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Design of the Maps of Commercial Risks of Managing Metallurgical Production in Russia on the Basis of Alternative Scheduling Solutions

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Abstract: Today Russia is one of the leaders at world metal market. Having established as the result of tough competition, mergers and acquisitions, metallurgy as the structural sector of the Russian economy not only determinates the specialization of Russia in the modern international differentiation of labor, constitutes the industrial potential of the country but also makes the great contribution to the development of the economy being its life supporting element. The stable operation of the metallurgical complex in the nearest future is directly related to stimulation of the domestic market for metal products and efficient planning of the commercial activity performance of which does not seem to be possible without assessment of commercial risks. This study presents approaches to development and design of the commercial risk maps that will facilitate the qualitative ranking of the causes and determination of the domain of the risk manifestation by the degree of their impact on the final figures of the economic entities, increase the efficiency of managing the Russian metallurgical production in whole.

Key words: Commercial risks, commercial risks of metallurgical plants in the Russian Federation, Risk, commercial risk map, determination

INTRODUCTION

Analysis of the modern systems of risk management of the national metallurgical enterprises has shown that they primarily incorporate the set of measures aimed at eliminating, preventing and/or reducing the production risks. And commercial risk is considered within the frameworks of the market or financial risk and it is recognized as an independent kind; however in the conditions of the modern market it takes the dominant lead. This is why, it makes sense to perform assessment of commercial risks of metallurgical enterprises proceeding from the core ideas of the "risk-resource" concept. Its essence is revealed through the ambivalent nature of economic risks and the possibility of not only negative (with losses) but also positive (with additional increment of the results productivity, profitability, competitiveness, etc.) implementation thereof.

The design of the commercial risks map consists in formation of the unified terminology for the risk identification and management. It is designed on the basis of the register of risks and their quantitative characteristics obtained during the process of measurement (Davnis and Sivtsova, 2014).

The risk map represents a diagram where on one axis the possible damage from realization of the risk is marked and on the other one the probability of development of this risk. The axes may be called differently but the essence is the same at the upper right, there are the risks that are the most threatening greater damage upon greater probability of realization. These are risks that may cause the toughest troubles for an enterprise and require immediate intervention. At the bottom left, i.e., closer to zero there are risks that may be sharpened with time, therefore shall also be monitored. And in the intermediate position between these two domains there are the risks that pass into the critical ones.

Literature review: The studies by such researchers as Edgington (1995), Davison and Hinkley (2006), Good (2006) and Manly (2007) were taken as the basis for formation of the categorical framework and methodology of this research. The "risk-resource" concept the core ideas of which are described in the studies by Greenfield (1998) is of special importance for achievement of the objective of the research.

The studies by Potapov (2008), Stepanova (2010) dedicated to development of the tools and risk management procedure also deserve attention. In the studies by Gaydaenko (2012) and Davnis and Sivtsova (2014), the aspects of performance of tracking analysis are considered as well as peculiarities of design of the commercial risk map as a tool for managing the risks of an economic entity, specifics of risk management in the sphere of metallurgical production.

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The studies by Andreica *et al.* (2007), Todor *et al.* (2010), Bologa (2011), Achimm and Borlea (2014) and Bluszcz and Kijewska (2015) are dedicated to the modern conditions of the metallurgy development at the world market and analysis of the risks of managing the development of this sector of economy.

MATERIALS AND METHODS

The basic stage in the course of design of the maps of risks is identification thereof as the result of which the potential events are identified affecting the commercial activity regardless of whether they provide additional options or cause negative effects. These events are considered as situations of action of commercial risks and require not only the quantitative assessment but also selection of the measures of appropriate response.

By identification of these events difference factors of the internal and external environment determining emergence of commercial risks are investigated. Special attention shall be paid to the so-called risk indicators that are defined as the result of the risk identification and classification. The risk indicators are used for monitoring, detection and forecasting a risk situation. They supplement the process of the qualitative assessment of risks with continuous monitoring and control. They can be measured as often as required. The properly selected key indicators accompany a particular kind of risk for a long time while weakening or strengthening their effect.

Since within the forecast model of assessment of a commercial risk the quantitative and probabilistic components are distinguished then on the basis of correlation of the commercial risk with the forecast sample versions the verbal evaluation of the quantitative component may be provided and by means of analyzing the values of the logit binary choice model one may proceed from the expert estimation to verbal evaluation of the probabilistic component.

