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Keskusteluaiheita – Discussion papers

No. 1078

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ESSAY ON INTERNATIONALISATION POTENTIAL OF NORTHWEST RUSSIAN AND FINNISH ENERGY CLUSTERS*

* This is a part of the project ”Opening of the Russian Economy and Its Integration with the European Union”, financed by the Academy of Finland (Grant No. 208203).

ISSN 0781-6847 20.03.2007

FILIPPOV, Pavel – **YURKOVSKY,** Vlad, **ESSAY ON INTERNATIONALISATION POTENTIAL OF NORTHWEST RUSSIAN AND FINNISH ENERGY CLUSTERS,** Helsinki: ETLA, Elinkeinoelämän Tutkimuslaitos, The Research Institute of the Finnish Economy, 2007, 36 p. (Keskusteluaiheita, Discussion Papers, ISSN, 0781-6847; No. 1078)

ABSTRACT: Finnish and Russian energy clusters widely use resources and competences of each other. They can be considered as a good example of broader phenomenon which is internationalisation of clusters. Though these clusters are on very different development stages their internationalisation ambitions, geographical proximity and complementary resources encourage them to cooperate closely, and the scale of this cooperation is predicted to grow. The article investigates the current status of the concrete energy clusters cooperation, summarises the main reasons, benefits and barriers for their cooperation, and imposes some theoretical and practical questions related to internationalisation of clusters in general.

Key words: cluster, Northwest Russia, energy, international cooperation

JEL-code: L14, L24, F15, F21

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1. Introduction

The main objective of the study is to discuss the prospects of cooperation between Northwest Russian and Finnish energy clusters, i.e. networks of firms specialised in the energy related fields, including production, processing and distribution of energy raw materials and electricity, power engineering, energy services etc.

Separate studies addressing the issues of cluster landscapes in Finland and Northwest Russia name energy clusters in both countries among the most prospective and powerful[1]. In different years the focused full scale researches have been published on Finnish (1994, 1999)[2] and Northwest Russian (2003)[3] energy clusters, however the matters of cooperation with the neighbouring partner were not discussed there in any detail.

It is obvious that both clusters widely use resources and competences of each other, but there are still many questions interesting from theoretical and practical points of view. In this study we tried to answer the following ones:

- Do the clusters benefit from internationalising as clusters?
- How specific features of the energy clusters contribute to the intensity of their cooperation?
- What are the subjects and forms of cooperation between the clusters' firms today?
- What are the basis and prospects for development of this cooperation?
- What are the major barriers for cooperation of the selected clusters?

The study is a minor part of the larger project "Opening of the Russian Economy and its integration with the European Union" carried out by ETLA and involving also experts from St. Petersburg State University. The project is financed by Academy of Finland.

The study is mostly based on analysis of information from such sources as structured and non-structured interviews with the top managers of Finnish and Russian firms, annual reports, publications, reviews of investment banks as well as professional experience of the author, who works with a strategy consulting and corporate finance advisory firm Solid Invest.

Russian-Finnish foreign trade and investment statistics was also investigated in the course of the study, however in this publication only conclusions from this analysis are presented in the section 5.

During the project the author worked 3 months with ETLA in Helsinki, having a chance to organise interviews in Finland and discuss the study framework and preliminary findings with the members of the project team.

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[1] Those interested in more detailed information about the emerging clusters of Northwest Russia are advised to address "Advantage Northwest Russia" (Dudarev – Boltramovich – Filippov – Hernesniemi, Sitra Reports series 33 and ETLA B 206, 2004), comprehensive information about Finnish industrial clusters can be found e.g. in "Suomen avainklusterit ja niiden tulevaisuus". ETLA, Helsinki. (Hernesniemi – Kymäläinen – Mäkelä – Rautkylä-Willey – Valtakari, 2001).

[2] Suomen energiaklusterin kilpailuetu, ETLA, Helsinki (Hernesniemi – Viitamo, 1999).; Energia Suomessa - Tekniikka, talous ja ympäristövaikutukset. VTT Energia, Helsinki 1999; Energian niukkuudesta teknologian vientiin.Energiaklusterin kilpailukyky. ETLA, Helsinki (Rouvinen P., 1994).

[3] Energy³: Raw Materials, Production, Technology/Competitive Analysis of the Northwest Russian Energy Cluster. ETLA, Taloustieto Oy, Helsinki. (Filippov – Dudarev – Osipov, 2003).

The author is very grateful to Dr. Sergey Sutyrin (St. Petersburg State University) and Dr. Peter Zashev (Turku School of Economics and Business Administration) for their comments to the Russian version of the text as well as to Dr. Kari Alho, Dr. Markku Kotilainen, Dr. Pekka Sulamaa, Mr. Paavo Suni, Mr. Ville Kaitila and Mr. Hannu Hernesniemi for the valuable discussions in the course of the project.

2. Internationalisation of Clusters

Quite many economic studies insist that a firm's competitiveness is heavily dependant on competitive power of networks it managed to take part of. As a consequence active interactions and positioning within networks become a very important element of a firm's competitive strategy. The intensity of the interactions in its turn depends on the density of economic activity in a specific region or country and tends to move also outside the country. Internationalisation takes place if incentives for it are not diminished by the political, economical, cultural and other related barriers.

To describe the geographically located networks of economic agents actively interacting in the framework of value system M. Porter introduced the term "cluster", which is currently widely used in strategic management and regional economics terminology.

Analyzing various cluster studies undertaken during last 15-20 years through the prism of internationalisation theories we formulated a number of theoretical assumptions:

As a general rule, firms strive to expand interaction inside clusters, since it means better opportunities for managing the value chain and produces a number of synergy effects facilitating the creation and maintaining of competitive advantages[4].

Many reasons motivate firms to pursue internationalisation. Given the synergy effects enjoyed by them inside a cluster, it can be assumed that as firms undergo internationalisation they will aim to preserve these synergy effects, broadening them in new environments.

Given that expansion into a new overseas market always entails new risks and financial costs for a company, we can maintain that a focused or a more or less "concurrent" internationalisation of many companies within a cluster can be achieved only in regions located at a short "business-distance".

Internationalisation processes develop much more intensively if participants on both sides are companies that have already been integrated into clusters, i.e. they are already familiar with various formats of intra- and inter-sectoral cooperation.

It can be stated that the internationalisation of clusters is one of the particular cases of the global process of internationalisation, and since it is characterised by a number of specific features, it may become a subject of separate study. Even though the issue of cross-border cluster formation is ever so often raised in publications and discussions, it is dealt with mostly in passing, or treated just as one possible scenario of cluster evolution, or otherwise understood as a product of inter-cluster interaction (usually for high-tech industries) standing in no relation to local competitive advantages sources. This makes it possible to conclude that the issue of mutual internationalisation of geographically adjacent clusters has not been sufficiently researched yet.

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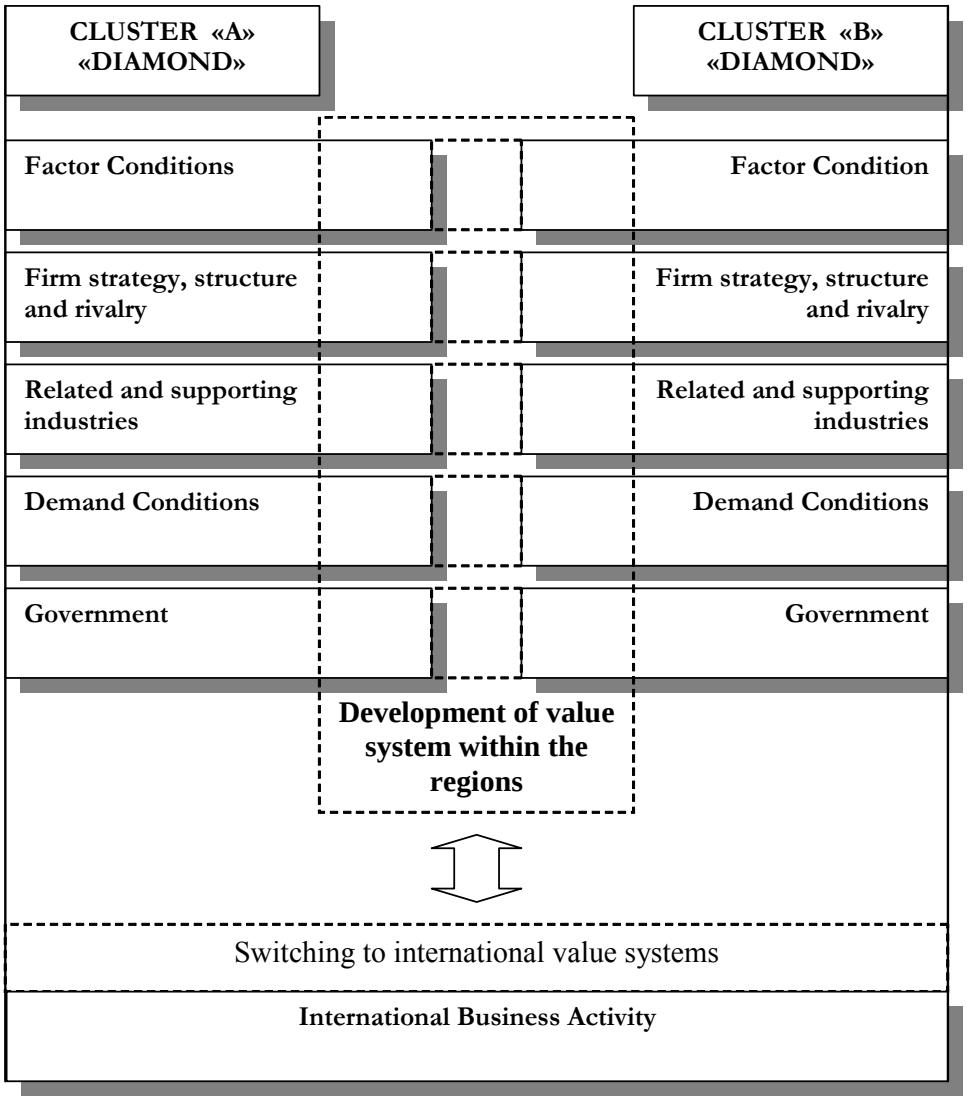
[4] Competitive companies can also be found outside clusters, but this is an exception rather than a rule.

Figure 1 shows vectors of interactions between two clusters structured according to the "diamond" competitive advantage model in the course of their internationalisation: two clusters endowed with their own set of competitive strengths and needs shaped by nature, geographical, historical and other factors begin to permeate each other deeper and deeper as they build up their experience of cooperation. This type of interaction leads to a "consolidation" of the value system, in other words – higher competition between segments of the system available in both clusters, and the filling of gaps and missing links. Positive impact under this model is not just manifested at the level of elements of the inter-branch value system, but also at the level of elements of value chains of individual companies.

Figure 1 Merging of Two "Diamonds" in the Course of Inter-Cluster Cooperation.



We will now look at consequences of mutual penetration of clusters at the level of individual elements of the system of competitive strength factors according to the Porter's Diamond model.

Factors: mutual penetration facilitates better access to infrastructure, natural resources and available science and research potential, helps to integrate workforce markets and broaden the knowledge about capabilities of cluster participants.

Demand: interaction introduces new standards of quality and service, forges new types of links between consumers and producers, helps to create demand for new specific combinations of goods and services and provides more possibilities for participants of cooperation to access the international market.

Company's Structure, Strategy and Rivalry: interosculation results in mounting competition between companies, forces them to develop, stimulates investment in new technologies, facilitates higher labour productivity and lowers costs per unit of produced goods, forms a more effective market for raw materials and materials, encourages faster development of respective infrastructures, fills in the "missing links" in value chains and enables producers of specialised niche products to achieve economies of scale. Cooperation between representatives of various corporate cultures leads to the accumulation of knowledge about best practices in designing corporate strategies, building management and personnel motivation systems, etc., while successful experience helps to forge international links and increases the investment attractiveness of both clusters.

Related and Supporting Industries: broader access to enterprises in related and supporting industries facilitates better division of labour, specialisation and – as a result – higher efficiency, makes for the production of more complex goods and helps to organise more efficient post-sales services, while increasing competition in related industries contributes to lowering cost price in key enterprises of the clusters.

Government: possible vectors of public policies stimulating inter-cluster interactions are described below. The most obvious consequences of clusters' mutual inter-permeation is the joining up of two governments' efforts to lower barriers to foreign economic activities, dissemination of successful regulation experiences, formulation of better coordinated policies aimed at promoting network interaction and implementation of large-scale infrastructure projects[5]. All this leads to lower costs of both future and current projects and can lay the foundation for a qualitatively new page in the clusters' development[6].

