The management of the radio-electronic instrumentation corporate entities in Russia

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Abstract. The article observes the issues of the knowledge-intensive corporate entities’ management. The lack of the unified approach to the mechanism of the corporate entities’ management in high tech manufacturing industries, the insufficiency in the methodology of the diagnostics mechanism of the management of the corporate entities of the radio-electronic instrumentation industry, the deficiency in the models of the improvement of the integration processes are the main challenges for scientists and practices in this field of research. The theoretical and empirical research of the corporate entities’ management has been conducted by using the process and system approaches, statistical analysis and questionnaires. The economic nature of the categories “knowledge-intensive corporate entities” and “corporate entities’ management ” is clarified, the stages of development of the corporate entities’ management in Russia, the domestic model features of corporate management and its features are defined. The object of the empirical research is industrial corporate entities of the radio-electronic instrumentation industry. The developed method of analysis of the high-tech corporate entities management mechanism has been contributed to strengths and weaknesses identification and highlighting of the main directions of the knowledge-intensive corporate entities’ management development. The classification of methods and tools of corporate management, the development of approaches and principles of the diagnostics radio-electronic instrumentation industry are the core theoretical value of this research. The practical usage possibilities of the mechanism of the corporate entities’ management in high tech manufacturing industries have been demonstrated by authors.

1. Introduction

A characteristic feature of the development of modern economic systems is the increasing role of large integrated corporate entities in the processes of ensuring the efficiency growth and competitiveness, economic security and the country defense, production and innovations dissemination. The importance of knowledge-intensive corporations for the national economic system and the urgent need to develop corporate governance mechanisms have determined the relevance of this research area. The purpose of this article is based on the study of theoretical approaches to corporate governance issues and analysis of high-tech corporate entities to offer recommendations on increase of diagnostics efficiency of
Corporate governance mechanisms in knowledge-intensive enterprises. The article analyzes the concepts of corporate governance, methods and approaches to the analysis of knowledge-intensive industrial corporate entities, indicates the main conclusions, and determines the theoretical and practical significance of the research results.

2. Research Overview
From the point of view of accelerating the process of changes in the environment, an in-depth theoretical analysis of the Corporation's current problems is required. The concept of "Corporation" is based on the Latin term "corporatio" - an Association or group of persons with common interests [1,2].

Some authors emphasize the legal aspect of the term Corporation, while other researchers consider mainly corporate economic concepts. Table 1 (compiled by the authors) shows the stages of corporate governance development in Russia. The most common view is that corporate governance implies the equity capital management. In this case, we consider a method of managing the company that ensures a fair and equal distribution of income and capital among all company's securities owners and other interested parties [3].

| Period         | Characteristic                                                                 |
|----------------|--------------------------------------------------------------------------------|
| Before 1992    | Pre-corporate period (before market reforms). There are councils of labor collectives through which employees have the opportunity to participate in the management of production associations. |
| 1992-1994      | Initial stage of market reforms. The emergence of partnerships during the first stage of (voucher) privatization. The lack of managing experience in the new environment. |
| 1994-1998      | The period of market space formation. Formation of corporate governance institutional foundations. |
| 1998-2001      | The period of market structure crisis. Use of modern mechanisms and forms of corporate governance and financial instruments. |
| 2001-2008      | The period of mergers and acquisitions market development. The increasing ownership concentration. Strengthening the state role in the ownership structure. |
| 2008- Nowadays | A period of increased exogenous instability. Increasing the importance of the adaptive partnership potential, forming corporate business social responsibility. |

Corporate governance is an organizational model for regulating relations between company managers and their owners, which makes it possible to clarify the goals of various stakeholders to ensure the effective enterprise functioning. In the economic literature several models of corporate governance have been identified: Anglo-American (Anglo-Saxon, outsider), German (insider) and Japanese.

The corporate governance models used in Russia are mixed. Based on the study "infrastructure of corporate governance in Russia" [4] and other works [5,6,7] the specifics of the Russian model formation of corporate governance are determined. This is the concentration of ownership (60% - a controlling stake, 27% - a blocking stake). According to Russian law, shareholders have extensive rights, which corresponds to the Franco-German legal tradition that forms a low threshold for holding shares for shareholders in the Board of Directors inclusion; institutional regulatory problems that reduce the effectiveness of corporate disputes; insufficient information content of Russian corporate standards; lack of transparency of the ownership structure; low liquidity of securities of Russian companies; a relatively large share of state participation in the capital of corporations, which results in a bureaucratized decision-making procedure for their development. At the same time, it is necessary to recognize the need for the state formation support of large industrial corporations, leading to their diversification; low incentives for managers to create value, their lack of flexibility (in state corporations).

