Formation of approaches to the value added distribution in industrial clusters

I.V. Filimonenko1,3, A.V. Moskvina1,4, T.P. Likhacheva1,4 and M. Y. Kharitonova2,5
1 Siberian Federal University, School of Business Management and Economics, Krasnoyarsk, 660074, Russia
2 Federal Research Center Krasnoyarsk Science Center, Siberian Branch of the Russian Academy of Sciences, Krasnoyarsk, 660049, Russia
3 Department Of Marketing, Krasnoyarsk, 660074, Russia
4 Department of Economics and business process management, Krasnoyarsk, 660074, Russia
5 Institute of Chemistry & Chemical Technology, Krasnoyarsk, 660049, Russia

Abstract. The problem of formation and development of the system of relations between partner companies in industrial clusters on the basis of determining the value chain as an indicator of its current performance and potential development opportunities in the future. The key prerequisites for the emergence of the problem were the emerging trends in the activation of the processes of integration interaction of companies within the created network structures. The peculiarities of their coordination mechanisms, power distribution and value extraction influence the market positioning of each company and the network as a whole. They also determine the direction of their strategic development. From these positions, there is a need to create an analytical database for each company belonging to the cluster or their "portfolio", in order to make subsequent strategic decisions on the expansion of the cluster through new participants, the development of existing or even non-cooperation. The study identified the entire list of tasks related to the formation and management of the portfolio, however, the emphasis is on the diagnosis of the partner network, which offers the design of the portfolio of the cluster. The specificity of the industrial cluster in which there is always a leading company or a key link of partner companies that manage the value chain of each member of the cluster through the supply of raw materials or intermediate products, indirectly affecting the resource base of their development. The portfolio approach allows to distribute all participants of the cluster according to their contribution to the creation of added value of the cluster, to assess their own resources to support current activities and innovative development in the future, and to determine the feasibility of redistribution of added value at the expense of other members of the cluster and the leading company. The portfolio approach at the same time provides a basis for assessing the value of products manufactured by the cluster companies at the created or added value relative to the raw materials used by them. Comparing them with the prospects of market development improves the quality of decisions on structuring the portfolio of cluster members. The approach adopted in the study makes it possible to expand the understanding of the interaction of cluster members in the value chain, creating a methodological basis for the formation of a portfolio and access to the adoption of a whole complex of strategic decisions. Applied aspects of the research are considered on the materials of the industrial cluster "Technological valley" organized on the basis of JSC "RUSAL". The theoretical and methodological basis of the study was the works of domestic and foreign scientists in different fields of knowledge from marketing, Economics, organizational theory to strategic management. The study used methods of comparative statistical analysis and expert assessments.
1. Introduction

The problem of value added distribution in industrial clusters and its solution is impossible without understanding the trends and features of the development of relations between partners that take place in the B2B markets and to which they relate. Studies of these markets [1] allow today to talk about a set of distinctive features that affect the formation of the mechanism of relations between the participants of the cluster.

One group of characteristics concerns the specifics of B2B markets arising within the cluster. Among them:

1. The market presence formed by the interaction of legally independent companies and having an internal and external shell. The internal boundary of the market determines the relationship between the partners within the cluster. External – when entering other markets B2B and consumer market. In most cases, partners are well-versed in market conditions, product quality, supplier positions.

2. Demand for products within the cluster is secondary because it is used in the subsequent stages of production processing in order to obtain finished products, or resold for profit.

3. In industrial clusters, there is a high degree of localization of production, strict technological and social interdependence of partners, which limits their ability to choose both suppliers and consumers. Localization of production of raw materials, for example, contributes to the emergence of enterprises for its processing in one territory, determining their technological binding to each other and the need for cooperation.

As a result there is a limited number of participants, causing the need to develop personalized strategies for interaction within the cluster.

The second group of features is related to management problems arising in the system of relationships in the cluster. First, to increase the stability of the cluster and its member companies, continuous work is required to improve their long-term competitive advantages by expanding the range of finished products with high added value, innovation and increase the level of technological development. This, in turn, will reorient the cluster from product market management to managing the potential of partners to enter new markets. At the same time, it serves as a measure to protect them from competition.