International Business Activity: mutual permeation resulting in the integration of the four main blocks of the "diamond" facilitates substantial increase in the investment attractiveness, since under this model foreign firms get *access to "diamonds" of both clusters at once*. This in turn leads to regional companies acquiring higher value, the possibility of foreign funding with lower costs, and finally, to existing foreign companies expanding their presence in the region/s. The broadening of cooperation between clusters facilitates a more active engagement of foreign firms in external economic activities, the growth of knowledge about foreign markets (including quality standards, distribution channels and marketing policies), as well as the strengthening of cluster positions in the international chains of value creation.

The latter for its part may entail the strengthening of the region's position inside global networks, turning it into a "gateway" of higher order. What is understood by a "gateway" is a region acting as a hub of network interaction on the global scale, which – as a result of economic effects achieved – has relatively higher priority than other hubs[7]. Because, despite possible dis-

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[5] For example, according to the interview conducted by the author in September 2004 with the Vice-Governor of Vologda Oblast Mr. L.G. Iogman and the Deputy Chair of the Economic Development Committee of Arkhangelsk Oblast Mr. A.G. Tutygin, the absence of technology parks (industrial sites with the necessary infrastructure) is one of the chief factors that hamper the development of wood processing with foreign participation.

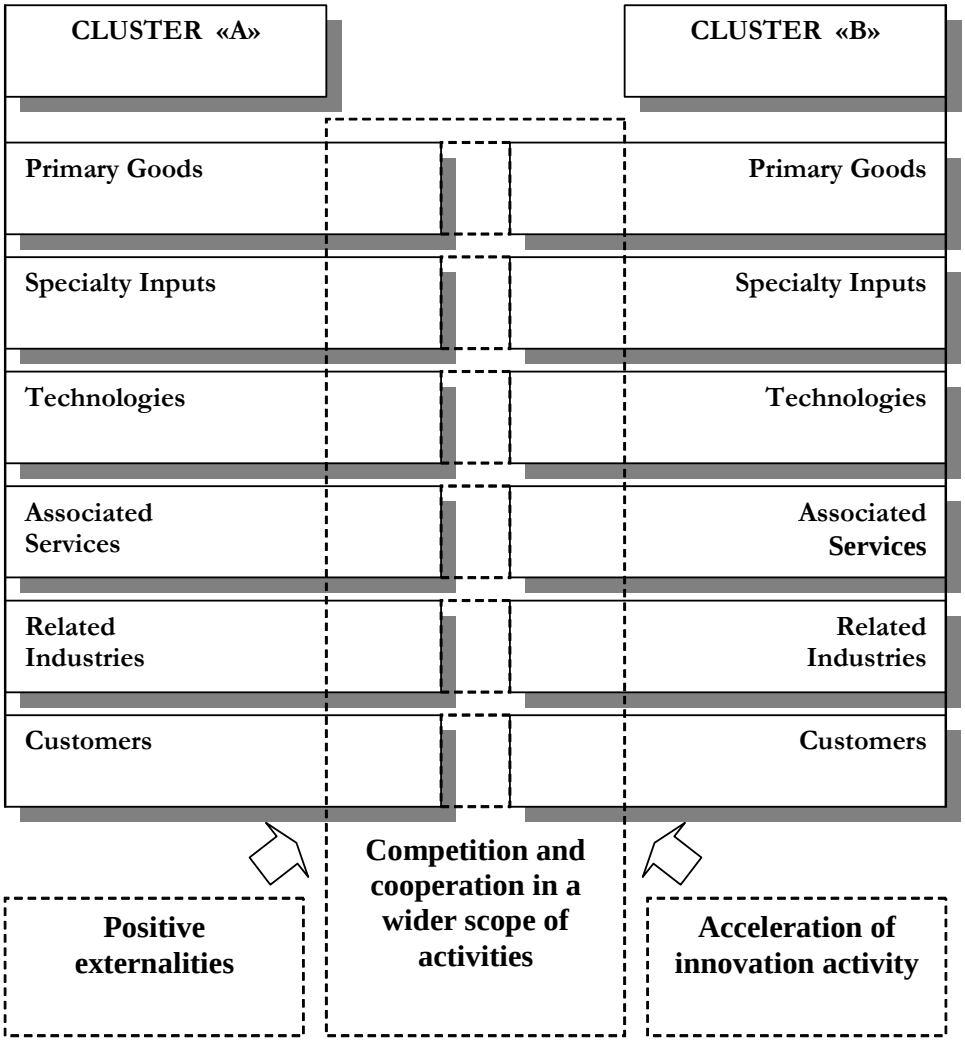
[6] Of course all the mentioned policies are rarely implemented. In reality the differences in targets and priorities, various political concerns as well as lack of professionalism of the state officials reduce significantly the efficiency of inter-governmental cooperation.

[7] A.E. Anderson, 2003

creteness and short-term nature of interaction between networks, "networks are results of long-term investment processes and are extremely long-lasting in themselves"[8], a broadening of the region's role inside global networks, or even that of specific companies, is a considerable accomplishment.

It should be pointed out that when we discuss cooperation between clusters in practice we should view it primarily in its *international aspect*. On the national level there are seldom any separate and strictly geographically localised clusters that have the same specialisation (they are normally viewed as elements of one cluster). And even if such formations emerge, possibilities for cooperation may be fairly limited, since they grow out of the same soil and therefore possess similar sets of competences and capabilities[9].

Figure 2 Merging of Cluster Structures in the Course of Inter-Cluster Cooperation



[8] A.E. Anderson, 2003

[9] Naturally, the larger is the economic space of a nation and the higher is the level of institutional development of its innovation system, the more possibilities open for cooperation on the national level. Yet this does not make yields from internationalisation any lower.

The situation becomes different when cooperation processes develop between clusters that have formed in two different countries. Such clusters historically develop their specific sets of competences, know-how and marketing channels and differently realise their strategies of integration into the international labour division system. Chains and value systems are by definition different in such clusters; consequently, different types of synergies can emerge between them. The deeper the cooperation, the higher the concentration of knowledge and technologies that are critical for the cluster, the more economies of scale and scope is achieved, the more effective is the labour market and the more intensive the innovation process (Figure 2).

Based on all the aforesaid we can surmise that the internationalisation of clusters, that is the merging of clusters with the same specialisation existing in two or more countries, as it is understood in this context, could be viewed as one of the most mature form of international expansion of business activity generating the greatest number of profitable business opportunities for the parties involved in this process.

As we have already said before the problem of clusters internationalisation remains inadequately studied up to date. In particular, no empirical studies have been conducted that would provide answers to the following question:

- What types of clusters are most predisposed to internationalisation? How do internation processes unfold between clusters at different stages of development?
- What features of clusters are of primary importance for internationalisation?
- What types of foreign economic activity are most consistent with inter-cluster interaction?

Our analysis of research dedicated to the cluster topic allows us to answer these questions proceeding from the basic premises of the internationalisation theory, as well as on the basis of the general notions of driving forces shaping cluster development, structure of clusters, and methods of inter-cluster interaction, which have been sufficiently well studied by now.

The following key factors play priority roles in developing cooperation between clusters:

- clusters specialise in serving the needs of similar value systems;
- their advantages are concentrated at different links of a unified value system;
- geographical proximity of clusters allows achieving agglomeration effects, enabling SMEs to fully participate in the cooperation.

We can with good reason hypothesise that when these conditions are met and there are no barriers between countries, clusters will gravitate towards each other, striving to gain easy access to resources and competitions possessed by the neighbour.

Noteworthy in this respect is that both the industry and the geographical aspects of cooperation processes will focus on those links of the value system, for which costs in increasing efficiency are relatively lower[10]. The level of costs borne to increase efficiency is determined by a multitude of factors pertaining to economic conditions (cost level), nature and geographical conditions (availability of resources), political and other conditions[11].

In any case, the higher the level of cluster development, the more vigorously should be internationalisation process. This is due to the fact that since leading companies in clusters have

[10] Characteristics of cooperation between energy clusters in the Northwest Russia and Finland can be used to support this thesis: the overwhelming majority of the projects have been initiated on the Russian territory.

[11] Terrorist threats, for example, tend to become a significant factor as well.

long-term partnerships, their entry to an overseas market would bring their traditional suppliers and contractors to the same market. Conversely, the lower is cooperation inside a cluster, the more fragmentary in nature will its internationalisation[12] be and the fewer systemic effects will be achieved.

The intensity of internationalisation processes for different types of clusters is illustrated in the following matrix (Figure 3). The intensity of colouring of the cells matches the intensity of cooperation processes between two clusters.

Figure 3 Intensity of Cooperation Processes between Two Clusters Depending on Type of Cluster

"A" Type Cluster \ "B" Type Cluster	Strong	Latent	Potential
Strong			
Latent			
Potential			

If we address the specific characteristics of clusters, set of which has been offered by M. Enright (2000), we would point out that *stable competitive positions, high innovation capacities, strong competitive advantages and high growth potentials* play the most important role in the internationalisation. These characteristics can be said to be "critical" for cooperation, since they all stimulate companies to make a broader use of resources and competences at their disposal. A cluster's *breadth* and *depth* can also be an important contributor, determining the cluster's economic scale and the number of elements in the cluster's value system that can be affected – in other words, the range of opportunities for cooperation. As mentioned above, the intensity of cooperation processes will be higher, if competences of clusters project on different segments of the value system. But even if these segments are identical, favourable options still exit (R&D, logistics, etc.), especially if the cluster's leading companies are oriented towards export operations. The *activity,* which describes the number and types in value chain for firms working within the cluster, may also be of great importance for the internationalisation process. Clusters with broad *activity base* are more autonomous in making decisions and are more inclined to take local opportunities and advantages[13] on board than clusters with narrow activity base, especially if such activities as strategic management and development of new products and services are not contained inside the cluster.

The importance of *governance structure* has been noted above, albeit in a somewhat different context. We can claim that if a cluster makes a wide use of long-term alliances and coalitions, internationalisation will proceed much faster (often after a flagship company enters the

[12] This is so at least in the early stages of internationalisation.

[13] In this case we will not discuss which is better because, ultimately, everything depends on the quality of management. Therefore we just choose to state the specific features of the priority system.

market, its suppliers and contractors also follow) than when the majority of firms within a cluster subscribe to an opportunistic (time-serving) strategy.

The aspect labelled *ownership structure* of companies that form the production basis of the cluster can be closely correlated with the aspect denoted as the *activity base*. Clusters that have evolved according to the organic model usually belong mostly to local owners and conduct all main types of operations locally, whereas *"transplant-clusters"* established on the basis of subsidiaries of foreign firms by definition belong primarily to foreign owners and, consequently, decision making centres usually lie outside these clusters. At the same time, not only does the presence of foreign enterprises enrich the cluster with capital, knowledge and specific know-how, but it also facilitates the dissemination of a more cosmopolitan view of international cooperation. Thus, ideally for the purposes of internationalisation, some kind of a rational balance must be maintained between local and foreign ownership.

The role of *specialised organisations* for internationalisation processes on the whole depends on how actively they function. It is the author's view, however, that today it is not high. Trofimenko et al[14] in their research indicated that companies extremely rarely approach specialised agencies (for example, chambers of commerce, associations, etc.) to ask for help in finding partners. The presence and functioning of such organisations is an indicator of the overall level of development of a business environment rather than a source of concrete projects.

Government policies play an important role in the development of international contacts. Different aspects that determine the role of the State in cluster development in general are also relevant from the viewpoint of international cooperation between clusters. It is noteworthy that the government's role should not be seen as limited entirely to lowering the barriers to foreign trade and foreign investment. The government can create conditions for the development of cooperation by means of establishing an infrastructure (transport systems, industry zones, etc.), providing information to businesses (conducting marketing research, raising awareness about best practices and technologies, etc.), stimulating science and education in selected sectors, improving the investment climate in the region, facilitating the development of international cooperation between companies (organisation of joint international actions pertaining to issues of interest to the parties, engagement in preparing joint development programs), etc. A cluster approach to developing industrial policies and advancement of international activity allows identifying an effective set of both direct and indirect regulatory instruments. It is also necessary to note that although in general regional authorities play a higher role in the development of a cluster than the federal ones[15], federal governments[16] also need to play an important role in supporting the internationalisation of clusters. The significant conclusion regarding the government's role is that the government probably should treat internationalisation of clusters as a sort of priority as compared to internationalisation of specific firms, since it is precisely the inter-cluster cooperation that might generate maximum effects for the economic development of a region.

