

Methodological Aspects of Strategic Development of Regional Socio-Economic System (Following the Example of Radio-Electronic Industry Enterprises in the Republic of Tatarstan)

Nikolay N. Uraev^a, Gaziz F. Mingaleev^a, Aleksandr T. Kushimov^a and Nikolay A. Kolesov^a

^aKazan National Research Technical University named after A.N. Tupolev, Kazan, RUSSIA

ABSTRACT

This paper considers the methodological aspects of forming a development strategy for the regional socioeconomic system (by the example of radio-electronic enterprises in the Republic of Tatarstan). The paper suggests a conceptual scheme of the macro- and micro-factors' influence on the regional socioeconomic system. This scheme is based on the study of the market power of enterprise's contact persons (suppliers, competitors, and consumers) and subjects that have an indirect impact (government, markets, financial institutions, insurance companies, etc.). It has a hierarchic structure and allows coordinating the terms of cooperation for different elements of the socioeconomic system. The paper builds a formation algorithm for the manufacturing program of radio-electronic enterprises. A peculiar feature of this algorithm is its focus on involving resources of the enterprise's external environment on terms that are acceptable to an economic entity. The paper also suggests stages of the development strategy for the regional socioeconomic system that are based on the principles of lean production, which assume the determination and market substantiation of the regional resource intensity limit of separate productions. This allows plotting an evolutionary vector for the transformation of the socioeconomic system into an adaptive structure with such properties as self-organization and self-regulation.

KEYWORDS

Radio-electronic industry, socioeconomic system, strategic plans, regional development factors, operating efficiency

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Introduction

Solving the scientific problems of improving economic and social results of the regional economic management system by taking extensive measures for rationalizing the cooperation of each separate element and the structural parts

CORRESPONDENCE Nikolay N. Uraev ✉ kafedra@eupkai.ru

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of the regional production management system, using geopolitical, environmental, and infrastructural factors that influence the regional economic growth rate, counteracting the negative impact of instable external and internal environments, becomes especially relevant during the mitigation of the economic and financial crises' effects, given the low technological level of the fixed capital, unsolved problems of improving investment and innovation attractiveness of the regional economy, insufficient growth rate of the economic performance (gross regional product), compared to the growth rate of aggregate production costs, and discrepancy between the levels of production growth and salaries. It is possible to improve the economic and social results of the current operation and future development of the regional socioeconomic system by forming and taking comprehensive measures within the framework of the mechanism for rationalizing the cooperation of elements of a regional production management system that are aimed at improving the organizational structure, ensuring the balance between available resources and set future objectives for economic and social results, observing the functional purpose and objective orientation of technological and resource-related elements of the management system of the regional socioeconomic development.

The solution of the following scientific problems is also relevant: estimating the economic result and efficiency of the management system for the development of the regional socioeconomic system, and the mechanism for the cooperation of its elements, based on the determination of the influence level of current, future, and strategic management on the economic and social result with a subsequent correlation of the economic result with the expenditures on taking measures within the technological elements of the management system; predicting the achievement of the planned economical regional result, which is an objectification factor for determining the level of using own resource and organizational capacities with a view to ensuring necessary rates of economic growth under the conditions of unstable external and internal environments (Piercy et al., 1997; Reading, 2002; Schoemaker, 1995).

Under modern conditions, the industrial of the Tatarstan Republic enterprises that aim to keep their share of the market face the need to determine the trends and factors of the external environment's influence, alongside the study of internal processes of the enterprises. Timely reaction to challenges of the external environment and preventive actions can help avoiding an unwanted course of events and ensuring the enterprise's survival under globalization and growth of production scale, which is a relevant modern problem (Porter, 2010). Radio-electronic enterprises of the Tatarstan Republic (RT) are a spatially distributed regional socioeconomic system that has common strategic objectives, and are included in the structure of the Russian radio-electronic industry.

The relevance and practical demand of the national economy, radio-electronic enterprises, and branch-specific constituents of the regional economy for improving economic and social results of the management system of the regional socioeconomic development determined the objective, tasks, and subject of this research.

The study aims at the elaboration of methodological aspects of strategic development of regional extensional socio-economic system in the present-day environment.



