

**THESIS**

Irina Atkova 2011

**INNOVATION POTENTIAL OF THE  
MURMANSK REGION**



**Rovaniemen  
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# **INNOVATION POTENTIAL OF THE MURMANSK REGION**

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The Finnish-Russian trade relations regardless of the geographical proximity remain underdeveloped. The objective necessity to disseminate information about economic attractiveness and innovation potential of the Murmansk region in the Finnish business environment emanates from the above said. Thus, the object of the thesis project is the cross-boarder economic cooperation between Finnish Lapland and the Murmansk region, the topic being the innovational potential of the Murmansk region. The aim of the thesis project is to evaluate the innovational potential of the Murmansk region and to identify business opportunities for Finnish enterprises on the Kola Peninsula.

The multidimensionality of the innovation concept preconditions the choice of the pragmatic philosophical perspective that allows using all approaches available to understand the research problem. Pragmatic orientation underpins the choice of the sequential research methodology.

The main outcomes are boiled down to four main conclusions. First, the concept of innovation is perceived and consequently understood differently in Finland and Russia - the Finnish scholars following the European scientific tradition interpret innovation as a process that includes the phases of idea generation, development and commercialization. The Russian business society differentiates between innovation and innovation process and defines the former as a final product. Second, the entrepreneurs of both Finnish Lapland and the Murmansk region agree that the Murmansk region possesses high innovational potential ensuring vast business opportunities. However, the opinions differ concerning the innovational potential of the specific industries. Third, though the Murmansk region possesses high innovational potential, the Lappish entrepreneurs are not motivated to exploit its business opportunities as the Lappish economy is experiencing substantial growth ensuring opportunities in the local market. Forth, to develop its innovational potential the Murmansk region needs multinational companies that can introduce new technology and know-how in financing and marketing opening at the same time international markets for the new products.

Key words: innovation, innovation potential, innovation potential assessment, the Murmansk region, Finish Lapland.

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'Innovation distinguishes between a leader and a follower'  
Steve Jobs, Apple

## **1 INTRODUCTION**

The size of the Finnish trade and other economic activities with Russia and the Soviet Union has varied considerably during the last centuries. During the time when Finland was an autonomous region of the Russian Empire, Russia was Finland's largest trading partner. In the period following the World War I, the Soviet Union's share of the Finnish trade was marginal, as were other forms of economic cooperation. War repatriations imposed on Finland after the World War II developed into bilateral trade regime with the Soviet Union that not only stimulated the cross-border relations but also became a significant engine in developing the Finnish industry. During the Soviet period Finnish enterprises hardly made any investments in Russia and the investment levels continued to be very moderate until the 1998 crisis. The first decade of the new millennium witnessed an intensive development of the Finnish-Russian cross-border cooperation concentrated mainly in the metropolitan cities living out the regional level.

The Murmansk region is one of the most rapidly developing subjects of the Russian Federation ensuring lots of economic opportunities for various business branches. However, the cooperation between Finnish Lapland and the Murmansk region remain underdeveloped. To foster the economic collaboration between the neighboring areas, the assessment of the innovational potential of the Murmansk region is executed to reveal its economic attractiveness. Thereby, the object of the thesis project is the cross-boarder economic cooperation between Finnish Lapland and the Murmansk region, the topic being innovational potential of the Murmansk region. The main aim of the thesis project is to assess the innovational potential of the Murmansk region and to identify business opportunities for the Finnish enterprises on the Kola Peninsula.

The aim preconditions the range of the main research questions. The thesis addresses the question of the innovation definition, classification, sources

and discusses the innovational potential assessment problem. Other key research questions presuppose the investigation of the industrial infrastructures and the peculiarities of the innovation policies of both regions.

The multidimensionality of the innovation concept preconditions the need for a synthesized research framework. It explains the choice of the pragmatic philosophical perspective that allows using all approaches available to understand the research problem. Pragmatic orientation underpins the choice of the sequential research methodology that allows elaborating and expanding on the findings obtained at the different investigation phases. The theoretical background is formed by employing such methods as discourse analysis, analysis of the theme-specific documents and materials.

The first empirical stage is focused on the collection, categorization and analysis of the statistical data related to the innovational potential of the Murmansk region. The second phase represents a series of qualitative interviews with the experts from four industry-specific support organizations, namely with Radik Safin from Opora Russia, Evgeniy Prosoedov from Murmansk Regional Development Agency, Olga Buch from Arctic Center of Training Specialists and Timo Rautajoki from the Finnish Chamber of Commerce, the Lappish subsidiary. The third step involves comparison, analysis and cross-referencing of the statistical and empirical data to draw the research conclusions.

The thesis comprises six distinct sections. Chapter 2 outlines the theoretical background of the research, describes philosophical position, research strategy and method. Chapter 3 and 4 represent the empirical part portraying the industrial infrastructure and innovation policy in Finnish Lapland and the Murmansk region. Chapter 5 compares, integrates and discusses the research findings making links back to the literature. The limitations of the research are specified with implications for practice and opportunities for further research. The main research outcomes are formulated in Chapter 6. These are illustrated in Figure 1.

## ACTIVITY

## OBJECTIVE

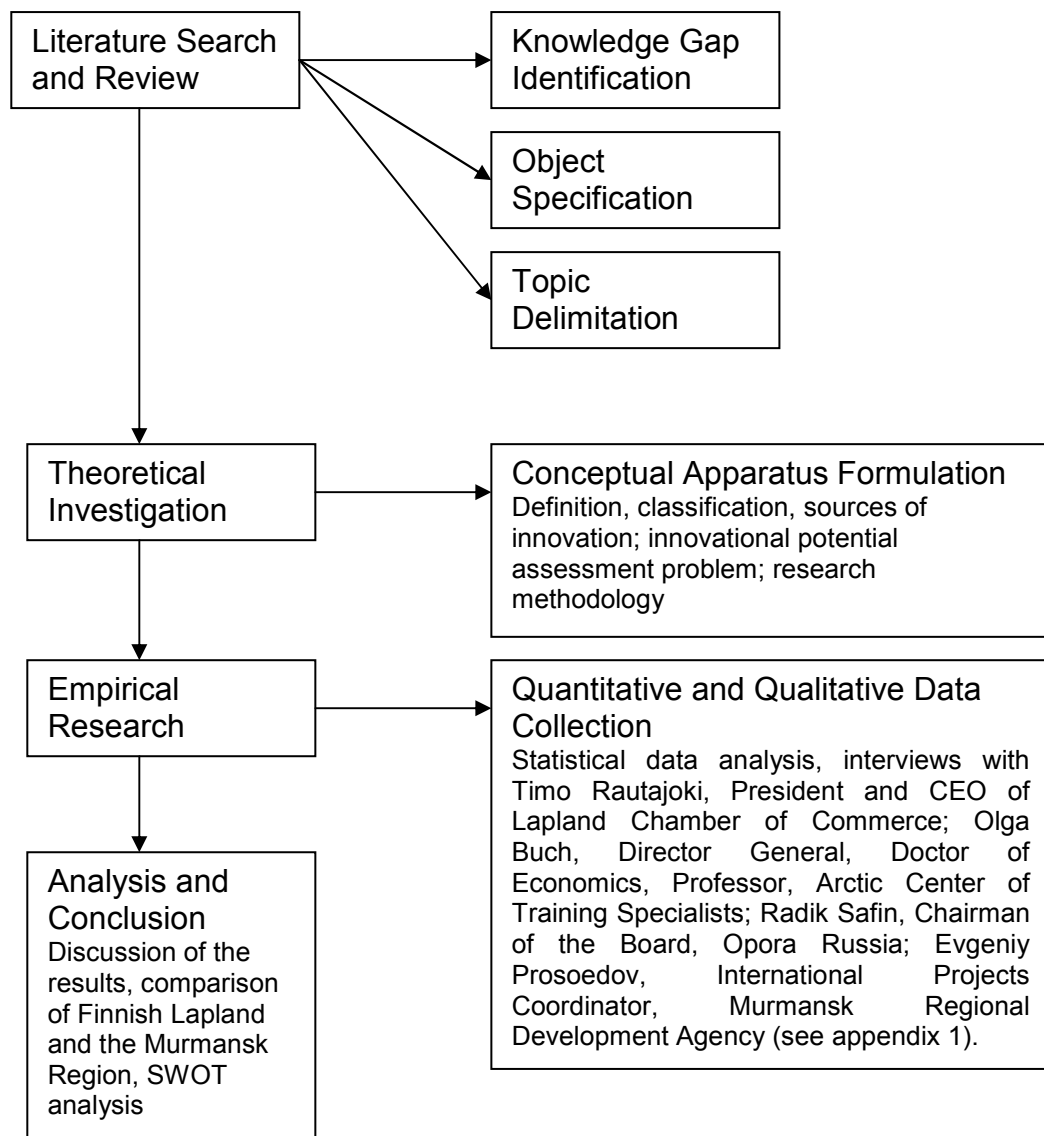


Figure 1. Research Outline



## 2 INNOVATION ONTOLOGY

### 2.1 Concept of Innovation

Having been admitted as a critical factor in ensuring the company's survival and competitiveness in the contemporary economic context, innovation is especially important due to a number of interrelated factors and forces, i.e. hyper-competition, globalization, rapidly changing technologies, deregulation and shorter product life cycles. Nowadays, the need for innovation is frequently promulgated by government. (Storey – Salaman 2005, 4.) However, despite the general recognition of the importance of innovations, there is little unanimity among the scholars concerning the understanding of the concept due to the inter-disciplinarity of the research and absence of a dominant theory on the field. Wolfe (1994) was satisfied that there never would be - innovations are not all similar. They do, however, have certain features in common, which include their critical role in processes of change and fusion of existing and new knowledge.

Being a broad notion, innovation induces much debate about its nature, processes, extent, determinants and consequences. As a concept, innovation evokes images of mystery, skill, inspiration, creative genius, toil and serendipity (Adams 2003, 23). Etymologically, the word innovation stems from the Latin *innovare*, meaning to make something new (Storey – Salaman 2005, 18). Implicit within its origins is, therefore, a sense of newness and change. During the last 50 years, the sense of the term has steadily developed aspiring to encapsulate the complexity of the phenomenon. Schumpeter argued that 'if...we vary the form of the production, then we have an innovation' (Sauber – Tschirky 2006, 24). The 1970s featured a new stream of research and Witte was the first who analyzed an invention from a commercial perspective: 'Innovation is the first economic use of invention' (Sauber – Tschirky 2006, 24). Pavitt developed a procedural definition of the concept stating that 'technical innovation in industry is the development, commercialization, adoption and improvement of product and production process' (Pavitt 1980, 1). Early proponents of the purposive view argued that 'innovation is the effort to create purposeful, focused change in an

enterprise's economic or social potential' (Drucker 1985, 67). Similarly, Vahs and Burmester's evolutionary view is purposive, in which innovation is defined as a 'purposeful implementation of new technical, economical, organizational and social problem solutions that are oriented to achieve the company objectives in a new way' (Sauber – Tschirky 2006, 25). In its broadest sense, therefore, innovation is about the creation and implementation of a new idea in a social context with the purpose of delivering benefit(s) (Adams 2003, 25).

Another tendency is to adopt a view of innovating as consisting of a series of inputs which is converted by a process to deliver a series of outputs. This input-process-output model has become a widely-adopted generic model for the study of innovation (Fig.2). Obviously, gradually increasing competition, technological advancement and globalization are among the reasons that have preconditioned transformations of the understanding of the innovation concept. (Adams 2003, 26.)

