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Crisis Identification and Development of Crisis Management Algorithm in the Agricultural Sector

Идентификация кризиса и разработка алгоритма антикризисного управления в агропромышленном комплексе

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Abstract

The efficiency of many enterprises has declined significantly in the current global crisis. Enterprise management is the management of joint activities of people, which consists of many problems. The primary tactical tasks for most business entities are “patching holes” (or a reactive form of management) and preventing bankruptcy. This approach does not allow to achieve sustainable operation of the enterprise in the long term. Therefore, the formation of an effective mechanism for managing enterprises is acquiring special significance in today's conditions. The crisis is characterized by many interrelated situations that increase the complexity and risk of management. The problem of evaluating the effectiveness of enterprises is still one of the most complex and intractable. The crisis is objectively characterized by many interrelated situations that increase the complexity and risk of management. The crisis state of the enterprise is particularly difficult in predicting the results of management actions, since the course of events can be changed by relatively small impacts. Based on this, the company should be able to analyze both its own interests and the interests of business

Аннотация

В настоящее время в условиях мирового кризиса, эффективность деятельности многих предприятий значительно снизилась. Управление предприятием - это управление совместной деятельностью людей, которая состоит из множества проблем. Современное состояние большинства хозяйственных объектов таково, что первоочередными тактическими задачами для них являются «латание дыр» (или реактивная форма управления) и недопущение банкротства. Подобный подход не позволяет достичь устойчивой работы предприятия в долгосрочной перспективе. Поэтому особое значение в современных условиях приобретает формирование эффективного механизма управления предприятиями. Объективно кризис характеризуется множеством взаимосвязанных ситуаций, повышающих сложность и риск управления. Проблема оценки эффективности предприятий до сих пор остается одной из самых сложных и трудноразрешимых. Объективно кризис характеризуется множеством взаимосвязанных ситуаций, повышающих сложность и риск управления. Особую сложность в

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partners with whom the company enters into economic relations. There is such a problem as low management competence in the agricultural sector. In this regard, the development of enterprises becomes an urgent problem. This can be achieved by forming a scientifically based algorithm of actions aimed at improving the position of enterprises in the market.

The subject of the study is the formation of a crisis identification system and the development of an enterprise crisis management algorithm. The theoretical and practical significance of solving problems associated with achieving sustainable development and functioning of enterprises determined the choice of goals, objectives, object and subject of this study. Based on the foregoing, the object of study is industrial (processing) agricultural enterprises.

The research task is to propose a set of measures to overcome the crisis in the processing industrial enterprise.

A set of measures has been proposed and justified to overcome the crisis in an industrial enterprise, which will help in managing the economic entity and the result of the implementation of this approach should be overcoming the crisis.

The proposed measures can be applied not only by industrial processing enterprises, but also by other economic entities.

Key Words: strategy, crisis management, bankruptcy, analysis.

Introduction

Industrial processing of agricultural products is one of the most capacious sectors of the Russian industry responsible for food security.

In modern market conditions, the fundamental for the effective development of the activities of any economic entities is to change the production

прогнозировании результатов управленческих действий представляет кризисное состояние предприятия, так как относительно небольшими воздействиями может быть изменен ход событий. Исходя из этого следует уметь анализировать как собственные интересы, так и интересы бизнес партнёров, с которыми предприятие вступает в хозяйственные связи. В агропромышленном комплексе существует такая проблема как низкая компетентность управления. В связи с этим актуальной проблемой становится управление развитием предприятиями. Это может быть достигнуто с помощью формирования научно обоснованного алгоритма действий, направленных на улучшение положения предприятий на рынке.

Предметом исследования является формирование системы идентификации кризиса и разработка алгоритма антикризисного управления предприятия. Теоретическая и практическая значимость решения задач, связанных с достижением устойчивого развития и функционирования предприятий обусловили выбор цели, задачи, объект и предмет данного исследования. На основании вышеизложенного объектом исследования является промышленные (перерабатывающие) предприятия сельскохозяйственной продукции.

В соответствии с поставленной целью была определена задача предложить комплекс мероприятий по преодолению кризисного состояния на перерабатывающем промышленном предприятии.

