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Comprehensive analysis and diagnostics of the bankruptcy probability of an enterprise

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SYMBOLS AND ABBREVIATIONS

In this dissertation the following abbreviations were used:

CDMA	–	Code division multiple access
CIS	–	Commonwealth of Independent States
EBIT	–	Earnings before interest and taxes
EMS	–	Emerging Markets Score
FSA	–	Financial statement analysis
GSM	–	Global system for mobile communications
JSC	–	Joint stock company
LCCAC	–	Life cycle of competitive advantage of the company
LLP	–	Limited liability partnership
LRA	–	Logistic regression analysis
LSM	–	Least-squares method
MDA	–	Multivariate discriminant analysis
ROA	–	Return on assets
ROE	–	Return on equity
SWOT	–	Strength, weaknesses, opportunities, threats
WTO	–	World Trade Organization

INTRODUCTION

Relevance of the research topic. In conditions of the global crisis, which has led to a high level of volatility of the world and national economies, frequent cases of enterprises' crisis occur. Such situations require alternative methods of avoiding the crisis and effective methods of overcoming it.

The head of the state, Nursultan Nazarbayev, during his speech at the VII Astana Economic Forum noted that there is a crisis worldwide, and that current crisis is stronger than the one of 2007-2009 [1]. The President asserted that "*... the public should know the current situation, which implies a reduction in profits of our businesses, decreased income and possible job cuts. In this regard, I charge the Government to analyze, plan the anti-crisis work, and to determine the necessary measures"* [2]. In this regard, the need for timely analysis and diagnostics of the probability of bankruptcy is very relevant for the national economy.

To assess the financial stability of the company, to make evidence-based and optimal managerial, production, and especially financial decisions it is necessary to carry out a comprehensive analysis of the financial condition of the enterprise and diagnostics of the bankruptcy probability. Only thorough and comprehensive analysis gives an opportunity to evaluate the activities of the company and develop specific recommendations to the management for better decision-making on strengthening the financial sustainability, increasing business activity and overall improvement of the company.

In the economic literature, there are numerous methods for determining the financial condition of the company, which are also used to predict the probability of bankruptcy. Among them, Beaver's and professor Altman's models are widely spread and more popular within the Commonwealth of Independent States (CIS). However, it should be noted that the use of foreign models to determine the probability of bankruptcy in domestic conditions do not always yield reliable results.

A number of Russian researchers have tried to adapt the models of foreign authors to their economic conditions. One of the examples is the model of diagnosing a possible bankruptcy developed by R.S. Sayfullin and G.G. Kadykov. Notwithstanding, these models are not entirely applicable to the Kazakh enterprises, since they ignore the industry characteristics of the national economy. Therefore, while assessing the financial condition of the business entity, we suggest considering the industry peculiarities. This, in turn, determines the need to develop new methods of analysis and diagnostics of the bankruptcy probability of domestic enterprises.

The level of scientific development of the problem. Review of the scientific literature on the problems of analysis and diagnostics of the financial condition of the business entities showed that this issue attracts both domestic and foreign scientists. Nevertheless, in Kazakhstan economic science diagnostics of the bankruptcy probability is not as well developed as in western countries.

Theoretical and practical research works of E. Altman, W. Beaver, J. Ohlson, R.J. Taffler, M.E. Zmijewski hold a most unique position among the bankruptcy prediction models. Among the Russian scientists who have studied the analysis and

diagnostics of bankruptcy, we can name A.D. Sheremet, V.V. Kovalev, G.V. Savitskaya, R.S. Sayfullin, O.P. Zaitseva and others.

Kazakh professors K.Sh. Dyusembaev and R.E. Dzhanshanlo devoted their research works to the analysis of the financial condition of enterprises, analysis and audit of financial statements of the domestic enterprises. Scientists T.I. Muhambetov and A.G. Nukushev considered the bankruptcy and anticrisis management. T.S. Seytimov and Zh.S. Samat focused on the development of the bankruptcy institution in Kazakhstan.

Financial problems of bankruptcy diagnostics were considered by G.T. Abdrakhmanova. Professors of the Pavlodar State University studied domestic and foreign practice of diagnosing the bankruptcy of the business entities. D. Kunanbayeva considered suitability of the foreign bankruptcy prediction models to Kazakhstan enterprises.

Despite the variety of approaches to company's bankruptcy extent valuation and forecasting methods, which are widely represented in the foreign and domestic scientific literature, there are only a few studies on the issues of adaptation of these methods to Kazakhstan practice. The developed models and guidelines do not fully reflect the current state of economic conditions in Kazakhstan, as well as industry-specific, and that led to the choice of the goals and objectives of the research.

The purpose of the research is to study the development process of bankruptcy and to improve the methods of analysis and diagnostics of determining the bankruptcy for Kazakhstan enterprises. To achieve this goal, the following tasks we defined:

- to examine the essence and causes of bankruptcy;
- to systematize existing foreign methods of determining the bankruptcy;
- to specify the terms analysis and diagnostics of determining the bankruptcy process;
- to improve methods of diagnosing the bankruptcy probability;
- to develop a model of predicting the bankruptcy for the service and production industries.

The subject of research are the methods of analysis and diagnostics of the bankruptcy probability of enterprises.

The object of the research is the bankruptcy probability of Kazakhstani enterprises.

The hypothesis of the research. Timely analysis and diagnostics of the financial condition of the organization will help to avoid the bankruptcy.

Theoretical and methodological basis of the doctoral dissertation was a study of foreign and domestic scientists in the field of analysis of the financial condition of enterprises, as well as the diagnostics of the crisis and the bankruptcy probability.

The information base of the dissertation comprises of the reports of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, as well as the financial statements of the service and production industries gathered by the author as a result of independent research in this area.

The scientific novelty of the research is to determine the causes of bankruptcy and enhancing the methods of analysis and diagnostics to identify the probability of bankruptcy to be applicable to the domestic enterprises taking into consideration the industry specifics.

As a result of the research the following elements containing of the **scientific novelty** were achieved:

1) the author's interpretation to the concepts of "bankruptcy" and "diagnostics of the bankruptcy probability" was given;

2) the method of diagnosing the probability of bankruptcy based on combination of the ratio analysis and dynamical normative was suggested;

3) the normative model of ranking the indicators of financial condition of the service industry companies was developed;

4) the normative model of ranking the indicators of financial condition of the production industry was developed;

5) a scale of classification of the firms' bankruptcy probability on the basis of financial diagnostics was proposed.

The main provisions to be defended:

1) the main obstacles of the practical use of the existing bankruptcy prediction models in the conditions of modern Kazakhstan's economy were determined, the possible ways of their elimination were defined;

2) the most important financial ratios of stable functioning of the service and production industries' enterprises were validated and the method of selecting the indicators was developed;

3) the normative models of diagnosing the bankruptcy probability for the enterprises of the service and production industries were suggested;

4) the method of analysis to identify the causes of the enterprise's crisis was proposed;

5) a scale of the bankruptcy probability was determined.

The practical significance of the dissertation lies in the possibility of a broad application of the basic provisions of the research work to determine the financial condition of enterprises in the global crisis conditions. President Nursultan Nazarbayev appeals to the government to conduct the analysis and to develop a plan of anti-crisis measures to ensure the economic sustainability of the country. In this regard, the need for timely diagnosing the bankruptcy probability increases the practical significance of the work. Implementation of the developed method, using the necessary statistics, allows to develop models for the business entities of other fields, taking into account their specific operating circumstances.

The following items have an independent practical importance:

– the method of selecting indicators to analyze and diagnose the enterprises' crisis situation with the greatest accuracy in terms of Kazakhstan;

– the method of calculating the probability of a crisis condition of the enterprises with the use of mathematical tools taking into account specifics of operating activities (telecommunications and food industry).

Dissertation materials can be used in the process of higher education and during the preparation of textbooks for the "Analysis and diagnostics of financial and economic activity of the enterprise", "Financial Analysis", "Economic Analysis", "Enterprise Economy", "Crisis Management" and other courses.

Approbation of the research results. The main results of the thesis were presented at five international scientific conferences: VII Ryskulov Readings (Almaty, Kazakhstan, 2012), Kazakhstan's Economy: The global challenges of development (Montana, United States, 2012), Mathematical modeling in economics, management, and education (Kaluga, Russia, 2012), International conference on eBusiness and eGovenment (Istanbul, 2013), International Conference on Applied Economics (Istanbul, Turkey, 2013).

Publications. On the subject of the research 10 scientific papers were published, including three in Kazakhstan scientific journals recommended by the Committee for Control of Education and Science of the Ministry of Education and Science, two articles in international journals included into Scopus database, with non-zero impact factor.

The structure and volume of the research. The thesis consists of an introduction, three chapters, conclusion, and list of references. The volume of the thesis is 112 pages, containing 16 figures and 26 tables.

1 BANKRUPTCY – A CATEGORY OF MARKET ECONOMY

1.1 Essence, types and causes of bankruptcy

In a market economy, where individuals and legal entities interact with each other, as well as various financial institutions, government agencies, and other organizations, the concepts of "insolvency" and "bankruptcy" are a sore point. The recent global financial and economic crisis (2007-2010) added particular importance to these terms. In this regard, the public authorities and the management of organizations have to find ways to prevent the crisis and to ensure the financial sustainability of enterprises, as the bankruptcy of some business entities adversely affect the solvency of other organizations, which in turn affects the overall economic condition of the country.

The economic essence of bankruptcy is concerned with the high risk of an economic entity, under the conditions of market economy, which gives an opportunity to determine the degree of responsibility of the economic entity for its performance.

Bankruptcy is the disruption of the business activities due to the lack of financial ability to restore its solvency through the procedure established by the law. According to the Law of the Republic of Kazakhstan "On Bankruptcy", the basis for declaring the debtor bankrupt in the courts is its insolvency. At the same time, insolvency is defined as a debtor's inability to fully satisfy the claims of creditors on monetary obligations [3, Article 3, clause 7].

According to Zh. Koszhanova, the term "bankruptcy" has a special meaning, and should be used in special cases of insolvency, such as if the debtor is insolvent, and commits criminal acts to the detriment of the lender [4]. As she asserts, the bankruptcy is a legal fact, however, in most cases, it has financial and economic outcomes. Due to this, theoretical understanding, analysis, diagnostics and forecasting of bankruptcy are of paramount importance.

However, there is a scarcity of research devoted to the analysis of the insolvency and bankruptcy both in Kazakhstan and Russian economic science. Until now, there is no coherent economic concept of sustainable development of the company, preventing the crisis and the bankruptcy. Among the scientific works of local and foreign scholars on the subject of bankruptcy prevails the judicial literature. Moreover, publications that deal with theoretical aspects of the economic content of the term "bankruptcy" almost do not exist.

Furthermore, there is no clear understanding of the etymology of the word "bankruptcy". The compilers of dictionaries of the Russian language believe that "bankruptcy" comes from the French «banqueroute» [5]. However, most researchers of the etymological basis of the word "bankruptcy" argue that it comes from Italian - «banco» and «rotto», which means a "bench" and "broken" [6].

Similarly, E. Freiheit [7] considers that the term "bankruptcy" dates back to the XVI century, and comes from the Italian «banca rotta», which literally means "broken table", on which sat a merchant, leading financial and commercial activities. In case of failure to pay on the debt obligations, the bench of the merchant was

broken which served as a signal for everyone else, and meant the termination of the business.

According to the point of view of M. Sobolev [8], the word "bankruptcy" comes from the word "bank", since in the medieval time often for various reasons, commercial banks became insolvent. P. Chernyh states that in the Russian language the word "bankruptcy" has been known since the XVII century, from the time of Peter's rule [6, p. 70].

N. Breslavtseva, in her scientific work, determines that the bankruptcy is a civilized form of resolving the conflict that arose between creditors and debtors. She insists that the bankruptcy enables a certain extent to meet the interests of both, because after the completion of the bankruptcy a debtor is discharged from the former obligations associated with the loss of business, and again has the opportunity for business, and a creditor, in turn, receives a portion of money spent [9].

Indeed, many companies and individuals interact in myriad monetary relations. In some cases, the cash amount of debts exceeds a certain limit, and it results in inability to repay liabilities. Legal entities and individuals are declared insolvent (bankrupt).

Insolvency of economic entities is a common phenomenon in the market economy. It is defined as unfavorable condition of the entity in the system of economic relations, characterized by the inability to pay off its obligations.

According to I. Kukukina, insolvency is the financial condition of the company at which it is unable within a regulatory deadline to execute its own debt and to restore solvency. In case of the observed inverse effect in the enterprise there might occur an irreversible insolvency [10].

T. Seytimov deeply considered the development of the bankruptcy institution in Kazakhstan, and tried to identify the economic aspects of it. He believes that the economic theory of bankruptcy should consist of multifactorial independent content, and affect the macro- and micro-economics. [11].

Professor K. Dyusembaev, states that the bankruptcy is usually a result of imbalances in the economic mechanism of reproduction of capital of the enterprise. In other words, bankruptcy occurs because of inefficient pricing, investment and financial policies [12].

If we analyze the process of company’s failure, it is clear that there is a significant period of time when the company is able to restore the solvency of their own funds between the threshold of the crisis and the beginning of bankruptcy procedure. After the start of the bankruptcy procedure this is no longer possible, since the company can be liquidated or funded from other sources (budget, creditors).

Thus, we believe *that the bankruptcy is the extreme form of crisis, when the economic entity does not have enough resources for the payment of accounts payable and restore solvency.*

The concept of bankruptcy is organically inherent in a market economy. It is characterized by the inability of the enterprise (organization) to satisfy creditors' claims concerning the payment of goods, works and services, and to ensure compulsory payments to the budget and extra budgetary funds.

Under normal conditions of management shareholders and creditors are hoping for a reward, the value of which depends on the level of profitability of the company. One of the first signs of approaching bankruptcy - the fall of the profitability of the company less than the cost of capital. Interest on the loan and the dividends paid by the company no longer meet the market conditions of managing.

Based on the characteristics, bankruptcy of the companies classified into several types:

1. The credible bankruptcy of the enterprise is characterized by a high level of capital losses that adversely affects the business. In this condition, the company is not able to restore its financial sustainability and solvency, in consequence of which it is declared bankrupt in the legal sense, liquidated or reorganized.

2. Technical (conditional) bankruptcy means insolvency of the enterprise due to the late payment, and a significant delay in its debts. At the same time, accounts payable may exceed the amount of notes payable and the amount of its assets may exceed its debts. However, with the help of the effective anti-crisis management, including reorganization, it is possible to amend the situation and to avoid legal bankruptcy. That is why this type is also referred as temporary.

3. Deliberate bankruptcy, according to the Law of the Republic of Kazakhstan "On Bankruptcy", it is an intentional creation or increase of insolvency committed by the head or the owner of a business, as well as the individual businessman in personal interests or interests of other persons [3, article 1, clause 3]. The Law prosecutes educed evidence of the deliberate bankruptcy.

4. Fraudulent bankruptcy. It is characterized by enterprise's false announcement of being insolvent with an intent to mislead the creditors to get them to delay their credit obligations or rebates on the amount of credit debt. Such actions also prosecuted by the Law [13].

Modern economic reality forces managers of commercial organizations to make decisions under uncertainty. In terms of financial and political instability in the activities of organizations is fraught with various crises that could result in the bankruptcy (insolvency) and, as a consequence, the loss of jobs and increased social tension in society. It is therefore necessary to pay great attention to the forecasted assessment of the likelihood of insolvency (bankruptcy).

Bankruptcy is an inevitable phenomenon of any contemporary market that uses insolvency as a marketing tool for redistributing the capital, which leads to the elimination of non-competitive businesses.

The purpose of bankruptcy is predetermined by the essence of entrepreneurship, which is always associated with the uncertainty of achieving outcomes, and therefore the risk of losses. The sources of uncertainty are external and internal factors. Therefore, relationship of risk and return is crucial in understanding the nature of the successful business. The risk of bankruptcy, as a powerful driving force of any business project, helps to ensure that an entity recognized and weighed its possibilities on the way of achieving the goal. In this regard, it is advisable to focus on the basic principles of management of risky situations.

As the international experience shows, bankruptcy can be predicted 1.5-2 years prior of its obvious symptoms. It is possible to determine the initial signs of bankruptcy by the "cost of the company" prediction in the short and long terms.

Reduced profitability of the company or an increase in the average cost of liabilities causes a drop in its price. The price of the company is given to date streams of payments to creditors and shareholders. The discount rate is used as the weighted average cost of capital. The price of the company may fall below the amount of liabilities to creditors. This means that the share capital "disappears". This is the complete bankruptcy - bankruptcy of the shareholders .

In some cases, the price of the company may be lower than the value of the liquid assets. In this case, the liquidation value of the company acts as a price, and it becomes more profitable to sell it than continuing operations. The shareholders in this case lose their capital.

There are a number of external factors affecting the financial condition of the enterprise:

1. General economic: the economic and financial system condition of the nation.

2. Political (state): fiscal policy, the level of taxation, foreign policy, the legislation in the field of business law, competition policy, and other determinants of the regulatory functions of the state.

3. Market: international competition, scientific and technical development.

4. Demographics: size, composition of population, the level of welfare of the people, and so on.

The internal factors affecting the development of the company include the following:

1. Operational: level of technology development and production organization, production costs, losses, equity.

2. Financial: getting loans on unfavorable terms, increase in accounts receivable, excess of permitted financial risk, etc.

3. Investment: lack of working capital, an inefficient stock portfolio, significant cost overruns and other investment resources [14].

G. Savitskaya assures that in the countries with the market economy, sustainable economic and political system, the bankruptcy of 1/3 business entities caused by the external factors and 2/3 by internal [15].

It should be noted that the external factors might be international as well as the national. International factors are shaped by the dynamics of the overall economic performance of the leading countries, the global financial system, stability of the international trade, customs policy, the level of international competition, international capital movements, and others.

Unfortunately, the company's management can not influence the external factors. However, during decision – making the possibility of their negative impact on the company should be taken into account. Depending on the influence of various factors, the causes of the enterprise’s crisis can be defined, financial rehabilitation and crisis-overcoming measures to be determined.

From the mentioned above, the bankruptcy of companies occur due to the negative impact of various factors. The ability of the enterprise to adapt to different changes in the economic environment is a guarantee of its survival as well as prosperity.

In addition to these common causes, Kazakhstani scientists defined a few reasons specific for domestic enterprises. For example, Samat Zh. identifies the following reasons for bankruptcy:

1) inefficient governance at all levels;

2) low level of specialization of small businesses;

3) insufficient level of qualification and information systems [16];

T. Seytimov adds to this list (4) the impact of the global economic crisis, and (5) the debtor's bankruptcy [11, p. 82].

Professor K. Dyusembaev groups the main causes of bankruptcy into the objective and subjective. The objective reasons include:

- inadequate financial, monetary, credit, and tax systems, regulatory and legislative reform of the economy;
- high inflation;
- decrease of the market value of the securities;
- high level of competition and the consequent drop in prices of products without a corresponding reduction in production costs.

Subjective reasons include the following:

- inability to predict the bankruptcy and to avoid it in the future;
- decline in sales due to the poor market research and policy;
- unnecessarily high costs and overpriced products;
- low profitability;
- inefficient and inflexible organization management and inability to fit the new realities of the market [12, p. 220-221].

The activities of any business entity are multifaceted and diverse. Economic-industrial activity comprises of receiving and granting loans, transactions with suppliers and vendors. However, all operations are not always favorable. Since there is no clearly defined and specific ways of doing business and making a profit, you can not be legally required to clearly establish the scope of business activities. This little nuance complicates the process of determining the purposefulness of certain actions of economic entities during the bankruptcy. Moreover, only a proven causal connection, expressed in the property damage, gives the right to recognize entrepreneurs' actions as criminal in the field of bankruptcy.

Bankruptcy is conditionally divided into three types by caused reasons:

1) The bankruptcy of the business due to inefficient enterprise management, inept marketing strategy, waste of resources;

2) The bankruptcy of the owner with the lack of investment in working capital for the simple reproduction;

3) The bankruptcy of the production may be due to the release of non-competitive products, that in turn requires the diversification of products [17].

The critical condition of the particular companies in the market is a natural phenomenon. Due to this, weak enterprises cease to exist, and sustainable ones continue to develop. The critical condition of the company is a turning point in its life cycle that threatens its viability and presents a growing danger of bankruptcy and liquidation of the organization.

According to T.I. Mukhambetov and A.G. Nukushev, the main instrument of economic recovery is the bankruptcy [18]. Causes of the bankruptcy were originated in the period of the planned economy. In the context of centralized financing of capital investments, the enterprises were built too large and therefore were not flexible. Each enterprise was specialized in the narrow production functions. The result was a large monopolized enterprises, many of which were uncompetitive because of the imported goods on the market. Investments of working capital were uneven. Some of the enterprises used to have an excess of assets, others lacked those assets for further development. Consequently, there was a high percentage of morally and technically obsolete enterprises. Many factories were built as a universal production of a single and small series of products. In the market economy, those enterprises were uncompetitive. Administrative-planned economy developed economic environment and the concept of enterprise management, which led Soviet companies to the financial crisis.

In the planned economy, everything belonged to the state. And in the case of financial insolvency of an economic entity financial resources were redistributed from one business entity to another. Under the conditions of market economy the economic entities began to meet their own obligations.

The market economy objectively determines the origin and development of mechanisms that regulate the production, distribution and consumption of goods and services. Achievement of the optimal manufacturing infrastructure that meets the needs and demand of economic operators, is carried out by the national market and currently prevailing market situation. Uneven economic development is characterized as a crisis situation, and it is possible to overcome it with the help of the mechanism of bankruptcy.

The process of healthy enterprise's turning into insolvent, and as the consequence into a bankrupt goes through several stages. Schematically, this process is shown in Figure 1.

At the initial stage, the company is faced with the crisis of the implementation of the chosen strategy, in other words, failure to comply with the full or partial execution of the current problems, finally the strategic goal can not be achieved. Due to the fact that it is almost impossible to integrate quantitative indicators characterizing the crisis of the company's development strategy, this stage of the most difficult to detect. Even if according to the profits and losses statement, the company generates normalized or desired profit, it can not get economic profit. Situational analysis which is conducted in a timely manner helps to identify the crisis, to adjust a strategy and to determine new targets. Due to the short-term impacts on the strategic development of the enterprise it is possible to optimize the production, reduce costs and improve competitiveness.

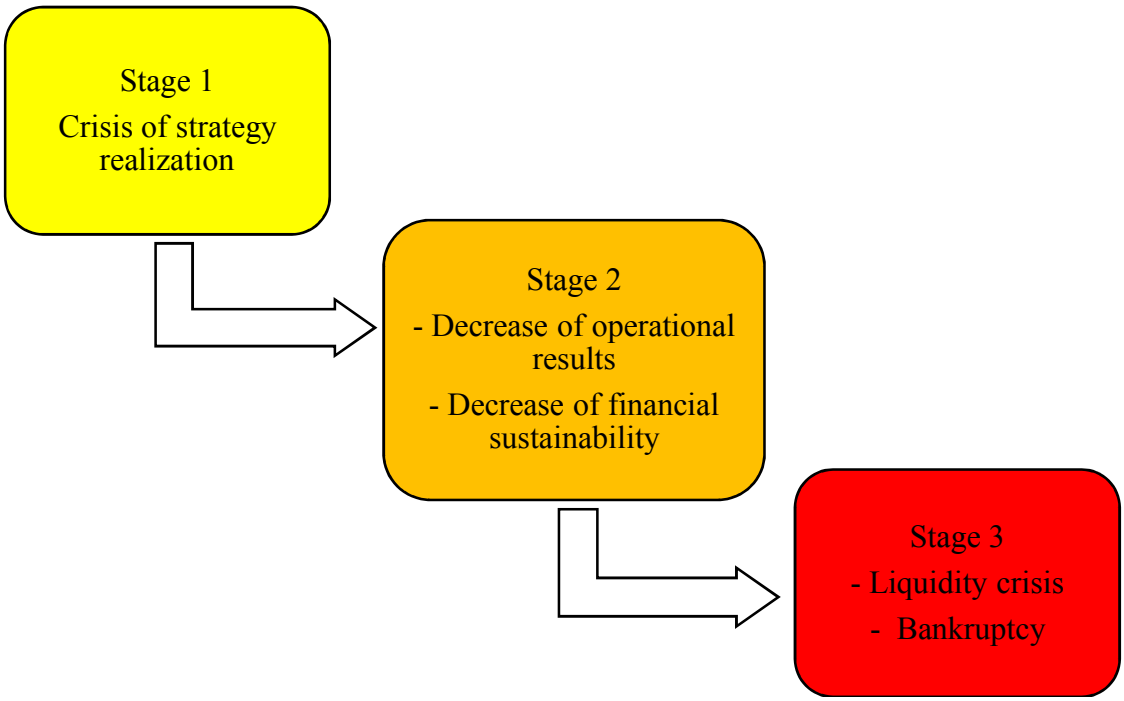

Figure 1 - The process of bankruptcy

Note: composed by author based on [19].

The second stage is characterized by the deterioration of many financial and economic indicators of an economic entity. Sharp fluctuations in profitability and business activity as well as its position in the securities market says about the end of the first and beginning of the second period.

At this stage, the company ceases to receive the normalized profit, and therefore increases its inconsistency. Attracting investments and loans becomes difficult, and if they occur, they are with higher interest rates and in lower volumes. As a result, financial stability and liquidity indicators are deteriorated. This moment characterizes the beginning of the third stage.

To reduce the risk of bankruptcy and to survive, the enterprises are required to conduct operational restructuring, which should increase the efficiency of operational performance and ensure the liquidity of assets. To achieve this goal the following actions might be undertaken:

- increase of turnover;
- reduction of inventory costs, especially fixed costs;
- decrease in accounts receivable;
- reduction of production and technical supplies and finished goods;
- sale or rent of extra property, and more.

In addition to the above, a business plan can be developed.

In the third stage, the company is no longer able to meet its obligations as they become due. As a result of a thorough and comprehensive analysis of the company reorganization procedures (reorganization or liquidation) are chosen. Bankruptcy is a

result of the crisis condition of the enterprise and a market instrument of capital redistribution.

The success of the enterprise management in a crisis essentially depends on the understanding of the happening processes, their characteristics and features. Crises of companies usually arise during the development of enterprises, at the stage of production expansion, and at the initial stage of production decline. This is due to changes in the volume of production and sales, the growth of receivables and payables, working capital deficit.

The crisis performs an incentive function, which means that with the depreciation of fixed capital the conditions for its renewal are created. Classification signs of crisis help to define it in a timely manner and to find ways to prevent it. In Figure 2, we present a typology of crises based on its causes, characteristics and consequences.

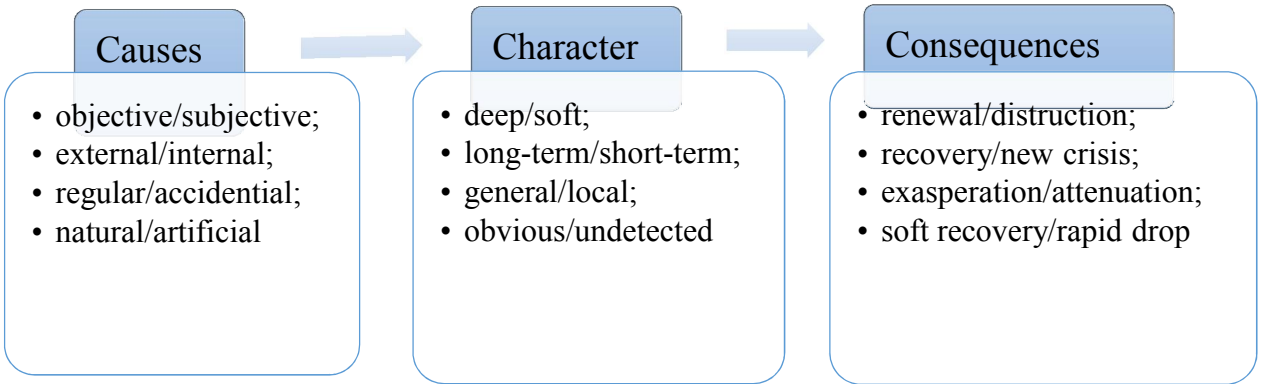

Figure 2- Typology of crises

Note: composed by author based on [20].

The crisis happens due to objective reasons (cyclical needs of modernization and restructuring) and subjective (poor management and lack of professionalism of the personnel). Consistency of the reasons may be related to the lifecycle of enterprise, industry and society in general. Furthermore, the causes may occur as the consequence of natural or force majeure, such as earthquakes, hurricanes, floods, or artificial (terrorist attack, etc.) circumstances.