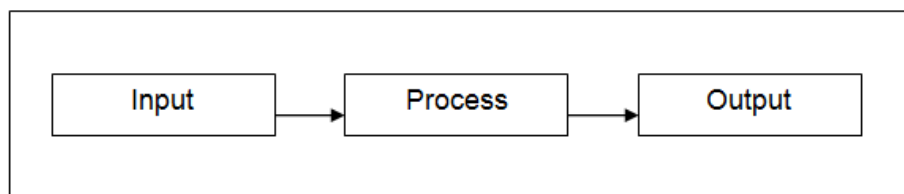


Figure 2. Input-Process-Output Model (Adams 2003, 26)

Another categorical distinction is between an 'invention' and 'innovation' that emphasizes two essential aspects of a new idea - technical and economic. From this perspective, an innovation can be defined as an ability to create a greater wealth-producing capacity enabling to utilize the economic value from an invention (Adams 2003, 43). Thereby, an invention not followed by a successful commercialization or implementation remains within a domain of technical breakthroughs. It should be stressed that innovation is not confined only to the new products - it can also build upon creative practices, processes, relationships and business models.

A multidimensional innovation paradigm encompasses also a concept of innovativeness. For an innovation driven company, a high degree of

innovativeness is essential as it allows to utilize the company's potential capabilities to create new products and processes and to commercialize them. Therefore, innovativeness can be understood as the ability of individuals and organizations to be aware of changes in order to realize renewals early and anticipate events (Sauber – Tschirky 2006, 26). Innovativeness, by definition, is an enduring organizational trait implying that truly innovative organizations are those that exhibit innovative behaviour consistently over time (Subramanian – Nilakanta 1996, 633).

Proceeding from the aforesaid, one can state that the concept of innovation has been evolving rapidly over the last decades changing its meaning and incorporating new phenomena. Contemporary paradigm shift to the new knowledge-based economy, combined with a dramatic increase in a highly capable global competition, has necessitated a new understanding of the innovation concept embracing technological advancements with an ability to harness and utilize its economic value.

## 2.2 Innovation Classification

The study of a multidimensional concept of innovation being interdisciplinary in character multiplies various competing classifications: scholars from a diversity of the research fields bring with them a diversity of perspectives. Depending on a criterion that forms the basis for a classification, different typologies emerge. Of the classifications many share dimensions and share high level of congruence that allows to single out three prevailing classificatory approaches: based on innovation newness, area of focus and innovation attributes (Adams 2003, 56).

The newness approach likely has its origins in Schumpeter's circumscription of innovation (Adams 2003, 57). He proposed a typology of organizational innovation arranged under five categories: new goods (or modified existing products), new processes, new markets, new sources of raw material supply and the creation of new types of industrial organization (Schumpeter 2004, 66). In this view, newness may vary in magnitude and scope. However, it is difficult to indentify a commonly held, universally agreed definition or measure of newness. Usually, along a continuum with contrasting polar extremes, radical (new to the world) and incremental (slight modification of a former state) innovations are identified.

Classification by area of focus is less commonly used in the innovation literature than classifications based on newness, but still underpins a large proportion on innovation research (Adams 2003, 62). Gopalkrishnan and Damanpour indicate product, process, administration and technology as the main focus areas of innovation (Gopalkrishnan –Damanpour 1994, 103). Proceeding from the fact that technological innovations are those that bring change to an organization, product or service by introducing changes in the technology that is used to transform raw materials and information into product and services, the Oslo Manual Guidelines typology differentiates between a technological product innovation and a technological process innovation (OECD 1996, 9). A technological product innovation is the implementation / commercialization of a product with improved performance characteristics such as to deliver objectively new or improved services to a

consumer (OECD 1996, 9). A technological process innovation is the implementation / adoption of new or significantly improved production or delivery methods. It may involve changes in equipment, human resources, working methods or a combination of these (OECD 1996, 9).

Administrative innovations occur in the administrative or productive components of an organization and affect its social system. The social system of an organization consists of the organizational members and the relationships among them. It includes those rules, roles, procedures and structures that are related to the communication and exchange between organizational members. These innovations do not provide a new product or service but can directly influence the introduction of new products or services or the process of producing them. As such, they are only indirectly related to the basic work activity of the organization and are more immediately related to its management, personnel, allocation of resources and the structuring of tasks, authority and rewards. (Subramanian – Nilakanta 1996, 637.)

Technical innovations are defined as those that occur in the operating component and affect the technical system of an organization. The technical system consists of the equipment and methods of organizations used to transform raw materials or information into products or services. A technical innovation, therefore, can be the adoption of a new idea pertaining to a new product or service, or the introduction of new elements in an organization's production process or service operations. (Subramanian – Nilakanta 1996, 637.)

The third area uncovered is that of innovation attributes. An attribute is a descriptive property, quality or feature belonging to an entity. Similarly, attributes are those qualities that individuals assign to innovations. (Adams 2003, 63.) Classically, empirical studies have tended to adopt a uni- or bi-dimensional approach as the means of distinguishing between innovations based on their attributes, for example, adaptability (the degree to which an innovation can be modified to fit local needs), complexity, magnitude, profitability, reliability, slack and prestige (Adams 2003, 74). There is an extensive range of attributes that can be identified from the literature.

However, many of them are virtually synonyms, for example, adaptability and flexibility.

The advantage of monothetic classifications is that they are simple to understand and relatively easy to determine. However, given that they allocate membership according to the presence, absence or degree of a single criterion they risk ignoring salient and defining information and may even be misleading if the wrong criterion is chosen as the basis for classification. However, as innovation has become increasingly important to organizational growth and survival, this uni- or bi-dimensional categorization is argued to be insufficient to capture the diversity inherent in individual innovations. (Adams 2003, 65-67.)

Multidimensional frameworks offer an opportunity for polythetic that is more sensitive, classifications of innovation (Adams 2003, 65-68). Rogers and Shoemaker's (1971) present five conceptually distinct, but empirically interrelated attributes of innovation that were as mutually exclusive and universally relevant as possible (Table 1). They argue that their five factors are the most important attributes as most other attributes can be subsumed within their meanings. (Adams 2003, 80.)

Table 1. Rogers' Framework (Adams 2003, 80)

Attribute	Description
Relative advantage	The degree to which an innovation is perceived as being better than the idea it supersedes. Advantage can take several forms, particularly economic and social factors. Because of the economic factor, diffusion researchers are not surprised to find relative advantage a good predictor of adoption.
Compatibility	The degree to which an innovation is perceived as being consistent with the existing values, needs and past experiences of potential adopters. Change agents find it difficult in promoting innovations that run counter to strongly held values. The more compatible the more likely to be accepted but 100% compatibility implies that the degree of change would be marginal.
Complexity	The degree to which an innovation is perceived as being difficult to understand and use, classified on a complexity-simplicity continuum.
Trialability	The degree to which an innovation may be experimented with on a limited basis before adoption. Those that can be trialed will be adopted more quickly as trial reduces uncertainty.

Observability	The degree to which the results of an innovation are observable to others, the more observable the more likely adoption.
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Underlying each of the classification systems is a drive for better understanding of the innovation phenomenon. The need for classificatory approaches is premised on the basis of a belief in the existence of different types of innovations, that these are the product of different processes and which have different impacts and implications on innovation adoption and diffusion and organizational performance. (Adams 2003, 67.)

The Murmansk region is distinguished by a high degree of economic specialization largely in the mining and processing industries with a major emphasis on the initial stages of the production cycle. However, a substantial impact of the Soviet period economic organization and the following economic crises hampered the timely development of the industrial processes not allowing to utilize modern technological advancements. The aforesaid explains the dominance of the focus area innovation classification in the research process (Zukerman–Berezikov 2007, 160).

## 2.3 Innovation Sources

The role of innovation as crucial driving force of economic development is widely acknowledged. Inexpensive telecommunications and computer technologies have made it possible to work seamlessly across the borders opening the door to outsourcing strategies, research collaborations, manufacturing alliances, new forms of networking and necessitating rethinking and adapting to the constantly changing business environment. Within the business setting, innovation is often considered to be a vital source of strategic change, by which a firm generates positive outcomes including sustained competitive advantage. (Sauber – Tschirky 2006, 27.) A key question is how to innovate. As Drucker points out, innovation is the responsibility of every executive and it begins with a conscious search for new opportunities. Those opportunities or sources can be categorized but not predicted. (Drucker 1998, 1.) Diversity of research perspectives of the innovation concept generates not only an extensive cluster of definitions but also source categorizations.

Based on the linear model of innovation<sup>1</sup>, Hippel (1988) in his classical book *The Sources of Innovation* emphasizes functionality as a key criterion for distinguishing between a user, manufacturer and supplier as major functional sources of innovation. Users actually develop novel, commercially successful scientific instruments (Hippel 1988, 21). Suppliers are individuals or firms whose relationship to an innovation is that of supplying components or materials required in the innovation's manufacture or use (Hippel 1988, 21). The functional role of an individual or firm is not fixed. It depends instead on the particular innovation being examined. Many functional relationships can exist between innovator and innovation in addition to user, supplier and manufacturer. For example, firms and individuals can benefit from innovations as innovation distributors or insurers. (Hippel 1988, 4.)

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<sup>1</sup> The linear model of innovation postulated that innovation starts with a basic research, followed by applied research and development and ends with production and diffusion (Godin 2005, 3).



Sheth and Ram (1987) accentuate technological change, changes in operating environment, in nature of competition and customer change as the main sources for innovation. Increased competitive pressure, instability, complexity and heterogeneity of the operating environment, changed customer behavior patterns and technological progress represent fundamental changes compelling businesses to innovate to achieve competitive advantage.

Widening this perspective, Drucker introduces seven innovation sources. He distinguishes between internal and external opportunity areas stating that unexpected occurrences, incongruities, process needs and industry and market change exist within a company or industry. Demographic changes, changes in perception and new knowledge are observable outside a company in its social and intellectual environment. (Drucker 1998, 4.) The author emphasizes the possible overlapping of the sources creating innovation potential in more than one area simultaneously.

The unexpected occurrences relate to the technological development and the main idea lies in the recognition and utilization of the new opportunities. Drucker underlines that unexpected failure may be an equally important innovation opportunity illustrating it with the example of the Ford Diesel that was the biggest new-car failure in automotive history. (Drucker 1998, 4.) However, this failure laid ground for the development of one of the most successful Ford product lines.

Incongruity within the logic and rhythm of a process, between expectation and results is viewed as another innovation source. Incongruity and subsequent process needs claiming for creative satisfaction form the next innovation opportunity. Changes in market and industry structures not only impose additional pressure on the businesses but also provide massive opportunities. 'Indeed, when market or industry structure change, traditional industry leaders again and again neglect the fastest growing market segments. New opportunities rarely fit the way the industry has always approached the market, defined it or organized to serve it.' (Drucker 1998, 6.)

Among the external innovation sources, demographics is viewed as the most reliable. It is explained by the fact that the innovation opportunities created by the changes in the age distribution, education, occupations and geographic location are considered to be the most rewarding and least risky of entrepreneurial pursuits. (Drucker 1998, 6.)

Change in perception is linked to the alteration of opinions or meanings ascribed to the societal phenomena. 'It took less than two years for the computer to change from being perceived as a threat and as something only big business would use to something one buys for doing income tax.' (Drucker 1998, 6-7.)

New knowledge as an innovation source is identified due to the generally recognized fact that knowledge has been historically responsible for much of the economic development. Organized knowledge transformation which leads to innovation is becoming a major joint effort of government agencies and universities due to its prominent role in economic growth, international trade and regional development. With an increased mobility of information and the global work force, knowledge and expertise replacing capital and energy as the primary wealth-creating assets are transported instantaneously around the world fostering progress and stimulating competition. An ability to derive value from new knowledge, i.e. to innovate, is an essential prerequisite for a company to survive in the globalized markets.

