Research of High-Tech Businesses of the Krasnoyarsk Territory for Structural Changes in the Economic System of the Raw Material Region

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Abstract. The article considers the results of research of enterprises in the high-tech sector of the economy of the Krasnoyarsk territory in order to form a portfolio of high-tech innovative businesses for further identification of the potential of promising commodity markets, which will contribute to structural changes in the economic system of the region. The study identified the existing product range of these enterprises, as well as new and innovative products planned for production, and identified the main markets for these products – both internal and external. The list of import-substituting products from both the existing and updated assortment is defined. The list of problems that companies currently face in terms of sales and promotion of products to international commodity markets, which relate to both the cost of transportation, certification, market research, etc., and the degree of trust in foreign contractors, is defined. The experience of companies receiving various types of state support, both regional and Federal – financial, consulting, property and other types. Also identified are the main problems that companies face when receiving such support, including issues of cost co-financing, the complexity of processing a large number of documents, multi-stage competitions for obtaining support, communication barriers, and other problems.

1. Introduction
The export-raw material orientation of the economy of the Krasnoyarsk territory with a high degree of wear and tear of production capacities of industrial enterprises requires rapid diversification by identifying and developing promising regional commodity markets [1, 2, 3]. The importance of this diversification is associated on the one hand with ensuring national security through the formation of access to necessary goods and services for the population, business and the state, on the other hand, with the need to integrate the country into the world commodity markets in order to increase the competitiveness of its economy and create conditions for sustainable socio-economic development [4, 5].

2. Research problem
In connection with the above, a study of industrial enterprises of the Krasnoyarsk territory, namely the high-tech sector of the economy, was conducted in order to form a portfolio of high-tech innovative businesses for further identification of the potential of promising commodity markets, which will contribute to structural changes in the economic system of the region.
3. Methodology
To form a portfolio of high-tech innovative businesses for structural changes in the economic system of the Krasnoyarsk territory, a survey of industrial enterprises in the region related to the manufacturing industry was conducted. The sample size was 35 enterprises. Main tasks of the survey:
- identification of the main types of products and main consumer industries;
- study of export potential and problems in promoting products to international markets;
- study of new product release plans and relevant consumers;
- study of plans for the development of innovative high-tech products and relevant consumers;
- research on the issue of enterprises applying for state support.

4. Research result
In the structure of “All-Russian classifier of types of economic activity” enterprises, 36% is accounted for "production of computers, electronic and optical products", about 30% - for "production of machinery and equipment", 14% - for "production of electrical equipment" and "production of other vehicles and equipment", namely:

1. Production of computers, electronic and optical products:
   - production of antennas, antenna reflectors of all types and their parts;
   - production of radio and television transmitting equipment;
   - production of instruments and devices for measuring, testing and navigation;
   - manufacture of radar, radio navigation and remote control equipment;
   - manufacture of devices for monitoring other physical quantities.

2. Production of electrical equipment:
   - production of electric motors, electric generators and transformers;
   - manufacture of electric lamps and lighting equipment.

3. Production of machinery and equipment not included in other groupings:
   - production of engines and turbines other than aircraft, automobile and motorcycle engines
   - production of Intercontinental ballistic missiles;
   - production of machinery and equipment for metallurgy;
   - production of machinery and equipment for mining and construction.

4. Production of other vehicles and equipment:
   - provision of services for the restoration and equipping (completion) of railway locomotives;
   - manufacture of automatic space vehicles.

5. Production of other finished products:
   - manufacture of medical instruments and equipment.

According to the scale of activity, the enterprises were divided into small – 71% and large-29%, respectively.

The maximum share of 100% in the assortment of enterprises falls respectively on those types of products that they have been producing for a long time, but the majority of respondents indicated that they are engaged in the introduction of both new products and innovative ones.

On the issue of exporting existing products, 64% of respondents noted that they supply products to the domestic market, and 36% of respondents noted that they supply their products abroad in addition to the domestic market.

