Prerequisites for the implementation of a balanced scorecard in strategic forest management

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Abstract. This article is devoted to the definition of prerequisites for the introduction of a BSC in forestry sector management of the Russia. Today, an unstable economic situation, new ways of forest management help to achieve the goals of preserving the interests of the state, private business and society in the areas of efficient reforestation, development of the forest industry, starting with the problems of land use planning, conservation of forests, ending with the availability of management cost estimates. As a consequence, the principles of the BSC into strategic forest management are discussed in the article. BSC is positioned as a tool for assessing and managing the strategic development of the forest complex, by creating strategic maps for each level of management. The variant of BSC adaptation into the specificity of the current strategy and development of the forestry complex of the Russia until 2030 is considered. Thus, balanced scorecard of strategic forest management contributes to achieving a balance between production, economic, environmental and social aspects, as well as maximizing the effect by combining the efforts of various economic sectors related to forest resources and other forest benefits based on the balance of their interests.

1. Introduction

In the course of the last decade forest complex has gone through significant external and internal changes, including changes in management structure and collapse of export markets during global financial crisis in 2008-2009 in addition to Russia’s accession to the WTO, reduction of export rates on unprocessed wood in 2012, depreciation of Russian rouble in 2014-2015 and entering an era of import substitution and export orientation. Along with the external impact, the internal environment has also showed its reflection, which consists in the fact that strategic forest management has not reached (according to the key indicators) planned targets that characterize management efficiency.

Due to these problems existing strategy of development of Russian forest complex, active until 2030, which has been created in 2017, should be corrected on a number of issues. Consequently, strategic forest management should be transformed, as well.

Before studying this area it should be noted that strategic development of forest complex lacks its strategic value because current strategy is based on outdated information on forest resources of the country. Furthermore, average date of forest organization in the Russian Federation is over 20 years, although, according to the strategy, it is more than 10 years which means that forest plans with 10-year terms, enacted in 2008, should be reviewed and corrected in 2018. This leads to a discrepancy, i.e. strategy of development of Russian forest complex until 2030 is based on forest data from forest plans...
of the subjects, enacted in 2008. However, forest plans are updated, including parts of actualization of information on forest fund, only in a current year.

Despite the fact that the Ministry of Industry and Trade undertakes assumed correction in forest industry and the Federal Forestry Agency will do this work in the forestry, strategic goals can not be achieved without efficient methodology conducive to quantitative assessment of measurable indicators [1].

In the process of implementation of development strategy of forest complex efficiency of management decisions which, in complex, will reflect obtained final result, can be observed by applying strategic analysis and management because operational management itself is not able to create a system of goals in accordance with specificity of forest sector. Ideally, combination of both strategic and operational management is necessary for efficient management. It has become possible recently after professor of Harvard School of Business Robert Caplan and the CEO of consulting company Renaissance Solutions David Northon created a balanced scorecard in the 90s. A huge amount of accumulated problems of management which jeopardized connection between operational and strategic management became prerequisites of its creation. A balanced scorecard is a mechanism of consistent communicating to administrants about strategic goals of development strategy and control of their achievement through key indicators of efficiency. Therefore, the issue of implementation of the system into strategic forest management is extremely relevant.

Currently, balanced scorecard can be used not only in production, but also in adaptation mode in strategic and organizational tasks. As a result, balanced scorecard can benefit the public sector in the area of performance management and strategic planning.

Agreeing with the opinion of M Komleva, we note that a balanced scorecard is a tool capable of increasing the objectivity of evaluating the activities of public authority and thereby ensuring the timely necessary management decisions, which in its turn improves the quality of state government in general [2].

Y Lapygin, in his monograph on the implementation of balanced scorecard in municipalities, notes significant positive effect of its use in managing the strategic development of municipalities in the USA, Sweden, Belgium and other countries of European Union [3]. T Nesterova proposes to use the balanced scorecard for analysis and determination of ways to improve the quality of the municipal administration activities [4]. A number of authors, for example, V Ryazanov, E Zvereva, M Belyaeva, T Pesyakova, consider it possible to use the integrated balanced scorecard model (BSC) for managing the region’s forest complex [5].