Предложен и обоснован комплекс мероприятий по преодолению кризисного состояния на промышленном предприятии, который позволит в управлении экономическим субъектом и результатом реализации данного подхода должно стать преодоление кризиса.

Предложенные мероприятия могут быть применены не только промышленными перерабатывающими предприятиями, но и другими экономическими субъектами.

Ключевые слова: стратегия, антикризисное управление, банкротство, анализ.

management system through the widespread use of economic methods (Alborov, Kontsevaya, Klychova and Kuznetsov, 2017). The main task of the management system is the development and implementation of management decisions (Ostae, Klychova and Nekrasova, 2018). The optimality principle is important, which means

that it is necessary to study the maximum of possible options for the execution of a managerial decision and choose those that would most fully ensure the achievement of goals, including in crisis situations (Ostaev, 2017).

Insufficient attention is paid to the functioning of crisis enterprises or those entering the phase of crisis functioning of enterprises (Alborov and Kontsevov, 2016; Sheremet, 2009). In some studies, crisis management is presented as a self-sufficient mechanism (Khosiev, Ostaev, Kontsevov, Suetin, Sokolov, Antonov and Suetin, 2019), while its role in the activities of industrial processing enterprises remains unsolved.

Literature review

In the conditions of the market Russian economy, the interest of participants in the economic process to reliable and objective information about business activity and the financial condition of the organization significantly increases. Broad scientific circles have actively studied the problem of predicting bankruptcy since the advent of the works of Beaver (1966) and Altman (1968).

The most popular foreign models of bankruptcy of enterprises in modern times are: "Financial Ratios. Discriminant Analysis, and the Prediction of Corporate Bankruptcy" (Altman, 1968), "R. Lis's Bankruptcy Forecasting Model (Great Britain, 1972)" (Edwards, 1996), "Forecasting company failure in the UK using discriminant analysis and financial ratio data" (Taffler, 1982), "G. Springate's Bankruptcy Forecasting Model (Canada, 1978)", "D. Fulmer's Bankruptcy Forecasting Model (USA, 1984)" (Edwards, 1996); There are also models of Russian scientists R.S. Sayfulina and G.G. Kadykova (1996), N.N. Selezneva and A.F. Ionova (2001), A.V. Kolyshkin (2003) etc.

The algorithm for constructing all models of multiple discriminant analysis (MDA-models) is the same: a sample of bankrupt enterprises is formed; a sample of non-bankrupt enterprises is being formed; financial ratios for both groups are calculated; using the tools of multiple discriminant analysis (MDA), a regression equation is constructed that classifies all enterprises into bankrupt and non-bankrupt; the adequacy of the constructed model is checked.

In our opinion, the two and three-factor models constructed by the multivariate discriminant

analysis method are not sufficiently accurate. More factors are needed. However, in our opinion, a large number of financial ratios is also a drawback of the model.

None of the models proposed by foreign scientists can objectively correspond to Russian economic conditions, domestic models also do not take into account the industry affiliation of the agro-industrial complex. We can conclude that it is necessary to supplement quantitative indicators with qualitative ones. It is also necessary, on the basis of foreign and domestic developed MDA models, to continue the development of models and methods for identifying the crisis, as well as the crisis management algorithm in the agro-industrial complex.

Methodology

The development of the global and national economies in modern conditions is characterized by multiple transitional processes, accompanied by both local and global crises (Endovitsky, Lyubushin, Babicheva and Zotova, 2019; Endovitsky and Durakova, 2018).

Volatility in both global and national markets has occurred in recent years. Organizations use different methods to ensure sustainable development by forecasting threats and managing risks in response to changes in the operating environment (Erokhin, Endovitsky, Bobryshev, Kulagina and Ivolga, 2019).

In many ways, the causes of the crisis in the functioning of agricultural production that are currently observed are due to the loss of control over ongoing processes (Molchan, Frantsisko, Ternavshchenko, Ostaev, Tinyakova and Markovina, 2020).

An important role in the development of an effective food security strategy is played by the study of global trends affecting the future of food security in the world and global experience in solving this problem (Frantsisko, Ternavshchenko, Molchan, Ostaev, Ovcharenko and Balashova, 2020).

