* (EIS)[2]. The EIS is an annual presentation of quantitative data in four categories: human resources for innovation; the creation of new knowledge; the transmission and application of knowledge; and innovation finance, outputs and markets. The Scoreboard tracks 17 main indicators for all of the 25 member countries, 3 candidate countries (Bulgaria, Romania, Turkey), 3 associate countries (Iceland, Norway, Switzerland), the US and Japan.

In addition to the EIS, there are a number of sources measuring innovation on a more global basis:

2 A detailed explanation of the EIS and links to data can be found at: http://trendchart.cordis.lu/Reports/index.cfm?fuseaction=ReportInnovationHome

- The OECD's *Science, Technology and Industry Scoreboard*[3] measures over 200 indicators in its members countries under the following four themes: 1) the creation and diffusion of knowledge; 2) the information economy; 3) the global integration of economic activity; and 4) productivity and economic structure.

- The World Bank's *Knowledge Assessment Methodology* (KAM)[4] consists of a set of 76 structural and qualitative variables that serve as proxies for the four pillars that are considered critical to the development of a knowledge economy: an economic and institutional regime that provides incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship; an educated and skilled population that can create, share, and use knowledge well; a dynamic information infrastructure that can facilitate the effective communication, dissemination, and processing of information; and an efficient innovation system of firms, research centres, universities, consultants and other organizations that can tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new technology. The KAM compares indicators for a group of 121 countries, including most of the developed OECD economies and about 90 developing countries.

- The World Economic Forum's *Global Competitiveness Report*[5] presents two overall rankings for 102 countries: growth competitiveness and microeconomic competitiveness. Within the growth competitiveness ranking, there are three sub-indices including technology, public institutions and macroeconomic environment. Innovation, ICT and technology transfer are the three elements making up the technology index.

A summary of the main indicators for both the EIS and KAM is listed below in Table 1. It should be pointed out, however, that no indicator, or set of indicators, can give the full picture of innovation in a country, nor explain the background behind the measurements. It is important to understand the national context (what laws and regulations govern education, what fiscal incentives there are to R&D, etc.) as well as the methodology behind the figures (what is included as an R&D expense for a company, if measurements are reported in a similar manner among countries, if information is from a qualitative survey or factual data). This is, of course, where it gets very complicated, if not impossible, to truly measure and present an accurate picture of innovation in an economy.

3 More information can be found at the following link: http://www.oecd.org/document/21/0,2340,en_2649_37417_16683413_1_1_1_37417,00.html

4 For further information and a link to the KAM: http://info.worldbank.org/etools/kam2004/

5 Access to the executive summary and overall rankings of this report is available at: http://www.weforum.org/site/homepublic.nsf/Content/Global+Competitiveness+Programme%5CGlobal+Competitiveness+Report

Table 1: Innovation Scorecard Indicators

Summary Innovation Index-2 (European Commission)	Basic Knowledge Assessment Scorecard (World Bank)
Human resources	**Performance indicators**
S&E graduates	Average annual GDP growth
Population with tertiary education	Human development index
Participation in lifelong learning	**Economic incentive and institutional regime (pillar one)**
Employment in high-tech manufacturing	Tariff and non-tariff barriers
Employment in high-tech services	Regulatory quality
Knowledge creation	Rule of law
Public R&D expenditure	**Education and human resources (pillar two)**
Business R&D expenditure	Adult literacy rate
Innovation finance, output and markets	Secondary enrolment
Hi-tech venture capital	Tertiary enrolment
Early stage venture capital	**Innovation system (pillar three)**
Internet access/use	Researchers in R&D
ICT expenditures	Scientific and technical journal articles
Value-added in manufacturing	Patent applications granted by the USPTO
	Information infrastructure (pillar four)
	Telephones per 1000 population
	Computers per 1000 population
	Internet users per 10.000 population

Source: European Commission (2003d) and World Bank Knowledge Assessment Methodology

Furthermore, composite indicators suffer from considerable flaws or shortcomings and can, at worst, be dangerously misleading for policymakers. In his very useful critical assessment of composite indicators of country performance, Freudenberg (2003), identifies two major sets of problems with composite indicators. The first concerns the fact that composite indicators, particularly those aimed at comparing different countries, are constructed not around the information necessary for providing an accurate assessment of overall performance but around the information that is available. Thus, "[t]here is no meaningful way to adjust a composite for information that should be reflected in a performance measure but is not reflected in available indicators" (Freudenberg (2003), p.29). The second problem relates to the difficulty in weighting the different components, so as to "reflect the relative importance of individual indicators in determining performance outcomes" (ibid.).

Finally, innovation indicators suffer from the shortcoming that they tend to be biased towards technological innovation, at the expense of organizational or process-based innovation (European Commission (2003g, p.7). However, bearing in mind these limitations and need for contextual understanding, the indicators mentioned provide a widely-used basis for assessing and comparing, or benchmarking, innovation across countries.

The Role of Government in Strengthening Innovation

So far, we have established that innovation is an important driver for economic growth, competitiveness and prosperity, and shown different ways of measuring the innovative capacity and performance of an economy. Having accepted the importance of innovation does not automatically imply that governments can or should intervene in the market to promote innovation. Universities, research institutes, public authorities, unions, NGOs, and so on, all represent important players which may make vital contributions unrelated to government action. True, governments are in possession of key instruments and mechanisms for leveraging the contributions of other actors, but exercising them may invoke costs just as well as benefits. What is the rationale and role for policymaking aimed at stimulating or enabling innovation?

The first argument that can be listed as a rationale for government intervention to strengthen innovation is *market failure*. According to this argument, firms under-invest in R&D because they cannot appropriate all the benefits from their investment. To put it simply, the benefits of an investment in R&D undertaken by a firm or institution tend to spill over to other firms, institutions and society at large. While this can be argued to be a good thing from a societal perspective (enhancing productivity in other firms or sectors of the economy), the fact that competitors will potentially also be able to reap some of the benefits leads to firms under-investing in R&D. In this case, the social rate of return from R&D investment is higher than the profit reaped by the firm from a particular R&D investment. Due to this situation, there is a justification for government to intervene in the market and introduce measures aimed at stimulating or increasing R&D (Koch et.al. (2003), pp.4-6; see also Hauknes and Wicken (2003), p.5).

The second argument put forward as a rationale for innovation policy is *systemic failure*. This argument is rooted in the notion that the ability to innovate "is … not only dependent on how specific actors perform but also on how they interact with each other as elements of an innovation system" (ibid., p.6). Systemic failure exists when the interaction between key actors in the innovation system, i.e. interactions between firms, academia and the public sector, but also amongst firms, are not conducive to or optimal for generating or enabling innovation. When this is the case, there is a rationale for governments to introduce new policies, or modify existing policies, aimed at improving the functioning of the innovation system. From a policy perspective, designing effective measures for addressing systemic failures is more complex and less obvious than responding to the above-described market failure.

A third important rationale for innovation policy is the fact that existing government policies, ranging from tax policies, to patent legislation and national education systems, are already affecting or distorting the capability and willingness of individuals, institutions, and firms, to innovate. There is no such thing as policy neutrality. *Government, and policymaking, both advertently and inadvertently, play an important role in the innovation process and innovation system.* Thus, the European Commission points out that, implicitly or explicitly, the ability and willingness to innovate is influenced, and often hindered, by "competition, taxation, regional, environmental or education policies" (European Commission (2003e).

A recent analysis of biotech clusters in the United States, illustrates this fact. Thus, in examining critical success factors for the development of thriving biotech centres, Cortright and Meyer (2002) find that "Government policy plays an important role in almost every stage of the biotechnology industry" (p.9). They list a number of examples of how government policy impacts on the development of biotechnology firms and clusters, ranging from public support for R&D, to government subsidies of medical researchers, patent laws, and healthcare policies. In many of these areas, such as healthcare policies, promoting biotechnology is clearly not the primary focus of government policy. Yet, decisions such as whether to include coverage of particular drugs in national healthcare programs, have a strong impact on the development prospects of biotech firms and clusters. Cortright and Meyer conclude:

> *It is difficult to overstate the importance of these government decisions to the performance of this industry. Everything from fundamental questions of policy – can a gene sequence be patented – to mundane administrative trivia has a profound effect on industry development.* (ibid.)

Having established the rationale, one of the big challenges in designing successful innovation policies is that, generally, there is no specific, universally applicable, and direct policy intervention or measure that will always ensure results. Designing and implementing effective national innovation policies or strategies tends to be hampered by a number of challenges or pitfalls. Firstly, the systemic nature of innovation is not sufficiently reflected in the design, implementation, evaluation, and, perhaps most importantly, the organisation, of innovation policy. As observed by the European Commission:

> *…because innovation is everywhere, it is nowhere. Public administrations often show too much conservatism in their processes for innovation policy development, by rigid adherence to orthodox definitions of departmental 'territory'. Dealing with a policy without a well-defined 'territory' or an administrative home is a major challenge.* (European Commission (2003f), p.9)

A second challenge can be found in the fact that, "vested interests and incumbents will generally find it easier to gain the ear of policymakers than innovators trying to break through, so here too there is often an implicit bias against innovation" (European Commission (2003e), p.6). Finally, a third pitfall of innovation policy is that it tends to be biased towards promoting technological innovation. This is partially a reflection of the difficulty in measuring, and therefore targeting, innovation in services and process or organizational innovation.

These pitfalls show that, while few would dispute the importance of innovation for economic performance and growth, designing successful policies for promoting innovation is neither a simple nor obvious task. Based on the above observations, a successful innovation policy can be defined as one where all policymakers are conscious of the importance and needs of innovation and are constantly taking these aspects into consideration when designing and implementing policy in their own fields. Furthermore, successful innovation policy depends not only on how it is designed and implemented but also on who governs it. Thus, governance plays a decisive role in determining effectiveness and success in promoting or

enabling innovation. In the following chapter, we take a closer look at how innovation policy is designed and governed in the individual countries in the Nordic-Baltic Sea region.

Summary

Rather than being limited to hi-tech inventions, innovation is all-pervasive and includes changes in management, organisation, and the conditions and skills of the workforce. Innovation is important for its impact on increasing productivity (through improved products and processes) and employment (through new firms and firm growth), which in turn impacts a country's economic growth and competitiveness. Innovation is on centre stage not only for its impact on economic growth and competitiveness, but also for its inherent benefits on improving social well-being and standards of living through its multiple spill-over effects.

Innovation and its impact on economic growth is not a new phenomenon, nor should it be viewed as a goal which, once achieved, requires no further attention. Whereas many different actors are importantly involved, and each one of them may make critical contributions, policies come into play through a number of mechanisms. For these reasons, policymakers around the world are working to better understand innovation and innovation systems – how the different elements are inter-related and how they best can move the levers of policy action to catalyse innovation in their economies. In the next chapter, we take a closer look at the current situation with regard to innovation policy performance and governance in the Nordic-Baltic Sea region.

III. AN OVERVIEW OF INNOVATION IN THE NORDIC-BALTIC SEA REGION

The countries of the Nordic-Baltic Sea region form a unique and very interesting sample of innovative performance, potential and policy action. The Nordic countries and Germany are typified by their leading positions in many competitiveness and innovation indicators, as well as GDP per capita and human development indices. These countries have impressively high investment in R&D, internet and computer usage, and mobile phone penetration. They lead in patents and scientific publications, as well as employment in high-tech sectors. On the other hand, the Nordic countries and Germany are experiencing relatively slow growth and increasing concerns over the long-term viability of their social welfare systems. With ageing populations, a high incidence of sick leave, and financially-strained health and childcare systems, these countries are pushed to consider major reforms to their economic systems – finding ways to get a higher return on their research investments and closer collaboration between science and industry.

The Baltic countries, Poland and Russia rank much lower on international indicators of competitiveness, political and economic stability. These countries are still completing the transition from planned to market economies – having to completely restructure financial systems, re-vamp educational structures, build-up infrastructure and ICT systems, and privatise a large majority of companies. Despite the major changes and strains of the last decade, these countries are showing impressive performance – with annual GDP growth rates in excess of 6-7%, major improvements in ICT usage, and continued strength in their scientific and research assets. Yet, there is still a long way to go before these countries reach prosperity levels equivalent to their other European neighbours. Also, policymakers are concerned over the ability of their countries to continue the dynamism and momentum of the past decade – maintaining the growth and structural changes as they approach "convergence" with the older EU Member States.

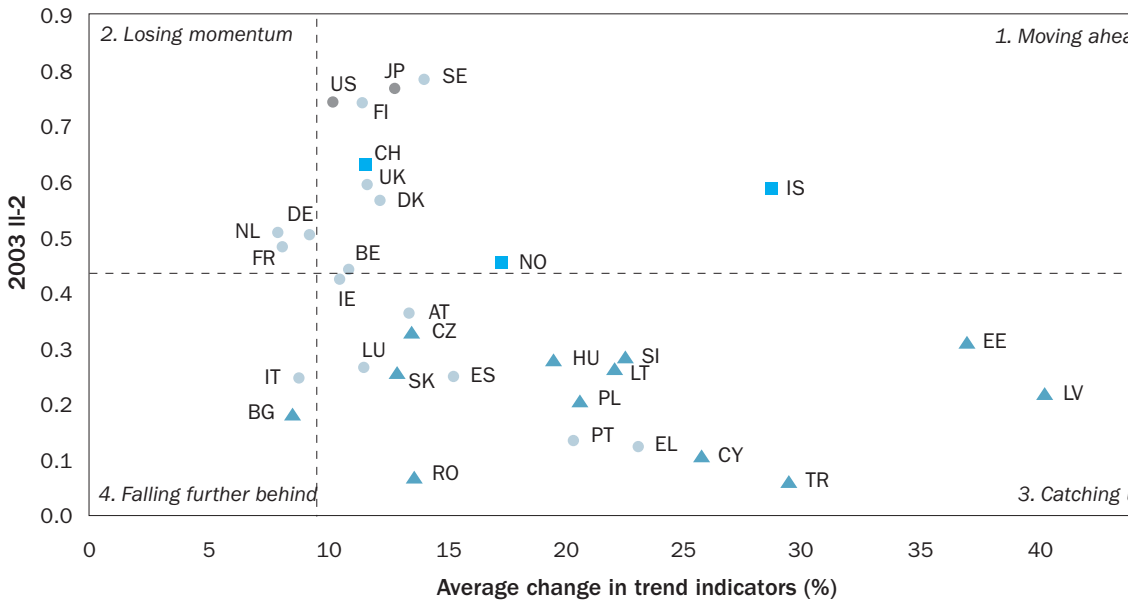
Like an increasing number of nations around the globe, both of these groups of countries are looking to innovation policy – realizing that in order to ensure long-term economic growth and competitiveness, they will need to establish the appropriate educational and technological foundations, and facilitate effective interactions and linkages between actors within their borders as well as with other countries in the region.

Innovative Capacity and Performance

As mentioned in the previous chapter, it is difficult to get a completely accurate and comparable picture of innovation in an economy, yet the best way to understand relative performance, strengths and improvement areas is to benchmark against others. In the following section, we will look at various innovation indicators for the eleven countries in the Nordic-Baltic Sea region and assess their relative strengths and weaknesses.