## 2.4 Innovational Potential Assessment Problem

'Measurement began our might'

W.B. Yeats

Multidimensionality of the innovation concept and great variation in innovation processes, in terms of their objectives, organization, cost and use of research results stipulate for the absence of the innovational potential integrated indicator (Korobeinikov–Trifilova–Korshunov 2000, 5). Depending on the scientific approach, the scholars interpret differently the notion of the innovational potential proposing various criteria for the measurement system development.

From the economic perspective, potential is understood as an ability of a business entity to implement effectively a particular functional task while making maximum use of the available economic resources (Korobeinikov–Trifilova–Korshunov 2000, 5). According to this principle, innovational potential can be defined as a totality of economic resources of an entity such as personnel, intellectual, financial, infrastructural and material resources aimed at the effective integration of the new technologies into business processes. However, the identification of the terms 'resources' and 'potential' is unacceptable. (Korobeinikov–Trifilova–Korshunov 2000, 6.) At the same time, the availability of the necessary resources is an ultimate prerequisite for the innovation implementation.

International Federation of Inventors' Associations terms innovational potential as a capacity to develop and advance further. The Association argues that innovational potential is proportional with the available intellectual assets including all public goods and intellectual properties. (IFIA 2006.)

Having unified the perspectives of the above cited definitions, Sadovskaya understands innovational potential as a sum of economic resources and conditions necessary for the efficient exploitation of the scientific research results. The main aim is to increase the effectiveness of the business processes. (Sadovskaya 2006, 43.)

Innovational potential predetermines the innovational development strategy. Obviously, the innovation issue for the innovation-generating and innovation-adopting organization differs, indicating that the innovation outcome cannot be measured in the same way in the two types of organization. Regarding rate and speed indexes as more direct measures of the organization's outcomes than surrogate measures<sup>1</sup>, Damanpour and Wischnevsky suggest that in the IGO innovation outcome can be appropriately measured by the speed of generation or success in the marketplace of one or few innovations. The speed of generation of innovations usually reflects how fast innovation projects are developed. Speed is measured by 'project duration', the total project time from the beginning of the idea generation to the end of the market launch or 'project timeliness', the degree to which the innovation project adheres to its time schedule or is completed in a time-efficient manner. 'Innovation impact' reflecting the innovation's success in the marketplace has also been used as a measure of the generation of innovation. (Damanpour – Wischnevsky 2006, 283.)

In the IAO where innovation is a means for organizational adaptation, it would be more difficult to specify the impact of a single innovation. Hence, the measure of innovation should reflect the organization's ability to continually adopt and assimilate innovations across its units over time. For the innovation-adopting organization, earliness and rate of adoption will be appropriate measures of initiation of innovation and the speed or extent of implementation will be suitable measures of implementation of innovation. The earliness of adoption of innovations reflects the timeliness of the adoption decision in a firm compared to other firms in its population. (Damanpour – Wischnevsky 2006, 283.) Subramanian and Nilakanta measured earliness of adoption by the 'mean time of adoption', the average time of innovation adoption of each firm relative to the other firms in the

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<sup>1</sup> Examples of surrogate measures are: (1) R&D intensity, measured by R&D expenditure per sales; (2) R&D commitment, measured by the proportion of R&D scientists and engineers to all employees or scientific publications and (3) the number of patents and patent citation (Damanpour – Wischnevsky 2006, 283).

sample and the 'consistency of time of adoption', the consistency with which firms adopt innovations either earlier or later than average (Subramanian – Nilakanta 1996, 638).

Whereas earliness of adoption reflects the organization's readiness and propensity to innovate, rate of adoption reflects the firm's commitment to assimilate innovations continually over time. The rate of adoption of innovations has been measured by the total number of innovations adopted within a time interval, the percentage of innovations adopted from a pool of innovations within a given time period and the mean number of innovations adopted during the years between the first and the last innovation adoptions. (Damanpour – Wischnevsky 2006, 284; Subramanian – Nilakanta 1996, 637-638.) Measures such as earliness and rate of adoption are more closely related to the initiation stage. Researchers have also used measures of innovation adoption that relate more closely to the implementation stage, namely speed and extent of assimilation. The speed of implementation reflects how quickly the innovation is assimilated throughout the organization and becomes a regular part of organizational procedures and behaviour after the adoption decision. On the other hand, the extent of implementation represents the pervasiveness of the implementation of innovation across organizational units and members. It reflects the extent to which an organization has successfully implemented the innovation or is committed to it. (Damanpour – Wischnevsky 2006, 284.)

The Oslo Manual guidelines (OECD 1996, 18) specify the innovation measurement framework indicating four broad domains of factors predetermining the innovational potential of a business unit (Fig.3). The broader **framework conditions** of national institutional and structural factors (e.g. legal, economic, financial and educational) set the rules and range of opportunities for innovation. The **science and engineering base** represents the accumulated knowledge and the science and technology institutions that underpin business innovation by providing technological training and scientific knowledge. The **transfer factors** are those which strongly influence the effectiveness of the linkages, flows of information and skills and absorption of learning which are essential to business innovation. These are

factors or human agents whose nature is significantly determined by the social and cultural characteristics of the population. The **innovation dynamo** is the domain most central to business innovation – it covers dynamic factors within or immediately external to the firm and very directly impinging on its innovativeness. (OECD 1996, 19-20.)

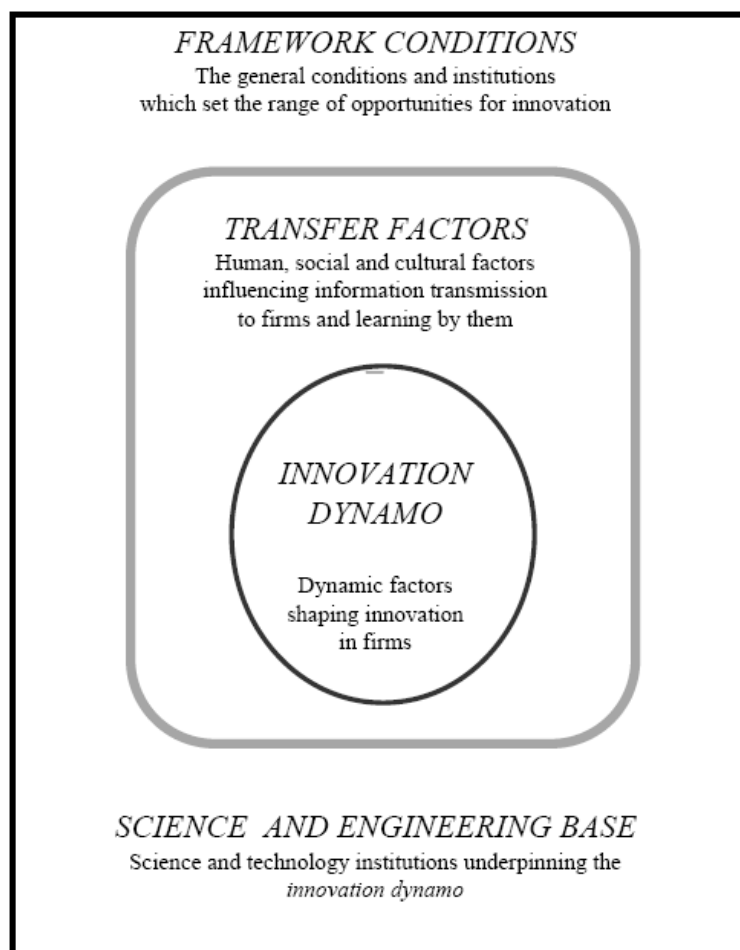


Figure 3. Innovation Measurement Framework (OECD 1996, 18)

**The framework conditions** forming the external arena within which firms can manoeuvre and change, comprise institutions and conditions that determine the broad parameters within which firms exist and carry out their business. Therefore, they have substantial effects on business innovation. The component elements include *the basic educational system* for the general population which determines minimum educational standards in the workforce and the domestic consumer market, *the communications infrastructure*, including roads, telephones and electronic communication, *financial institutions* determining, for example, the ease of access to venture

capital, *legislative and macro-economic settings* such as patent law, taxation, corporate governance rules, policies relating to interest and exchange rates, tariffs and competition and *market accessibility*. (OECD 1996, 20.)

Scientific knowledge and engineering skills are primary support for business innovation. The elements of the national **science and engineering base** include *the specialized technical training system, the university system, the support system for basic research and R&D activities*. (OECD 1996, 21.)

Research on innovation has identified a number of human, social and cultural factors which are crucial to the effective operation of innovation at the firm level. These factors are mostly based around learning. They relate to the ease of communication within organizations, informal interactions, cooperation and channels of information and skills transmission between and within organizations and social and cultural factors which have a pervasive influence on how effectively these activities and channels can operate. Broadly, these **transfer factors** may be listed as *formal and informal linkages between firms*, including networks of small firms, relationships between users and suppliers, relationships between firms, regulatory agencies and research institutions and stimuli within “clusters” of competitors. *Expert technological “gatekeepers” or receptors* are individuals who, through many means, keep abreast of new developments (including new technology and codified knowledge in patents, the specialized press and scientific journals) and maintain personal networks which facilitate flows of information. *International links* are a key component of the networks through which information is channeled. The degree of *mobility* of expert technologists or scientists will affect the speed at which new developments can spread. *The ease of industry access to public R&D capabilities, ethics, community value-systems, trust and openness* influence the extent to which networks, linkages and other channels of communication can be effective by affecting the informal dealings between individuals which underpin many business arrangements. (OECD 1996, 20-21.)

The complex system of factors shaping innovation at the firm level is referred to as the **innovation dynamo**. Placing the innovation dynamo at the centre

of the map recognizes the importance of the firm for an economy to be innovative. It is therefore important to understand what characteristics make firms more or less innovative and how innovation is generated within firms. Innovation capability consists of a set of factors and ways of combining these factors efficiently. These factors include *strategic orientation* as a necessary background to innovation activity, *R&D capabilities* and *non- R&D activities* such as developing pilot and full-scale production facilities, buying technical information, paying fees for patented inventions, enhancing human skills relevant to production and reorganizing management systems. (OECD 1996, 22-23.)

The Murmansk region innovation potential is assessed employing the OECD framework which has been adapted to the needs of the research. The choice has been preconditioned by the fact that an interview as a means of the qualitative research and restricted access to the required statistical data necessitate a descriptive analysis which is embedded into the OECD framework.



## 2.5 Research Methodology

During the past three decades, several debates or “wars” (e.g., Guba–Lincoln 2004) have raged in the social and behavioral sciences regarding the superiority of one or the other of the two major social science paradigms or models. These two models are known alternately as the positivist / empiricist approach or the constructivist / phenomenological orientation. (Tashakkori–Teddlie 1998, 3.)

Guba and Lincoln define paradigm as the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways (Guba–Lincoln 2004, 17). The positivist paradigm underlines quantitative methods, while the constructivist paradigm - qualitative methods. Due to a number of factors such as the introduction of a variety of new methodological tools (both quantitative and qualitative), the rapid development of new technologies (computer hardware and software) to access and use those methodological tools more easily and the increase in communication across the social and behavioral sciences, the evolutionary process toward the use of mixed method and mixed model studies has been occurring at an ever increasing pace. (Tashakkori–Teddlie 1998, 5.) Pragmatic philosophical approach arose as a way to resolve paradigm differences and utilize the research potential of both. As noted by Brewer and Hunter, ‘since the fifties, the social sciences have grown tremendously. And with that growth, there is now virtually no major problem-area that is studied exclusively within one method’. (Brewer–Hunter 1989, 22.)