Literature Review

The term "strategic management" is relatively new and appeared in the second half of the XXth century (Raizberg, 2014). At that time, there was a need for objective study of the processes occurring within the enterprise, with regard to the external trends and impact. Timely response to the external challenges, and quite often - the preventive actions provided the survival of the enterprise in the context of globalization and production growth (Kolesov & Uraev, 2012). The radio - electronic industry enterprises of the Republic of Tatarstan (RT) represent the regional extensional socio-economic system that has common strategic goals; it is included into the radio-electronic industry structure of Russia.

The questions of strategic development of production and business activities of enterprises in various industries are discussed in a large number of papers written by foreign authors such as: I. Ansoff (2008), K. Bowman (2007), A.J. Strickland & A.A. Thompson (2007), D. Archibugi & J. Michie (1997), A. Beerel (1998), E.K. Clemons (1995), M.J. Dooris, J.M. Kelley & J.F. Trainer (2004), I. Garifullin (2014), L. Goodstein, T. Nolan & J.W. Pfeiffer (1993), S.W.L. Hill & G.R. Jones (1992), M.D. Hutt, B.A. Walker & G.L. Frankwick (1995); as well as the national researchers, such as: V.B. Akulov (2012), E.E. Vershigora (2007), O.S. Vikhansky (2008), S.W. Gorbunov (2010), G.B. Kleiner (2008), B.A. Raizberg (2014), R.A. Fatkhutdinov (2008, 2009), and others. However, presently some questions have been studied insufficiently, namely, the methodological aspects of current strategic development of production at domestic enterprises of radio-electronic industry, given the fact that these enterprises are characterized by a certain potential for development (the expected growth of the state defense orders) and threats (complexity of fulfilling the permanently growing state defense orders and cancellation of imports barriers to until the end of re-equipment, and the R&D), as well as risks (sectoral, social, general and regional, financial, legal) (Uraev, 2014). Thus, insufficient level of study and the degree of elaboration of strategic planning methods at the radio-electronic industry enterprises, with regard to their current situation, on the one hand, and their scientific and practical significance - on the other, determined the choice of research topic, allowed to formulate the purpose, tasks and the range of questions to be discussed.

Research questions

The overarching research question of this study was as follows: formation a development strategy for the regional socioeconomic system in radio-electronic enterprises in the Republic of Tatarstan and formation of algorithm for the manufacturing program of radio-electronic enterprises that allows to plot an evolutionary vector for the transformation of the socioeconomic system into an adaptive structure with such properties as self-organization and self-regulation.

Method

The development of methodology and guidelines for the regional development strategy of extensional socio-economic system based upon the system approach to the development of production processes in the enterprise, providing expanded reproduction, along with organization of rational interaction between its members and the distribution of resources among them.

The study applied:

- the systematization method that that consists in the division of studied phenomena, based on the tasks of the study and selected criteria, into classes that are characterized by a certain commonality and peculiar features (classification, typology, specialization, concentration, etc.);
- the economic and geographical research method that includes the regional method (study of the ways of territorial formation and development, the examination of the development and arrangement of productions in the regional development), the branch method (study of the ways of formation and functioning of economic branches in terms of geography, examination of the development and arrangement of productions by branches) and the local method (study of the ways of formation and development of local productions, examination of the development and arrangement of productions by its elementary cells);
- the economic and mathematical modelling method that includes modelling territorial proportions of the economic development of Russia, modelling the arrangement of the economy by branches, and modelling of the formation of economic regional complexes;
- the regionometrics methods (regionometrics is a scientific field in regional economics that studies the application of mathematical methods);
- the taxonomy method – the division of territories into commensurable and hierarchically superordinate taxons. Taxons are equivalent and hierarchically superordinate subnational entities, e.g. administrative areas;
- the variant method of allocating regional production capacities. This method is mostly used when designing schemes for arranging production across the territory of the region during the first stages of planning and prediction. It involves studying variants of different development levels of this or that region's economy, and variants of territorial economic proportions by regions;
- the methods of correlating regional living standards of the population and predicting the development of the regional social infrastructure.

Data, Analysis, and Results

During the elaboration of the company's development strategy three levels could be specified: the general strategy (stability, growth, unemployment reduction), competitive strategy (cost leadership, differentiation, focusing), functional strategies (production development strategy, marketing and financial strategy, R&D strategy, information strategy, etc.) (Vikhansky, 2008). The functional strategy of each department (division) should be subordinated to the overall strategic orientations.