As regards the types of foreign economic activity that describe the process of mutual internationalisation of geographically adjacent clusters, we should underscore two factors here – relatively fewer stimuli for large-scale direct investment in production and relatively high number of arguments in favour of various forms of industrial cooperation, exports and imports of goods and services. This specific feature is related, first and foremost, to geographical proximity, which accounts for low transportation costs and facilitates mutual trade (as long as the state's

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[14] Trofimenko O. et al, 2003.

[15] Enright M., 2000

[16] Since this is the body within the jurisdiction of which are most issues pertaining to foreign trade lie.

foreign policy does not grossly distort export or import prices and volumes). In this respect, a physical relocation of existing facilities producing those goods for which materials and raw materials play the key role in the cost structure is usually not feasible. The geographic aspect also plays an important role where the export of industrial services for which the economies of scale are of paramount importance is concerned.

Of course what we have drawn above is a sort of an ideal case, which like a perfect competition never takes place. In order to test the theoretical issues on the real life example we carried out a detailed study of the Northwest Russian and Finnish energy clusters. In the course of this study we investigated their structure, developments and competitiveness as well as driving forces and roadblocks behind their mutual cooperation dynamics and, finally, prospects of this cooperation. Some results of this study are presented below. Those interested in the full version of the research could find it in the author's doctoral thesis named "Internationalisation of Industrial Complexes by the example of Northwest Russian and Finnish Energy Clusters" in the library of St. Petersburg State University.

3. Key Aspects of Northwest Russian and Finnish Energy Clusters

A complex of various industries which are in some manner related to energy production and power engineering both in Northwest Russia and in Finland meet the definition of "clusters" quite well, given their role in the economy of the region, the level of concentration of respective companies and organisations, as well as the level of inter-branch cooperation.

The energy cluster of the Northwest Russia is a powerful complex consisting primarily of Russian firms specialising in the extraction and processing of hydrocarbons, electric power production and distribution and power engineering. Many leading companies export their products, however these exports are either made up mostly of raw oil and gas or of low-processed mineral oils, or, have weak competitive positions in the largest and most solvent markets of developed countries. The chief problems faced by the cluster are considerable physical and moral depreciation of equipment and infrastructure, low competition, backward related and supporting industries, the decline of science and education base, insufficiency of efforts of the state and business leaders at developing a long-term competitive advantages. Today the cluster faces major changes arising in relation to the ongoing reform of the power industry, preparation for development of large oil and gas deposits, Russia's expected joining of WTO and fulfilment of obligations under Kyoto Protocol which was ratified in the end of 2004. A gradual improvement of investment climate in Russia is another important factor. All this is expected to facilitate higher competition, growing domestic and foreign investments in the sector and a broadening of international cooperation, which are all necessary prerequisites to boosting the competitive strength of the cluster as a whole. According to the typology of clusters proposed by Enright (Box 1), the energy cluster of the Northwest should be classified as one in transition from potential to latent: many elements of value system are involved in the cluster, although not all of them are equally developed. The cluster lacks a clearly defined strategy[17] for its key players, as well as self-identity, which are both needed if it is to gain any substantial advantages from the clusterisation.

[17] A good example of this is Power Machines' wavering between a merger with OMZ and takeover by Siemens.

Box 1. Cluster "Type" according to Enright.

Working clusters are those in which a critical mass of local knowledge, expertise, personnel, and resources create agglomeration economies that are used by firms to their advantage in competing with those outside the cluster. Working clusters tend to have dense patterns of interactions among local firms that differ quantitatively and qualitatively from the interactions that the firms have with those not located in the cluster. They often have complex patterns of competition and co-operation and often are able to attract mobile resources and key personnel from other locations. Even if participants do not call themselves a "cluster" there tends to be knowledge of the interdependence of local competitors, suppliers, customers, and institutions.

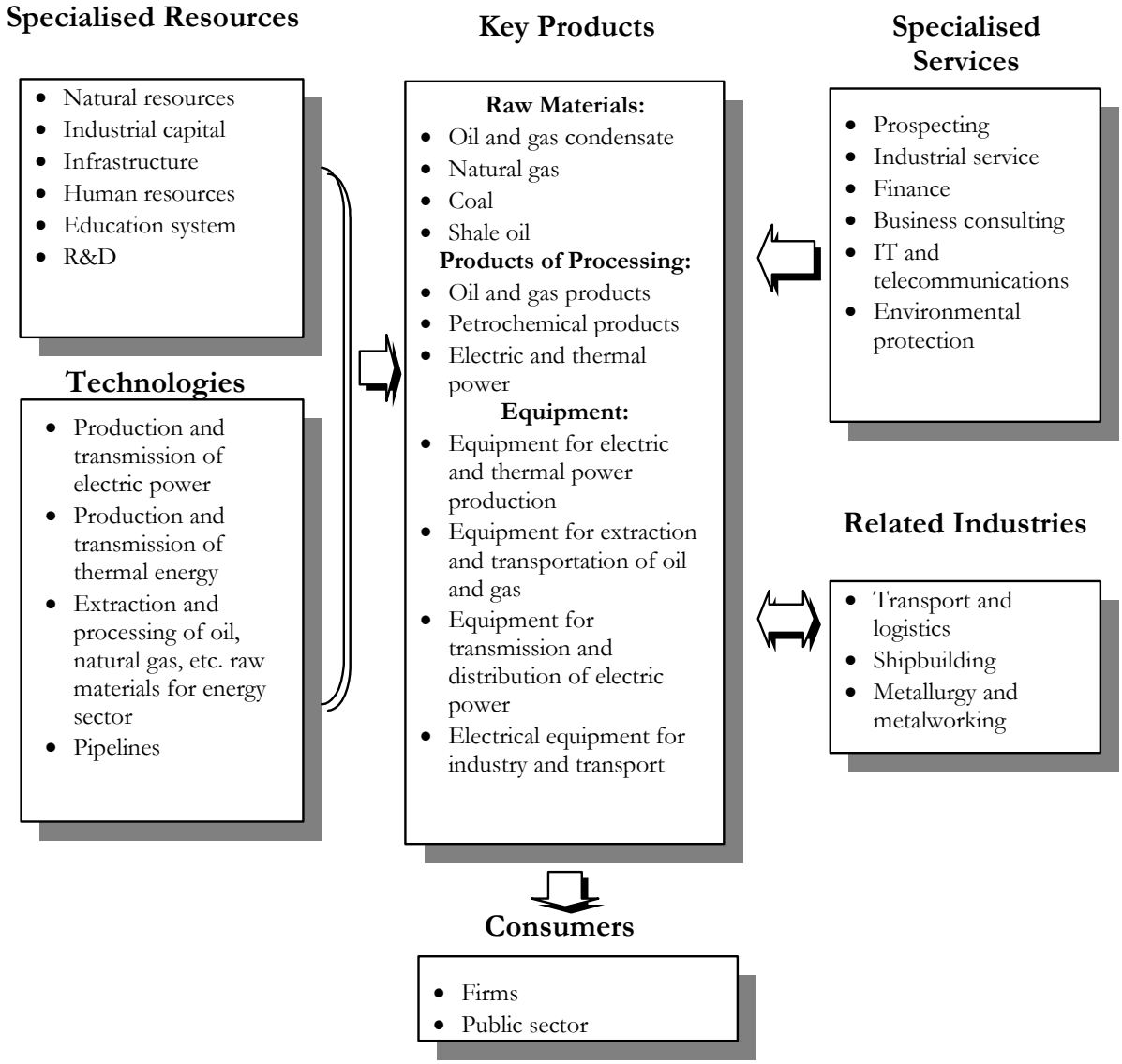
Latent clusters have a critical mass of firms in related industries sufficient to reap the benefits of clustering, but have not developed the level of interaction and information flows necessary to truly benefit from co-location. This can be due to a lack of knowledge of other local firms, a lack of interaction among firms and individuals, a lack of a common enough vision of their future, or a lack of the requisite level of trust for firms to find and exploit common interests. In any case, such groups of firms do not think of themselves as a cluster and, as a result, do not think of exploring the potential benefits of closer relationships with other local organizations.

Potential clusters are those that have some of the elements necessary for the development of successful clusters, but where these elements must be deepened and broadened in order to benefit from the impact of agglomeration. Often there are important gaps in the inputs, services, or information flows that support cluster development. Like latent clusters, they lack the interaction and self-awareness of working clusters.

Policy driven clusters are those chosen by governments for support, but which lack a critical mass of firms or favourable conditions for organic development. Many of the electronics and biotechnology "clusters" found in government programs are examples of this type of cluster. Policy driven clusters tend to be chosen more on political grounds than through any detailed analytical process. They tend to rely on the notion that policy can create clusters from a relatively unfavourable base.

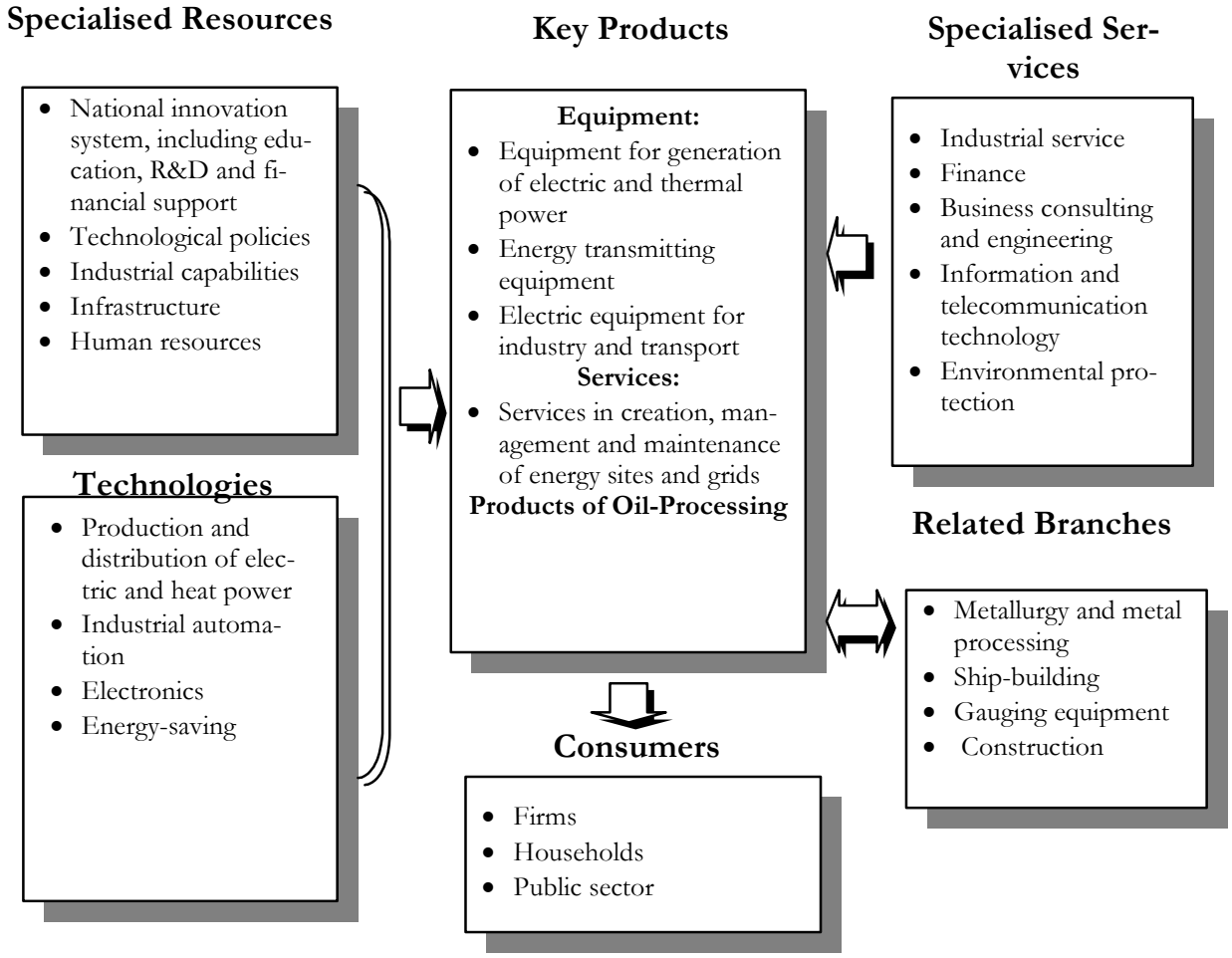
"Wishful thinking" clusters are policy driven clusters that lack, not only a critical mass, but any particular source of advantage than might promote organic development.