In today's reality, the Kazakh traditional methods of management, as it turned out, do not give real effect, since focused on the normal functioning enterprises in the market. In an environment where the vast majority of small, medium and even large companies do not just experience the temporary difficulties, but are at the edge of a precipice for a long time, the usual, standard management tools do not help. Therefore, it has become crucial to find and implement suitable forms and methods of management, the use of which would allow avoiding the crisis of the enterprise. Despite the overall unfavorable market situation in our country, and in the case when the results are deplorable, and the company faces the bankruptcy those management

approach allows to prepare and implement a program of improvement of the enterprise.

The main objective of crisis management is to ensure that enterprises in the market when the bankruptcy out of the question should not be, but the emphasis is on overcoming temporary difficulties, including financial, through the use of all the possibilities of modern management, development and implementation of each enterprise social software having a strategic nature, which would allow to stay afloat under all market conflicts.

Going to the crisis condition begins at the time of the cumulative growth of certain parameters' deviation, characterizing the condition of the external and internal functioning environment of the company, together with the long-term trends of the dynamics of these indicators.

There are very specific symptoms of the onset of total debt and total insolvency of the enterprise (organization) [21]. The main of them are as follows:

- a drop in demand, decrease in sales volumes;
- decrease of profitability;
- unevenness of production;
- increase in the cost of production and sales;
- reducing the number of jobs.

Growth of interest rates and prices causes an increase of the raw materials price, component parts, which outpaces the increase of the prices for finished products, and growth of notes payable. All of these require additional credit resources and, as a consequence, lead to negative changes in the structure of liabilities of the enterprise due to the increase in the average cost of liabilities balance.

Further, the signs of crisis are accumulated (more obvious signs of bankruptcy), caused by an abrupt change in the balance sheet structure of the enterprise, namely, the difficulty with cash and a sharp decrease of cash in the bank accounts; an increase of both accounts payable and receivable (sharp decline in its can also be a negative phenomenon, showing the difficulties in sales); decrease in sales volume (even before the liquidation of the company can complete sale of products). As a rule, there are delays in the submission of reports, the conflict situations in the enterprise arises.

Blank I. identifies the following items that represent a threat to the emergence of the financial crisis on the enterprise (Figure 3).

On the second stage to evaluate the financial crisis of the enterprise Blank I. suggests the following system of vital indicators (Table 1).

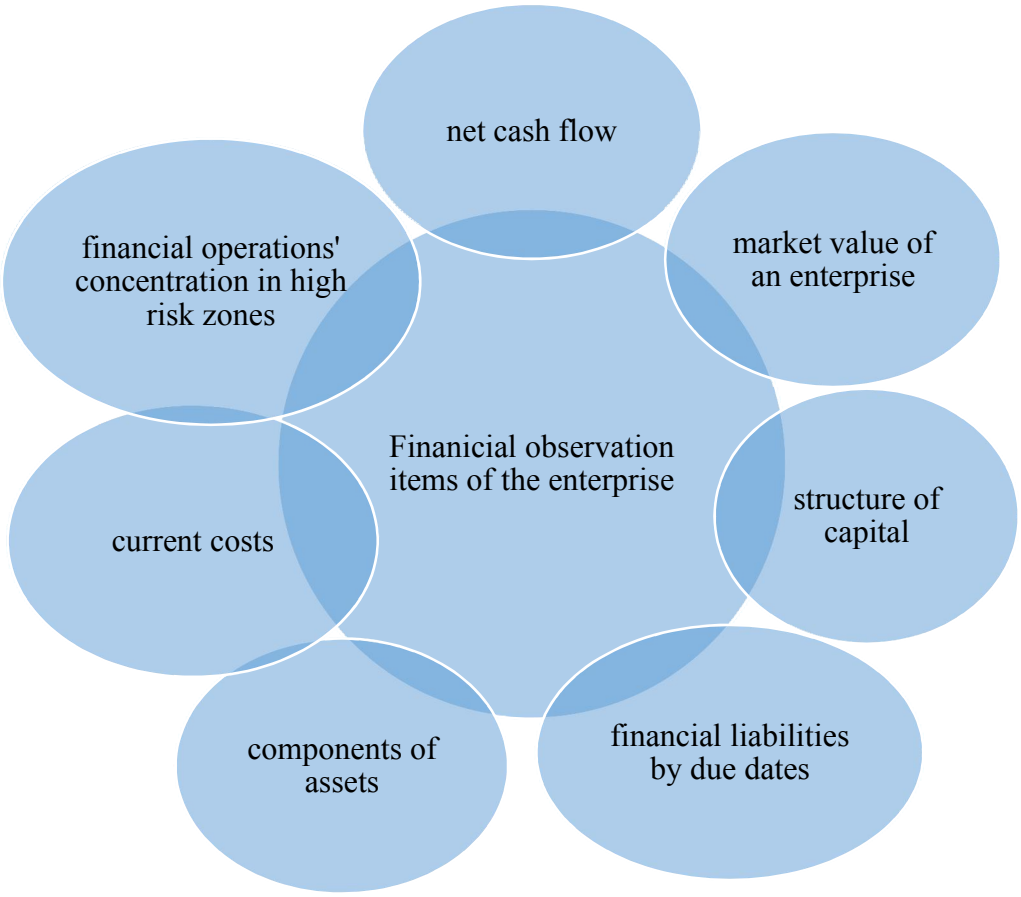

Figure 3 – Financial observation items of the enterprise

Note: composed by author based on [22].

At the third stage the financial crisis evaluation of the enterprise is carried out with a minimum of methods and techniques of financial analysis. Standard techniques of analysis are used: horizontal analysis, vertical financial analysis, comparative financial analysis, ratio analysis, financial risks analysis, integrated financial analysis based on the DuPont model or situational SWOT-analysis of strengths and weaknesses of the enterprise.

At the stage of identifying the extent of the crisis of the financial condition of the company the type of financial crisis is determined through its division into three groups: a) soft financial crisis; b) deep financial crisis; c) catastrophic financial crisis. The following table can be used for the preliminary assessment of the extent of the crisis of financial condition (Table 2).

Table 1 – System of vital indicators for evaluating financial crisis of the enterprise

Observation items	Indicators	
	Extensive	Structural
1.Net cash flow	1. Total net cash 2. Total operational net cash	1. Cash flow adequacy ratio. 2. Cash flow liquidity ratio. 3. Cash flow efficiency ratio 4. Cash flow reinvestment ratio.
2.Market values of an enterprise	1. Total market value of the net assets	1. Market value of an enterprise. 2. Cost of the company at a rate of capitalization of profits.
3.Structure of capital	1. Total equity. 2. Total liabilities.	1. Equity to total assets ratio. 2. Total debt to equity. 3. Total debt to total assets.
4. Financial liabilities by due dates	1. Total long-term liabilities. 2. Total short-term liabilities. 3. Total financial loan. 4. Total inventory loan. 5. Current liabilities due for settlement.	1. Long-term liabilities to short-term liabilities. 2. Financial loan to inventory loan ratio. 3. Urgent financial debt to total liabilities ratio. 4. Accounts payable turnover.
5. Components of assets	1. Total Fixed assets. 2. Total current assets 3. Total accounts receivable. 4.Total cash and cash equivalents.	1. ROA 2. Quick ratio. 3. Cash ratio. 4. Current ratio. 5. Quick assets ratio.
6. Current costs.	1. Total current costs. 2. Total permanent costs.	1. Inventory turnover. 2. Level of current variable costs. 3. Operating leverage.
7. Level of financial operations' concentration in high risk zones		1. Critical risk ratio 2. Catastrophic risk ratio.
Note - Source: [23]		

Table 2 – Preliminary assessment of the scope of the financial condition crisis based on its main indicators

Observation items	Scope of the financial crisis		
	Soft financial crisis	Deep financial crisis	Catastrophic financial crisis
1.Net cash flow	Decrease of the cash flow liquidity	Negative net cash flow	Rapid negative net cash flow
2.Market values of an enterprise	Stabilization of the market value of the enterprise	Trend of the decreasing market value	Rapid reduction of the market value
3.Structure of capital	Equity to total assets ratio decrease	Increase of the ratio meaning and decrease of financial leverage ratio.	Too high ratio and absence of financial leverage
4.Financial liabilities by due dates	Growth of total debts share	High ratio of urgent financial debt	Excessively high ratio of urgent financial debt
5. Components of assets	Decline of quick assets ratio	Decrease of quick and current assets ratios.	Insolvency caused by scarcity of cash and cash equivalents.
6.Current costs.	Trend of increasing variable costs.	High operational leverage ratio with the trend of increasing variable costs	Excessively high operational leverage ratio with the trend of increasing variable costs.
7. Level of financial operations' concentration in high risk zones	Increase of equity ratio in the high risk zone	Primary contribution of equity in the high-risk zone.	Significant share of contributed capital in the high-risk zone.
Note - Source: [23, p. 156]			

E. Zharkovskaya and B. Brodsky also note that these methods are used for diagnosing the potential bankruptcy [24]. With these approaches, diagnostics of the

potential bankruptcy determines the probability of crisis in the enterprise, as well as discovers the unrecoverable loss of solvency (bankruptcy).

Bankruptcy can occur at each stage of the life cycle of competitive advantage of the company (LCCAC). Researchers identify a specific set of factors that contribute to the bankruptcy of the company at each stage of its LCCAC.

The first determinant are the parameters of the factors of production. The impact of these factors is observed at all stages of LCCAC, but their role is especially high in its infancy. At this stage, the largest number (seven) of reasons that might result in bankruptcy are determined:

- wrong definition of the mission of the company and its production profile;
- low entrepreneurial skills of the owner of the company;
- poor-skilled management personnel of the company;
- inadequate marketing;
- disproportionate share of attracted (borrowed) capital;
- lack of qualified executives (engineers and workers);
- inadequacy of the transaction costs.

The next stage of LCCAC is acceleration of growth. This stage is characterized by the fact that the firm has a good demand for its products, a strong marketing strategy, and highly qualified management personnel. Consequently, this company is rapidly increasing production and thriving. In this situation, the only threat of the company is a large share of borrowed capital in the total capital employed. The company can not ensure timely payments to creditors and therefore might be bankrupt.

At the stage of slowing down the growth the following factor might lead to the bankruptcy: poor use of working capital, loss of the management flexibility, inadequate marketing and inadequate transaction costs. The level of capital can be determined by analyzing liquidity ratios. The rate of turnover directly affects the solvency of the company. The lack of the management flexibility leads to ineffective decisions and, as a consequence of it, to the growth of administrative expenses and loss of earnings [25].

A stable condition and earnings of the company, the saturation by all production resources, characterize the stage of maturity. Dangerous factors of this stage are: a high degree of illiquidity in working capital, aging capital stock, inadequate marketing and transaction costs. In particular, the depreciation and aging of fixed capital causes a decrease (compared to other companies) of labor productivity, loss of competitive advantage of the company, and as a consequence - bankruptcy.

At the stage of production decline the same factors as in the stage of maturity affect the financial condition of the enterprise. However, the situation is exacerbated by the overall poor financial condition of a business entity. Enterprise loses customers. Moreover, the negative effects of internal factors may lead to an accelerated bankruptcy.

Other important determinants are the demand parameters. Analysis shows that these parameters work at all stages and are generally the same for the whole LCCAC. The sharp decline in aggregate demand negatively affects all types of activities:

declining production volumes, increased unit costs and total production, reduced profits. In the case of developing the production of substituting goods the process of displacement produced by products from the market, reducing the demand for its products and, as a possible consequence of the loss of company profits and bankruptcy.

Similarly, there are other factors and parameters of demand, but their impact varies depending on the stages of LCCAC. In particular, at the stage of rapid growth the only factor that may lead to the bankruptcy is the sharp decline in aggregate demand. Other factors are not critical, since the firm at this stage always has recourses needed for preventive measures.

A group of Russian scientists determine the connection between indicators of the financial condition of the company and the stages of its life cycle. These indicators are conditionally divided into five categories:

1. liquidity indicators;
2. financial condition indicators;
3. turnover ratios indicators;
4. return on equity indicators;
5. return on sales indicators [26].

Table 3 shows which indicator needs primary attention to be paid on certain stages of the life cycle competitive advantage of the company.

Table 3 – Indicators requiring special attention in different stages of LCCAC

Stages of LCCAC	Liquidity indicators	Financial condition indicators	Turnover indicators	Return on equity indicators	Return on sales indicators
Infancy					
Acceleration of growth					
Slowing down or stabilization of growth					
Maturity					
Decline					
Note – Source: [26, p.182]					

The authors note that the priority of one index over another does not mean that others do not need observation. They argue that at the stage of decline, for example, the most important are liquidity indicators, since there is an issue of the elimination or survival of the business. The researchers need to bear in mind that all the indicators are closely interconnected with each other. Therefore they must be calculated all together.

In addition, the level of industry's competition plays an important role as well. Increasing competitive advantage to other firms of the industry might cause the

bankruptcy of the company at any stage of LCCAC. This process indicates that other companies use the best technology, marketing strategy and management skills.

In conclusion, it worth to be noted that the bankruptcy as an element of the economic mechanism has the both positive and negative sides.

The advantages of this phenomenon are listed below:

– liquidation of the debtor and the return of debts to creditors through the fulfillment of the obligations, assigned by the court;

– creation of a new business;

– rotation of managers who do not perform their duties, replacing temporary leaders by professional managers, the transfer of business into more capable hands;

– transfer of business organizations from the state to the private sector and vice versa;

– restoration of financial stability and the restructuring of the company to overcome the crisis.

The following disadvantages should be considered too:

– loss of the part of business by the creditors;

– emergence of a new, subsequent bankruptcy;

– deterioration of the social life of employees;

– job losses, and therefore reduction of the solvency of the population;

– narrowing of the consumer market;

– the possibility of criminal bankruptcy associated with the redistribution of property and theft of property, including companies with significant state and municipal property.

Summing up, it can be noted that the first cause of insolvency of the enterprise lies in improper marketing policy, and the second - in an inefficient financial sector. In this connection, it can be concluded that the starting point for the financial recovery of the company is a marketing strategy, and financial restructuring - its finale.

Thus, we can draw the following conclusions. A sign of the bankruptcy of a business entity is considered to be the inability to satisfy the claims of creditors on monetary obligations and (or) to fulfill the obligations of compulsory payments, if the relevant obligations and (or) the obligation not fulfilled by them within three months from the due date.

Bankruptcy, like any other economic and legal institution, should be considered as a tool to achieve certain objectives of economic policy. As it was mentioned earlier, the first cause of insolvency of the enterprise lies in improper marketing policy, and the second - in an inefficient financial sector. In this regard, it can be concluded that the starting point for the financial recovery of the company is a marketing strategy, and financial restructuring - its finale. The economic meaning of the institution of bankruptcy lies in the fact that it should serve as a mechanism to establish more effective management mode of production resources at the level of business entities.

1.2 Category of bankruptcy to improve the efficiency of market economy

Governance plays a crucial role in the implementation of the bankruptcy proceedings, which arranges and organizes the activities of all branches of the government: legislative, judicial, and executive. During the bankruptcy procedure the public administration aims to regulate relations between the state, the debtor, creditors, and the workforce, establishing their relationship through the rational state intervention.

The purpose of the state regulation of bankruptcy proceedings is the conservation of strategically important enterprises of the country. Moreover, it ensures the steady growth in tax revenues, avoiding major social conflicts in the enterprises that are subject to bankruptcy, associated with the mass layoffs of employees and their lack of the means of living. Furthermore, sectoral crises, mass unemployment, and insolvency on a national scale requires the active participation of the government in bankruptcy proceedings.

Direct regulation of bankruptcy proceedings in Kazakhstan is carried out by the authorized state body - the Tax Committee (hereinafter - Committee) of the Ministry of Finance of the Republic of Kazakhstan. According to the Government Resolution dated 12 September 2013 №947 «On some issues of the Ministry of Finance" was reorganized through merger of the Committee on work with insolvent debtors [27].

As the experience has proven, the system of measures, known as anticrisis management, can really help insolvent enterprises. In fact, it is even more effective in the implementation of measures aimed at the timely prevention of the crisis. Generally, poor management causes bankruptcy, besides other factors. That is why the problem of optimization of management, and implementation of its best practices, local and international, becomes the top issue.

According to the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan, in 2013 the total debt outstanding of enterprises amounted to 298 billion tenge [28]. The sharp increase in the volume of debt outstanding is observed since 2008, by 211%, from 85 billion tenge in 2007 to 263.9 billion tenge in 2008. Since 2010 there has been a reduction from 357 billion tenge to 298 billion in 2011.

As of January 1, 2014 through bankruptcy procedure 862 debtors were liquidated, while in 2013 the number of liquidated business entities equaled 2132. At the same time only 96 companies took advantage of the rehabilitation procedure. Table 4 shows the number of debtors undergoing bankruptcy procedures as of January 1, by the regions and cities of national importance [29].

In compliance with the report on the liquidating debtors as of 1 June 2012, formed by the Statistics Committee, for the most part small and medium-sized enterprises are subject to insolvency engaged in construction, trade, and agriculture.

According to experts of LLP "KazBankrot" in Kazakhstan, 80% of the bankrupt companies had a weak ability to adapt to changing internal and external environment, in 20% of cases companies built up a substantial tax debt in a short period. In some cases, the issue of suspicious transactions arise as well [30].

Thus, the main problems of the current system of bankruptcy concerned with balance of interests of private creditors, public employees. Moreover, there is another problem of using the gaps in the legislation by unscrupulous debtors in order to avoid claims of creditors. At the same time, business entities often do not consider the procedures provided by the legislation as an effective mechanism to restore solvency, therefore the cases of rehabilitation are limited.

Table 4 – Number of debtors undergoing bankruptcy procedures in the context of the regions of Kazakhstan as of 01.01.2014

Name of the region of Kazakhstan	Number of debtors in the context of procedures			
	External observation	Rehabilitation	Bankruptcy proceeding	Liquidated (bankrupt)
Astana city	0	10	352	136
Almaty city	1	7	316	75
Akmola region	0	4	99	32
Aktobe region	0	25	123	96
Almaty region	0	15	95	55
Atyrau region	0	10	48	47
Eastern-Kazakhstan region	0	9	103	70
Karaganda region	1	19	81	21
Kostanay region	0	15	94	43
Kyzyzlorda region	0	11	90	28
Mangystau region	0	2	43	9
Nothern-Kazakhstan region	2	7	49	65
Pavlodar region	0	5	155	48
Southern-Kazakhstan region	2	6	123	119
Western- region	0	14	112	9
Zhambyl region	0	3	25	9
Total within the Republic	6	162	1908	862
Note – composed by author based on the Statistic Committee data				

It should be noted that today Kazakhstan urgent problem of increasing the attractiveness of the economy to foreign investors and improve the investment

climate. According to the International Finance Corporation and the World Bank "Doing Business - 2015: Doing Business in a more transparent world» conditions for doing business in the Republic of Kazakhstan one of the most attractive in the region: 41th out of 183 countries, an increase of 12 positions compared to the ranking in 2014 [30].

Obviously, to increase the investment attractiveness of the economy protection of the creditors' rights needs to be strengthened, including the improvement of the Law "On Bankruptcy". Main areas to be considered while improving the Law on bankruptcy are as follows:

– restoration of creditors institute in the bankruptcy proceedings and giving it broad powers;

– introduction of affiliation institute to the debtor, creditors and the administrator in order to prevent incidents of using the bankruptcy proceedings for the withdrawal of the debtor's assets and the infringement of the creditors' rights;

– reduction of excessive interference of the state authorized bodies in the rehabilitation process and bankruptcy;

– improvement of legislation on insolvency (bankruptcy) of enterprises;

– adoption by the Government of the Republic of Kazakhstan measures to overcome the crisis of non-payments [31, 32].

Building an effective bankruptcy systems, fairly taking into account the rights of debtors and creditors, is one of the important tasks of state regulation. Imperfect regulation could have negative socio-economic consequences associated with the deterioration of the situation of creditors - banks and trading partners, which in turn, affects the availability and price of the credit for businesses. Furthermore, it affects employees of enterprises with nonpayment or delayed wages, job releases; consequently, the state loses the tax revenue, a decrease in investor confidence and investment attractiveness of the economy as a whole.

In conclusion, it might be noted that the need to improve the handling of industrial enterprise involves solving a number of challenges in the field of production and financial management. In practice, these problems are reduced to the construction of such a system of financial management company that minimizes the expenditures of forming the cost of production. It is quite difficult to execute: as a rule, in large enterprises which have a network of branches, there is no clear system for collecting, processing and accounting of financial information, low degree of automation of these processes. Opacity, uncertainty and fragmentary data on financial flows and their timing lead to poor reliability on management information. As a result, these enterprises scarce the system of operational control over the activities of structural units, as well as the difficulty of choosing the overall development strategy adequate to the existing realities [33].

Improving the quality of governance requires the development and improvement of methodological and methodical support of financial analysis and planning of its enterprise activities. All of these, in turn, necessitates the development of relatively simple and accurate method of predicting crises, and as a special case of such crises -

bankruptcy. To increase their efficiency involvement in the process of forecasting tools and mathematical methods is intended.

1.3 Foreign bankruptcy prediction models

Currently in our country widely used modern methods of early diagnostics of the financial insolvency of the company. Western models adapted to the Kazakh business conditions. However, quantitative methods for predicting bankruptcy are usually limited by discriminant analysis, or building some integral indicators, scales which are determined on the basis of the same discriminant and regression analysis.

Nowadays domestic and foreign experts offer a variety of methods for analyzing financial statements, which differ from each other depending on the goals and objectives of the analysis, the knowledge base, technical support, urgency of analytical and management problems solving, experience and qualifications of staff.

In foreign scientific directions of the financial statements analysis five relatively independent approaches, scientific schools are determined. Such a division is rather conditional, because to some extent, these approaches intersect and complement each other:

- Empirical Pragmatists School;
- Ratio Statisticians School;
- Multivariate Modelers School;
- Distress Predictors School;
- Capital Marketers School.

Representatives of the first school, for example, Robert Foulk, working in the field of the analysis of the creditworthiness of companies, trying to justify the set of relative indicators, which are suitable for analysis [34]. Their goal was to select those indicators that could help the analyst to answer the question whether the company is capable to pay its short-term obligations. Representatives of this school considered this aspect of the companies' analysis as the most crucial, so the analysis was based on indicators of the working capital and short-term payables. An important contribution of this school to the theory of a systematic analysis of financial statements is that they were the first who calculated, based on the accounting (financial) statements, the variety of analytical ratios, which were useful for making management decisions of a financial nature.

The appearance of the second school associated with the work of Alexander Wall [35] devoted to the development of criteria of creditworthiness. The main idea of the representatives of this school was that the analytical ratios calculated according to the financial statements must conform to certain standard values or ranges of values. The aim of research was to develop similar standards for ratios by sectors, sub-sectors and groups of similar companies on the basis of statistical methods. Studies have shown that factors inherent spatiotemporal multicollinearity. This made it necessary to classify the totality of factors by groups, within each of which indicators are correlated with each other, and different groups of indicators are relatively independent.

The very first steps in exploring the possibility of predicting the bankruptcy of the company were made at the turn of the thirties of the last century. Scientists have been able to calculate various financial ratios of the normal operating companies and the bankrupt companies.

The early studies of the ratios' behavior preceding the collapse of the company include the works of A. Winakor and R. Smith, who studied 183 companies in financial difficulty in the past 10 years [36]. As a result, scientists have concluded that the ratio of net working capital to total assets is one of the most accurate and reliable indicator of bankruptcy.

Fitzpatrick P. analyzed the three- and five-year trends of 13 ratios in 20 companies that have failed in 1900 - 1929 [37]. Comparing them to performance of the control group of 19 successfully operating enterprises, he concluded that all analyzed factors to a certain extent predicted collapse. However, it turned out that the best ratios of insolvency are income to net equity ratio and net equity to total debt ratio.

C.L. Merwin studied the experience of 939 companies for the period of 1926 - 1936 [38]. After analyzing the several key ratios, he found that only three ratios were most suitable for predicting the termination of company's operation for 5 years before the event. They are: coverage ratio, the ratio of net equity to total assets and net equity to total debt. All of them are characterized by declining trends before the insolvency and bankruptcy. Furthermore, during the entire study period these ratios showed a value below the normal level.

W. Xickman focused on the study of enterprises that have experienced difficulties in repaying debt and bank loans. He carefully studied the experience of the issuance of corporate bonds for the period of 1900 - 1943 and concluded that the coverage ratio of interest payments and the ratio of net profit to sales turned out to be very useful for predicting the failure conditions of the bond issue [34, p.11].

Representatives of the fourth schools have made emphasis on the analysis of financial stability, preferring prospective analysis to retrospective. According to them, the value of the financial statements is solely in its ability to ensure the predictability of possible bankruptcy.

W. Beaver [39] used a stronger statistical technique than his predecessors, and found that financial ratios were useful for bankruptcy prediction and default on the bonds for at least 5 years before the upcoming crisis (Table 5). He also determined that the ratios can be used to clear delineation of enterprises which approaching the crisis and avoiding it, better than it is possible with a random prediction.

In addition, one of the most important conclusions of W. Beaver was that in a short and a long-term the cash flow to total debt ratio was the best indicator to predict the crisis. Further, W. Beaver proposed the following factors by importance: the capital structure ratios, liquidity ratios. He insisted that the worst crises predictors were turnover ratios.

Table 5 – System of indicators of Beaver

Indicator (or ratio) ki	Standard values of calculated coefficients and quantities		
	Group 1, successful companies	Group 2, 5 years before bankruptcy	Group 3, 1 year before bankruptcy
Indicator of Beaver, k1	$k1 > 0,4$	$k1 \approx 0,2$	$k1 < -0,15$
Coverage ratio, k2	$k2 > 2$	$1 \leq k2 \leq 2$	$k2 < 1$
Return of assets, k3	$k3 \geq 6$	$1 \leq k2 \leq 6$	$-22 \leq k2 \leq 1$
Financial leverage, k4	$k4 < 35$	$35 \leq k4 \leq 8$	$k4 \geq 80$
Net working capital to total assets, k5	$k5 \geq 0,4$	$0,1 \leq k5 \leq 0,4$	$k5 < 0,1$
Note – Source: [38]			

However, the experience has shown that the predictions of firms' bankruptcies based on a study of the one variable's effect on the overall financial condition of the company, are often misleading or contradictory. Therefore, the first multivariate model for predicting bankruptcy was developed by professor Edward Altman in 1968 [40]. After this pioneering study, a multi-discriminant approach to the prediction of bankruptcy spread throughout the world among researchers in the field of finance, banking and credit risk. Detailed analysis of professor Altman's models is presented in the next chapter.

Bankruptcy prediction models are important tools for bankers, investors, asset managers, rating agencies, and even to the troubled firms. The banking industry, as the main provider of financing in the economy, is particularly interested in minimizing the level of non-performing loans in order to maximize the return on credit activity [41]. Another issue of interest to the bankers is the capital adequacy and internal ratings approach has been proposed on the basis of Basel 2 (the first version presented in 1999 and implemented in 2004).

In 1978, a new model was developed by Gordon Springate [42]. He used a multiplier discriminant analysis to select four of the 19 financial ratios that best characterize the activity of successful enterprises and bankrupt enterprises. These indicators include the followings:

M - Working Capital / Total Assets;

N - EBIT / Total Assets;

P - Profit before Taxes / Current Liabilities;

Q - Sales / Total Assets.

Out of these ratios Springate built the following model:

$$Z = 1{,}03M + 3{,}07N + 0{,}66P + 0{,}4Q \quad (1)$$

The critical value of Z for this model is 0.862. The accuracy of this model is 92.5% for the 40 companies studied by Springate.

Danish economist Fulmer in 1984 proposed a model obtained from the analysis of 40 financial ratios of 60 companies - 30 of them were successful companies and 30 were bankrupt with an average value of assets equal to 455 thousand US dollars [43].

Key indicators of Fulmer model are listed below:

S1 - retained earnings / total assets;
S2 - sales / total assets;
S3 - profit before taxes/equity;
S4 – net cash / total debt;
S5 - debt /total assets;
S6 - current liabilities /total assets;
S7 - log tangible assets /total assets;
S8 - working capital / debt;
S9 - EBIT / interest.

From these indicators Fulmer has constructed the following model:

$$N = 5{,}528\ S1 + 0{,}212\ S2 + 0{,}073\ S3 + 1{,}270\ S4 - 0{,}120\ S5 + 2{,}335 S6 + 0{,}575\ S7 + 1{,}083 S8 + 0{,}894\ S9 - 6{,}075 \quad (2)$$

The critical value of N is 0. Fulmer announced the accuracy of his model for the nearest future as 98% and 81% for a period more than a year.

Another worthy to be noted model was developed under the leadership of the Canadian expert Jean Legault [43]. In the development of this model 173 industrial companies' 30 financial indicators have been analyzed in Quebec with an annual revenue of 1 to 20 million US dollars. Jean Legault used the following parameters for his model:

F - shareholders equity + net debt owing to directors / total assets);
L - EBT + financial expenses / total assets;
T - sales / total assets.