Previous chapters have asserted the multidimensionality of the innovation concept preconditioning the need for a synthesized research framework. It explains the choice of the pragmatic philosophical perspective that allows using all approaches available to understand the research problem which is confirmatory in nature, i.e. the author assumes that the Murmansk region possesses relatively high innovation potential ensuring vast business opportunities for the Lappish businesses.

Pragmatic orientation underpins the choice of the sequential research methodology that allows elaborating and expanding on the findings obtained at the different investigation phases. Theoretical background is formed employing such methods as discourse analysis, analysis of the theme-specific documents and materials.

The first empirical stage is focused on the collection, categorization and analysis of the statistical data related to the innovational potential of the Murmansk region. The second phase represents a series of qualitative interviews with the experts from four industry-specific support organizations, namely with Radik Safin from Opora Russia, Evgeniy Prosoedov from Murmansk Regional Development Agency, Olga Buch from Arctic Center of Training Specialists and Timo Rautajoki from the Finnish Chamber of Commerce, the Lappish subsidiary. The third step involves comparison, analysis and cross-referencing of the statistical and empirical data to draw the research conclusions.

The choice of the mixed methods has been preconditioned by several factors. Data sources triangulation allows to overcome limitations and lessen the biases of the research methods and ensure results convergence. Besides, it provides a comprehensive analysis of the research problem contributing to the investigation objectivity. Moreover, it adds breadth and scope to the project allowing to avoid difficulties related to the simultaneous use of the qualitative and quantitative methods. Conclusions utilize theoretical investigation and empirical findings providing a detailed picture of the innovation potential of the Murmansk region and indicating potential business opportunities.

### 3 ANALYSIS OF THE ECONOMIC INFRASTRUCTURE AND INNOVATION POLICY IN THE MURMANSK REGION

#### 3.1 Economic Infrastructure of the Murmansk Region



Figure 4. Map of Finland and Russia (Kola Encyclopedia)

The Murmansk region has undergone major revolutionary changes in the 1990s: transition to the market economy, changes in the legislation and institutions opened the borders for the international trade and investment, substantially altering the industrial structure and corporate landscape in the region. The local economy has been formed on the basis of the unique mineral resources of the Kola Peninsula and biological resources of the Barents and White seas, the advantageous geographical position determined by the relative proximity to the central regions of the country and the possibility of year-round navigation with a direct access to the international sea trade routes.

Regional industrial economic complex fully satisfies the needs of Russia in the phosphate ore, vermiculite, niobium, tantalum, rare earth metals; 45 per cent of nickel, 35 per cent of ceramic raw materials, 10 per cent of iron ore concentrate, 8 per cent of copper are produced in the Murmansk Region

(Kola Encyclopedia 2008). Of all the goods manufactured, ore concentrates, primary metals and over 80 per cent of fish and seafood are delivered outside the region. Predominance of the export industries (Fig.5, table 2) in the economy of the Murmansk region ensures rapid development of the transport infrastructure. The transport share in the GRP structure approximates to 10 per cent. Available land, air and sea transportation links facilitate the expansion of business cooperation with the Russian and foreign companies.

Table 2. Dynamics of the Foreign Trade in the Murmansk Region, mil USD (Russian Federal State Statistics Service 2010)

	2005				2008			
	With non-CIS countries		With CIS countries		With non-CIS countries		With CIS countries	
	export	import	export	import	export	import	export	import
Russian Federation	208846	79712	32627	18996	398103	230429	69809	36611
Murmansk Region	1187,3	203,6	3,4	6,8	2295,6	350,3	12,3	6,9

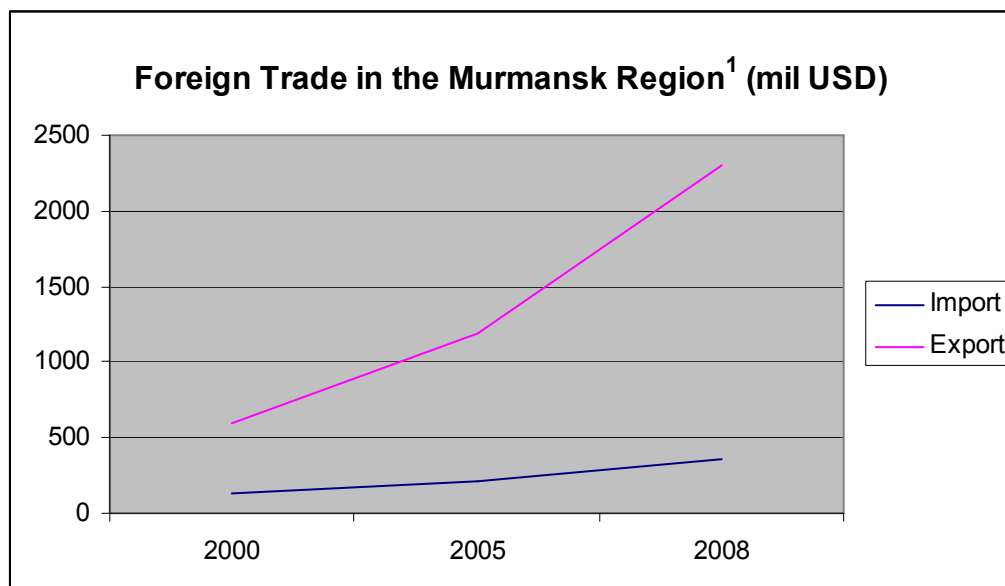


Figure 5. Aggregated Indexes of the Foreign Trade in the Murmansk Region (2000-2008) (Russian Federal State Statistics Service 2010)

<sup>1</sup> The diagram displays aggregated indexes of import and export with CIS and non-CIS countries.

The regional power system meets the local energy needs, despite the fact that only 80 per cent (Kola Encyclopedia 2008) of its production capacity is being utilized allowing for the power transfer to Karelia and abroad. The main problem facing the region in the area of energy is the limited lifetime of the Kola nuclear power station (Rudakova–Makarova 2007, 29). However, development perspectives of considerable energy resources reserves on the continental shelf of the Arctic seas, including the Barents Sea, afford the region a future opportunity to become a part of not only the national but world energy system.

Due to the extreme arctic conditions, agricultural production that partially solves the problem of fresh food products supply has little significance in the Murmansk region and little development possibilities (Table 3). However, despite the harsh climate, the Murmansk region is recognized as one of the most economically developed regions of the Russian Federation (Fig.6, table 4) showing gradual DRP growth where *fishing, mining and processing, power engineering, transport and communication are being notably developed* (Buch 2010) forming the industrial specialization of the region (Fig.7, fig. 8).

Table 3. Agricultural Production in the Murmansk Region, mil RUB (Russian Federal State Statistics Service 2010)

	1991	1995	2007	2008	Position in RF, 2008
Russian Federation	260,0	204878	1931625	2461355	
Murmansk Region	0,7	381	2102	2596	77

Besides, exploration of the Arctic shelf and the establishment of the related infrastructure are becoming increasingly important. Mining complex constitutes a considerable part of the industrial production structure that has been preconditioned by the rich mineral reserves and high level of local market monopolization.

Table 4. GRP, mil RUB (Russian Federal State Statistics Service 2010)

	2003	2004	2005	2006	2007
Russian Federation	10742423	13964305	18034385	22492120	28254788
Murmansk Region	80604,1	124972,0	132870,2	158127,0	192176,6

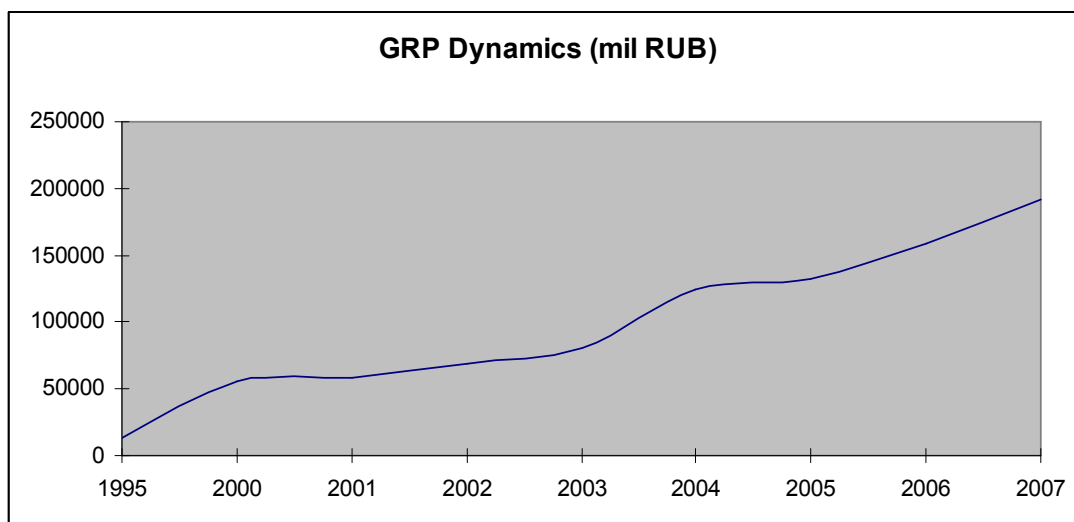


Figure 6. GRP Dynamics, mil RUB (Russian Federal State Statistics Service 2010)

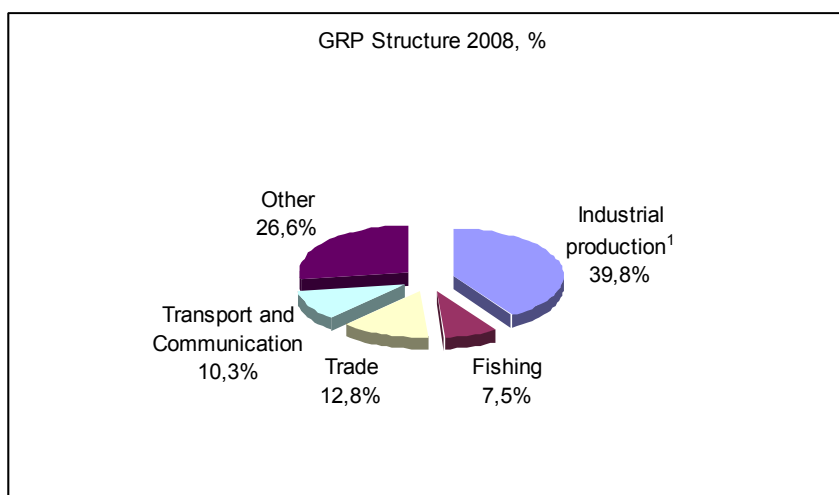


Figure 7. GRP Structure 2008, % (calculated based on the Russian Federal State Statistics Service data)

<sup>1</sup> In 2005, the Federal State Statistics Service introduced a new methodology for company clustering and their production volumes to calculate summary indexes: it is computed now according to the economic activity not according to the specific industry. Industrial production includes now 3 types of aggregated activities: mining, processing and power engineering (production and distribution of electricity, gas and water). (The Murmansk Region: Challenges and Prospects 2007, 10.)