Secondly, the task of strengthening the position of partners is the need to meet their requirements for suppliers of raw materials or intermediate products in terms of its quality, service level and equitable distribution of value added.

Thirdly, against the background of globalization of the economy, the number of suppliers of industrial products, especially raw materials, is decreasing, which leads to higher prices of final products and higher prices. The processes of integration in the industry increase, so the barrier to entry for potential competitors. Preservation and development of relations of existing partners with suppliers of raw materials is a necessary condition for the preservation of their positions in the cluster.

Fourth, the value added structure formed within the cluster is influenced by costs, causing the need to find ways to optimize them, including through the rational organization of business through the redistribution of its resources. In addition, the problem of the structural composition of value added remains significant, each element of which is aimed at maintaining the state and potential of human, scientific, technological and innovative potential of the partner network.

These problems are typical not only for the subjects of the Russian economy, but also accompany the global cluster processes. However, the current market structure, the existing legislative and institutional barriers, the high degree of dependence of partners in the cluster systems, protect the position of existing enterprises, but do not reorient to qualitative changes, do not create incentives to increase value added and productivity. In this regard, there is a need to revise the existing relationships from the standpoint of efficiency and compliance with the development strategy.

Today, a large share of raw materials goes abroad in the product markets and companies of other production and technological purposes of B2B have a strong degree of vertical and horizontal integration, which is an obstacle to the entry of new participants.

In addition, suppliers of raw materials in the absence of great competition and demand are more profitable to sell raw materials abroad or to companies in other regions of the country. The task of creating high added value is not obvious to them, and the existing links are economically ineffective.
There is a problem of revaluation of partnership on the basis of the criterion of economic value (attractiveness), on the basis of value added. At the same time, it calls for purposeful actions to form and strengthen the portfolio of partners on the basis of mutually beneficial cooperation.

The long-term and cost-effective relations formed on its basis form the capital providing competitive advantages of partners.

2. Methodology
Coase and Williamson's work was the source of ideas for the development of partner relationships. Currently, there are four schools of industrial marketing relationships.

Among the Scandinavian school of industrial marketing are H. Hokansson, P. Turnbull, D. Ford, J. Wind and others. The works were the impetus for the development of industrial marketing, identifying its features and characteristics of the procurement process. More recent research was carried out within the framework of the IMP (Industrial Marketing And Purchasing) project. [2]

The process of business development was considered by scientists as a process of developing relationships and as a system of tools for analysis, evaluation and development of effective strategies. The result of the partners’ interactions was characterized as based on their mutual understanding of the needs on both sides and successful adaptation.

Representatives of this school made a great contribution to the development of network theory [3], when there is an exchange between companies that are interrelated participants [4].

The North American school of relationships is based on the theory of transaction costs, the founders of which were Coase and Williamson [5,6]. Their ideas, developed by other scientists, are in demand today in the industrial markets, as they allow to allocate specific assets in partnerships, to avoid the negative consequences of transformation processes to strengthen the position of companies through the formation of long-term relations. The joint value that arises can be maximized by forming strategic alliances.

Northern school considers the relationship of partners as "the process of determining... relations with customers on the basis of profit, subject to the objectives of all parties involved, with the implementation of all mutual obligations" [7].

The main aspects affecting the success of the relationship are highlighted. Among them: value creation as a result of relationship management, interaction processes and communication process that support the development of these relations. Within the framework of this school, the direction of B2B market research on the management of key buyers appeared [8]. The main objectives of customer management are the formation of strategic alliances with key customers in order to become their sole or main supplier [9].

The method "portfolio" and its various modifications for the analysis of industrial buyers is offered. Among them are the models of R. Fiocchi (1982), N. Campbell and M. Cunningham (1983) and P. Turnbull (1990), differing in the object of analysis, the number of variables, the stage of analysis, the evaluation criterion. However, their lack of universality and subjectivity leads to limited use. "Portfolio" method allows you to build relationships with key partners and focus on achieving synergies from their development, stopping unprofitable relationships.