Legault's model presented below:

$$RZ\text{-}Score = 4{,}5913F + 4{,}5080L + 0{,}3636T - 2{,}7616 \quad (3)$$

The critical value for RZ -Score is - 0.3. The accuracy of this model is 83%, but it can only be used to predict the bankruptcy of industrial enterprises. To enhance the prediction power of formalized models their results might be converted into PAS-factor (Performance Analyses Score), which is used to track the activities of the company over time.

PAS-factor is in the range from 1 to 100, and calculated as a percentage. With the help of the PAS-factor, both above and below the critical level, it is easy to

identify the moments of decline and revival of the enterprise for a certain period of time, as well as emerging risks related activities. "Risk Rating" is based on statistical observations of changes resulting indicators formalized models. If over a period, the resulting figure was negative, it is possible to make a finding as to the high risk associated with the enterprise and if, on the contrary, it was positive, the risk was minimal.

In addition, the calculation of PAS-factor allows the researcher to combine the key features of the income statement and balance sheet into a single representational ratio. So, if a company gets big profits, but has a "weak" balance, with the help of the PAS-factor it can be associated with a less profitable enterprise, but have a more "balanced" balance. This feature of the PAS-factor can be used not only for calculating the financial risks associated with the activities of the enterprise, but also when considering the capacities, the conditions of the transactions of the enterprise in order to improve the effectiveness of its development.

The fifth school is the youngest in the sphere of a systematic analysis of the financial statements. The followers of this school, for example, George Foster [34, p.18], believe that the value of reporting is the ability to use it to predict the level of efficiency of investment in certain securities and the extent of the associated risk.

In the next two decades there appeared even more research in the field of financial distress, for example, J. Ohlson [45], who used a logit model, R.J. Taffler [46], who developed Z-score model for the United Kingdom), which were summarized in the work of M.E. Zmijewski [47] who introduced a probit model. A.I. Dimitras [48] et al. reviewed 47 studies on the business model prediction (13 of which were from the United States and nine from the UK). They summarized the popular techniques (discriminant analysis was prevailing), and the coefficients used.

P.R. Kumar and V. Ravi [49] examined 128 models, including statistical and artificial intelligence models for predicting bankruptcy of banks and firms, with particular attention to the technique used in various models, indicating that neural networks were the most popular methods. Jackson and Wood [50] reported in his review of the incidence of specific prediction methods in the prior literature.

Top five popular methods were:

1) the multivariate discriminant analysis;
2) the logit model;
3) neural networks;
4) contingent claims;
5) univariate analysis.

Recent significant reviews of the effectiveness of the models were presented by R.J. Taffler and V. Agarwal [51] and J. Bauer and V. Agarwal [52], taking into account the characteristics of the models on the basis of accounting models and models of market risk. These three types of models are mainly prevalent in financial literature. According to V. Agarwal and R.J. Taffler, there is little difference in forecast accuracy between models based on accounting and market-based. However, the use of models based on accounting gives an opportunity for more accurate calculation of return on the credit risk activities.

Russian bankruptcy prediction models

In the Russian literature mainly three models are widely used. Zayceva's Model appears as follows:

$$K=0,25X1 + 0,1X2+ 0,2X3+ 0,25X4+ 0,1X5+0,1X6 \quad (4)$$

Where,

X1 – net loss/total equity. Normative meaning for it is 0.

X2 – total debt/total assets with the normative meaning of 1.

X3 – current liabilities/liquid assets. Normative meaning is 7.

X4 – net loss/sales. Normative meaning is 0.

X5 – debt capital/equity. Normative meaning is 0,7.

X6 – weighted average assets/net income. Normative meaning equals the prior period's meaning.

K – overall indicator.

The next model which was developed by R. Sayfullin and G. Kadykov is presented below:

$$R = 2X1 +0,1X2 + 0,08X3 + 0,45X4 + X5 \quad (5)$$

Where,

X1 – working capital/current assets; X1>0

X2 – current ration; X2> 2

X3 – asset turnover; X3>2,5

X4 – profit margin; X4 >(n-1)/r, where r – is Central bank's rate

X5 – net income/total equity, X5 >0,2.

With the full compliance of financial ratios' value to the minimum of normative level, overall indicator equals to 1. Financial companies with a rating number of less than 1 are characterized as unsatisfactory.

Another popular model of is developed by the professors of the Irkutsk State Academy, and comprises of the following indicators:

$$R = 0,38K1 + K2 + 0,054K3 + 0,63K4 \quad (6)$$

Where,

K1 – current assets/total assets;

K2 – net income/total equity;

K3 – sales/total assets;

K4 – net income/operating expenses.

The meanings of R-score and probability of bankruptcy according to this model is presented in table 6 below.

Table 6 – Irkutsk State Academy's bankruptcy prediction model meanings

R-score meanings	Probability of bankruptcy (%)
Less than 0	Maximal (90-100)
0-0,18	High (60-80)
0,18-0,32	Medium (20-35)
0,32-0,42	Low (15-20)
More than 0,42	Minimal (till 15)
Note – Source [53]	

From the stated above it can be concluded that there are many models and approaches to the prediction of bankruptcy, however, there is no single universal model, the results of which would be suitable to all situations. Each model has its advantages and disadvantages, they tend to work effectively for the specific data with specific tasks, under certain conditions. Table 7 reflects the area of application, the inputs and outputs of data.

Scientists classify an information or data which are used for prediction of bankruptcy into several subgroups. The first subgroup includes the primary official financial statements (balance sheet, income statement, statement of cash flows). This information reflects historical past performance and is retrospective.

In contrast to the first group, there is a second, anticipatory (forward looking), which represents the market value/price of the company. This information is generated by investors based on their expectations and predictions of the future of the company. When determining the market price, investors are using their subjective assessment of the prospects of the company, the value of its risk information from the company's financial statements, historical data on past prices of its obligations. Finally, all the information is combined into a single entity based on an analysis of the investor and his desire to buy or sell shares or debentures of the company [54]. Thus, the market price - the result is a kind of synthesis of the plurality of opinions and forecasts investors wish to buy or sell some of the assets.

The third group also includes a subjective assessment of the prospects of the company, which is expressed in the form of subjective judgment and / or rating from international agencies or financial institutions.

While analyzing the condition of the company any information needed for analyst, such as macroeconomic indicators, which may affect the financial performance of the business entity can be considered.

The final result of applying a particular model is also classified according to the value. With many models we get a certain number, index, which lies in the range between zero and one, and is characterized by the probability of approaching bankruptcy. Another group, simply involves categorization bankrupt and non-bankrupt. Moreover, the rating models allow us to obtain the third type of data output. This may be an indicator which is not limited to specified intervals. However, the complexity of the interpretation of the values without owning more information about the standard value slightly complicates the task of the researcher or analyst.

Table 7 – Bankruptcy prediction models' application area, input and output of data

Model/ approach	Application area	Input data and its sources	Data output
Discriminant models (Z- score)	Publicly traded industrial companies	Balance sheet, Income statement Market value of share	Category (bankrupt/ non-bankrupt)
Linear probability (regression) models	Depends on sampling	Financial statements. Also might use any available information	Default probability
Logit and Probit models	Depends on sampling	Any available data depending on the model and factors. Usually use the official financial statements	Default probability
Artificial neural networks	Depends on sampling	Any data depending on constructed neural network.	Default probability or a category
Analysis of the time structure of credit risk	Publicly traded companies that have passed the procedure of credit rating	Historical market information + agencies rating (S&P, Moody's)	Default probability or a category
Actuarial approach	Publicly traded companies that have passed the procedure of credit rating	Default statistics + agencies rating (S&P, Moody's)	Default probability or a category
Option approach	Mostly for public companies as well as for private companies	Market value of assets of the firm and its volatility. Nominal debt value	Default probability or a category
Note – Composed by author on the basis of [40-56]			

Further, we consider the comparative characteristic of the popular methods of bankruptcy forecasting (Table 8).

Thus, it can be noted that the range of models to predict the financial crisis of the company is quite wide. Consequently, the traditional problem of choosing the method to apply to the conditions the analyzed company arises everytime.

It is impossible to clearly choose the best method. In deciding whether it is necessary to take into account a number of criteria: economic conditions of the company (equity risk, the degree of competition, the availability of resource provision), advanced informative basis, the objectives of the study (retrospective,

prospective), character of models, and of course, the professionalism of the team of analysts.

Table 8 – Comparative characteristics of bankruptcy prediction models

Name of model	Advantages	Disadvantages
1	2	3
Univariable models (Model of Beaver)	-user friendly; - does not need excessive information, since the influence of only one factor on bankruptcy is considered.	- method classifies the firms into healthy and distressed, not allowing to predict the bankruptcy in the output; - does not consider effects of the industry and size of the enterprises; - there is a probability of getting contradictive results while using a number of factors simultaneously; - complexity of considering qualitative characteristics; - retrospective characteristic of model
Multi-discrimi-nant models (Altman models)	- user friendly; - focused on key factors; - considers effect of numerous factors on bankruptcy; - structural character.	- method classifies the firms into healthy and distressed, not allowing to predict the bankruptcy in the output; - does not consider effects of the industry and size of the enterprises; - complexity of considering qualitative characteristics; - retrospective characteristic of model; - dependence of the result on sampling.
Linear probability (regression) models	- user friendly; - allows to assess bankruptcy; - focused on key factors; - considers effect of numerous factors on bankruptcy; - structural character.	- possible cases of bankruptcy's "overhitting" he boundaries of the interval (0 to 1); - complexity of considering qualitative characteristics; - retrospective characteristic of model; - dependence of the result on sampling.
Logit and Probit models	- user friendly; - allows to assess bankruptcy; - focused on key factors; - considers effect of numerous factors on bankruptcy; - structural character.	- complexity of considering qualitative characteristics; - retrospective characteristic of model; - dependence of the result on sampling.

Continue of table 8

1	2	3
Artificial neural networks	- allows to determine hidden nonlinear links between various data; - highly resistant to failures; - ability to generalize when dealing with incomplete data; - quick adaptation to changing conditions due to the ability to learn.	- models are not structural; - does not reveal the nature of hidden dependencies that may not be given a logical explanation; - models of this group tend to represent a "black box"; - complexity of the controlling correctness of operating system by the final-user; - increasing complexity of network architecture increases the risk of type illogical behavior; - for effectively operating network it is required a large training sample; - method is quite expensive.
Analysis of the time structure of credit risk	- output determines the probability of bankruptcy; - "forward looking" model; - consideration of market expectations; - ease of use; -not considerable number of input parameters; - structural character	- controversial prerequisites of the model; - the nature of the conclusions is unstable over time; -applicability of the models only to debt instruments that have a liquid market circulation.
Actuarial approcah	- output determines the probability of bankruptcy; - ease of use; - almost does not require any data input in addition to the rating; - the possibility of using data of rating agencies rather than conducting research; - allows to estimate coefficients of loss and recovery in the case of bankruptcy.	- the difficulty of applying the method in the evaluation of loans due to lack of sufficient statistics; - assessed companies must have a rating of the relevant international agencies; - not structural, but statistical nature of the model; - the nature of the conclusions is unstable over time and is sensitive to the sample; - retrospective characteristic.

Continue of table 8

1	2	3
Option approach	- the output determines the probability of bankruptcy; - "forward looking" model; - structural nature; - allows to track changes in the credit risk with a higher frequency than other methods; - accounting for both accounting and market data.	- focus on the method on public companies; -for more accurate results it is necessary to carry out complex mathematical calculations.
Note – composed by author based on sources [42-52]		

Moreover, the models are based on financial data and include manipulation of the estimated coefficient. Based on the conducted analysis and literature review, we have identified the following significant disadvantages of their use:

1) companies in financial difficulty often delay publication of financial reports;

2) the published financial statements do not reflect the real economic situation of the company by virtue of the constraints that caused by modern system of accounting;

3) analyzed factors reflect various aspects of activity of the enterprises and have different directions, and therefore do not lead to reliable forecasts.

Chapter conclusions. The basic idea of creating models to predict crises in enterprises is that according to the observations of the trend and behavior of some factors more or less accurate predictions can be made. The signs of deterioration in the company, which is indicated by changes in the coefficients, can be identified at an early stage of development of the company, which will take action and avoid a significant risk of default and bankruptcy.

In conclusion, we emphasize that the use of different formal models to predict crises of enterprises caused by the need to increase efficiency and effectiveness of the enterprise in the conditions of dynamically changing environment. Studies of foreign scientists in the field of bankruptcy predictions show that out of the set of financial ratios only a few useful and more accurately predicting bankruptcy can be chosen. In this paper, for the early diagnostics of probability of bankruptcy of Kazakh enterprises we use five factors that are disclosed in the following paragraphs.

Studies of foreign scientists in the field of bankruptcy predictions show that from the set of financial indicators, only a few useful can be selected for more accurate prediction of bankruptcy. In this research, for the early diagnostics of the bankruptcy probability of Kazakh enterprises five ratios which are disclosed in the following paragraphs were applied.

2 COMPREHENSIVE ANALYSIS AND DIAGNOSTICS OF BANKRUPTCY PROBABILITY OF THE ENTEPRISE

2.1 Methods of analyzing viability of the enterprise

In today's world, when Kazakhstan is a member of the Customs Union, and became a member of the World Trade Organization (WTO), the problem of the survival of each business entity becomes crucial. That is why the most important task is to acquire the skills of "economic reading" of the financial statements by a variety of market participants, directly or indirectly interested in the positive results of company's operation. The financial environment of business determines the necessity of conducting the trend analysis, evaluation of business companies to optimize management decisions.

One of the ways of reducing the financial and operational risks is to conduct a permanent qualitative financial statements analysis (FSA) of the company. It can be considered as a modern diagnostics equipment of assessing the financial health of the organization, involving extensive use of formalized, available methods of processing current credentials, requiring serious consideration. This financial analysis answers the questions of what should be the value of the optimal composition and structure of the company's assets; how to choose sources of funding and to optimize the capital structure, organize the management of financial flows to ensure the solvency and financial stability of the company.

Financial analysis, as an integral part of a comprehensive economic analysis, is an essential element of the financial management, as its purpose is closely linked with the ultimately realized managerial decisions, in the management of cash flows, maintaining the solvency of the company.

In turn, financial statements analysis is an integral part of both external and internal financial analysis, which provides an estimate of the property and financial situation of the company on the basis of external public reporting.

Financial statements analysis allows the analyst to assess the followings:

- financial structure (property condition) of the company;
- adequacy of capital for current operations and long-term investments;
- capital structure and the possibility of repayment of long-term liabilities to third parties;
- trends and comparative effectiveness (direction of the company's development);
- company's liquidity, the emergence of the bankruptcy threat;
- business activity of the company and so on.

Financial statements analysis should be considered in the context of the goals which are set by the researcher. In this regard, there are several basic motives of conducting regular FSA. These include:

1. Investing in shares of the company;
2. Granting or extension of credit;
3. Assessment of financial stability of the supplier or the buyer;
4. Predicting the probability of financial insolvency;

5. Internal analysis of the effectiveness of the company in order to optimize solutions on improvement of the financial results and strengthen its financial condition [57].

Thus, the decisions about investing capital, obtaining credit, bankruptcy prevention and overall management of the business can not be effective without a timely and comprehensive diagnostics of the condition of the enterprise.

As a rule, financial and organizational techniques are described as self-diagnostics procedure. In fact, the diagnostics should be considered as one of the phases of the model of the planned organizational changes, as well as the consultation process. It is necessary to conduct a comprehensive analysis to avoid errors when making management decisions. The individual components of this comprehensive study include the management of organization, key business processes, finance, marketing, personnel management.

Therefore, the process of diagnostics should be conducted in several stages:

- setting goals of diagnostics;
- financial analysis;
- deviation analysis;
- search for the causes of deviations appeared;
- organizational diagnostics;
- action planning.

Thus, the complex financial and organizational diagnostics are two interrelated approaches to the analysis of the enterprise, good compound that provides analysts and managers with a powerful management tool for long-term future operation of the company in complex and ever-changing economic conditions.

The target of a systematic review of the contents of financial statements is to provide a reliable set of data characterizing the current financial stability of the company and having predictive value. The result of such activity is a system of basic and most informative parameters that give an idea of the company's financial condition, its efficiency as an independent economic entity, and used in the current activities of the company.

The results of the financial analysis can be used as part of the strategy, and in the course of operational activities of the company, for example, in obtaining credit, attracting investments, entering the stock exchange, benchmarking, to assess the financial condition and forecasting of bankruptcy of an organization.

There are many approaches and methods of conducting analysis of financial statements, which are widely used by auditors and arbitration managers, and other market participants.

Selection of the method used depends on factors such as the specifics of the business, development strategy, external environment and so on. For example, the company’s target is to increase sales efficiency. The analysis should be primarily directed towards the profitability analysis. In this case the key indicators would be the dynamics of sales, market share, profitability of capital investment.

The procedure of conducting analysis of financial statements is understood as the establishment of a certain logical sequence of individual directions analysis and

the relationship between them [55, p. 20]. As a result of the established logical sequence of analytical procedures a block diagram with the release of the key areas of analysis in accordance with the interests of a particular group of users, as well as specified baseline was built (Figure 4).

It should be noted that the FSA can be conducted step by step by the determined chain as well as on specific areas which are identified at the stage of identifying the purpose and objectives.

The sequence of the conducted analysis of the financial statements is as follows:

– obtaining basic information (about the owners of the company, its management, activities, position in the industry, accounting policies, etc.);

– obtaining the necessary financial statements and notes thereto;

– determination of the depth and direction (the content) of the analysis;

– analysis of individual reports using special methods of processing and interpretation of data;

– forecasting the performance of the company and the possibility of repayment of its obligations to third parties.

In fact, financial analysts are using conventional methods, which comprise of a systematic set of tools and principles of studying the financial activity of the subject.

All methods and approaches of the analysis can be grouped into formalized and non-formalized (Figure 5). The first group includes mathematical, statistical, econometric methods, and modeling of processes involving a high degree of formalization. The second group includes methods that focused on intuition and experience of the analyst, which implies a high level of subjectivity. Accordingly, such a tool as a method of expert estimations, the method of comparison, the construction of analytical tables, and others, can not be regarded as an opportunity to obtain absolutely accurate, truthful picture of the financial condition of the company. However, the analysis of a number of financial ratios allows an overview of the company, to get valid data to make decisions about investments, lending to business development.

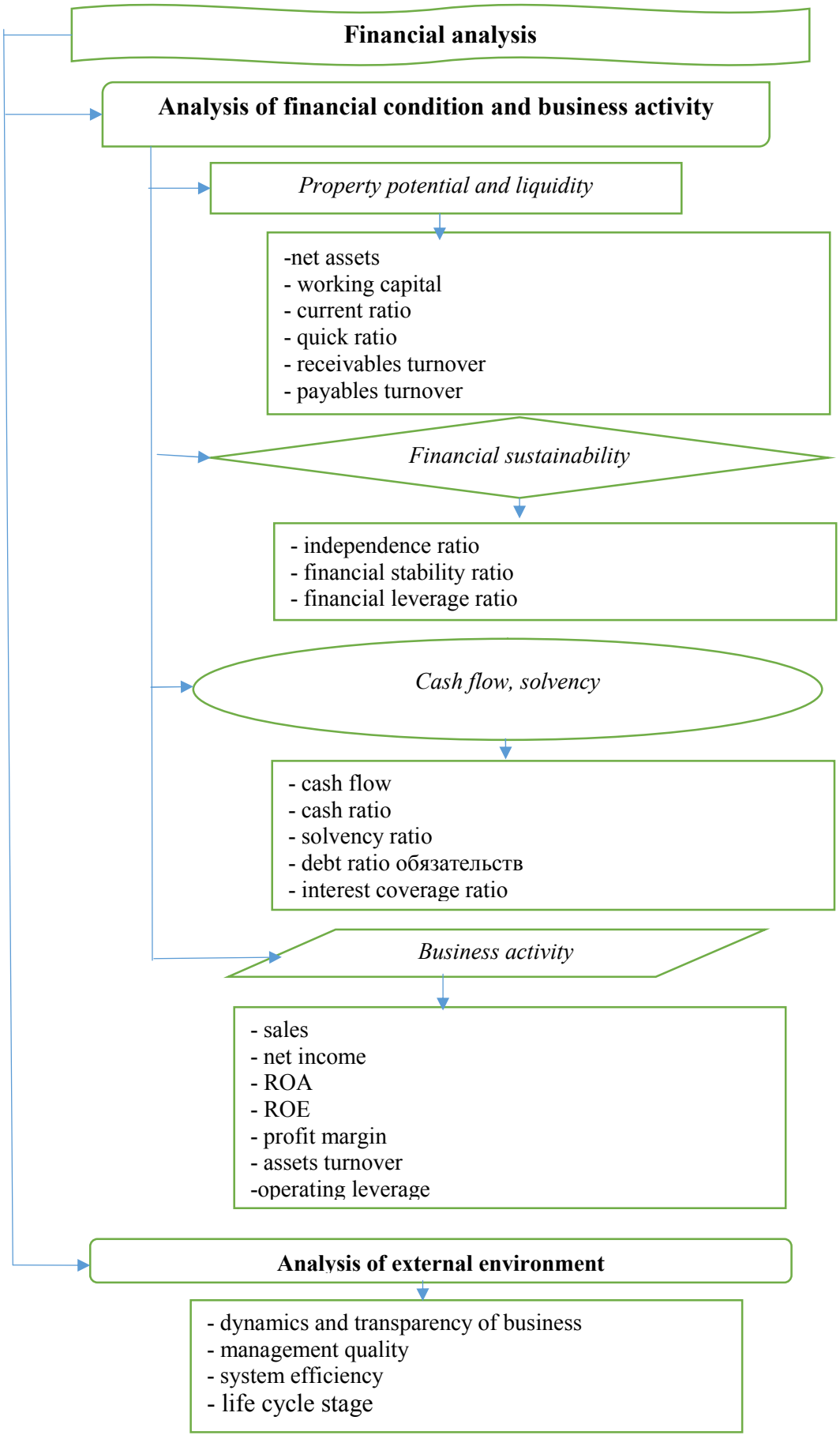

Figure 4 – Block-scheme of financial analysis

Note – Source [55].

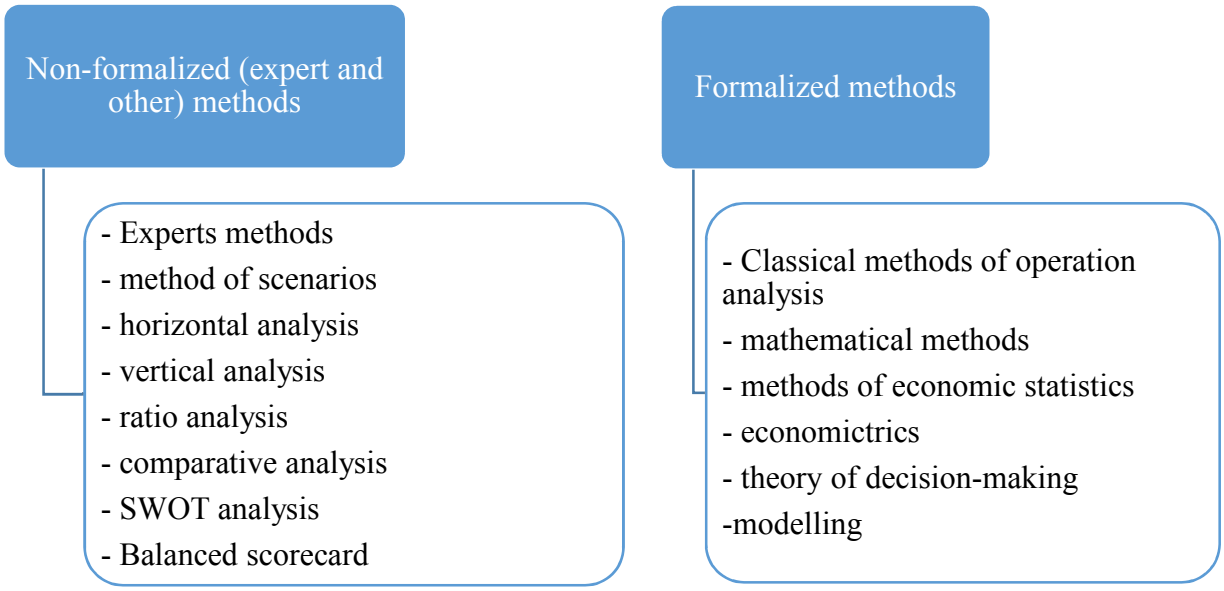

Figure 5 – Methods of financial statement analysis

Note - Source [58].

From the listed above the most commonly used methods by analysts are formalized. The basic rules of "reading" of the financial statements is based mainly on techniques such as horizontal, vertical, trend and ratio analysis.

Horizontal analysis is a so-called chain dynamics of financial performance of the reporting period compared with the previous period. Technique of this kind of analysis is done by comparing the items of balance sheet, income statement, and statement of cash flows. Thus, the horizontal analysis identifies trends in certain items or groups (Table 9).

Table 9 – Technique of horizontal analysis Company ABC Balance sheet (Assets)

Assets	Year 1	Year 2	Changes	
			Absolute	%
Current assets	CA1	CA2	CA2-CA1	CA2/CA1
Fixed assets	FA1	FA2	FA2-FA1	FA2/FA1
Total (balance)	T1	T2	T2-T1	T2/T1
Note - Source: [55, p.183]				

Vertical (structural) analysis determines the proportion of each item in the overall totals and results are compared with the data of the previous year (Table 10). The mandatory element of analysis is the construction of the time series of these variables in order to track and predict the structural changes. The findings obtained in the course of vertical analysis, confirmed by the results of the ratio analysis.

Table 10 – Technique of vertical analysis Company ABC Balance sheet (Assets)

Assets	Absolute amount		Proportion		Changes
	Year1	Year 2	Year1	Year 2	
Current assets	CA1	CA2	P1=(CA1/T1)*100	P2=(CA2/T2)*100	P2-P1
Fixed assets	FA1	FA2	P1 =(FA1/T1)*100	P2 = (FA2/T2)*100	P2-P1
Total	T1	T2	100%	100%	
Note - Source: [55, p.183]					

This type of analysis is considered to be useful when working with the balance sheet, as well as when working with the profits and losses statement.

Trend analysis defines the deviation of indicator for a number of years from the base year level (Table 11).

Table 11 – Technique of trend analysis Company ABC Balance sheet (Assets)

Assets	Years					
	1	2	3	4	5	6
Current assets, thousand tenge	CA1	CA2	CA3	CA4	CA5	CA6
Current assets , %	100	CA2/CA1	CA3/CA1	CA4/CA1	CA5/CA1	CA6/CA1
Fixed assets, thousand tenge	FA1	FA2	FA3	FA4	FA5	FA6
Fixed assets,, %	100	FA2/FA1	FA3/FA1	FA4/FA1	FA5/FA1	FA6/FA1
Balance						
Note - Source: [55, p. 213]						

As can be seen from the table above, the trend analysis is a comparison of each position of the statement to the base period and the determination of the trend for a few periods. Due to the trends the possible values of the future are calculated, therefore, this type of analysis is perspective (forecasting) analysis. Trend analysis provides a picture of the condition of the company and its developments, whether the company improves or worsens the situation, or having any problems.

The most popular method of the analysis is the ratio analysis, which represents an estimate of the change in the balance between the individual indicators. It identifies the dynamics of the relationships between different sets of data. Despite the fact that the coefficient itself is quite easy to calculate, since it is a mathematical relation of one figure to another, interpreting the dynamics of values obtained is quite difficult. It is the most time-consuming phase of analytical work.

The system of coefficients is a set of relationships of the data presented in the financial statements. There are certain requirements that the system must comply with:

– coefficients in the system should have a low correlation, they should not depend on each other;

– factors should be considered only in the dynamics to identify the main trends;

– the order of calculation should reflect the features of the industry;
– easiness of calculations, the ratio should be clear to interested users;
– interpretation of the dynamics of the calculated ratios should be presented in clear and easy manner.

For a correct analysis and conclusions it is necessary to have a normative meaning for comparison. It can be both the industry average and the indicators characterizing the financial position of the competitors or benchmark companies in the industry.

Another popular method is SWOT-analysis that can estimate the internal strengths and weaknesses of the company, as well as the threats of the environment and opportunities for future development. Thus, SWOT-analysis explains and describes intractable quantifiable factors, and therefore not intended to be highly reliable.

Strength comprises of some specific features that differentiate the company from competitors, which in turn, provides additional business opportunities. Weakness is the lack or absence of an important element in the functioning of the institutional system. However, the weakness does not always mean the vulnerability of a particular company. All depends on the importance or significance of the missing factor. The strength and weakness both could be potential factors affecting the development and decline of the company.