The econometric model of the demand with two fictitious variables used by design of the alternative planning solutions; provides the four development pathways and therefore, obtaining four estimates of commercial risks. This allows proceeding to the verbal estimation of commercial risks as follows (Table 1).

The dependences of the magnitude of commercial risk on the expert estimation may be evaluated on the basis of the sensitivity analysis by the 100-point expert scale and determination of threshold values (μ_1, μ_2, ... μ_{k-1}) used in the regression logit binary choice model by estimate of likelihood of the commercial risk magnitude determined on the basis of the diagram representing the dependence of the commercial risk magnitude on the expert estimates (Fig. 1).

Table 1: Verbal estimates of the commercial risk magnitude

Classification group of the forecast sample	Characteristics of the group	Verbal measure
$+d_1+d_2$	Quite favorable situation at the market	L (low)
$+d_1-d_2$	Favorable situation at the market	A (acceptable)
$-d_1+d_2$	Unfavorable situation at the market	H (high)
$-d_1-d_2$	Rather unfavorable situation at the market	VH (very high)

Table 2: Graphical representation of risk maps

Verbal assessment of the probability of risk	Verbal assessment of the probability of risk vales			
	L	A	H	VH
VH	II	II	III	III
H	I	II	II	III
A	I	I	II	II
L	I	I	I	II

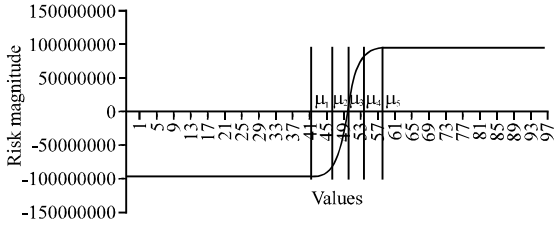

Fig. 1: Dependencies of the commercial risk magnitude on the values of the expert estimates

It can be seen from the (Fig. 1) that the dependence of emergence of a risk situation on the expert estimates is symmetrical to the point of intersection with the abscissa axis (μ_3) at which the commercial risk equals to zero. The expert estimates within the domain exceeding the value μ_3 initially determine the status of the risk situation of excess of supply over the demand or demand over the supply and the values within the range from 0-μ_3 represent the opposite situation.

Within the presented distribution of dependence of the commercial risk magnitude on the values of expert estimates the four domains may be distinguished that allow introducing the verbal estimates of probability of emergence of a risk-situation. Thus, the algorithm of formation of alternative planning solutions allows not only developing the predictive estimate but also proceeding to verbal estimates of both the magnitude of commercial risk and of probability of the specified variants.

Further on the final results of the conversion under consideration will be used by calculation of the values of the commercial risks metrics by means of 'multiplying' the verbal estimates (Stepanova, 2010). On the basis of the calculated metric values the risks may be ranked starting with "VH" and ending with "L". Graphical representation of the ranked metrics of verbal estimates on the basis of their significance and effect on the commercial activity is provided in Table 2.

The risks of the first domain (white domain of the map) either are unlikely to emerge or do not have significant effect on the commercial activity.

The risks of the second domain (light-grey domain of the map) indicate the average probability of emergence and exercise moderate effect on the commercial activity.

The risks of the third domain (dark-grey domain of the map) are critical to commercial activity due to the high probability of emergence or severity of damage.

According to position of the specified domains the graphical representation of the risk map allows defining their priority:

- I Group: low risks laying within the normal range and allow maintaining the performance of the commercial activity at the acceptable level
- II Group: average risks the number two risks, require continuous monitoring and control
- III Group: catastrophic risks feature the highest priority and require increased attention

RESULTS AND DISCUSSION

The main result of formation of the commercial risks map is identification of the most significant kinds of risks for the purpose of development of rational management methods (Table 3).

Thus having obtained the information required for systematization and generalization by design of the risk map, we get the massive database within which the risks are structured by categories (kinds), then the specified categories are divided into the risk factors and indicators and only after that the formulations of the specific forms of risk emergence by means of constructing the register thereof are presented.

Having initially selected the key indicators of the relevant risk profile, further one may perform the adjustment of them (if applicable) by not only changing the thresholds but also substituting the obsolete values. As the result, the risk map may be supplemented during the process of monitoring and may be changed along with the development of an enterprise. So being the basis for identification, analysis and planning of risk situations, it represents a dynamic object that has to be improved according to the processes taking place in the environment.