In industrial clusters with their network structure, rigid forms of integration of companies based on ownership control and the pyramid of subordination are replaced by soft, organized on mutually beneficial cooperation and the development of a joint strategy for adapting their participants to changes in the external environment [Katkalo, 1999]. Industrial clusters are stable, they have centers and ways of coordinating and distributing power, extracting value. The dominant members of the cluster create, maintain and develop the potential for interaction through rules and regulations [Tretyak, 2008; Oleynik, 2009]. Clusters also have their typological features [Sheresheva, 2006; Popov, Tretyak, 2008; Oleynik, 2013].

In industrial clusters, vertical integration with its specific relationships within the value chain is used. Vertical integration refers to long-term contractual relationships between independent economic entities at different stages of the technological chain [10, 11], resulting in a formed value chain (value added).

The concept of "value chain" was introduced by M. porter [1985] for a comprehensive study of individual components of economic activity of enterprises aimed at identifying their competitive
advantages. The approach of M. porter was developed in the works of D. Shank and V. Govindarajan (Shank and Govindarajan, 1993), A. Thompson and A. Strickland (Thompson and Strickland, 2003), L. Gibbon [Gibbon, 2001], R. Kaplinsky [Kaplinsky, 2004] in the form of a chain of value creation (CSSs).

A. Brandenburger and B. Nalebuff proposed to expand the interpretation of value chain as a mechanism that increase the value of the products and enable you to distribute it among all members of the network [2012].

Among the Russian scientists, the formation of value chain in national and international aspects paid attention to in the works of T. A. Meshkova, E. Y. Moiseyev [12], Andreeva P. S. [13] etc.

Applied research is carried out by Andreeva T.V. [14], Soldatova S. E. and Voloshenko K.Yu. [15], who proposed approaches to the identification of participants and the construction of structural and logical stages of the design of the value chain/

A systematic view of the effectiveness of interaction in networks is contained in the works of A. Sterlin and A. Ardishvili [Sterlin, Ardishvili, 1991], V. Katkalo [Katkalo, 1999], O. Tretyak and M. Rumyantseva [Tretyak, Rumyantseva, 2003], S. Kush [Kush, 2003], where in a generalized form under the value added is understood the increment of the value of the product to the value of the material resources used at a certain stage of industrial production.

Some provisions of the category of added value can be found in scholastics and philosophers of natural law [16], but the theoretical foundations of this category were laid in the works of classics of political economy A. Smith, D. Ricardo, denoting the concept of surplus value, which was developed in the "Capital" of Marx. The basis of this approach is the labor theory of cost [17]. According to the theory of factors of production, originating in the works of J.-B. Say, T. Malthus, supplemented by the mechanisms of limit values of G. Hessen, K. Menger, W. Jevons and later developed J.B? Clark, each factor of production has its own production effect, measured by the marginal productivity [18].

The modern concept of economic value added, which includes the achievements of classics and marginalists, is based on the concept of "residual income", indicating the difference between operating profit and capital expenditures. The methodological foundations of the modern concept of economic value added (economic Value Added — EVA) are based on the research of A. Marshall and are presented in the works of B. Stewart, D. young and S. O'byrne. The concept of economic value added is based on the premise that the main task of a modern company is to maximize revenues. The applied aspects of this concept, the specific results of EVA implementation in the activities of foreign companies are published in the works of S. weaver, G. Biddle and R. Bowen [19].

In the modern economic literature, value added is understood as the value of goods and services produced minus intermediate consumption and represents the difference between the revenue from the sale of products, goods, services produced by the company and its costs for the purchase of materials and semi-finished products [20, 21]. In fact, the added value combines depreciation, the cost of companies ' wages, social contributions, taxes, which are included in the cost of production and the planned rate of return [22].

The General definition of economic value added is the difference between net operating profit after tax and capital expenditure. The concept of economic value added involves the analysis of the use of such resources in the capital of the company as investment in R & d, staff training, investments in the creation and promotion of the brand, business restructuring. The new concept of management, which is based on the idea of managing companies on the basis of their value, provides an opportunity to analytically determine the market value of the company and assess its effectiveness as a whole, as an indicator of the quality of management decisions [23]. However, the focus mainly on financial indicators of the concept of economic value added leads to an incomplete assessment of the company and misses the analysis of such strategic advantages as human capital, innovative technologies, etc.