Figure 4 Structure of the Energy Cluster in Northwest Russia



The energy cluster of Finland consists of a number of large and a host of small- and medium-sized firms that belong both to Finnish and foreign investors, including those that are a part of large multinational corporations. Since Finland has no hydrocarbon resources of its own, it relies entirely on supplies of hydrocarbons from abroad, mainly from Russia. This is why the energy sector of Finland combines primary engineering and servicing companies specialising in the production of power equipment and technologies, creation and maintenance of energy sites and grids, as well as oil processing. The majority of these companies successfully export their products and services, being competitive world market players. The most important advantages of the Finnish cluster are its efficient innovation system, the mature development strategies of key companies, high levels of internationalisation and active inter-industry cooperation. At the same time high production costs, narrow home markets and niche nature of traditional competences encourage companies to develop partnership networks in countries with low cost levels and to move closer to end-customer, i.e. establish affiliated companies in the countries consuming products and services, as well as strengthen cooperation in R&D.

Figure 5. The Structure of Finland's Energy Cluster



Based on the typology of clusters proposed by Enright, the energy cluster of Finland can be classified as a transition type between latent and working. Despite the relatively fragmented structure of the cluster, which prevents it from reaping high awards from clusterisation, its confident self-identification and a healthy balance between competition and cooperation allow companies in this cluster to identify and create synergies, which form an essential element of their international competitive strength.

4. Specific Characteristics of the Selected Clusters

Before we turn to the analysis of directions and forms of existing and possible cooperation, it would be fitting to review and compare the specific characteristics of the energy clusters in the Northwest Russia and Finland. This should help us to position these clusters within the value system and get a notion of the specifics of their structures and the most prominent factors determining their respective competitiveness.

The results of the comparison are put together in the Table 2 below.

Table 2. Comparison of Energy Clusters in Northwest Russia and Finland

	Cluster Characteristics	Russian Northwest	Finland
1	**Geographical Scope** refers to the territorial extent of the firms, customers, suppliers, support services, and institutions that are embedded in the ongoing relationships and interdependent activities that characterize the cluster.	Geographical borders of the cluster are hazy; a number of agglomerations located in western, northwestern and eastern parts of the region are considered. All the major engineering, education and R&D resources are concentrated in St. Petersburg.	A number of cities and industrial enterprises are mostly located in the southern parts of Finland.
2	**Breadth** - refers to the range of horizontally related industries (industries related by common technologies, end users, distribution channels, and other non-vertical relationships) within the cluster.	The cluster is relatively broad, since it encapsulates a whole number of various industries and sub-industries, producing a broad assortment of goods and services.	The cluster can be characterised as relatively "narrow". Although it envelops a number of industries, the majority of companies in the cluster have narrow specialisations, putting out niche products.
3	**Depth** - refers to range of vertically related industries within the cluster.	The cluster is deep – potentially it can engulf virtually all the segments of the production chain in all industries involved, except that some of them are currently non-competitive and therefore not engaged.	The cluster is relatively 'shallow', since most companies involved in the cluster centre round the upper segments of the production chain. The production of raw materials, semi-finished products and components is not covered by the cluster, or is otherwise present only in negligible volumes.
4	**Activity Base** - involves the number and nature of the activities in the valueadded system that are performed with the region.	Many types of activities that are critical for the final result are performed within the geographical boundaries of the cluster. Among those are fundamental and applied research, new products development, production management, specialised services, sales management, logistics, etc. However, corporate strategies and top corporate management for most large companies within the cluster come from Moscow.	The situation is in many respects similar to the situation in Russia. Many types of key activities are conducted within the geographical boundaries of the cluster. Yet, since several largest companies are integrated in multinational corporations, corporate strategies and top corporate management for these companies might come from corporate centres abroad.
5	**Growth Potential** - describes capacity for growth in response to increased demand for products and services supplied by the cluster, competitive ability against external competitors, and available resources needed to sustain growth.	From the viewpoint of stage in its life cycle, the cluster can be characterised as mature and growing faster than the market. Yet the vigorous growth of companies in the cluster is in many ways determined by its low start, the favourable state of the market and low costs due to a whole range of short-term factors.	This cluster is also mature and grows faster than the market. This growth, however, is driven primarily by strategic segmentation and focusing of activities, as well as by active innovations.

	Cluster Characteristics	Russian Northwest	Finland
6	**Innovative Capacity** - refers to the ability of the cluster to generate the key innovations in products, processes, designs, marketing, logistics, and management that are relevant to competitive advantage in the industries in question.	Companies mostly commercialise products designed in the Soviet days. Today's innovation potential is relatively low as a result of disproportions of planned economy that still hold out in part, as well as errors during the privatisation, weak state support of R&D and insufficient investment in new products.	Companies in the Finnish cluster possess a relatively high innovation potential, actively generate and absorb technological and management innovations. This is facilitated on the one hand by the country's highly developed innovation system, and on the other, by its access to progressive international experience and innovation systems of other nations along the channels provided by multinational corporations.
7	**Key Competitive Advantages**	- Natural resources - Relatively low costs - High production potential and accumulated science and technology knowledge - A large set of interrelated industries and institutions, and, as a result, the availability of conditions needed to manage the value system	- Innovation potential - Successful market focus and positioning - Positive experience of implementing international development strategies - Experience of tight inter-sectoral cooperation in free market conditions - High competence in IT and communications
8	**Competitive Position** - characterises the positions of the cluster on regional, national and international markets.	In terms of competitive potential, companies in this cluster can be said to rank among the domestic market leaders and "competitors of world leaders" on the international market. At the same time it is necessary to acknowledge that the world market consumes only a small portion of the range of goods and services supplied by companies in the cluster. Depending on the market, companies can provide both strong competition (in Asia) and weak competition (in Europe) to world leaders.	Companies in this cluster are world leaders in their market segments. Export-oriented companies are either global players, or focus on the market of the Nordic and Baltic countries.
9	**Governance Structure** - refers to the relationships among firms in the cluster in terms of the way that transactions within the cluster are organized and the overall industrial organization of the cluster.	The cluster is dominated by large companies that as a rule have well-established ties with each other dating from the Soviet days. This "strategic partnership" is in many respects conditioned by the absence of effective markets of corresponding goods and services. Competition between domestic suppliers and contractors develops rather slowly because the majority of companies use a large number of foreign suppliers.	Both large and medium-sized companies form the cluster. Industrial companies as a rule have more or less stable networks of suppliers and contractors or aim to establish such networks; service companies prefer to purchase goods and services from 'on-the-spot' market, limiting the number of long-term relationships solely to unique and specially adapted goods and services.
10	**Ownership Structure** - characterises ownership of key companies in a cluster either by domestic or foreign players.	Russian owners control all the key companies. Foreign companies participate only as minority holders.	Almost all key companies have a share of foreign capital; many are controlled by foreign investors.

	Cluster Characteristics	Russian Northwest	Finland
11	**Specific Type of Cluster** - refers to the extent to which the cluster exists, is self-aware, and is self-reinforcing.	Potential/latent (transitional type): Many segments of value system are engaged in the cluster. However, not all of them are equally developed. There are opportunities for achieving substantial clusterisation advantages, but clear strategies and self-identity are lacking. Low competition is also typical for the cluster.	Latent/working (transitional type): The cluster's structure is fragmented. There are not enough elements to gain substantial advantages from clusterisation. Self-identification and competition levels are high.
12	**Specialised organisations** - refers the existence and roles played by specialized organizations associated with the regional clusters they reported.	The role of the specialised organisations is extremely low; generally, there are no organisations that coordinate business activities within the cluster.	Specialised organisations play an appreciable role, functioning not only as a forum and a promoter of knowledge about the cluster, but also helping to improve rules of the market game. The Ministry of Trade and Industry implements a policy aimed at developing the cluster and in a sense can be seen as a supra-cluster organisation.
13	**Government Policy towards Clustering** - characterises the principles and methods of governmental regulation in cluster activities and relative contribution of different levels of government to the implementation of state policies.	The federal Government remains distant from the problems of specific clusters, while activities of regional authorities are not coordinated. The key policy initiatives that have been formulated for this cluster target the development of the infrastructure for oil and oil products exports. An important factor is also the all-Russian energy reform. No Initiatives for the energy machine-building sector have been formulated or are being implemented. The state possesses many levers that can influence companies in the cluster, but employs them unsystematically and in violation of the free market principles. Education and R&D policies are not focused, failing to stimulate the development of high-tech industries. Financial support for science and education is weak.	The government's role in the development of this specific cluster is high, especially in shaping the innovation system (science and technology policy, education system and research and design, venture funding, etc.) adapted, inter alia, to the needs of the cluster. The state also plays a prominent role in the development and continuous improvement of the infrastructure, the active drive to forge effective market conditions, information support to the cluster development, stimulation of cooperation, including trans-border cooperation. The government is largely responsible for formulating the target structure of the fuel mix and priorities of technological development. The role of regional authorities is, however, not quite as high. The government retains a fairly large number of levers to directly influence companies in the cluster.

It is the author's view that the energy cluster of the Northwest Russia potentially possesses broader capabilities than its counterpart in Finland. This statement is based on a fact that it has much more resources (both natural and human) employed only partially at this stage, R&D and manufacturing entities of the Northwest Russia have wider range of competences (nuclear power is only one example), allowing them to serve more market niches.

Actually the science and industrial complex that functioned in the Soviet days much closer resembled a cluster than it does today – as far as inter-industry cooperation is concerned, with the major differences being the non-market nature of its transactions and the virtual non-existence of competition. Unfortunately, the period of reforms and privatisation (or rather the

way they were implemented) has had a major effect on the key players' positions and on the whole led to a decrease in technological development and a decline in technological levels and intensity of cooperation in the energy cluster of the Northwest. Nevertheless the reforms have been conducive to the development of competition (although its intensity across sectors was different) and initiated the processes of formation of respective markets of goods and services and the development of a network of competitive suppliers and contractors, just as it opened access to the market for foreign companies. It should be admitted that activities of foreign companies both in the power engineering and in the raw materials sector have met with rather little success[18]. This may have been because not all foreign companies that entered the Russian market have been really seeking to implement win-win projects, yet, in our view, the main reason why many projects were dropped were "internal" problems faced by Russian companies participating in these projects. In any event, the result today is extremely low participation of foreign companies in the energy cluster of the Northwest, although in many of its sectors foreign capital and technologies are much in evidence.

Although the government plays a very significant role in the energy cluster of the Northwest of Russia, its current participation in raising the competitive strength of the said cluster is highly controversial and ineffective. De jure liberalisation is presently in conflict with the toughening of the de facto regulations. The adoption of a long-term energy policy, reform of the energy sector, investment in infrastructure and a number of other important steps are just not sufficient to replace clearly formulated goals, objectives and regulation instruments.

The energy cluster of Finland has a much longer history of operating in market conditions, even though this statement is fully applicable only to companies working on the energy machinery market (the energy market was deregulated only in 1998). The result of this is more balanced ownership and business structures of companies, mature suppliers and contractors, ripe market relations and tough competition. In this respect we should mention the active and significant role played by the government in the cluster's development. Such categories as the "energy cluster" and "national leadership in energy technologies" are unequivocally listed among policy priorities in science and technology, featuring among the starting points for the formation of an innovation system. Unlike its Russian counterpart, the Finnish energy cluster is characterised by the mature markets of related and supporting goods and services. However, this cluster's insufficient "depth" precludes the possibility of influencing the majority of segments in the production chain. Another major difference between the energy clusters of the Northwest Russia and Finland is the high degree of internationalisation of Finnish companies. The majority of largest and leading companies in the country belong to multinational corporations headquartered outside Finland's borders. The narrowness of the domestic market and growing costs encourage Finnish companies to base their strategies on global or international expansion with view to both accessing new markets and improving production. Russian companies also pursue international expansion; however, at this stage Russian goods with high value added (equipment) are competitive only on emerging markets of developing nations, and the core of Russia's exports is raw materials (oil, gas, oil products).

All the aforesaid makes it possible for us to conclude that the energy clusters of the Northwest Russia and Finland possess their own sets of characteristics, competitive advantages and disadvantages, as well as strong and weak sides. Although the Russian cluster provides better opportunities for managing the value system, the Finnish cluster has been performing better on the world market in the past few years, and is characterised by higher levels of technological advancement.

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[18] Good examples in this respect are fruitless efforts of Wärtsilä to establish contact with the Russky Diesel manufacturing plant, and failed ABB's cooperation with Nevsky Mashinostroitelny Zavod.