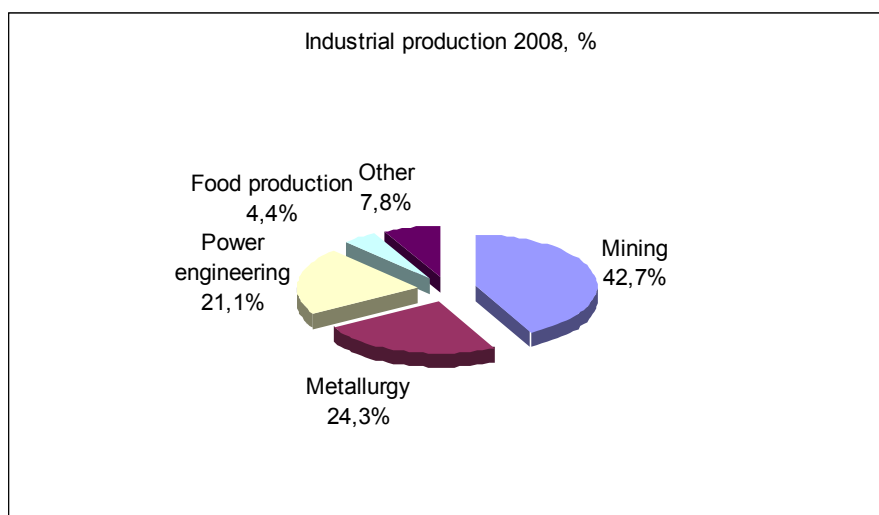


Figure 8. Industrial Production 2008, % (Russian Federal State Statistics Service 2010)

Apparently, the contemporary economic crisis has negatively influenced the development of the main regional industries in 2008-2009. However, owing to a number of anti-crisis measures implemented by the government and local administration, the regional economy is slowly recovering showing growth according to the main economic indexes (Table 5).

Table 5. The Main Indicators of Socio-Economic Development 2009-2010, as % of Corresponding Period of the Previous Year (Russian Federal State Statistics Service 2010)

	January- November 2010	January- November 2009
Industrial Production Index including by type of economic activity:	104,6 <span style="color: green;">↗</span>	92,1
Mining	110,2	93,4
Processing and Manufacturing	98	89,4
Power Engineering	103,4	95
Agriculture	98,3 <span style="color: red;">↘</span>	101
Fishing	95,9 <span style="color: red;">↘</span>	108,4
Building and Construction	99,9 <span style="color: green;">↗</span>	87,6
Investment in fixed capital from all sources of funding	79,5 <span style="color: red;">↘</span>	99,6

According to Barentsnova, the Murmansk region has fully recovered from the crisis in 2011(Murmansk 2010 in figures 2011). The most promising economic sectors include oil production and processing industry, mining industry of the central part of the Murmansk region, power engineering, fishing industry and fish processing (Buch– Ivani 2009, 43).



### 3.2 Regional Innovation Policy

The state innovation policy foundation was laid in the 1990s and formulated in the Federal Law “On State Science and Technology Policy” amended in 2008. During that decade the national science was confronted with a substantial crisis objectively necessitating creation of a new institutional environment, efficient mechanisms and organizations for the innovation activities development. At the beginning of the millennium the preparation of a concept paper aimed at defining strategic research and innovation policies was initiated. It resulted in issuing the Long-Term Socio-Economic Development Conception of the Russian Federation 2020 adopted in November 2008. A transition from a raw materials export-oriented economic model to an innovative one was proclaimed as a main objective for the coming period. (Ministerstvo Obrazovaniya i Nauki Rossiiskoi Federacii 2009.) In the context of globalization, innovativeness and flexibility of the state and regional socio-economic systems are the essential prerequisites for the regional sustainable development and competitiveness.

In accordance with the Federal Law “On State Science and Technology Policy” (2008), the main goals of the state innovation policy are the development, rational distribution and efficient use of the scientific and technological potential, the increase of the science and technology contribution in the state economic development and the provision of progressive structural transformation in the field of material production. Other objectives include the improvement of products efficiency and competitiveness and further development of the intellectual property rights. (Ministerstvo Obrazovaniya i Nauki Rossiiskoi Federacii 2009.)

Due to the historical peculiarities, the Russian regions differ significantly in terms of socio-economic development, population density, industrial, scientific and technological potential. Approximately 80 per cent of the population lives in the European part that constitutes less than 25 per cent of the country area; 74 per cent of GDP and 80 per cent of the total industrial output is produced within the borders of the European part of Russia, while Siberia and Far East are accountable for the two-thirds of the mineral

resources extraction and energy production. Taking into consideration regional differences, the Long-Term Socio-Economic Development Conception of the Russian Federation 2020 states the following objectives for the innovative development of the regions (Ministerstvo Obrazovaniya i Nauki Rossiiskoi Federacii 2009):

1. Development of technical, scientific and educational potential of the large urban agglomerations with a high quality living environment, substantial human potential, dynamic innovation and educational infrastructure.
2. Formation of the regional production clusters focusing on high-tech industries in the priority sectors, with concentration of such clusters in the urban areas.
3. Establishment of the regional production clusters in the underdeveloped areas oriented on the deep raw materials processing and energy production utilizing modern technologies.

The Murmansk Region Science, Technology and Innovation Development Strategy 2015 (the Strategy) was formulated based on the Federal Law “On State Science and Technology Policy” and the Long-Term Socio-Economic Development Conception of the Russian Federation 2020 identifying a number of objectives in the field of innovation policy (Pravitelstvo Murmanskoi Oblasti 2010). It is planned to create new organizational, legal and financial mechanisms to control innovation activities. Currently, innovation sphere is financed jointly by the public and private sectors. The regional authorities aim to improve the public procurement mechanism of scientific and technical services stimulating the demand for the latter, the mobilization of non-budget funds for research and innovation and the establishment of regional and interregional networks of venture funds. The regional administration strives to create a transparent system of R&D public funding ensuring the efficient use of the budgetary resources.

Human resources are considered as an essential factor for the effective utilization of the regional innovation potential. Thereby, special attention is intended to be paid to the training of research personnel of higher

qualifications in postgraduate and doctoral studies. (Pravitelstvo Murmanskoi Oblasti 2010.)

The establishment of an efficient infrastructure conducive to innovation commercialization envisages the creation of information-technology centers, technology transfer centers, science and technology parks, business incubators and networks of other organizations. Their objective is to provide consulting, information, financial and other services aimed at supporting and developing innovation activities in the region. (Pravitelstvo Murmanskoi Oblasti 2010.)

Furthermore, the Strategy identifies the key economic sectors specifying the critical measures to be taken to foster the regional innovation advancement. The development of new industrial sectors such as oil and gas industry including hydrocarbon production, transportation and processing are among the priority strategic goals. Pipeline construction in the region may facilitate the exploitation of the platinum and rare metals deposits in the central and eastern parts of the peninsula, as well as strengthening the development of all related industries. (Pravitelstvo Murmanskoi Oblasti 2010.)

Moreover, the implementation of the Kola Mining and Chemical Complex project is essential for the region. It allows commencing the industrial development in Revda and Afrikanda and constructing new mines in the Kola and Lovozero districts utilizing the latest innovation technologies. (Pravitelstvo Murmanskoi Oblasti 2010.)

Another topical research question and practical problem to be approached in an innovative way is the radioactive waste management as the operation of the Kola nuclear power plant, nuclear vessels of the Northern Fleet and the Murmansk Shipping Company has led to the accumulation of a significant amount of radioactive waste and nuclear fuel. The potential energy consumption growth due to the exploitation of the new hydrocarbon deposits of the Arctic seas, as well as the expected revival of the military-industrial complex necessitates the research and development of the innovative energy sources. Fishing and fish processing industry challenged by the resource limitedness encourages the implementation of the innovative aquaculture

technologies and innovative forms of aquatic life. The implementation of the Shtokman project ensures the development of the related infrastructure, as well as poses new challenges for the flawless operation of the communication and radio-navigation systems requiring introduction of the innovative technologies. The Arctic and Northern Sea Route development aimed at protecting geopolitical interests of Russia gives new prospects for the growth of the Murmansk port and its transformation to a modern powerful deep water harbour. (Morozov 2009, 48-49.)

Thus, the main vectors of the innovation policy formulated in the Science, Technology and Innovation Development Strategy 2015 of the Murmansk region emphasize further development of the innovation legislation framework, modernization of education and university environment enhancing the human resources quality and the innovation infrastructure. It aims at fostering innovation commercialization and innovation development of the priority economic sectors such as oil production, processing industry, mining industry, power engineering, fishing industry and fish processing.

## 4 ANALYSIS OF THE INDUSTRIAL INFRASTRUCTURE AND INNOVATION POLICY IN FINNISH LAPLAND

### 4.1 Industrial Infrastructure of Finnish Lapland



Figure 9. Map of Finnish Lapland (Map of Finland)

Finnish Lapland has gone through a rapid socio-economic change during the five decades since the World War II. At the beginning of the 1950s, Laplanders lived mainly from a combination of small-scale farming, seasonal, forest or construction work and a subsistence economy. In the 1990s, the Lappish economy went through considerable structural changes as a result of the severe recession between 1990 and 1993. It necessitated entrepreneurial development and innovation laying the foundation of the regional industrial specialization. At the beginning of the new millennium, services comprising a combination of public services and tourism were accountable for the considerable part of the GRP.<sup>1</sup>

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<sup>1</sup> The share of the service sector is about 80 per cent of the jobs in some municipalities, when the average in Lapland is about 67 per cent and in the whole country about 65 per cent. See Regional Council of Lapland, *Statistics*.

Continuing to progress, the regions' economy is now being driven by the private sector channeling the major investments into the steel and metal industry, mining operations and energy production, tourism services, cold technology and construction that form the structural pillars of the Lappish economy. Reindeer management was for centuries the most vital source of livelihood for the Sami people and it still remains important for the entire region of Northern Finland.

Nowadays, tourism is an important branch of industry in Lapland with its clean and peaceful nature as the main attraction perceived by the tourists as an authentic and pure experience. According to the statistics, in 2009, 12 per cent of Finland's overnight stays are registered in Lapland (Table 6) that explains the fact that in the regional plans and political programmes, tourism is seen as a cornerstone for the future prosperity. (Regional Council of Lapland 2010.)

Table 6. Registered Overnights in Lapland (Regional Council of Lapland 2010)

Registered overnights	2009	2008
Total	2 233 153	2 342 428
Domestic	1 418 451 1 421 855	1 421 855
Foreign	814 702	920 573
Direct tourism income	595 M (€)	570 M(€)

The mining industry has always played a prominent role in the regional economy and is now rapidly growing supporting the labour market that has experienced a severe decline after a crisis in the forest industry (Lapland Chamber of Commerce 2010). The Outokumpu deposit is one of the most important in Lapland, the exploitation of which and the associated metallurgic research have effectively created the foundation for the mining and metallurgy industries in Finland (Korkalo 2006, 18). The mines being actively worked for metal ores at present are the chrome mine at Kemi, the zinc-copper mine at Pyhäsalmi (Oulu Region), the nickel mine at Hitura (Oulu Region) and the gold mine at Pahtavaara. In spite of the marked growth in ore prospecting, not a single metal ore deposit has been discovered over the

last 35 years that has led to mining activities on the scale of those that began in the 1950s and 1960s or earlier. (Korkalo 2006, 19.)

The necessity to operate in the extreme climate preconditioned the advancement of the cold technology sector which is based on the multidisciplinary research uniting the regional educational and research institutions. Lapland's universities are producing professionals to manage the Arctic environment and to meet the needs of the experience industry and cold technology sectors which are essential for movement and transportation, construction, dwelling and living, as well as for operating different installations and systems. (Lapland Chamber of Commerce 2010.) Furthermore, the networks between the companies, the Universities of Lapland and Oulu and the regional universities of applied sciences facilitate the development of the R&D and IT industries.

