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**BUSY LINES,
HECTIC PROGRAMMING
A Competitive Analysis of the
Northwest Russian ICT Cluster**

ETLA, The Research Institute of the Finnish Economy

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ABSTRACT: Northwest Russia and particularly St. Petersburg were a globally important development center for information and communication technologies (ICT) during 1850-1950. The region's position of strength deteriorated after this period as a consequence of the choices made about technology and Soviet secrecy. However, the region and its ICT industries still enjoy the benefits of education provision, the research-oriented tradition and inherited human and industrial capital. The transition to the market economy opened up many opportunities but also resulted in the evaporation of uncompetitive producers like giant electronics manufacturers. It also reduced financing and changed the priorities for R&D and education. At the same time, breakthroughs in telecom technologies and the overwhelming success of mobile communications greatly influenced the ICT industries in Russia. Understanding the major changes and trends is crucial for industrial policy and business strategy decision makers. In this study, we identify the Northwest Russian ICT cluster and the key matters related to its competitiveness and growth prospects in the new environment. The study demonstrates that inherited production factors, as well as growing domestic demand, form the background of the growth currently experienced. Russia already has a competitive edge in offshore programming. However, focused industrial policy is urgently needed in order to make the cluster's growth sustainable and create long-term competitive advantages.

KEY WORDS: Northwest Russia, cluster, information and communication technologies ICT, new media, competitive advantage, economic growth, industrial policy.

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TIIVISTELMÄ: Luoteis-Venäjä ja erityisesti Pietari olivat vuosina 1850 – 1950 yksi maailman tieto ja viestintäteknologian (ICT) kehityskeskuksista. Tämä jälkeiset teknologiavalinnat (sotilas- ja avaruusteknologiapainotus) ja salailun aiheuttama eristäytyminen vaurioittivat alaa. Tästä huolimatta ICT-alat hyötyvät koulutuksesta, tutkimustraditiosta, sekä periytyneestä inhimillisestä ja teollisesta pääomasta. Siirtyminen markkinatalouteen avasi monia liiketoimintamahdollisuuksia mutta myös kiihdytti elektroniikan kilpailukyvyttömät jättiyritykset. Myös T&K:n ja koulutuksen rahoitus pieneni ja painotukset muuttuivat. Teletekniikan läpimurrot ja matkapuhelimen ylivoimainen menestys vaikuttivat voimakkaasti ICT-aloihin Venäjällä. On ensiarvoisen tärkeää, että elinkeinopolitiikan ja yritysten päättäjät ymmärtävät näiden muutosten vaikutukset. Tutkimuksessa analysoidaan Luoteis-Venäjän ICT-klusterin kilpailukykytekijät ja kasvumahdollisuudet. Tutkimus osoittaa, että kasvu perustuu perityille tuotannon tekijöille ja kasvavalle kotimaan kysynnälle. Ohjelmointiliiketoiminnassa on jo saavutettu kansainvälistä menestystä. Kestävän kehityksen ja pitkän tähtäimen kilpailuetujen saavuttamiseksi tarvitaan tarkasti kohdistettua elinkeinopolitiikkaa.

ASIASANAT: Luoteis-Venäjä, klusterit, tieto- ja viestintäteknologia, uusmedia, kilpailuetu, taloudellinen kasvu, elinkeinopolitiikka.

Preface

Everyone knows the Silicon Valley in California. During the last few decades, Finland and Sweden have become famous as pioneers in mobile telephone technology. Few people know that St. Petersburg was one of the world's leading telecommunications, radio and television technology development centres for as long as one hundred years, from 1850 to 1950. Even after this time period, a huge number of experts continued to conduct research and development, though in secrecy from the rest of the world. The results of their work were harnessed to maintain the military power and ensure the space conquest of the Soviet Union, the world's second super power.