The long-term development of the radio-electronic industry enterprises, is associated with expanded reproduction, creating the conditions for productivity and revenue growth. Strategic development of production is today's top priority for both individual organizations of domestic radio-electronic industry (industrial enterprises, research institutions, design departments etc.) and for the structures responsible for development and general management of the industry.



The present activity of national radio-electronic industry enterprises is characterized by a large number of factors, offering many opportunities for the development of enterprises. However, the achievement of certain results related to the use of favorable external conditions, can pose significant threats that can change the main vector of development of individual industries.

The production system of any industrial enterprise is a single organism and its general viability depends on the efficiency of its individual elements (Gromova, Latfullin & Raichenko, 2014). The active interaction of a set of elements of the production system of industrial enterprises provided teamwork and common goal, has larger effect as compared with the combined effect of each subsystem (Goryushkin & Novitskiy, 2010). This demonstrates the synergistic effect, which allows to form long-term competitive advantages and to create a positive image of the company.

The radio-electronic industry enterprises form the open socio-economic system capable of functioning given rapid response to the impact of external economic environment; this system is a set of economic subjects interacting in specific economic, legal, social, political or other environment. This environment is formed by the subjects along with the participation of social, governmental and inter-governmental institutional structures, and it reflects the influence of various factors, which have the impact on different aspects of the enterprise activities. The external economic environment is divided into 2 parts (Figure 1):

1. The immediate environment (microenvironment), having strong impact on all spheres of activity. It is formed by suppliers of the material, technical, technological and other resources, consumers, dealers, suppliers and other marketing agents, the existing and potential competitors and other contact subjects.
2. The macro environment, having indirect impact on the company through the immediate surroundings (Porter, 2011; Oveshnikova, 2013).