Table 3: Main tools of managing the commercial risks at metallurgical enterprises

Kind of risk	The risk components to be controlled	Management tools
Ready delivery risks	Ensuring the required volume of production and execution of contracts with the sensitivity analysis of absence of demand of products manufactured	Control of compliance with the production policy of an enterprise
Risks of non-performance of commercial contracts	Minimization of losses arising out from delays in fulfillment by the counterparts of the current contract obligations	Control of estimation of the raw material the supply schedule at the stage of execution of contract obligations
Risks of increased competition	Compliance of the marketing policy of the enterprise with the market requirements and sensitivity to introduction of innovations	Control of the evaluation of the enterprise competitiveness
Risks of changes in the market economic condition	Sensitivity to instability of economic situation	Control of emergence of macro-economic risks at economic conditions the external and internal markets

CONCLUSION

Analysis of the modern systems of risk management at metallurgical enterprises showed that they basically incorporate the set of measures aimed at elimination, prevention and/or reduction of indicators of production risks and the commercial risk is not recognized as an independent kind.

The stable operation of a metallurgical complex in the nearest future is directly related to stimulation of the domestic market for steel products and effective planning of commercial activity which appears to be not possible without assessment of commercial risks.

The computational experiment of analysis based on the "risk-resource" concept for national enterprises of metallurgical complex enabled designing the map of commercial risks on the basis of alternative planning solutions as well as ranking the causes and areas of the risk emergence by the degree of impact on the final results of the corporate commercial activity.

Practical application of the risk maps is related to the possibility of the optimal choice that has to be used for effective planning of the commercial activity and volumes of production.

REFERENCES

Achim, M.V. and S.N. Borlea, 2014. Elaborating a Global Diagnosis of a Company in Metallurgy Industry. J. Metalurgia, 53 (2): 261-264.

Andreica, C., M. Andreica, R. Andreic, I. Miclaus and M. Ungureanu, 2007. Conclusions on Using the Statistical Methods in Forecasting the Structure Evolution of an Economic Indicator System, Economic Computation and Economic Cybernetics Studies and Research, pp: 1-2.

Bluszcz, A. and A. Kijewska, 2015. Challenges of Sustainable Development in the Mining and Metallurgy Sector in Poland. J. Metalurgia, 54 (2): 441-444.

Bologa, A., 2011. Analysis of the Economic and Financial Performance of an Organization in Metallurgy. Academic J. Metalurgia Int., pp: 26-30.

Davison, A.C. and D.V. Hinkley, 2006. Bootstrap Methods and their Application. 8th Edn. Cambridge: Cambridge University Press, pp: 594.

Davnis, V.V. and N.F. Sivtsova, 2014. Treking-analysis in plany alternatevnykh resheniy of postroenii karty kommercheskikh riskov. Nauchny resultat: Ekonomicheskie issledovaniya, Russia, 1: 70-80.

Edgington, E.S., 1995. Randomization tests. 3rd Edn. New York: Marcel Dekker, pp: 341.

Gaydaenko, E.V., 2012. Karta riskov how instrument Upravleniya riskami Selskokhozyaystvennogo Proizvodstva. Sovremennye the tendency v Economic of Upravlenii: Novyy Vzglyad, Russia, 13 (2): 131-139.

Good, P., 2006. Resampling Methods: A practical Guide to Data Analysis. 3nd Edn. New York: Springer, pp: 218.

Greenfield, M.A., 1998. Risk Management Risk as a Resource. Presentation to the Langley Research Center. http://www.hq.nasa.gov/office/codeq/risk/risk.pdf.

Manly, B.F., 2007. Randomization, Bootstrap and Monte Carlo Methods in Biology. 3rd Edn. London, UK: Chapman and Hall, pp: 445.

Potapov, M., 2008. Metodology Upravleniya Riskami Proektov. Finansovyy Director, Russia, 8: 29-36.

Stepanova, V., 2010. Analiz riskov: Instrument. Finansovyy Director, Russia, 9 (93): 75-79.

Todor, L.S., I. Doro, H.T. Andreica and S. Briciu, 2010. Role of Customer Relationship Management in Decision Support System projection. Revue Metalurgia Int., 15 (5): 109-113.