The history of Russian inventors and early introduction of new technology is impressive. It is introduced in greater detail in this book, but here are a few examples. The telegraph, whose development the Czar's army considered highly important, was introduced as early as 1850. The telephone took over St. Petersburg in 1882. The fast growing market attracted industrial entrepreneurs, with approximately twenty communications equipment manufacturers being established in St. Petersburg during 1877–1917. Siemens-Hanske and Ericsson, for example, had their own factories in the city. In 1895 Alexander Popov developed his radio, and in 1915 Professor Bonch-Bruевич invented the electron tube, which revolutionized radio technology. The first television was introduced as early as 1911. The test broadcasts started in 1936, four years after the first television set for consumers was manufactured. The mass production of television sets started in 1949.

History tends to repeat itself. The collapse of the Soviet Union and creation of the new market economy have gotten Russia's information and communications business off on a new, promising start. Mobile and data communications are growing extremely fast. Young consumers and new service suppliers have started to use the newest technologies at once, skipping several generations of technology that are still used in the West. In the programming area, Russia is becoming a phenomenon similar to India or Israel.

The new, solid link to consumers and users is a strong catalyst for business growth. Technology policy measures and risk financing of new technology are almost entirely unused resources in the new Russia. The market will not take care of everything. Russia also has a

long way to go in attracting technology transfer and foreign investment from Western multinational companies. If measures to safeguard investments in Russia are introduced, bureaucracy is diminished and the infrastructure is improved, the old Siemenses and Ericssons as well as new Nokias will return to Russia.

Russia faces plenty of challenges. A good mobile telephone system for a sparsely populated country should be developed. The country's rundown fixed-line telephone network cannot be used as a basis for mobile telephone and data communications, so what should be used instead? What will "eRussia" look like? Over 250 million people speak Russian, and Russia's cultural offerings are versatile. This is a good prerequisite for developing lucrative content products for the Internet and telecom networks. We hope that this book, written by our Russian researchers, will contribute to companies' knowledge of Russia, and in this way reduce barriers to investment and business growth.

Helsinki, January 2003

Pentti Vartia

Author's Preface

This Study is part of a larger project entitled “Analysis of the competitiveness of Northwest Russia,” the goal of which is to assess the growth potential of the Northwest of the Russian Federation in the conditions of transition to the open market. The project implies the analysis of the five industries most important to the economy of this region: forest, energy, metallurgy and metalworking, information and telecommunications technologies and food. The research was carried out by a consortium of participants, including: *The Center for Strategic Research* (www.csr.ru), a leading Russian think tank that prepared a current action plan and strategy for the Russian Government; *ETLA* (www.etla.fi) - the Research Institute of the Finnish Economy, a leading Finnish economic research institute; and *Solid Invest* (www.solidinvest.com), a St. Petersburg research-based consulting company. We are happy to express our appreciation of valuable help, understanding and support provided by these organizations in our research.

Within the framework of this study we intended to assess the important issues and trends for the information and telecommunications technologies (hereafter ICT) industries, which are among the most rapidly growing industries in Northwest Russia nowadays. It is envisaged that to make the further growth sustainable new approaches and regulating methods of the state industrial policy are urgently required. The view produced with a help of methods and analysis approaches, used in this study, is quite new in Russia. Therefore this study aimed to assess basic information, introduce new views and facilitate the start of reconsidering the role of industries and governments in ensuring economic growth and prosperity in Northwest Russia. We hope that the results of our research will be interested to the wide range of readers and will be of high value for the purpose of facilitating the further growth of the cluster.