Esko Lotvonen, Chairperson of the Regional Council of Lapland, views the strong private commitment to Lapland's economy as a vote of confidence in the future of the region and the long-term sustainability of the investments. According to Lotvonen, the region's growth sectors in the future will also include the nature-based experience industry, cold technology and environmentally sustainable mining activities. (Invest in Finland 2010.) In addition to tourism, mining operations and forestry, potential biodiesel and nuclear power initiatives may create a new foundation that will ensure the province's continuous development on the national, as well as international level (Lapland Chamber of Commerce 2010).

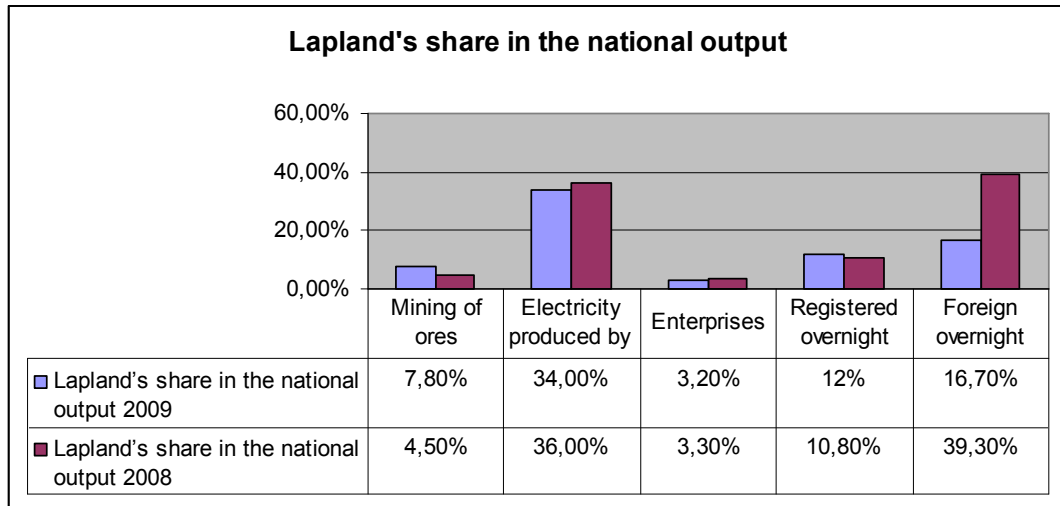


Figure 10. Lapland's Share in the National Output (Lapland Chamber of Commerce 2010)

The comparison of the economic specialization of the Murmansk region and Finnish Lapland leads to several conclusions (Table 7). First, the two regions are equally interested in the development of the mining industry that lays foundation for the potential mutual cooperation and know-how transfer. Gradual decline of the industrial production in the Murmansk region during the last decade caused among other reasons by the considerable technological underdevelopment and lack of innovation activities prompts vast potential for the Lappish organizations to mutually cooperate transferring Finnish know-how to the Murmansk region. Second, the regions diverse considerably in terms of economic specialization focusing on different industries (Table 7), however, comparable climatic conditions and rich resource base in the two regions implies the similarity in the development needs allowing to exchange knowledge and skills ensuring new business opportunities for both countries.



Table 7. Economic Specialization of the Murmansk Region and Finnish Lapland: Comparative Overview

	Murmansk region	Finnish Lapland
Mining	√	√
Power engineering	√	
Fishing industry and fish processing	√	
Tourism		√
Cold technology		√
Construction		√

## 4.2 Innovation Policy in Finnish Lapland

Globalization and constantly intensifying competition require an economic operating environment of international standard to serve the needs of the business community. Recent comparisons of innovativeness (Evaluation of the Finnish National Innovation System 2009) have placed Finland among the leading countries in the development of high-tech industries with the total investments in the R&D sector amounting up to 3,5 per cent of the national GDP (Finlyandiya Torgovii Partner Rossii 2010, 37). Since 1995, export of high technology products exceeds import, while the share of such products in the total export approximates to 21 per cent. In 2007, a new funding scheme for R&D sector was adopted by the EU allowing to finance the innovation projects implemented not only in the sphere of technology and engineering but also in the public services and organizational commercial activity. (Finlyandiya Torgovii Partner Rossii 2010, 40.) Significant success in the innovation field has been achieved due to the steady increase of the public investments in the sustainable development of the national innovation system and continuous improvement of mechanism aimed at attracting private funds to support strategically important industrial sectors.

There is no legislation for innovation activities in Finland per se - the regulation framework is based on the laws for small and medium-sized enterprises supported by the intellectual property rights. Tax relieves for the R&D activities are not applied. However, there are other forms of state support that are discussed later in this chapter.

A government programme OSKE (The Centre Expertise programme) forms the state innovation policy basis designed for 6 years and aimed at fostering regional specialization and creating a centralized innovation management system which is planned to include 13 national Competence Clusters and 21 regional Centers of Expertise. The Centers appointed by the Government implement the programme at the local level. Lapland Center of Expertise aims to further develop the experience industry by launching cooperation projects between the local research sector, educational institutions, business and industry. These projects seek to boost the companies' productivity,

strengthen and improve regional expertise, create new businesses and advances innovation environment. (Finlyandiya Torgovii Partner Rossii 2010, 38; Evaluation of the Finnish National Innovation System 2009, 214.) The Programme focuses on business development and the capitalization of selected fields of global excellence including nanotechnology, energy technology, intelligent machines, maritime, tourism and experience management, ubiquitous computing, health and well-being, forest and food industries (Evaluation of the Finnish National Innovation System 2009, 215).

The initial stage of a company's innovational activity is supported by various governmental programmes including assistance in the registration process, provision of special loans and venture capital guarantees and utilization of the regional venture funds. Expert evaluations of innovation projects are executed and given their compliance with the priority research areas, the government can finance up to 50 per cent of a project. In addition to the financial aid, the government supports the companies at all stages of the innovative business development providing a wide range of services. Private sector engages actively into the priority research projects being interested in reducing costs and respective risks owing to the partial public funding and centralized coordination. (Finlyandiya Torgovii Partner Rossii 2010, 39.)

The key actors of the innovational system are the National Technology Agency "TEKES" that executes expert evaluation and financing of innovation projects implemented by the companies, educational and research institutions, Technical Research Center of Finland, Academy of Finland that coordinates international cooperation with the EU and European Science Foundation, Finnish Innovation Fund Sitra aiming at the national competitiveness development, ensuring gradual progress of the Finnish economy and fostering business activity, state venture capital fund Finnvera" and association for the Finnish export promotion Finpro. (Finlyandiya Torgovii Partner Rossii 2010, 40-41.)

Significant attention is also paid to the technology parks development that are perceived as important elements of the national innovation system contributing to the deepening of cooperation between public research

centers, universities and industry. The technology parks are united into the Association of Science Parks Tekel.

The effective national policy targeted at increasing R&D expenditures is combined with the government support of the initiatives in the field of science and education. It has allowed Finland to maintain a leading position in such areas as information technology, wireless communication, metalworking, wood processing, construction, energy and environmental technology.

It is important to stress that while the innovation policy of Finland is inherently national, there is nonetheless an important regional dimension. To some extent, the regional dimension materializes since regional policy shares the same tool box with national innovation policy. As a result, innovation policy and regional policy have created a complicated system in which both target similar objectives though with somewhat different emphasis. Due to these similarities and overlaps, in practice it is very difficult to distinguish between innovation policy conducted across regions and regional policy focused on innovativeness and newness per se. (Evaluation of the Finnish National Innovation System 2009, 204.) According to the Ministry of Employment and Economy, there is basically only one rationale behind 'regional' innovation policy - it aims at seeking innovative potential in all regions (Evaluation of the Finnish National Innovation System 2009, 207). Building networks between companies, local governments, private developers, regional councils, polytechnics and universities is a crucial expedient for achieving this objective. Accordingly, regional innovation policy develops capacities and favorable environments for innovation all over Finland.

The responsibility for regional development rests with the state, municipalities and regional councils acting as regional development authorities. Regional councils are legally responsible for the planning and development of their respective areas being charged with responsibility for the Regional Plan and the Regional Programme. The Regional Plan sets development guidelines over the long term (20-30 years). The plan drafting involves the participation of the state and government officials, the business sector, establishments providing education and training, a variety of organizations and individual

citizens. All other development plans and programmes affecting the region are based on this document. (Evaluation of the Finnish National Innovation System 2009, 213.)

The regional innovation policy is mainly implemented through the Centre of Expertise Programme (CoE) which has been already discussed. The Regional Development Plan and the Regional Strategic Programme also aim at improving the innovativeness and knowledge base of regions in accordance with the national targets.

The Regional Development Plan of Lapland 2030 is a description of the joint and desired development direction for Lapland which the operators in the region actively strive for. The Regional Development Plan 2030 lays out the long-term development objectives for Lapland and the strategy for achieving those objectives. The strategy of the industrial policy in Lapland is to strongly invest in highly processed natural resource and energy industries, as well as tourism and travel cluster efficiently utilizing regional natural resources, attraction factors and expertise. Investments in the above mentioned priority sectors allow creating a significant number of new jobs and to turn the migration balance positive. Along the development of livelihoods, the operational ability of the municipalities and the availability of services must be ensured. Both the national economic budget and the economy of the municipalities are expected to constrict over the next few years. At the same time, there is more pressure on organizing services for the inhabitants, particularly due to the aging of the population. Consequently, it is vital to foster mechanisms of organizing services in cooperation over municipal and regional borders. (Lapin Liitto 2010.)

The Regional Strategic Programme is a document compliant with the Regional Development Act ( *Laki alueiden kehittämisestä*), no. 1651 (2009), and it contains the development objectives, central projects and other actions required for meeting the objectives, in addition to the financing plan. (Lapin Liitto 2010.)

The policy definitions of the Regional Strategic Programme guide the public development funding, land use and safeguarding local interests for the following four-year term. The Regional Strategic Programme describes how the strategy is implemented. In addition, the Programme depicts the implementation of the specific national programmes such as the Regional Cohesion and Competitiveness Programme and the Centre of Expertise Programme. The Regional Strategic Programme includes also a financing plan, assessment report and a Sámi culture section which is prepared by the Finnish Sámi Parliament. (Lapin Liitto 2010.)

The implementation plan of the Regional Strategic Programme is prepared every year. The plan presents the most essential projects to be executed within the framework of the Programme during the following year. The implementation plan operates as the Region's proposal for the preparation of the State budget and its regional allocation. (Lapin Liitto 2010.)

As was stated above, the innovation policy and regional policy have created a complicated system across regions. To tackle the problem, a new Cohesion and Competitiveness Programme is planned to be implemented during 2009-2013 seeking to unite several national programmes and traditional regional development programmes (Evaluation of the Finnish National Innovation System 2009, 217, 228). The Programme objective is to improve the operational methods of regional development work, intensify cooperation between regions, build networks between regions and boost the sharing of knowledge and experience (Lapin Liitto 2010).

The general lines to innovation policies both in Finnish Lapland and the Murmansk region are drawn by the Government which are further incorporated into the regional policies. However, in the Murmansk region, the innovation policy is confined to a few statutory acts which implementation is hampered by the innovation infrastructure absence. On the contrary, the innovation infrastructure in the Finnish Lapland is highly developed being supported by the national programmes aimed at promoting regional expertise.

