Digital concept of balanced scorecard for managing production cluster efficiency through GAP-analysis and "direct-costing" system

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Abstract. The evaluation of innovative engines distribution impact for anti-crisis clusterization management of the production system of Ivanovo region on the organization of "direct-costing" system in regional cluster was carried out within digital technology of Balanced Scorecard projections. The article elaborates the conceptual GAP-analysis model within the application of the integrated digital concept of Balanced Scorecard for the improvement of "direct-costing" process in the management accounting of cluster-forming enterprises. Using collective and distributive accounting mechanisms and GAP-analysis elements, the criteria for evaluation of the economic potential of regional production cluster were corrected. As a result of the research, when disclosuring the innovation "direct-costing" mechanisms of management accounting, the elements of the methodology for comprehensive evaluation of production cluster efficiency through the digital Balanced Scorecard model were proposed.

1 Introduction

The application of the "direct-costing" system in the management accounting of production cluster enterprises of Ivanovo region involves the use of collective and distributive accounting mechanisms within the elaboration of innovative information and technological anti-crisis clustering drivers that prevent distortion of the distribution of direct and indirect costs of cluster-forming producers. In the conditions of impossibility of regional production reorganization, the current irregularity of innovative development of industry sectors in the cluster leads to a decrease in innovation and production effectiveness for cluster-forming enterprises and determines the occurrence of oscillations in the production costs negatively influencing the economic development potential of industrial complex of the region [1]. The uneven digital activity of enterprises not only exacerbates the problem of the lack of multilevel regional production but also determines the insufficient positive effect of the polystructurality (interweaving) of various innovative anti-crisis drivers (digital concepts of the Balanced Scorecard and Diophantine equations, strategic mapping models based on GAP-analysis) when used to organize the "direct-costing" process in the regional cluster in order to increase the accounting, financial and production efficiency of cluster-forming enterprises [2-6]. In this situation a multilateral mechanism for managing the clustering of

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the production system of Ivanovo region based on the "direct-costing" method should be aimed at overcoming the uneven digital development of economic entities by rationalizing accounting and production processes. The application of collective and distributive mechanisms in modeling the economic potential of the regional cluster will make it possible while eliminating oscillations in the production costs to form additional strategic prospects for the effectiveness of business processes of cluster-forming enterprises within digital platform of Balanced Scorecard [7]. In this regard, the key leading indicators that form integrated strategic projections of clustering under the influence of positive and negative factors will allow to assess the impact of the polystructurality of the balanced scorecard elements and other innovative anti-crisis drivers on the level of organization of the "direct-costing" system and generate specific features of the condition of the accounting and production mechanism of in the financial and socio-economic management processes of the digital cluster economy.

The problem of the research is to determine the degree of the impact of innovative anti-crisis clustering tools' distribution in order to use them in improving the mechanism of integrated efficiency assessment for the production cluster of Ivanovo region on the basis of modifying the collective and distributive mechanisms of the "direct-costing" system within digital concept of Balanced Scorecard. In each strategic projection of the integrated digital Balanced Scorecard, which acts as a universal innovation driver of sustainable development of enterprises and the cluster system as a whole, various modifications of collective and distribution mechanisms can cause progressive effects in the development of the economic potential of the cluster and provide a high level of efficiency in the accounting and production processes at a faster pace.

The purpose of the work is to elaborate the conceptual GAP-analysis model within the application of digital concept of Balanced Scorecard for assessing the polystructurality of innovative anti-crisis drivers for clustering the production system of Ivanovo region with the correction of a modern modification of the collective and distributive accounting mechanisms and the improvement of the "direct-costing" system as a tool for managing the strategic development of the regional cluster system.