Table 1 shows the countries to which the Respondent enterprises export their products by type of activity.
Table 1. Countries of export of existing products by type of enterprise activity [6].

| All-Russian classifier of types of economic activity | Country of export |
|-----------------------------------------------------|-------------------|
| 26.30.17 Production of radio and television transmitting equipment | Kazakhstan, China |
| 26.30.4 Manufacture of antennas, antenna reflectors of all types and their parts | Belarus, Armenia, Kazakhstan |
| 28.91 Manufacture of machinery and equipment for metallurgy | Kazakhstan, Armenia, Great Britain |
| 28.92 Manufacture of machinery and equipment for mining and construction | Kazakhstan, Slovakia, Estonia, Angola |
| 30.41 Production of automatic spacecraft | Ukraine |

43% of enterprises-respondents noted that they plan to expand sales markets for existing products in the near future. Potential export countries of existing products by type of enterprise activity are presented below:

- 26.30.17 Production of radio and television transmitting equipment - Uzbekistan, Vietnam, Mongolia.
- 26.30.4 Production of antennas, antenna reflectors of all types and their parts - member Countries of Intersputnik.
- 26.51 Production of instruments and instruments for measuring, testing and navigation - EU, South-East Asian countries, Africa, South and Central America, Arab countries.
- 27.40 Manufacture of electric lamps and lighting equipment - CIS Countries.
- 28.92 Production of machinery and equipment for mining and construction - African Countries: Algeria, Botswana, Ethiopia, Gabon, Ghana, Guinea, Mozambique, South Africa, Namibia, Nigeria, Zambia, Zimbabwe; Asian countries: Vietnam, Laos, Cambodia, India, Myanmar, Malaysia, Thailand, Indonesia; Eastern European countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Poland, Republic of Kosovo, Romania, Serbia, Slovakia, Slovenia, Montenegro.
- 30.30.41 production of automatic spacecraft - countries of the Near, Middle and Far East, EU countries

On the issue of production of new products (updating the assortment), 71% of enterprises-respondents stated that they are already engaged in the production of new products or only plan to. In addition, as part of the expansion of the range, 90% of enterprises noted that their new products are classified as import-substituting, including by type of activity:

1. Production of radio and television transmitting equipment - mine head radio light with functions of emergency notification, search, positioning, methane sensor, pager and SOS button.
2. Production of antennas, antenna reflectors of all types and their parts - satellite modem YAR-7272.
3. Production of radar, radio navigation equipment and remote control radio equipment - an electric remote control device installed on any standard locking devices (valves).
4. Production of electric lamps and lighting equipment - 3D printer.
5. Production of machinery and equipment for mining and construction - timber grabs for front-end loaders with a load capacity of 3-5 tons.
6. Production of machinery and equipment for metallurgy - installation of refining of aluminum alloys, installation of casting of non-ferrous metals in an electromagnetic mold.
7. Production of engines and turbines, except for aviation, automobile and motorcycle engines - a long-range water blowing device for cleaning the heating surfaces of power boilers from slag deposits.
8. Production of automatic space vehicles - space vehicles, platforms of space vehicles and modules of payloads, systems (subsystems) of space vehicles (onboard radio-electronic equipment, Electromechanical devices, antennas, and antenna-feeder devices).

In addition, 90% of enterprises (among those who plan to update the range) noted that they plan to export new products. Export countries are presented by type of activity as follows:
- 26.30.17 Production of radio and television transmitting equipment-Kazakhstan, Uzbekistan, China, Vietnam, Mongolia.
- 26.30.4 Production of antennas, antenna reflectors of all types and their parts - Intersputnik member Countries
- 26.51 Production of instruments and instruments for measuring, testing and navigation-EU, South-East Asian countries, Africa, South and Central American countries, Arab countries.
- 26.51.2 Manufacture of radar, radio navigation and remote control equipment-countries not specified.
- 27.40 Manufacture of electric lamps and lighting equipment of the country does not have.
- 28.91 production of machinery and equipment for metallurgy-UAE, Saudi Arabia
- 30.30.41 production of automatic spacecraft-countries not specified.