## **5 INNOVATION POTENTIAL OF THE MURMANSK REGION**

### **5.1 Innovational Potential of the Murmansk Region and Business Opportunities for Lappish Businesses in the Region**

The basis of the regional industrial infrastructure was laid during the Soviet Union period with the main emphasis on the initial stages of the production cycle not meeting the requirements of sustainable development. Consequently, in the 1990-ies due to the political and economic crisis, the Murmansk region was confronted with the instability of its resource-strategic position which resulted in the inability of the local administration to reorganize highly centralized and inflexible regional industries to meet the requirements of the newly emerged market economy. This problem is characteristic not only for the Murmansk region but also for the whole country. The capital funds structural analysis indicates that the industrial share in the capital funds structure in the Murmansk region is higher than the country average with a strong predominance of mining and processing industries in total industrial output (Zukerman–Berezikov 2007, 159) that necessitates the transition to the innovation development model and knowledge-based economy. It implies new market development, implementation of advanced technologies, product range widening, human capital quality improvement and its efficient use, development of public-private partnership mechanisms and private investment stimulation.

The intensity and effectiveness of the innovation activities depend on the regional innovation potential level and innovation policy the priority of which is to objectively assess the regional innovation potential creating conditions for its effective utilization. Adapting the guidelines of OECD (OECD 1996) for the innovation potential assessment to the needs of the thesis work, the regional innovation potential is evaluated as a totality of framework conditions and transfer factors.

The innovation policy of the Murmansk region is implemented according to the specifications identified in the Murmansk Region Science, Technology and Innovation Development Strategy 2015 described above. Formulation of the legal framework to organize the innovation and research activities is

among the strategic priorities of the local administration. Insufficient legal protection of the intellectual property rights is an acute problem for the country in general and the Murmansk region in particular. Extensive work is being carried out to properly regulate the innovation entrepreneurship in the region.

The Murmansk region has always been distinguished by the high level of education that is attested by the figures in the following table. Within the framework of the national project “Education” it is planned to modernize the educational system embedding innovative teaching technologies (National Priority Projects 2010).

Table 8. Institutions of Higher Education in the Murmansk Region (Russian Federal State Statistics Service 2010)

	2007-2008	2008-2009	2009-2010
Number of institutions, units	4	4	4
Number of subsidiaries, units	25	25	24
Total number of students	37810	37083	35894
Teaching staff	1039	1356	1274
Number of institutions, units	4	4	4

At the contemporary stage of the global economic development the major factors of economic growth are not capital and means of production but knowledge and innovative ideas that foster competitive products manufacturing (Zukerman–Berezikov 2007, 160). The innovation development of the Murmansk region and its major industries is based on the scientific researches implemented by the academic institutions of the Kola Science Centre of the Russian Academy of Sciences, Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO) and regional institutions of higher education. Significant potential of the highly developed basic and applied science as a fundamental component of the national innovation system has been and remains a competitive advantage of the Murmansk region. However, the challenges of the 21 century urge to intensively search for the new vectors of the scientific research and results utilization methods.



The Murmansk region is gradually developing its technological and innovation potential. At the moment 29 academic institutions, 2 universities, as well as a number of Moscow, St. Petersburg and Petrozavodsk university subsidiaries are engaged in the scientific research and development projects. The expansion of the scientific research solves a dual problem: creates conditions for the scientific and technological potential growth and at the same time forms the basis for the technical base modernization of the Murmansk region.

Substantial work has been carried out aimed at the regional innovation infrastructure formation. In 2003 on the basis of the Kola Science Center Science and Technology park Apatity was established, in 2006 the creation of a business incubator in Apatity was commenced and a business incubator in Murmansk is planned to be created. The Technology Transfer Center had begun its operations. As a result, an integral regional innovation system ensuring efficient implementation of the innovative technologies designed by the regional researchers is to be developed.

The Murmansk region has traditionally been characterized by a relatively high quality of human resources (Table 9). However, because of significant population decline since the early 1990's, this capacity declined significantly, but remains at a level that provides the possibility of dynamic development of the region (Fig. 11). (The Murmansk region: challenges and prospects 2007, 14.)

Table 9. Employment Distribution in the Regional Economy in 2009 (1000 people) (Russian Federal State Statistics Service 2010)

Total of which:	482,2
specialists of high qualification in the field of science and engineering	15,9
specialists of high qualification in the field of biological and agricultural sciences and health	5,0
specialists of high qualification in education	12,4
other specialists of high qualification	39,9

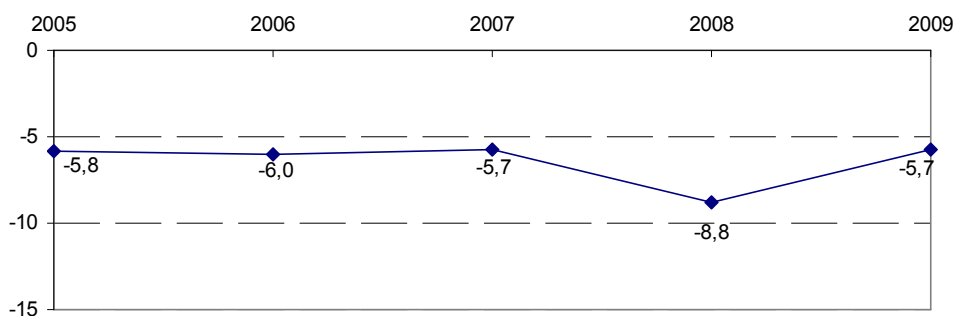


Figure 11. Migration Process Dynamics, Population Decline (-) (1000 people) (Russian Federal State Statistics Service 2010)

The global financial crisis has severely affected the region. The sharp decline in industrial production (Fig. 12) has caused substantial regional budget revenues reduction and unemployment increase. The reduced income and the need to implement previously adopted commitments to increase by 1.5 times social spending in the Murmansk region has led to the regional budget deficit of 1.8 billion rubles (against 309 million rubles surpluses in 2008) (Socio-economic Development Strategy of the Murmansk Region to 2025 2010, 11). The reduced budget revenues have inevitably impacted the amount of the regional R&D spending resulting in the allocation of the most financial resources to the machinery acquisition (Table 10).

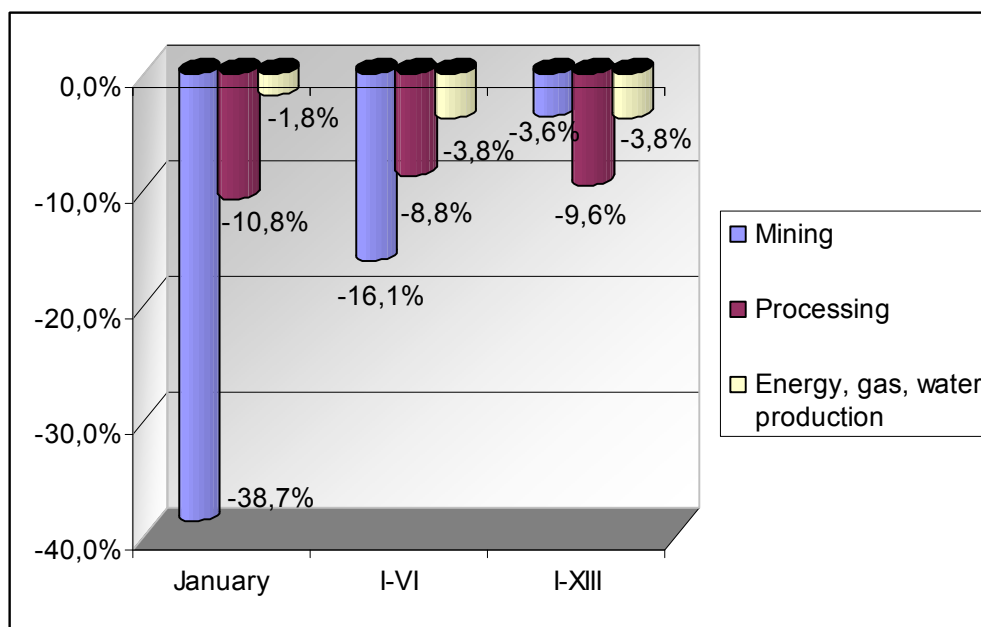


Figure 12. Industrial Production Decline Rate, by Economic Activity in 2009, as % of Corresponding Period in 2008 (Russian Federal State Statistics Service 2010)

Table 10. Investments in Non-Financial Assets, Percentage of the Total (Russian Federal State Statistics Service 2010)

	2005	2006	2007	2008	2009
Total	100	100	100	100	100
Capital assets	99,7	99,6	99,2	98,7	99,3
R&D expenditures	0,3	0,2	0,1	0,6	0,0

Predominance of industrial over agricultural production and high commodity specialization providing stable export growth means low diversification level and increased dependence of the regional economic situation on the world markets. The exhaustion of extensive factors of export growth preconditions the need to alter the export policy priorities and necessitates improvement of the export goods processing, new products and services development and promotion on the global market.

Considering the current economic situation in the mining and processing industries, the most competitive brunches for the regional export base formation and development are:

- apatite concentrate, iron and copper-nickel ores production, fishing industry,
- diversification increase of the above mentioned industries to produce goods of a higher value-added,
- rare- earth metals and strontium extraction from apatite ores,
- increased use of iron ore concentrate for the new high-tech products manufacturing,
- export services development - marine services, aviation and railway transport, tourism, scientific, technical, consulting and intermediary services.

The perspective development of the non-traditional deposits on the Kola Peninsula opens up opportunities for the new industries growth such as platinum-containing products manufacturing, non-ferrous metals and cement industries. (The Murmansk region: challenges and prospects 2007, 31-32.)

Export diversification, traditional export base extension, new products and services inculcation allow not only utilizing the regional competitive

advantages and guarantying dependency on the world markets reduction but also ensure opportunities for the Finnish –Russian cross-boarder business relations intensification. Timo Rautajoki, the President and CEO of the Lapland Chamber of Commerce, emphasizes the high level of development of mining and mine-waste processing industries in the Finnish Lapland the development of which is among the strategic priorities of the innovation policy as has been discussed above. New technologies adapted to the extreme climatic conditions and incorporated into the technological processes supported by the profound experience allow efficient know-how transfer to the Murmansk region mining companies creating a framework for mutual cooperation.

Perspective development of the cement industry on the Kola Peninsula requires the establishment of a new production infrastructure that can be supported by the Lappish companies, e.g. Ylitornio Betoni Oy. It gives an opportunity for the Russian businesses to utilize the latest innovative achievements in the cement production and construction.

The problem of absence of a clear, coherent industrial policy represents another limiting factor for the effective innovational potential exploitation. In the region the issue is further complicated by the fact that the companies operating on the Kola Peninsula are in most cases branches or subsidiaries of the holding companies with the governing bodies located outside the regional borders and not interested in the local economy development preconditioning the low rates of the GRP growth. And a significant asymmetry of socio-economic development of the local municipalities further complicates the situation.

The military presence has a direct impact on the regional economy restricting access to the favorable sea routes and creating additional risks to the economy and population in case of emergency. Besides, the solution of many economic issues is hampered by the need to harmonize them with the military departments and agencies.

The ecological situation in the Murmansk region is complex, even in comparison with the situation nationwide. A particularly difficult situation is in the waters of the Kola Bay, the coastal zone of the Barents Sea and some industrial sites (Monchegorsk, Nickel, Polarniy). On the one hand, this factor certainly affects negatively the position of the region deteriorating its image and reducing investment attractiveness. On the other hand, the establishment of the Barents Euro-Arctic Region, one of the main goals of which is the solution of environmental problems has assisted in attracting additional financial resources to the region.