SWOT-analysis technique implements the control over weak signals. The data signals are not just tracked, but amplified at the level of senior management and influence the choice of management strategy.

Analysis of opportunities and threats is reduced mainly to seek attractive areas of management, for example, geographically, demographically or by industry. Finding a vacant market niche is one of the most important factors for success in the competition. At the same time should be avoided industries associated with increased risk, especially those associated with high volatility of the market situation and falling curve of the product life cycle.

A. Thompson and A. Strickland carried the analogy of the SWOT-analysis to the balance sheet, explaining the internal strengths of competitive asset, while the weaknesses were competitive liabilities of the companies [26, p. 31]. The authors continue that the SWOT-analysis allows to draw conclusions about the state of the company and the need for strategic change, and therefore, this method of analysis "is an essential component of the assessment of the strategic situation."

It should be noted that the SWOT-analysis is not the only qualitative method of analyzing the strengths and weaknesses of the organization. M. Meskon, M. Albert and F. Hedouri presented classification, including marketing, manufacturing, finance, human resources and the company's qoodwill. I. Ansoff presents his own methodology to assess the results of the competitive status of the company [26, p. 32].

For the last decades the system of strategic analysis is becoming more and more widespread, employing such tools as the Balanced Scorecard. This approach provides transformation of strategy into the plane of operational objectives by building a tree

of goals and indicators to monitor the performance of each of them in the framework of the four main directions: financial, internal business processes, customers and staff. Thus, the system includes both financial and non-financial indicators reflecting the efficiency of the intellectual capital of the company and the main factors in the growth value of the company in a competitive market [55, p. 35].

The second group of tools of financial analysis consists of methods based on the formalization of well-defined analytical dependence. The formalized methods include, but not limited to the followings:

– methods of mathematical statistics (correlation, regression, factor, cluster and other tests);

– methods for analyzing economic activity (chain productions, interest numbers, discounting, integral);

– methods of economic statistics (average and relative values, index, graphics, processing time series);

– methods of decision theory (game theory, the method of trees, methods of network planning and management).

Alternatively, all of the above methods can be classified as descriptive, predictive and normative. Descriptive models comprise of the vertical and horizontal analyses, the construction of the system of analytical coefficients and other factors.

Predictive models are forecasting in nature, therefore used to predict changes in the financial condition of the company, the value of revenues, profit margins and so on. The most famous are the calculation of break-even point, the threshold of profitability, rigidly deterministic factor and regression models, the formation of forward-looking financial statements.

Normative models compare the actual performance indicators with the set in the business plan or the company budget. Within the framework of these models the analysis of deviations from the standard take place.

Moreover, equally to all the above methods, the traditional scoring (rating) methodology for assessing credit risk is used by analysts. As a rule, the rating is calculated by summing the ratings of different characteristics (attributes) of the borrower or issuer, adjusted by weight, which are defined by normative process. For example, based on the preferences and experience of the analyst. Thus, the choice of weights is not necessarily mathematically or statistically reasoned characteristic. Frequently, quantitative characteristics and qualitative information is used as the estimating parameters.

The most popular scoring systems are the ratings of international agencies Standard & Poor's (S & P) and Moody's. In addition to these agencies, international banks and other financial institutions, have their own methods of calculating credit risks as well.

Standard & Poor's has been operating for more than half a century. However, it began the rating activity about 80 years ago. To date, the ratings assigned to companies from over 50 countries.

Short-term credit rating of the issuer determines the financial condition of its short-term debt instruments. It is divided into several categories: A-1 to D; A-1

describes the highest level of reliability and D - respectively, the lowest. In some cases, when the A-1 is used with a "+", it means that the company has an ultra-high reliability rating.

Long-term credit rating is characterized as the long-term debt of the company in terms of reliability and prospects. The range of long-term rating is from AAA to DDD. The company assigned the rating of AAA is perceived as highly reliable. While rating DDD means the actual bankruptcy. Also, the category of AAA, BBB, and CCC may be supplemented by characters "+" or "-", this means that the company has a deviation from the mean in a given rating category. The rating process presented in Figure 6.

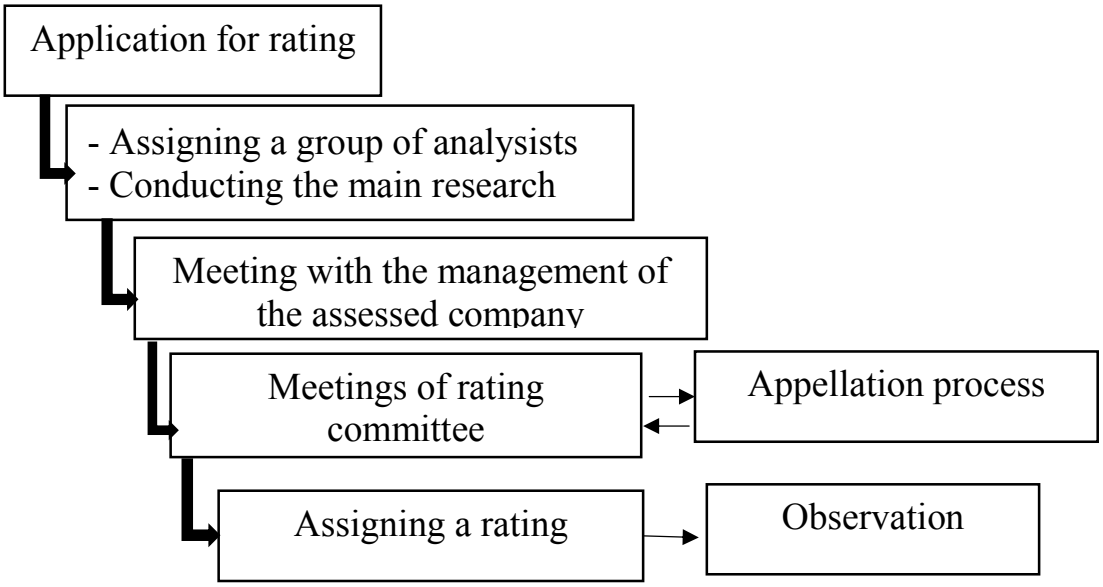

Figure 6 – Rating process of the Standard & Poor's agency

Note - Source: [55, p. 386]

As it can be seen from the figure above, the rating process includes quantitative, qualitative and legal analysis of the target firm. Quantitative analysis is mostly the analysis of financial condition based on the published financial statements. Qualitative analysis is based on an assessment of the quality of management of the company, the study of the level of competition within the industry and the market position of the company and industry analysis.

The procedure of assigning the rating lasts for four to six weeks. The applying company, in case of dissatisfaction, has the right to appeal against the rating assigned to the moment of its official publication by providing additional information. Revision of the rating is held once a year.

The rating process of the Moody's agency appears as on the following figure 7.

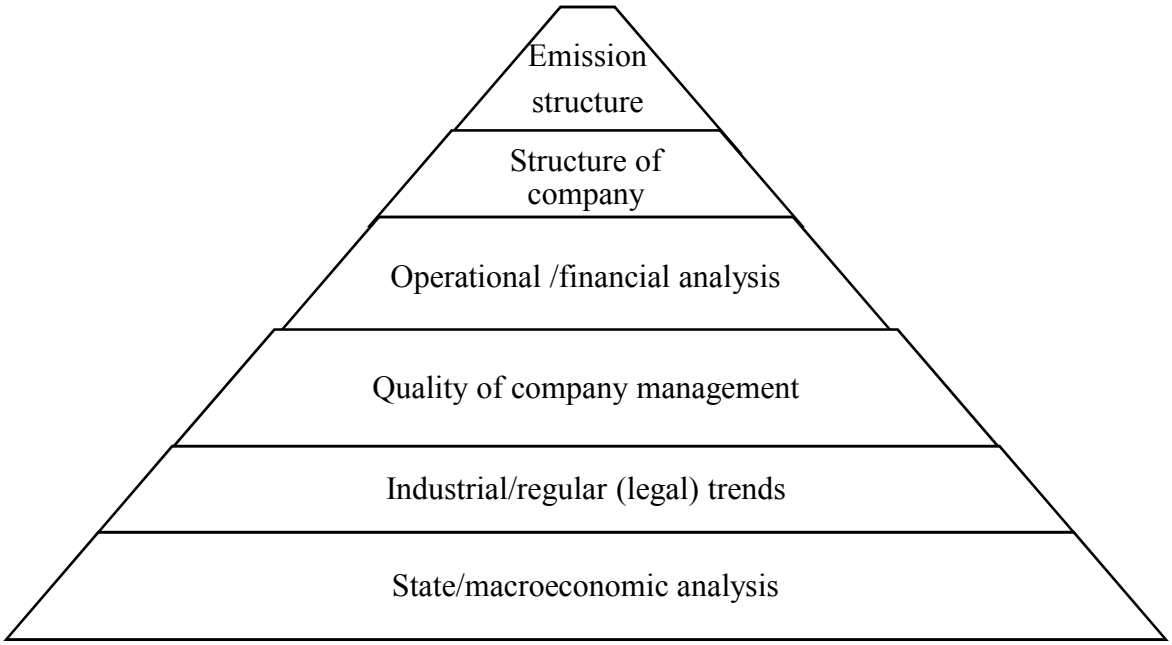

Figure 7 – Rating process of the Moody's agency

Note - Source: [55, c. 349]

Table 12 presents a comparative analysis of these two agencies' and International Monetary Fund's credit risk criteria.

Table 12 – Rating criteria of credit risk

Standard & Poor's	Moody's	International Monetary Fund
1	2	3
Financial risk: - Balance sheet and income statement; - Financial policy; -Profitability; - Structure of equity; - cash flow; - financial flexibility	Financial risk: - cash flow; - liquidity; - debt structure; - equity and reserve capital	Economic situation: - revenues (cash flow, profitability); - financial situation (structure of equity, liquidity)
Business risk: - industry code; - competitive environment	Competitiveness and business risk: - market share, competitive condition; -diversification; -turnover, costs, profitability; - buying and selling	Business situation: - industry evaluation; - patents and competitors; - products mix; - specific risks; - forecast: revenues and liquidity
	Juridical structure and juridical risks: -consolidation of interrelated companies	Juridical structure

Continue of table 12

1	2	3
Management	Management quality: -planning and control; -management achievements; -organizational structure; -entrepreneurial succession	Management quality: -experience; -succession; -accounting and control quality
		Client relations, work with the bank accounts
Note - composed by author based on [55, c. 349]		

Thus, the art of a financial analyst is largely determined by the ability to choose the methods of research in accordance with the task and create a set of basic performance indicators that can reflect the financial situation of a particular company with all the features of business and perspective user of the final analytical report.

2.2 Diagnosing financial health of the enterprise

The term of diagnostics was borrowed from the medical science. Diagnostics is the process of studying human's oscillation from standard and diagnosing a problem. At the beginning of the twentieth century, the term "technical diagnostics" appeared, which was related to the study of machine fluctuation and its causes [59]. Only at the beginning of the twenty first century, the term "economic diagnostics" emerged.

In the works of Russian scientists, the term of economic diagnostics is defined as the identification of the economic condition of an enterprise [60]. The economic diagnostics defines and studies the signs of shortcomings in the management of economic activities in order to predict the consequences, both positive and negative, and the development of methods and means of identifying abnormalities and the impact on them. In economic science, the analysis of the financial condition plays the role of methods and tools of diagnostics. Therefore, diagnosing the financial condition of the enterprise is conducted with the aim to determine its sustainable development and the ways of improving its performance.

Thus, we define *diagnostics of the bankruptcy probability of the enterprise as the identification of the negative deviations of indicators, characterizing the financial condition of the enterprise, from the normative model, which is accepted for the object considering the specifics of operating activities*.

Economists divide the diagnostics into several types, such as a detailed and thorough, functional and rapid diagnostics.

Detailed and thorough diagnostics is the base model. This model identifies the strengths and weaknesses of the company for the current and prior periods. Moreover, it determines the factors affecting the functionality of the company and provides the ability to plan actions accordingly. This type diagnoses the economic activity of the enterprise in detail and carefully.

Instant or rapid diagnostics is used to identify the cause of the problem urgently. For example, rapid diagnostics helps when the shortcomings of the enterprise should

be resolved as soon as possible to continue to operate. In this case, the studies are conducted around a specific issue [61].

Functional diagnostics is an independent type, dedicated to a specific operation of the enterprise, such as marketing, production, and so on. In all cases, the economic diagnostics is carried out.

Periodic diagnostics of economic trends provides an opportunity for appropriate planning to mitigate the risks of the forthcoming crisis, and to remain competitive in current economic environment. In fact, favorable economic conditions and competitiveness are different by nature. In a crisis, the financial condition should be monitored, taking into account the impact of external factors and competitors' activities. Consequently, regular diagnostic of the economic status is a valuable tool against the crisis.

Economics, as any phenomenon, has its own rules. If these rules are followed, economy remains sustainable and competitive. . However, a variety of events can lead to negative consequences, which may lead to a recession or crisis. Upon determination of theoretical background and normative model of economic processes, deviation from that model can be easily identified and appropriate actions to be taken. Therefore, It means that for the diagnostics of the economy needs a normative model to ensure its sustainable development. Thus, having considered the diagnostics of economic development, the author gives the definition for economic diagnostics.

Thus, we believe that economic diagnostics is the identification of actions with the aim to bring distressed condition of the enterprise closer to normative. It is possible with the help of the analysis of the causes of deviations, which are derived from a comparison of the current trends of economic development with a pre-established normative model of the economy.

A. Sheremet argues that economic diagnostics determines the operational weaknesses of the enterprise, their causes and the means and methods of rehabilitation. Diagnostic analysis of the company is an assessment of its development, to determine the degree of positive and negative influences of the factors on the sustainable development of enterprises, offer effective ways of development [60, p. 40].

A number of Russian authors do not consider "analysis" and "diagnostics" separately, since their subject and goals are similar. The others claim that analysis goes first, followed by diagnostics. A. Sheremet asserts that the analysis is the research process, while diagnostics is its conclusion. "Analysis and diagnostics

are tightly related to each other: without analysis diagnostics does not exist, and the main goal of diagnostics is making a final decision. Analysis and diagnostics are bases for decision making. In medicine the following chain has been established: analysis – diagnoses – treatment; while in economics it is: analysis – diagnostics – decision making" [60, c 41].

Economic processes are continuous and dynamic processes. Factors of economic process either increase or decrease during all period. Match of the increase and decrease processes with the standards of economic theory guarantees economic

success. Therefore, diagnostics of trends and changes in dynamics of economic processes is very important.

During the shift from one period to the other economic indicators might change positively or negatively in comparison with the standards. In practice, the tendency is not always positive, it goes up and down from time to time. Analysis of enterprise operations' trend in a particular period in comparison with the normative model gives an opportunity to avoid failure.

The normative model of diagnostics is a model of an effective regime of the enterprise or its affiliated companies. Comparative analysis of the actual activities of the enterprise with the normative model makes it possible to identify existing reserves and deviations. By their nature, normative model, including economic indicators, is a reflection of the scientific operative relations in the enterprise.

Unfortunately, methods of diagnosing economic processes have not been established yet. As mentioned earlier, analysis and diagnostics have been considered jointly, instead of being separated. Consequently, the methods have not been classified.

Diagnostics of bankruptcy is a system of targeted financial analysis aimed at identifying the parameters of the crisis development of the company, generating a threat of bankruptcy in the coming period. It should be noted that focus here is on the diagnosing a potential bankruptcy of an economic entity in the early stages as a process of financial control, the main purpose of which is to prevent a possible crisis of the enterprise.

Diagnostics is the basis for system analysis in order to identify problem areas of functioning of the entity and the possibility of making decision on probability of bankruptcy.

Results of the analysis and evaluation of the probability of bankruptcy also considers the possibility of restoring financial stability and solvency of the company. Financial and economic indicators characterizing the condition of the enterprise, in which the restoration of stable economic position is not possible, can serve as the benchmarks of the extremely critical financial situation [62].

Within the frame of economic science diagnostics determines the condition of the business entity, phenomenon or process (production, management, technology) through the implementation of comprehensive procedures to identify weak links in the course of development.

Modern economic analysis identifies three basic types of diagnostics:

a) express or rapid diagnostics;

b) diagnostics of a potential bankruptcy;

c) comprehensive (fundamental) diagnostics of the economic condition (Figure 8):

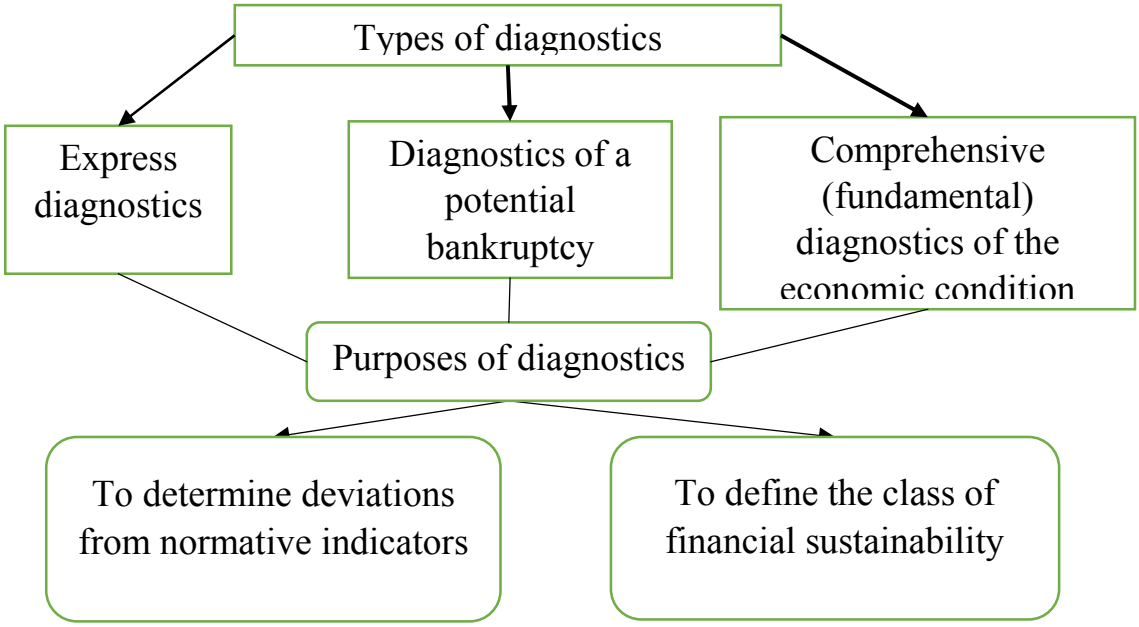

Figure 8 – Types and purposes of diagnostics

Note - composed by author based on [63].

Express diagnostics allows in a short period of time to obtain a minimum set of economic and financial indicators, which fully characterize financial and economic condition of the enterprise. If necessary, a supplementary factor analysis of problematic indicators can be conducted. Express-diagnostics can also be called the monitoring of the enterprise.

N. Rodionova believes that "express diagnostics is a formal assessment of the enterprise close to bankruptcy through the regular calculation of the relevant coefficients and balance data" [26]. The author assumes that the purpose of diagnostics is to identify trends in the condition of the enterprise, evaluation of the depth of insolvency and analysis of financial turnover, providing business activities.

Express diagnostics of bankruptcy describes a system of regular evaluation of the crisis parameters of the financial development of the enterprise carried out on the basis of its financial accounting data in comply with the standard algorithms analysis. The main purpose of the express diagnostics of bankruptcy is the early detection of signs of the enterprise crisis and a preliminary assessment of its condition.

According to I. Blank [22, p. 85], express diagnostics of bankruptcy has the following stages:

– Determining the objects that form a real threat of financial crisis;

– Establishing a system of indicators, and system of assessment of the threat of financial crisis of the company

– Analyzing individual aspects of the crisis of the enterprise carried out by standard methods

– Identifying the extent of the crisis of the financial condition of the company.

In our view, any analysis and diagnostics should begin with the defining the goals and methods of the research, as well as receiving the information that must be checked for reliability. Therefore, we propose a more detailed algorithm of express diagnostics shown in Figure 9:

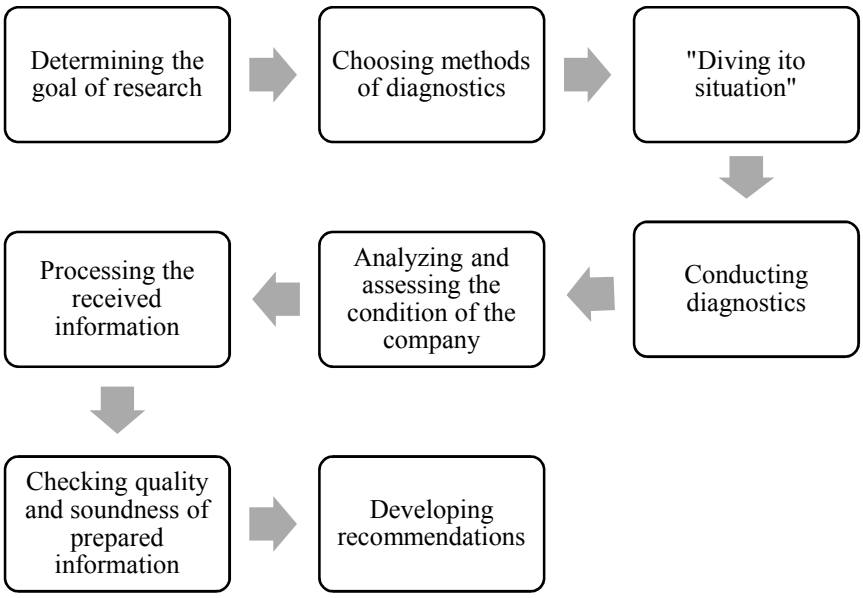

Figure 9 – Algorithm of express diagnostics

Note: composed by author based on the source [22].

Economists assert that one of the advantages of methods of express diagnostics is that results have a clear economic interpretation and provide guidance for financial planning of the company. In addition, the information base of the rapid diagnostics can serve as a data for subsequent economic and financial analysis.

Express diagnostics consist of the several phases: preparatory phase, preliminary analysis, detailed analysis, and the final stage. Table 13 shows the steps, measures, and actions of express diagnostics of the financial condition of the company.

In the balance sheet, there are so-called "sick" accounts, indicating the presence of problems, proving that there are some problems in the company, decline of the financial condition: losses for several financial years, overdue of accounts receivable, bad debts in accounts receivable, uncovered losses of previous years. All this is a serious signal to the revision of the financial management policies of the company.

Also, it should be noted, and there is evidence of a "good" balance, which is estimated on the basis of trends for several periods. These include:

- increase in net assets;
- optimal size of the working capital;
- lack of losses;
- compliance with the ratio of non-current and current assets of the specifics of the industry;
- excessive growth of the equity growth over the rate of debt;
- balancing the rate of turnover of accounts receivable and accounts payable;
- excess of current assets over current liabilities;

– excess of revenue growth over the growth of borrowed capital.

Table 13 – Phases of conducting the express diagnostics

Phases	Steps	Actions
1	2	3
Preparatory	Data collection	Compilation of financial statements, explanatory notes, and auditor's opinion for several periods. Checking availability of reporting forms, attachments, stamps and signatures in all forms. Collecting data of the analytical accounts. Selection of published statistical data of the industry, selection of the information from stock exchange. Working with databases of large companies. Interviewing.
	Checking soundness of information	Auditing the accounts: identification of arithmetic errors, reconciliation of subtotal, reconciliation of the balance sheet total, a comparison of data from different forms of reporting, checking of relevance of indicators and reporting forms, calculation of main controlling relations among them. Identification and elimination of disparate data in a report.
	Building an aggregated data source	Transformation of standard reporting forms into the format of analytical tables, comfortable for horizontal and vertical analysis.
Preliminary-assessment of financial statements' quality	Identifica-tion of "sick" accounts	Identification of «losses» account. Checking for receivables overdue. Checking for payables overdue.
	Identifica-tion of "vague" accounts	Familiarization with the explanatory note to the balance sheet and analytical reporting.
	Assessing the balance based on "good" accounts	Signs of "good" balance: the growth of the balance sheet total, exceeding the growth rate of equity, balanced growth of receivables and payables, no "sick" articles, the growth of the share of equity in the balance sheet.
	Computa-tion of the intermediate indicators	Calculation of the net assets. Calculation of working capital. Calculation of the coefficient of own funding sources. Evaluation of the results.

Continue of table 13

1	2	3
Detailed – main directions of financial statement analysis	Balance sheet analysis	Conducting horizontal and vertical analysis of the balance sheet. Analysis of the results (by any liabilities generated assets of the company, in which assets are invested most of the money, which is dominated by assets).
	Evaluating financial condition of the company	Analysis of liquidity and financial sustainability
	Assessing profitability and efficiency of the company	Analysis of activity (profitability and turnover).
Final	Conclusions and recommendations	Developing the conclusions and recommendations of the analyzed company-specific business
Note - Source: [22]		

The subsystem of express diagnostics gives an opportunity for early detection of signs of a crisis of development in companies and allows taking a swift action to neutralize them. It's most noticeable deterrent effect can be observed at the stage of pre-crisis situation, or light of the financial crisis the company. In case of the different scale of the crisis in the enterprise, it must be necessarily complemented by the fundamental financial system diagnostics.

The fundamental diagnostics of the financial crisis characterizes the subsystem assessment of the crisis of the financial condition of the company, carried out through a variety of methods of financial analysis and forecasting, and depends on the desired structure and depth of research. It determines the depth of investigation procedures and a comprehensive diagnostic of its term, and cast list. The information base for decision-making is the conclusion of rapid diagnostics. However, experience shows that the most complex diagnostics combines organizational, personnel, functional, strategic analysis and diagnostics itself [64].

Express diagnostics determines the range of problems that are evaluated in more detail during the comprehensive analysis. With an integrated diagnostics to assess the overall situation of the company, provide cut financial and economic conditions, perform an assessment of innovation potential, conducted a factor analysis the causes of the problems identified.

The fundamental diagnostics of bankruptcy characterizes the system of evaluation of the financial crisis parameters of the enterprise carried out by the methods of factor analysis and forecasting.

The main objectives of the fundamental diagnostics of bankruptcy are as followed:

- deepening the results of the evaluation parameters of the financial crisis of the company obtained during the rapid diagnostics of bankruptcy;
- assuring the preliminary assessment of the extent of the financial condition crisis of the company;
- forecasting the development of the individual factors generating the threat of bankruptcy, and their negative consequences;
- estimating and forecasting the ability of enterprises to neutralize the threat of bankruptcy due to internal financial capacity.

Fundamental bankruptcy diagnostics is realized through a number of stages:

- systematization of the main factors causing the financial crisis the development of the enterprise;
- conducting a comprehensive fundamental analysis with the use of special methods of assessing the impact of individual factors on the development of the company's financial crisis;
- forecasting the development of the financial condition crisis of the company under the negative influence of individual factors;
- forecasting the ability of enterprises to neutralize the threat of bankruptcy due to internal financial capacity;
- final definition of the scope of the crisis of the financial condition of the company.

The fundamental diagnostics of bankruptcy gives the most detailed picture of the crisis of the financial condition of the company and specify the forms and methods of its improvement forthcoming.

As a result of complex diagnostics of the enterprise can get an estimate of a wide range of industrial and commercial processes. However, carrying out this type of diagnostics is a very time consuming and difficult process. It is advisable to carry out this procedure by outside consultants to get an unbiased opinion.

In implementation of the complex diagnostics, there is one serious drawback: the possible contradiction of the principle of economic profitability, which means that the produced management costs should not exceed the reliability resulting from this financial result.

As noted earlier, the results of a rapid diagnostics and diagnostics of potential bankruptcy are the basic foundations for a comprehensive diagnostics of the economic condition of the company. Based on the stated above, it is appropriate to present the following scheme for a comprehensive diagnostics (Figure 10).

Conducting express diagnostics and diagnostics of potential bankruptcy in the structure of the financial analysis is an indicator at the entrance of the enterprise in a critical sector development. In other words, if the results of the diagnostics conducted revealed possibility of occurrence of the insolvency of the enterprise, then it is

necessary to conduct a comprehensive diagnostics of the economic status and identify the causes of the critical values of the parameters of bankruptcy.