2 Material and methods

Principles of using the "direct-costing" method in the management accounting of enterprises proposed by the authors of various methods for evaluating the effectiveness of accounting and production processes [8-12] cannot be fully used to build the conceptual GAP-analysis model of innovative anti-crisis drivers based on digital concept of Balanced Scorecard and the reflection of collective and distributive accounting mechanisms in it. In terms of the complex relations between variants of "direct-costing" procedures modification, the various parameters of the clustered processes of the regional economy and the competitive advantages of cluster-forming enterprises (the carriers of direct and indirect costs) the evaluation of the polystructurality of concepts of the Balanced Scorecard, Diophantine equations and strategic mapping based on GAP-analysis forms two additional strategic projections ("Financial emergency" and "Financial cyclicity") [13-15].

Observed in the path of polystructural preplacement the basic and additional projections of the Balanced Scorecard of regional cluster provide accounting and cost planning using the "direct-costing" system, not only in terms of variable costs, but also with the participation of the permanent in the subsequent forward and reverse distribution by cost object. Ultimately, these cause-and-effect relationships form the conceptual GAP-analysis model for assessing the complex impact of distribution of the elements of the integrated digital Balanced Scorecard on the "direct-costing" process in the management accounting of cluster-forming enterprises of the region (Figure 1).
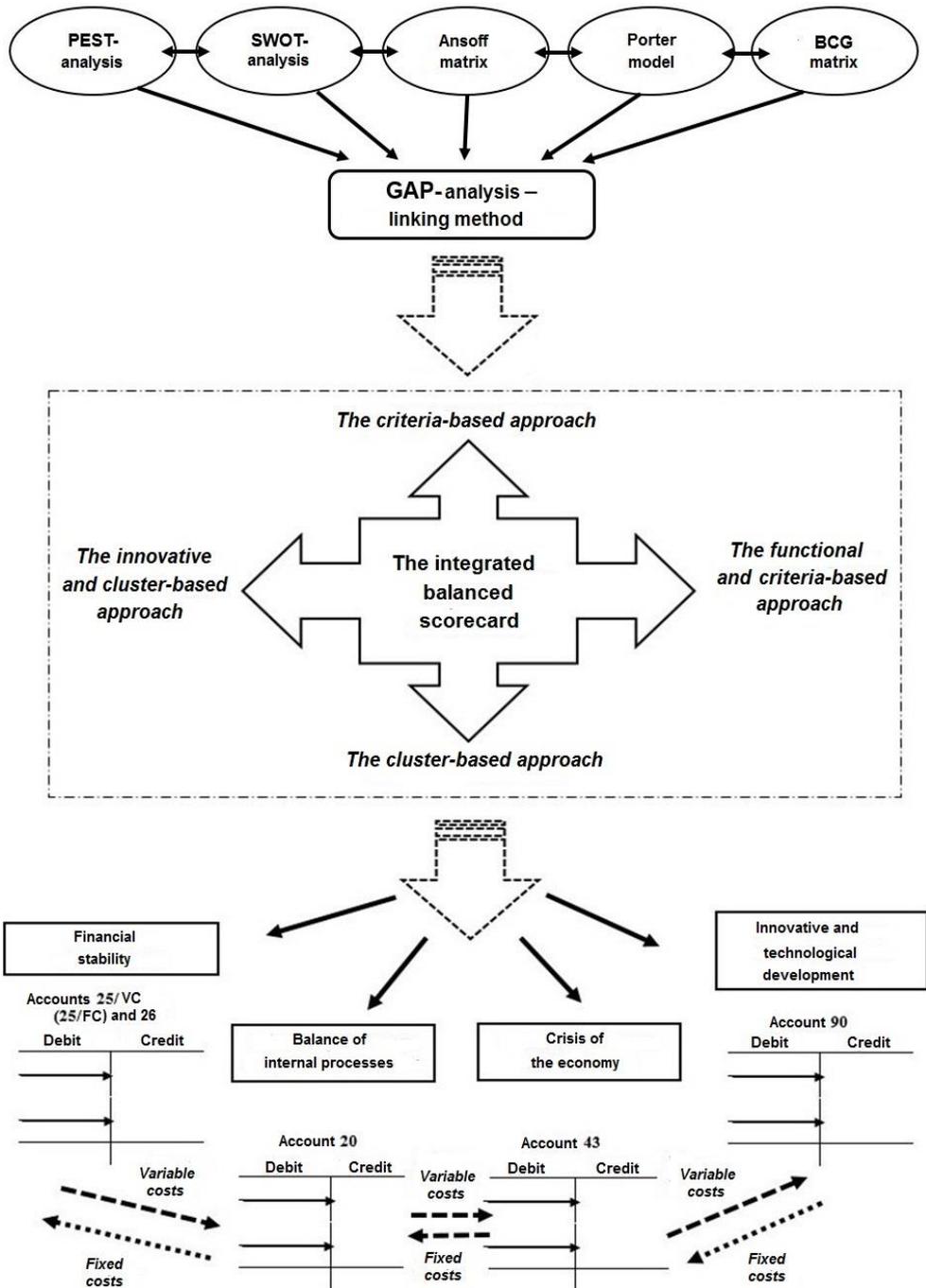
Fig. 1. The conceptual GAP-analysis model within the application of the integrated digital concept of Balanced Scorecard for improving "direct-costing" process in the management accounting of cluster-forming enterprises.