Ageing, low birth and high death rates characterizing the demographic situation in the region represent an important frame factor. It has an immediate impact on the amount of the human resources limiting the opportunities for the effective utilization of the local innovation potential. (Heleniak 2008, 25-53.)

Another aspect of the frame conditions include factors assisting in fostering of the innovation activities in the region distinguished by substantial transportation and resource potential. The Murmansk region occupies less than 1 per cent of the Russian territory. However, it is one of the richest mineral resources suppliers exploiting a few large mineral deposits. The mining complex of the Murmansk region provides 98 per cent of the total phosphates production, 100 per cent - zirconium, phlogopite and vermiculite, 41 per cent - nickel, 42 per cent - cobalt, 16 per cent - iron ore, and this percent increases every year. (Russian Federal State Statistics Service 2010.)

The sea port of Murmansk is a major marine hub connected by railway and auto roads, air routes and water ways with all regions of the state and some neighboring foreign countries, the beginning of the Northern Sea Route. Tendencies in the development of the country economy and rating of the Russian goods on the world market forecast further growth of transporting cargos via railway transport in connection with the ports of North-West region. (Mihno 2009, 31.) In this context the importance of the local transport

infrastructure possessing promising development perspectives is further increasing opportunities for the cross-boarder cooperation.

Favorable economic and geographical position of the Murmansk region on the border with Scandinavia and the unique natural heritage is a solid foundation for the tourism development. Sport, adventure and ecological tourism are the most promising from the investment perspective as it allows increasing inbound tourist flow notwithstanding emergent tourist infrastructure and lack of service meeting the international standards that needs to be developed in the long-term perspective.

Active implementation of the cluster policy in the region aimed at uniting closely related companies and industries into associations for mutual cooperation and competitiveness stimulation allows taking full advantage of the innovative strategic projects being implemented in the Murmansk region such as the Shtokman project envisaging an integrated development of the Shtokman gas condensate field (Socio-economic Development Strategy of the Murmansk Region to 2025 2010, 47). The Murmansk transport hub development project aims at harnessing the potential of the local transport infrastructure to effectively manage the cargo flows of the Northern Sea Route and the Barents Euro-Atlantic Corridor. Another group of projects includes construction of several new mining and processing plants.

The above described frame conditions allow referring to the Murmansk region as a potential innovation leader (National Innovation System and State Innovation Policy of Russian federation 2009, 166) that is distinguished by the relatively high rate of the innovation technologies development and implementation. However, it yields on the financial performance to the regions described as innovation leaders (St. Petersburg and Moscow).

The results of the discourse analysis and empirical research - interviews held in October-November 2010 - allow concluding that the Murmansk region possesses relatively high innovational potential with profound developmental perspectives. The Shtokman project execution and development of the Murmansk transportation hub afford an opportunity for the Lappish

companies specialized in building and construction to cooperate with the Murmansk region businesses transferring latest construction technologies adapted to the extreme climatic conditions.

Rapid development of the mining and mine-waste processing industries in Finnish Lapland and perspective exploitation of the new resource deposits on the Kola Peninsula lays foundation for cooperation in the sphere of metallurgy and ecological development. In the long term-perspective, the Murmansk region offers vast innovation opportunities for the Lappish tourism companies in the tourism industry.

## 5.2 Discussion: SWOT Perspective

Due to the relatively low innovation activity in the Russian Federation the availability of the regionally specific official statistic data is limited not fully reflecting the formation of the innovation processes and frame and transfer conditions influencing the regional innovation potential. Thereby, the obtained statistical data is supplemented by the discourse analysis and empirical research to draw objective conclusions on the innovation potential of the Murmansk region which affords vast opportunities for the cooperation between the Lappish companies and the Russian businesses. A number of characteristics that the region is distinguished by foster the Finnish-Russian business relations.

First, there is a developed infrastructure providing support and assistance in the cross-border business activities including the Chamber of Commerce and Industry, entrepreneurial associations, business incubators, science and technology parks, consulting companies and agencies. Second, the regional business has accumulated substantial knowledge and experience of the international cooperation. At the beginning of the 90-ies even the leading companies of the Murmansk regions didn't have any contacts to the foreign business partners, neither international trade specialist were available. Nowadays the products of JSC "Apatit" are known worldwide. Goods manufactured by Kola Mining and Metallurgical Enterprise under the trademark "Norilsk Nickel" are exported to more than 30 countries in CIS, Europe, Asia and North America. Fishermen of the North have business partners in over 40 countries. Third, during the last decade the regional business climate has improved dramatically - customs, banking and foreign exchange legislation was further developed to meet international standards. The innovation policy implemented by the local authorities stimulates foreign investment ensuring favorable conditions for the international businesses. Forth, the administrative barriers are being eliminated alleviating the process of business establishment in the region.

Evaluating the innovational potential of the Murmansk region, the respondents have identified a number of features directly or indirectly



influencing the innovation potential of the area which are represented by means of SWOT analysis (Fig. 13).



Figure 13. SWOT Analysis

Identifying strengths and weaknesses, the Russian respondents concentrated mainly on the economic and financial aspects, while the Finish interviewee focused on the pure innovation factor stressing that the region possesses vast opportunities, however, in order to utilize them there is an objective necessity to establish an innovation infrastructure and align understanding of the innovation concepts and processes.

The main areas of the innovation technologies implementation are largely predetermined by the regional strategic projects which are concentrated in the mining, processing and transport industries. Service industry and tourism in particular, are among the perspective development vectors ensuring

economic diversification. The potential threats mainly stem from the global economic crisis that has largely influenced the local economy due to the narrow industrial specialization. Though the innovation potential of the Murmansk region is assessed as relatively high that is confirmed by the discourse analysis, the opinions concerning innovation potential of the specific industries vary (Table 11).

Table 11. Murmansk Region Industries Possessing High Innovation Potential as Viewed by the Finnish and Russian Interviewees

Finnish Interviewee*	Russian Interviewees**
Mining and waste-processing industry	Mining
Building and Construction	Building and Construction
Reindeer husbandry	Tourism and service sector
	Fishing industry

\* Timo Rautajoki, President and CEO of Lapland Chamber of Commerce

\*\*Olga Buch, Director General, Doctor of Economics, Professor, Arctic Center of Training Specialists; Radik Safin, Chairman of the Board, Opora Russia; Evgeniy Prosoedov, International Projects Coordinator, Murmansk Regional Development Agency

The opinion differences amongst the Finnish and Russian respondents can be explained by the variations in the business approaches: the Lappish organizations taking into considerations the Russian's social and economic instability prefer to develop business relations with short-term orientation ensuring fast return on investment. The industries mentioned by Timo Rautajoki allow direct transfer of know-how, its commercialization and receiving revenues in the short-term perspective. Tourism and fishing industry require profound preliminary work including the development of the industry infrastructure, introduction of the modern technology and training specialists that implies much higher risks and revenues only in the long run.

Absence of a common internationally recognized framework for the innovation potential assessment on the regional level is a significant limitation to this research work identifying several key areas for the future research. A unified taxonomy of factors influencing the innovation potential level is to be identified forming the base for the innovation potential assessment framework. In relation to the Murmansk region, the innovation potential of

each specific industry could be evaluated and innovation infrastructure map developed.

## 6 CONCLUSION

The concept of innovation is complex and is not adequately explored in unidimensional studies. Slow progress in the development of the innovation theory has been attributed to inconsistencies in the labelling of innovations. Consequently, innovation studies lack a shared set of concepts and definitions that, to an extent, promulgates the context dependent analysis. Innovation potential assessment systems often lack generalisability because they fail to take into account the different ways in which it is perceived in different contexts. At the heart of this research is the objective of innovation potential evaluation of the Murmansk region enabling the comparison of business opportunities across borders. The OECD framework provides a conceptual and theoretical starting point for the research which is mainly exploratory in nature. This research contributes to the existing body of knowledge mainly from the practical perspective as innovation activities are identified as a key priority for the economic sustainable development both in Finnish Lapland and the Murmansk region. The main research outcomes are:

1. The concept of innovation is perceived and consequently understood differently in Finland and Russia - the Finnish scholars following the European scientific tradition interpret innovation as a process that includes the phases of idea generation, development and commercialization. The Russian business society differentiates between innovation and innovation process and defines the former as a final product.

2. The entrepreneurs of both Finnish Lapland and the Murmansk region agree that the Murmansk region possesses high innovational potential ensuring vast business opportunities. However, the opinions differ concerning the innovational potential of the specific industries. The entrepreneurs of Finnish Lapland mention building and construction, mining and mining waste processing and reindeer husbandry as possessing the most innovational potential in the Murmansk region. The businessmen of the Murmansk region single out building and construction, mining, tourism and fishing industries. The opinion differences amongst the Finnish and Russian entrepreneurs can be attributed to the variations in the business approaches:

the Lappish organizations taking into consideration the Russian's social and economic instability prefer to develop business relations with the short-term orientation ensuring fast return on investment. The industries mentioned by the Lappish entrepreneurs allow direct transfer of know-how, its commercialization and receiving revenues in the short-term perspective. Tourism and fishing industry require profound preliminary work including the development of the industry infrastructure, introduction of the modern technology and training specialists that implies much higher risks and revenues only in the long run.

3. Though the Murmansk Region possesses high innovational potential, the Lappish entrepreneurs are not motivated to exploit its business opportunities as the Lappish economy is experiencing substantial growth ensuring opportunities in the local market. Organizations located in Central and Southern Finland are more interested in the business opportunities of the Murmansk region.

4. To develop its innovational potential the Murmansk Region needs multinational companies that can introduce new technology and know-how in financing and marketing opening at the same time international markets for the new products. In the international comparison, it may be easiest for Finnish companies to settle in the Murmansk region due to a number of factors. First, the close geographical proximity and relative familiarity with each other's conditions allow management of direct investments and keeping of costs at a reasonable level. Second, power engineering, mining and tourism are important for both Finnish Lapland and the Murmansk region, but their products are complementary which generates new business opportunities. Third, it would be profitable for the Lappish companies to subcontract to the Murmansk region due to the profound differences in the labour costs.

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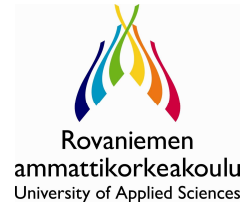
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## INTERVIEW QUESTIONNAIRE



### Innovational Potential of the Murmansk Region



#### I. Murmansk Region Industry

1. What branches possess the most innovation potential in your opinion?
2. What are the competitive advantages of the region in your opinion?

#### II. Regional Innovation Policy

1. Are there any governmental programmes developed to support innovation processes?
2. What are the strategic targets of the regional innovation policy?
3. How the innovation processes are financed?

#### III. Regional Innovation and Research Activity

1. Is the number of patents registered growing? Which industry is noticed for the biggest number of patents registered? In which industry is the scientific research the most intense?
2. How is the regional innovation system represented? Is there any specific networks uniting businesses, universities, research institutes and entrepreneurs?
3. Is there any "innovation apathy" observable in the region in your opinion?
4. (In case there is no any "apathy") What is the most prominent indicator of the innovation activity growth in the region in your opinion?

#### IV. Innovation Projects and Foreign Investments

1. Are there any innovation projects that are being currently implemented?
2. Are there any foreign investments involved?
3. What are the investments risks? How is investors' protection implemented?
4. Is there a specific economic policy in relation to the foreign investors?
5. What Finnish companies are represented on the local market?
6. How would you characterize/describe the development of the Finnish-Russian business relations during the last 5 years?
7. How the global economic crises influenced the cross-border business relations in your opinion?

8. What obstacles in your opinion do the Finnish businesses encounter while entering the Russian market?