The food production index was 104.9% in 2019 compared to 2018, and 110.8% in December 2019 compared to the corresponding period of the previous year (tables 1, 2) (Information on the socio-economic situation of Russia, 2019, Moscow <https://gks.ru/storage/mediabank/oper-12-2019.pdf>).

Table 1.
 Dynamics of food production in 2018.

No	Period	In percentage to the period	
		The corresponding period of the previous year	Previous period
1	January	102,2	83,2
2	February	101,9	100,1
3	March	102,8	113,0
-	I quarter	102,3	84,2
4	April	105,2	95,9
5	May	103,9	98,8
6	June	105,0	102,2
-	II quarter	104,7	103,8
-	I half	103,5	-
7	July	105,2	103,3
8	August	106,1	107,8
9	September	106,7	105,6
-	III quarter	106,0	111,9
-	January-September	104,4	-
10	October	106,9	106,9
11	November	106,6	95,5
12	December	104,5	95,7
-	IV quarter	106,0	108,5
-	Year	104,9	-

- Information on the socio-economic situation of Russia, 2019, Moscow <https://gks.ru/storage/mediabank/oper-12-2019.pdf>

Table 2.
 Dynamics of food production in 2019.

No	Period	In percentage to the period	
		The corresponding period of the previous year	Previous period
1	January	102,8	81,8
2	February	107,7	104,3
3	March	103,3	107,5
-	I quarter	104,6	82,4
4	April	107,6	99,9
5	May	101,1	95,7
6	June	100,6	99,1
-	II quarter	103,1	102,8
-	I half	103,8	-
7	July	106,7	107,2
8	August	104,1	105,7
9	September	105,3	108,1
-	III quarter	105,4	112,0
-	January-September	104,4	-
10	October	104,5	105,0
11	November	104,3	95,8
12	December	110,8	98,8
-	IV quarter	106,5	109,0
-	Year	104,9	-

- Information on the socio-economic situation of Russia, 2019, Moscow <https://gks.ru/storage/mediabank/oper-12-2019.pdf>.

The transition of farms to market rails at the end of the last century necessitated the adaptation of production and management mechanisms to the requirements of the external environment, which in the first place required the maintenance and strengthening of labor discipline, the independence and initiative of management in setting and solving current and future problems (Kondratiev, Ostaev, Osipov, Bogomolova,

Nekrasova and Abasheva, 2020). At the same time, many economic entities under the influence of market business processes could not adapt to the current realities, or under the influence of certain factors, both internal and external, have signs of insolvency (bankruptcy) (Kontsevaya, 2017; Kontsevaya, Chachotkin, Kostina and Khoruziy, 2019).

Table 3.
Subjects of bankruptcy by industry.

No	Branch of the economy	The number of bankruptcy proceedings introduced in the first half of 2019
1	Trade	1683
2	Construction	1173
3	Manufacturing industry	635
4	The property	703
5	Consulting and scientific and technical activities	318
6	Transportation and storage (logistics)	316
7	Agriculture, forestry and fisheries	278
8	Energetics	128
9	Finance and Insurance	150
10	Administrative activities	138
11	Hotels and catering	103
12	Housing and communal services	96
13	Mining	55
14	Information and Communication	68
15	Services sector	36
16	Culture and sport	24
17	Healthcare	20
18	Education	5
19	Public Administration and Social Security	3

❖ Bankruptcy statistics for the first half of 2019 <https://xn--c1abvl.xn--p1ai/stat/ekonomika/statistika-po-delam-o-bankrotstve-za-pervoe-polugodie-2019-goda/>

In accordance with the objectives of the study, it is necessary to determine the criteria for the transition of an industrial (processing) enterprise to crisis management (Khoruzhy, Gupalova and Katkov, 2019; Molchan, Frantsisko, Ternavshchenko, Illaronova and Prokhorova, 2017). The following new concepts were introduced fundamentally for this: the transition point to crisis management and strategic management in the face of uncertainty and crisis in industrial processing enterprises.