Balanced scorecards developed by E Zvereva and M Belyaeva for the Khabarovsk Territory is of particular interest, which is characterized by: goals' primacy of the participants of forest relations; lack of personal balanced scorecards, as this only burdens and scares partners; lack of binding projects to any of the prospects, they have a nature of general action; collective (by all participants of forest relations) creation of balanced scorecards [6].

T Pesyakova comprehensively describes the management of the effectiveness of the regional forest complex on the basis of a balanced system of indicators in the Arctic zone of the Russian Federation [7].

Based on the foregoing, we consider it necessary to create a balanced scorecard for the purposes of forest management, focused on the interests of all participants in forest relations, namely, the state which implements its functions through the executive authorities; business structures – enterprises and organizations operating in forest sector (including both forest industry and forestry) and public sector, that is, the population.

2. Theoretical, Informational, Empirical, and Methodological Grounds of the Research

When determining algorithm of forming a balanced scorecard it should be pointed out that goals are built below in this system so that they are connected with general strategic vision. In strategic forest management the main goal is creating an efficient mechanism of government collaboration and control of all departments of forest sector for achieving maximum economic and ecological effect with simultaneous fulfillment of interests of our and future generations in regard to forest and natural resources. The strategy and strategic map which controls process of realization of the strategy, corrects the goals and eliminates inconsistencies in the strategy. Strategic goals on each level of forest management are made according to the intended targets [8].
It should be noted that strategic map combines strategic goals and indicators of their achievement, thereby minimizing various risks of unfulfillment of strategy stages. The choice of indicators is a crucial factor in the algorithm of forming a balanced scorecard which measure degree of strategic goal achievement and determination of their target value. Use of indicators specifies a created system of goals and makes these goals measurable. It is advisable not to use more than two or three indicators for each strategic goal wherein approximately 80% of all indicators should be non-financial one. A balanced scorecard is designed for a period of time over 3 years and target value for a long-term period is determined for deferred indicators in the context of our research [9]. It is vital to have indicators that would diagnose tendency of progress towards the ultimate goal at a particular moment (so-called preventive indicators) taking into account the fact that realization of the strategy is continuing ones. Establishment of transitional indicators allows evaluating the progress towards the intended objective.

3. Results

Forest sector of the Russian Federation is adapting to market relations with great difficulty and requirements of global markets are not a priority of national economic policy. The Russian Federation owns more than 20% of world forest which is much more than amount of forest in the leading forest-industrial countries, such as the USA, Canada, China, Sweden and Finland. However, this resource is currently used unsustainably. Russia’s share in global trade of wood materials is only 4% and what is more over 50% of export consists of products of low limits, such as roundwood and lumber. The Russian Federation is the largest exporter of roundwood, 16% of global market and takes the second place in lumber supply (18%), after Canada. Nevertheless, when products of wood recycling with high added value are concerned, our country ranks to take the last position. Hence, its share in export of cellulose is only 4%. Contribution of the sector to GDP of the country is only 1%. According to prognoses of the Ministry of Economic Development in 2018-2020 tendency of moderate growth of domestic consumption of forestry products will continue, which is attributed to rates of population’s increase of income and trade, situation in residential construction, amount of construction work. Currently, level of consumption of production in the Russian Federation is several times lower than the same indicator in the countries of the European Union (figure 1).

Figure 1. Consumption of forest complex products per 1000 people, 2017.

Manufacture of wood and wood products is determined by existing internal and external demand on products of Russian forest industry. It should be pointed out that Russian-made products are, in general, inferior to their foreign analogues due to outdated, detrimental to the environment technology, high level of moral and physical depreciation of capital assets. For that reason quality standards are not met and resource intensity and energy intensity of production is rising [10].