We would like to express herewith our gratitude to the Finnish companies and organizations (SITRA, Elcoteq, Nokia, Sonera, Elisa Communications), which supported the research. Our special thankfulness is expressed to Steering Group members: *Mr Christer Härkönen*, Group Vice President, Terminal Products and Services, *Mr Petri Allekotte*, Account Team Manager, Elcoteq Network Oyj; *Mr Matti Mäki*, Regional Manager NET Russia, Nokia Networks Oy; *Mr Martti Huttunen*, Vice President, *Mr Carl-Frederik Geust*, Director of International Relationship, Russia, Sonera Oyj; *Mr Tauno Heikkilä*, Director, Information Society Development, Elisa Communications Oyj; *Mr Gunnulf Mårtensson*, Managing Di-

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Andrey Averin and Grigory Dudarev

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Summary

The present paper is devoted to the analysis of the information and telecommunications (ICT) industries of Northwest Russia. The most important lines of business in this cluster are the traditional line telephone services and the fast growing mobile communications, data transmission, Internet services, programming, and manufacture of communications equipment, which still suffers from the collapse of the Soviet market. Northwest Russia is one of the seven federal districts, bordering in the west to the Baltic countries, Finland and Norway. There are 15 million inhabitants in the region. Its administrative center, the City of St. Petersburg is the ICT capital of Russia.

At present, ICT industries are among the fastest growing sectors of the regional economy. A spectacular 35% growth was registered in 2001. The growth of the sector is due to structural changes in demand, transition to the market economy and opening of the economy. The importance of information and telecommunications technologies increases in the overall economic development of the region (in line with the similar global trend). The modern ICT technologies serve both as an instrument of integration into the global networks and as a means of improving productivity and lowering the production costs. This role of the ICT industries is becoming more and more noticeable and, correspondingly, its development draws significant attention of some political leaders and officials in Russia.

The changes in demand caused by the collapse of the Soviet Union have greatly influenced the Russian ICT industries owing to the dynamics and globality of the technological development in the field. When the centralized planning system responsible for the allocation of resources and industrial development collapsed, the advance of many manufacturing and technology development activities stopped as well. New institutions to replace the old ones and facilitate development with indirect means and appropriate industrial policy were not created. A certain vacuum appeared. In such conditions the local manufacturing and R&D companies were forced to fight for survival on their own, using their inherited technologies.

The scale, speed and scope of the change in the Russian industries was such that companies and the government were not able to respond. The government was busy with dismantling the old, Soviet system and building new institutions. The lack of targeted industrial policy weakened the positions of advanced technology and research-intensive industries –

ICT sector in particular. Now that the markets are stabilizing and the new institutions and legal framework started to operate it is time to assess the changes and development prospects.

Among the main goals of the study are the analysis of the structural change in the Northwest Russian ICT cluster, and the creation of an information basis for strategic decision-making, both by regulatory bodies and companies. As a basis for analysis the authors used the 'diamond' model and the industrial cluster concept developed by M. Porter in the well-known paper *The Competitive Advantage of Nations*. Besides, the subsequent theories related and underlying this concept were applied to broaden the views presented in the study.

The cluster approach emphasizes the importance of inherited skills, industrial capital and traditions. Education and research are also considered important, as well the close links between manufacturers and suppliers. In addition to close links, geographical proximity is emphasized. In fact similar ideas underlay the creation of regional scientific-technical complexes in the Soviet Union starting from the 70-ies. In this period the territorial complex of electronics industry was developed in Northwest Russia. The main differences between regional complexes and industrial clusters were allocation of resources and supplies neglecting the markets and customer needs and aspiration for mass employment and standardization instead of competitiveness, lower costs and flexibility. Owing to these differences, the transition to market economy has brought a natural destruction of long-established links in the industrial complex.

Now the region is witnessing the formation of an ICT cluster based on the industries that either survived, e.g. wire communications, or emerged during the transition period, e.g. mobile communications. New networks of market partnerships have replaced most of the links established in the Soviet period. *Chapter 3* introduces the structure of the Northwest Russian ICT cluster – primary goods and services, universities and central research institutes providing the cluster with labor and know-how, other specialty inputs, technology, associated services, companies of related industries and the main consumer groups. Chapter 3 also presents the main interconnections between the companies of the cluster, as well as the value chains in the cluster.