3 Results and discussion

As the main result of the research, the integrated digital model of the Balanced Scorecard for assessing the sustainable clusterization development of the production system of Ivanovo region is proposed and modern options for correcting and modifying the collective and distributive accounting mechanisms of the "direct-costing" system for improving economic potential's strategic projections of regional cluster are presented (Table 1).

Table 1. The integrated digital model of the Balanced Scorecard for assessing the sustainable development and polystructurality of "direct-costing" distributive accounting mechanisms.

Strategic directions for improving the production cluster efficiency of the "direct-costing" process	Key leading indicators of the Balanced Scorecard strategic projections			
	Financial stability (financial emergence, financial cyclicity)	Balance of internal processes (financial cyclicity)	Crisis of the economy	Innovation and technological development
1. The nomination of the priority of domestic innovative and technological sources to attract additional financial resources	The level of the financial flows optimization (generation – 75%) (and distributive mechanisms: ***D 20,23 C 25/VC*** – write-off of a variable part of general production costs for the main production of cluster-forming products with the further cost calculation and achievement of the financial stability; ***D 90 C 25/FC*** – periodic write-off of a permanent part of general production costs in revenue reduction from sales of cluster-forming products)	The level of the production costs efficiency (generation – 75%) (distributive mechanisms: ***D 20,23 C 25/VC*** – write-off of a variable part of general production costs; ***D 90 C 25/FC*** – periodic write-off of a permanent part of general production costs)	X	X
2. The organization of a multi-level digital monitoring system for the implementation of investment strategies in other regions		X	The level of clients coordination (generation – 25%) (distributive mechanisms: ***D 44 C 10,70,69,02,60,76...*** – write-off of commercial costs of cluster-forming products; ***D 90 C 44*** – write-off of commercial costs of cluster-forming products)	X

In the digital strategic projections "Financial stability (financial emergence, financial cyclicity)", "Balance of internal processes (financial cyclicity)" and "Innovative and

technological development" key qualitative indicators (the level of the financial flows optimization, the level of the production costs efficiency and the level of competitiveness and innovative digital activity) generate trends and prospects for improving the efficiency of accounting and production processes of the "direct-costing" system in cluster-forming enterprises (cost carriers) by about 75%. The most comprehensive positive effect is achieved by improving the regional cluster's strategic projections within the modifications of the collective and distributive mechanisms (correspondences) of D 20,23 C 25/VC, D 90 C 25/FC, D 26 C 10,70,69,02,71,60,76,96,97..., D 90 C 26, taking into account the given distribution of variable and fixed parts of the overhead costs and the total amount of general costs to streamline pricing processes and optimization of the cost excess of production for cluster-forming products.