Manufacture of the main types of forest complex products, considering projected numbers, is represented in table 1.
Table 1. Manufacture of main types of forest complex products

| Indicators                              | 2016 account | 2017 assessment | 2018 prognosis | 2019 | 2020 | 2020 to 2016, % |
|-----------------------------------------|--------------|-----------------|----------------|------|------|-----------------|
| Unprocessed wood                        | 104.2        | 104.0           | 101.9          | 101.8| 101.5| 109.6           |
| Processing of wood and manufacture of wood products | 102.8        | 103.0           | 101.9          | 101.8| 101.5| 108.6           |
| Wood which has been cut lengthwise      | 103.6        | 105.4           | 103.1          | 102.3| 101.4| 112.6           |
| Fiberboards                             | 102.2        | 100.3           | 100.2          | 101.2| 101.0| 102.8           |
| Particle boards                         | 110.3        | 112.0           | 102.6          | 102.0| 101.8| 119.4           |
| Plywood                                 | 103.0        | 108.7           | 102.1          | 102.1| 102.1| 115.7           |
| Manufacture of paper and paper products | 105.1        | 104.5           | 104.5          | 103.6| 103.4| 116.9           |
| Commercial cellulose                    | 104.2        | 102.3           | 102.2          | 102.3| 102.2| 109.3           |
| Paper and cardboard                     | 104.1        | 102.8           | 101.6          | 101.7| 101.6| 108.0           |

It is important to note that the use of average annual production capacities in the Russian Federation in 2016 on wood manufacture which has been cut lengthwise was 56.6%; lumber – 55.2%; plywood – 87.3%; particle boards – 76.8%; fiberboards – 77.8%; wood cellulose and cellulose made of other fiber materials – 90.0%; paper – 91.9%; cardboard – 88.6%.

We should mention the reduction in export of unprocessed wood by 5.0%, plywood – by 1.3%, cellulose – by 2.5% speaking about export supply in the first 6 months of 2017. Dramatic rise of Russian export until 2020 is not to be expected due to the limitation of nomenclature of export goods, quality of which do not meet the required standards [11]. Increase of export deliveries will be determined by development of economy of main countries-importers of Russian goods. Main part of export deliveries will be products which have already found their own niches on the international market of wood (mostly goods of low quality).

In the view of the foregoing relevant prerequisites of implementation of a balanced scorecard into strategic management of forest sector of the economy, conducive to providing rational development of the sector and increase of its income through reasonable use of raw materials, taking into account demand on internal and external markets, become obvious (figure 2).

Firstly, accumulated significant and successful experience in balanced scorecard applying in the field of enterprise and complex management, both in Russia and in the countries which can be approximated taking into account the industry specificity of the forest complex of the Russian Federation is accumulated;

Secondly, inefficiency of the existing system of management of the forest complex on the basis of indicators defined by legal acts in forest complex branches;

Thirdly, the disunity of targets in the field of forest management, the absence of causal relationships between aims, objectives, and interests of forest relations participants;

Fourthly, a significant number of indicators are currently used in forestry for the purposes of strategic management of the forest complex (Indicators of the Forestry Development Strategy, indicators of the State Program for the Development of Forestry for 2013-2020, criteria for evaluating the effectiveness of state authorities of the Russian Federation on the implementation of the transferred powers of the Russian Federation in the field of forest relations – and target indicators for the implementation of the planned forest development (planned targets that characterize the effectiveness of activities in the use, conservation, protection, regeneration of forests and afforestation for the planned period, including increasing availability of forests for their usage, increasing the use of forest resources, income from using forests – 11 units) foreseen by the Forest Plan, largely duplicated, which complicates forest management.