In addition to these features, corporate governance in Russia is characterized by global trends, not only the desire to increase the cost of capital, investment attractiveness and the degree of stakeholders satisfaction, but also tasks, such as monitoring the effectiveness of interaction between companies in the external and internal environment, maintaining the continuity of the value chain [8], managing public relations and the impact of the organization on society.
3. Analysis

The object of empirical research is industrial corporate entities (on the example of radio industry enterprises). Solving the problems of high-tech enterprises in the radio industry and entering the path of progressive development is possible only in the framework of joint projects with large customers to solve the problem of infrastructure development and a number of other problems [9]. Research methods used in the work are analysis, synthesis, process, system approaches, statistical and expert methods. We believe that the analysis of the effectiveness of management mechanism of corporate entities Radio receiver industry should include analysis of organizational and managerial enterprise performance; analysis of financial enterprise indicators; analysis of financial results and General indicators of efficiency; analysis of production and economic enterprise performance; analysis of efficiency indicators of the personnel management system.

Practice shows that corporations often do not have databases for calculating certain indicators, and some of the data of high-tech enterprises in the radio industry is the closed information. Therefore, it is proposed to use the following indicators to assess the organizational and managerial level: the share of administrative and managerial employees in the list of personnel, net profit per administrative and managerial employee. Thus, comprehensive diagnostics of the corporate entity management mechanism will help to identify key problems and economically justify the development directions in order to increase the competitiveness and efficiency of knowledge-intensive industrial corporations.

Based on the results of calculations (table 2, compiled from the balance sheets, profit and loss statements for the five years from 2015 to 2019) the liquidity of JSC RPE "Almaz" exceeds the specified level, JSC RPE "Contact" is significantly lower than the normative value due to the decrease in the most liquid marketable assets and increased with rising amounts of short-term liabilities.

**Table 2.** Financial status of corporate entities in the radio industry.

| Indicators                                      | JSC RPE “Almaz” | JSC RPE “Contact” |
|------------------------------------------------|-----------------|-------------------|
| Absolute liquidity ratio (min 0,2) | 0.05 0.11 0.32 0.52 1.05 | 0.05 0.051 0.028 0.042 0.048 0.031 |
| Quick liquidity ratio (coverage, min 1)      | 0.33 0.23 0.34 0.80 1.55 0.650 0.591 0.371 0.388 0.381 |
| Current liquidity ratio (min 2)               | 0.83 0.91 0.52 1.31 2.34 2.364 1.986 1.463 2.658 1.128 |
| Ratio of provision with own funds            | 0 0 0.16 0.51 0.534 0.461 0.313 0.150 0.098 |
| The ratio of autonomy                         | 0.37 0.47 0.58 0.74 0.811 0.748 0.707 0.605 0.568 |
| Sales revenue per 1 employee                 | 420 490 675 643 834 518.45 539.33 482.95 525.89 564.82 |
| Capital productivity                         | 1.90 1.38 1.53 1.09 0.96 1.07 1.01 0.88 0.89 0.85 |
| Turnover ratio                               | 0.90 0.72 0.67 0.54 0.46 0.874 0.795 0.722 0.695 0.659 |
| The rate of growth in productivity to the rate of growth in personnel costs | 1.17 1.19 0.79 1.11 0.979 0.900 1.113 1.151 0.979 |
| The index of the labor cost                  | 1.00 1.16 1.21 1.17 1.063 0.995 0.978 0.933 1.063 |

At the same time, the company has opportunities to restore its solvency. The low availability of own funds for radio industry enterprises is largely due to the insufficient volume of targeted financial revenues, a decrease in the level of own funds, and low liquidity of assets. Both “Almaz” and “Contakt” have experienced a tendency to reduce capacity utilization, slow down capital turnover and increase labor costs.

To determine the weaknesses and threats, the degree of control and vulnerability of the corporate governance mechanism of knowledge-intensive industrial enterprises, an expert assessment of these factors was conducted in points (from -3 to +3). In figure 1 two criteria (degree of manageability, scale of risk) are used to form a matrix with each square corresponding to a certain degree of vulnerability and requiring different control measures.
The main risks of high-tech enterprises (financial and economic, production and technological, investment, innovation, legal, corporate) may be negatively affected by sectoral sanctions of the United States, Canada, the EU, as well as a number of other countries.