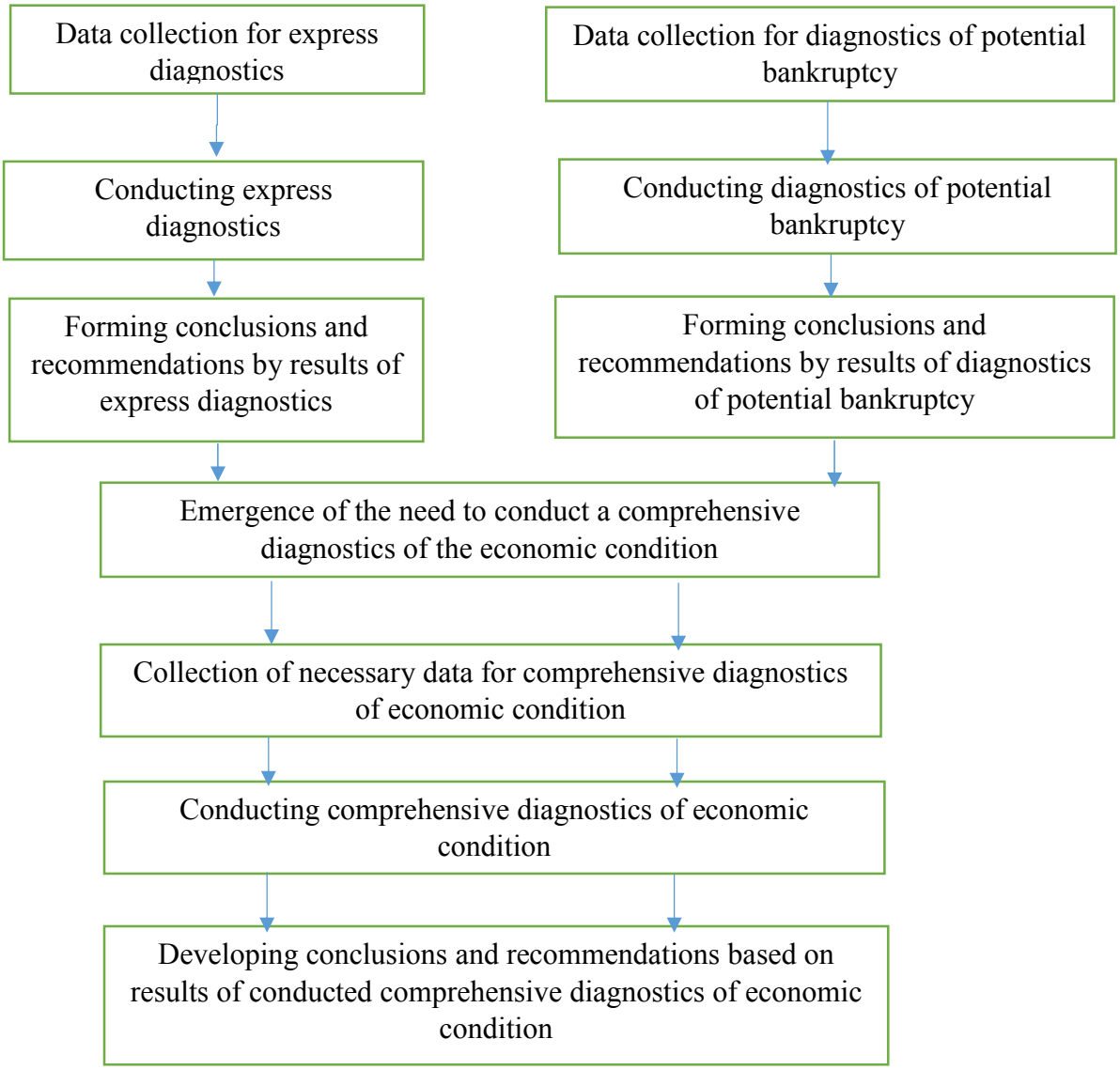

Figure 10 – Algorithm of conducting comprehensive diagnostics of the enterprise

Note - Prepared by author, based on [65].

It should be noted that the diagnostic system of the enterprise recognizes the crisis and continuously monitors the enterprise, and tracks its main trends. By increasing the degree of closeness to the bankruptcy of the company, expressed in the emergence of the trend of decline, management should begin to develop countermeasures that should prevent and reduce negative impacts at an early stage of their occurrence. The success and failure of anti-crisis measures and policies depends on early diagnostics and recognition of the danger even before the crisis. However, we should not forget about the likelihood of a "false alarm", so-called weak signals that indicate the termination of certain growth trends. Identification of the crisis situations is a strength of diagnostics.

Any change in the enterprise entails the adjustment of existing strategies. Continuous diagnostic system allows effective monitoring of the implementation of the chosen strategy. Its task includes the evaluation of the situation in the formation of intra strategies and constant monitoring of its implementation and, ultimately, evaluation of the success of the strategy as a whole after the expiry of its implementation.

Leaders, because of the popular belief that the probability of a sharp change in the favorable trends in the development of their business is small, often underestimate the system diagnostics and its necessity for business. Meanwhile, the cost of improving the administrative apparatus by introducing a system of diagnostics and monitoring if quite large.

The system of diagnostics of general condition of the company is an example of the information system of decision-making. Its presence in the institutional system of monitoring is irreplaceable, since it directly solves the problem of the internal monitoring by the company's large number of indicators, making it easier to control the analysis of the vast array of information and decision-making about the dynamics of the enterprise.

2.3 Analysis of the original Altman's Z-score model

As mentioned in previous paragraphs the model of diagnosing the probability of bankruptcy, developed almost 50 years ago by an American professor Altman is widely used around the world. However, the diagnostics results and actual condition of enterprises often contradict each other. In this regard, we analyzed the original model of Altman and opinions of foreign and domestic scholars and practitioners about its applicability in foreign countries.

Z-Score model became the prototype for many of these models based on the internal ratings. Asset managers, investors need to have reliable tools for the selection of the companies in their portfolios. Rating agencies assess the risks of business entities and securities, so they need a tool to predict the crisis. In addition, Altman suggested that managers of the distressed firms can use Z-Score model as a guide for financial recovery [40, p. 602].

Altman has criticized previous studies on the financial failures and said that the adaptation of the results to assess the potential bankruptcy of firms, both theoretically and practically, are questionable. The dominant methodology was essentially a one-dimensional, and the focus was on the individual "signal" of impending difficulties. This meant that the analysis of the factors could be misinterpreted, which in turn, could lead to confusion in the analysis.

Altman proposed to build a meaningful predictive model based on the findings of one-dimensional and combining several measures. Then the question, about the most important factors for identifying potential bankruptcy arose. Altman suggested multivariate discriminant analysis (MDA) as the appropriate statistical tool. In order to adapt the MDA model, it is important to know how to choose the objects of research; bankrupt and not-bankrupt firms, and how the variables were originally selected for this model.

The initial sample consisted of sixty-six corporations, thirty three companies in each of the two groups. Bankrupt group (Group 1) consisted of corporations which filed for bankruptcy protection in accordance with Chapter X of the Law on the National Bankruptcy in the period 1946 - 1965. This means that the assets of these companies amounted to 6.4 million US dollars, with a range of 0.7 - 25.9 million US dollars. Altman acknowledged that the group was not homogenous with regard to size and sector, although all firms were relatively small, and in the manufacturing industry. Thus, he tried to make a careful selection of the not- bankrupt firms (Group 2).

Group 2 consisted of a matched sample of manufacturers, selected on a stratified random basis. These firms have been divided by industry and size of their assets comprised of 1 to 25 million US dollars. Altman has eliminated small firms (less than US $ 1 million in total assets) due to the lack of data on them, and very large firms in connection with their sparse probability of bankruptcy. He did not compare the size of the assets of the two groups, thus the firm's assets in the group 2 are slightly larger than in group 1. The data collected for firms in both groups were for the same period. For Group 1, the data were derived from the financial statements of one reporting period prior to the bankruptcy.

Financial ratios chosen for the model were based on data from the balance sheet and profit and loss statement. In previous studies, a very large number of variables have been defined as the significant indicators of financial difficulties. Thus, Altman has compiled a list of 22 potentially important financial ratios for evaluation. He classified these variables into five blocks: liquidity ratios, profitability, financial leverage, solvency and business activity. Ratios were chosen based on their popularity in the literature and the potential relevance to the study. The list included only a few "new" factors. In addition, Altman did not consider cash flows due to the lack of consistent and accurate data.

From the initial list of 22 financial ratios, Altman chose five basic for his model as "the best predictors" of corporate bankruptcy. This profile did not contain all of the important variables that were weighed separately. Instead, the estimated contribution of the entire profile. To come to the final profile of variables, Altman used the following procedures:

1) observation of the statistical significance of the various alternate functions, including determination of the relative contribution of each independent variable;
2) evaluation of interrelated correlation between the variables;
3) monitoring the accuracy of the predictions of various profiles;
4) evaluation analyst.

The final discriminant function, developed by Altman appeared as follows:

$$Z = 0{,}012 \cdot X1 + 0.014 \cdot X2 + 0.033 \cdot X3 + 0.006 \cdot X4 + 0\ 0.999 \cdot X5 \quad (7)$$

Or

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5 \quad (8)$$

(when the first four variables are expressed in decimals, such as 20.0%), where:
X1 = working capital / total assets
X2 = retained earnings / total assets
X3 = earnings before interest and taxes / total assets
X4 = market value of equity / book value of total liabilities
X5 = sales / total assets
Z = total score.

The economic interpretation of each factor of this model described below.

Factor 1. The ratio of the working capital to total assets (X1) is a measure of net liquid assets of the company in relation to the total market capitalization. Working capital is defined as the difference between current assets and current liabilities. When a firm is experiencing successive operating losses, this leads to a reduction in current assets in relation to total assets. The X1 ratio proved to be more valuable in the analysis than the current ratio and quick ratio. This ratio clearly defines the liquidity of the company and its value.

Factor 2. The ratio of retained earnings to total assets (X2) defines the surplus earned by the company during the entire life cycle. This measure of the long-term profitability is one of the two (the other is the use of market value instead of book value of equity, in X4) «new» relations introduced by Professor Altman. This factor describes the multiple aspects of the status of the company.

Firstly, this factor indicates the profit or loss that has been reinvested in the assets of the company throughout its life. Thus, it reflects not only the final result of the firm, but its age, since the meaning of this ration for the young firms is likely to be lower. This discrimination of young firms, according to the American economist, it is fair, due to the fact that they are at higher risk of bankruptcy.

Secondly, X2 also serves as a measure of leverage. Higher levels of this indicator suggest that the firm finances its assets to a greater extent due to own rather than borrowed funds, thereby reducing their dependence on external resources.

Factor 3. The ratio of operating profit (profit before interest and taxes) to total assets (X3) is the measure of true performance and profitability of the firm's assets. However, it does not affect the tax or interest rates. It reflects the ability of earning assets, which determines the value of the assets themselves. In the concept of bankruptcy, insolvency occurs when total liabilities exceed the fair value.

Factor 4. The ratio of the market value of equity to total debt (X4) shows how the assets of the company may decline in value (measured by the market value of equity plus debt) before the obligations exceed the assets and the firm goes bankrupt. This ratio adds a market value measure to the model. The adverse side of this ratio - the debt to equity ratio - is used to measure financial independence. Indeed, the use of market value of equity capital was firstly introduced by Altman, and was in some sense a precursor of the so-called structural approach presented by R.C. Merton [66].

Factor 5. The ratio of sales to assets is a standard ratio of capital turnover, showing the ability of the firm's assets to generate sales. This reflects the ability of

management to rule in a competitive environment. However, this ratio was not used in the Z "-Score model.

Altman estimated the importance of the five factors in several ways. Firstly, he used F test to evaluate the dimensional difference between the average values of the ratios in each group by variability (or incidence) of the ratios values in each group. In this test, all the variables from X1 to X4 were significant at the p 0.001 level, indicating a significant difference between the groups in the variables. Nevertheless, X5 showed no significant difference on the one-dimensional basis. All five ratios had higher values for not-bankrupt group, which corresponds to a positive sign of the discriminant function.

Secondly, Altman determine the relative contribution of each variable to the overall discriminant function with the help of large-scale vector. In this vector, a measure of profitability (X3) showed the highest contribution while the ratio of sales to assets (X5) took the second place on the deposit, although this was not significant on the basis of one-dimension. To explain this, Altman found a negative correlation (-0.78) between the X3 and X5 in the bankruptcy group. As a rule, negative correlations are more useful than positive, adding new information to the function. Altman explains that this negative correlation occurs when insolvent firms have losses and get closer to failure, and their assets are replaced in the same way as they were in the best times. In addition, the cumulative losses further reduce the size of assets by debit to retained earnings. Thus, reducing the size of assets obviously inhibits any movement of sales.

As a result, the value obtained is evaluated as presented in table 14.

Table 14 – Altman Z-Score bankruptcy probability scale

Z-score	Company condition
More than 2,675	Safe zone
1,81-2,675	Grey zone
Less than 1,8	Distress zone
Note – Source: [40, p.605]	

Original Z-Score model was based on the market value of the company and, therefore, should only be applied to publicly traded companies (represented on the stock exchange). Altman [67] stressed that the Z-score is a model for public companies that is why situational and special adjustments are not scientifically justified. Thus, Altman made a full reassessment of the model, replacing the market value of equity to book value in X4 indicator. Using the same data, Altman took out the following revised Z'- score model:

$$Z' = 0{,}717X1 + 0{,}847X2 + 3{,}107X3 + 0{,}420X4 + 0\ 0.998X5 \quad (9)$$

Where,

X1 = working capital / total assets

X2 = Retained earnings / total assets
X3 = Earnings before interest and taxes / total assets
X4 = book value of equity / total liabilities (carrying amount)
X5 = sales / total assets
Z '= overall index
Furthermore, he revised the grading scale of firms as well (table 15).

Table 15 – Z'-Score bankruptcy probability scale

Z'-Score	Company condition
More than 2,9	Safe zone
1,23-2,9	Grey zone
Less than1,23	Distress zone
Note – Source: [68]	

Altman did not test the Z'- score model in the secondary sample due to the lack of reliable data on private firms. Still, he analyzed the accuracy of four variables of the Z " - score model, subtracting X5 factor (sales to assets) in the revised model, because of the possible impact of the industry. The industry effect is likely to happen if the industrially sensitive variable (asset turnover) is included into the model. Thus, in order to minimize the potential effect of the industry, Altman has introduced the following four-factor Z " - score model [69]:

$$Z'' = 3.25 + 6.56X1 + 3.26X2 + 6.72X3 + 1.05X \quad (10)$$

Where, X1 = working capital / total assets
X2 = retained earnings / total assets
X3 = earnings before interest and taxes / total assets
X4 = book value of equity / total liabilities carrying amount
Z " = overall index

Factor X3, which is the ratio of earnings before interest and taxes on total assets, again made the biggest contribution to the discriminant power of this version of the model. The classification results for the Z " - Score model was identical to the revised five factor (Z 'Score) model. Also this model is widely known under the name of Emerging Markets Score (EMS), since it was supposed to predict bankruptcy of non-US companies from emerging markets.

In his concluding remarks, Altman [70] considers the general applicability of his Z-Score model as controversial. He admits that the model did not consider the very large and very small firms, as the observation period was quite long (almost two decades), and the analysis included only the manufacturers. Altman came to the following conclusion: "Ideally, we would like to develop bankruptcy predicting models, using homogeneous group of bankrupt companies using the up-to-date data as relevant and truthful, as far as possible." Thus, he advised to carefully use the Z-Score model, as well as the revised Z'- Score and Z" - Score models.

In 1977, Altman, together with R. Haldeman and P. Narayanan created a new ZETA model [70, p.50]. The main advantage of ZETA is that it improved the accuracy of long-term forecasts of bankruptcy (in five-year forecast error is not more than 30%). It is also based on the construction of integral index, the weight of which are also using the technique of multiple analysis of variance. ZETA-score consists of seven variables:

– earnings before interest and taxes (EBIT) / total assets

– stability of earnings, measured as the standard deviation of the company's revenue over the past 5-10 years of its operation;

– debt coverage = EBIT / total amount of interest and lease payments;

– cumulative profitability = retained earnings of previous years / total assets. This ratio is not only incorporates the age and effectiveness of the company throughout its existence, but is the most important indicator of the model;

– current Ratio;

– capitalization = the average for the last five years market value of equity /total capital, which is considered as the sum of the market value of common shares, the liquidation value of preferred shares, long-term debt and capitalized lease payments;

– size, expressed in the form of logarithm of the total assets of the company.

Review of the literature shows that the Z- Score model (for publicly traded firms), Z'-Score model (for private companies) and Z " - Score model (for private production and non-production companies) have been widely applied in various contexts for various purposes. For the purpose of this research, we firstly interested in *evaluating the effectiveness* of the original Z" - Score model classification of bankrupt and non-bankrupt firms in international (Kazakhstan) context. We will evaluate the impact of the following five factors on the effectiveness/applicability of the model: the year of bankruptcy, firm size, firm age, industry and country of origin.

First of all, Z" - Score model was calculated using the same sample firms that were used to develop the original Z-Score model. Bankruptcy has been predicted based on the data of 1946-1965 years. That is more than seventy years ago observation. Later, Altman [40, p.125] recommended to use as much as possible the most relevant data to develop predictive models of bankruptcy. Obviously, the financial behavior of firms and their business environment have changed significantly after that, potentially affecting the importance of financial ratios that differ from their initial values, reflected in the coefficients of the model. Therefore, we suggest that revision of the four variables meaning will enhance the applicability of the classification model in the international context. This idea is supported by previous studies, for example, Grice and Ingram [71] and in practice.

Secondly, the original Z" - Score model was estimated using the multi-discriminant analysis (MDA), based on the proposal of Altman, as the most appropriate statistical tool. However, MDA is based on the conventional least-squares method (LSM) and therefore requires the assumption of multivariate normality and homoscedasticity of linearity, which are not often used in the empirical analysis of financial ratios. Thus, the Z" - Score model can be overestimated using logistic regression analysis (LRA) to evaluate the effect of the method of evaluation. LRA

requires the most restrictive assumptions of MDA. The LRA does not require multivariate normality of independent variables, as well as their homoscedasticity and linearity. In the case of the method of least squares, the MDA may be more useful than the LRA when the sample is small, such as in the initial sample of 66 firms used in the evaluation of Z " - Score model. However, in a large sample LRA could potentially perform better.

Furthermore, a model based on the relationship between bankruptcy and financial performance is likely to be dependent on the macroeconomic environment. These effects may significantly reduce the accuracy of the classification model. If the model predicts, using data from a single year, and will be applied to the data of another year, the validity of the model can be questioned. Economic cycles in terms of economic growth, credit policy and interest rates can have an impact on the border between the bankrupt and bankrupt firms. As previously noted, the original Z" - Score model predicts using data of 1946-1965, which includes several business cycles. Thus, the model is not focused on any particular stage of the cycle, and obviously ignores year of bankruptcy. Altman offers to collect the data from firms for the last couple of years, in the development of predictive models.

The distinction between bankrupt and bankrupt firms are significant for small and large firms. It is reducing the effectiveness of the model, since the data used one category to another category on the size. It should be noted that for the bankrupt and non-bankrupt firms in the initial data for the Z " - Score model, asset size range was between 1 and 25 million US dollars. The data did not include very small and very large firms. For this reason, Altman's revised the applicability of the initial Z-Score model (as well as the Z " - Score model) for questioned firms.

International insolvency statistics indicates that bankruptcy risk is a function of the age of the company. Usually very young company, show a high risk. Original Z " - Score model does not consider the age of the firm. However, Altman noted that the age of the company indirectly taken into account in the ratio of retained earnings to total assets (X2), which was considered a new factor in the context of bankruptcy prediction. At relatively young companies, probably this factor will be low because they do not have enough time to create a total profit. Thus, young firm somewhat discriminated in the model and their probability of being classified as bankrupt relatively higher than of the old firms. This situation, like Altman argues: "The situation in the real world" [69, p. 107], that is, the probability of failure is much higher in the early years of the company. Despite the fact that the age of the company in this case is taken into account indirectly in X2, we believe that a detailed consideration of the age of the company will increase the accuracy of classification due to age-factor.

Original Z'-Score model is estimated only for manufacturers. Altman said that, ideally, there should be a model for predicting bankruptcy with a homogeneous group of bankrupt firms. If we are interested in a specific group of industries, we need to collect data from the bankrupt and non-bankrupt firms in these groups. Previous studies have shown that the industry affects the analysis of the financial crisis [70, p. 33].

It is no secret that companies in different industries tend to have different levels of the same financial ratios, which in turn affects the distinction between the bankrupt and non-bankrupt firms. This industry effect may be present in the Z'-Score model, especially because of the ratio of sales to total assets (X5). This ratio was the lowest value in the one-dimensional model. However, there has been a significant contribution to the discriminant ability of the multivariate model. Altman, recognizing the potential effect of the industry because of the vast differences in the indices of turnover of assets among sectors, lowered coefficient of X5 in Z " - Score model for private non-manufacturing firms.

Finally, original Z " - Score model was developed only for the United States firms. However, Z " - Score model was applied and used in countries worldwide. It can be expected that an international model applicability for other countries based on differences in specific countries. The economic environment, legislation, culture, financial markets, accounting and reporting in the country may affect the behavior of financial firms and the boundary between the bankrupt and bankrupt firms. These factors have the potential to weaken the effectiveness of the classification models in foreign countries [72].

Despite the myriad research in the field of bankruptcy prediction, the original Altman's Z-Score model has been the dominant model, used around the world. Thus, while the Z-Score model has existed for over 45 years, it is still used as a primary or adjunct to the analysis and forecasting of financial crisis or bankruptcy, as in the field of research and practice.

The study of foreign experience is certainly useful. Many elements may be used in the domestic economy, but not all. Kazakhstan has its own specifics that must be taken into account. If you blindly rely only on Altman's model, it is possible to declare more than two thirds of Kazakhstani business entities bankrupt. In view of the above analysis of Altman model, and because it is not always appropriate to apply it to local enterprises, we developed a model to diagnose the probability of bankruptcy of domestic enterprises, as described in the next section, and its testing at the enterprises of telecommunication industry and food industry are presented in Chapter 3.

2.4 Enhancement of methods of analysis and diagnostics of the bankruptcy probability of an enterprise

There are a number of methods for the analysis of economic activity of the enterprise. One of them is the method of a dynamic normative (DN). This method is used to determine the level of sustainable development of the enterprise. The new method is linked with the analytical modeling and matrix method of mathematics.

Dynamic normative is a model of an effective regime of the enterprise or its affiliated companies. Comparative analysis of the operating activities of the enterprise with the normative model makes it possible to identify existing reserves and deviations. By its nature, dynamic normative, including the economic indicators, is the scientific reflection of the operative interrelations on the enterprise. Thus, the

diagnostic model comprises of dynamics of the different indices that characterize the current condition and results of operations of a particular company.

Model of the dynamical normative has been the object of research of I. Syroezhkin, N. Pogostinskaya, and Y. Pogostinsky [73-76]. However, the method has not been widely used in practice because its calculations are complex and there are some logical discords.

In accordance with the method proposed by the authors, the ranks of the trends of specific indicators are always linear. In the case of non-linear, it is impossible to compare the normative matrix and the matrix of the index. That is why nonlinear regulatory model should be transformed into a linear model to compare and contrast with certain data. In addition, the method was developed to determine the financial stability of the enterprises. We present a method for determining the probability of crisis (bankruptcy). Thus, taking into account some of the shortcomings of the method, our model was improved in accordance with the requirements of diagnosing the bankruptcy of Kazakh enterprises

The suggested method of diagnostics consists of two stages: development of normative model and conducting diagnostics. Development of a normative model comprises of the following steps:

1. identifying the purpose of diagnostics
2. finding rationale for the coefficient indices in accordance with the specifics of analyzed industry and the company.
3. ranking trends of indicators.
4. developing the matrix of a normative model.

Identifying the purpose of diagnostics depends on the type of diagnostics to be conducted on the enterprise's operations. This requires a comprehensive analysis to identify strengths and weaknesses of an enterprise. Comprehensive or functional diagnostics might be conducted for a short or a long term as well. The purpose of diagnostics might be linked with the strategic development of an enterprise.

Rationale for the coefficient indices in accordance with the specifics of analyzed industry and the company. Here, for diagnosing the financial position, accordingly financial indicators are to be taken. Likewise, diagnostical period is to be defined. Indicators are to be collected in compliance with that time period. At least 2-3 periods' data must be collected. If to consider only two periods then economic duagnostics takes place. In case of considering three periods, dynamical diagnostics takes place.

Limited number of indexes leads to a deficient evaluation, which leads to the unpredictable results. However, too many indexes can diminish the sensitivity for changes in development paces. Optimal number of indices has not been developed and well-defined yet. However, practice says that there should be from 6 (minimum) to 25 (maximum) number of indices for in-depth analysis [64, p. 53].

Ranking trends of indicators. Only related economic indicators of an enterprise are to be considered. For instance, let us consider return on assets ratio (ROA). If a high profitability ratio index is needed the numerator tendency (Net income) must be stronger than the denominator tendency (average total assets).

(NI)/ (ATA), hence T(NI)>T (ATA)

For other indicators such tendencies, based economic theory apply as well. By the sum of these interrelations indices are sorted and ranked. The ranking process suggested by the authors is explained below.

A particular pair of indices is to be considered, the index with the rapid growth potential is to be chosen. The third index should be compared to the index of rapid growth; eventually the "most rapid" among them is to be determined. The process lasts till the most rapid index can be defined. The defined index becomes the first index in the rank. The same procedure is applied to the rest of indices until all of them are put into order.

The other way of sorting out and ranking can be used, too. A pair of indices is to be chosen and put into order. By comparing the third index to the previous two its rank is defined. The following chain is based on the comparison of the forth index with the previous three, and so force, until all indexes are put into order. The final result of implementing these methods is the order row of indices, where each of them is assigned a rank number.

As the consequence of economic indices' diversity, they are not always comparative based on the interpretation of interrelations and purposeful directions. That is why sometimes the methods of sorting and ranking explained above are not applicable. For such cases, the authors recommend the graphs theory for ranking the indices [77].

In case of applying the graph theory, the graph top identifies indices chosen for the model. Graph arcs show the development pace of indices. If during the comparison of two indicators the relation is defined, it is good in terms of establishing integral index, and the arc that is concerned with the relation, appears on the graph. If it is impossible to interpret the development pace of the chosen two indices, there is no arc on the graph that links according tops. The more the development pace is defined, the more systematic and complex the analysis is. In better situation all pairs of indices are interpreted and put into order, consequently arcs link each tops accordingly on the graph. We have applied this method in various situations, and came to a conclusion that the experienced practitioner of a particular industry must make corrections based on the industry peculiarities.

Developing the matrix of a normative model. In compliance with ranks, a square matrix can be developed, and a normative model formed [78]. Graphs are used to rank the overall relationship of indicators' trends, and then a square matrix to form a dynamical normative is to be built (Table 16).

The matrix A of the normative interrelationships, built on the development trend of the indices can be described as follows:

a_{ij} -the element of the preferred matrix on the crossing of the I-row and the J-column;

a_{ij}= 1 if the index in of the I-row correlates strong with the J-column index;

a_{ij} = - 1 if the index in the I-row correlates weakly with the J-column index.

Matrix of the normative model is completed, as described below. Each element of the matrix is at the intersection of a particular row and a particular column. If the indicator in the line corresponding to the determined financial and operational ratios must grow faster than the rate in the column, the intersection of a row and column is marked with "1". Conversely, if the indicator in the line corresponding to a particular factor should grow slower rate in the column, it is placed at their intersection a sign of "-1". The matrix in performance with a "1" formed normative relationship, which means that growth trend index line should be above trend of the index in the column.

Table 16 – Matrix of dynamical normative

Indicator		A	B	C	D	E	F	G	Total
Rank		1	2	3	4	5	6	7	
A	1	x	1	1	1	1	1	1	6
B	2	-1	x	1	1	1	1	1	6
C	3	-1	-1	x	1	1	1	1	6
D	4	-1	-1	-1	x	1	1	1	6
E	5	-1	-1	-1	-1	x	1	1	6
F	6	-1	-1	-1	-1	-1	x	1	6
G	7	-1	-1	-1	-1	-1	-1	x	6
Total		6	6	6	6	6	6	6	42

Matrix constructed in this way, show the dynamical normative of financial and economic activity of the enterprise.

After the formation of a normative model, diagnostics of the specific economic process takes place in the following order:

1. Forming the matrix of the normative model;
2. Ranking trends of actual indicators;
3. Forming the matrix of actual indicators;
4. Comparative inversion of normative indicators and the matrix of actual models;
5. Diagnostics of the bankruptcy probability;
6. Factor analysis of the economic and dynamic diagnostics of bankruptcy;
7. Decision making.

Let us consider the algorithm for calculating:

1. Normative matrix, according to the laws of economic theory, forms the prototype relationships. The elements of the matrix are defined by the formula below:

$$a_{ij} = \begin{cases} 1, & \textit{if} \quad \text{trend is strong} \\ -1, & \textit{if} \quad \text{trend is weak} \end{cases} \tag{11}$$

2. First of all, we need to calculate the growth rate of indicators in the selected time interval:

$$T(I_i) = \frac{I_i^r}{I_i^b} \tag{12}$$

where: I_i^r, I_i^b - absolute value of the I-index in the reporting and basis periods; T (I) - the growth tempo (rate) of the I-index in the reporting year.