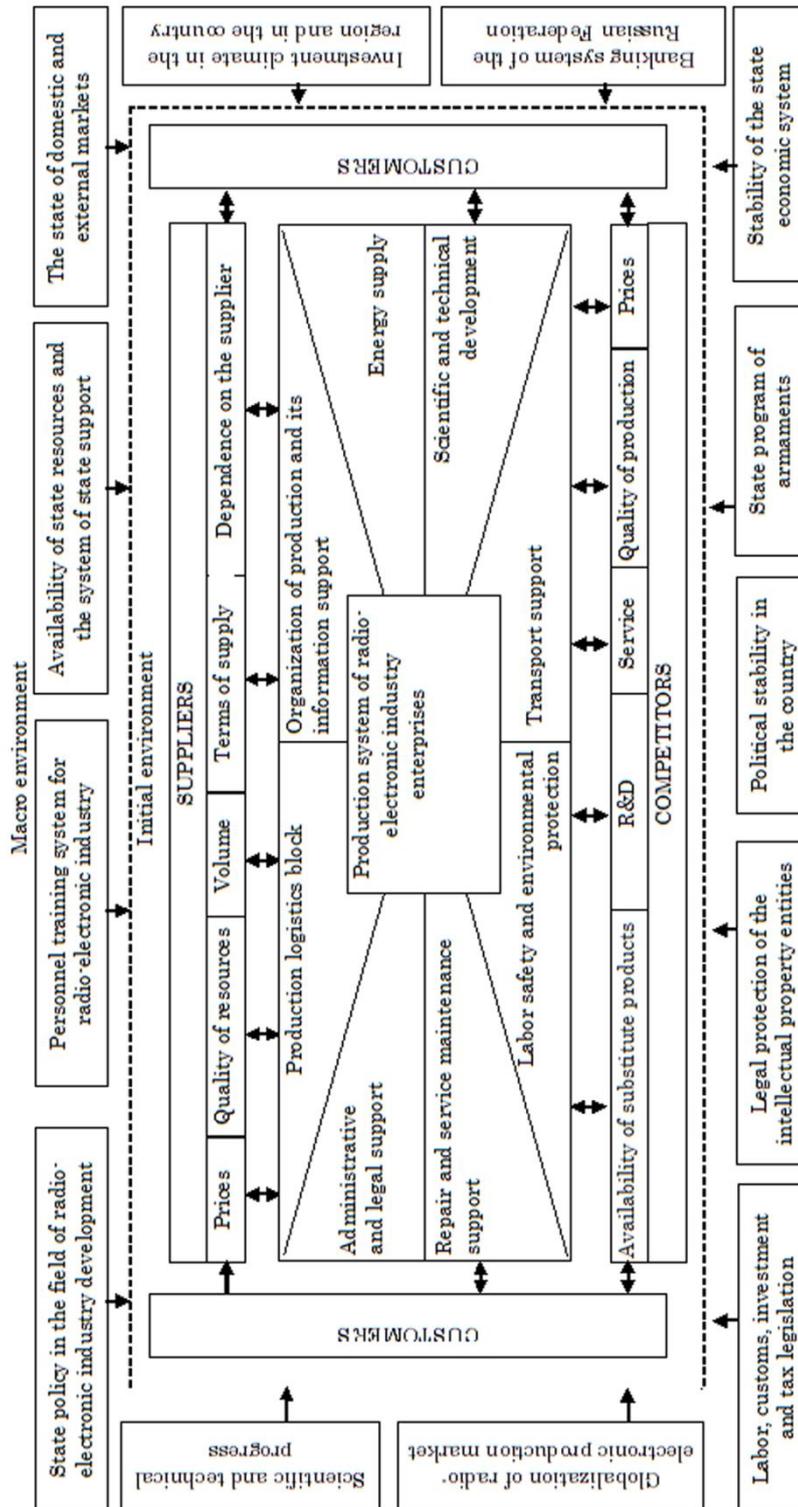


Figure 1. Conceptual diagram of the impact of macro and micro factors on regional extensional socio-economic system (by the example of radio-electronic industry enterprises in the Republic of Tatarstan).



A clear vision of the constituents and structure of an enterprise's production program for a certain period is a key element of the development strategy for the regional socioeconomic system. In order to achieve this, the author suggested an algorithm of forming a production program for radio-electronic enterprises with the following distinguishing features:

- demand orientation that is expressed in the consideration of existing, potential and hidden needs of clients in terms of the correlation between cost and quality, volume of the order and discount amount, etc.;
- maximum return of internal resource use, particularly, due to the use of efficient organization of production processes, the use of time management and lean production technologies, production automation and mechanization means, and technical and technological re-equipment (Gromova, Latfullin & Raichenko, 2014; Goryushkin & Novitskiy, 2010);
- timely interaction with the external environment, the search and involvement in production processes of the enterprise's external environment resources, such as borrowed and called up capital (financial lease and leaseback, credit, private-public partnership, additional emission of shares, bonds placement, insurance, etc.), temporary personnel policy (recruiting and leasing of personnel, outstaffing, etc.), the use of external objects and means of labor (rent, operating leasing, outsourcing, consulting, engineering, etc.), the use of various intellectual property assets (purchase of patents, franchising, joint research and development, creation of common use centers, cooperation between higher education institutions and research institutes, the attraction of various level grants, venture investment, etc.) (Kolesov & Urayev, 2012).

The algorithm of forming a production program for radio-electronic enterprises is presented in Figure 2.

The main condition for applying the algorithm is the discrepancy between the growth rate of demand for radio-electronic products and the enterprise's productivity dynamics. The suggested algorithm is based on the procedure of choosing a planning model for the production program. At that, it is necessary to consider the tasks that have to be completed in order to ensure the formation of the output program.