Early concentration of ICT activities in Northwest Russia has made this industrial agglomeration highly important on the national scale. With 12,3% share of the total volume of telecommunication services it is the second largest market in Russia. The largest one is the Central Federal District with 51,6% (Moscow alone accounts for 43%) of the total. The market is heavily concentrated in St. Petersburg – 64% of the total in Northwest Russia.

The mobile business of Russia started in St. Petersburg. North-West GSM was the first GSM operator of Russia, and it quickly acquired the market. Due to this pioneering role, the mobile telephone penetration in Northwest Russia is higher than the Russian average. After the monopoly of North-West GSM was broken, the prices went down and mobile telephones started to become more common.

The geographical location makes Northwest Russia an important branching point of telephone communications. The most important telephone and data transmission lines from Russia go through St. Petersburg and further via Finland to the rest of the world.

Northwest Russia is still among the main telecom equipment production centers in Russia, although the production of the leading companies – Svetlana, Krasnaya Zarya and Positron – has collapsed compared to the Soviet time. New small enterprises producing specialty products emerged within the old companies. Some of the leading western companies, too, such as Lucent and Elcoteq, have started producing telecom equipment. The majority of ICT schools and research institutes is located in St. Petersburg, as described in *Chapter 4*.

At present, the Northwest Russian ICT production is oriented on the domestic market. Its competitiveness on the world market is low, which is reflected in the tiny, 0,03% (118 mln. USD) market share of Russian products in OECD countries. However, the high volumes of telecom equipment imports (over 1 billion USD), as well as the production factors accumulated in the region, suggest the possibility of organizing import-substituting production. Realization of this opportunity depends on whether the authorities manage to create a favorable investment and business climate.

In terms of exports volume the Northwest Russian software industry is substantial but poorly recorded, since the products are immaterial. Russia is becoming the same type of player in the programming as India and Israel. The most important programming centers are Moscow, St. Petersburg and Novosibirsk. Among them St. Petersburg is relatively the most export-oriented one.

Offshore programming needs targeted industrial policy. The example of Finland and many other countries shows that government can do a lot to facilitate development and improve the operating environment of companies. The role of government is important in protecting the intellectual property rights and creating an efficient venture capital market. If these things were taken care of, offshore programming and ICT companies could grow much faster.

Growth of imports in the cluster, to a large extent, results from the growing local demand for telecom services and information technologies, and consequent investments of the operators in the extending and improving their networks. As demonstrated in *Chapter 5*, during the last few years these markets displayed a high rate of growth. In 2000 the growth was 25%, and in 2001 – 35%. Demand for the telecom services and equipment also leads to creation of supplier and service networks, and facilitates development of the domestic manufacturing through import substitution and creation of the solutions meeting better the domestic customer needs.

Development of the software market is based on high concentration of qualified workforce, education and R&D facilities in the region, which enables local companies to participate actively in the world offshore programming market. Compared to Moscow and Novosibirsk, the schools and research institutes in St. Petersburg traditionally have better contacts with the outside world. In addition, the immigration rate of people interested in ICT business is relatively higher in St. Petersburg. These factors contribute to the growth of offshore programming in the region.

Development of the local telecommunications equipment manufacturing has been markedly slower. The industry greatly suffered from the sharp decline in demand and discontinuation of public financing in the early 1990s. A profound structural change is necessary to overcome the technology and quality gap between the domestic hardware producers and the international competitors.

Apart from the key industries, supporting and related industries play an important role in the development of the cluster. Convergence of information, telecommunications and media technologies result in the emergence of cardinally new products and services. New supply creates additional demand, and thus stimulates further growth. There is also some small but positive improvement in the local supplier networks and their possibilities to meet the modern quality and flexibility requirements. Sevcabel and its optic fibre division is a good example of this. A well-developed system of higher education helps to maintain the qualified personnel potential in the region, and to provide the growing ICT sectors with skilled employees.