The Summary Innovation Index of the European Innovation Scoreboard presents one overall view of how these countries are positioned against each other, and relative to the other European countries (see Figure 3 below). Russia is not included in this index.

Figure 3: European Summary Innovation Index-2 (SII-2)



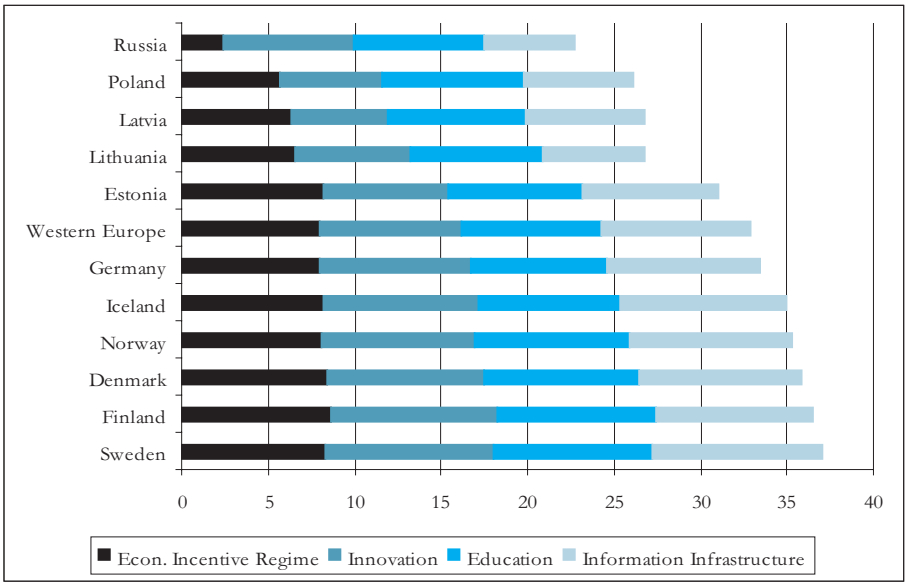
Source: European Commission (2003d)

As shown in the figure above, Sweden and Finland lead in this index, performing at par with the US and Japan. Iceland, Denmark, Germany and Norway all find themselves above the European average, while Estonia, Lithuania, Latvia and Poland lie below the average. Although these four new EU member countries are showing very positive trends in their performance (with Estonia and Latvia leading the average change in trend indicators), one must remember that a large part of the performance leaps in past years can be attributed to very low initial values. Also, positive trends should not distract from some of the serious concerns with innovation performance that persist in these countries (e.g. falling public and private R&D spending, and worries over the sustainability of reforms in the longer-term).

The World Bank's Knowledge Economy Index[6] supports the findings of the Commission's Innovation Index, illustrating the Nordic countries' leading position globally (above the US and Japan), Germany's performance above the Western European average, and lower performance results for the Baltic countries, Poland and Russia (see Figure 4 below). It is worth noting, however, that all of the new EU member countries and Russia rank similarly to their Nordic and German neighbours (the leaders) in the education pillar – having high levels of adult literacy, and secondary and tertiary enrolment. In addition, Estonia stands out as it lies close to the Western European average performance for this index.

6 The Knowledge Economy Index is the average of the most recent performance scores of a country or region in all four KE pillars (Economic Incentive Regime, Education, Innovation and Information Communications & Technology). Each pillar score is derived by averaging the normalized scores of each pillar's defining variables for which data is available. Each pillar is comprised of three variables as described in Table 1 above.

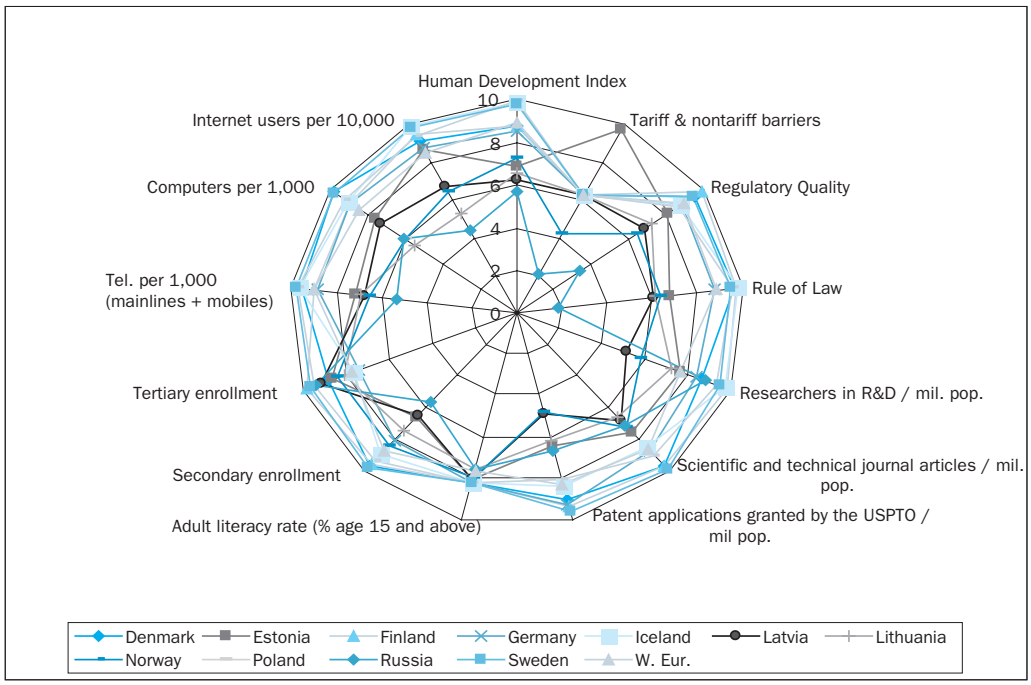
Figure 4: Knowledge Economy Index for Selected Countries



Source: World Bank Knowledge Assessment Methodology

To get a better idea of the relative strengths and weakness in innovation performance for each country, one needs to take a closer look at the individual indicators that make up composite indicators such as the European Innovation Scoreboard. Figure 5 and Table 2 below provide such detailed information.

Figure 5: Basic Scorecard Indicators for Nordic-Baltic Sea Countries
(normalized values, most recent data)



Source: World Bank Knowledge Assessment Methodology, Basic Scorecard, cross-country comparison

Innovation indicators both from the World Bank (Figure 5)[7] and other sources (Table 2) highlight the overall strengths and improvement areas in the Nordic-Baltic Sea region. Higher education, in particular tertiary enrolment, is a strength for this region as a whole. The prevalence of science and engineering graduates and researchers in R&D is also generally high throughout the region. However, it should be pointed out that the performance of the Nordic countries in this area, close to the EU average with the exception of Finland which is clearly above, is not as high as one might expect given the Nordic countries' overall strong performance in innovation indicators. The Nordic countries and Germany invest more in R&D – particularly R&D from the private sector (BERD). ICT proliferation is much higher in the Nordic countries and Germany than elsewhere in the region. The institutional and regulatory framework (including tariff and non-tariff barriers, and the rule of law) is also markedly stronger in the Nordic countries and Germany (as one might expect from countries with a longer tradition of market economics). Patent applications and employment in high-tech sectors are lower in the Baltic countries, Poland and Russia. The availability of early stage venture capital (seed financing) is an issue for all of the countries in the region.

Table 2: Selected Innovation Indicators for Nordic-Baltic Sea Countries
(highest in bold, lowest shaded and in bold)

Variable	Denmark	Estonia	Finland	Germany	Iceland	Latvia	Lithuania	Norway	Poland	Russia	Sweden	Europe[4]
Average Annual GDP Growth (1998-2002)[1]	2.1	4.4	3.5	**1.5**	3.6	**5.7**	4.5	1.8	3.0	3.08	3.0	3.27
Human Development Index (2000)[1]	.93	.83	.93	.93	**.94**	.81	.82	.94	.84	**.78**	**.94**	.93
Tariff & Non-tariff Barriers (2003 Heritage Foundation score)[1]	8	**10**	8	8	8	8	8	8	6	**4**	8	8
Rule of Law (2003)[1]	1.97	0.80	1.99	1.73	**2.00**	.46	.48	1.96	.65	**-0.78**	1.92	1.66
Researchers in R&D (per million population, 2002)[1]	3479	2650	**7094**	3154	6197	**1094**	2307	4389	1475	3493	5168	3246
Tertiary Enrollment (% of population, 2000)[1]	58.86	57.55	**73.86**	**46.3**	48.66	63.11	52.48	64.42	55.54	64.09	70.04	50.97
S&E Graduates (% of 20-29 age class)[2]	11.1	7.3	**16**	8	9.1	7.6	13.1	8.6	**7.4**		12.4	11.3
Public R&D Expenditure (% GDP)[2]	0.75	0.53	1.02	0.73	**1.33**	**0.28**	0.49	0.65	0.43		0.96	0.69
Business R&D Expenditure (% GDP)[2]	1.65	0.26	2.47	1.76	1.78	0.16	**0.20**	0.97	0.24		**3.31**	1.30
ICT Expenditure (%GDP)[2]	7.4	9.6	6.8	6.9	9.3	7.9	5.9	**5.7**	5.9		**9.8**	7.0
Mobile Phone Subscriptions (per 100 inhabitants, 2003)[3]	88.72	65.02	90.06	78.54	**96.56**	52.86	66.62	90.89	45.09	**12.01**	88.89	55.40
Internet Users (per 10.000 inhabitants, 2003)[3]	5128	3277	5089	4727	**6747**	4057	2136	5026	2325	**409**	5731	2373
EPO Patent Applications (per million population)[2]	211	11	337.8	309.9	117.2	7.6	**2.4**	288.8	2.5		**366.6**	161.1
Employment in Hi-tech Manftg (% of total workforce)[2]	6.33	3.41	7.39	**11.36**	2.02	**1.97**	2.64	4.60	7.54		7.28	7.41
Employment in Hi-tech Services (% of total workforce)[2]	4.74	2.87	4.74	3.33	4.81	2.26	**1.69**	4.11			**5.23**	3.57
Early Stage VC (% GDP)[2]	0.08		0.087	0.042	0.048			0.036	0.018		**0.098**	0.037

Sources: [1]World Bank Knowledge Assessment Methodology (multiple sources); [2]European Commission (2003d); [3]International Telecommunications Union (ITU)

[4]Europe refers to Western Europe (for World Bank), EU-15 (for European Commission) and Europe and Central Asia (for ITU)

In general, one might say that the region shares a strength in higher education and human capital assets, but to a varying extent displays weaknesses in turning these human assets into

7 A more detailed description of the World Bank's main innovation indicators (what is being measured and from which sources) can be found in Appendix A.

financial gain. The Nordic countries and Germany generally offer a more stable economic regime and more sophisticated infrastructure (given their more advanced economic position and ability to attract higher levels of investment), including ICT infrastructure, while the Baltic countries, Poland and Russia offer greater dynamism (as shown in their GDP growth) and momentum for change. In the next section, an overview of innovation policies and governance in the region will be presented.

Innovation Policy and Governance

National choices concerning governance of innovation policy play a key role in determining the effectiveness of government policy in enabling and strengthening innovation in an economy (see Box 1 below). According to the European Commission, "Coordination [of policies] should take place at a high political level, to ensure the maximum commitment from the departments involved…" (European Commission (2003f), p.14).

In most countries, the ministries responsible for trade and industry and for education and research are traditionally the key actors in policy fields related innovation policy-making in a narrow sense of the definition (Koch and Oksanen (eds.) (2003), p.5). In addition, through its responsibility for the overall governmental budget allocation, the Ministry of Finance plays a significant role in innovation policy making. In recent years, in some countries, there has been a heightened awareness of the need to adjust policy-making to better reflect the systemic nature of innovation policy. Thus in their analysis of innovation policies in the Nordic countries, the authors observe that:

> *Several Nordic countries are considering a possible reorganisation of the institutional layout and policy-making structures in order to reflect a more systemic approach to innovation policy. Traditional administrative boundaries between sectors dealing with research financing, industry oriented R&D or innovation funding or more general business development needs are seen increasingly as problematic and unsuitable for [a] more comprehensive approach to innovation policy.* (Koch and Oksanen (eds.) (2003), p.5)

In the sections that follow, a cursory overview of key institutions/governance mechanisms, primary policy documents, and key issues/priorities in innovation governance will be provided for each country. Diagrams of the national innovation structures for each country (except Russia) are provided in Appendix B.

Denmark[8]

In 2001/2002 responsibility for innovation-related policy was transferred from the Ministry of Economic and Business Affairs to the new *Ministry of Science, Technology and Innovation*. Innovation policy is focused on meeting four objectives: (i) greater mobility and better interaction between the business sector, universities and other knowledge institutions; (ii) more high-tech and knowledge-based entrepreneurs; (iii) easier access to advanced technological knowledge for companies; and (iv) increased focus on standardisation. The main advisory

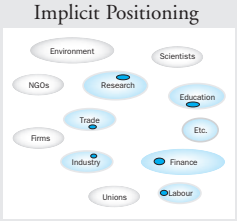
8 Main sources: European Commission (2003g) and http://www.cordis.lu/denmark/rd-policy-innovation.htm

Box 1: On Innovation Policy Governance

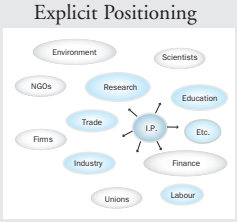
In practice, there are sharp differences between countries in the way that innovation policy is designed and implemented. Some of these depend on the political colour of governments and, e.g., the way in which they favour market-oriented or government-sponsored programmes. In addition to changes in political and/or ideological orientation, innovation policy is shaped by systematic differences between the influence of traditional policy perspectives. The figures below provide schematic illustrations of alternative situations. According to the "traditional positioning", the responsibility of innovation policy (medium blue domain) is placed somewhere between the ministries (in light blue) in charge of education, research and industry. Some countries practice more of an "implicit" approach, however, where responsibilities are spread out, resulting in a shared sense of ownership but typically also resulting in coordination problems. A newer and generally more successful approach is one which assigns an "explicit" responsibility not dominated by any traditional policy domain, but with sufficient clout to allow for coordinated concerns and initiatives across ministries. As the final figure shows, there is not only the task of bringing together departmental interests, but also of allowing for, and orchestrating, the impetus of multiple relevant stakeholders.

Traditional Positioning

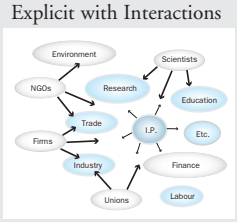
Implicit Positioning



Explicit Positioning



Explicit with Interactions



The choice of approach and positioning of innovation policy has critical implications for the weight attached by national governments to different kinds of issues and concerns. A direct influence by the Ministry of Industry, for instance, tends to account for high priority to public-private partnership and leaving appropriate room for private sector interests even in government-led initiatives. A more active role for the Ministry of Finance will account for stronger emphasis on indirect, horizontal policy instruments rather than public funding or fine-tuning with incubators or science parks. A strong engagement by the Ministry of Education in research and innovation generally results in prioritizing basic over applied research, and emphasising supply-side, rather than demand-side aspects of human capital accumulation. Between the extremes, shared forms of responsibility will produce outcomes that in part depend on which room is left for these different influences to dominate.