Based on the results of the analysis of specific features of each cluster, we can isolate the following factors that favourably or detrimentally condition the development of cooperation (Table 3).

Table 3 Specific Characteristics of Energy Clusters in the Northwest Russia and Finland, Which Can Be Seen as Conductive or Detrimental to Cooperation

<table>
<tr><th>Features conductive to cooperation:</th><th>Features detrimental to cooperation:</th></tr>
<tr><td>Geographic proximity of clusters</td><td></td></tr>
<tr><td>Relative “breadth” and “depth” of the Russian cluster</td><td rowspan="2">Relatively “narrow” and focused nature of the Finnish cluster</td></tr>
<tr><td>Each of the clusters is positioned to serve different segments of the value system.</td></tr>
<tr><td>Many mission-critical activities are conducted within the geographical boundaries of both clusters.</td><td>Corporate centres of many leading companies in both clusters lie outside their respective regions.</td></tr>
<tr><td>Steady growth in demand for goods and services supplied by both clusters</td><td rowspan="3">Growth in the raw material sector of the Russian cluster is based on exploitation of new deposits (Finnish firms are only acquiring the necessary competences in this area), whereas growth in the mechanical engineering sector is sustained by short-term factors and is not a product of ‘strategic’ competitive advantages.</td></tr>
<tr><td>Both clusters grow at faster rate than the market as a whole.</td></tr>
<tr><td>Electric power segments of both clusters grow, sustained by strengthening market relations in this sector and raising demand.</td></tr>
<tr><td>High innovation activity of the Finnish cluster</td><td>Low innovation activity of the Russian cluster</td></tr>
<tr><td>Complementary resources and competitive benefits are in place</td><td rowspan="2">A whole set of issues that govern access to resources and competences remain uncovered by the Russian legislation</td></tr>
<tr><td>Strong competitive positions of many companies in both clusters focused on different segments of the world market</td></tr>
<tr><td colspan="2">Declining competitive strength of the power engineering segment of the Russian cluster on the one hand encourages Russian companies to seek partners more actively, on the other making Russian firms less attractive as potential partners.</td></tr>
<tr><td>The experience of Finnish firms in intersectoral cooperation and establishing long-terms partnerships in market conditions</td><td rowspan="2">Low competition across virtually all segments of the Russian cluster, weak cooperation between large firms and SMEs. Many transactions are conducted either because the parties have no other choice at all, or are governed by non-market factors.</td></tr>
<tr><td>Shareholders exercise ever-stronger control over Russian companies, while their managers become more and more interested in implementing long-term development strategies.</td></tr>
<tr><td>Foreign companies play an important role in the Finnish cluster, serving as conduits of foreign experience and elements of global networks.</td><td>Insufficient participation of foreign companies in the Russian cluster and relative closeness and non-transparency of it (both owing to low foreign participation and in direct consequence of it)</td></tr>
<tr><td>Relatively highly-developed cluster relationships inside the Finnish cluster</td><td>Relatively weak cluster relationships inside the Russian cluster at the present (but not potentially).</td></tr>
<tr><td>The Finnish cluster has a number of specialised organisations capable of facilitating the development of trans-border cooperation.</td><td>The absence of specialised organisations capable of efficiently coordinating trans-border cooperation in the Russian cluster</td></tr>
<tr><td colspan="2">The strong role of national governments and the influence of political factors on setting rules of the game are evident in both clusters. If coordinated consensus-based policies are adopted they may improve cooperation, whereas if policies are not consensus-based they will achieve the adversary result of putting up additional roadblocks to cooperation.</td></tr>
</table>

Table 3 demonstrates that although the clusters researched in this work possess important features conducive to furthering the cooperation between them – e.g. specialise in serving similar value systems, focus on different segments of a unified value system and are located in geographic proximity, there is a whole number of factors that can substantially reduce (or is already doing so) the cooperation potential. The most prominent among these negative factors is the quality of market relations (low competition, non-market forms of competition and cooperation) and inefficient state regulation.

Hence, despite the fact that positive factors contributing to cooperation on the whole have more fundamental nature, the existing business distance between the two clusters is rather large today[19]. In the following we will describe the actual levels of cooperation and analyse the opportunities and barriers to furthering this cooperation.

5. Cooperation between Companies in the Selected Clusters

Finland imports the following from Russia (either directly from the Northwest Russia or over its territory): natural gas, oil products, coal and electric power. At the same time Russian Gasprom holds a large stock in the Finnish gas monopolist Gasum, while Teboil, Suomen Petrooli (both were acqired by Lukoil in 2005) and Crudex Oil Products (controlled by Russian capital) maintain a 30% share of the Finnish oil products market.

On the other hand, Finland – represented by Neste Oil sells its fuel products through a chain of gas stations in St. Petersburg and the Leningrad Region[20] and represented by Fortum holds a blocking stock portfolio in TGK-1, power generating company, which in turn exports electric power to Finland. The construction of the North-Western Heat Station in St. Petersburg was also managed by the Finnish company Fortum. Finnish engineering companies supply diesel, boilers and other power equipment, predominantly with small capacity for minor energy facilities, at the same time importing selected parts for units of Russian build. Many Finnish energy machine-building and service companies have opened their representative offices in St. Petersburg and Moscow; some have acquired small specialised Russian companies.

Another example of inter-cluster cooperation in the energy sector is the signing of a Memorandum of Understanding (MoU) on the implementation of the Kyoto Protocol mechanisms within RAO UES subsidiaries in Russia by RAO UES and Fortum Corporation. Fortum is expected to make a significant contribution to the development and introduction of these mechanisms, as it possesses a vast experience in implementing environmental projects and has been actively participating in the EU's Emissions Trading System (ETS) from 2005. This type of cooperation allows attracting additional sources of funding for the implementation of RAO UES' investment programme.

Broader cooperation in the power-engineering sector is announced in all public plans for the future. A development of export transmission lines is planned in the Northwest; a portion of these lines will be used to transmit power to Finland. The development of Shtokmanovkoye Gas Condensate Deposit in the Barents Sea includes the construction of a trunk pipeline, which is

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[19] This is evidenced by the fact that although the level of internationalisation of even medium-sized and small Finnish companies is high, only a handful of them have "dared" to start operating in Russia.

[20] It should be mentioned that Neste Oil used to participates in petroleum production on the territory of the Republic of Komi together with Lukoil, but then Lukoil bought out its 50% shares for USD 321.5 million.

highly likely to pass through the Finnish territory. Finnish companies will participate in the construction of this pipeline. Mutually important projects feature in plans for the energy machine-building sector. For example, St. Petersburg's power engineering companies incorporated in the Power Machines holding have in the recent years been commissioned to modernise a large number of hydropower plants and equipment for Loviisa nuclear power plant in Finland. On the other hand the reconstruction of the Russian electric power sector, development of low capacity power facilities, implementation of energy saving projects in industry and municipal economy open up huge opportunities for Finnish firms.

It is quite difficult to mine reliable statistics about the Russian-Finnish cooperation for a number of reasons. Some foreign trade information and analysis are presented in the part 8 of the article. In order to compensate this gap and to take better stock of prospects of further cooperation, the author has initiated a study of a number of Finnish and Russian companies, representing the most important segments of the energy clusters in Finland and in the Northwest of Russia. In the course of the research author has studied publicly available materials (publications in the press, annual reports, data from investment banks) dedicated to more than thirty energy cluster related companies and organisations. Besides this in 2003-2004 more than thirty structured and unstructured interviews (as well as questioning by e-mail) with the top managers of the companies and organisation were carried our involving such companies as Fortum, Wärtsilä, ABB, Eltel Networks, TEKES – National Technology Agency, ETLA – The Research Institute of the Finnish Economy, SITRA – National Fund for Research and Development, Enermet, Greennet, Imatra Steel, National Emergency Supply Agency, Lapeenranta University of Technology, RAO UES of Russia, Lukoil-Komi, Lukoil-Ukhtanneftepererabotka, Severnaya Neft, KINEF, Lenenergo, OMZ, Power Machines, Zvezda-Energetika, EFESK, Nevsky Zavod etc.

Given its limitations, our work cannot be said to be fully representative. Yet, the fact that we have polled the leading companies in the respective segments in the course of the study, and that interviews showed unanimity among the experts about the majority of key issues (with some variation that can be attributed to the specifics of different industries), makes it possible to claim that the results of our study are more or less true.

The results of the interviews and questionings are presented and commented below. They reflect the respondents' vision of various aspects of Russian-Finnish cooperation in the power sector. Specific answers are highlighted if they reflect the opinion of the majority of respondents. In some cases, when variation in answers was due to different natures of businesses in which respondents worked, more than one version of an answer is highlighted.

It should be noted that Finnish firms have initiated most investment and cooperation projects[21], while Russian companies, even though they declare their willingness to cooperate, came up with concrete proposals only in isolated instances. This is why the tables are based on visions of Finnish participants, on whose commitment, in author's view, the dynamics of future cooperation processes will depend. Opinions and visions of Russian companies that differ significantly from those of Finnish firms are commented on separately.

[21] See also Trofimenko O. et. al., 2003

Table 4. Use of Complementary Resources

#	Options	Today	In 5-7 [22]years
1	All important complementary resources are utilised within the framework of cooperation.		
2	Only major complementary resources are utilised within the framework of cooperation.		
3	Only major complementary resources are partially utilised within the framework of cooperation.		

All respondents expressed the opinion that objective opportunities of cooperation are far from being fully utilised at this stage. Noting the fact that the trend is on the whole positive, none of the respondents assumed that the situation would change drastically in the next 5-7 years.

Table 5. Geographic Scope of Cooperation

#	Options	Today	In 5-7 years
1	On-going and/or planned projects are targeted to enlarge the shares of Russian and Finnish participants both on the domestic and international markets.		
2	On-going and/or planned projects are targeted to conquer the all-Russian market.		
3	On-going and/or planned projects are targeted to get/increase a share on a specific Russian region or regions.		
4	On-going and/or planned projects are targeted to conquer the Finnish market primarily.		

The region named as the target market for the majority of cooperation projects is in most cases Russia as a whole, although many projects target specific regions within Russia (primarily the Northwest). The latter situation is typical above all for such companies as for instance Fortum and Eltel Networks. Having said that, we can also be sure that once the regionally focused strategies of these companies succeed, they will continue their expansion into other regions. While regionally oriented firms are awaiting entry into the national level, companies specialising in manufacturing energy equipment that have already gained a footing on the national level contemplate joining efforts and competences in order to expand to markets outside Russia and Finland.

It is interesting that representatives of multinational corporations express less enthusiasm about this prospect than representatives of Finnish firms and organisations. This demonstrates one of the important reasons for the sluggishness of cooperation processes (Table 6.), which has also been named in the course of interviews – the fact that decision making centres of many Finnish companies are located outside Finland. Managers of multinational corporations might underestimate the potential of cooperation with Russian firms, since it takes time to establish connections, hard to evaluate how well Finnish specialists know Russian conditions and how extensive their experience of cooperation with Russia is, whereas current risks are evident and the number of failed projects (or projects resulting in unforeseen difficulties) is fairly high.

Table 6. Intensity of Cooperation Projects

#	Options	Today	In 5-7 years
1	Number of new projects is increasing.		
2	New projects emerge regularly, trend is stable.		
3	New projects are stochastic depending on short-term market conjuncture.		
4	Number of new joint projects is decreasing.		

[22] This period was selected as long one enough to reflect long-term changes, but at the same time more or less forecastable.

Despite their different evaluations of today's dynamics of cooperation processes, all respondents note the positive dynamics and expect higher numbers of projects in the coming years. Also, it is expected that targeted lengths of cooperation project will increase, which will require huge efforts from both parties[23].

Table 7. Target Length of Cooperation Projects

#	Options	Today	In 5-7 years
1	Long term (>5 years)		
2	Medium term (2-5 years)		
3	Short term (<2 years)		

The results of our questionnaire can hardly be interpreted as the projected shift from short-term projects to long-term ones. Even under the positive development scenario, the number of short-term projects will definitely not decrease, but increase. These results, in all likelihood, mean a desired shift in corporate strategies of companies towards achieving a more "regular" and stable interaction within the frameworks of one or many large projects aimed at gaining long-term advantages. The efficiency of such projects will determine the outcomes of future cooperation.