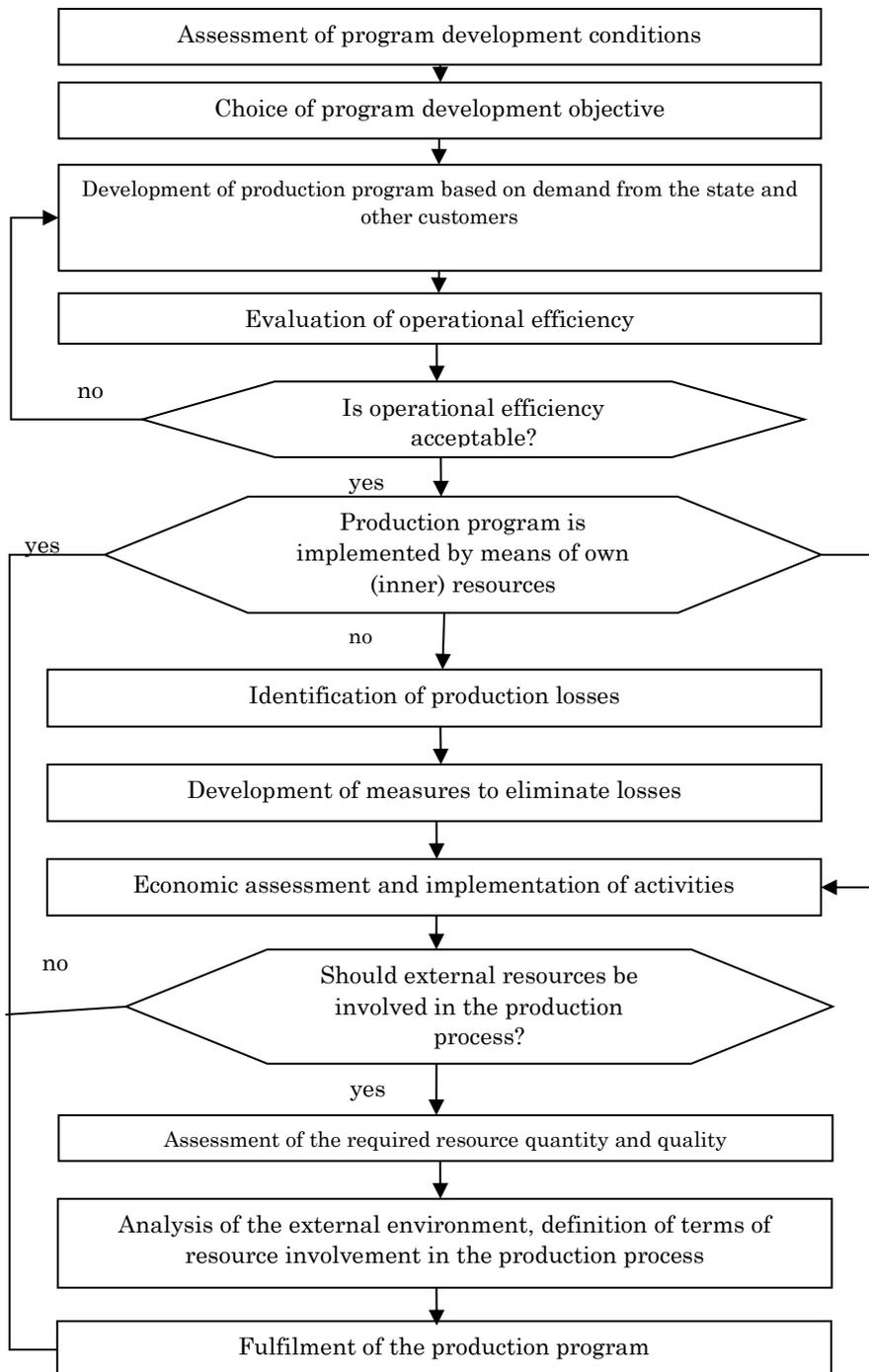


Figure 2. The algorithm of formation the enterprise production program in radio-electronic industry.



Thus, assessing the conditions of forming radio-electronic enterprises' production program allows tying in the goals of its formation with the tasks of the regional socioeconomic policy. At that, the main goals are reduction of the need for own circulating assets, reduction of production's dependence on borrowed capital, maximization of output at a determined level of own funds sources, ensuring maximum continuity and best production rhythm, freeing sources of funds for production upgrading and assortment updating.

As previously noted, if the production is characterized by significant resource intensity and fluctuations of income amounts, it is efficient to use the model for determining target costs for satisfying consumer needs that allows comparing the values for specific solvent consumers and the aggregate production costs. If the enterprise is characterized by a high risk of insufficient production capacities to execute the target production program, it is expedient to use the model that allows both the efficient use of own production capacities and the maximum use of resources from the external environment with a view to achieving certain goals.

It is worth noting, that using the considered algorithm of forming a production program is expedient for assessing products that constitute a considerable share in the enterprise's sales. If according to the assessment results the target production program is not demonstrating an adequate operating efficiency, an analysis is performed for the possibility of its improvement by correcting (modifying) the volumes and structures of production.