National governments themselves will have some difficulty having perspective on the strengths and weaknesses that result from the asymmetric influence of one ministry or the other. Nevertheless, they may be aware of some consequences, and thus try to push to other actors - such as regional/local authorities or the private sector - the responsibilities for those tasks which are likely to suffer. The other actors are likely to be more aware, as they are closer to and can witness the practical consequences of a bias in policy. They may thus from their end try to push for compensating mechanisms or undertaking themselves actions which are then better handled that way. Governments assume the overall responsibility, however, for assuring governance structures that include such considerations. Thus, irrespective of the way in which national governments organise the cross-cutting horizontal aspect of innovation policy, putting in place incentives that encourage systematic learning on the part of the different stakeholders should be viewed as a priority.

adapted from Andersson et. al.(2004b)

council is the *Council for Research Policy* – which advises the Minister, government members and Parliament on issues related to overall research policy.

In June 2002, Parliament passed an *Act on Technology and Innovation*, with the objective of strengthening technology development and innovation within trade and industry. The Act is a framework act for a number of initiatives (including, for example: technology incubators, regional growth centres, and technology foresight programmes). To help implement the new legislation, a *Council for Technology and Innovation* was set up. The Council's mandate is to advise the Minister of Science, Technology and Innovation to make decisions in a number of prioritised areas. The Council is made up of representatives of different competencies, covering: technological development and innovation in trade and industry; provision of capital and competencies for company development; promotion and commercialising of research results; cooperation between companies; cooperation between companies and researchers/research institutes; international cooperation on technology and innovation, particularly regarding requirements for small enterprises.

The main policy documents include The Danish Growth Strategy (May 2002), The Danish Knowledge Strategy (January 2003), and the Danish Strategy for Public-private Partnership on Innovation (September 2003). The Strategy for Public-private Partnership on Innovation was followed by an action plan, and a budget of 37 million over four years (2004-2007) to put into action some 20 initiatives. Currently, one of the main priorities is to improve cooperation and interaction between knowledge institutions and business. Comparing institutional structures in the Nordic region and other developed countries, Fora (2003) argued for considerable opportunities for Denmark to learn from the experience of others.

Estonia[9]

At the highest level of the Estonian National Innovation System are the parliament and government, which hold the legislative and executive functions respectively. Education and science policies fall under the Ministry of Education and Research, while innovation and technology policies fall under the Ministry for Economic Affairs and Communications. *The Research and Development Council* (RDC, re-launched in 2002) is an advisory body to the Government on issues regarding research and development. The Council, which is chaired by the Prime Minister, comprises representatives of the research institutions and economic community, and *ex officio* members from the Government. The members of the R&D Council are nominated by the Government for up to three years. The daily work of the RDC is split into two sub-commissions: one in the Ministry of Education and responsible for research-related issues, and one in the Ministry of Economic Affairs and responsible for innovation policy development.

Within the Ministry of Economic Affairs, the *Innovation Policy Committee* prepares documents shaping the innovation policy of Estonia. Its tasks include preparing medium and long-term development plans to increase the innovation capacity of Estonia in cooperation with the research policy committee (while taking into account both the regional development needs and other aspects of a balanced society and cooperating with various European

9 Main sources : European Commission (2003h) and http://www.tan.ee/tan/en/innovation

Union innovation strategy development initiatives). The main arm for executing innovation policy is the new umbrella organisation of the *Foundation Enterprise Estonia (EAS)*, which was launched in October 2003 and encompasses five organisations: Estonian Technology Agency, Estonian Export Agency, Estonian Investment Agency, Regional Development Agency, and the Tourism Agency. The EAS is responsible for implementing national innovation policy by providing financing for selected projects and technology programmes, and by launching and coordinating targeted supportive activities for innovation.

The most important policy documents are the research and development strategy *Knowledge-Based Estonia* (6 December 2001), and the SME development strategy *Enterprising Estonia* (15 January 2002). Both documents set objectives and strategies until 2006. Key priorities (also included in the programming document for structural funds) include: the feasibility of setting-up a government venture capital fund, developing cooperation between R&D institutions and enterprises, enhancing enterprise support structures (including credit guarantees), assessing industrial property rights, and realising an industrial design programme to enhance the role of design for increasing competitiveness and added product value.

Finland[10]

Finland views successful innovation policy as a national success factor. Although Finland prides itself in the fact that it has become a model for many other countries, Finland continues to seek ways of improving its innovation system – currently shifting focus from technology development to broader support for innovation and the business environment overall.

The two most important ministries in the Finnish national innovation system are the *Ministry of Education* and the *Ministry of Trade and Industry*. Each administers approximately one-third of public research funding. (Administration for the remaining third is spread among several other ministries.) The Ministry of Education and the universities together maintain the basic services and infrastructure for the national research system. The *Academy of Finland* is the central financing and planning body in the field of basic and university research. In 2003, approximately 13% of all government research funding (euro 185 million) was channelled through the Academy. Their responsibilities also include the advancement of scientific research, the development of international scientific cooperation, and the role of expert on science policy issues. The Ministry of Trade and Industry is responsible for technology policy and for providing support for industrial research and development. *TEKES* (the National Technology Agency) has a central position in planning and financing technical research and development. It prepares, funds, and coordinates national technology programmes, and provides funds for applied technical research and risk-carrying R&D ventures in industry. With its share of close to 30% of government appropriations for R&D (euro 399 million in 2003), TEKES is larger than most comparable agencies in the region.

The *Science and Technology Policy Council*, established in 1987, is chaired by the Prime Minister. Membership consists of 7 Ministers, including the Ministers of Education, Trade

10 Main sources: European Commission (2003i) and http://www.pixelpress.fi/ktm2004en/01_innovaatiopolit.shtml

and Industry, and Finance, and ten other representatives from public and private sectors (including the Academy of Finland and TEKES). The composition of the council ensures coordination for innovation policy at the highest political level possible (Koch and Oksanen (eds.), (2003), p.6). This high-level mandate is arguably one of the defining features of the Finnish innovation system. The main tasks of the Council include directing science and technology policy, developing the direction for scientific research and education, and issuing statements on the allocation of public science and technology funds to the various ministries and interested bodies. These guidelines and issue statements are made public in triennial policy documents. The latest review came out in 2002: *Knowledge, Innovation and Internationalisation*[11].

According to this review and Council discussions, a major future challenge will be keeping Finland sufficiently attractive for business and jobs. It will not be possible to limit the development of innovation to the national environment; Finland will have to internationalise its activities and its national science and technology institutions. The Council recommended that public funding be increased, focusing on three main targets: enhancing education, research careers and utilisation of research findings; boosting social and technological innovation; and ensuring flexible expert development of innovation funding. Emphasis should be focused on innovation and integration of user perspectives into innovation projects, and on entrepreneurship and the promotion of entrepreneurs.

As an example of Finnish attempts to expand the scope of innovation policy beyond their borders, the Finnish Council for Science and Technology Policy and the Estonian Research Council held a joint meeting in Tallinn on May 26th, 2004. The meeting agenda focused on possible cooperation areas in the field of education, science and technology, and innovation. Such areas could include top research units and researcher training, technology and innovation policies and technological anticipation. Cooperation in the aforementioned fields will be monitored by an expert group that is to be appointed at the meeting. The group will report to both Councils at the end of next year.[12]

Germany[13]

Awareness of the importance of innovation and innovation policy are a relatively more recent phenomenon in Germany than in most of the Nordic and Baltic countries. Policy focus and governance structures have been more traditionally delineated and hierarchical, yet there is a growing realisation of the need for a broader perspective and different approach if economic targets are to be met.

The federal character of the German state leads to a division of labour between the federal government and the 16 länder governments in financing education, R&D and innovation policy programmes, and innovation promotion in Germany. The länder governments' main role is financing the education system. The federal government takes up a variety of activites in research and innovation policy. The main actors on the federal level are the *Ministry of*

11 http://www.minedu.fi/tiede_ja_teknologianeuvosto/eng/publications/Review_2003.html
12 http://www.valtioneuvosto.fi/vn/liston/base.lsp?r=85831&k=en)
13 Main source: European Commission (2003j)

Education and Research (BMBF) and the *Ministry of Economics and Labour (BMWA)*. Among other things, the BMBF finances public R&D infrastructure, runs technology programmes, and fosters innovation in Eastern Germany. The BMWA focuses on competition policy, R&D programmes in energy, aviation and multimedia, and R&D support programmes for SMEs. Coordination between the federal and länder levels takes place through joint commissions as well as through informal cooperation at parliamentary level.

Since the start of the new government in 2002, the main government activities have centred around labour market reforms, reforms in financing the health and pension system, and tax cuts in order to stimulate growth. The main objectives and measures of these have been laid out in the *Agenda 2010* in March 2003. One important pillar of the Agenda 2010 is innovation policy issues. Principal focal points in this area include: increasing federal spending on education and research; improving framework conditions for SMEs, especially through administrative simplification; and advancing the final stages of the tax reform 2000. As a follow-up of the Agenda 2010, the BMWA and BMBF are working on a new innovation policy initiative (*High Tech Masterplan*) to boost innovation in start-ups and SMEs. The planned focus is on four main topics: improving access to early stage and second stage financing of new technology-based firms; strengthening R&D cooperation among SMEs; re-orienting R&D grants in Eastern Germany to 'sustainable growing firms'; and improving technology transfer into handicrafts.

In January 2004, German Chancellor Gerhard Schröder initiated a Partnership for Innovation[14], bringing together representatives from science, industry and the labour unions, with the objective of launching "a comprehensive and sustainable innovation initiative with broad public involvement". Realising that improving and preserving existing strengths will require the joint efforts of all stakeholder groups, the "Partners for Innovation" initiative outlined a nine-point plan. The plan calls for, among other things, the establishment of a joint *Innovation Office* to support the work of this partnership.

Iceland[15]

Iceland lies at the forefront of institutional reforms to ensure coordinated and efficient innovation policymaking. However, its geographic location and industrial structure leaves Iceland on the periphery of a number of recent changes. A main challenge is to find new approaches and tighten international linkages in order to promote entrepreneurship and innovation more broadly in Iceland.

In order to increase coordination within research, technology and innovation policy, and to make more efficient use of public R&D appropriations, new organisational structures and legislation have been introduced during 2003 in Iceland. The main organisational body charged with innovation is the recently-established *Science and Technology Policy Council* (STPC). The STPC, which replaces the Icelandic Research Council, is a ministerial-level body headed by the Prime Minister. It is comprised of 18 seats: 4 permanent ministerial seats

14 For more information, see http://www.bundesregierung.de/en/News-by-subject/Education_-Training-and-Innova-, 10977.596414/artikel/Chancellor-Schroeder-Agenda-20.htm

15 Main sources: European Commission (2003k) and http://www.innovating-regions.org/download/Iceland.pdf

for the Prime Minister and the Ministers of Education, Science and Culture, and Industry and Trade; and 14 other members with scientific, technical and other relevant experience from higher education institutions, labour market organisations and ministries. The new legislation also set up two public funds to support scientific research and technology development and innovation: the Research Fund and the Technology Development Fund. The new structure has been inspired by the Finnish experience. The Icelandic Centre for Research, *RANNIS*, provides overall administrative services to the whole structure – administering funding and managing everyday operations.

One of the newest activities has been the establishment of the *Impra Innovation Centre*, which provides support services to entrepreneurs and SMEs, as well as initiates and supports regional development agencies and local business advisors. A key goal is to coordinate national actions and initiate cooperation between support agencies.

A main concern in Iceland is the uneven composition of R&D investments in the private sector. Two-thirds of total R&D comes from the private sector, yet more than half of that comes from one single company. A key challenge is to promote entrepreneurship and innovation more broadly across Icelandic companies.

Latvia[16]

Latvia has shown much determination in quickly adopting reforms and actively involving academia and the private sector in defining a national innovation strategy. Yet lack of experience and changes in political leadership have made it difficult to set priorities and decide the appropriate course of action (and use of EU structural funds) to strengthen innovation in the economy.

The main bodies charged with innovation policy in Latvia are the *Ministry of Economy* and the *Ministry of Education and Science*. Other bodies, such as the *Council of Higher Education*, the *Council of Science* and the *National Economic Council*, also play a role and include the representation of stakeholders from academia, science and industry.

Based on the *National Concept on Innovation* (2001) and input from external experts, including the recent World Bank report on Latvia's national innovation system and the Centre for Science and Technology Studies within the Academy of Sciences[17], the government has adopted a *National Innovation Programme* and Action Plan for 2003-2006. The programme focuses on priorities in the areas of: protection of intellectual property, innovation financing, and the strengthening of companies (particularly SMEs) to absorb technologies and know-how. There is also a great deal of focus on improvements in the legal and regulatory environment (including implementation of reforms in education, training and taxation).

One of Latvia's key activities is the establishment of a more concrete strategy to accompany their National Innovation Action Plan – a set of priorities, concrete activities, and actors responsible for implementation. As there are several different councils (representing various

16 Main sources: European Commission (2003l) and Watkins et.al. (2003)
17 http://www.lza.lv/csts/csts_main.htm

stakeholder interests), it is difficult to reach consensus on priorities and decide the best use of the newly appropriated structural funds. Another key concern is the ability to ensure backward linkages from foreign direct investment (FDI). With such high levels of investment coming so quickly, it is critical that Latvia secure technology transfer, skills upgrading and other spill-over effects in order to develop its own long-term competitive niche.

Lithuania[18]

Lithuania has been very successful in maintaining a focus on the private sector in its development of initiatives and innovation policy measures. Strong "mentors" (primarily from the private sector) have initiated activities and inspired reforms to increase science-industry collaboration and clustering, build entrepreneurship skills, and strengthen international linkages and technology exchanges. Yet institutional leadership and concrete innovation strategies are still lacking.[19]

In Lithuania, the *Ministry of Economy* and the *Ministry of Education and Science* have the main roles for establishing innovation policy. A recently-established *Science and Technology Commission* (October 2002) play the role of advisor to the government – submitting proposals on the creation and implementation of policies, creating strategies for the development of applied sciences, technology and innovations, and stimulating interaction between science, industry and business.

There are two main policy documents on innovation: the *Long-term Development Strategy of the State* (November 2002) and the *Innovation in Business Programme*. The first document mainly focuses on finalising the transition to a market economy – addressing restructuring of state-owned enterprises, reforms in the legal and regulatory environment, and priorities for economic growth. The second document focuses on creating an innovation-friendly environment for innovation development and implementation in SMEs. Some of the main priorities include: creating the necessary cluster infrastructure, stimulating cluster formation, and fostering cooperation between science and industry. Organisations such as the *Lithuanian Innovation Centre* play a key role in identifying and administering projects to fulfil these goals.

Innovation policy is still quite new, and there are a number of issue areas remaining, including the creation of an effective financing system designed for innovative start-ups and the establishment of taxation incentives oriented to help innovation development and encourage research.