Regarding the development of innovative products, 71% of enterprises indicated that they are engaged in the development and (or) launch of innovative products.

The survey revealed more than 16 names of innovative products that Respondent companies are currently developing. And more than half of them are at the stage of launching into production, namely:
- The Radius-3 system, whose seismic communication channel allows you to transmit emergency signals from underground workings to the earth's surface during an accident, when all communications are destroyed, at a speed of 10 characters per minute;
  - Conveyor protective complex;
  - 3D printer;
  - Side dumps for light and heavy graders;
  - Long range water blowing device for cleaning the heating surfaces of power boilers from slag deposits;
- Spacecraft, spacecraft platforms and payload modules, spacecraft systems (subsystems) (avionics, electromechanical devices, antennas and antenna-feeder devices);
  - A lower-limb prosthesis;
  - Upper limb prostheses.

Among the surveyed enterprises, about 57% face problems in selling products to the foreign market. The main problems of promotion to the foreign market include the following:
- getting a certificate, translating documents
- lack of information about the necessary types of certification and technology protection in the target markets;
- the lack of measures to support organisations representing the interests of importers in target countries/information about these support measures;
- high cost of certification;
- high cost of promotion (exhibitions, distribution requirements);
- complexity of product delivery;
- difficulties with high-quality translation of information;
- difficulties with funding to create a site for different countries;
- high dollar and Euro exchange rates;
- imported components;
- high cost of production (taxes, Bank charges %);
- complex logistics (costly);
- difficulty in obtaining reliable and up-to-date information about the target market situation;
- search for a reliable counterparty for foreign economic activity;
- foreign economic situation, including the application of sanctions against Russia;
- lagging behind foreign competitors in terms of tactical and technical characteristics;
- insufficient legislative and regulatory documents that regulate and encourage innovation.

Products of OKVED 26 "production of computers, electronic and optical products" are designed for such consumer industries as mining companies that extract minerals by underground method, the mining industry, the telecommunications sector, rescue services and law enforcement agencies, the banking industry, logistics, geological exploration, environmental monitoring, higher and school education, sports medicine, veterinary medicine, agriculture.

Products of OKVED 27 "Production of electrical equipment" are designed for such consumer sectors as industry, education and science.

Products of OKVED 28 "Production of machinery and equipment not included in other groupings" are designed for such consumer industries as mining, warehousing, logging, utilities, road construction, construction, logging, utilities, metallurgy, mechanical engineering, thermal energy.

On the issue of applying for state support, 57% of enterprises noted that they have applied for state support over the past few years.

On the issue of types of state support, enterprises indicated both Federal and regional types of support. In addition, 14% of enterprises received support under the Federal target program "Research and development in priority areas of development of the scientific and technological complex of Russia for 2014-2020"; 14% participated in the competition of the Krasnoyarsk regional Fund for support of scientific and technical activities; 14% partially reimbursed the costs of participation in exhibitions, business missions with the support of the Russian export center and the business development Agency; 14% participated in the competition of the Russian Foundation for basic research with the support of the Foundation for assistance to the development of small businesses in the scientific and technical sphere [7, 8, 9, 10].

As for receiving state support, 50% of enterprises noted the problems they faced, namely:
- Lack of feedback from the expert Commission on the investment attractiveness of products and missing information (fsbi Fund for assistance to the development of small forms of enterprises in the scientific and technical sphere).
- The problem is the difficulty of getting support for more than 100 thousand, funds for compensation appear only at the end of the year, co-financing costs.
- Federal-co-financing requirement for obtaining grant support for the organization of production, commercialization and export.
- Refusal motivated by the presence of 4 manufacturers of front-end loaders in the territory of the customs Union.

