Development and Implementation of Machinery Building Enterprises Complex Development Strategies in the Contexts of the Contemporary Russian Economy

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Abstract: The article explains theoretical and methodogic basis and methodic approaches as well as practical recommendations on the development and implementation of the development strategy for enterprises of machinery building complex providing its innovation orientation in the contexts of the contemporary Russian economy. In the process of developing the author's concept of designing a strategic managemet system, we stipulated the necessity of using the most leading princiles being known already in the system synergy and new principles of forming the concept of designing the mechanism and system of strategic management of the enterprise innovation activity offered by us.

Key words: Development strategy · Machinery building enterprise · Enterprise innovativeness indicators · Strategic management system · Balanced indicators system · Logistical systems

INTRODUCTION

A characteristic feature of the world economic development is the countries' transition to building the economy based predominantly on the generation, distribution and knowledge use. Further development of the Russian economy, increasing of its competitiveness and reinforcement of social orientation are related to the activation of innovation (non-energy) sector that demands the necessity to force the development of highly technological, intellectual- and science-intensive types of economic activity [1].

Due to this the Russian economic science has tasks of theoretic reasoning and practical solving problems of manufacture complexes adaptation and development in the context of economic structural transformations, above all, based on the efficient management of innovation activity.

Under current conditions of economy management the most rational form of increasing the innovation activity of the Russian economy is the development of machinery building complex with the use of social and economic systems functioning theory and management theory.

The existing approaches to forming the system of managing the innovation-oriented machinery building complex activity consider only separate aspects and trends, but at the present time there is no comprehensive study of existing economic fundamentals and problems of strategic management under conditions of the increasing turbulence of the market environment [4]. This circumstance does not allow to fully use the existing potential of the machinery building complex and stipulates the necessity to explain new methodological approaches to making the concept of efficient management with the use of modern management technologies.

RESULTS

The undertaken study and analysis of the Tatarstan Republic machinery building complex present state and development perspectives developed the conditions for its innovation and investment development: allocation of the machinery building complex productive forces on the cluster approach basis, i.e. the formation of separate clusters of the machinery building (manufacturing groups) on the basis of large enterprises; system use of mechanism and private and state partnership (PSP), the

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development of the course to implement priority projects of the republic petrochemical industry complex and close integration of the machinery building with the industry science; tempo maintenance and increasing of the investments growth into the basic capital of the machinery building complex of the RT on the basis of the republic industry investment policy development and implementation (including machinery building), differentiation of the activity areas and coordination in one responsibility center; implementation of the "Program of the Innovation Activity Development in the Republic of Tatarstan" related to the highly technological machinery productions development, increasing of the competitiveness and science-intensive machinery building products export; development and implementation of breakthrough investment projects on the manufacture of competitive machinery building products expanding cooperation with a "small" business according to the outsourcing scheme and construction of technological and industrial parks on the basis of idle capacities.

Mechanism of managing the machinery complex innovation activity is defined as a way of the innovation potential implementation with the aid of the management system to provide its stable innovation development as a special combination of the enterprise innovation management forms and methods. In the context of this approach a strategy is regarded as an organic unity of goals and their implementation means with the aid of scientific approaches, principles and methods. The way of implementing the enterprise functions is the creation of added value through the merger of the external environment resources and internal opportunities.

In accordance with the level of the external environment turbulence, the economic entity's capacity to react and innovation radicality level (basic (synergetic), system, growing, pseudo-innovations) strategies of the machinery building complex development (diversification, integration, intensive) are singled out [6].

Diversification strategy of the machinery building complex development is preferable in the context of considerable turbulence which success contemplates the necessity to form the external conditions by the economic entity. This strategy is based on the implementation of synergetic innovations or qualitative (those that change system forming and/or strategic factors) innovations leading to the revolutionary development of the machinery building complex as a sociotechnical system.

Integration strategy of the machinery building complex development is preferable under conditions of the non-continuous turbulence and dominating role of the external conditions towards the enterprise. This type of strategy contemplates the system innovations implementation. The strategy is focused on the activation and support of processes on the improvement of the products manufactured by the machinery enterprise complex enterprises and the technologies that are used; to a greater extent its implementation is associated with development works and with fundamental and applied researches to a lesser extent.

Intensive strategy of the machinery building complex development is preferable under conditions of the changing and growing turbulence, as well as a dominating role of the market towards the enterprise. This type of strategy contemplates re-innovation processes which implement the innovations of a low novelty level (growing and pseudo-innovations) focused on the enterprises insignificant changes in products and technologies [8].

In the course of developing the author's concept of the strategic management construction scheme we explained the necessity to apply progressive principles that are already known and new principles to form the mechanism construction concept and system of strategic management of the enterprise innovation activity we proposed and displayed in Fig. 1 in the system unity.