Fifthly, the current approach to assessing the effectiveness of forest management based on the analysis of target forecast indicators cannot be considered satisfactory, since their use does not answer
questions about how well forest management is carried out and whether all the delegated powers are implemented by the constituent entities of the Russian Federation. It is necessary to group the subjects, cluster them according to any significant characteristics considering the diversity of climatic conditions in which forests grow, their forest taxation characteristics, characteristics of development, use, organization of protection and reproduction by regions. Similarity of forest and socio-economic conditions can be the basis for the grouping of regions, such as grouping by federal districts or regionalization of the country by the proportion of managed forests in the overall structure, i.e. by the ratio of protective, operational and reserve forests.

Revealed prerequisites are conducive to implementation of a balanced scorecard into strategic management with government’s participation and support of a long-term perspective of versatile adaptive use of forest resources with high and steady economic growth, stimulation of consumption of forestry goods, improvement of structure of external trade, increase of the share of deep recycling of wood. As a consequence, efficient management policy results in transparency and attractiveness of forest sector for both Russian and foreign investors [12].

**Figure 2.** Prerequisites for the implementation of a balanced scorecard in strategic forest management

Having considered prerequisites for the implementation of a balanced scorecard in strategic forest management it is obvious that the main course of the government policy (as an owner of forest resources) should be creation of one ministry with functions of forest management and responsibility for development of forest policy, legislation, strategic programs and their realization. The ministry should concentrate on transition to intense system of the forestry, increasing productivity of forests through modern methods of reforestation, protection from pests, fire control and prevention of illegal logging. Maximum economic effect will be achieved not by increasing of areas of cutting but by efficient use of resources [13]. Forest sector of economy should be considered one of priority direction of development,

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1 Authors’ development
relevant strategy of development should be designed and implemented along with government programs of manufacturers’ support. It is critical to create an official structure for monitoring, projection and stimulation of demand on wood products, stimulation of domestic demand (e.g. promotion of development of construction of wooden houses) in the Russian Federation. Increasing quality and competitiveness of produced goods in the forest complex is possible by updating capital assets which requires significant investments. Lack of production capacities of goods of deep recycling and low investment attractiveness of the sector can be eliminated by efficient investment policy, subsidizing interest rates for manufacturers and government support in realization of project funding and interest rate reduction of export custom fees on unprocessed wood according to the obligations of the Russian Federation which have been enacted upon WTO accession [14]. Underdevelopment of the previous two decades can be overcome by innovations and breakthrough technology, stimulation of production of modern and innovative goods, such as nano-cellulose, bio-fuel, high-quality types of paper and cardboard. According to the minister of natural resources’ assessment, development of production of fuel pellets and briquettes will enable to create new markets of wood consumption and increase profitability of logging by 25-30%. Thus, strategic management will promote the increase of the amount of logging from each hectare of forest resources and, as a result, larger economic return. In order to evaluate realization of strategy of forest management we suggest to use a balanced scorecard on a number of criterions which can describe elements of the strategy: goal of development of forest sector; object of forest use and general strategy of its development; subject of forest use and its strategy; system of forest exploitation; instruments of management of strategic development. Thus, a balanced scorecard, consistently monitoring strategy, is able to provide achievement of system multidimensionality, goals of strategic forest management, considering measuring of value, applied to the future period, cause-and-effect relationship between goals, management flexibility [15].

4. Conclusions and recommendations
In conclusion, it is important to mention the main advantages of a balanced scorecard e.g. complicated, multidimensional approach to evaluation of complex objects of management and revealing weak and strong functional areas of development of forest sector of the economy.

From our point of view it is necessary to determine areas of evaluation, quantity and content of criteria-based indicators and content of a strategic map during implementation of a balanced scorecard into strategic forest management.

Firstly, it should be noted that quantity and content of evaluated areas of a balanced scorecard are not strictly fixated, as a rule, they are determined on the basis of particularity of research object.

Secondly, adaptive balanced scorecard for strategic development of forest sector should take into account the interests of all functions of forest management.

Thirdly, a balanced scorecard should reflect complex structure of forest management strategy, including a plan or a point of reference of further development, behavior as an ability to forecast consequences in external environment, position as a place of a system in space and time and perspective which means application to the future.