“The point of transition to crisis management” is a point in time at which the resources of current management methods and private anti-crisis measures are exhausted, and the performance of the enterprise continues to deteriorate and continued operation of the enterprise using the

management technologies used by it leads to a high risk of bankruptcy of the enterprise.

“Strategic management in the face of uncertainty and crisis of industrial processing enterprises” as an economic category is a set of economic relations that are formed and proceeding in the management system of an industrial processing enterprise in crisis conditions regarding the most complete, timely and high-quality distribution of available resources to achieve an economic output subject out of crisis.

One of the main factors affecting the functioning of industrial processing enterprises is various instruments of state and regional support (Ostaev, Khosiev, Nekrasova, Frantsisko, Markovina and Kubatieva, 2019).

Table 4.
Factors that affect the financial condition of the company.

No	Groups of factors	The main factors affecting the state of enterprises	Crisis Prevention Activities
1	Technical	Low technical level, high wear, obsolescence of equipment	Equipment fleet renewal;
		Low capacity utilization	Implementation of resource-saving equipment;
		Lack of own financial resources	Computerization of production
2	Economic	High cost	
		Limited opportunities to attract investment, high interest rates on loans	Using a marketing mix policy;
		Risks of new product development	Implementation of logistic methods;
3	Technological	Shortcomings in the organization and management of production and marketing of products	Diversification
		Inertia in mastering innovative technologies	Implementation of resource-saving technologies, including raw material preparation; Expanding the range of drinks
4	Innovative	Underdeveloped infrastructure for innovation	Creation of an industry information system for innovative developments.
		Inadequate information support	Strengthening the industry research and production base. Rapprochement of science and production.

- Compiled by the authors

During the study, a descriptive method was used, which is a system of procedures for collecting, primary analysis and presentation of data and their characteristics.

Results and discussion

The algorithm for building a crisis management system can be represented as follows (Figure 1).

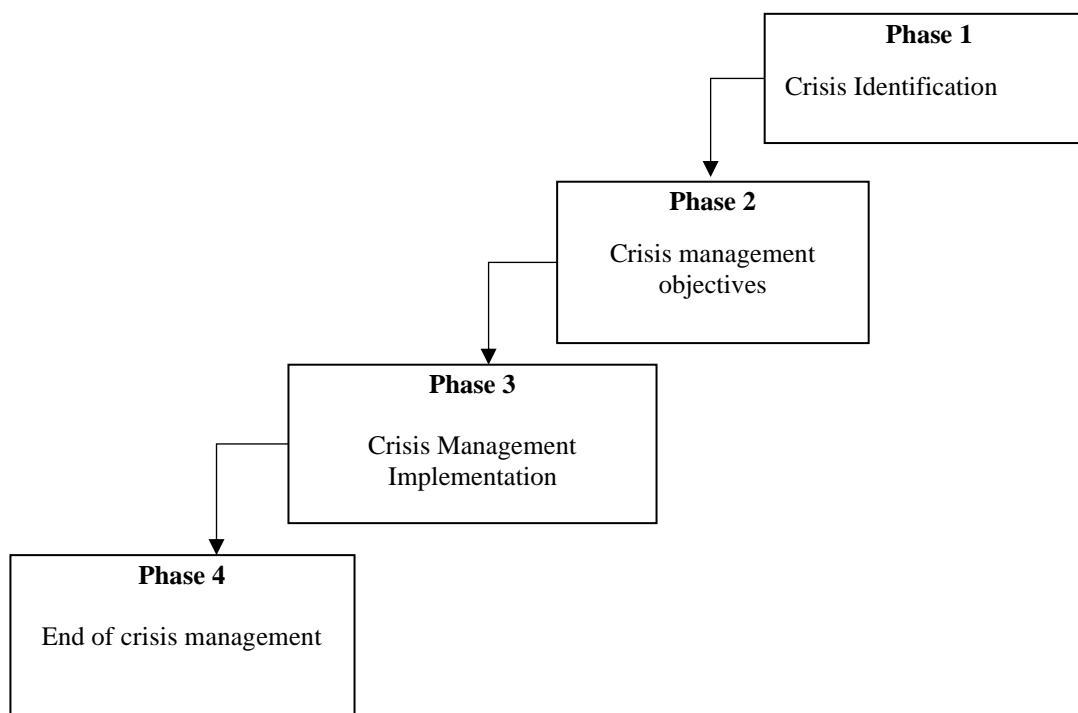


Figure 1. Algorithm for building a crisis management system (authoring).