The next table (Table 8) allows analysing specific directions of cooperation that seem to hold most promise for Russian and Finnish companies. The demand for Russian raw materials, which are Russia's most important export to Finland, remains consistently high. Various projects are being implemented and advanced in creating production facilities and infrastructure aimed at increasing the stability of cooperation in this sphere (Fortum's oil-loading terminal in Bronka, Porvoo oil pipe-line, Northern-European gas pipe-line, etc.). Broader cooperation in the production of goods and services with high value added can, in view of Finnish respondents, be achieved first and foremost in relation to further "penetration" of the Russian market: final assembly and adaptation of finished products for the Russian market, cooperation in marketing and distribution, provision of engineering services, management services and technical services. The latter appears to be the most fruitful area of cooperation, especially since the market for this type of services is only beginning to emerge in Russia, while leading Finnish companies have been exporting to Nordic and Baltic countries for a long time. In order to enable this type of services,

Table 8. Subject of Cooperation

(1 – the least appropriate, 3 – the most appropriate)

#	Options	Today	In 5-7 years
1	Production of final products for export	**1**	**2**
2	Production of final products for local market	**2**	**2-3**
3	Fine tuning of final products for local market, assembling	**1-2**	**2-3**
4	Production of components	**1-2**	**2**
5	Supply of raw materials and components	**3**	**3**
6	Marketing and distribution	**2**	**2-3**
7	Management, engineering and maintenance services	**1-2**	**3**
8	Fund raising (financial partnership)	**1**	**2**
9	Personnel training	**1**	**2**
10	R&D	**1**	**2**

[23] Although it is evident that a short-term project is neither better nor worse than a long-term one, long-term cooperation is traditionally associated with large investments (in the broader sense of the word) and achieving goals of more fundamental nature.

a local partner (or a subsidiary) is always called for: this partner will have the capabilities for disseminating the accumulated know-how and responding quickly to customers' inquiries. Projects of joint production of export-oriented goods, as well as cooperation in R&D and personnel training are viewed as intensive and possible. However, the possibility of such projects being implemented within the next few years is not rated as very high.

It is Finnish companies that primarily initiate projects of industrial cooperation. These projects are aimed at either capturing / expanding the share of end-use goods in the Russian market, or securing supplies of energy, raw materials or semi-finished products to Finland. At the same time all necessary prerequisites for increasing the intensity of cooperation in the field of energy machine building and provision of specialised services both to power producers and consumers are already in place. It is expected that in the next 5-7 years the absorbed cooperation experience will make it possible to realise projects aimed at increasing the share of Russian and Finnish companies in the third countries markets.

On the whole it can be stated that the Finnish companies view themselves and are seen by Russian firms primarily as "technology partners" and only in this context as a source of funding. The likelihood of financial partnerships in pure form (portfolio participation) is not rated as very high.

If we look at specific forms of cooperation between Russian and Finnish companies we should first note that they pursue to achieve stronger corporate control over subsidiaries and joint venture companies and broader alternative joint-stock forms of cooperation. The interviews that we have conducted and the analysis of results of joint Russian-Finnish projects initiated in the 90's all evidence relatively low success of alliances with Finnish firms. This has motivated a more conservative strategy towards foreign projects on behalf of Finnish companies, which is manifested in their drive to gain maximum control over the functioning of all mechanisms involved. Even those Finnish companies that now hold minority stock portfolios in Russian companies spare no effort to increase the size of these portfolios to controlling stock[24]. The only exceptions known are a few cases in which Russian companies possess the key know-how and infrastructure sites, which makes it extremely undesirable for Finnish firms to try to lower Russian stakes in the outcomes of such joint business.

The majority of respondents stated that acquiring a controlling stock in a Russian partner is one of the main alternatives of long-term work on the Russian market in the next few years, and that joint stock companies will decline in numbers. Also, an increase in the number of sales offices and service centres of Finnish companies in Russia is projected (reflecting the expected increase in marketing and distribution activities), which will provide an impetus for broader cooperation in the field of technical service (for example, entering into service agreements for maintenance work on installed equipment). Many respondents expect substantial advancement of sub-contractor relationships and various forms of non-equity cooperation (strategic alliances), in particular linking them to the prospects of multinational power engineering corporations coming to Russia and increased manufacture of licensed equipment[25]. It also appears possible that Finnish companies will establish production branches in Russia from scratch (as it happens in some other industries, for example – in telecommunications equipment – with Elcoteq), although respondents have noted that at this stage risks associated with implementing this strategy are fairly high.

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[24] A typical example is Fortum, which increased its share in TGK-1.

[25] This is because the most common claim made to Russian manufacturers is unstable quality. It is expected that this problem will be resolved by adopting quality control systems used by a respective multinational corporations.

Table 9. Forms of Cooperation

(1 – the least appropriate, 3 – the most appropriate)

#	Options	Today	In 5-7 years
1	Green field (100% FDI)	**1**	**2**
2	Acquisition of majority share	**3**	**3**
3	Acquisition of minority share	**2**	**1**
4	Majority JV	**2**	**2**
5	Minority JV	**1**	**1**
6	50-50 JV	**2**	**1**
7	Non equity wide scope alliance	**1**	**2**
8	Contractual agreement (subcontracting)	**1**	**3**
9	Licensing	**1**	**3**
10	Sales subsidiary	**2**	**3**
11	Export-import	**2-3**	**2-3**

Our analysis of interviews indicates that companies belonging to the energy clusters in Russia and Finland on the whole rather favourably asses the possibilities of furthering the cooperation between them, noting the evidence of complementary resources and needs. All respondents expect the number of projects to increase, their targeted duration to become higher, and their geographical span to broaden. The narrowness of the Finnish market, high costs and limited investment opportunities motivate the fact that Russia is viewed as a target region for joint projects implementation. If the high priority of projects aimed at developing raw material resources and electric power exports persists, projects in the filed of energy machine building and provision of specialised services both to producers and consumers of energy will become more and more attractive. Yet the negative experience of the past years, as well as a number of aspects characteristic of the Russian business environment in its current phase, shape new priorities in the forms of implementing joint projects, shifting them towards such forms that are described by high level of shareholders control. On the other hand, non-equity forms of cooperation (subcontracting, licensed production, etc.) have so far been developing rather slowly. Yet it is expected that this process will also become more active and develop faster than cooperation processes in general.

6. Driving Forces and Roadblocks to the Development of Cooperation

In order to understand the logic of further development of cooperation processes it is necessary to analyse the overall picture of opportunities and roadblocks on the way of cooperation. Geographical proximity and complementary resources form the basis of opportunities. In our research we attempted to investigate which complementary resources play a key role in the development of cooperation between the energy clusters of Northwest Russia and Finland. The results of our analysis of public sources and interviews with Russian and Finnish companies are compiled in Table 10.

Quite naturally, the list of complementary resources and needs provided herein has a number of flaws. One particular deficiency of this list is that not all listed resources and needs are equally important. It is evident that each of the points in the Table 10 is opened to a whole number of qualifications. Moreover, it is not entirely correct to place the Northwest in the header of the Table, since the all the said relates to Russia as a whole. Nevertheless, the Table, in our view, projects a correct impression as far as the potential directions of cooperation are concerned. Moreover, it supports the thesis formulated above that the target region for the imple-

Table 10. Complementary Resources and Needs of Companies in Energy Clusters of the Northwest Russia and Finland

Northwest of Russia	Finland
✓ Access to the most valuable natural resources, knowledge and experience in extraction, transportation and processing of these recourses ✓ Surplus capabilities in power generation, coupled with low costs of producing electric power	✓ Demand for external power sources
✓ Accumulated industrial and science capital in power engineering, primarily for high power energy generation, including hydro- and heat-and-power engineering, as well as nuclear power engineering ✓ Relatively inexpensive workforce	✓ Demand for competitive solutions for the national energy sector and industries ✓ The need to service equipment of Russian origin installed earlier ✓ Demand for broader production base ✓ The need to cut costs
✓ Competitive strength of a number of components and materials, for example, special steels	✓ Demand for competitive suppliers and contractors
✓ The need to implement large-scale energy-saving programs	✓ Knowledge and experience in implementing energy saving projects at both producers and consumers of power
✓ Growing demand for high-quality industrial services in the energy field	✓ Knowledge and experience in managing and servicing electric power and heat generating facilities and networks
✓ The need to resolve problems associated with energy companies' major contribution to environmental pollution	✓ Knowledge, experience and access to international financing needed to implement projects with environmental value-added
The need to adapt to new management, marketing and innovation management technologies	✓ Knowledge and experience in international management, including innovation management, and marketing
✓ The need to explore new methods of operating in competitive energy market	✓ Knowledge and experience in production and distribution of power in competitive market environment
✓ The need to use independent energy sources for industry and municipal economies in areas where there are no centralised power provision systems, or where such systems are of low quality, as well as in areas where it becomes economically feasible to do so.	✓ Knowledge and experience in the development of small-scale distributed power solutions and systems
✓ The need to achieve deeper oil refining and broaden the range of high-value-added oil products	✓ Knowledge and experience in refining sour crude Russian oil and development, production and distribution of high-grade oil products
✓ Demand for new competitive solutions in the field of industrial energy	✓ Competitive edge in the field of production of specialised energy equipment for different industries of industry
✓ Demand for technology and financial partners to implement large projects – both in the field of extraction of natural resources and in technological modernisation	✓ Strategic interests in the Russian power sector, good access to international financial markets, global-scale competitiveness of a number of critical technologies
✓ Demand for scientific and technical cooperation in order to accelerate the production of new goods and broaden their ranges ✓ The need to expand into new markets ✓ Favourable conditions for establishing a common energy market ✓ Common environmental interests	

mentation of joint projects is Russia, and not any other country, which follows directly from the nature of specific complementary resources[26].

An entry of a big Finnish company to Russia will make it highly probable that the presence of its main suppliers on the Russian market will also become larger. Thus, as an example, the announcement of Fortum's strategic plans respecting Lenenergo (presently TGK-1) has immediately boosted interest in Russian projects among a number of Finnish firms. In addition, as it was stated in the previous chapter, if a foreign player buys a Russian firm, this will in general facilitate the broadening of contacts of this specific Russian company with foreign buyers and suppliers. Finnish companies may be the first to utilise this window of opportunity.

Also, any large industrial construction project will result in the demand for creating a system of power supply; therefore such projects also fall within the area of commercial interest of Finnish energy machine building and service companies. For example, Wärtsilä closely follows new projects in the field of oil and gas development, since this company specialises in small diesel power plants which, as a rule, are used in this type of project. Finnish energy technologies and equipment for timber and pulp and paper industry, metallurgy, housing and communal services are also highly competitive, and, in author's view, their involvement in the Northwest Russia will also become greater.

Russia's joining the WTO and fulfilment of commitments of Kyoto Protocol will also make the Russian market more attractive for Finnish firms that specialise in producing goods and providing services in the power sector, thus strengthening and broadening forms of cooperation between the two clusters[27].

Nevertheless, despite considerable opportunities, the intensity of cooperation between the energy clusters of Russia and Finland remains relatively low today. This evidences serious barriers to cooperation, which cannot be attributed just to immaturity or narrowness of the market.

It appears from the results of the interviews that to Finnish companies, positioned to cooperate with large Russian partners, barriers arising from the quality of business environment in Russia are more important, whereas companies positioning themselves to deal with smaller partners view barriers related to Russian companies' strategies and management practices as major obstacles. From the point of view of Finnish participants of the interview the most significant barriers to cooperation are gaps in legislation which create the situation of uncertainty (and, consequently, risks) about a whole number of aspects (investment protection, reform of the energy sector, land reform, access to natural resources, tax legislation, etc.), inefficient administrative standards that result in waste of time (difficulties related to obtaining various permits – whether to build a plant or get a multiple-entry visa, shortage of staff speaking English and manuals available in English), immature marker institutions, instability of the financial system. An important, although not a principal barrier, is the need to make adaptations to Finnish products in order for them to meet Russian technological standards. It noteworthy that, quite in con-

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[26] It is very important to note separately that there are also clear prerequisites for increasing presence of the Russian companies in Finnish energy sector. It is related to the growing dependence of Finland from energy the Russian supplies, which inevitably ties Finland to the Russia's energy policy. Some experts argue that in order to secure the predictability, reasonable conditions and stable development of the Russian energy export to Finland, the latter should provide strategic incentives to the Russian energy suppliers. Among such incentives they mention first of all a sale of a share in the leading Finnish energy firms, such as Fortum Oil and Gasum, to some large Russian players, for instance correspondingly Lukoil, Surgutneftegas or Rosneft and Gazprom, for which this strategic partnership could be very valuable. We also believe that it is highly probable that RAO Nordic will develop fast through organic growth. This is a very politically sensitive issue, but there are clear economic reasons behind these developments, which hopefully will win. (See more about this issue in Vahtra, P. & Lorentz, 2004 and the author's doctoral thesis)

[27] See more about these issues the author's thesis

tradiction to the prevalent view, only a handful of respondents named corruption in power circles as a major roadblock to cooperation.