1. Developing the $B = \{b_{ij}\}_{nxn}$ – matrix, defining the rank interrelations of the actual indicators' growth rate.

$$b_{ij} = \begin{cases} 1, & if \quad T(I_i) > T(I_J) \\ -1, & if \quad T(I_i) < T(I_J) \end{cases} \tag{13}$$

where: n - the number of indexes in a dynamic normative; b_{ij} - elements of matrix of the indicators' growth rank relationship; i, j - number of indicators; Ii, Ij - indicators with i and j numbers, respectively; T (Ii)> T (Ij) and T (Ii) <T (Ij) - rank relationships of indicators' growth rate.

4. Inversion of actual indicators' ranks deviations from the normative ranks is calculated with the following formula:

$$U_{ij} = \begin{cases} 1, & if \quad r_i > r_j \quad i < j \\ 1, & if \quad r_i < r_j \quad i > j \\ 0, & in \quad other \quad cases \end{cases} \tag{14}$$

Inversion displays the deviation of current actual data from normative data. If there is a change, it equals to 1, if not, then it equals to 0. At the end, the number of changes is calculated. In normative matrix n(n-1) – if relationship exists, dynamics of development in accordance with the number of changes is to be defined.

Depending on development paces, actual and normative relationship between indices can be assessed with the formula below:

$$Y = \frac{\sum_{i=1}^{n} m_i}{n(n-1)} \tag{15}$$

Whereas, Y – enterprise's bankruptcy probability evaluation index; n – quantity of indices; i – serial number of indices; m_i – quantity of inversions.

The bankruptcy probability index must be in range between zero and one. If the actual and dynamical normative values of Y-index are close, this means that enterprise's economic policy directed towards sustainable development is executed effectively. All normative relationship of indices' development trends will occur, and Y will be equal to 0. And vice versa, if those values are far from each other, and even opposite, Y will be close to 1. In general, the bankruptcy probability index is an

assessment tool of enterprise's economic operations and shows the relationship between indicators. However, it is not linked to prior periods' achievements.

During transformation from one period to another the bankruptcy index might go up and down. In case when the index goes down it does not necessarily mean that an enterprise had positive changes or operating more effectively, it can be described also by violation of normative relationships. In other words, normative relationship, which occurred in past and was fixed as dynamical normative index, does not mean that this relationship will appear in future periods as well. Therefore, in addition to the bankruptcy probability index, thorough consideration of operating and economic environment is needed. Evaluation of operating environment can help to differentiate achievable and non-achievable goals in normative relationship structure.

Based on this diagnostic method, managers can easily assess and identify the indices and their relationships that mostly impact the enterprise's integral index of economic operations. This identification and assessment will help to focus attention on urgent issues in order to resolve them as soon as possible. In this case, in order to change the current unfavorable situation it is important to know exactly which tools are necessary and how strong should be the impact to achieve the change. Economic strategy and tactics are not the assembly of isolated decisions; each economic decision is the part of established and approved strategy.

During the execution of strategy, the dynamical normative serves as an interconnecting tool of economic decisions. Keeping all indicators in one normative order while introducing changes to that normative is of paramount importance.

Dynamical normative gives the opportunity to evaluate and justify decisions' impact on economic operations through assessment of possible crisis of the enterprise and its ability to change.

In case of using the ordinal scale, the method of factor analysis is based on its main purposes and essence, and it is necessary to define the influence of each factor on index's development.

Established dynamical normative can be considered as factor system (model). To identify the impact of each factor the following formulas are used:

$$\Delta Y(П_i) = \frac{m_i^b - m_i^c}{n(n-1)} \tag{16}$$

Whereas, m^b_i , m^r_i – inversions in reported and basis periods. In this case, development pace of final bankruptcy probability index can be completely decomposed into factors:

$$\Delta Y = \sum_{i=1}^{n} \Delta Y(I_i) \tag{17}$$

Where, ΔY - change of the bankruptcy probability assessment of enterprise; $\Delta Y(I_i)$ - change of the bankruptcy probability index due to dynamics of trend

relationship between *i*-index and other indices; n – quantity of indices; i, j – serial numbers of indices.

Decisions of two other responsibilities arose from decisions of main responsibilities of factor analysis.

Moreover, percent change of the bankruptcy probability index in comparison with basis year under the influence of the *i*-index can be calculated with the following formula:

$$\alpha_i = \frac{\Delta Y(I_i)}{Y^b} \times 100\ \% \tag{18}$$

Secondly, to calculate the percent change of bankruptcy probability index in comparison with conditional dynamics caused by *i*-index the formula below can be used:

$$\beta_i = \frac{\Delta Y(I_i)}{\Delta Y} \times 100\% \tag{19}$$

Since the evaluation of the bankruptcy probability of the enterprise is a dynamic assessment, there is a possibility of factor separation by growth rate, as well as its absolute value. Such problems of factor analysis are solved with the help of the ordinal scale.

During the dynamical assessment, index-factors' dynamics supports normative dynamics, or decreases it. Hence, integral assessment of economic stability of enterprise is not based on a comparison with the current situation. It makes a comparison with the normative model without deficiency. Through the decrease of actual sustainability, the influence of each factor can be identified. In other words, factor analysis does not consider only current situation indices; it considers the difference between maximum sustainability assessment and its current value.

Chapter conclusions. In might be stated that the factor analysis gives the opportunity to put into order the indices by their impact importance to the bankruptcy probability of an enterprise. Approved and executed financial investment and other operational decisions are identified in particular economic indices, including those entered into dynamical normative model. In fact, changes of a particular index's dynamical relationship in comparison with normative model can cause miscellaneous issues.

It is important to identify impact of different factors on economic sustainability of the enterprise. Moreover, the main issues that could arise due to changes in those factors must be taken into account.

Inversion matrix is one of the tools of problem identification. It presents problems in appropriate manner and gives an opportunity to assess their importance for enterprise.

Based on this method of diagnostics, managers can easily identify and assess the indicators and their relationship, which strongly influence the integral indicators of business operations of the enterprise. This identification and evaluation of lead, in

turn, to the determination of the actual problems that require urgent solutions. In this case, in order to change the current unfavorable situation, it is important to know exactly what tools are needed and how to be a strong influence for change.

Economic strategy and tactics are not a collection of isolated solutions, that is, every economic decision should be an integral part of a well-considered and adopted strategy. In the process of implementation of the strategy, the regulatory model serves as a tool for economic decisions.

3 NORMATIVE MODEL OF THE BANKRUPTCY PROBABILITY ANALYSIS AND DIAGNOSTICS FOR KAZAKHSTANI COMPANIES

3.1 Rationale of chosen indicators of the normative model of bankruptcy probability

Analysis of the company - is not only a study of the processes taking place in the structure of the firm, it is primarily an analysis of the environment in which the company operates. As it was noted in the first chapter, there are internal environment consisting of factors relating to management decisions such as goals and objectives, structure, people, technology, and the external or marketing environment (relations with customers, suppliers, competitors) which affect the company's condition. Moreover, external macro-environment includes both demographic and economic indicators, as well as political, technical and cultural characteristics.

Traditionally, it is possible to predict the bankruptcy of the enterprise by examining the negative dynamics of statistical financial performance (Table 17) over a long period of its occurrence.

Table 17 – Indicators of diagnosing the crisis process of the organization

Indicators defining financial results of the company's operations	Indicators determining ineffective assets management	Indicators defining management process in organization
– sales decline; – decrease of profitability; – decline in cash flows; – decline in net working capital; – debt payment due	– quick ratio decrease; – assets turnover ratio decrease; – inventory turnover ratio decrease; – payable turnover decrease; – increase of debt to equity ratio; – financing fixed assets by current assets; – attracting external investment on an unfavorable rates; - disinvestment; - reduction of the production base; - using equipment with a 100% wear; - forced interruption of the production process; - reducing the cost of R & D	- absence of long-term and short-term forecasting and planning; - increase in the proportion of fixed costs; - delays in the publication of financial statements; - deterioration in the quality of products, increase in the number of damaged, returning goods and complaints of customers; - decrease in labor performance; - violation of the terms of supply; - inability to adapt to new technologies; - staff turnover; - general dissatisfaction of workers and their performance indicators; - dismissal of employees; - Board of Directors' improper performance of functions
Note - Source: [79]		

The peculiarity of mathematical modeling in general is that the information can be processed only when it consists of indicators, expressed quantitatively. In economics, there are a number of processes that are not quite, and not always successfully translated into the language of formulas. Fortunately, these factors in the economic life are not critical, and often directly dependent on such factors as manufacturing, finance, which can be described quantitatively, mainly by statistical methods.

The recognizing system, as a central part of solving the problems of diagnosing the company condition, makes high demands on the quality of input information. The feature space is a generalized description of the firm for more than one feature in the form of a set of numbers, the amount of which is equal to the number of signs. In such form, the input information of a recognition system is suitable for further processing by the system.

However, not all types of numerically expressed value may be included in the feature space. Expert assessments, scale scores, and scales obtained through interviews (expert panel, survey) in general will lead to unsatisfactory results. The data obtained through these methods have nothing to do with the objective probabilistic estimates, instead they are subjective and heuristic. Management in case of uncertainty commonly uses them when the decision is made in the absence of the opportunity to calculate the probability of its success.

The task of diagnosing the situation corresponds to the decision under risk, where the probability of obtaining a result can be calculated. The practical significance of the decision provided by the feature space are indicators which were calculated by direct method. Thus, the feature space is a synthetic expression of the internal processes that characterize the enterprise.

It should be noted that the losses from the inability to use the qualitative characteristics of the company are very high. After all, the vast majority of high-quality evaluations "high", "strong", "crisis" based on the results of the comparative analysis of quantitative indicators.

Quantitative indicators are able to eliminate the negative impact of uncertainties that almost can not be done by subjective categories, regardless of the form of representation: numerical, verbal, symbolic. Quantitative indicators can be compared, provide an opportunity to forecast, and to aggregate new indicators, while qualitative methods have good clarity, they only interpret events, but do not explain them.

It should be noted that the financial analysis while not comprehensive, but rather deeply and objectively reflects the strengths and weaknesses of the company. Practical examples of diagnostics of crisis conditions of private enterprises confirm the orientation primarily on the financial performance indicators used at the input of the diagnostic system. The continuity of financial control, which is carried out by the appropriate structural departments makes it possible to conduct express and continuous in time diagnostics of the enterprise.

Diagnostic system summarizes the results of operational control, part of which is a financial control. In turn, the statistical control uses information about the status of

the enterprise and other data to develop operational control which is important for management decisions.

The difficulty of the analysis is in defining a set of indicators, which on the one hand, satisfy the requirements of reliability and objectivity of the processes of the company, and on the other hand, would describe them in detail and comprehensively. Moreover, the system of indicators of the company is chosen to avoid duplication of information by various indicators, each indicator would characterize a new phenomenon in its activities.

Another measure of the quality of the performance indicators system of the enterprise is their comparability, expressed in the possibility to compare businesses of all sizes and various structure. The system of indicators must comprise of a number of relative indicators that allow comparing the results of different business enterprises (for example, profitability and productivity).

Formation of the feature space on financial indicators is similar to some of the development programs of complex financial analysis of the international rating agencies. For example, Standard and Poor's has developed a list of 13 coefficients, summarizing the financial performance of the company, which for several years were observations, and then changes in their averages were assessed.

Performance indicators of the company according to the rating agency Standard and Poor's:

1. Sales;
2. Revenues;
3. Revenue to total assets ratio;
4. Total assets;
5. Revenue to equity ratio;
6. Ratio of dividends to shares;
7. Stock price (adjusted);
8. Ratio of debt to equity;
9. Share capital in common stock;
10. Revenues to the total equity;
11. Price to earnings ratio;
12. Payment of dividends to revenue ratio;
13. Price to equity ratio [55, p.267].

This list demonstrates the financial results of the return on equity, return on assets, revenues in the form of dividends. At the same time, these 13 indicators do not allow a deep analysis of the situation of the company, as there is no calculation of profitability, financial stability and liquidity analysis.

This list is rather demonstrative than practical, if to consider it from Kazakhstan’s economy prospective. The underdevelopment of the stock market, compared with the United States, leads to a very small share of the equity in their own working capital. In Kazakhstan's practice in calculating all the indicators related to the capital, decided to replace the value of the share capital by the amount of total equity.

In Western economies the value of the share capital and the profitability of individual stocks are crucial in the life of companies. Therefore, we think that the use of unadapted bankruptcy prediction models of foreign scientists is inappropriate and needs some enhancement. This circumstance, as well as the serious limitation of the list for in-depth analysis makes it difficult to implement its use in domestic practice.

The requirement for comprehensive coverage of economic activity dictates not to limit the study of the enterprise only in terms of the success of financial performance, but also take into account the complementarities and linkages among all major organizational units.

In economics, there is probably no other theme, which is written so many times, and that seemed to be simple, deeply studied, and widely known, as a financial analysis using ratios. The set of indicators, both in literature and in legal procedures, is almost the same (with small deviations). However, it is important to take into account that the standard does not mean that these ratios / indicators are applicable to all companies. It is necessary to take into account the specifics of the enterprise and its surrounding internal and external business environment.

Ratio analysis helps to shed the light on the financial condition and operations of the company, and make a meaningful interpretation of the figures in the balance sheet and profit and loss statement.

With the introduction of the ratio analysis, it is necessary to take into account certain constraints such as:

(1) The financial statements do not contain all detailed information about the company, especially the operating. Of course, all parties understand that there is the concept of confidentiality of inside information, the disclosure or use of which entails the legal responsibility, which is mainly aimed at withholding information from competitors or law enforcement or judicial system. The brightest example is the company's commitment to certain ongoing legal cases, which are not reflected in the financial statements as provisions or liabilities, as it may influence the decision of a judge who might think that the company pleaded guilty;

(2) the financial statements are not always true and trustworthy. Nevertheless, there are certain tools or market institutions as regulators in the form of monitoring agencies or audit firms to improve the confidence. However, absolute confidence or trust does not exist, especially in terms of the leadership of the company, which is trying to conceal the negative data and embellish the existing data;

(3) the financial statements comprise of the historical information and may not reflect the current condition. In this regard, many stock exchanges put deadlines for the public companies on financial reporting. For example, in the United States, the public companies must provide financial statements within 60 days after the end of the fiscal year, but it is only the public, private companies do not have any demands from the market. Considering the fact that in Kazakhstan, the majority of the companies are private, many statements are not disclosed, and even if it reveals something, they do it very late.

(4) The ratio analysis is of no value if you do not compare the figures with the competing companies from the same industry. Kazakhstan's economy is very limited

in the number of companies and market participants from the same industry, and the list of goods and services regulated by public authorities are evidence of this.

Before discussing these or other indicators, it is extremely important to say about the key principles, which has to be followed by one, who is committed to the idea that the analysis should give useful information and help in the decision-making, not only been reduced to an exercise in arithmetic calculations. Firstly, any analysis starts with the definition and precise understanding of the purpose - which question should be answered in result. Typical goals can be considered as an assessment of possible insolvency - for lenders, performance evaluation and search for reserves of its increase - for managers, evaluation of the impact on equity - for the owners, and so on. This, however, does not mean that owners and managers have no interest in solvency, and lenders in efficiency of production activities, which directly affects the ability to service its obligations. In the current global business environment, every business has many interested parties, and each party is interested in a particular part of the business. In any case, the financial analysis should begin with a clear and correct wording of the questions.

Secondly, while calculating certain factors it is important to understand their meaning. There are no unified rules and only true formulas for calculating financial ratios. Without proper understanding of the meaning of the coefficient, its calculation useless. Third, the ratio analysis makes sense only if the comparison is made with past performance (dynamics) and with those of other enterprises (industry average), as well as if financial indicators' relationship is analyzed. From the point of view of these principles, we have selected a few key, in our opinion, financial indicators.

As previously noted, depending on the purpose of the analysis, corresponding ratios should be chosen. After a detailed study of the Kazakh and foreign manuals and lessons learned, to conduct analyzes of bankruptcy, we have identified the following indicators to achieve the goal of the thesis:

1) K1 = Net working capital / total assets;
2) K2 = Net income / Average total assets;
3) K3 = EBIT / total assets;
4) K4 = Total equity / total assets

1) The first factor, we proposed, the ratio of working capital to total assets is the liquidity ratio. This ratio is one of the frequently mentioned in foreign literature [80-86], perhaps because it is the most keenly watched by investors, business owners, and other stakeholders, the financial factor.

Liquidity ratios measure the sufficiency of liquid assets to meet current liabilities. Ratios of this group differ only by assets in the numerator, the denominator is always the total amount of current (short-term) liabilities. Often, these factors indicate the so-called "critical importance", a comparison which is intended to help to make a conclusion about the liquidity of the company. For example, for current ratio (in the native methods it is also called coverage ratio, which is not quite consistent with international practice), which is calculated by division of current assets by current liabilities, the critical value is 1. We can agree with that point of view, that if

the current assets are less than current liabilities (meaning of ration is less than one) it says about illiquidity. However, a high value of the ratio may be far insufficient as well, since the composition of assets, which included fixed assets should be closely considered.

The ratio of working capital to total assets, helps stakeholders to analyze the level of assets in working capital, or the amount of assets required to run the daily operations of the company.

The high rate ratio of net working capital in the amount of assets shows the company's ability to repay accounts payable on time. Suppliers prefer to have relationships with companies that would make payments on time.

It is believed that the increase in this ratio is a positive sign that the liquidity is enhanced with the passage of time. The company with a low ratio can be considered to have a greater amount of current liabilities, reducing the proportion of available working capital.

The low ratio of working capital to total assets, usually indicates serious problems of cash flow for the company, which may not be able to pay their suppliers and make payments on the loan, even if the company makes a profit and has assets to cover their commitments. This number would indicate a high probability of bankruptcy or distress. The reason for the low rate may be consistent operating losses due to slow sales, which eat up the working capital reserve, causing it to shrink in relation to total assets. Low or negative factor, however, may also indicate the adoption of zero working capital initiative.

A sudden drop in the ratio of working capital to total assets, may mean that the company has made significant investments or carry out approaches of zero working capital.

The ratio of working capital to total assets is not in itself enough to give the possibility to assess the financial condition of the company. Another general rule in understanding the position of the company is to compare the ratio of working capital to net liquidity of the company with the current average value. Other financial factors also need to be tested, and to get a true picture it is needed to take into account the inventory turnover ratio, the ratio of receivables, and quick ratio.

2) The next factor - Return on Asset (ROA) transmit analytics picture of management effectiveness in the use of the company's assets to generate earnings. As this ratio includes the total assets (debt and equity financed), its meaning is important to a creditor, as well as to the contributors of capital (equity stakeholders).

One way to determine the quality of the company is an analysis of the effectiveness of the company's management in the use of its assets. With high-quality investment there is always a possibility to hold them longer than other investments. It is assumed that the company's effective income grow at above industry averages.

The Russian textbooks recommend using in the denominator the average total assets for the period, not their size at the end of the year. And, if necessary, to neutralize the impact of the amount of taxes paid and interest, instead of net income calculate the operating profit (earnings before interest and taxes - EBIT).

ROA is most extensive return on assets ratio, which measures revenues in relation to the assets of the company. This ratio is useful in comparing companies within the same industry, as it does not take into account the capital structure. Moreover, since the net income can be unstable, it is best to monitor the index for a number of years.

Tobias Carlisle, in his work «Deep Value» provides evidence that this may be the best indicator of return on assets in the calculation of shares that can ensure profitability above average [87, p.195].

Asset turnover ratio is an efficiency factor, which measures the company's ability to generate sales from its assets by comparing net sales with an average value of total assets [88-98]. In other words, this ratio expects net sales as a percentage of assets to show how many sales are generated from each tenge assets. For example, the ratio of 0.5 means that each tenge of asset generates 50 tiyn sales. Higher rates of turnover mean that the company is efficiently using its assets.

Net sales used to calculate this factor should be taken from gross sales to measure the real capacity of the firm's assets to generate sales. As a rule, the mean value of the assets is calculated by adding the beginning and ending values of the amounts of assets and dividing by two. It is simply the arithmetic average based on the two-year balance. Also it can be used deeper, average calculation, but it is not necessary.

Like most of the ratios, the asset turnover ratio is based on industry standards. Some industries use assets more efficiently than others. To get a true picture of how well the company's assets are used, the analysis should be carried out in the same industry. For example, the asset turnover ratio tends to be higher for companies in the sector, as the consumer products that have a relatively small asset base, but a big sales. While, firms in sectors such as utilities and telecommunications, which have a large asset base, will have a lower asset turnover. Thus, this ratio tells investors and creditors how the company is managed and uses its assets for production and sales.

When analyzing a particular company, you should pay attention to the trend of the asset turnover ratio over a period of time to see how improving or deteriorating asset utilization.

3) Further, we have examined the rate of return on total assets (ROTA), which measures how effectively a company generates earnings before interest and taxes. This means that the capital structure and the different tax rates will not affect the comparison between different companies [99-110]. This ratio gives an indication of the possibility of the organization to fulfill the obligations to creditors, borrowers and shareholders in cash. Profitability, calculated on the basis of inflow of cash is widely used in countries with market economies. It is preferable, because the operation of intensive type of production, a sign of the health of the economy and the financial situation of the organization.

4) Indicators of the capital structure of the enterprise, often combined as the category of "financial stability" (in Kazakh literature it is primarily equity ratio, financial sustainability and leverage), meaning that the larger the company's own

funds in relation to loans , the more stable it is, this means that the lower the probability of insolvency.

However, in today's environment the use of these indicators is very controversial. Firstly, there is the problem of inadequate assessment of the balance of fixed assets - revaluation surplus attributed to the additional capital, which often leads to an overestimation of the carrying value of its own funds. This means that a company with an extremely "good" ratio of equity to assets (for example, 0.7 - 0.8, and even more) may be insolvent. Secondly, the question remains - what level of debt should be considered normal? While in the West for 20 years - 30 ago, the share of debt in the capital at the level of 40 - 50% was considered very high, then now may be quite normal value of 60 - 70% and even higher. Kazakhstan is not the West, but to talk about any normative meanings in this ratio is possible only on the basis of detailed statistical studies.

Western financial analysts in the analysis of this ratio are more positively to such a significant portion of the debt ratio in the capital for several reasons [111-119].

First, the expected return on equity is higher than the rate on the debt, there are opportunities from equity to make a profit much higher than the interest rate debt securities. It can be assumed that, given the high cost of debt instruments in Kazakhstan, the proportion of debt in the capital accepted in the West as normal is not acceptable for Kazakhstan. But this fact is highly debatable, since high interest rates is mainly related to the risk of the Kazakhstan market and the instability of the economy, which is also the main engine of increasing expectations of the owner of the return on equity. The owner of capital will expect a higher return if money are invested in more risky market. For example, the owner in the United States or similar developed countries may have high expectations in the amount of 10-12% return on equity. However, in Kazakhstan the return is very low, even the rate of inflation will block the major part, if not all of it.

Second, financial institutions providing debt to private or public companies have extensive experience and will not give money to companies not eligible for a sustainable solvency. That is, if the financial institutions and their mechanisms of evaluation and monitoring trust these companies, then, there is a definite positive factor. But we must take into account the inconsistency of this ratio as the low cost of equity financing by debt, utilization pf activities to interest payable, and so forth.

Equity ratio is the ratio of investment leverage and solvency ratio, which measures the amount of assets that are financed by the owners of investment by comparing the total capital of the company with total assets.

The ratio of equity highlights two important financial concepts - the solvency and sustainable business. The first component indicates how much of the total assets of the company is directly owned by investors. In other words, what assets investors will remain eventually after repayment of all liabilities. The second component vice versa indicates the number of assets that have been financed by debt. Companies with a higher equity ratio shows the new investors and creditors that investors believe in the company and are willing to finance the investment in it.

3.2 Normative model of the bankruptcy probability analysis and diagnostics of the service industry

In accordance with the purpose of this dissertation for analysis, the researcher have chosen two industries: service and production industry. The choice of these industries was due to the peculiarities of the national economy of Kazakhstan. Kazakhstan's economy is at the stage of development, but not all industries develop at the same pace. Nowadays, the system and structure of Kazakhstani economy is built mainly around raw mineral resource base. The most developed industries of Kazakhstan, such as oil and gas and mining are not suitable for analysis because these industries are more dependent on the external and non-financial factors.

Under external factors, we mean extractive industry's dependence on world market prices for oil, gas, metals and other raw materials, which is a non-controllable indicator for any enterprise in Kazakhstan. Under the non-financial factor is meant dependence of oil and gas and mining industries on the specifics of the geological characteristics of the deposits. Moreover, due to the fact that businesses are under development, and public capital market is not functioning actively, there is a limited access to financial information. Thus, for this research, a choice of the relevant industry that are subject to volatility plays a very important role, which is a positive factor for the statistical analysis and helps to identify the relationship between the indicators for the diagnostics of the financial condition of the enterprise.

The telecommunications industry is an integral part of the modern world economy. However, its role is significantly different from the effect of the other economic sectors in the overall pace of development of human civilization. Indeed, in today's economy there are some sectors, changes in which do not affect the pace, scope and quality of services (equipment) or other sectors of society as a whole.

The telecommunications industry consists of the local and long-distance communications operators, mobile operators and internet service providers. First of all, the growth of telecommunication services points contribute to the economic development of any country, and is one of the key aspects of the social life of the mankind. Products and services provided by telecommunications companies helps to improve the lives of people, development of modern business. Moreover, it contributes to the public service, and strengthens the international economic relations.

The telecommunications industry is the growing and connecting segment of the Kazakh economy. Large-scale introduction of information and communication technologies has an impact on an increase in productivity and the creation of conditions for progressive development of domestic enterprises and their integration into the world economy.

Since the reform of the national economy in the telecommunications industry have been significant changes. It has become one of the most dynamic and well growing potential industries.

The importance of the telecommunications sector in the world economy and the system of international economic relations is reflected in the growing role of this component in the global production and trade in services, and in the attention paid to

the world's governments and international organizations on economic development of the sector and regulation of the global telecommunications market.

Conclusive evidence of the growing world economic importance of the telecommunications market is the fact that the World Trade Organization (WTO) as part of their founding treaties adopted a special document on telecommunications. It is a standalone application to the basic documents on the establishment of the common issues and concerns the regulation of world trade in services sector, customs and tariff regulation of exchange, liberalization and the distribution of shares of the global telecommunications market.

According to contemporary conceptual approaches to the development of a market economy, the communication is the core system of economic management. Experts believe that the economy, which has developed the telecommunications sector, may be a worthy participant in the world of business.

The main mobile operators in Kazakhstan are JSC Kazakhtelecom, JSC Kcell, Kar-Tel LLP and JSC Altel.

JSC Kazakhtelecom is a representative of the two mobile operators. The last operator, Tele2, was introduced in April 2011. Tele2 is a European service provider, which was first launched in 1992 in Sweden. Tele2 acquired the block of shares (51%) of the third GSM-operator NEO in Kazakhstan in December 2009 from the national fixed-line operator JSC Kazakhtelecom. The operator NEO in Kazakhstan is a mobile operator providing mobile services standard GSM 900. The operator NEO, which is also a brand of JSC Kazakhtelecom, appeared on the market in Kazakhstan in February 2007 [120].

JSC Kcell with brands Activ and Kcell provide services in the standard GSM-900/1800. The company was founded in 1998, and in February 1999 began offering cellular services under the brand name Kcell, and in September of the same year founded the cellular brand Activ [121].

Kar-Tel LLP - one of the leading cellular operators in Kazakhstan, as the current standard of GSM-900, which offers services under the brand Beeline. Finally, JSC Altel stamped Pathword and Dalacom. Pathword, appeared on the market in Kazakhstan 13 February 2004, it is the first in Kazakhstan mobile communication network of CDMA2000 1X operating at a frequency of 800 MHz. Another brand Altel - Dalacom was founded in late 2003. This third generation mobile communication, and is based on advanced standards of CDMA2000 1X in the frequency range of 800 MHz [122].

JSC Astel is formed on the basis of Arna-Sprint Data Communications, which was founded in March 1993. Since May 1997 the company operates under the brand name ASTEL. The company sells telecommunication projects in Kazakhstan. It has regional departments in all regional centers of Kazakhstan. Head office is in Almaty.

According to the research company iKS-Consulting the market for communications of the Republic of Kazakhstan in comparison with 2013 grew by 6%, amounting to 6.3 billion tenge [123]. The structure of revenues from telecommunications services for the major segments is presented in Figure 11.