Norway[20]

Historically, Norwegian R&D policy has been based on the co-called sector principle, with each ministry responsible for promoting and funding research activities within their own areas (Koch and Oksanen (eds.) (2003), p.7). A primary problem with this system was that

18 Main source: European Commission (2003m)
19 http://www.lmt.lt/NAUJIENOS/2004_05_28_Wessner.ppt
20 Main sources: European Commission (2003n), http://odin.dep.no/archive/nhdvedlegg/01/10/fromi033.pdf and http://odin.dep.no/nhd/engelsk/aktuelt/taler/024071-090053/dok-bn.html

R&D investment was very low in industry – as Norway's industrial structure is dominated by small companies in low R&D intensive industries. The primary objective of innovation policy in Norway is to facilitate increased wealth creation across sectors and across the country.

The *Ministry of Education and Research* is responsible for the overall R&D policies, for funding large parts of basic science in the universities, and for coordinating sectoral R&D policies. Recently, The Minister of Education and Research initiated a cross-ministerial process with the goal of launching a new holistic innovation policy – addressing the need to become more efficient and better-suited to facilitate value creation in Norwegian industry. The responsibility for the process was transferred to the *Minister of Industry and Trade*. In late 2003, the new innovation policy (*From Idea to Value – The Governments' Plan for a Comprehensive Innovation Policy*) was launched, aimed at fulfilling Norway's vision of becoming one of the most innovative countries in the world. The plan defines six key objectives: (i) favourable and predictable conditions for trade and industry, offering a good overall foundation for innovation and wealth creation; (ii) an outstanding system for learning and education, offering industry access to people with relevant knowledge of a high quality; (iii) more research-based industry; (iv) more new start-ups with a potential for growth; (v) an electronic and physical infrastructure promoting effective interaction between businesses, markets, knowledge centres and public authorities; and (vi) a new administrative practice that facilitates the development of an effective, dynamic and comprehensive innovation policy.

Another important measure is the recent re-organisation of the *Research Council of Norway*. In September 2003, six divisions were replaced by three: a Science division, an Innovation Division, and a Division for Strategic Efforts. In its new statutes, it is stated that the Council shall promote innovation throughout the country. As a follow-up, the Research Council will strengthen its regional presence and its cooperation with the new governmental entity Innovation Norway.

As of January 1, 2004, *Innovation Norway* has replaced the following four organisations: the Norwegian Tourist Board, the Norwegian Trade Council, the Norwegian Industrial and Regional Development Fund (SND) and the Government Consultative Office for Inventors (SVO). 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, internationalisation and promotion.

Norway has taken bold steps in defining an ambitious innovation strategy, and restructuring many of the institutions charged with implementing innovation policy. Norway has also realised that executive leadership is key, and has established a new *Innovation Panel* to be led by the Minister of Industry and Trade. Yet, a number of challenges remain, including with respect to the engagement of other key societal stakeholders in the formulation and implementation of policy objectives (Andersson et.al. (2004a)).

Poland[21]

There are four ministries involved in the formulation of innovation policy in Poland: the Ministry of Science and Technology, the Ministry of Economy, Labour and Social Policy; the Ministry of Infrastructure; and the Ministry of National Education and Sports. The first two ministries (Science and Technology, and Economy) take the most active roles in defining policy, defining direction for scientific research, developing programmes for SMEs, allocating funds and managing implementation of projects.

A few key issues are driving priorities for innovation policy: low competitiveness of domestic industry, high unemployment rates, and the overall inefficiency of R&D. These issues, coupled with pre-requisites for EU membership, prompted the development of several major policy documents: *Guidelines for the state innovation policy until 2002* (prepared in 1999 by the Committee of Scientific Research); *Government policy guidelines for SMEs until 2002* (prepared in 1999); and *Increasing the innovativeness of the Polish economy until the year 2006* (prepared in 2002 by the Ministry of Economy). The last-mentioned programme is currently the guiding strategy document, and identifies four priority areas: creation of mechanisms and structures conducive to innovation; stimulating innovative activities; increasing the efficiency of implementing modern technologies in the economy; and making consumption standards and production models more favourable to long-term development.

Actual implementation of concrete measures has been less prevalent, but two measures in support of SMEs are worth mentioning: financial support for new investments, and grants for entrepreneurship development. Agencies such as the *Polish Agency for Enterprise Development* (PAED) are active in soliciting, selecting, funding and administering projects to support SME development in Poland.

In January 2003, the Council of Ministers accepted the *National Development Plan* for 2004-2006, outlining Polands' social and economy strategy in the first years of its EU membership. Its strategic goal is to develop a competitive economy, based on knowledge and entrepreneurship, able to develop in a long-term perspective, providing for an increase of employment, and improvement of social, economic and territorial integrity with the EU, on the regional and national levels. Several sectoral operational programmes (and financing mechanisms) have already been decided as part of this overall programme.

In the first half of 2004, the Ministries of Science and Technology, and Economy, worked together to draft an *Act on Innovation* – proposing a re-structuring of public R&D units, improving industrial demand for R&D, developing incentives for entrepreneurs to invest in R&D and innovate, and bridging scientists and businessmen (encouraging cooperation on research). Other organisations, like the Polish Lisbon Strategy Forum (PLSF)[22] are also active in promoting innovation for economic development. In May 2004, the PLSF hosted its 2nd annual congress, where Polish President Aleksander Kwaśniewski and German Chancellor Gerhard Schröder held key note addresses.

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21 Main source: European Commission (2003o)
22 http://www.pfsl.pl/

Russia

The main challenge facing Russia, as defined by the Government's economic reform program, is to develop a strategy for transforming Russia from a raw material exporter to a world class producer of knowledge intensive products (Watkins et.al. (2002), p.2). Russia already possesses a sophisticated science and technology base and a core of highly-educated scientific personnel, but Russia has to overcome a long legacy of institutional rigidities and dysfunctional institutional arrangements inherited from the Soviet system. Currently, the private sector is not adequately represented, nor sufficiently connected to the main performers of public R&D (OECD (2001)) or innovation policy formulation.

Main priorities, addressed in the *Development Strategy of the Russian Federation Until 2010*, include: modernisation of existing production facilities, building the percentage of high-technology products; and increased relations between research and production. It is recommended that closer relations be encouraged through regulatory reforms and measures to facilitate the mobility of researchers and public/private partnerships. In addition, a strong banking sector and a domestic venture capital industry is necessary for the entry and exit of new innovative firms. Business advisory and information services for scientists and young entrepreneurs are also necessary for building the management skills for new firm creation. International cooperation in this area, focused on linking Russian entrepreneurs to foreign partners and markets, has proven successful and could be strengthened (OECD (2001)).

Sweden[23]

In Sweden, the *Ministry of Industry* and *Ministry of Education* share the main responsibility for innovation policy. Although the concept of innovation policy has existed since the end of the 1990's, it wasn't until a reorganisation of the Swedish institutional structure in 2001 that a move towards a more systemic national innovation policy was seen. In that year, the *Swedish Agency for Innovation Systems (VINNOVA)* was established, with the focus on creating increased coordination between growth and research policy. VINNOVA has an annual budget of approximately euro120 million, with the mission of promoting sustainable growth by financing research and technology development, and developing effective innovation systems. VINNOVA has a number of national programmes, including *incubators* (to support researchers in the process of commercialisation) and *competence centres* (to strengthen the link between academic research and industrial R&D).

In the spring of 2002, the government initiated a process to create a new innovation policy field – integrating parts of industrial policy and research policy (Andersson et.al. (2002)). There have subsequently been a number of consultative rounds eventually resulting in a joint declaration by the Ministry of Industry and the Ministry of Education on the directions for further reform (Swedish Government (2004)). Whereas distinctive changes are proposed in research and education, such as an adjustment in IPRs, a number of functions (generally assumed by ministries in other countries) are assigned to government agencies. VINNOVA, NUTEK and the *Institute for Growth Policy Studies (ITPS)*, set up to conduct policy analy-

23 Main source: European Commission (2003p)

sis, intelligence and evaluation in growth-related policy areas, are set to manage different relevant policy instruments. The *Research Council*, on the other hand, is not charged with innovation policy matters on a scale comparable to the situation in Finland, Iceland or even Denmark.

In March 2004, VINNOVA published an abridged version of a study analysing the strengths, weaknesses, and policy challenges in the Swedish innovation system. The study identified five categories of innovation policy challenges: (i) start-up, innovation and growth in knowledge-intensive SMEs, (ii) improved supply, use and mobility of human resources, (iii) new regime for user-producer public-private partnerships; (iv) increased volume and impact of mission-oriented research; and (v) centres of excellence for research and innovation. The study underlined that these challenges need to be addressed in a national innovation policy strategy for Sweden.

Some Key Observations

The eleven countries of the region constitute a diverse mix of strengths, experiences and approaches to common issues. Each country has a unique profile. These individual profiles form an impressive source of experience and viewpoints from which to draw. They also provide a basis from which some key factors for efficient innovation policy formation, governance and performance can be observed.[24]

- ***A high-level mandate and commitment is fundamental***

  As innovation policy intersects with many traditional ministerial areas of responsibility, it is necessary that decisions on strategy and a mandate for action be given at the highest levels of government. In countries like Finland, Iceland and Estonia, where innovation policy is decided in a council with the prime minister at the head, difficult decisions are reached more quickly, innovation awareness is greater and more widely anchored, and budgets/mandates more broadly accepted.

- ***Concrete goals and strategies are important guides***

  It is important to determine specific areas of priority, and enumerate concrete goals. Every nation has its specific issues to resolve, and needs a defined innovation strategy and action plan to guide policy measures and investments. In countries like Latvia and Poland, where the disbursement of EU structural funds catalysed the definition of innovation strategies and priorities in these countries, all stakeholders have clearer overall targets from which to plan activities.

- ***Assigned operational responsibility ensures momentum and continuity***

  In all the Nordic countries (with the exception of Denmark) and in Estonia, there is an agency charged with implementing innovation policy. Agencies like VINNOVA

24 The key factors described in this report are meant only as a set of summary observations derived from the authors' analysis of innovation policy formulation and governance in the Nordic-Baltic Sea Region.

in Sweden have the responsibility of allocating public funds to prioritised projects, and ensuring that the outcome of these projects meets initial expectations. Without designating operational responsibility, it is unlikely that innovation strategies and action plans will be implemented. However it is equally important that innovation policy does not become marginalised in the responsible agency. While agencies such as TEKES and VINNOVA are important instruments or executers of national innovation policy, governments should be careful not to regard them as the sole agents of innovation policy. Rather, to be effective, innovation policy must be understood as a cross-disciplinary, systemic policy area, which should permeate the actions and strategies of a wide variety of agencies and ministries, as well as non-governmental sector stakeholders.

- ***An inclusive process, involving all stakeholder groups, is essential***

  Although ultimate responsibility for innovation policy should rest with government, the process (formulation, implementation and evaluation) must include relevant stakeholders. In Denmark and Lithuania, for instance, the active involvement of relevant private sector representatives in the policy formation process ensures greater policy effectiveness and relevance as well as, and partially due to, a greater engagement of the private sector in the implementation and follow-up of policies.

- ***Awareness of innovation breeds continual improvements and new approaches***

  In countries like Sweden, where innovation policy has been developing for several years, there is a greater understanding of innovation's impact on economic growth. The Swedish International Development Agency (SIDA) is working together with VINNOVA to understand approaches to innovation in order to apply this perspective to its international development work. It is important that policymakers, business leaders and academicians all understand and adopt an "innovation perspective" that allows them to develop new approaches to growth.

- ***Investments should follow priorities***

  It is not surprising that Finland is among the most technologically-advanced nations in the world when one considers that the Finns have, over a long period, invested substantial resources in R&D. It is essential that public investment decisions, of which spending on R&D is a significant component, are in some way linked to or anchored in national strategic priorities. Adopting an investment perspective to expenditures to strengthen innovation is also useful in enabling evaluation of policy measures.

- ***International linkages are important regardless of country size***

  Within the Nordic-Baltic Sea region, there are a number of small countries (e.g. Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway and Sweden) who are obliged to establish international ties (trade, FDI, research collaboration, etc.) in order to gain critical mass and ensure economic growth. It is generally these small

countries who are "further along" in the development of their innovation systems – having understood that long-term competitiveness and prosperity is dependent on interdependencies between actors (both within a country and across international borders).

- *Effective innovation governance is key*

  All of the above factors should exist in concert. In order for innovation policy to be formulated, targeted, and implemented with success, all elements of the "innovation system" must work together. Innovation governance should include a high-level executive mandate, a well-anchored strategy and action plan, a sound operational management, adequate and targeted financing, and continual improvements through an iterative process including multiple stakeholders (both nationally and internationally).

Summary

The Nordic countries are world leaders in innovation and competitiveness indicators; the Baltic countries, Poland and Russia exhibit remarkable dynamism and momentum for change – with high GDP growth and the strongest improvements in many innovation indicators.

Even though each of these countries has their own specific challenges, they share a number of the same issues and policy priorities: the need to encourage higher levels of entrepreneurship and commercialisation of research results; the desire to more closely link the science/academic community and industry; the urgency of securing venture capital financing and other support mechanisms to encourage innovation and growth among SMEs (which dominate the industrial structures of these countries); and the will to establish better-functioning, more horizontally-linked innovation governance structures.

There are a number of areas where the eleven countries of the Nordic-Baltic Sea region have shared interests and concerns. Given this, the question is then if there are enough shared interests to constitute a base for coordinated discussion and action. The case for regional cooperation on innovation policy will be presented in the next chapter.

IV. STRENGTHENING INNOVATION IN THE NORDIC-BALTIC SEA REGION: A CASE FOR REGIONAL COOPERATION

In the eleven countries of the Nordic-Baltic Sea region, there are a number of forces pushing towards greater regional cooperation, particularly in the realm of innovation. A common cultural heritage and geography – recently renewed by the end of the "East-West divide" – has led to a tighter regional identity among the countries surrounding the North and Baltic Seas. Institutional fora and networks aimed at strengthening the "Northern Dimension" are blooming. In particular, the countries of the region are turning to each other for support and policy learning opportunities in the field of innovation policy. Recent views from the European Commission also push for strengthening the regional dimension of innovation policy.