Возмещение reimbursement of expenses for export transport services (CCI):
a short time program and a large flow of wanting, it is difficult to apply; a large volume of documents that need to be collected; the complexity and multistage procedure in a short time (to get the Act examination of compliance with the requirements of industrial safety on the territory of the Russian Federation, it is necessary to collect documents not only on our products but also on components, ie request all the certificates from our suppliers).

5. Conclusion

Thus, the following results were obtained from the survey:
- 71% of small businesses and 29% of large ones were surveyed;
- OKVED of enterprises: 36% - OKVED 26 "Production of computers, electronic and optical products", 29% - OKVED 28 "Production of machinery and equipment not included in other groupings", 14% - OKVED 30 "Production of other vehicles and equipment", 14% - OKVED 27 "production of electrical equipment", 7% - OKVED 32 "Production of other finished products";
- export-oriented enterprises-36%, main foreign markets-Kazakhstan, China, Belarus, Armenia, great Britain, Slovakia, Estonia, Angola, Ukraine;
- 43% of enterprises plan to expand their sales markets to countries such as Uzbekistan, Vietnam,
Mongolia, Intersputnik member Countries, the EU, South-East Asia, Africa, South and Central America, Arab countries, neighboring countries, Africa: Algeria, Botswana, Gabon, Ghana, Guinea, Zambia, Zimbabwe, Mozambique, South Africa, Namibia, Nigeria, Ethiopia; Asian countries: Vietnam, Laos, Cambodia, India, Myanmar, Malaysia, Thailand, Indonesia. Eastern European countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Poland, Republic of Kosovo, Romania, Serbia, Slovakia, Slovenia, Montenegro;
- 71% of enterprises plan to update their product range with new products (90% of which plan to produce import-substituting products);
- 90% of enterprises (among those who plan to update the range) noted that they plan to export new products to countries such as Kazakhstan, Uzbekistan, China, Vietnam, Mongolia, Intersputnik member Countries, the EU, South-East Asia, Africa, South and Central America, Arab countries, the UAE, Saudi Arabia;
- 71% of enterprises are developers of innovative products and more than 16 names of innovative products have been identified, which are currently being developed by the Respondent enterprises. And more than half of them are at the stage of launching into production;
- 57% of businesses have different kinds of problems with the promotion of their products on the external market, namely the high cost of certification, the high cost of the advance, complexity of product delivery, difficulties with high-quality translation of information, difficulties with financing the creation of a website for different countries, the strength of the dollar and the Euro, the General attitude of foreigners to Russian, the difficulty of obtaining reliable and relevant information about the situation in the target market, finding a reliable counterparty for foreign economic activity, foreign economic situation, including application of sanctions against the Russian Federation, lagging behind foreign competitors in terms of tactical and technical characteristics, insufficient legislative and regulatory documents that regulate and stimulate innovation, underdeveloped innovation infrastructure in the country (intermediary, information, legal, banking, and other services);
- 57% of enterprises applied for state support in the following areas: Federal target program "Research and development in priority areas of development of the Russian scientific and technological complex for 2014-2020"; competition of the Krasnoyarsk regional Fund for support of scientific and technical activities; reimbursement for participation in exhibitions, business missions with the support of the Russian export center and the business development Agency; competition of the Russian Foundation for basic research with the support of the Foundation for assistance to the development of small forms of enterprises in the scientific and technical sphere.

Thus, the study revealed the potential for the development of high-tech industries in the region: the current product range, planned new and developed innovative products, including those from the Federal import substitution lists, as well as their main sales markets, both in Russia and abroad. These lists of products will be the basis for the formation of a portfolio of high-tech industries in the region, which will allow developing targeted support mechanisms for their further development. The mechanisms being developed to support high-tech industries should include solutions to the problems identified by enterprises in the survey regarding current regional and Federal support and promotion of products to the world market.

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