Strategic factors regulated by corporations using monitoring systems and a set of corrective actions are located in the square "high risk" and "high level of control". Such factors corporate entities Radio receiver industry include obsolescence of products and technologies (+1;+3), insufficient level of partnership with contractors, the possibility of ending the number supplies of materials and components (+1;+3), unprotected intellectual property (+1;+3), depreciation, limited depreciation of fixed assets (+2;+2), low degree of the strategic diversification vectors of development (+1;+2), lack of qualified technical personnel (+3;+3), inefficient system of organizational communications (+2;+2), low degree of compliance with the stakeholder requirements (+2;+2).

The vulnerability zone is characterized by a high level of risk and lack of control. Factors in this group include changes in the volume of government orders (-3;+3), rising prices for products of natural monopolies (-3;+3), increased competition (-3;+3), insufficient demand for the company's products in the external and internal markets (-3;+3), uncertainty of the economic situation (-3;+2), inflation (-3;+1), expensive loans (-3;+1). The operating area is characterized by low risk and high manageability. This group includes the problem of payments (1,-1), inefficient motivation system (+3,-2). First of all, it is necessary to pay attention to factors from the vulnerability zone, since these are difficult to control and forecast risks that most strongly affect corporations.

The external capabilities of corporate entities in the radio industry include state orders and demand for products of high-tech corporate entities abroad; resource availability (raw materials, fuel and energy products, labor), formed relationships with suppliers and customers, infrastructure support; effective functioning of research institutes, research centers, scientific and educational institutions dealing with the development of radio electronics and high technologies.

Results As a result of the survey of knowledge-intensive enterprise managers, the strengths (internal environment factors) are a significant fleet of machines and equipment with an average shelf life of 60%, increased processes of modernization and updating of equipment; average level of liquidity and solvency of assets; highly qualified personnel, labor productivity growth rates exceeding the growth rate of personnel costs.

The analysis shows that efficiency improving of scientific and industrial corporations depends largely on the effectiveness of organizational and structural support of the corporate governance mechanism. For modern knowledge-intensive corporations, which majority is owned by the state, the most effective type of organizational and structural structure are holdings and horizontally integrated research, and production clusters.

![Figure 1. Risk matrix - the degree of control.](image-url)
4. Conclusion
The problem of developing a mechanism for managing knowledge-intensive corporate entities has been considered in a significant number of studies. Further research of the methodology and tools for diagnostics and transformation of the corporate governance mechanism in science-intensive engineering is relevant. The main result of this work is to identify areas of the corporate governance mechanism of knowledge-intensive enterprise development based on its diagnostics, systematization of threats and opportunities, strengths and weaknesses.

As a result of empirical research, it was proved that improving diagnostics of knowledge-intensive enterprises provides justification for improving the effectiveness of corporate governance, which expands and complements earlier studies [10,11]. The offers can be successfully used by corporate entities in the radio industry and other industries. The authors see the need for further research in both theoretical and methodological as well as in the design and empirical planes. Further research in the field of diagnostics methodology and development of the corporate governance mechanism in knowledge-intensive industries will contribute to improving their efficiency and competitiveness.

References
[1] Adizes I 2004 Managing Corporate Lifecycles: An updated and expanded look at the Corporate Lifecycles (NY: Prentice Hall Press) p 460
[2] Galbraith K 2004 The Economics of Innocent Fraud: Truth for Our Time (Boston: Houghton Mifflin) p 88
[3] Drucker P F 1964 The concept of the corporation (NY: New American Library) p 164
[4] Shuvalov S A 2004 Development of corporate management in the industry of Russia dissertation of doctor of Economics (Saratov) p 362
[5] Bushmeleva G V et al. 2014 The essence of resource-factor adaptive management of industrial enterprises Materials of the International scientific-practical conference (Tambov: Ucom consulting company) p 17-23
[6] Porter M 1998 Competitive Advantage of Nations (NY: Free Press) p 896
[7] Kuznetsov V N 2011 Partnership: the culture of partnership as an integrated humanitarian cluster of meanings of the peace and security culture; partnerships of people, peoples and civilizations (Moscow: Book and business) p 483
[8] Kovalenko N V and Gontovaya N V 2012 The essence of the concept of "adaptation" in the context of the innovative enterprise development Economic Bulletin of Donbass 28(2) 147-58
[9] Trenev N N 2015 The concept of increasing the competitiveness of electrical products by combining enterprises of electrical products Marketing in Russia and abroad 3 99-111
[10] North D C 1984 Government and the Cost of Exchange Journal of Economic History 44 255-64
[11] Coase R-H 1960 The Problem of Social Cost Journal of Law and Economics 3 1-44