Identification of the crisis is the determination of the factors of crisis formation and decision-making on the transition to crisis management of the enterprise.

The crisis management algorithm at the first phase is presented in table 5.

Table 5.
The crisis management algorithm in the first phase.

No	Crisis Management Phase	Crisis Management Phase
1	Identification of the crisis	The manifestation of a crisis, such as: - drop in revenue; - drop in sales; - difficulties in paying off payables; - a large percentage of defective products, etc.
2	Selection of forces and means	Identification of responsible departments: marketing, sales, procurement, production, finance, etc.
3	Information transfer to company management	Transmission of information about the crisis to the management of the enterprise
4	Formation of a working group on the assessment of crisis phenomena and their empowerment	Definition of the working group for assessing the state of the enterprise: - head; - employees of the enterprise; - external experts. Also, the definition of each task and subtask responsible and the timing of its implementation; work priorities, etc. produced at this phase
5	Data collection for analysis	The working group makes a request to the business units about the necessary information

No	Crisis Management Phase	Crisis Management Phase
		Detailed analysis of the state of the enterprise: - analysis of the strategy of the enterprise development plan; - analysis of financial and non-financial indicators of the enterprise;
6	Analysis of identified factors	- analysis of factors and groups of factors of the external environment of the enterprise; - analysis of factors and groups of factors of the internal environment of the enterprise; - analysis of the managerial, production, marketing and economic potential of the enterprise
7	Reporting to company management	Conclusions about the current and potential state of the enterprise, proposals for overcoming the crisis of the enterprise
8	Making decisions on the need for crisis management	Decision making by the enterprise management on the need to introduce crisis management. If there is a need for crisis management, transition to the second phase

- Compiled by the authors

The definition of crisis management tasks is the definition of goals, objectives, resources and terms (determination of the goals and objectives of crisis management of an industrial enterprise; determination of a list of capable solutions to problems of crisis management of an industrial enterprise; determination of resources for implementing crisis management of an industrial enterprise (human, financial, intellectual, technological, production, marketing, marketing, reputational); determination of the start and end dates of anti-crisis management Lenia industrial enterprise).

The implementation of crisis management is regulation, the selection of forces, means and those responsible (the establishment of the regulations for crisis management of an industrial enterprise; the selection of forces and means for the implementation of crisis management; the identification of those responsible for the implementation of crisis management; the phased implementation of crisis management of an industrial enterprise; periodic analysis of an enterprise's activities; performance monitoring crisis management of an industrial enterprise).

The completion of crisis management is testing, analysis and management (testing the results of the implementation of crisis management of an industrial enterprise; analysis of enterprise sustainability indicators; transition to crisis management of an industrial enterprise).

The entire algorithm presented should ensure the smooth operation of the crisis management system, which will later help the industrial (processing) enterprise either restore its normal state or identify problem areas in its activities. It is also assumed that this process should consist of two phases, which will include subparagraphs of the presented algorithm. The first phase will be the detection of threats and crisis phenomena at an industrial enterprise, their assessment, determination of further actions. At the second phase, the implementation and use of crisis management of the enterprise takes place.

At phase, one, corresponding to the first and second subparagraphs of the algorithm described above (table 5), the key organizational structure of this scheme should be a group of experts that assesses the state of the enterprise, created by management when crisis phenomena are detected in the enterprise. This group should ensure the collection, analysis and evaluation of data on the state of the enterprise, prepare conclusions disclosing the main causes and factors of the crisis in the enterprise, ensure the interaction of the enterprise units and environmental sources to solve these problems. The working group develops the concept of crisis management, interacts with management, which, on the basis of the data received, decides to introduce a crisis management system at the enterprise. After deciding on the introduction of a crisis management system, the enterprise should be organized as part of the second phase (table 6).

Table 6.
The crisis management algorithm in the second phase.