The focus on strategic factors of increasing the competitiveness of economic entities was developed in the works of M. porter, who introduced the concept of the value chain into scientific circulation and for the first time developed a comprehensive methodology for its analysis [24]. According to M. porter, the relative level of value chain analysis is the activity of a company or a business unit in a particular industry. Analysis of the entire industry, from his point of view, is not appropriate, since generalizations blur the picture of competitive advantages, impoverishing the base of analysis. Moreover, the value chains of competing companies within the same industry have significant differences. Therefore, the
production technology of the product will be the determining factor of efficiency and competitiveness. Under the technological development should be understood technologies used in the creation of value, engineering and technological equipment of the production process. In General, the concept of value chains proposed by M. Porter provides more opportunities for in-depth study of the relationships and factors of efficiency and competitiveness in the manufacturing sector than traditional methods of economic analysis [25]. At the same time, it is more descriptive in nature, which does not reflect its potential for application to the formation of knowledge about a particular company.

The systematization of theoretical approaches and the development of the methodology for the analysis of value chains are reflected in the works of R. Kaplinsky and M. Morris, who proposed a methodological guide to the study of value chains with an emphasis on the construction of inter-firm and intersectoral relationships [26]. In their work, they note the advantages of value chain analysis for the study of dynamic production relationships between intra-and intersectoral interactions.

The specificity of the B2B market and the model of cluster business organization dictates the features of the formation and distribution of added value in network structures. As a rule, in industrial clusters the leader of the network is the company-producer of raw materials. Other companies-partners of the network, which are with the leader in the same technological chain for the production of intermediate or final finished products, are its members as consumers or processors of raw materials. Thus, the B2B market is formed within the cluster, as the companies in the cluster have the status of legally independent and their relations are determined only by bilateral agreements on joining the cluster and jointly adopted strategy of its development [27].

There is a problem of evaluating the effectiveness of such interaction by each of the participants not only in terms of the current situation, but also in the future. A special task is faced by the leading company, which has the opportunity to choose partners-buyers both within the cluster and in the external environment.

In both cases, the main criterion would be value added. And it will be the more, the more careful and deep processing will be subjected to raw materials, the more science - and capital-intensive this process will be in terms of technologies for updating production, product range, used human potential.

At the same time, the leading company determines the market potential of its partners-buyers, based on available or resource opportunities and its own opportunities for its development. The first area of interaction involves the orientation to the current partner-the consumer potential of the development where there is access to the markets of B2B and consumer markets outside the cluster. This approach can not be considered creative, because it uses the existing opportunities of partner buyers.

The second interaction of the leading company with partners-buyers within the cluster is focused on determining ways of joint development of the cluster's potential through redistribution of added value, which makes it more promising. Developing the potential of the partner-buyer, the leader develops his own potential and forms the markets of his own partners-buyers who are initially more loyal to him.

The search for ways to develop the potential of the partner-buyer is based on a set of tools for its analysis, evaluation and control of the organization. The joint development of the potential of business partners in the cluster allows to form common opportunities based on the pooling of resources.

Since the cluster leader has a certain number of partners-buyers with whom he interacts, there is a problem of assessing their attractiveness and the formation of the overall potential of the portfolio of the cluster, followed by its division into separate categories of participants in accordance with the selected criteria. At the same time, the portfolio of partners-buyers in the cluster should be understood not as a set of participants in its internal market, but as a complex of relationships of the leading company on the basis of the value and development potential formed by them.

Categorization implies management of the potential of the partner-buyer in terms of using their own capabilities and subsequent joint development. As part of this approach, the key should be considered partners-buyers with good prospects for the development of the market of final products, high growth rates and volumes of purchases.

From the point of view of the development of the potential of relations between the company-leader and partners-buyers, such options for the strategic development of the latter are possible, when not being currently key, they form a common opportunity by combining resources, bringing themselves and the cluster as a whole to another level of effectiveness.
Based on the above, the following categories of participants can be included in the portfolio of purchasing partners:

1. Existing partners-buyers, relations with which are based on contractual obligations and real purchases in the analyzed period;
2. Potential partners-customers, relationships which are promising from the point of view of expansion of markets for finished products and the growth of the total value added that can be supported at the expense of activization of innovative and investment processes of cluster cooperation.