In this case, one can emphasize a set of production programs that correspond to the operation of the enterprise under various unfavorable conditions: decrease of demand, increase of the products' financial cycle, and increase of fixed costs. Since it is known beforehand, which conditions may be realized, the correction of the production program should be made with a view to increasing its adaptability in relation to changes in parameters of the external environment.

According to analysis results, a decision can be made to correct the obtained production program or keep the initial optimal production program. If the initial program turns out to be inadequate, it's risk level unacceptable, and its improvement impossible, the main limitations should be reconsidered, or new models of forming production programs should be used.

A peculiar feature of this algorithm is the focus on using resources from the enterprise's external environment on terms that are acceptable to this economic entity. In order to execute a certain production program that is substantiated in terms of operating efficiency, this algorithm involves the study and realization of primarily internal reserves for improving the efficiency of resource use by the production system, by applying methods and technologies of lean production, and involvement of resources from the external environment in the required amount and quality on acceptable terms.

The formation of production development strategies at radio-electronic enterprises requires a distinct sequence of actions that should have adequate methodological support, and focus on a certain result (Figure 3).

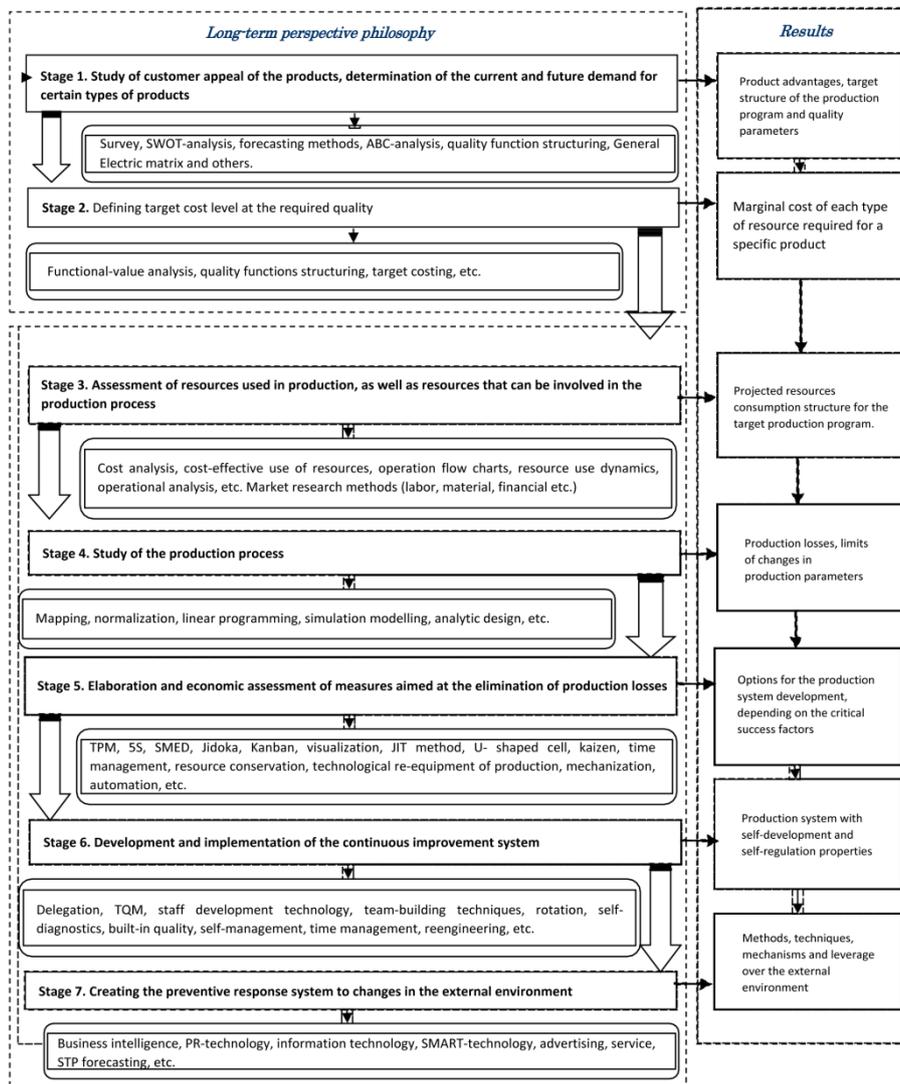


Figure 3. Strategy aiming at the development of regional socio-economic system (by the example of radio-electronic industry enterprises in the Republic of Tatarstan).