Among the key competitive advantages of the cluster (see *Chapter 6*) it is possible to distinguish the local factors of production: labor resources, R&D, education and the inherited industrial capital. These factors were the basis of development for a number of successful companies. However, for sustainable growth and development of competitiveness, it is necessary to invest in improvement of these factors. This is possible only

by creating favorable conditions for the investors and business, and removing development barriers. Focusing the government funding on education and R&D would bring better results than uncoordinated support to the remains of the Soviet system. Cooperation between universities and industry, and between domestic and international companies and educational institutions is very important. This could be done through support and cooperation with appropriate industrial associations, funding of the projects targeted at diffusion of knowledge from the universities to industry, supporting international exchange of experts, traveling, etc.

An intense growth in the domestic demand for products and services has a strong positive influence on the development of the cluster. This growth is concentrated in telecommunications and related services. Although the growth is spectacular, it is anticipated to continue for some time, since the hardware and service prices have gone down thanks to the scale effects of a large subscriber basis.

PC penetration in Russia is rather small - 5% of households had a PC in January 2001. As the rate grows development of data transmission, Internet and related services is bound to grow faster than today. This growth is expected to gain gradually more speed and concentrate in large cities owing to poor infrastructure and low density of the population in rural areas. Poor and obsolete infrastructure is one of the major obstacles for development of telecommunications in Northwest Russia. Digital exchanges in the wire telecom network represent less than 32% of the total. This restrains growth in many segments of the ICT market but on the other hand motivates mobile operators to offer competitive wireless solutions. Development of competition stimulates the companies to improve their offerings (lower prices, better services, etc.), which further increases demand.

Other significant obstacles for the development of the ICT cluster are monopolies in traditional areas such as wire communications, access to the backbone infrastructure, and excessive government participation. This leads to the situation where inefficient and inflexible business management is preserved for years and customers pay excessive costs. So far the government preserved important positions in all sectors of the ICT cluster. It is of the outmost importance that this grip is eased and independent and private players are given more freedom. It is also important to focus the industrial policy on lowering the barriers for entry to allow more competition in ICT cluster.

Development of the related and supporting industries in the Northwest Russian ICT cluster is gaining speed. The networks of specialized suppliers form around the leading companies. Nevertheless, due to un-

derdeveloped financial markets as well as lack of venture capital and private equity investors, these networks remain underdeveloped and many opportunities are still unexploited. Dedicated efforts of the regional and federal level government could facilitate the development of the cluster immensely. Making the Russian NIS (National Innovation System) competitive and targeted is among the major challenges of the decision makers.

Traditional media in Russia – newspapers, radio and television – are in difficulties due to deteriorating infrastructure. There are changes in consumer habits, too. For example, the circulation of newspapers has fallen. The deterioration of the infrastructure presents an opportunity for the new media to offer substituting services. An analysis of the audiences of the traditional and new media shows that the gap is already very small. Popularity of the new media continues to increase. Northwest Russia could be among the first areas in the world where the Internet based media outperforms traditional TV, radio and newspapers as a source of information and entertainment.

Most of the competitive advantages of the ICT cluster are potential. They require further development under a comprehensive industrial policy implemented both on the federal, and the regional level. On the basis of the analysis of competitive factors, in the closing part of the study the authors suggest actions of industrial policy, which could help to develop the cluster. These actions could include a number of measures aimed at developing of the existing competitive advantages, improvement of investment and business climate. Stimulation of over-the-border cooperation and integration with the well-developed ICT agglomerations of Finland, Sweden and Germany could also be considered as important measures to develop the local ICT industries.

The main obstacles for the development of sustainable competitiveness of the cluster are an unfavorable investment climate, low efficiency of financial markets, and poorly developed infrastructure. The passive role taken by government bodies hinders the cluster growth. They have been reluctant to solve such crucial for the ICT sector problems as simplification of customs procedures, development of investment and business climate, coordination and focus of development in the spheres of education and R&D. These areas require urgent improvement and better coordination by the regional and federal government.