Practically all respondents mentioned non-transparency and low standards of corporate governance as major obstacles both to deals in acquiring companies and developing other types of partnerships. Numerous tax optimisation arrangements (for example, using small companies and registering top-managers in offshore companies to minimise social tax payments)[28], along with downright illegal schemes (for example, overstating cost price by using "buffer" suppliers, or lowering the earnings by arranging sales through offshore traders), secretiveness and frequently the existence of off-the-record interior hierarchy among shareholders in a company, high dependence of company's sales on top-managers' personal connections with highly placed officials, etc. – all of this does not, on the one hand, allow foreign companies to gather and process information about potential partners, and on the other hand makes risks associated with this type of partnerships extremely high[29]. The absence of long-term vision of business development and business plans, insufficient skills in international management, poor economic knowledge (for instance, in such areas as forecasting, budgeting and company valuation), as well as the language barrier, are major obstructions to establishing international ties.

A summary analysis of the results of our study of these barriers is presented in Table 11.

Table 11. Impediments for cooperation from the point of view of the Finnish firms

(1 – the least appropriate, 3 – the most appropriate)

Barrier	Significance
1. Internal	
1.1. Low transferability of strategic advantage	**1**
1.2 Lack of internationalisation strategy	**1**
1.3 Lack of international management skills	**1-2**
1.4 Risk aversion	**2-3**
1.5 High costs of financing	**2**
2. External	
2.1 Political stability	**2**
2.2 Legal system: corporate law, competition, labour, IPR, advertising	**3**
2.3 Rigid, inefficient institutions	**2-3**
2.4 Financial system	**2-3**
2.5 Administrative standards, corruption	**2**
2.6 Tariff barriers, custom duties	**2-3**
2.7 Non tariff barriers: quotas, licences, certification	**1-2**
2.9 Regulation of inward FDI	**2**
2.10 Technology standards and product localisation costs	**1-2**
2.11 General costs: business establishing, raw materials, labour, tax	**2**
2.12 Availability and quality of HR: education, working standards	**1-2**
2.13 Low transparency and low quality of corporate governance	**3**
2.14 Cultural differences (language, history, tastes, religion)	**2**

On the whole, if we compare the results of interviews with Russian and Finnish participants, we can draw the conclusion that Finnish companies assign major importance to external barriers, whereas to Russian companies internal barriers generally appear more important.

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[28] It should be noted in this respect that the outcomes of "the YUKOS Case" evidence the trend towards tougher tax regulation, and suggest that what used to be "blameless" arrangements for tax optimisation in the past is now interpreted as tax crimes.

[29] Here we are discussing primarily small- and medium-sized companies. Yet there is not a single large company in which all the listed characteristics would not be inherent in some measure.

In addition to the said barriers there are others that may be hard to formalise, but which have been a serious influence, especially in the past few years. A whole range of various uncertainties arising from the development of the Russian economy in unstable world market conditions, various aspects of Russia's foreign relationships and so forth can be listed among these factors.

Elaborating on this thesis, many researchers specifically note that that the modern generation of the Finnish youth, which is now about to graduate or have recently graduated from universities, are oriented primarily towards the European Union which is supposed to serve as the motor of economic and political growth of their country and the main source of their own carrier growth, while their interest in Finnish-Russian relations is rather low. According to experts, the "EU generation" will attain key positions in the Finnish economy in the next 15-20 years, and unless Russia and Finland arrange efficient cooperation by then, the cooperation drive and some specific knowledge about Russia accumulated by more senior generations may be lost to some extent.

7. Will Russia Benefit from the Cooperation?

Carrying out the Russian part of the research and while discussing the first results with Russian scientists the author was very often asked if he analysed the consequences of the described internationalisation process for the Northwest Russian energy cluster and the regional economy as a whole. It became clear that a big part of business and academic community in Russia hardly believe in win-win outcome of cooperation[30]. This caution does not relate specifically to Finnish investments but rather typical for perception of any foreign investments and business activities[31].

To fill in this very sensitive gap we reviewed the benefits and disadvantages for Northwest Russian cluster generated if possible significant intensification of cooperation between it and the Finnish energy cluster takes place under scenarios discussed above.

Of course given than the energy cluster of the Northwest Russia and that of Finland have their own SWOT balances, it can be assumed that deepening integration would not necessarily be equally beneficial for both parties. In particular, as one development scenario we can assume that the more organised, competitive and technologically advanced Finnish cluster will actively expand the business and acquire local players in order to gradually take the lead in the energy cluster of the Northwest Russia, at least in its mechanical engineering segment. For the Russian cluster this scenario is not necessarily a dark one: everything depends on advantages and disadvantages created by this process.

Positive and negative impacts of internationalisation should be viewed from the point of building competitiveness of the cluster, in other words in terms of long-term labour productivity in cluster's companies and organisations, and resulting increases in the communities' standards of living as whole.

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[30] We are pretty sure that the same sort of discussion will be raised in Finland if to touch upon the question of partial sale of Fortum Oil to Lukoil or Surgutneftegas, or increase of Gazprom's share in Gazum.

[31] In opposite in Finland the Russian origin of an investor might cause the problem, irrespectively the potential economic benefits of the deal.

Due to the complexity of this issue, positive and negative consequences are fairly probabilistic in nature, and at this stage it is more advisable to discuss opportunities and threats rather than pluses and minuses. The key opportunities and threats for the energy cluster of the Northwest Russia arising from strengthening of internationalisation processes[32], are brought together in Table 12. They are classified according to the blocks of the "Diamond" model.

Table 12. Opportunities and Threats for Competitiveness of the Northwest Russian Energy Cluster Arising from Intensification of its Internationalisation

Group of factors	Opportunities	Threats
Factors	✓ Development of applied science ✓ Development and increase in education standards ✓ Development of joined infrastructure projects ✓ Increased efficiency of labour force	✓ Drain of specialists and technologies ✓ Science and education focusing solely on applied aspects, traditional "schools" disappear, long-term potential shrinking
Demand	✓ Meeting domestic demand for products and services ✓ Broader opportunities for supplying to more exacting export demand ✓ More segments in which the cluster's products are competitive	✓ Gaining control over the client base of Russian companies inside the country and abroad, and moving profit centres outside of Russia, or replacement of Russian products with imports
Strategy, Structure and Competition	✓ Formulating longer-term and more ambitious strategies ✓ Business consolidation ✓ Development of competition and cooperation ✓ Increased investment ✓ More active innovation ✓ Unification of technology, product and service standards	✓ Lower competition in a number of segments as a result of market partition ✓ Russian companies being reduced to the role of subcontractors of foreign companies, loss of target markets, increased dependency on foreign customers ✓ Supplanting of Russian standards
Linked and auxiliary branches	✓ Development of related and supporting industries, primarily the sector of industrial services, and stronger competition inside them ✓ Strengthening of inter-industry cooperation	✓ Supplanting of small and medium-sized Russian companies operating in related industries, replacement of domestic production with imports
State	✓ Adaptation of efficient regulation experience ✓ Coordinated policies aimed at lowering transboundary barriers ✓ Joined investments in infrastructure	✓ Increased contradictions about regulation ✓ The risk of altering political relationships and, as a result, decline of business activity in the cluster
International business activity	✓ Strengthening of the cluster's role of global gateway, inclusion in international value systems ✓ Increased attractiveness of the region for international direct and portfolio investment	✓ Loss of the cluster's self-identity on the international market as a result of loss of independence and subsequent decline of investment attractiveness of local companies

The threats of internationalisation for the Finnish cluster are, primarily, in overall higher dependency on supplies of Russian energy resources, as well as in the risk of slower growth of operational efficiency of energy companies[33], the latter being an important prerequisite to the Finnish industry staying competitive as a whole.

[32] What is meant here is first and foremost increased cooperation with the energy cluster of Finland, but not by any means limited to this specific cluster.

[33] We are discussing, in this respect, primarily the scenario of Russian players with access to inexpensive energy resources and, consequently, fewer stimuli for investing in increased efficiency, acquiring Finnish energy companies.

Although it is impossible to evaluate the probability of these opportunities and threats becoming reality, it is the author's view that positive consequences of internationalisation by far 'outweigh' the possible risks, and thus internationalisation in so far as the researched clusters are concerned is a positive trend.

8. Brief Statistical Analysis of Internationalisation of Russian and Finnish Energy Clusters

It is unfortunate that it is fairly difficult to reliably illustrate the experience that has been acquired relying solely on available statistics. This is a result of various shortcomings and limitations of both Russian and Finnish statistics. In particular, it is impossible to separate data for the Northwest from those for the entire Russia, account for transactions booked through offshore companies, take stock of acquisitions made by nominal shareholders, finally, impossible to be sure that services related to the energy sector have not also been registered under other headers, such as "capital construction", or booked as equipment costs, etc. In this situation accidental errors considerably distort the real situation. The following are examples of how unreliable statistics can be: import and export figures, featuring in the Finnish and the Russian statistics for the same positions (i.e. corresponding to the same articles of the HS classification) differ by 30%-300%, while numbers representing foreign investment made by Finland in Russia are not reflected at all in the electric power statistics, although Fortum's position in TGK-1 is a common knowledge.

Nevertheless, in order to try to construct a complete picture, the author has viewed the current situation through the prism of statistics, namely statistical data for trade in energy-related goods, as well as foreign investment in industries connected to the power sector.

In 2005 Russia exported over USD 4 billion worth of energy resources to Finland. In this total petroleum sales accounted for 69%, electric power exports to 10% and oil products sales to 16%. The dynamics and structure of Russian energy exports to Finland have been changing during the said period, but the overall volume increased 3.3 times (in then-current prices) between 1997 and 2005.

It should be noted that on the whole Russia continues to play the role of Finland's main energy supplier. Over the reviewed period Russia's share in Finnish imports of oil, coal, gas and electricity increased up to 51% of total imports to Finland. At the same time an interesting trend is Finland's growing stake in aggregate cost of Russia's imports of oil products. The Finnish export of energy resources to Russia consists virtually 100% of oil products, which reached USD 131 million in 2005. On the whole, Finland's share of the Russian oil products import went up from 7.6% in 1997 to 50% in 2005.

A more balanced and stable structure of Finnish export as compared to the Russian one is clearly discernable in the composition of power equipment and electro-technical equipment trade. Finish exports to Russia reached the highest in 1997, whereas for Russian exports of similar equipment the 'best' year was 2001. In 2005 Russia's export of power units and electro-technical equipment to Finland reached USD 38.1 million, of which just two commodity groups – electric cables and equipment for electric grids – amounted to 72% of the total. Finnish exports of energy and electric power equipment to Russia in the same year amounted to USD 153.6 million and consisted in a whole range of commodity groups: electric cables, steam-boilers, equipment for electric grids, central heating boilers, etc.