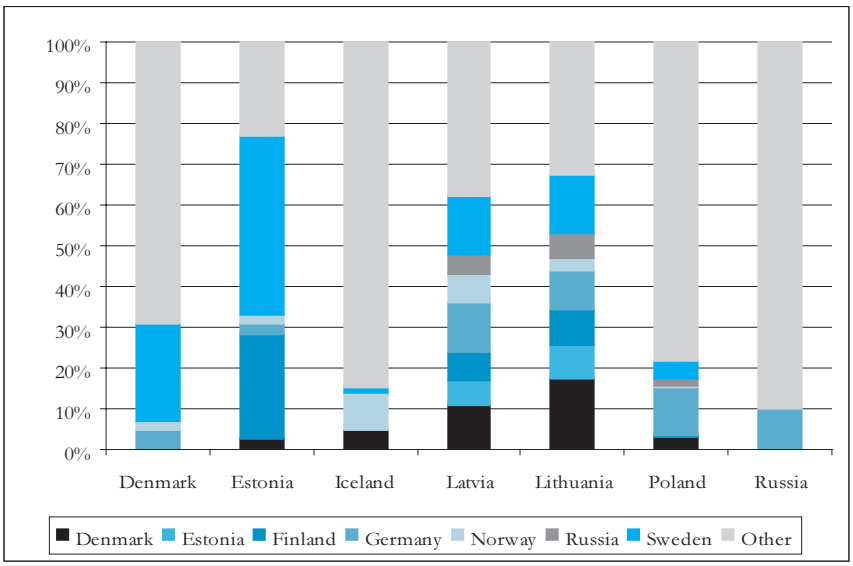
Common areas of priority include: promotion of innovation and growth in SMEs; cross-border ties between science and industry – encouraging closer cooperation to gain critical mass and competitiveness; and development of dynamic/effective innovation governance and evaluation methods. Although there are many opportunities for joint regional discussion and action, there are also barriers. National laws and business regulations, varying investment and educational structures, as well as differing levels of understanding, familiarity and trust are among the obstacles to establishing closer regional cooperation. Despite these barriers, it is difficult to dispute the need for, the benefits of, or the drive towards tighter Nordic-Baltic collaboration in the field of innovation policy. This chapter focuses on presenting the case for regional cooperation.

Past and Current Drivers for Baltic Sea Regional Cohesion

The ties between the countries of the Baltic Sea Region date as far back as the 13th and 14th centuries, when the cities of the region joined together in the Hanseatic League – for trade and security purposes. Over time, historical events and political fundamentals have shaped the region into a flexible and cooperative grouping of countries under the expanding umbrella of the European Union (EU). As Hiski Haukkala mentions, there are four functional factors that have promoted region-building in the Baltic Sea area: (i) the promotion of democratic institutions, (ii) the strong environmental problems of the Baltic Sea and specific regions around it, (iii) a form of regional identity, or "shared cultural heritage", and (iv) the will to create a growing region within Europe (Williams (2001), p.9).

One of the indicators of cohesion in the region is foreign direct investment (FDI). As illustrated in Figure 6 below, there is a good deal of investment activity flowing among the countries of the Nordic-Baltic Sea region. Inter-regional FDI accounts for as much as 70% of total inward FDI stocks for some countries. The Nordic countries and Baltic countries, in particular, have close ties with high levels of bilateral investment. All of these countries are working to ensure favourable business environments for attracting more FDI, as well as regulatory conditions, incentives and absorptive capacity of firms in order to secure adequate linkages and spill-over effects.

Figure 6: Inward FDI Stock, selected countries (by country of origin)



Sources and year of data: Central Bank of Denmark (2001), Enterprise Estonia (March 2004), Central Bank of Iceland (2001), Latvian Development Agency (2003), Lithuanian Development Agency (2003), Poland Information and Foreign Investment Agency (2003)

Increasingly, countries are realizing that they are facing many of the same issues. The 'New Regionalism' that exists around the North and Baltic Seas has been borne out of decades of inter-governmental cooperation and informal actions geared towards creating a 'sense of belonging' and a platform for agenda-building and influence in the EU. Common values, structures and priorities in the areas of health, environment and the balance between economic growth and quality of life form the basis of this platform. Today, there are many organisations, networks, programmes and reports that build on the concept of a close collaboration between the countries of the Baltic Sea region (see Table 3 below).

These organizations and formalized networks all aim to strengthen collaborative ties and economic activity, as well as form and further a Nordic-Baltic Sea regional agenda. The goal is not simply to increase the competitiveness of private firms in the region, but also to establish a regional niche – to answer the question "what does the region stand for?" In addition to realizing the European goals of the Lisbon agenda with regards to innovation and competitiveness, the countries of the region also strive for establishing environmentally-sustainable growth[25], strong health care and social welfare systems, cutting-edge ICT and biotech capabilities, and an efficient and socially-responsible public sector.

24 See Baltic Sea States' Declaration on Environment and Sustainable Development from the CBSS Ministers of the Environment Meeting: http://www.baltic21.org/?a,226

Table 3: Examples of Baltic Sea Regional Organisations and Programmes

Organisation/ Programme	Establ./ Duration	Mission/Areas of Activity	Scope (countries)
Nordic Council of Ministers (NCM)	1971	- The NCM was formed from a basis of common values (democratic decision-making, human rights, social solidarity, gender equality and respect for minorities) and focused on ensuring long-term sustainability and competitiveness essential to finance the Nordic welfare model - Nordic programmes support the development of democracy, the market economy, the sustainable use of resources and improvement of relations between the adjacent areas and the EU - Nordic cooperation increasingly reaches out to include adjacent areas (Estonia, Latvia, Lithuania, NW Russia and the Arctic region); a fifth of the NCM budget is earmarked for activities in these areas - Nordic cooperation funds approximately 30 institutions throughout the region, including the Nordic Investment Bank and the Nordic Innovation Center	- Denmark, Finland, Iceland, Norway and Sweden - Danish presidency 2005
Council of Baltic Sea States (CBSS)	1992	- CBSS serves as an overall regional forum for intergovernmental cooperation, focusing on the need for intensified coordination of activities in virtually every field of government, with the notable exception of military defence - The council has working groups on democratic institutions, economic cooperation, and radiation and nuclear safety - The most recent bi-annual ministerial meeting (held in June 2004) underlined the importance of cooperation between the CBSS and the Nordic Council of Ministers (NCM) in developing cross-border cooperation, improving coordination and enhancing implementation of specific priorities - In April, the CBSS launched www.BalticSea.net - an internet portal providing information on events, news, ongoing activities and background information for the Baltic Sea Region	- Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, Russia, and Sweden - Polish chairmanship 2004-2005
Baltic Sea Chambers of Commerce Association (BCCA)	1992	- The goal of the BCCA is to promote industry, trade and business among the countries of the Baltic Sea by offering services to the business community - The association represents 50 chambers of commerce (over 450.000 companies) in the Northern and North-Eastern European market - BCCA participates in and contributes to meetings of the Council of the Baltic Sea States CBSS and is a member of the Baltic Sea Alliance BSA - The threefold task of the BCCA is to protect and uphold the interests of private entrepreneurship by advising politics in business related affairs, offering services to the business community and providing facilities for contacts, debates and meetings in the region - The association launches initiatives that promote the development of infrastructure, transportation, communication systems, human resources and the environment	- Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia and Sweden - The BCCA presidium is currently located in Malmö, Sweden
Baltic Development Forum (BDF)	1998	- The BDF was established in light of a perceived need for a platform for decision makers to discuss strategies for the development of the Baltic Sea region - The forum distinguishes itself by being an organisation that gathers not only politicians, but also business, academia and media - The BDF's mission is to promote the Baltic Sea region as an integrated, prosperous and internationally competitive growth region by: providing a platform for cross-border and cross-sector networking between regional decision-makers from business, politics, academia and media; Influencing the regional agenda; Profiling the Baltic Sea region in Europe and globally; Acting as a catalyst and facilitator of concrete partnerships and projects benefiting the region; Initiating the formulation of regional strategies for growth, competitiveness and innovation - Its core activities include: the organisation of the annual Baltic Development Forum summit, thematic seminars and round tables, the profiling of the Baltic Sea region in the media and in decision-making fora, as well as cooperation with partners on the production of thematic reports and strategies for the development of the region	- Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia, and Sweden
The Northern Dimention of the EU	1999	- The Nordic Dimension is an EU-led initiative that provides a common framework for the promotion of policy dialogue and concrete cooperation aimed at helping the Northern Dimension region seize the opportunities offered by EU enlargement, and help strengthen cooperation with the Russian Federation and NW Russia as a neighbor - Funding is provided through EU financial instruments (Phare, Tacis and Interreg) - The 2nd Action Plan (2004-2006) covers five broad priority sectors: economy, business and infrastructure; human resources, education, cluster, scientific research and health; the environment, nuclear safety and natural resources; cross-border cooperation and regional development; and justice and home affairs - The key purpose of the current Action Plan is to provide a clear operational framework for all Northern Dimension stakeholders, setting out strategic objectives, priorities and concrete activities	- Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, Russia, and Sweden
US's Enhanced Partnership in Northern Europe (e-PINE)	2004	- Following the Northern Europe Initiative (launched in 1997), the US launched an updated policy approach to the region, encompassing three major areas: cooperative security (including the fight against terrorism), healthy societies, and vibrant economies	- Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, and Sweden
Baltic 21	1996	- The Baltic 21 is a regional multi-stakeholder process for sustainable development initiated by the Prime Ministers from the eleven member states of the Council of the Baltic Sea States (CBSS) - Members are the CBSS member states, the European Commission, intergovernmental organizations, international financial institutions, international subregional, city and business community networks and other international non-governmental networks - The overriding objective of Baltic 21 is to contribute to achieving sustainable development in the Baltic Sea Region in a 30-year perspective - The Baltic 21 Action Programme addresses the three dimensions of sustainable development – the environmental, the social and the economic aspects – and includes goals and indicators in eight sectors of crucial importance to this region – Agriculture, Energy, Fisheries, Forests, Industry, Tourism, Transport and Education, and Spatial Planning	- Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, Russia, and Sweden
Baltic+ Project	2003-2005	- The Baltic+ project is a project to strengthen strategic cooperation between the regions of southern Sweden, northern Germany and northern Poland - The project focuses on the areas of spatial development, agriculture and forestry, tourism, regional and local accessibility, and city networks - The three-year project budget of 3.1 million Euro is funded by the Interreg IIIB Programme, Phare, and national partners in Germany, Poland and Sweden	- regions in Germany, Poland and Sweden
Baltic University Programme (BUP)	1991	- The Baltic University Programme is a network of 180 universities and other institutes of higher learning throughout 14 countries in the Baltic Sea region, coordinated by a Secretariat at Uppsala University in Sweden - The Programme focuses on questions of sustainable development, environmental protection, and democracy in the Baltic Sea region - The aim is to support the key role that universities play in a democratic, peaceful and sustainable development; this is achieved by developing university courses and participation in projects in cooperation with authorities, municipalities and others - Main financiers of the Programme are the Swedish Ministry of Education and Uppsala University; some funding is also received from the Swedish Institute, Interreg IIB and the Nordic Council of Ministers as well as the Foundation for Knowledge and Competence Development	- Belarus, Czech Republic, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia, Slovakia, Sweden, and Ukraine
Baltic Sea Area Studies: Northern Dimention of Europe	2000-2004	- The Baltic Area Studies: Northern Dimension of Europe is a project between eight universities and colleges around the Baltic Sea region - It is a research and training network carried out in the EU's 5th Framework Programme, investigating the significance of the Baltic Sea region as a cultural, political, and economic factor in the development of a Northern Dimension to Europe - and, in turn, how this concept will influence the development of the Baltic Sea region	- Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, and Sweden

Source: Internet sites of the various organizations listed above

Interest in regional collaboration and joint action in the field of innovation is especially strong. The European Commission has recently highlighted the phenomena of increasing regional action to improve the climate for enterprises to innovate. Regions are better able to take into account the specific strengths, weaknesses and ambitions of the region, yet should continue to gain insight from trans-regional or trans-national networks as well (European Commission (2003a), pp.20-21). The latest European Competitiveness report also stresses that there is a positive association between productivity and a number of variables – such as R&D intensity, human capital and specialization in high-tech activities – indicating the importance of a knowledge base for regional competitiveness. The analysis also suggests the presence of spill-over effects across adjacent regions showing that proximity matters. Knowledge is given a pivotal role, as is the ability to establish links between academic work and innovation at the firm level. The common thread appears to be the potential to connect the different economic actors – both in the physical sense through good transport and communication networks and in a more intangible way through a common vision among regional stakeholders as well as through collaboration between the academic and the business world (European Commission (2003c), p.13).

Many researchers and businessmen have commented on the apparent complementary nature of the countries of the Baltic Sea region with regards to innovation: the Nordic countries and Germany offer experience, stability, and lessons from global leaders, while the Baltic countries, Poland and Russia offer new perspectives, dynamism, flexibility and high momentum (Fromlet (2004), p.15). The desire to take advantage of this synergy effect is felt by many, and has helped to shape the Nordic Council of Ministers' (NCM) recently-published Innovation Book (see Box 2 below).

Box 2: Nordic Council of Ministers' Innovation Book

The Nordic Region has the potential to be one of the world's leading regions not only in research but also in innovation, which provides Nordic business with a competitive edge in a rapidly changing world. In late 2003, Gustav Björkstrand of Åbo University published a whitebook on research and innovation in the Nordic Region. The whitebook was followed by a complementary vision-setting paper, prepared by Bjarne Lindström, with more focus on business as a stakeholder. The resulting innovation book, launched at a conference in Reykjavik in June 2004, was discussed by the Nordic Trade and Industry ministers at their yearly meeting at the beginning of September 2004.

The suggestion put forward to the Nordic Committee of Senior Officials for Industrial Policy included three priority areas for cooperation in the field of innovation during 2005-2010:

- Transnational cooperation on the strategic policy level, with a goal to develop a policy learning process which encourages more innovative policymaking in the Nordic countries
- Operationally-focused international activities between multiple 'innovation stakeholder' groups, aimed at dismantling legal and regulatory barriers to international innovation flows (e.g. promoting free flow capital, intellectual property, researchers, etc.)
- Targeted international network support for developing and expanding a few international industrial sectors or clusters

Source: Nordic Council of Ministers (2004)

Part of the NCM's overall vision is to operate in close cooperation with several international, regional and national organisations outside the Nordic countries. The Adjacent Areas Programme, which is directed at the Baltic States, Russia and the Artic area, has a high priority within Nordic cooperation. International cooperation in the field of innovation policy learning, formulation, action and evaluation is part of this agenda.

There is broad consensus about the trends towards Baltic Sea regional cohesion, and the benefits of regional action in the field of innovation policy. The challenge is in defining regional priorities for analysis, discussion and action, and in determining an appropriate structure for this process.

Opportunities for Strengthening Innovation in the Nordic-Baltic Sea Region

Defining regional priorities is not easy. There are many areas where a deeper understanding of the issues and regional collaboration – or joint action – would strengthen innovation performance. Some of the topical areas include: innovative small and medium-sized enterprises (SMEs) and clustering; human capital development; and innovation policy formulation and evaluation. An introduction to some of the substantive issues in these areas is provided in the sections that follow.

Innovative SMEs and Clustering

SMEs are widely recognized as a primary source of innovation and entrepreneurial activity. In the Baltic Sea region, SMEs represent over 99% of total enterprises, and around 60% of the labour force (Schwaag Serger et.al (2004), p.38). Yet SMEs share a number of barriers to their ability to innovate and grow: excessive risk and cost of innovation, inadequate access to finance (especially start-up and seed financing), lack of qualified personnel, and inflexibility in regulations and standards (Eurostat (2004a), p.5-6). One particular challenge shared by many of the countries in the Baltic Sea Region is the fact that business sector R&D tends to be concentrated in a handful of large and, in some countries, primarily foreign-owned, companies. In countries such as Sweden, Iceland, Estonia and Latvia, one challenge to national innovative capacity is the R&D 'gap' between a few large, and/or foreign-owned companies – which tend to be at the frontier of international technological development – on the one hand, and the vast majority of domestic companies which have little or no capacities for, or access to, R&D.