This paper suggests using the 14 Dao Toyota principles (Liker, 2005) as the basis for designing a production development strategy. Each stage can include the selection, improvement and application of methods that are aimed at providing specific results (Liker, 1997).

Carrying out the strategy for developing enterprises of the radio-electronic industry as a regional socioeconomic system, the formation whereof is based on the application of resource and management by objectives approaches, allows specifying the interpretation of the “trans-regional production system” category. At the branch level, it is interpreted as a constituent of the hierarchal system of resource transformation for designing and producing competitive products. At

the enterprise level, it is interpreted as a set of subsystems: organization and servicing of workplaces; organization of production; organization of equipment maintenance and repairs; organization of storage facilities; organization of transportation facilities, etc. Applying the suggested methodological instruments allows performing a targeted search and realization of reserves for increasing the efficiency of production resources' use, which improves the mobility, flexibility, and stability of the production system.

Discussion and Conclusion

Nowadays, lean production is becoming more common among Russian industrial enterprises, in the service sector, banking sector, Russian Railways, etc. Educational programs of trans-regional importance are being carried out. For example, the leaninfo.ru information portal created an innovative service that it useful for studying lean production – a map of lean production distribution in Russia.

It is worth noting that the practice of lean production implementation of one-third of the enterprises is mostly limited to the application of 1-2 instruments, which limits their cost saving. Large-scale works for implementing lean production are performed by less than 5% of enterprises. The most significant tendency to apply lean production practices is demonstrated by large mechanical engineering and ferrous metallurgy enterprises, located in the Ural and Volga Federal Districts. The application of lean production affects the “bottlenecks” of enterprises. The most significant “bottlenecks” of enterprises that apply lean production are personnel motivation and design of new products. One of the requirements for further extension of lean production distribution in Russia is raising awareness of lean production instruments and the methods of their implementation in production (Cherkasov, 2014).

In the Republic of Tatarstan, in accordance to the Decree of the Cabinet of Ministers of the Republic of Tatarstan No. 524-R dated 05.04.2010 (, the Ministry of Industry and Trade of the Republic of Tatarstan, and “Kazan National Research Technical University named after A.N. Tupolev” Federal State Budgetary Educational Institution of Higher Professional Education (KNRTU-KAI) are launching projects for lean production at mechanical engineering enterprises of the Republic of Tatarstan:

- drafting educational programs, curriculums, textbooks on lean production for students of higher education institutions and secondary vocational education institutions, within the framework of creating a trans-regional distributed resource center, designing a draft program of the “Lean production technologies” professional module for secondary vocational education institutions' graduates;
- designing interuniversity approaches to updating skills and consulting in the field of lean production;
- signing partnership deals in the field of vocational education, professional training, retraining, and skills updating of personnel between KNRTU-KAI and “Kazan Motor Production Association” OJSC, “Kazan Aviation Production Association named after S.P. Gorbunov” JSC, “KVART” CJSC, “Kazan Electrical Engineering Plant” JSC, “Sergo Plant” Production Association” Federal State Unitary Enterprise, “Zelenodolsk Plant named

after A.M. Gorky” JSC, “Kazan Helicopters” JSC, “Povolzhsky Plywood and Furniture Factory” LLC, and “Zelenodolsk Plywood Factory” JSC;

- performing works with enterprises and organizations of the Republic of Tatarstan for providing services of advanced professional training for employees of enterprises and organizations that are restructuring and modernizing production in accordance with the lean production investment projects, top, middle, and low level managers, and specialists in direct economic contracts.

“Kamaz” JSC is the Russian enterprise that is the most active in implementing the lean production system. Its success is massive. Each ruble of costs is accounted for by more than a hundred rubles of income. However, such success was only made possible by mass involvement in the processes of both production personnel and managers. Before involving the personnel, the enterprise has to train them, but training all the personnel is only possible on the job. In the crisis period, almost any enterprise can find time for training without interrupting the production rhythm.

The main objective of the authors was to formulate the bases for sharing the international experience in lean production organization at the regional level.