Table 13. Russian Export/Import of Mineral Fuels, Oils and Distillation Products to/from Finland , USD thousand

# HS 2002	*Article*	1997		1998		1999		2000		2001		2002		2003		2004		2005	
		Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
2709	Petroleum oils, oils from bituminous minerals, crude	207349	50,2	123441,3	44,7	218069,7	17	361228,3	-	324305,6	-	665135,3	-	1097336,3	-	1943565,3	-	2792990,7	-
2710	Oils petroleum, bituminous, distillates, except crude	537533,4	77983	167302,2	76908,9	206826,8	26920,1	245339,7	23360,8	352044,3	32177,7	192528,8	37755,1	284708,5	73095,3	258310,8	92094,7	632456,6	131561,1
2711	Petroleum gases and other gaseous hydrocarbons	363920,2	3,7	391181,7	4,3	272207,4	0,519	421725,3	4,5	465780,3	4,5	425077,1	-	601386,9	1,6	18127,3	10,3	45531,8	0,0
2701	Coal, briquettes, ovoids etc, made from coal	19233,1	0,5	7121,9	-	17460,1	1,9	29373,8	4,5	69066,4	4,5	58795,7	-	115562,8	-	165637,5	2,4	188805,7	-
2716	Electrical energy	92469,2	128,5	113212,2	152,3	108746,1	68,6	71426,048	87	115625,8	88,8	145611,3	125,9	300428,4	210,8	301755,0	236,9	394193,6	246,2
Total		1220504,9	78165,9	802259,3	77110,2	823310,1	27008,119	1129093,1	23456,8	1326822,4	32275,5	1487148,2	37881	2399422,9	73307,7	2687395,9	92344,2	4053978,4	131807,4

Source: UN Statistics, Comtrade 2006

Table 14 Russian Export/Import of Energy and Electric Power Related Equipment to/from Finland , USD thousand

# HS 2002	*Article*	1997		1998		1999		2000		2001		2002		2003		2004		2005	
		Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
8401	Nuclear reactors, fuel elements, isotope separators	22207,8	-	23509,8	-	25853,3	-	-	-	8385	-	9666	-	9666	-	13653,0	-	14439,0	36,8
8402	Steam/vapour generating boiler(except central heating)	254,6	18261,6	154,8	5033	-	8859,3	-	4428,2	-	12149,1	263,2	4222,4	-	9385,6	9,6	3568,9	-	10310,7
8403	Central heating boilers except steam generators	-	14574,1	18,6	5120	-	2810	-	1735,8	1,8	6795,4	-	4572	-	3429,5	-	3239,3	-	2662,4
8405	Producer, water and acetylene gas generators	255,1	179,3	428,1	35,4	2	2,9	-	9,8	-	837,3	-	19,6	-	140,9	-	1,6	-	-
8406	Steam turbines and other vapour turbines	44,6	67,8	6,4	240,3	471,2	56,9	3917,6	68,8	52	68,8	144,5	342,6	38,3	784,4	107,4	80,3	88,1	158,8
8414	Air, vacuum pumps, compressors, ventilating fans, etc	124,3	9183,7	76,2	6636,6	170,7	4080,4	88,9	4516,3	1212,6	4808,1	24,6	4378,8	-	6529,7	119,8	2486,5	156,5	4833,3
8411	Turbo-jets, turbo-propellers/other gas turbine engines		10,8		58,1					1,3	4,6		2,3		41,8		12,0	165,0	19,8
8413	Pumps for liquids	58,1	11014,7	72,6	7541,2	70,4	7172,1	840,3	4441,9	1638,8	5985,2	563,4	8155	254	7093,3	127,5	8421,1	277,9	13344,8
8416	Furnace burners, equipment, liquid, powder or gas fuel	-	1276	15,5	1616,1	-	1057,8	897,2	1064	-	2518,4	-	3050,3	8,7	1105,7	8,6	151,2	148,5	2013,9
8536	Electrical switches, connectors, etc, for < 1kV	119,8	4346,2	104,1	2948,1	125	3055,3	1911,6	2221,4	1408,6	4186,5	745,6	5210,3	6731,9	5855,8	8192,2	7376,1	8398,4	9079,0
8537	Electrical power, etc, control and distribution boards	48,9	10993	42,4	8127,9	78,8	8664,5	43,2	7260,4	120,2	9509,8	52,9	16666,9	325,7	30497,1	1239,2	22616,6	766,1	62180,4
8544	Insulated wire and cable, optical fibre cable	3615,6	15378,2	4652,2	20128,7	17567,6	13291,4	16825,9	14097,9	10641,1	15041,1	14108,1	17336,6	16396,7	17731,5	14364,8	34352,7	13619,5	48993,8
Total		69704,8	345570,7	48002,6	261069,3	45170	49050,6	88094,6	39844,4	163233,5	61909,4	26768,1	63985,4	33483,8	82565,3	37822,1	82306,121	38059,143	153633,82

Source: UN Statistics, Comtrade 2006

Looking at the importance of Russian exports of energy and electro-technical equipment to Finland we arrive at the conclusion that these exports are fairly stochastic in nature. In all likelihood this is because Russian exports consist predominantly in isolated large supplies to a limited circle of large industrial consumers. Due to the limited size of the market sales drop to zero in some years. We should also note in this respect the declining competitive strength of Russian goods, especially as effects of the Rouble devaluation zero out.

Finnish exporters of energy and electro-technical equipment, on the other hand, initially direct their efforts towards relatively smaller deliveries to by far more numerous consumers in the 'middle' segment of the market, which is why their share of the Russian market experiences much lower fluctuations from year to year.

Statistics on foreign investments in Russia made from Finland appears to be the least reliable and the most controversial source of information, but if we want a complete picture of the situation we should also look into these figures as well. As it appears from data presented in Tables 15 and 16, Finnish companies have not been making any large investments in the Russian power industry (whereas in fact these investments are much higher), have been investing in petroleum production (Fortum) and have a small cumulative investment in the peat industry. Unfortunately, these statistical data do not show investments in sub-branches of the engineering industry separately, but we can surmise that the large cumulative volume of Finnish investment in the engineering industry consists in part of investments in the production of energy and electro-technical equipment.

Russian statistics shows the cumulative Russian investment in the Finnish electric power industry in the amount of USD 15.2 million as of the beginning of 2005, and does not have any information about Russian investments in Finnish fuel and engineering industries.

As a result our analysis of statistics indicated that today cooperation between the energy clusters of the Northwest and Finland grows in hydrocarbons trade and fluctuate greatly for other positions. It should be said that Finnish exports into Russia are on the whole more stable than Russian exports into Finland. It is also noteworthy that some types of trans-border cooperation have been noted practically across all energy-related sectors (electric power, petroleum production, peat extraction and processing, construction of power facilities, municipal power and power-saving, production and distribution of energy equipment, etc.) and across all forms of cooperation – trade in goods, trade in intellectual property, foreign investment[34]. The said fact can be seen as a proof that cooperation processes can be furthered within the cluster model of interaction.

[34] Those specifically interested in the statistics collected in the course of the project are advised to familiarize themselves with doctoral thesis of the author in St. Petersburg State University.

Table 15. Finnish Investments into Russia by Sectors, USD thousand

	1999	2000	2001	2002	2003	2004	2005
	Accumulated at beginning of the year	Accumulated at beginning of the year	Accumulated at beginning of the year	Accumulated at beginning of the year	Accumulated at beginning of the year	Accumulated at beginning of the year	Accumulated at beginning of the year
Electricity	5,8	5,0	1284,8	1195,9	1222,4	5345,7	10102,8
Fuel	16574,6	9686,0	10759,1	63,4	205219,3	382334,7	308898,3
- Oil production	16511,2	9622,6	10695,7	-	205155,9	382334,7	308898,3
- Peat extraction	63,4	63,4	63,4	63,4	63,4	63,4	63,4
Machine building*	29103,1	21451,3	20921,3	20754,4	22969,0	27710,9	26800,2

** Machine building and metal working in total*

Source: Russian Agency on Statistics, 2006

Table 16. Finnish Direct Investments into Russia by Sectors, USD thousand

	1999	2000	2001	2002	2003	2004	2005
	Accumulated at beginning of the year	Accumulated at beginning of the year	Accumulated at beginning of the year	Accumulated at beginning of the year	Accumulated at beginning of the year	Accumulated at beginning of the year	Accumulated at beginning of the year
Electricity	4,1	3,6	3,5	3,3	3,3	3,7	3,5
Fuel	6574,6	9686,0	10759,1	63,4	53219,3	182334,7	133898,3
- Oil production	6511,2	9622,6	10695,7	-	53155,9	182334,7	133898,3
- Peat extraction	63,4	63,4	63,4	63,4	63,4	63,4	63,4
Machine building*	21146,1	21351,3	20470,9	20404,0	22612,0	25443,1	15472,0

** Machine building and metal working in total*

Source: Russian Agency on Statistics, 2006

9. Conclusions

This research is only first and short step in studying the issues of internationalisation of the clusters, and many theoretical and field studies are needed to get a comprehensive picture of this phenomenon. Nevertheless the results of the carried out study of cooperation of the Finnish and the Russian Northwest energy clusters already give us some ground to state that on the whole the empirical data confirms the theoretical premises formulated in section 2. We can point out the following major conclusions:

1. The study has confirmed that as a result of the clusters focusing on similar value systems, their internationalisation even as we speak covers a broad spectrum of industrial sectors (electric power, oil extraction, peat extraction and processing, construction of energy-related sites, municipal power supply systems and energy-saving mechanisms, the production and distribution of energy equipment, etc.) and formats (trade in goods, services, intellectual property trade and foreign investment).
2. The study has confirmed our assumption that the initiative for inter-cluster cooperation will in the future come primarily from clusters with more developed cluster relationships, while cooperation will focus on regions and industries that provide broader opportunities for managing the value system as a whole. The study has indicated that Finnish companies in the overwhelming majority of cases acts as initiators of cooperation, while joint projects are primarily implemented on the Russian territory.
3. Our study has confirmed the thesis that the internationalisation of geographically adjacent clusters is usually characterised by fewer incentives for large-scale direct investment in production and relatively many arguments in favour of various forms of production cooperation, export and import of goods and services.
4. Our research has indicated that the fact that participants in cooperation on both sides are not individual companies but rather neighbouring clusters provides an important argument for rating the potential efficiency of joint projects initiated by Russian and Finnish companies higher.
5. The study has indicated that Finnish firms are interested not in just the growing Russian market, but also in such assets as accumulated knowledge and technologies, inexpensive qualified workforce and innovation potential, the preservation and growth of which in long-term perspective is only possible if the cluster as a whole continues to develop.
6. The research has identified a whole set of positive externalities characteristic of the researched clusters, which favourably impact the development of cooperation even at this stage, and facilitate the establishment of new business models of cooperation. The following can be mentioned among such positive externalities: relatively low costs and high efficiency of maintenance (warranty) service, economies of scale and coverage achieved by serving geographically adjacent clients, the development of just-in-time deliveries, savings achieved by specialization of companies and labour division, the development of locally oriented applied science and education, and dissemination of knowledge through informal exchange of information in the course of a large number of interpersonal contacts. In the future joint investment in infrastructure, increasing lobbying power and wider access to foreign markets of the clusters' firms might create another set of positive externalities.

Our analysis therefore speaks for a vast number of potential projects of Russian-Finnish cooperation, the potential of implementing which is understood by many market players. As the barriers to cooperation are removed, the intensity of cooperation processes between companies in the energy clusters of the Northwest Russia and Finland will increase at high rates. Given all the complementary resources mentioned in our work, we have good grounds to expect further development of trade in the future, as well as considerable broadening of trans-border cooperation, increase in the inflow of direct Finnish investment in Russia and much higher flows of workforce in both directions. According to the experts polled, if the relatively optimistic development scenario comes true, a whole number of Finnish-Russian innovations can emerge in the next 5 to 7 years in the fields of energy, while industrial cooperation and bilateral trade in various groups of merchandise may become a competitive advantage to both countries as far as exports to third countries are concerned. Furthermore, Finland and Russia may be able to make a giant step towards integrating their energy supply systems. Trail-up and tuning in Russian conditions, as well as achieving the economies of scale, may turn Russia into a launching pad for the expansion of Finnish power technologies and specialised services into member-states of CIS, led by Russian managers and experts. At the same time we predict strengthening of the role of large Russian oil, gas and electric power producing companies in Finland as a result of a few but sound acquisitions and green fields.

Despite all these very optimistic conclusions it is important to note that the authors were not able to find any undisputable quantitative arguments confirming that the cooperation between companies in the energy clusters of the Northwest Russia and Finland grows at a steady rate. In the authors' view this can be attributed to, on the one hand, low quality of statistics (as discussed in section 5), and to a whole range of barriers on the other, which hinder the development of cooperation, such as chiefly the fact that reforms in the electric power sector and housing and communal services keep 'dragging their feet', as well as bad investment climate in the period of market reforms. Since the real start signal for these reforms was given relatively short time ago, and since it coincided with improved investment climate in Russia, the energising of negotiations on Russia's joining the WTO, fulfilment of obligations under the Kyoto Protocol, growing solvent demand, and, in many respects, changed motivation of owners and managers of Russian companies, an upsurge of interest in Russia was observed in the past few years across practically all segments of the Finnish energy cluster. And even if this interest can be evaluated only in qualitative terms at present, it is our view that it will find its reflection in official statistics already in the next few years.

Given the fact that there are several developed clusters in the Russian Northwest and Finland, the resources and products of which are in many respects complement to each other (forestry cluster, information and telecommunications technology cluster, construction, construction materials and real estate cluster), many results and conclusions of our study relating to the energy sector may have broader application. Extrapolating our findings to a number of other clusters makes it possible to conclude that there are prerequisites for a sizeable increase of the role of Finnish companies in the economy of the Northwest in the next few years, just as for establishing stable forms of cooperation between Russian and Finnish firms. The development of cooperation will contribute to the deepening of regional technological specialisation, growth of economic interdependency between the Northwest Russia and Finland, as well as the strengthening of economic convergence processes.

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