Fourthly, necessary element of evaluation and forest management based on a balanced scorecard should be determination of integral level of development of forest sector, by applying created system of indicators.

We presume that implementation of a balanced scorecard into strategic forest management will promote making efficient management decisions with grounding of strategic courses and measures for providing perspective development of forest complex of the Russian Federation [9].

References
[1] Rezanov V 2014 Assessment of general and particular strategies for sustainable development of the forest complex based on a balanced scorecard Power and Administration in Eastern Russia 4 (69) 55
[2] Komlev M 2016 Balanced scorecard as a basis for improving the quality of government Theory and practice of social development 12, available at: https://cyberleninka.ru/article/n/sbalansirovannaya-sistema-pokazateley-kak-osnova-povyshenija-kachestva-gosudarstvennogo-upravlenija

[3] Lapygin Y 2005 Balanced Scorecard of the Municipality (Vladimir: VlSU)

[4] Nesterova T 2007 Methodology for calculating performance indicators of the municipal administration on the basis of a balanced scorecard Bulletin of OSU 8, available at: https://cyberleninka.ru/article/n/metodika-rascheta-pokazateley-effektivnosti-deyatelnosti-administratsii-munitsipsalnogo-obrazovaniya-na-osnove-sbalansirovannoy

[5] Rezanov V 2017 Modification of adaptive strategies for sustainable development of the forest complex of the region Modern problems of economic development of enterprises, industries, complexes, territories, materials of the international scientific and practical conference: in 2 volumes pp 327-332

[6] Zvereva E 2012 Integrated model of a balanced scorecard as a tool for implementing an adaptive strategy for sustainable development of the forest complex of the region Management of economic systems 6 (42), available at: https://cyberleninka.ru/article/n/integrirovannaya-model-sbalansirovannoy-sistemy-pokazatelej-kak-instrument-realizatsii-adaptivnoj-strategii-устойчивого-развития

[7] Pesuakova T 2016 Management of the effectiveness of the regional forest complex on the basis of a balanced system of indicators in the Arctic zone of the Russian Federation Dynamics, tendencies and problems of human activities in the Arctic regions of Russia Materials of the research topics Social and economic development of the North Arctic regions of the Russian Federation Arkhangelsk pp 66-72

[8] Kotik E 2015 Introduction of a balanced scorecard in enterprises through information technology Information technologies in science, management, social sphere and medicine: a collection of scientific papers of the II International Conference, May, 19-22, 2015 Tomsk pp 264-267

[9] Morkovina S 2017 Economic aspects of application of biotechnologies during creation of forest plantations, Integration and Clustering for Sustainable Economic Growth Ser. Contributions to Economics pp 305-315

[10] Larionov V 2017 Management of sustainable development of the timber industry complex in changing environment The development of the ideas of G. F. Morozova in the transition to sustainable forest management Proceedings of the international scientific and engineering jubilee conference pp 324-327

[11] Forecast of the socio-economic development of the Russian Federation for 2018 and for the planning period of 2019 and 2020. Information of the Ministry of Economic Development of Russia (Ministry of Economic Development of the Russian Federation) of October 27, 2017, available at: https://www.garant.ru/products/ipo/prime/doc/71700494/

[12] Morkovina S 2017 Risk factors for the development of entrepreneurship in forest sector of Russia, Education Excellence and Innovation Management through Vision 2020 From Regional Development Sustainability to Global Economic Growth: Proceedings of the 29th International Business Information Management Association Conference pp 1975-1981

[13] Stepanova Yu 2018 Rational Use of Forest as a Renewable Natural Resource European Research Studies Journal XXI (1) 443

[14] Prospects for the forest complex in the modern economy: innovative development http://tass.ru/pmef-2017/articles/42741718

[15] Stepanova Yu 2017 Complementary approach to functioning of entrepreneurial structures under the conditions of economic instability of region. Integration and Clustering for Sustainable Economic Growth Ser. Contributions to Economics pp 519-528