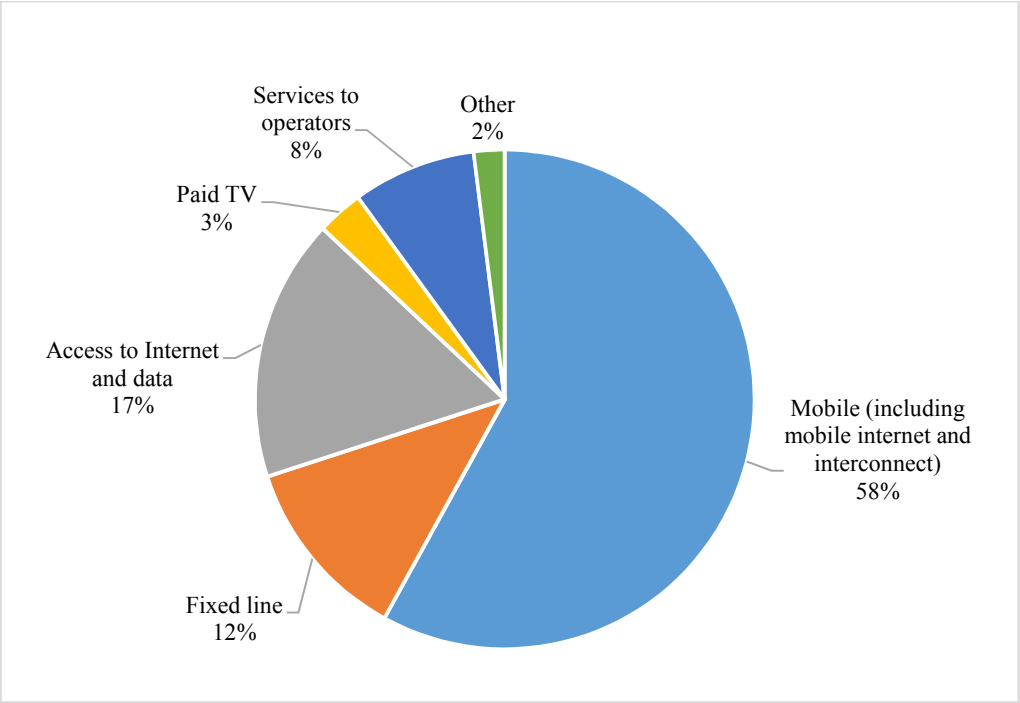

Figure 11 - Structure of revenue from communication services by major segments

Note - Source iKS-Consulting

The largest share fell on revenues from services in cellular networks - 58%. The dynamics of income in key segments (Figure 12) illustrates the point area of growth and stagnation of the Kazakhstan market.

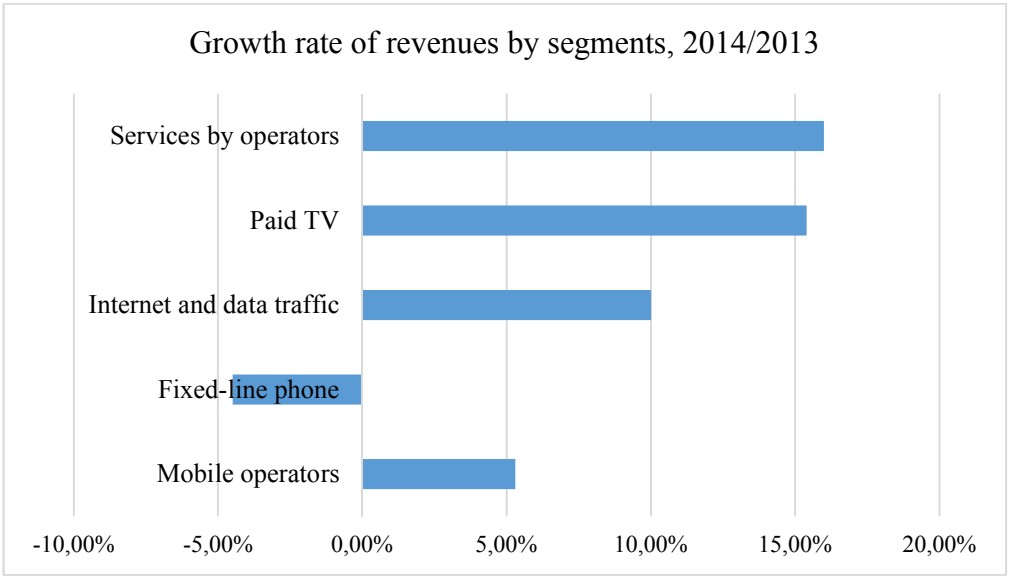

Figure 12 - The growth rate of revenues by segment, 2014/2013

Note - Source: iKS-Consulting.

In the negative zone at the end of 2014 was the only fixed telephony. "Overall, the decline in revenues from these services - a positive sign, indicating that

Kazakhstan is in a global trend, meaning the active exchange flow of voice traffic in the mobile network, - says Svetlana Chernenko, head of iKS-Consulting in Kazakhstan. - This in turn means that the mobile services are available to the widest possible user base.

Revenues from mobile data services in Kazakhstan in 2014 increased by almost 50% compared with the previous year, to ensure growth around the cellular market. Revenues from voice services in mobile networks for the first time in the history of the market showed a negative trend - minus 2% for the year. The main factor in the growth of revenues from mobile Internet has become a growing number of subscribers using smartphones for data transfer. According to iKS-Consulting, in 2014 their number exceeded 4.5 million, an increase of more than doubled compared with 2013 year. Significant impact on the market was and development in Kazakhstan network LTE (ALTEL), focused on the most demanding speed mobile data users [124].

The highest revenue growth rate in 2014 was recorded at the operator market - 16%. And if a few years ago, the growth segment provides income from rent of channels because of active construction of cellular network operators, in the past year, growth was driven almost doubled due to demand for wholesale Internet channels. Analysts believe it is logical - avalanche growth of data traffic in carrier networks, user-generated, require constant expansion of trunk channels to ensure adequate quality of service.

Active development of the market data has led to the fact that in 2014 Kazakhstan's operators faced with the downside of mass "connectedness" to express in a gigantic difference between the rate of growth of network traffic and the rate of revenue growth. For the first three quarters Kcell recorded traffic growth of 101.6% compared to the same period of 2013, Tele2 and Beeline subscribers have reported similar dynamics. The income statements of mobile Internet services in 2014 increased on average by one third compared with the previous year. The exception was ALTEL, whose income from the transfer of data to the LTE network increased several times compared with the previous year (the effect of the start). Obviously, the capacity of networking opportunities and, consequently, cost increases operator productivity increase of subscriber units, an increase of quality of media content will increasingly widen the gap between the volume of traffic and profitability of data services [122].

This doctoral research analyzes the financial condition of the enterprise telecommunications industry, such as the "Astel", "Kazakhtelecom", "Kaztranscom" and "Kcell".Dynamics of changes in financial soundness indicators, calculated using the formula (15) considered by enterprises for the last four years is shown in Figure 13.

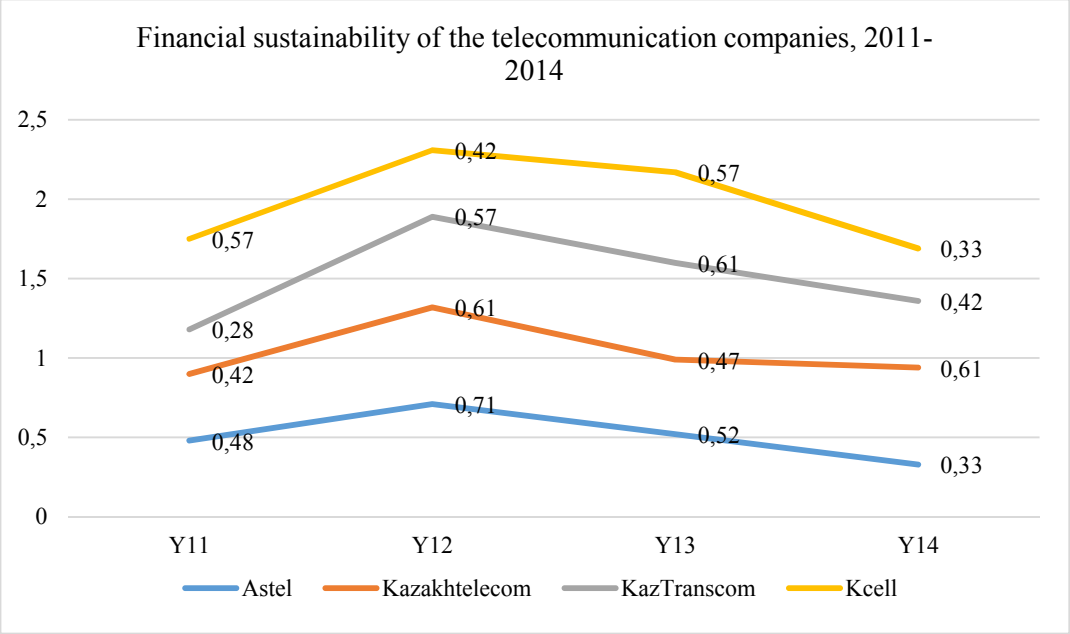

Figure 13 – Financial sustainability of the telecommunications industry, for 2011-2014

Financial analysis of the major telecommunications companies have demonstrated that financial sustainability have increased and decreased over periods.

Astel was chosen as the object of this study due to the fact that this company showed a declining trend in the last three years and it was closer to bankruptcy. Our task was to fix the crisis threshold beyond which develops a certain combination of indicators of the firm, determines the overall unfavorable result, able to lead to the bankruptcy of an economic entity.

Traditional methods of financial analysis do not meet the basic needs of the information to make informed management decisions, as even among the same type of indicators, considered as part of the same group, the trend of the results can vary considerably. As the consequence of having such conflicting dynamics of indicators, it is impossible to establish the result of the final set of factors considered, that is to reveal how the company successfully developed the test. Moreover, it is difficult to determine which areas of business management are the most problematic.

To resolve this problem in economics, the method for constructing the so-called benchmark indices dynamics is used. The idea of the standard ordering of the dynamics of economic systems owned by I.M. Syroezhkin [73], which was later developed by his students. They had noticed that the static characteristics of the disparate facilities are comparable over time. Moreover, the dynamics of tempo characteristics of the organization have some natural order that can be ranked and linked to each other, which makes it possible to compare the results (indicators) of economic activity of the analyzed companies:

– with common rules and standards for assessing the effectiveness of corporate governance;

– with similar data from previous years to examine trends of improvement or deterioration of economic condition of the enterprise;

– with similar data from other enterprises, which reveals its possibilities;

– with a variety of non-uniform parameters of analyzed enterprise within the same time interval.

Traditionally, in the post-Soviet countries, the five-year plan was considered as a standard plan. With the transition to a market economy, and the cancellation of the 'top-down' plan, the economic values do not lost their normativity. The economic magnitude, reflecting the socio-economic relations, can not be non-normative.

In connection with this, the analytical model should not only describe the state of the economic system at a predetermined manner, but also to contribute to its assessment in order to achieve the best management results. Therefore, the analytical model should have a standard-estimated character. Connection principles of idealization normativity enables us to formulate a methodological principle of the system of economic analysis as the need to create the reference (ideal normative) analytical model.

Thus, in this research, the method of dynamical normative for telecommunication services market have been applied for the first time. Moreover, the performance indicators of this industry have been assigned normative rank that are specific to operations. The sequence of parameters is presented below.

1. Total assets

The growth rate of total assets, especially the long-term assets, is the most important indicator.

Firstly, the telecommunications industry is a capital-intensive from the beginning of life of the enterprise, especially due to the acquisition of rights to radio frequencies and others the licenses necessary to provide communications services;

Secondly, after the acquisition of the necessary permits, the company needs to deploy a telecommunications network for the coverage, which directly attracts potential subscribers, which in turn, leads to the revenue growth. This phase is usually a hunt for the quantity of users through rapid deployment of the network to the detriment of the quality of communication;

After the capture of the necessary market share by subscribers, additional investments have to be made in fixed assets to improve service quality and types of services, which entails retention of current subscribers and luring dissatisfied customers of other operators. To increase the types of services, investment in technology is an ongoing and integral part of the business.

2. The average value of assets

The importance of this category is caused by the same factors outlined above, but in addition it is worth noting that the stock of equipment is also important. Especially for those companies that also sell telecommunication products such as cellular phones, the Internet equipment, and other payment cards. Growing number of selling points increases the stocks for supporting operations of these points. However, it should be noted that the surplus of stocks entails the risk of obsolesce, as the technologies evolve rapidly. On the other hand, the most significant benefit of a large number of points increases the presence in the local markets and eases the service to customers, particularly to replenish the account.

3. Earnings before interest and taxes

Earnings before interest and taxes are an important component of the enterprise. Profitability has always been a cornerstone in the evaluation of any enterprise. The growth rate of this indicator is more important than the rate of revenue growth for several reasons. Firstly, the cost of sales and services are very important in the industry and is directly correlated with revenues and analysis only from the revenue side does not give complete picture of the enterprise. Second, the cost of sales and marketing costs are also quite large in the industry due to a very advanced system of competition between market participants, forcing these companies to fight for every potential subscriber. However, significance of these costs does not mean that these items are not controllable, which is important to consider.

4. Sales

Revenue depends on the assets and would be more useful in the analysis based on operational data, for example, the average revenue per subscriber, revenue per minute of use, and others. However, due to the fact that the necessary operational data are confidential information of the enterprise in most cases, it is impossible to increase the importance of the revenue to be ranked above current allocation.

5. Capital

As described above, this is a capital-intensive industry, but the growth of capital during the period of operations are not necessarily fully characterizes the company, because the profit increases capital, but its subsequent distribution in the form of dividends reduces it. Also, the issuance of shares to the public market is not a popular solution in Kazakhstan to raise necessary capital due to limitations and disability of the public capital market.

6. Current assets

The growth rate of this index and the next are less important, in our view, since telecommunications companies are operating in a such environment, that these indexes are instable, even you can say "hyper-volatility".

For example, a mobile operator may have six-million subscribers, which makes it very difficult to analyze the repayment of debt and, respectively, cash flows. In this regard, the growth of the indicator can have both positive and negative sides. That is, the increase in trade receivables can mean increased revenues, but also could mean the bad debts and the poor quality of customer base.

7. Current liabilities

As noted earlier, the volatility of the index reduces the importance of its growth rate compared with other indicators, as its high growth can also have both positive and negative sides. That is, an increase in accounts payable may mean that the company enjoys working capital to the maximum, to use free (interest-free) cash or could mean that the company has problems with liquidity to meet its obligations.

The main condition for the success of the financial performance of the enterprise is not a mere compliance with the growth or decline of individual indicators, but compliance with certain subordination and combination of dynamic set of indicators. Thus, taking into consideration the points of view of the practitioners and auditors, we developed the following ranked sequence of the financial performance indicators of telecommunications companies.

T (A)> T (EBIT)> T (R)> T (C)> T (L)

Where, T (A) - the growth rate of total assets
T (EBIT) - the rate of growth of income before income tax and interest payments
T (R) - the growth rate of sales revenue
T (C) - the growth rate of capital
T (L) - the growth rate of liabilities.

Based on these tendencies' inequalities we developed a normative model for telecommunication industry (table 18).

Table 18 – Normative model for telecommunication industry

Indicator		TCA	TCL	TA	EBIT	Rev	ATA	TE	Total
Rank		1	2	3	4	5	6	7	
TCA	1	x	1	1	1	1	1	1	6
TCL	2	-1	x	1	1	1	1	1	6
TA	3	-1	-1	x	1	1	1	1	6
EBIT	4	-1	-1	-1	x	1	1	1	6
Rev	5	-1	-1	-1	-1	x	1	1	6
ATA	6	-1	-1	-1	-1	-1	x	1	6
TE	7	-1	-1	-1	-1	-1	-1	x	6
Total		6	6	6	6	6	6	6	42

Thus, in the case of non-compliance with that order, the activities of the enterprise can not be considered successful, even if the individual indicators achieved the desired results. Figure 14 illustrates the indicators' growth of "Astel" for the 2010-2014 period in absolute amounts.

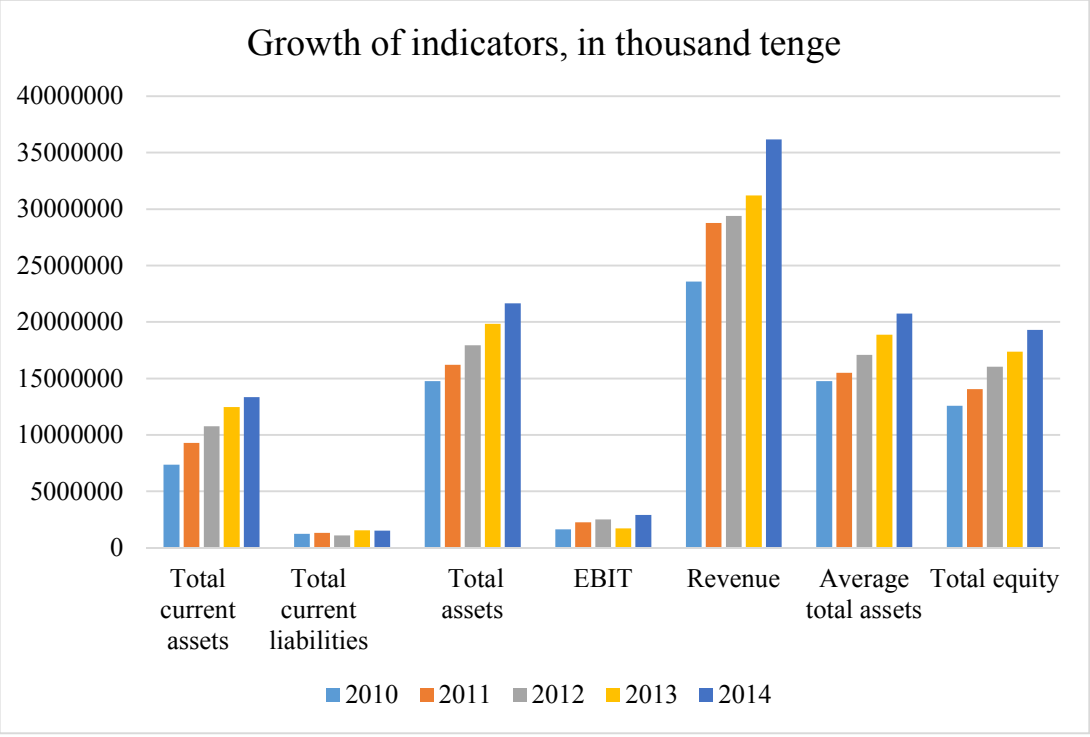

Figure 14 – Growth of indicators of "Astel"

A graphical representation of the information as shown in Figure 14 likely to serve as a basis for the assertion that in 2014 the economic activity of the enterprise is high on all counts, and, moreover, tends to improve compared to the base year 2010. However, the growth rate of indicators changes from year to year. Calculation of indicators' growth rates and their ranks are presented in Table 19.

Table 19 – Growth rates and ranks of financial indicators of "Astel" for 2010-2014

Index	The growth rates and ranks of indicators							
	2011	Rank 2011	2012	Rank 2012	2013	Rank 2013	2014	Rank 2014
Total current assets	1.32	1	0.86	6	1.13	2	2.27	2
Total current liabilities	0.99	7	0.73	7	0.95	7	6.12	1
Total assets	1.06	5	0.91	5	1.06	4	1.67	3
EBIT	1.30	2	1.03	1	1.24	1	1.08	7
Revenue	1.18	3	1.01	2	1.05	5	1.66	4
Average total assets	1.03	6	0.98	3	0.98	6	1.38	5
Total equity	1.13	4	0.94	4	1.09	3	1.11	6
Note - Calculated by the author based on the audited financial statements of the enterprise published on KASE								

The table 19 shows that the growth rate of current liabilities rose dramatically from the last position (seventh), where he remained for three years (2011-2013) prior to the first in 2014. While earnings before tax and interest payments, by contrast, has fallen from the first position to the last. Also, the growth rate slowed down capital and total assets.

By their nature, the economic indicators are displaying implemented actions in the economic system selected during the decision-making process. Any re-acceptance of the decision and, accordingly, change the set of implemented actions is reflected in the dynamics of economic indicators. For this reason, and in accordance with the traditionally used methods of economic analysis it is offered as a feature to streamline performance measures to use dynamical indexes, for example, the rate of growth or incremental growth.

Construction of ideal dynamics and measurement of deviations from the actual performance allows to identify uniquely the bottlenecks of financial management and the degree of severance. Depending on the deviation from the targets, the actual course of action to correct the situation can be developed, that is, taking steps to increase or decrease of indicators that make up the bottlenecks. For each indicator has

its own management practices. On the basis of the previous ranks, calculated normative ranking inversion (deviation) for 2011-2014 (table 20).

Table 20 - Table of inversions of "Astel" for 2011-2014

Index	Normative rank (i)	Actual Rank				Inversions							
						2011		2012		2013		2014	
		2011	2012	2013	2014	i <j	i> j	i <j	i> j	i <j	i> j	i <j	i> j
TA	1	5	5	4	3	4	0	4	0	3	0	2	0
ATA	2	6	3	6	5	4	0	2	1	4	0	3	0
EBIT	3	2	1	1	7	1	2	0	2	0	2	4	0
Rev	4	3	2	5	4	1	2	0	2	2	1	2	2
TE	5	4	4	3	6	1	2	0	1	1	3	2	1
TCA	6	1	6	2	2	0	5	0	0	0	4	1	5
TCL	7	7	7	7	1	0	0	0	0	0	0	0	6
Total number of inversions						11	11	6	6	10	10	14	14

On the basis of calculating the amount of the reversal, we can say that despite the annual growth of all indicators, as well as accelerated growth of some of them, the situation in 2013 deteriorated compared with the previous, and in 2014 even more aggravated.

The measure of the financial sustainability for 2011-2014 is calculated using the formula 15, confirmed our belief and found that financial sustainability has deteriorated more than doubled in 2014 compared with 2012. The tendency of financial sustainability indicators of "Astel" is shown below:

$$y^{11} = \frac{\sum_{i=1}^{7} m_i}{n(n-1)} = \frac{11+11}{42} = \frac{22}{42} = 0,52$$

$$y^{12} = \frac{\sum_{i=1}^{7} m_i}{n(n-1)} = \frac{6+6}{42} = \frac{12}{42} = 0,28$$

$$y^{13} = \frac{\sum_{i=1}^{7} m_i}{n(n-1)} = \frac{10+10}{42} = \frac{20}{42} = 0,47$$

$$y^{14} = \frac{\sum_{i=1}^{7} m_i}{n(n-1)} = \frac{14+14}{42} = \frac{28}{42} = 0,66$$

Thus, the probability of bankruptcy of the telecommunications companies is growing up since 2011. Since the logic of the analysis of the financial and economic condition of the enterprise requires articulating the economic indicators, we conducted a factor analysis in order to assess the impact of each indicator on the

bankruptcy probability of the enterprise. The results of the factor analysis are presented in Table 21.

Table 21 – Factor analysis assessing the financial condition of the company for 2013-2014

Index	Rank	Inversion		Factor analysis				
		2013	2014	Dynamic Diagnostics			Economic diagnostics	
				ΔU (P i)	a i.,%	β i,%	ΔU * (P i)	b i,%
1	2	3	4	5 = =(3-4) / n (n-1)	6 = 5 / /Yb	7 = 6 / /sum	8 = 4 / /n (n-1)	9 = 8 / sum
TA	1	3	2	0.023	0,05	-12.5	0.05	7.14
ATA	2	4	3	0.023	0,05	-12.5	0.07	10.71
EBIT	3	2	4	-0.047	-0,1	25	0.10	14.29
Rev	4	3	4	-0.023	-0,05	12.5	0.10	14.29
TE	5	4	3	0,023	0,05	-12.5	0.07	10.71
TCA	6	4	6	-0.047	-0,1	25	0.14	21.43
TCL	7	0	6	-0.142	-0,3	75	0.14	21.43
Total		20	28	-0.190	-0,4	100	0.66	100

The information in columns 5-7 shows the change in the dynamic diagnostics of the bankruptcy probability during the transition from the base period to the reporting. To assess the influence of factors to reduce sustainability and increase the bankruptcy probability the following values were calculated.

In the column 5 we calculated the effect of each indicator to enhance the bankruptcy probability.

For example, the influence of the index total current liabilities (TCL) was as follows: $\Delta U\ (P_i) = -0.142$. While some indicators, such as total assets (TA), the average value of the assets (ATA), and total equity (TE) have the same effect, equal to 0.023.

It should be noted that the total impact equals the incremental increase of the bankruptcy probability. Thus, the indicator of probability in 2013 was equal to 0.47, and in 2014 has increased by 0.19 and amounted to 0.66.

In column 6 calculated the relative influence of each parameter to push the company towards bankruptcy. For example, the relative influence of the index total current liabilities (TCL) was: $a_i = - 0.3\%$.

Column 7 calculated the impact of each indicator to change the assessment of failure. The cumulative effect is taken as 100%.

For example, (-0.3) / (- 0.4) * 100 = 75%. Thus, the rate of total current liabilities (TCL) had the greatest impact on the crisis situation of the company in 2014.

In column 8, we calculated the effect of each measure on the total bankruptcy probability index. For example, the influence of the index total current liabilities (TCL) to the value of bankruptcy was: ΔU * (Pi) = 0.14, or 21.43%, as identified in

the column 9. The same has been the impact and measure the total current assets which equaled (TCA) 21.43%.

Thus, to clarify the probability of bankruptcy we have developed the scale of determining the company's failure (Table 22).

Table 22 – Scale of bankruptcy probability

Y – bankruptcy probability index	Possibility of failure
More than 0,7	Crisis, almost bankrupt
0,7 – 0,5	High probability
0,5 – 0,3	Medium
Less than 0,3	Good standing

Note – developed by author

The analyzed telecommunications company had several significant events during 2013 and 2014, which affected the growth of certain indicators. Firstly, this company has been involved in several transactions of purchase and sale of assets, including the sale of the subsidiary, which affected the growth trends of certain indicators as forecasted performance standards were shifted by unusual events. Accordingly, a comparison of the two periods is a little irrelevant, but due to the fact that the researcher does not have detailed data on the performed transactions it is impossible to eliminate these events out of the context of the study.

On the other hand, these events are part of the life of the enterprise, and the researcher can take them as exceptional, due to the fact that they are reasonable and can be explained. Moreover, if to pick for the study of bankruptcy only the companies with a stable financial condition it would decrease the value of the research.

Secondly, the company significantly intensified its activities in selling the equipment after the development of new technologies and products that causeda new stream of revenue for the company operated pre-dominantly in services stream. The company has a stable business operations during 2010-2013 with the gross profit margin in an average 35% annually that allowed them to repay the maturing debts on a regular basis, that by December 31, 2013, the company did not have any debt balances payable. And this sustainability was in line with normative expectations developed by the researcher.

However, in 2014, when the company began to significantly enter the market of selling the telecommunications equipment, gross profit margin immediately dropped to 25%. In order to maintain the investment and operations for a new source of revenue, the company has attracted significant borrowings during 2014 in the amount of 3.8 billion tenge (in 2012-2013, this amount was in the range of 0.6 billion per year). This led to a change in financial sustainability as the ratio of total liabilities to equity ratio changed from an average of 0.24 during 2010-2013 to 0.76 in 2014. Moreover, the rate of current liabilities affected the decline in financial sustainability in 2014 the strongest of all (74%).

It is worth noting that the decline in gross profit margin is a consequence of the expected result in the shift of strategy from high-margin services to products. In general practice, it is assumed that the provision of the services has a greater impact on the bottom line than the sale of goods. Of course, this statement is not universal and does mean it works always, but this is true business logic.

As an example, we can look at it from several angles. The simplest one, if we look only to the accounting department, having no understanding of the operating business, the provision of services suggests that the main item of expenditure is salaries and related personnel costs, and the sale of the products is also the production of this product with significant movements (journal entries) of inventory and fixed assets. Hence, accounting department of service providing company is mainly smaller in size than of production companies.

On the other hand, if you look on the commercial side we can consider the example of dealerships that sell cars, where the margin of car sales is much less than the margin from services. However, these sources of income go together and to capitalize on service cars must be sold as soon as possible (and to avoid losses from the impairment of the goods, too) and to tie up customer on regular services at specified conditions in accordance with the Guarantee Agreement and other marketing campaigns. Each user of these dealerships in Kazakhstan can confirm this point, or the absence or limited number of individual users testifies to this too.

Third, the company's investments in joint ventures with the other two companies started its operations, that is, gradual investments since the beginning of 2009 for the construction of a joint network began to pay off, because the object was launched in phases during 2013-2014. However, the project has operated at a loss in both years and therefore have a negative impact on the company's results.