In turn, the key qualitative indicator of the digital strategic projection "Crisis of the economy" (the level of the coordination of clients) generates the accounting and production development of the cluster by only 25% and does not have a significant impact on the strategic prospects for overcoming the problems. The corrections of correspondences D 44 C 10,70,69,02,60,76... and D 90 C 44 presented within this projection reflecting the write-off and the optimization of commercial costs for the production of cluster-forming products do not allow to cover the main positions of surplus costs accumulation for their further distribution (taking into account the possibilities of rational cost calculation). In the conditions of aggravation of problems occurring under the influence of negative investment factors the polystructurality of innovative drivers based on improved tools in the organization of the "direct-costing" system in the regional cluster can be comprehensively assessed as insufficiently high (the economic potential of the cluster within the strategic projections "Financial emergence" and "Financial cyclicity" when using options for modifying collective and distributive accounting mechanisms does not meet the level of highly efficient cluster-intensive industries).

The factors should be constantly taken into account as part of the digital projections of the Balanced Scorecard to reflect the cyclical development of the regional cluster system [16-25]. In this regard, the Balanced Scorecard is the most acceptable digital model that evaluates the specific features of the state of cluster-forming enterprises and provides a metrological support of the flexibility of the management accounting. It should forecast trends in the production cluster development and the life cycle system through key direct and indirect indicators of the financial and economic potential of cluster-forming enterprises [26-32]. The positive and negative factors including in the strategic projections combine the "points of growth", opportunities, threats and problems of the economic development of the production cluster [33-38]. The internal balance between the production and innovation efficiency of cluster-forming enterprises and the socio-economic stability of the economy as a whole became the digital conceptual criterion (feature) for identifying the cluster life cycle factors within the Balanced Scorecard projections.

4 Conclusions

The improved tools for integrated GAP-analysis of polystructurality of innovative anti-crisis clusterization drivers and the organization of the "direct-costing" system in management accounting of cluster-forming enterprises within digital concept of Balanced Scorecard allowed us to elaborate an integrated strategic system of mechanisms for the assessment and management of innovative and production efficiency of the cluster system in Ivanovo region. Summing up, the usefulness of the integrated digital management accounting model is determined by considering the effectiveness of the internal environment of the regional cluster as a structure-forming element, the level of which depends on the consistency of the work of the company's divisions and the presence of a single direction for the implementation

of local tasks by functional cluster-forming enterprises. The application of the formulated impact measure is possible in the formation of a multi-level system for planning and monitoring the implementation of enterprises' own production strategies. Associated with the opening of these features, the decrease in the proportion of management accounting mechanisms from the occurrence of strategic projections will lead to the improvement of the financial state of organizations, which is an integral part of the process of restructurization on the basis of accounting approach to its reliability, suggesting that the transition from single-industry specialization to a diversified economic system based on the Balanced Scorecard digital model. The exchange of digital clustering experience, the strengthening of personal interaction and customer focus that arise when implementing a single direction of achieving the cluster's goals will allow to find new ways to attract the interest of enterprises and increase the awareness of investors when concluding contracts, which will reduce the impact of the risk-forming factors of operational disfunction of business activity of the population. The practical significance of the elaborated models is the generation of the sustainable cluster development goals and the key categorized indicators of the modified accounting apparatus for managing socio-economic, financial, innovation and digital cluster processes.

In the context of negative trends in the global economic system, freedom of access to the cluster resources of the regional economy leads to the emergence of negative risks associated with insufficiently high cluster-intensive industries. The reason is the increased sensitivity of negative investment factors, which causes constant changes in the indicators of regional management accounting. The condition for successful optimization of management accounting risks in order to achieve a balanced sustainability is the identification of corrections through the collective and distributive accounting mechanisms of the "direct-costing" system and GAP-analysis. Content analysis using this model allows to determine the close relationship between the forecasting value of the management accounting indicators and the factors of accounting mechanisms within the framework of the digital concept of Balanced Scorecard.

Thus, in choosing a way to solve the problems of identification of innovative anti-crisis clustering tools' degree can be completely reasonable to calculate the level of digital accounting risk within Balanced Scorecard concept. As a result of the research, effective forecasting of the management accounting mechanisms using digital platform of Balanced Scorecard increases the ability of cluster-forming enterprises in particular states to adopt to the current economic conditions and regulate the most important socio-economic processes in the regional cluster.

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