Implications and Recommendations

The practical value of this paper consists in the ability to use its recommendations regarding the concept of regional development of the socioeconomic system within the framework of radio-electronic enterprises in RT and other regions of Russia, regarding the mechanism structure of cooperation between federal, regional, and municipal executive institutions, the Rostec (formerly Rostekhnologii) state corporation and radio-electronic enterprises, and apply the principles of Japanese management (Dao Toyota) to develop the socioeconomic system within the framework of the RT radio-electronic enterprises’ activity that is aimed at increasing the value to the consumer and steadily reducing production costs, forming production programs for radio-electronic enterprises, under the execution of State Defense Order and production diversification.

This paper significantly updated the methodological aspects of improving the competitiveness of regional socioeconomic systems by applying M. Porter’s competitive advantage theory that allows forming and developing competitive advantages of individual regional productions.

The scientific novelty of the paper consists in the design of methodological recommendations for forming a development strategy for the regional spatially distributed socioeconomic system that involve the application of the systems method with a view to improving production processes at enterprises, ensuring extended reproduction, organizing rational cooperation between its participants, and distributing resources among them. The authors designed a conceptual scheme of the macro- and micro-factors’ influence on the regional spatially distributed socioeconomic system. This scheme takes into consideration the complex of specific peculiarities of radio-electronic enterprises’ operation, and allows coordinating the terms of cooperation for different participants of production processes.



The most important scientific results that were obtained by the author, and that determine the scientific novelty and value of the conducted research include the following:

In order to use opportunities and reduce the impact of threats, the activity of radio-electronic enterprises has to involve a constant study of market demands, search for profitable forms of investment and new means of bringing products to the market, applying new equipment and technologies with a view to maintaining financial stability and improving the efficiency of the enterprise's activity. The amount of income from products sales can be used as a criterion during production planning. It allows assessing the ability of the production program to provide additional influx of funds. Under the study of theoretical aspects of designing a development strategy for production, a conceptual scheme of the macro- and micro-factors' impact on the enterprise's production system was suggested, which takes into consideration the specific peculiarities of radio-electronic enterprises' operation, and allows coordinating the terms of cooperation for different participants of production processes. An algorithm was built for the formation of radio-electronic enterprises' production programs. Its distinguishing feature is the focus on involving resources of the enterprise's external environment on terms that are acceptable to an economic entity. This algorithm involves the study and realization of primarily internal reserves for improving the efficiency of resource use by the productions system, by applying methods and technologies of lean production, and involvement of resources from the external environment in the required amount and quality on acceptable terms.

The current state and organizational structure of the Russian radio-electronic industry, particularly, "KRET" JSC, was analyzed. The concern's positions in the market are relatively stable, but they are secured by only the governmental protection from import. The overall competitiveness of products is extremely low, both in terms of their price (higher or equal to import counterparts) and quality, and in terms of their engineering level, performance characteristics, and ergonomics. Therefore, the concern is almost absent from the civilian measuring instrument sector of the domestic market. The capacities and external environment threats of "Plant "Elekon" JSC were assessed. The assessment showed that the increase of the order for defense products is the first possibility in the ranking – it is highly probable in the near future. The most significant threats include the price pressure of consumers/clients (it is exerted constantly, and has a constant impact on the reduction of income), and the increase in the number of competitors in the household radio-electronic appliances sector. Both these factors are major in terms of their stage of involvement, and defining in terms of their power. In order to eliminate the threat of price pressure, it is necessary to design reliable methods of price formation (the lack thereof is considered an important factor), improve the operating productivity, and determine internal strategic focal points. The threat of an increasing number of foreign competitors in the production of household radio-electronic appliances is considered significant due to the lack of adequate strategies.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Nikolay N. Uraev holds a Research of Department of Economics and Management at Enterprise, Kazan National Research Technical University named after A.N. Tupolev, Kazan, Russia;

Gaziz F. Mingaleev holds a PhD, Research of Department of Economics and Management at Enterprise, Kazan National Research Technical University named after A.N. Tupolev, Kazan, Russia;

Aleksandr T. Kushimov holds a PhD, Professor of Department of Economics and Management at Enterprise, Kazan National Research Technical University named after A.N. Tupolev, Kazan, Russia;

Nikolay A. Kolesov holds a PhD, Professor of Department of Economics and Management at Enterprise, Kazan National Research Technical University named after A.N. Tupolev, Kazan, Russia;

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