The model of strategic innovation-oriented machinery building complex management proposed in the work is based upon the integration of innovativeness manufacture, maintenance, transport, infrastructure, organization and management indicators into the system of indicators characterizing the current machinery building complex activity. The management model cannot fully comprehend the specificity of all current activity directions.

That's why there is a necessity of a so-called "cascading" mechanism, i.e. a consequent translation of the model "from top to bottom" for each level of business units, structural subdivisions, sections, separate employees of the machinery building complex. The main goal of cascading is to discover and confirm cause-and-effect links between the actions of a specific enterprise (subdivision) and strategic goals of the machinery building complex management.

The cascading depth must be set by the chosen strategy of the machinery building complex, management and clients-orientation criteria, specificity
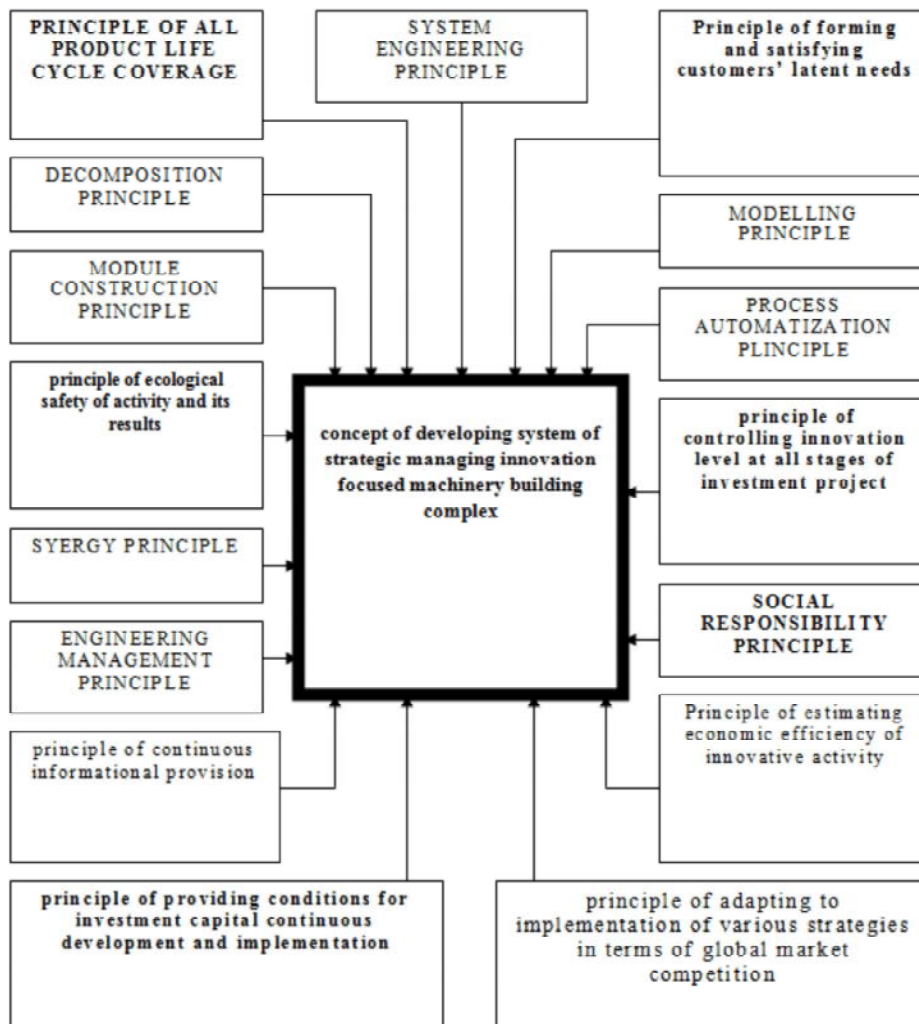
Note: principles formulated by the author are in bold type

Fig. 1: Basic forming principles of the concept of developing system of strategic

of the organizational hierarchy and the type of economic activity. Herewith, the following cascading rules were applied in the paper: goal achievement is an individual zone of a separate enterprise responsibility; the enterprise Balance Scorecard (SS) contains the same business aspects as the strategic card of the machinery building complex; a general methodology of making strategic cards is applied for all SS levels.

In connection with this, the most important factor of the efficiency of the innovation activity management model for a machinery building complex in the region based on the SS becomes the specification of the content and innovativeness indicators structure (Table 1).

Table 2 systemizes information about various approaches to the enterprise efficiency estimation.

The undertaken analysis of the informational systems of the machinery building products life cycle support reveals the basic problems related to the provision of the logistic flows interrelation and synchronization in the dynamics of single informational environment. Due to this, we proposed and explained the approach to consider the efficiency of the global logistic system on the basis of the managed logistic resonance achievement providing the simultaneity of the flow processes of enterprises participating in the product life cycle (LC) as well as explained and developed the approach to the mathematical formalization of inertial characteristics of the LC processes that will allow to provide the reactivity of the product LC logistic support system to the consumer demand dynamics in the real-time.