Therefore, the cluster portfolio should be considered as a strategic one that characterizes the life cycle of the relationship between the leader and the purchasing partners, the management of which provides them with stable relationships and high efficiency of return.

The effectiveness of the impact or value of the relationship is measured by a set of indicators, among which value added should be identified as a result of the development of economic potential. Its structural elements determine the potential for the development of the resource base of each of the partners of the cluster and the entire cluster, as well as the need to connect, in case of insufficient resources of the cluster leader.

Thus, the management of the portfolio of partners-buyers of the cluster is proposed to be built in steps on the basis of the formation of the value chain.

**Step 1.** Determination of the scheme of production and technological cooperation of the cluster and identification of activities (production processes) involved in creating the value of the final product from the material flow (raw materials, intermediate and finished products) to key processes and activities (markets for goods, works, services). Determination of the composition of the value chain participants (business entities, networks, suppliers and contractors of the network participants, potential partners).

**Step 2.** Identification of the key link in the value chain of the leader of the activity that constitutes the largest share of value added. Establishing the proportions of the distribution of value added between the network partners based on the average selling (retail) unit price on the national, regional or foreign market, where the sale of finished products is realized or planned.

**Step 3.** Strategic selection and verification of the activities of the inter-firm network and its products for compliance with market conditions through the assessment of transfer and market prices.

**Step 4.** Identification of potential areas for improvement of the value chain based on the analysis of internal and external factors (SNW-analysis, SWOT-analysis) with a focus on Russian and international average values of indicators. Determining the capabilities of the extensions of value chain due to vertical integration with raw materials suppliers (backward) or consumers of the final products (forward). Analysis of organizational prospects and their alternatives, including the inclusion of opportunities and competencies of foreign partners.

**Step 5.** Identify alternatives to the value chain and assess their impact.

The activities of companies and the allocation of activities with the highest share of value added are systematized.

For each value chain option, value-added quality indicators are defined, which are divided into:

- dynamics indicators;
- structure indicators;
- the performance indicators.

Quality indicators of value added chain are checked for their compliance with the interests of stakeholders.

**Step 6.** Selection of the optimal variant of value chain on the basis of comparison of quality indicators of value added chain on alternative variants.

The most preferred variant of the inter-firm network is determined by the highest values of the quality indicators of the value added chain.

The stages of formation of the value chain, based on the allocation of the management link in the chain and the distribution of the value added chain between all participants of the inter-firm network, including foreign ones, allow to choose the most effective option of network interaction in terms of achieving a balance of interests of all stakeholders and to determine strategic decisions.
3. Outcomes
The basis for the formation of value chains within the cluster "Technological valley" is the scheme of production and technological relationships of companies (figure 1).

The analysis of the value chain was carried out in order to form an integrated approach to the effectiveness of the current state of business of companies, accurate positioning and determination of strategic advantages, localization of activities and resources that create value added, the formation of areas of responsibility for the results of activities and mechanisms of interaction between them, systematization of performance.

The General scheme of the value chain study by stages and key indicators is shown in figure 2.

The assessment of added value was carried out consistently for each company within the framework of the value chain by products, by activities that take into account the degree of readiness of the products (level of formation), the cluster as a whole. The structure of added value for each of the elements within each participant and the entire network as a whole was determined, their role in the formation of value added was assessed.