No	Crisis Management Phase	Phase Description
1	Creation of a crisis management group	Definition of the crisis management team of the enterprise: - head; -competent in specific tasks of crisis management company employees
2	Distribution of duties and determination of deadlines	Determining each task responsible and the timing of its implementation; development and evaluation of anti-crisis solutions, development of anti-crisis management.
3	Operational interaction of enterprise units with a working group	Correction of the current activities of divisions, business processes; formation of strategic consciousness
4	Introduction of crisis management	Providing communications on the implementation, control of execution, completion of crisis management
5	End of crisis management	Decision by enterprise management to complete crisis management

- Compiled by the authors

Since activities to overcome the crisis must be operational, a number of actions must be carried out in parallel at the second phase, corresponding to subparagraphs 3 and 4. Also during anti-crisis measures, there is an operational interaction, changes in business processes and the restoration / formation of a stable corporate environment that meets the modern needs of the enterprise.

In order to improve internal financial control, it is necessary to develop a process, determine the frequency and responsible persons.

It is proposed to build the following internal control process in the crisis management system at the enterprise, which will ensure the normal functioning of the organization (table 7).

Table 7.
Objects of control in crisis management and consolidation of responsibility.

No	Object of control	Explanation definition	Periodicity	Responsible person (structural unit)
1	Accounts receivable	Analysis of the dynamics and structure of receivables Accounts receivable turnover analysis	Quarterly	Bookkeeping, accountant
2	Profitability indicators	Control over settlements with buyers, customers Monitoring the level of effectiveness of the use of resources and assets Control over profitability or sales cost parameters Calculation of the profitability of a unit of a service	Once every six months	Finance Department, Economist
3	Liquidity ratios	Control over the stability of services Monitoring the ability to meet obligations to partners	Once every six months	Finance Department, Economist
4	Financial stability indicators	Analysis of the structure of current assets Control over the ratio of borrowed and equity	Once every six months	Finance Department, Economist

- Compiled by the authors

Control is a universal mechanism and management function of an organization (Kontsevoi, Ermakov, Rylova, Leoshko and Safonova, 2020).

The crisis management group interacts directly with the company's management, providing periodic reporting and forecast information, provides communications at the enterprise to adjust current measures of the crisis management system. Qualification, interest in a positive result of crisis management and willingness to learn new competencies of enterprise management are of great importance in the success of crisis management.

The implementation of crisis management can be complicated by the following reasons:

- the internal resources of the enterprise counteract anti-crisis measures, delaying or interrupting the implementation of anti-crisis management. This resistance can be attributed to: dissatisfaction and lack of staff motivation, accelerated depreciation of equipment in the event of forced production; instability of business processes at the phase of their reengineering;
- there is no practical experience in implementing crisis management, the company's management has only ideas about a project management methodology based on a theoretical study of standards;
- technical and managerial errors of management in the implementation of crisis management related to insufficient competencies in the field of management;
- there is no common understanding by management of the goals and objectives of crisis management in the enterprise;
- there are no relevant documents and formalized algorithms governing communications, the management hierarchy and the activities of the enterprise units.

Conclusions

The advantages of using the presented crisis management algorithm are:

- implementation of constant monitoring at various levels depending on the current situation and the facts of the detection of crisis phenomena and their scale, allowing timely identification of threats and development of appropriate countermeasures;

- the use mainly of the company's own resources in order to reduce the associated costs of monitoring and anti-crisis measures;
- a clear delineation and definition of personal responsibility and authority;
- a systematic approach to determining the phenomena and factors of the crisis, as well as in the development and implementation of anti-crisis programs due to the involvement of specialists and managers of various levels and activities in accordance with the directions of the sources of threats;
- increased control over the expenditure of funds and resources (material and labor) aimed at anti-crisis measures and methods for their more efficient use, due to the high-quality awareness of the involved specialists;
- increasing the efficiency of using the time factor in analyzing the situation and implementing anti-crisis measures;
- a qualitative increase in the level of systems and methods of internal communications.

The result of this approach should be to overcome the crisis (with the subsequent transition to the operational management of the organization), evaluate the effectiveness of anti-crisis measures, introduce a monitoring system for the manifestation of crisis phenomena at the enterprise.

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