Table 1: Efficiency indicators system of innovation potential acquisition

Ser.	Indicator	Unit	Meaning and formula for defining
			Goals setting indicators
1	Volume of sold products	RUR	$GP = \sum_{j=1}^{n} Vj * Pj$ (1)
			where: GP is volume of sold products, RUR;
			Vj is ready products of j type, pcs;
			Pj is the cost of the î type products unit, RUR.
2	Enterprise innovation products	RUR	$GP_{inn} = \sum_{j=1}^{n} V_{innj} * P_{innj}$ (2)
			where: GP_{inn} is volume of sold innovation products, RUR;
			V_{innj} is volume of innovation products, pcs;
			P_{innj} is the cost of innovation products unit, RUR.
3	Innovation products share	%	$D = \dfrac{GP_{inn}}{GP}$ (3)
			D is a share of enterprise innovation products.
4.	Innovation potential	RUR	$P = \left[\left(\dfrac{R_{uHH}}{R}\right)_{O\partial P} - \left(\dfrac{R_{uHH}}{R}\right)_{PT}\right]GP$ (4)
			where: P is enterprise innovation potential;
			$\left(\dfrac{R_{uHH}}{R}\right)_{o\partial P}$ is exemplary level of the resources use to manufacture innovation products;
			$\left(\dfrac{R_{uHH}}{R}\right)_{PT}$ is level of using resources for the manufacture of innovation products at
machinery			building enterprises;
			$R_{ëii}$ is a combination of resources for manufacturing innovation products;
			R is a combination of all enterprise resources;
			GP is volume of enterprise sold products.
5.	Innovation activity	RUR/year	$A = \dfrac{\Delta P}{\Delta T} = \dfrac{P_{i+1} - P_i}{t_{i+1} - t_i}$ (5)
			where: ΔP is innovation potential study, RUR
			ΔT is the period of studying innovation potential (year).
			P_i, P_{i+1} is the value of innovation potential before and after studying.
			t_i, t_{i+1} is time series chosen for calculations.
			Efficiency estimation indicators
6.	Investments in innovation products	RUR	$I = \sum_{k=1}^{n} \dfrac{I_k}{(1+r)^k}$ (6)
			where: I_i is investments in innovation products for the periods $k=1…n$ RUR;
			r is a discount norm (rate).
7.	Net discounted income	RUR	$NPV = \sum_{k=1}^{n} \dfrac{P_k}{(1+r)^k} - \sum_{k=1}^{n} \dfrac{I_k}{(1+r)^k}$ (7)
			where I is investments;
			P is annual profit.
8.	Internal profit norm	%	$IRR = r\ NPV = 0$ (8)
			IRR is internal profit norm.

Table 1: Continue

Ser.	Indicator	Unit	Meaning and formula for defining	
9.	Discounted recoupment term	Let.	It is defined according to the cumulating discounting flow of real funds from the project implementation; after it this flow has positive value till the project is finished	
			Indicators of accounting risks indefiniteness	
10	Maximin criteria (Wald's criteria)		$E_? = \max_i \min_j e_{ij}$	(9)
			Minimal result provision	
11	Minimax risk criteria (Savage's criteria)		$E_{rc} = \min_i \max_j r_{ij}$	(10)
			Minimal risk provision	
12	Generalized maximin criteria (Hurwitz's criteria)		$E_{i\varsigma} = \max\{k \min_j e_{ij} + (1-k)\max e_{ij}\}$	(11)
			where 0<=k<=1 Provision of balance between optimistic and pessimistic variants	

Table 2: Peculiarities of various approaches to the enterprise efficiency estimation

Theory (model)	Object under consideration	Efficiency criteria
1. Non-classical theory	Productivity efficiency	Output for the resource unit is maximal
	Economic efficiency	Firm profit is maximal
2. Approaches to management efficiency estimation		
2.1. *Du Pont* model	Management efficiency	Capital profitability is maximal
2.2. Approach based on the company market capitalization	Management efficiency	Company capitalization is maximal
2.3. F. Kotler's model	Management efficiency	Level of satisfying the needs of the parties interested in the enterprise activity is maximal
2.4. Value approach	Management efficiency	Company cost is maximal (economic profitability is maximal)
2.5. *BSC* model	Management efficiency	Company results maximally correspond to strategic plans

CONCLUSIONS

Classification of directions and methods of the innovative activity efficiency allows to reasonably set goals and tasks of the innovation development programs as well as to make a qualitative estimation of possible results from the position of separate innovation process participants. Besides, exact directions division on specific characteristics provides understanding of the structure and content of the manufacturing enterprise innovation potential.

Thus, the use of methodic and methodological approaches proposed in the study allows not only to increase the scientific knowledge, but also to contribute to solving a big national economy task that plays a significant role at this stage of the innovation-oriented machinery building complex development that allows to consider the goal of this study to be achieved.

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