Calculations of indicators were carried out for the period 2010-2018, the information provided in the financial statements of the companies was used.
| alumina production | aluminum and alloy production | manufacture of aluminum products |
|---------------------|-------------------------------|----------------------------------|
| **bauxite mining**  | **aluminum and its alloys**   | wheels wheel                     |
|                     | LLC "KraMZ"                   | LLC "KraMZ"                      |
|                     | LLC LPZ "Segal" (SIAL)        | LLC LMZ SKAD                     |
|                     | LLC ZMI “Siblenta”           | LLC "K&K"                        |
| **alumina production** | **primary aluminum, incl. liquid** | **aluminum press-rolling products** |
| JSC "RUSAL Achinsk alumina plant" | JSC "RUSAL Krasnoyarsk" | LLC "KraMZ"                      |
|                     |                               | LLC LPZ "Segal" (SIAL)           |
|                     |                               | LLC ZMI “Siblenta”               |
|                     |                               | *rod iron, rods, pipes, tape, foil, shrips, sheets, profiles* |
|                     |                               | **wire (standard, welding)**     |
|                     |                               | LLC "Alliance 2008",            |
|                     |                               | LLC ZMI “Siblenta”               |
|                     |                               | LLC "Metallservis"               |
|                     |                               | LLC PC “Persey”, etc.            |
|                     |                               | **domestic and commercial refrigeration equipment** |
|                     |                               | JSC "KZH "Biryusa"              |
|                     |                               | **biometallic radiators**        |
|                     |                               | LLC GK “Alberg”                  |
|                     |                               | **metal constructions**          |
|                     |                               | LLC LPZ "Segal" (SIAL)           |
|                     |                               | LLC “KMK”                        |
|                     |                               | LLC "Ankor-M"                    |
|                     |                               | LLC "Metallservis"               |
|                     |                               | JSC "Sibsmu"                     |
|                     |                               | **aluminum architectural systems, etc.** |
|                     |                               | LLC LPZ "Segal" (SIAL)           |
|                     |                               | LLC “KMK"                        |

**Figure 1.** Scheme of production and technological relationships in the cluster "Technological valley."
Figure 2. Scheme of the added value chain research on the companies and activities of the cluster

Added value (AV), currently created in the Technological valley, determines the key link of this network, which is represented by three companies: JSC "RUSAL Krasnoyarsk" (share 54.1%), JSC "RUSAL Achinsk alumina plant" (share 28.8%), LLC "KraMZ" (share 6.8%) (figure 3).

Figure 3. Share of added value of the technology valley cluster companies, %, 2018

JSC RUSAL Krasnoyarsk increases production of the product range with high added value, including foundry alloys, ingots cylindrical, a rod, gradually reducing delivery of primary aluminum to the market. Aluminum alloys, as well as other products manufactured by the company, are in demand in the
automotive, aerospace, aviation and construction industries. The launch of the new foundry complex will bring the share of high-tech products to 55%.

The company increases the volume of aluminum production in favor of high-tech products, which is economically feasible, leading to an increase in AV. For example, the added value of alloys for the automotive industry (alloy AlMgSi 6060) per 1 ton of bauxite processing increases by 37.65 times, and the production of wire rod by 29.5 times compared to primary aluminum.

Krasnoyarsk metallurgical plant (LLC "KraMZ") is the third largest and the youngest of the largest processing enterprises in Russia. The main semi-finished products produced from aluminum alloys of the plant are: bars, profiles, pipes. Note that the company's products mainly refers to the 3 level of processing.

The added value created by other companies, is about 10.9%: LPZ "Segal" – 2.40%, LLC "K&K" – 2.89%, LLC PHI "Siblenta" – 0.03%, LTD – a 0.05%, LLC LMZ SKAD - 0.83%, LLC "Alliance 2008" – 0.14%, LLC "Russian profile" – 0.34%, JSC "KZH "Biryusa" – 3.35%, JSC "Sibsmu" – 0.29%. However, these are companies of 3 and 4 levels of processing, which is important in the framework of the finished product strategy.

Analysis of the structure of added value by companies showed that the company PHI "Siblenta", JSC "RUSAL Krasnoyarsk", LLC "KMK" have a significant share of the wage costs and the relatively high share of the profits and depreciation, in contrast to LLC "KraMZ", LLC LMZ "SKAD", LLC "K&K", LLC "Metallservis", LLC "Alliance 2008", JSC "Sibsmu", where the structure of the value added is formed mainly at the expense of wages.

Value added within the Technological valley is distributed by levels of its formation as follows (figure 4): 58.3% of its amount is created at the level of production of aluminum and its alloys, about half of it is accounted for the production of alumina (28.7%). Only 8.7% of the value added belongs to companies that produce finished products.

![Figure 4. Value added by activity areas and levels of value added formation in the Technology valley, 2018](image)

The structure of added value at the level of production of alumina and aluminum is more promising and is aimed at the development of companies in these areas (figure 5). The creation of development opportunities within the Technological valley for companies producing intermediate and finished products will make it possible to move to new technologies and new types of products with higher added value.
The proposed approach estimates the value chain requirement a detailed level-by-level account for the production of aluminum products a high degree of readiness according to the nomenclature positions. It allows you to manage the inter-firm network, as well as to determine the structure of the types of products on the basis of the criterion – the increase in value added.