One of the alternatives that many countries are now considering as a method of strengthening/supporting smaller companies, and catalyzing innovation throughout their economies, is the development of clusters. Alliances, networks and clusters are positive tools to help SMEs – and other companies, universities and research institutes – to develop critical mass and a better ability to access funds, spread information and knowledge, and reach their innovative and commercial potential. However, these tools should not be used without reflection as to the rationale, benefits and possible negative consequences which policy action may entail (see Box 3 below).

Policy measures or interventions in support of SME development should be designed to meet the specific demands of companies. This may be quite difficult to attain, as the make-

Box 3: On Clusters and Cluster Policies

Clustering is generally defined as a process of firms and other actors co-locating within a concentrated geographical area, cooperating around a certain functional niche, and establishing close linkages and working alliances to improve their collective competitiveness. "Cluster initiatives" are viewed as conscious actions taken by various actors to create or strengthen clusters. There are multiple relevant actors, and they may relate to each other in different ways. Governments and other public authorities are known to be responsible for most cluster initiatives, although there is a marked geographical variation. It is widely recognised that public policy, whether explicitly directed at clustering or not, may exert a major influence on the formation and development of clusters.

There may be a rationale for policies aimed at upgrading skills and competencies which are essential for effective clustering of SMEs. Apart from catalysing inter-firm networks and university-industry linkages, cluster processes may strengthen the incentives for SMEs to upgrade their internal competencies, in part because needs and payoffs become more apparent. Special programmes may still be needed to realise and sharpen such efforts (Forfas, 2004). The rationale is a combination of imperfections in information, credit constraints in SMEs coupled with indivisibilities in competence upgrading, and the lack of universities and other public or private training institutions providing educational services tailored to the specific needs of SMEs.

Broadly speaking, the arguments for cluster policy, i.e. intervention by government or other public actors in regard to the development of clusters, are not yet fully-established. A host of approaches are nevertheless pursued by various policy institutions but motives vary, and are often vaguely formulated. There is a scarcity of comprehensive evaluations of results measured against clear-cut objectives. In other words, the field remains marked by unsettled issues. What is the role of policymakers with respect to clusters? What type of clusters should be prioritised when considering the role of public policy? Which measures should be implemented, by whom, and at which stages? How does cluster-driven policy relate to other approaches, such as those that spring from concerns with national/regional innovation systems, the information society, etc?. What are the guiding principles for public-private partnership, or for deferring responsibilities to the private sector?

The interest in clustering has been given a boost by the combination of disappointments with other policy approaches, the appreciation in academia as well as business and policy circles of innovation, and its perceived links to clustering processes. The emergence of any cluster is intrinsically related to innovation. As clusters evolve over time, however, forces of change both within the cluster itself and its location, and in the external environment, may bring changes that serve to challenge the continued development of the cluster. Success in maintaining strong conditions for innovation is likely to be greatly important for avoiding decay and stagnation, and ultimately for the survival of clusters. It is conceivable that today, and even more likely in the future, all long-living clusters will have to be continuously innovative in one way or the other. While *innovative clusters* may thus be a tautology, the link between clusters and innovation is critically important. The notion of innovative clusters is associated with their connection to the driving forces of innovation.

Potential benefits from cluster initiatives do not in themselves suffice as rationale for policy intervention in clustering processes. Individual firms and organisations are the prime actors in cluster processes, and cluster policy is about consistently paving the way for conditions that are conducive to people's engagement in joint efforts, and the realisation of mutual benefits. Yet, government policy impacts on the preconditions for clustering under all circumstances, whether willingly or un-willingly. The understanding and attitudes of policymakers thus matter greatly for what can be achieved through cluster initiatives and cluster actions. The realisation of an identified policy objective does not necessarily require a public policy measure. In some instances, private actors will, and should, undertake these roles spontaneously. As for outright policy intervention, the fundamental question is whether and how policy can be expected to add value beyond what other actors achieve independently. Cluster policies may thus spur learning processes and push policymakers to upgrade relevant competencies. Across a spectrum of domains, governments may see the need to reshape institutions and playing rules in support of clustering processes and innovation.

adapted from Andersson et.al. (2004b)

up (size and industrial focus) and needs of SMEs in a country can be quite varied. Perhaps not surprisingly, many of the national SME support schemes around the Baltic Sea region have prioritised and enacted similar measures (e.g. financing products, consulting, training, market analysis, statistics, network opportunities, etc.). It is interesting to note, however, that some of these national interventions (e.g. to increase seed capital, to locate business partners or technical services overseas, to establish links between science and industry) are not meeting expectations. In many cases, there is a trend to broaden the scope in order to have a greater impact. Examples of this can be seen in various clustering initiatives around the region (see Box 4 below).

Box 4: Examples of Regional Networks and Clusters

ScanBalt, funded by the Nordic Innovation Center, aims to improve intraregional capabilities and strengthen abilities to compete globally. ScanBalt also receives funds from the EU's 6th Framework Programme, within the life science thematic priority, to develop the meta-regional capacities and improve conditions for the regional life science/biotech communities.

ScanBalt is a network of networks within the meta-region encompassing the five Nordic countries, the Baltic countries, Poland, north Germany and north-west Russia. The ScanBalt BioRegion includes more than 60 universities, 870 biotech/life science companies and 85 million people. Networks span universities, biotech/life science industry, hospitals and other important actors in the biotech/life science arena. The purpose of this umbrella network is to build a strong competent meta-region able to compete with other life science players at the regional and global levels. ScanBalt is a mediating and coordinating network of existing networks and organizations (including Sunrise Valley in Lithuania, Medicon Valley Academy in Sweden and Denmark, and Estonian Biotechnology Association) as well as a stimulant to the creation of new ones.

Other projects within the **ScanBalt** umbrella include Educational Mobility and a working group on Economic Barriers to Borderless Cooperation.

The **Baltic Information Systems (IS) cluster** is a collaborative network of companies and institutions whose aim is to increase the competitiveness of the region, and ensure export growth on the basis of a shared vision. The IS cluster aims to become a leading exporter of software development services in Eastern Europe, provide reliable application services and to develop know-how and products competitive on the global market. The cluster was initiated in Latvia in mid-2001, when the Latvian Information Systems (IS) cluster was set up with the aim of ensuring that by 2010, Latvia would become the leading exporter of software, integration services, and outsourced services in Eastern Europe. Today, there are 20 enterprises and organisations in the cluster, including Latvia's leading software companies, communication service companies and data centres, a testing company, universities, a vocational training centre, and web design, marketing and PR companies.

Recent evaluations of cluster members' performance has shown that, on average, the companies increased profits rapidly. Growth in turnover and profits was proportionally much higher than overall economic growth in Latvia (during 2001). The focus achieved through the clustering process has lead to success: individual company revenues and exports have increased, and productivity/utilization has increased from 50-60% to 75%. Now, the cluster is preparing to expand beyond national borders, establishing a **Baltic Information Systems cluster**, aiming to compete with the U.S. and India. Recently, the Baltic IS cluster participated in the international exhibition COMDEX Scandinavia (in Gothenburg, Sweden, January 2004).

Yet even an enlarged scope and broader, regional efforts at SME development may not be enough. In the case of biotech, a recent report from the Brookings Institution highlighted the key success factors in developing a successful biotechnology cluster: concentration of highly qualified researchers, well-funded research institutions, and continuing private sector investment in product development. In the U.S., only nine of the country's 51 largest metropolitan areas have succeeded in establishing a significant concentration of biotech activity and financing (accounting for 75% of new venture capital in biopharmaceuticals in the past six years, 74% of the value of research contracts from pharmaceutical firms, and 56% of new biotech businesses formed during the 1990s) (Cortwright et.al. (2002), p.3). This information makes the goal of establishing a leading biotech cluster in the Nordic-Baltic Sea region (e.g. ScanBalt) appear like an overly high expectation. With this perspective, two things become clear: (i) there is a need for regional efforts – given the low chances that any *one* country in the region will be able to achieve competitive advantage on its own; and (ii) there is a need for closer coordination and priority-setting in order to make best use of limited resources – given that simply "spreading the money around" will not likely attain the desired result.

Within the area of innovative SMEs, there are many topics for further analysis and discussion (e.g. venture capital, national SME service networks, technology transfer and innovation relay centers, etc.). Clusters and cluster policies are just one area where all of the countries in the region are equally inexperienced and interested in outside perspectives and advice.

Human Capital Development

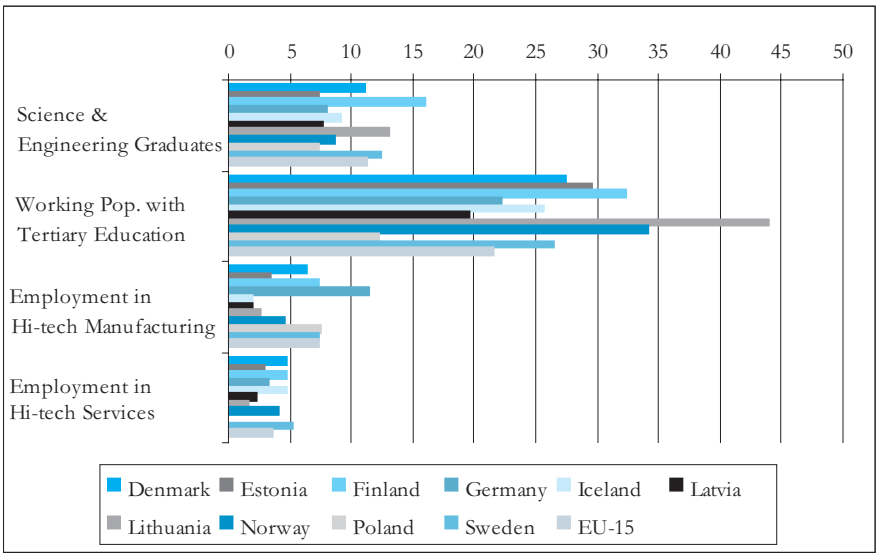
Human capital development spans a wide range of topical areas – including education, collaboration between science and industry, research exchanges, entrepreneurship, etc. Of the many innovation indicators, a shared strength for the countries of the Nordic-Baltic Sea region is the prevalence of a highly-educated population. Many of the countries have a long history of Academies of Science, a high percentage of researchers and R&D investments, and a strong institutional framework. At the same time, the traditions and composition of skills vary greatly, as is most obvious in the now partly outdated technical - and lacking commercial - skills among many older workers in the transition economies. Nevertheless, all of countries in the region face their specific issues with regard to: linking research results to industrial/commercial applications; linking education/science policies with industrial policies; and revamping their educational structures to encourage entrepreneurship and teach the skills necessary to start new businesses and compete in today's globalised markets (van Beers (2003); Lindström (2004); Hallin and Östhol (2004)).

Figure 7 below provides data from the latest European Innovation Scoreboard, highlighting a common strength among the countries of the Baltic Sea: a high percentage of science and engineering graduates, and a very high percentage of the working population with tertiary education. However, when one looks at employment in hi-tech manufacturing and services, the data shows relatively lower performance. The percentage of employment in high-tech manufacturing is an important indicator "of the manufacturing economy that is based on continual innovation through creative, inventive activity" (European Commission (2003d)).

The percentage of employment in high-tech services, in turn, is important both as an indicator of the share of innovative services in the economy and because high-tech services

> *provide services directly to consumers, such as telecommunications, and provide inputs to the innovative activities of other firms in all sectors of the economy. The latter can increase productivity throughout the economy and support the diffusion of a range of innovations, particularly those based on ICT* (ibid.).

Figure 7: Selected Education and Employment Indicators



Source: European Commission (2003d)

As an example, Lithuania illustrates extremely strong human capital assets – performing well above the EU average for tertiary education and science and engineering graduates, yet employment in high-tech manufacturing and services is well below the EU average. Throughout the region, on average, there seems to be a high level of investment in education put into the system, but a lower level of hi-tech employment and higher value-added products coming out. Although "high-tech" jobs and products should not be viewed as the end goal – innovation can and does exist in all sectors of the economy – these indicators point out an apparent imbalance in human capital investment and productive output.

This issue of "high value in, lower value out" – and an apparent dis-connect between the worlds of science and industry – is shared by most of the countries of the region, and tops the list of concerns for businessmen and policymakers alike. Increasingly, private sector leaders and scientists are getting involved in the policymaking process in order to more concretely define and address these issues. Ministries of Education and Industry are collaborating more closely in order to close the gap between market/industry demands and educational/science supply. For example, representatives from the Academy of Science in Latvia have been involved in defining Latvia's innovation action plan. In Poland, the Ministries of Education and Economy have worked together to recently propose a new *Act on Innovation*.

In Lithuania, the Confederation of Industrialists and the Lithuanian Innovation Center have sponsored activities to promote cooperation between companies and the research sector.

These companies and private sector organizations are becoming more and more active because they are concerned with human capital in their countries. A common view expressed during recent field study visits[26] was that, at present, human capital was an asset, but that in the future, there would be a lack of business/management and entrepreneurial expertise to face more intense European and global competition.

According to the Global Entrepreneurship Monitor (GEM), there is a positive, statistically significant association between national economic growth and national level of entrepreneurship (Reynolds et.al. (2003) p.iii). The GEM measures entrepreneurial activity in a country, based on three main variables: (i) new business creation, as measured by the total entrepreneurial activity (TEA) index; (ii) market changes and plans for growth among SMEs, as measured by the firm entrepreneurial activity (FEA) index; and (iii) changes introduced by or with the support of existing institutional structures and their elements[27]. In an attempt to answer the question "which countries are more entrepreneurial?", the GEM used the first two indices to classify 40 countries into five groups (see Table 4 below).

Table 4: Classification of Countries by Presence of Entrepreneurial Activity

Group	Count	Countries
A	5	Chile, Korea, New Zealand, Uganda, Venezuela
B	4	Bazil, China, India, Mexico
C	15	Argentina, Australia, Canada, Denmark, Finland, Hong Kong, Hungary, Iceland, Ireland, Slovenia, Spain, Singapore, Thailand, United Kingdom, United States
D	9	Belgium, Germany, Greece, Israel, Italy, Norway, South Africa, Sweden, Switzerland
E	7	Chinese Taipei, Croatia, France, The Netherlands, Japan, Russia, Poland

Source: Reynolds et.al. (2003)

Of the eleven countries in the region, only seven are included in GEM's analysis (the five Nordic countries, Poland and Russia). Within this group, Denmark and Iceland stand out as the only countries to achieve an "intermediate level" of entrepreneurship – classed in the same group as Argentina, Ireland, Singapore and the US. Germany, Norway and Sweden appear in the "below average" grouping. Poland and Russia (for which a smaller sample of data was collected) are classified among the least entrepreneurial countries. Keeping in mind that the differences between each group are highly significant and substantial, one of the main conclusions which can be drawn from this analysis is that efforts devoted to business start-ups seem to have more impact than the entrepreneurial activity of existing firms. Necessity entrepreneurship, which is a major source of business start-ups in relatively poor countries, continues to be associated with higher levels of subsequent economic growth. The

26 Leading-up to the recently-published IKED report (Schwaag Serger and Hansson (2004)), field studies were conducted in Estonia, Latvia, Lithuania and Poland. Over 100 interviews were conducted with representatives from government, industry, chambers of commerce, academies of science and research institutions.