The novelty of the proposed approach is to determine the value added on the basis of the formation of the post-stage value of products by nomenclature items or by types of aluminum products, based on the increase in value added based on the same amount of feedstock.

Four levels of formation of the added value at production with high degree of readiness are allocated. The calculation of value added is made per 1 ton of bauxite.

Comparison of the added value of the main types of aluminum products per 1 ton of bauxite processing and analysis of the added value created by enterprises of the Technological valley, allows us to draw the following conclusions and give recommendations on the strategy of their behavior: import substitution policy in respect of products created by LLC "Metallservice", LLC "Kik", LLC LMZ "SCAD", LLC ZMI "Siblenta", LLC "Russian profile", LLC "Alliance 2008", LLC PC "Persey", LLC "KMC", LLC "Anchor-M", LLC", JSC Sibtsmgo, LLC GK Alberg. Increase exports, as well as expand the range of enterprises JSC "RUSAL Krasnoyarsk", LLC "KraMZ"; and the policy of import substitution with the expansion of the range is possible for LLC LPZ "Segal" (SIAL). Four levels of formation of the added value at production with high degree of readiness are allocated. The calculation of value added is made per 1 ton of bauxite.

Analysis of the products of the cluster member companies on their contribution to the formation of added value, allows us to distinguish among them those that provide a high growth in relation to the original raw materials and are included in the priority category.

In general, the comparative assessment of companies within the cluster at value added allowed us to draw the following conclusions:

1. The added value of the cluster is mainly formed by companies located at the beginning of the technological chain of production activities: production of alumina (1) and production of
1. Aluminum (2) and its alloys (JSC "RUSAL Achinsk alumina plant", JSC "RUSAL Krasnoyarsk", LLC "KraMZ"). Thus, they are the key link in the cluster as producers of raw materials, around which the CCSS are built by companies with intermediate and ready-to-consume products.

2. There are groups of companies where the value added structure is formed by profit and depreciation, it is mainly the company’s key link in the cluster. There are several companies producing finished products with the same value-added structure, but they are not comparable in size. Most of the companies in the cluster that produce intermediate and finished products generate value added from the wage Fund and, in small amounts, depreciation and profit. For these companies, the restrictions associated with the material intensity of products and transfer prices within the cluster, as well as the prices of final products, do not allow to reformat the value added with a profit orientation, which, in turn, causes the need to adjust the mechanisms of inter-firm interaction.

3. Companies producing intermediate and final products where the value added are profit-oriented (OOO PHI "Siblenta", LLC PC "Perseus", OOO GK "Alberg", "Russian Profile", OOO "KMK", OOO "ANKOR-M"), constitute a low share in the cluster, but have perspectives of development because of market demand, enabling them through appropriate prices to generate its own sources of development. As part of the development of the cluster, it is advisable to provide them with advantages in the distribution of value added.

4. Conclusions

The initial stage of the analysis of the cluster using the added value allows to form a set of strategic decisions on the development of the cluster. Thus, based on the representation of all participants in the value chain, it is possible to form their portfolio and organize its management based on their own potential, as well as attracted by redistribution within the cluster. the whole complex of tasks is solved, among them:

- development of the portfolio of partners-buyers in General and the potential of the most promising of them, through the redistribution of resources in the cluster;
- setting key (Manager) of the link in the value chain and center the creation of economic rents, as well as flow distribution added value;
- the use of economic indicators of value chain companies at each stage of the analysis to justify the effectiveness of the formation of the added value and the development of strategic decisions on the formation of barriers to entry and exit into the cluster;
- testing the hypothesis and substantiation of conclusions on the relationship of value added and sales revenues and their impact on the technological development of companies and the cluster as a whole and on the change in the value chain;
- use of the indicator value added / revenue from sales as a tool for forecasting the prospects of economic and technological development of the cluster;
- implementation and monitoring of the economic cluster potential and the portfolio of purchasing partners using the value added indicator.

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