27 At present, GEM can provide direct evidence related to only the first two variables (new firm start-ups and entrepreneurial activity in existing SMEs). Measures of national institutional entrepreneurship may be among the most difficult to develop; no useful indicators are available at this time.

causal role for this is unclear, but a vigorous start-up sector would seem to be a necessary condition for high levels of national economic growth (Reynolds et.al. (2003) p.22).

There is limited data on entrepreneurship for the Baltic Sea region. In order to determine actions to improve performance, more detailed information is needed. Information about, e.g., the number of start-ups, survival rates, reasons for success/growth or failure, the existence of university and management training in entrepreneurship – would be helpful for policymakers to know in order to determine the best measures to address the issues. Participating in global surveys (like the GEM) are useful exercises to attain this information.

Human capital is an area which is both very important for long-term competitiveness and very complicated for policymakers to address. Not only does it require the close collaboration between ministries of education and industry, but it also requires a very long-term perspective, as results from policy measures aren't necessarily seen for decades.

Innovation Policy Formulation and Evaluation

Given the very different structures and decision-making processes, it is difficult to give a concise overview of the key issues regarding innovation governance in the region. In general, one can conclude that responsibility for innovation policy is still shared between two or more ministries. Although a majority of countries have an Innovation or Science and Technology Policy Council, most of these do not have the direct mandate and participation from the Prime Minister. Thus, decisions and actions take a much longer time to be agreed.

In a large majority of cases, relevant stakeholder groups are involved in the policy formation process although the degree varies considerably between countries, ranging from ad hoc, and sometimes rather superficial, consultation processes to their inclusion in top-level advisory councils. All countries strive after closer linkages between the research and industrial sectors. In about half of the countries, there is an agency charged with managing the day-to-day operations of innovation policy implementation: soliciting and financing projects, managing own projects, raising awareness on innovation priorities, etc. In all of the countries, innovation policy formation and governance is relatively new. Even though the Nordic countries tend to have rather mature institutions, the level of horizontal coordination is varied among the countries, and experience in this area is not widespread.

The area of policy evaluation, in particular, is under-developed. Evaluation is basically understood as a set of systematic tools through which actions and processes can be measured and assessed. Given the absence of market outcomes to guide policymaking, evaluation is particularly important as a means to guide public actions. *Ex post* assessment of outcomes represents only part of the required framework, however. The necessary stages include the: i) *ex ante* formulation of objectives and of the framework for implementation of the policy measure as well as of the evaluation; ii) selection of evaluation criteria, levels of observation, etc.; iii) monitoring of the programme over its lifespan; iv) the *ex post* assessment; and v) feedback, communication of results, and the implementation of the lessons learned. In this cycle, evaluation goes beyond serving as a tool for measurement to comprise a process and a policy instrument in itself, although views differ on the extent to which strict criteria should

be applied or room be granted for gradual adjustment and discretion in learning. Evaluations can be used to help sharpen and communicate objectives and shape incentives for actors engaged in programmes. Correctly arranged, they can help broaden the understanding of, and the support for, what a programme is trying to achieve.

Already before a policy is implemented, it should be clear what is to be measured and how. There should be proper communication early on. At the same time, evaluations should relate to continuous monitoring schemes. Interim evaluations could be used to assess whether processes are on track, and to muster collective reflection and inspire adjustment of behavioural codes and decision parameters. As for indicators, publications, patents, new products, or new firms, may be preferred as intermediary indicators of success. Variables such as profitability, job creation, growth, or welfare, ultimately need to be in focus. A combination of methods, with consideration to data-availability, is normally preferable. Evaluations should also be pursued in ways that are consistent with a portfolio perspective, i.e. experimentation is useful and individual cases must be allowed to fail.

Although evaluation is needed to help guide resource use and end-results, more is not always better. Practices and methodologies should be adopted with a view to the benefits as well as the costs involved. The latter includes the burden of time requested from market actors to respond to interviews and fill in questionnaires. The benefits conversely depend on the willingness and ability of policymakers to make use of the results. As the topic of evaluation is a technical one, and not high-profile in political terms, it seldom gains full attention at the highest levels of decision-making. Insufficient attention may also, however, be caused by insufficient capacity to receive and process the results of evaluation. That may particularly reduce the returns from sophisticated measurement techniques generating complex insights.

These kinds of concerns contribute to new developments and experimentation in the evaluation of innovation policies. Networking and increased exchanges of experience, and also the mobility of people between jobs, regions, and traditionally-separated social spheres such as the public and private sectors, are studied as possible means to remedy weak links in innovation systems. Attention is now paid to the value of networking and mobility in socio-economic assessments. Indicators, surveys or other statistics grading the success of various policy measures are difficult to develop and pursue on a national level. This is an area where joint action would be very beneficial.

None of the countries in the Nordic-Baltic Sea region seems to “have the key” to a systemic and integrated solution to innovation policy formulation, governance or evaluation. All countries benefit from exposure to new ideas – providing alternatives to the institutional routines that may have become engrained on a national level. All countries would benefit from a structured and open discussion of issues and exchange of experiences.

Summary

Recent European competitiveness assessments highlight the growing importance of regional coordination and action in order to spur innovation and reach the goals of the Lisbon accord. There are strong indications that the Nordic-Baltic Sea Region can develop to become a

world-leading region for innovation. Common baseline values, structures, and priorities in the areas of innovation policy form a strong platform on which to build. There are already a number of institutions and programmes formed to promote Baltic Sea regional collaboration, yet there is no forum in which policymakers and other stakeholders can advance efforts to catalyze innovation. In order to realise the above-described potential, different approaches are required. The creation of a concrete cooperation – a structured process in which all key stakeholders can develop a shared understanding of key issues and possible actions – can help the individual countries, and the region as a whole, move forward. There is a definite case for regional cooperation in the area of innovation policy.

V. CONCLUSIONS

The countries of the Nordic-Baltic Sea region combine a unique conglomeration of experience, world-leading performance, momentum, and a desire for more tightly-knit regional discussion and action in the field of innovation policy. Whereas the Nordic countries and Germany are leaders of innovation performance in Europe[28], the Baltic countries and Poland show the strongest dynamism, in terms of ability to adjust to change, and growth in their economies. In general, all the countries in the region have a highly-educated population, a strong science base, and a high dependency on international markets and networks for growth. The countries also share a number of common challenges: linking scientific assets, research and educational investments to commercially-viable and market-oriented outputs; encouraging closer links between businesses and among other stakeholders in clusters or other international networks; and understanding the key success factors for developing innovation policy measures – governance structures and decision mechanisms, benchmarking and evaluation.

Although each country offers its own specific profile – strengths, experiences, challenges and priorities – the eleven countries are united by historical ties, trade and investment, a number of regional organisations and programmes, and a common prioritisation of innovation. There are strong indications that the Nordic-Baltic Sea region can develop to become a world-leading region for innovation, and there are clear opportunities both for policy learning and for cooperating on concrete key issues and initiatives. However, there are also a number of barriers to overcome: different legal and regulatory environments (start-up laws, financial reporting, tax, employment regulations, etc.); limitations to international (venture capital) investments and protection of intellectual property; nationally distinct educational and research systems; and varied levels of understanding/trust among the different countries.

In order to find ways to overcome barriers and realise existing opportunities, different approaches are required. The innovation system consists of different players, each with their own specific driving forces, competencies, and limitations. Policy outcomes and performance results depend greatly on the incentives provided to the different actor groups. Future work and new approaches for strengthening innovation in the region will need to take this into account, and provide the right incentives to aid the various players in exchanging information, working together, and capturing synergies. The creation of a structured process, in which all key stakeholders can develop a shared understanding of key issues and possible actions, can help the individual countries, and the region as a whole, move forward. Acknowledging and learning from the many political platforms, networks and projects already in existence, there are a few conditions that must apply:

- ***clear ownership of the initiative*** – including a motivated sponsor, a neutral/independent facilitator, a clear structure, process and objectives

- ***a concrete agenda*** – defining and presenting the background and the issues; outlining suggested topics for discussion, aimed at defining actions/policy measures

28 as measured in the European Innovation Scoreboard

- ***an inclusive process*** – involving all key stakeholder groups (industry, academia and government) to ensure a realistic view and anchoring

- ***open discussion*** – setting an appropriate tone to encourage open exchange and policy learning, bridging traditional national perspectives

- ***linked to policy*** – seeking synergies with existing political bodies and international structures, and involving key decision-makers from each country in order to ensure adequate follow-up

There are many areas within the realm of innovation policy in which an open exchange – and regional cooperation to develop actions – would provide new perspectives, a catalyst for action, and a means to strengthen the cohesion, innovative performance, economic strength and competitiveness of the region as a whole. All of the eleven countries of this region are looking for answers to similar questions, seeking advice and alternative perspectives. What is needed now is an organisation to lead this forward – to help the Nordic-Baltic Sea region develop its position as the leading region for innovation in Europe.

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APPENDIX A: DESCRIPTION OF WORLD BANK'S "BASIC SCORECARD" INNOVATION INDICATORS

As working with a large set of 76 variables can be unwieldy, a simplified "basic scorecard" consisting of 12 variables that are based on the four pillars of the knowledge economy, plus two relating to performance, has been developed. In essence, this scorecard attempts to capture a country's preparedness for the knowledge-based economy. ***This scorecard can be captured for 2 points in time: for 1995 (or closest available) and for the most recent available year.***

The indicators used in the basic scorecard are as follows:

i. Performance Indicators

Two variables are used to illustrate the overall performance of a country: ***annual GDP growth*** and the ***human development index***. Annual GDP growth is a good indicator of a country's overall economic development. The human development index (HDI) is a composite measure of three components: longevity (measured by life expectancy); knowledge (adult literacy rate and mean years of schooling); and standard of living (real GDP per capita in purchasing power parity). The HDI provides information on the human development aspect of economic growth.

ii. Economic Incentive and Institutional Regime

Three variables are used as proxies for this pillar. The first, ***tariff and non-tariff barriers*** from the Heritage Foundation provides a measure of the degree of competition, and is a composite of the rating on the average tariff rate, non-tariff barriers, and corruption in the customs service. The other two variables have been chosen from WBI's Governance dataset. ***Regulatory quality*** measures the incidence of market-unfriendly policies such as price controls or inadequate bank supervision, as well as perceptions of the burdens imposed by excessive regulation in areas such as foreign trade and business development. ***Rule of law*** measures the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of both violent and non-violent crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts.

iii. Education and Human Resources

Three variables are used for this pillar: ***the adult literacy rate (percentage 15 and above)*** gives a very broad stock measure of educated population, while ***secondary and tertiary enrolment rates*** provide a flow rate.

Adult literacy rate refers to the percentage of people aged 15 and above who can, with understanding, read and write a short, simple statement on their everyday life. Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education indicated. ***Secondary education*** completes the provision of basic education that began at the primary level, and aims at lay-

ing the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers. ***Tertiary education***, whether or not to an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level.

iv. Innovation system

Three variables have been chosen to represent this pillar. As an input into the innovation system, we use ***researchers in R&D***. For output, we have ***patent applications granted by the US Patent and Trademark Office (USPTO)***, and ***scientific and technical journal articles.*** These three innovation variables that are presented in two ways:

a. all three variables are scaled by population (the "weighted" innovation variables).

b. all three variables are presented in absolute numbers (the "unweighted" innovation variables).

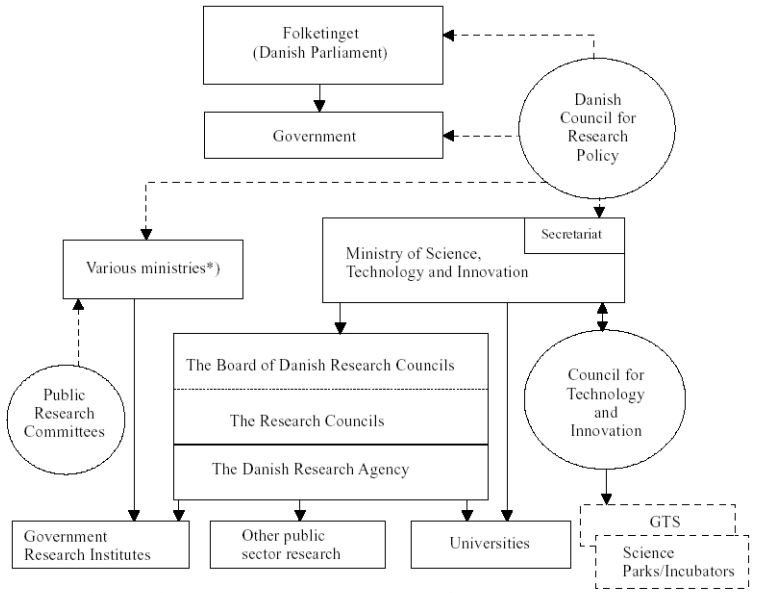
Patents granted by the USPTO includes utility patents and other types of U.S. documents, such as design patents, plant patents, reissues, defensive publications, and statutory inventions and registrations.The origin of the patent is determined by the residence of the first-named inventor. ***Scientific and technical journal articles*** refer to the number of scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences.

v. Information Infrastructure

Three variables are used for this plank of the knowledge-based economy. ***Telephones per 1,000 population*** is the sum of telephone mainlines and mobile phones and provides a better indicator of connectivity than either in isolation. ***Computers per 1,000 population*** refers to the number of self-contained computers designed to be used by a single individual and is an indicator of personal computer penetration and use of relatively new technology for information processing. ***Internet users per 10,000 population*** refers to the number of computers with active Internet Protocol (IP) addresses connected to the Internet and is used as an indication of how well a population has advanced to the level of adapting and using advanced communication channels (Internet) to serve its priorities.

APPENDIX B: NATIONAL INNOVATION GOVERNANCE IN THE NORDIC-BALTIC SEA REGION

Denmark

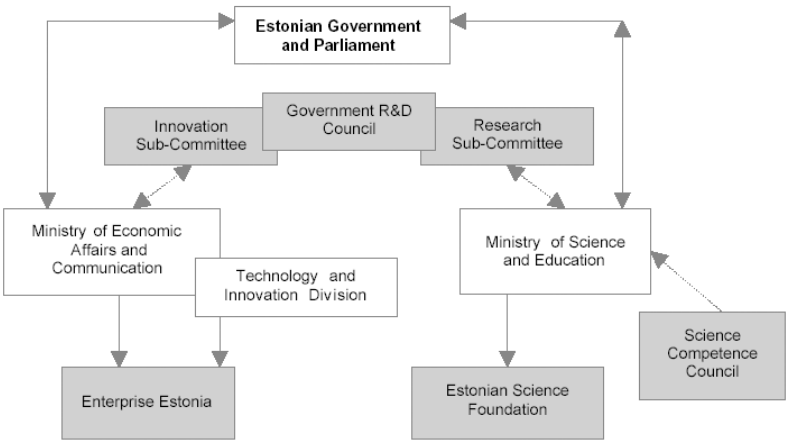


*) Includes the Ministry of Science, Technology and Innovation regarding Research Institutes attached to it.

Source: Ministry of Science, Technology and Innovation

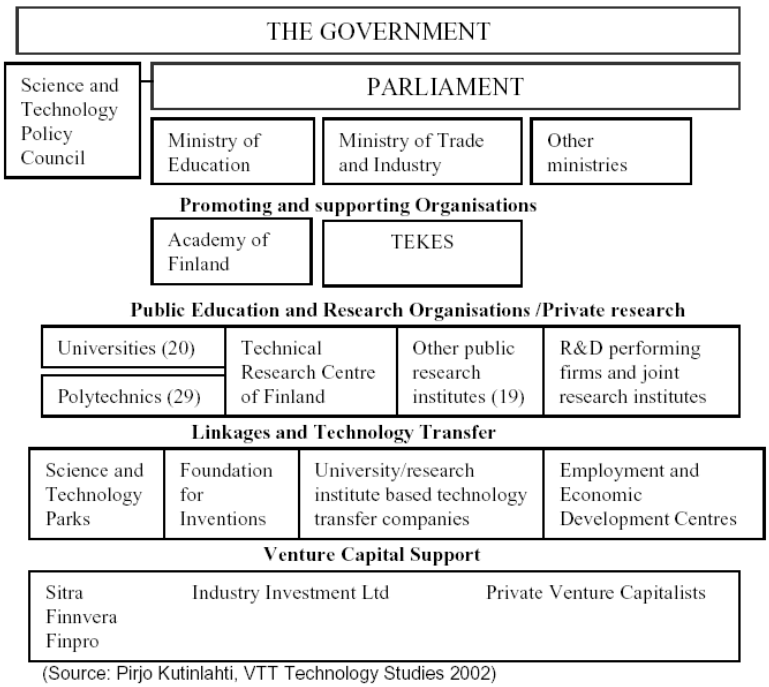
Source: European Commission (2003g)

Estonia



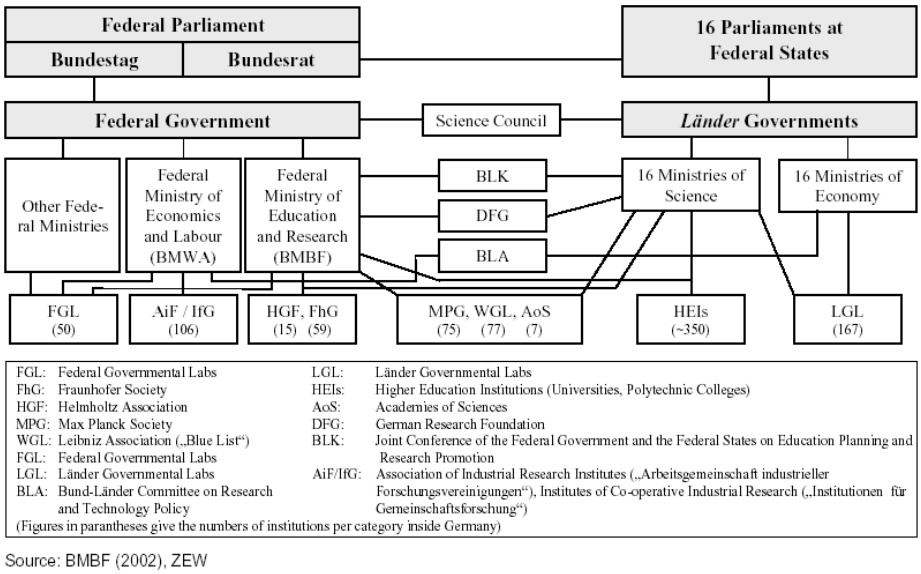
Source: European Commission (2003h)

Finland



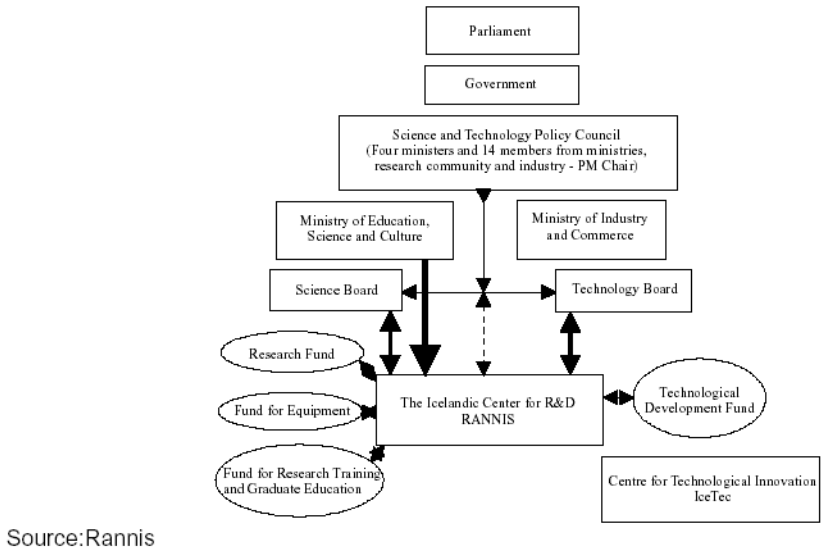
Source: European Commission (2003i)

Germany



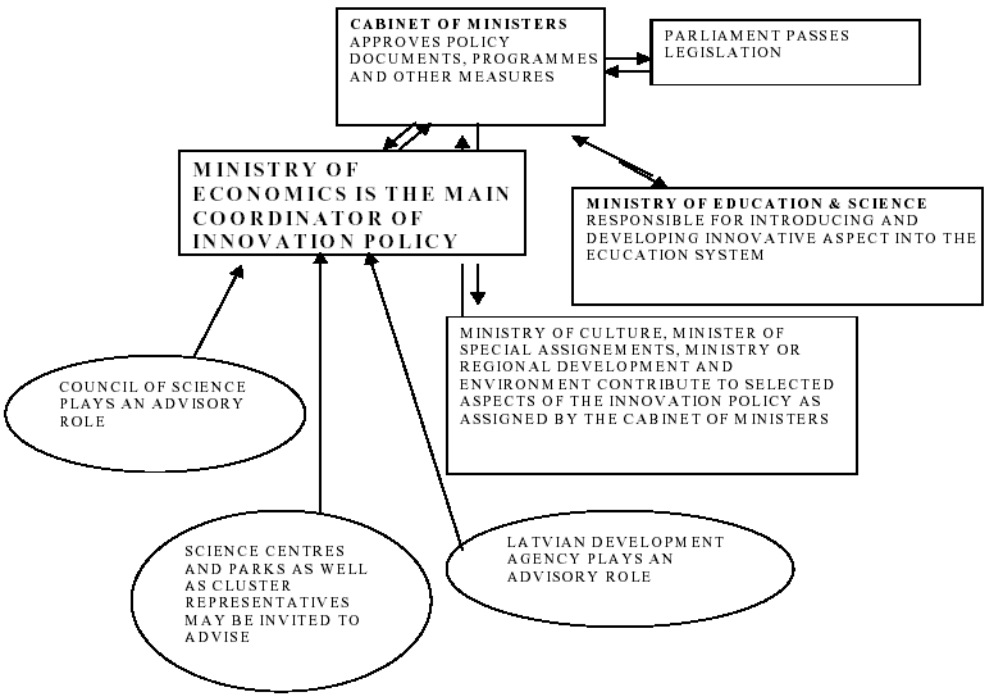
Source: European Commission (2003j)

Iceland



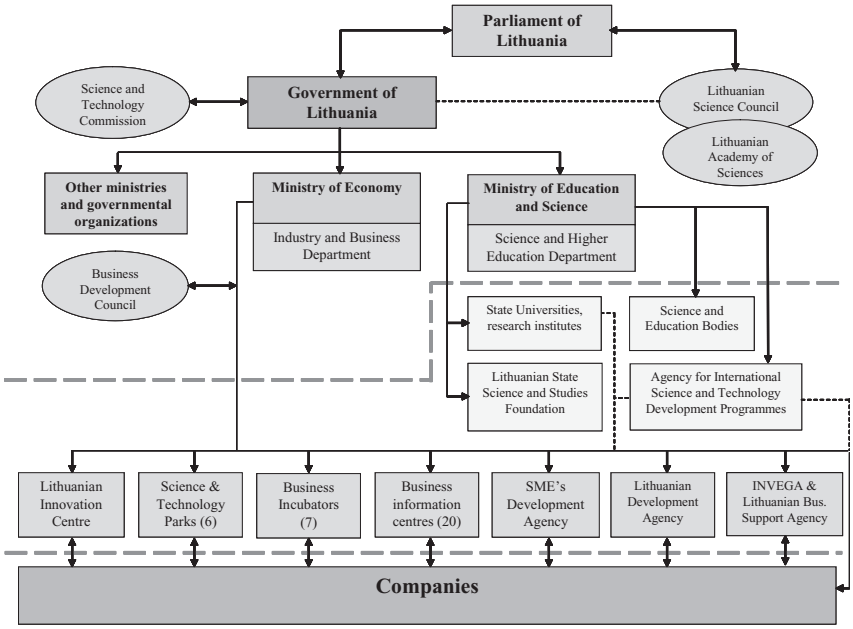
Source: European Commission (2003k)

Latvia



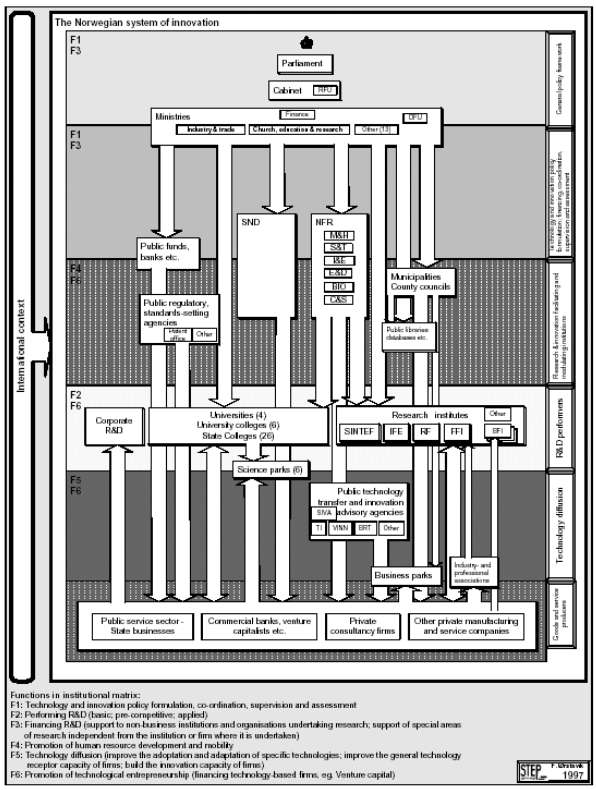
Source: European Commission (2003l)

Lithuania



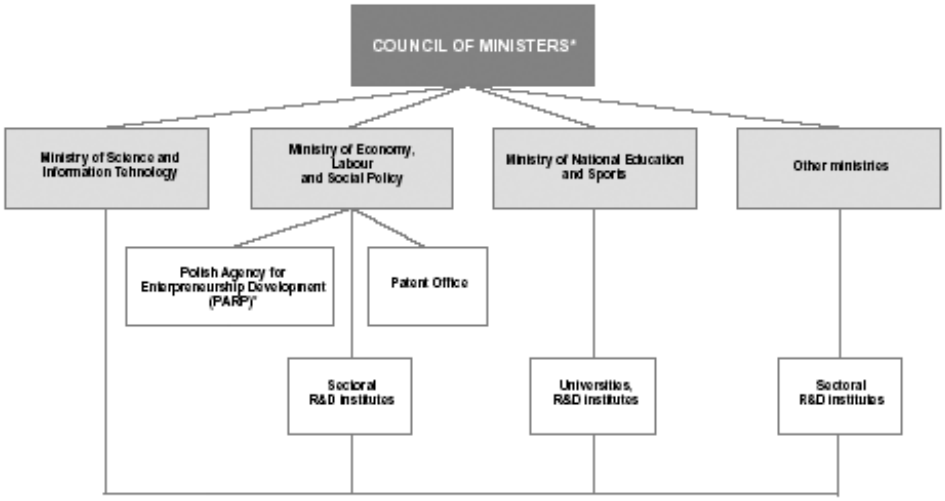
Source: Innovation and Technology Division, Industry and Business Dept., Lithuanian Ministry of Economy

Norway



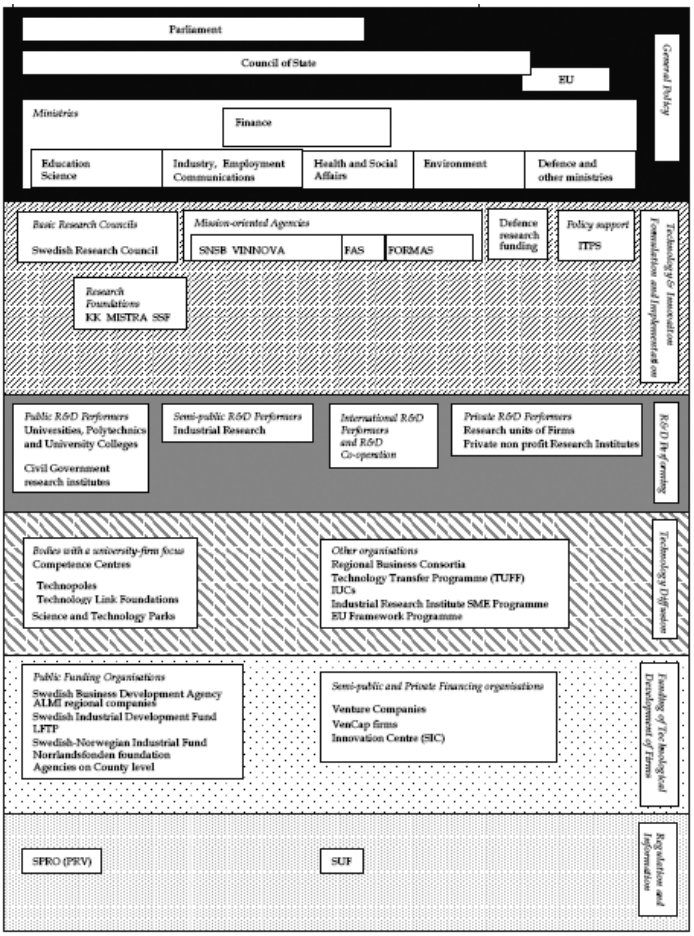
Source: European Commission (2003n)

Poland



Source: European Commission (2003o)

Sweden



Source: European Commission (2003p)

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