3.3 Normative model of the bankruptcy probability analysis and diagnostics of the production industry

An important priority of Kazakhstan, announced in the Message of President Nursultan Nazarbayev to people of Kazakhstan "Strategy Kazakhstan-2050 - a new policy of established state" is to achieve a leading position on the world food market and increasing agricultural production [125]. The development of food industry in Kazakhstan is now especially relevant in the changing environmental conditions - with the entrance to the Customs Union and WTO accession, as well as due to changes in te internal environment - in terms of population growth, intensive growth of food consumption and changing consumption patterns in the toward higher quality and more diverse products.

As you know, the food industry is one of the most important components of the economy of Kazakhstan and the third largest industry in the gross value added of the manufacturing industries after mining, oil and gas.

Thus, in 2014 the rate of growth in the food sector compared to 2013 slowed down twice, to 2.9% in annual terms. One of the key factors in the deterioration in the food industry is the strengthening of the position of imports. Since 2011, net imports of food and agricultural products is comparable with the volume of exports in the

monetary terms, but almost 5 times higher than exports in volume (excluding grain mill products) [126].

According to the data of Statistics agency, it is emphasized that local food production is increasingly run on imported ingredients. The faster growth of imports has led to the formation of a sustainable trade deficit for food that reached a peak of $2 billion in 2011, and subsequently decreased to a level of $1.6 billion in 2014. The share of imports of foodstuffs and agricultural raw materials reaches 11% ($4.1 billion) in total trade imports in monetary terms, while exports' share does not exceed 4% ($2.5 billion), and is formed mainly at the expense of grain and flour [127].

After rising in 2013, indicators of foreign food trade in 2014 declined slightly. It was affected by the weakening of the national currency, in addition, the price index of food products decreased by 4%. Key positions in the foreign trade of food products are occupied by the CIS countries, which account for 59% of imports and 61% of exports. At the same time, imports by a wide margin are dominated by the Russian Federation, whose share of imports exceeds a third of the total volume.

In addition, the structure of food products, including beverages, flour occupies the major share (17%), beverages (17%), milk (14%), meat processing (11%), fat and oil industry (6%) [127]. Due to the growth of food prices, changes in consumer preferences related to increase in household incomes and lack of production of specific products, for objective reasons, dependence on imports of raw materials and finished food products are growing, except for a grain processing industry, which has no imports, and more than half of domestic production goes on export.

Thus, accordingly utilization of the most food production capacity remains at a low level. The explanation for the low utilization of raw food production facilities are explained by worn-out of processing equipment, outdated technology and inefficient chain of production. In addition, the important factor is inflated unreasonable expectations of market participants to increase actively production capacity in the pre-crisis period, focusing only on a small local market.

According to available data, the investment in fixed assets in the food industry in 2014 were around 40.8 billion tenge, or 6% of total fixed capital investments in the manufacturing industry [128]. The investment comes primarily from the participants of the market available through profit or borrowed funds, which account for three-quarters of its own funds and one quarter of the loans and investments. Foreign investment is negligible.

Data on the share of the food industry in the context of the whole national economy and the share of bank loans in comparison with, for example, the manufacturing sector shows a relatively high interest of banks to the production of food and beverage. Due to economic slowdown, as well as reduction of the growth rate of real incomes of the population in 2014 and the likelihood of this trend to continue in the current year, it can be expected that production in the food industry to slow down up to 2.8% in 2015, while imports also supposed to decline. However, it should be noted that investment in the sector has increased significantly since the beginning of 2015, which should positively affect the dynamics of the industry in the short term.

In this research, we examined companies that produce goods and products of mass consumption, such as JSC Bayan Sulu, JSC Becker & Co., JSC Rakhat, JSC RG Brands and JSC Ust-Kamenogorsk Poultry Farm.

We have analyzed the financial sustainability of the above-mentioned companies (Figure 15), based on their financial statements for the last 5 years, which were published on the website of the Kazakhstan Stock Exchange.

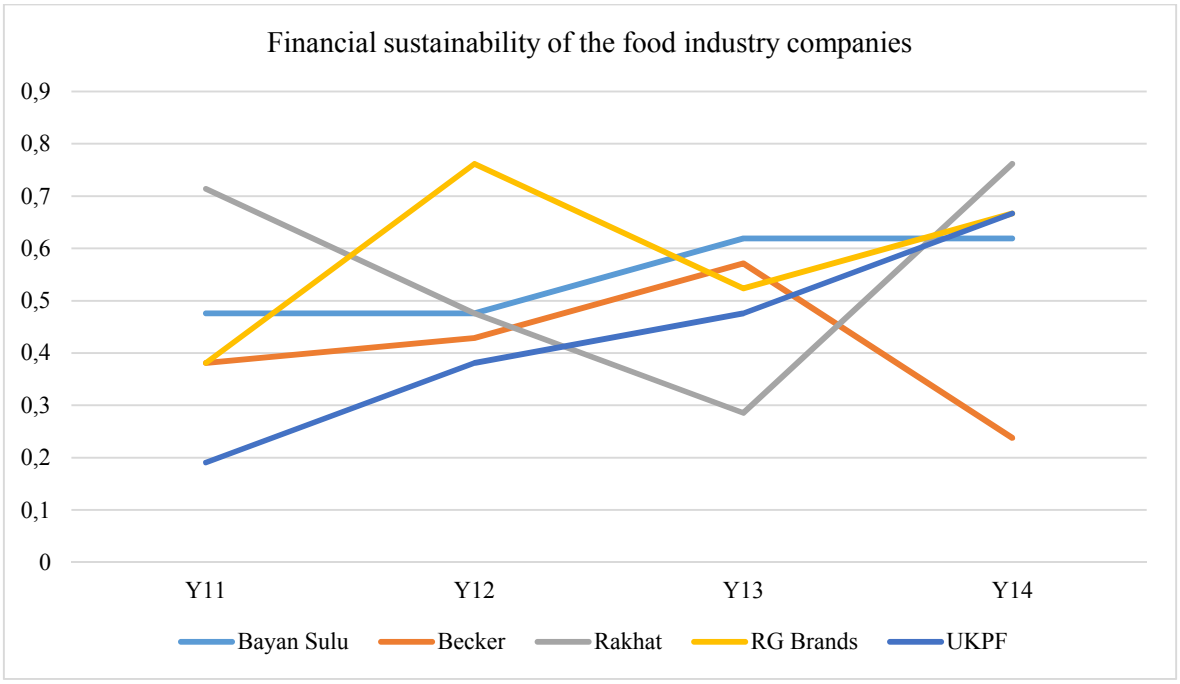

Figure 15 – Financial sustainability of the food industry companies

According to calculations, the financial sustainability of the company "Rakhat" has declined since 2011. The figure shows that in 2014, indicators of financial sustainability has increased several times, but this was not the result of operating activities of the enterprise, rather it was due to the acquisition by a foreign company. Factor analysis of the financial performance of the company is presented below.

According to the goals of the research, the following ranking of growth indicators of food industry-specific sector were developed. According to the authors, the industry's fastest growth rate should be revenue from sales or provision of services.

1. Sales

Obviously, every company seeks to make a profit (excluding governmental and non-for-profit structures that have other goals of existence). Without profit the business will die shortly, regardless of how much cash it generates. However, before the business makes a profit, the company must demonstrate the ability to generate revenues. No revenue – no profit, thus profit directly depends on revenue. In this regard, the revenue figure has been identified as the most important in terms of growth of all the indicators chosen for the following reasons.

Revenue or income from sales is the amount of cash or equivalent benefits that the company makes before expenses. From an accounting perspective, revenue generally consists of sales of goods and services on credit or cash.

First, the most basic argument for the importance of the rate of income growth is the fact that without them the company can not make a profit and remain viable in the long term. Sales revenue is needed to justify the fixed and variable costs, which are paid in the course of business management. Thus, a zero or low revenue leads to loss of business and the negative financial results.

Second, the revenue is often viewed in more detail than profit when evaluating business growth. Due to the fact, that inflation leads to higher costs from year to year, respectively, this increase should be accompanied by an increase in income, even to maintain a constant profit.

Moreover, investors want to see that the business is able to generate more sales for a long time, if the company outlines the expansion of the market. In a market economy, the lack of growth in sales revenue, probably it means that the company is not gaining market share because of their competitors and cannot attract new customers. Unchanged or declining sales growth rate assumes that the company has stalled, which casts doubt on the future growth of the company. Stagnant companies can produce short-term profits, but they do not attract the interest of new investors.

Third, in order to obtain loans at favorable interest rates from lenders, the company must show its ability to generate a steady income from ordinary business activities. This figure, along with the evaluation of the existing debt structure, are important when analyzing the creditworthiness of the company. Low income and poor financial position prevent attracting sources of funding of new projects and business activities of the company.

Fourth, revenue yield entails confidence both externally and internally. Employees want to feel confident with their employer, and have a sense of security and sustainability in the workplace. High income from sales inspires staff in terms of a feeling of comfort. Revenue yields also assures business partners, suppliers, the public and other stakeholders in the sustainability of the business. The more stakeholders are confident in the business, the more confident they are at risk and make decisions to support the company.

Thus, the analysis of growth rates and prediction of growth of sales revenue is important for the management of the company, for obvious reasons: planning for the next year of production, product development, inventory levels, marketing programs, hiring and budgeting of all kinds, to a large extent depend on the how much revenue the company expects from sales of goods or services.

The above characteristics important indicator of revenue can be attributed to any industry. When the researchers to analyze the importance of the indicators for the telecommunications industry, revenue has not been revealed as the most important factor in connection with the specifics of the industry. But for the food industry, revenue is the most important because it is the engine of all enterprise.

Although the food industry also requires large capital investments at the beginning, they are not as significant as in the telecommunication

industry. Moreover, the fixed assets in the food industry are very versatile, it is possible to adapt the production to the needs of the market. For example, the beverage producer can be adapted according to the season or the popularity of a certain type of beverage, i.e. on the market in the summer can be seen significant supply of soft drinks like sodas or iced teas, while over the winter juices of fruits supplied more that are less available in winter in natural form.

When entering the market, the most important for food companies is the presence on the market, that is, penetration and recognition of products. And revenues - this is the only explicit indicator of the entry and presence in the market and consumer confidence. These characteristics are the main base for the infusion of funds to the development of other products.

2. Earnings before interest and taxes is also very important indicator of the industry because of its specificity. Food industry depends from the mood of the market, i.e. consumers.

Consumers of Kazakhstan are highly addictive to range of products provided, which may be associated with the national cultural, particularly, hospitality and family intimacy. In order to satisfy the demand, food companies are forced to spend money for market research, development of technology and adaptation of production equipment to new productions. The main source of capital is in the profitability of existing products, so called 'cash-cow' products. Accordingly, the growth of this indicator promotes the development and sustainability of any enterprise.

On the other side, the fall of the indicator may initially lead to a stagnation of the enterprise with the subsequent loss of market share. The food industry is analyzed by professionals by margin per unit of a particular product. Management looks at the profitability of each product to make decisions on the introduction on the market or increase production, or the suspension of production, that is the earnings before interest and taxes on each product.

Financial and tax expenses are more corporate type of expense rather than the operational and not directly related to a specific product, and are not discretionary spending, and therefore the deduction of these items are more useful for the analysis of the financial condition of the company.

3. Average assets. 4. Total Assets. 5. Current assets

In addition to the income generated by the business, which directly determine the value of the business, the important indicators are assets, the nature and quality of which are very important in the overall consideration of the value of business and daily operations. The growth rate of the average index of total assets, current assets and total assets have been identified as important.

If the growth rates of revenue and profit are over the assets' growth rates in the reporting period, the use of company assets was more effective than in the previous period. If the growth rate of earnings are over the assets' growth rates and less than the rate of revenue growth, more efficient use of assets took place only at the expense of raise of prices for products, goods, works and services. If the growth rate of financial results (revenues and profits) is less than the growth rate of assets, this

suggests that the effectiveness of the organization has reduced. Changing the organization's assets, considering without comparison with changes in the financial results, in itself, have less value.

Tangible and intangible assets are added to the importance of business and helps in providing finance, if necessary. Availability of assets and their growth rate can help reducing the risk of the business. For example, the preservation of tangible assets like production equipment in good condition can help protect businesses from the threat of disease and the financial security of inefficiency and loss of working time. Protection of intangible assets such as brand or trade secrets, can help protect the business from the risks of using the idea.

Importance of the indicator of the average value of the assets has been put above total and current assets due to the fact that this figure takes into account both of other factors, that is, total and current assets listed below. It worth noting that the increase in total assets, including long-term assets, is more important than growth of current assets for the industry.

The growth of fixed assets, that is, the improvement of equipment for the introduction of new products or improve current products, or the growth of intangible in the form of new technologies or licenses also contributes to stable growth of the company and opens the door to the future. On the other hand, a decrease in long-term assets may mean aging equipment and stagnation of the company, leading to bankruptcy in the current competitive market conditions. The increase in current assets is also important due to the fact that this could mean an increase in inventories and raw materials required for the production of products demanded by the market or increasing market demand.

6. Capital

In comparison to business in other manufacturing industries, the food industry is less capital-intensive. Also, the increase in capital for the period of operations are not necessarily indicative of the company, as profits increase capital, but its subsequent distribution of dividend decreases. Due to the fact that in Kazakhstan, the issue of shares on the public market is not a popular decision to raise funds, and limited development and disability of the public capital market, main source of the capital increase are through contributions owners or retained earnings.

7. Current liabilities

The volatility of this indicator reduces its importance. Moreover, the growth rate of current liabilities may have both positive and negative sides. That is, an increase in accounts payable may mean that the company is enjoying the working capital to be used to the maximum free (interest-free) cash or could mean that the company cannot meet its obligations.

Similarly, as for the telecommunications industry, we have also streamlined the sequence of selected financial indicators for the food industry, which looks the following way:

$$T(R) > T(EBIT) > T(A) > T(C) > T(L)$$

We have determined that in the food industry, the fastest growth rate should have a ratio of revenue, then profit before tax and interest payments, assets, capital, and the slowest in the industry should grow index of "obligations". Based on this priorities we have built a normative model for Kazakhstani food industry as presented in the table below.

Table 23 - Normative model for the food production industry

Indicator		TCA	TCL	TA	EBIT	Rev	ATA	TE	Total
Rank		1	2	3	4	5	6	7	
Rev	1	x	1	1	1	1	1	1	6
EBIT	2	-1	x	1	1	1	1	1	6
ATA	3	-1	-1	x	1	1	1	1	6
TCA	4	-1	-1	-1	x	1	1	1	6
TA	5	-1	-1	-1	-1	x	1	1	6
TE	6	-1	-1	-1	-1	-1	x	1	6
TCL	7	-1	-1	-1	-1	-1	-1	x	6
Total		6	6	6	6	6	6	6	42

Further, we calculated the growth rate of the financial indicators of Rakhat company for 2010-2014.Figure 16 presents the results of the calculations.

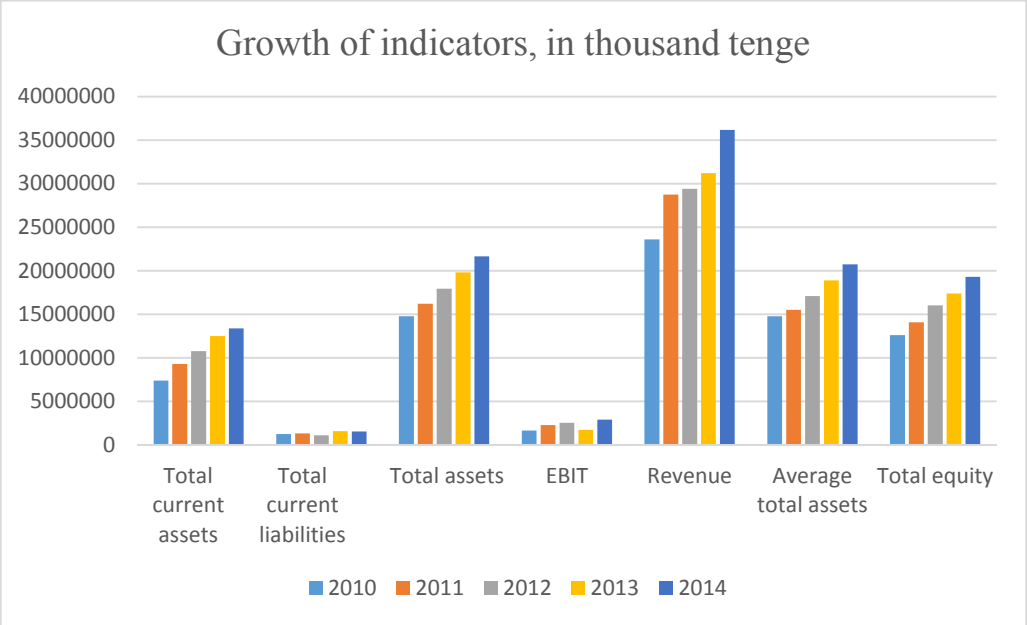

Figure 16 – Growth rates of indicators of Rakhat, 2010-2014

According to the figure 16, all indicators have a positive growth trend during the period under review, with the exception of total current assets and earnings before tax and interest payments. For the purpose of the correct interpretation of the financial

position of the company, growth rates of indicators were calculated and assigned to the appropriate ranks, which are presented in Table 24.

Table 24 – Growth rates and ranks of financial indicators of JSC Rakhat for 2010 - 2014

Index	Rates of growth and ranks							
	2011	Rank 2011	2012	Rank 2012	2013	Rank 2013	2014	Rank 2014
Total current assets	1.25	2	1.16	1	1.15	2	1.07	6
Total current liabilities	1.04	7	0.83	7	1.42	1	0.98	7
Total assets	1.09	5	1.10	4	1.10	4	1.09	5
EBIT	1.37	1	1.12	3	0.67	3	1.28	1
Revenue	1.21	3	1.02	6	1.06	6	1.11	3
Average total assets	1.04	6	1.10	5	1.10	3	1.07	6
Total equity	1.11	4	1.14	2	1.08	6	100	7
Note – Calculated by the author based on the audited financial statements published on KASE								

As from the table 24 can be seen, the total current assets slowed down considerably compared to the base year 2011, having fallen four positions in 2014. Also, the total capital, which had a fourth place in 2011, became the indicator with the lowest growth rate in 2014. Indicators of earnings before interest and tax had good growth trend, approaching the normative values.

On the basis of the developed standard grades for the food industry, we have calculated the inversion of Rakhat's financial performance for 2011-2014 which are presented in Table 25.

Table 25 - Table of inversions of "Rakhat" for 2011-2014

Index	Norma-tive rank (i)	Actual Rank				Inversions							
						2011		2012		2013		2014	
		2011	2012	2013	2014	i <j	i> j	i <j	i> j	i <j	i> j	i <j	i> j
Rev	1	3	6	6	2	2	0	5	0	5	0	1	0
EBIT	2	1	3	7	1	0	1	2	1	5	0	0	1
ATA	3	6	5	3	4	3	0	2	1	2	2	1	0
TCA	4	2	1	2	6	0	2	0	3	1	3	2	0
TA	5	5	4	4	5	1	1	1	2	1	2	1	1
TE	6	4	2	5	3	0	2	1	4	1	2	0	3
TCL	7	7	7	1	7	0	0	0	0	0	6	0	0
Total amount of inversions						6	6	11	11	15	15	5	5

Bankruptcy probability of the company for 2011-2014 is calculated in the following manner:

$$y^{11} = \frac{\sum_{i=1}^{7} m_i}{n(n-1)} = \frac{6+6}{42} = \frac{12}{42} = 0,28$$

$$y^{12} = \frac{\sum_{i=1}^{7} m_i}{n(n-1)} = \frac{11+11}{42} = \frac{22}{42} = 0,52$$

$$y^{13} = \frac{\sum_{i=1}^{7} m_i}{n(n-1)} = \frac{15+15}{42} = \frac{30}{42} = 0,71$$

$$y^{14} = \frac{\sum_{i=1}^{7} m_i}{n(n-1)} = \frac{5+5}{42} = \frac{10}{42} = 0,23$$

Thus, the assessment of potential bankruptcy of the studied companies is increasing since 2011. And in 2014 the company faced the decline. In order to assess the impact of these changes on the financial position of the company, we conducted a factor analysis. The results are presented in Table 26.

Table 26 – Factor analysis assessing the financial condition of the company for 2013-2014

Index	Rank	Inversion		Factor analysis				
		2013	2014	Dynamic Diagnostics			Economic diagnostics	
				ΔU (P i)	a i.,%	β i,%	ΔU * (P i)	b i,%
1	2	3	4	5 = (3-4) / n (n-1)	6 = 5 / Yb	7 = 6 / sum	8 = 4 / n (n-1)	9 = 8 / sum
Rev	1	5	1	0,095	0,133	20	0.02	10,00
EBIT	2	5	1	0,095	0,133	20	0.02	10,00
ATA	3	4	1	0,071	0,1	15	0.02	10,00
TCA	4	4	2	0,047	0,066	10	0.05	20,00
TA	5	3	2	0,023	0,033	5	0.05	20,00
TE	6	3	3	0	0	0	0.07	30,00
TCL	7	6	0	0,142	0,2	30	0.00	0.00
Total		30	10	0.476	0.666	100	0.2381	100

A significant influence on the change of financial sustainability indicator has the total current liabilities by 30%. Since the actual rank of capital ratios are close to normative rank, this figure has no effect on the decrease of the probability of bankruptcy in 2014.

As for the food company considered in the doctoral research, this case is very unique, because certain operating results were not comparable with the fact that the company was at a stage of merge and acquisition.

First, the operational activities of the economic entity depends essentially on macroeconomic and socio-political events. Incremental growth during last years of food market slowed down in 2013 compared with previous years, the growth of which was closely connected with a number of socio-economic indicators.

In 2010, Kazakhstan joined the Customs Union, which greatly increased the transparency of the local market for imported products, taking into account that the other members of the Customs Union are the major players in the industry. The market was full of different products with competitive prices. But the shock was not a catastrophic collapse of the market, especially given the limited shelf life of these products, as consumer demand is also increased accordingly.

Demand growth has been associated with certain social and macroeconomic developments, including the rise in oil prices, which is the main base of the formation of the purchasing power of the population, especially given the time that wages and incomes of the social professions (public sector) increases depending on the profitability of the country's budget that are based on the price of oil. Moreover, in 2011 the country's presidential elections were held, which is always a push for higher wages to employees of structures dependent on the state budget and social benefits to vulnerable groups. That is, the increase in purchasing power and the saturation of the market allowed the food industry to grow at a very fast pace.

However, by 2013 the market has stabilized and growth was only about 1.7%. And inflationary mood driven by high prices for oil and other trends in the world economy have affected the growth of the cost of production as this industry is dependent on world prices for cocoa beans, sugar, nuts and other ingredients, which are not produced either in Kazakhstan or in the Customs Union. On the basis of audited financial statements, the consolidated revenue grew by 6.2% in 2013 in comparison with the results of 2012, but growth in consolidated cost of sales increased by 9.3% in the same period.

Secondly, the company was in the process of merge and acquisition during 2013. Since the end of 2012, the company became the target of foreign investors, which is a very important player on the world stage and has several branded products that are in demand around the world. The strategic aim of the foreign investor is to win the CIS market and China. The most attractive strategy at the time was to acquire the company in Kazakhstan with a robust and streamlined production capacity that are close to Chinese border. By the end of 2013, foreign investors became the majority owner of the company. In world practice, such transactions are accompanied by a decline in certain indicators during the long process of the acquisition and absorption.

Based on discussions with some experts from consulting companies with a worldwide reputation who have been involved in major transactions of merger and acquisitions, the main factor is the mental attitude and the involvement of management or owners of the company. That is, the company devote less time to the

actual operations of the enterprise, and spend more time on the transaction process, since the process of examination of the company before the completion of the transaction (so-called due diligence) is a very time-consuming and careful process. Moreover, from the mental attitude, the current owners and managers have no meaning or purpose to put the full force on the development of the company, which is at the stage of completion of the transaction.

Third, in 2012, this company acquired a production site in the southern region of the country for the subsequent construction of the second confectionery factory. In 2013, the effect of certain production facilities and buildings were stopped and transferred to construction in progress due to the need for reconstruction of the structure and equipment to migrate to the new industrial needs for enterprise development in current and future conditions of the market of food products.

Chapter conclusions. We have developed a toolkit of analysis of financial statements, based on the formation of normative dynamics of indicators that can significantly improve the information on financial performance of the company, and therefore contributes to more effective management decisions. These priority actions stem directly from a clear and formalized methodology and are not based on intuition and skills of manager. It smooths out to some extent the human factor in decision making.

The analysis of actual data and diagnostics of the financial position of the studied companies allows to conclude that most normative expectations are reasonable and relevant. Some of the results were beyond normative limits in connection with certain specific events in some companies that have been identified after a detailed analysis of each indicator.

Generally, deviations are associated with two companies, one from each industry (Astel and Rakhat), which testifies to their deteriorated conditions, unlike other businesses, and may be the initial stage of bankruptcy, if the management does not take appropriate measures to improve the performance of the enterprise. As mentioned above, all cases of deviation from the standards of both companies were investigated and the reasons have been identified after a detailed analysis of each company and market developments in times of rejection.

Based on the above analysis of deviations from the normative expectations revealed that most events are not dependent on the activity of certain businesses, such as the transaction of selling the company or absorption is the main driving mechanism of the identified deviations, which indirectly proves the correctness of the developed normative indicators and respective ranking of their.

CONCLUSION

Based on the research results we can draw the following conclusions and recommendations:

1. One of the most actual problems in a market economy is conducting a research on the category of bankruptcy and finding effective ways of overcoming it. Bankruptcy, essentially, is an inevitable economic phenomenon, reflecting the condition of the national economy. Economists estimate that two-thirds of the established organizations, face the bankruptcy within the first two years after its creation. The domestic and foreign countries' experience proves that each firm faces a crisis in different ways. In order to identify the probability of bankruptcy it is vital to conduct a systematic analysis of the financial activities of the organization, to use an integrated approach to the study of this problem, and to apply more rational and suitable methods and mathematical models for estimating the probability of bankruptcy of the organizations.

2. There are various views on the essence of bankruptcy in economic literature. However, there is no unique definition of it. Some authors assert that the bankruptcy is a cessation of business activities due to the lack of financial ability to restore solvency, others that it is a civilized form of resolving conflicts that arose between creditors and debtors, and others identify it with the term "insolvency". Some of the existing definitions do not accurately reveal the essence of this concept. We believe that *bankruptcy is the extreme form of crisis, when the economic entity does not have enough resources for the payment of accounts payable and restore solvency*.

3. The crisis condition, leading to the bankruptcy, appears as the consequence of the negative influence of many factors, which are divided into external (general economic, political, market, demographic) and internal (operational, financial, investment), as well as objective (high inflation, inadequate financial and tax systems, regulatory environment) and subjective (inept marketing, decrease in sales, higher costs, etc.).

4. On the basis of the theoretical and methodological framework of the research, we have systematized the widespread bankruptcy prediction methods of foreign and domestic economists. The review and comparative analysis of the existing foreign models of revealing the bankruptcy let us to identify the following weaknesses of them:

- models discriminate the companies only between two extreme states of the company: bankrupt and not bankrupt. In a real life, things are not so simple. Condition of the company may vary from safe to severe;
- most models have low predictive power in the time horizon of more than two years. This means that for many investors interested in long-term investments, these techniques are of limited value;
- models are mostly retrospective with all its consequences;
- main disadvantage of foreign models, is that they are not always applicable to the conditions of the national economy. The reasons are the lack of comparability of the factors generating the threat of bankruptcy; differences in the accounting of

certain indicators; the impact of inflation on their formation; discrepancy of the book and market values of certain assets and other objective reasons.

The study of foreign experience is necessary and useful. However, many elements of this experiment can not always be used in conditions of Kazakhstan economy.

5. Despite a sufficient number of foreign literature devoted to the diagnostics of the bankruptcy probability, in the Kazakh economic science there are only a few works revealing this concept. Moreover, many Russian economists do not separate the concepts of analysis and diagnostics. We agree with professor A.D. Sheremet that analysis is the process of the study and diagnostics is its outcome. Thus, we believe that *diagnostics of the bankruptcy probability of the enterprise is the identification of the negative deviations of indicators, characterizing the financial condition of the enterprise, from the normative model, which is accepted for the object considering the specifics of operating activities*.

6. The leaders of organizations for the most time underestimated the need for analysis and diagnostics of the bankruptcy probability. Despite the fact that according to economic theory, the crisis is a consistent pattern, in practice, it is always an unexpected outcome for management. In order to make a rational solution to any problem, it is necessary first to identify it and to correctly diagnose. The actions of overcoming the crisis start with the diagnosing it. Therefore, there are three main requirements for diagnostics: timely recognition of the crisis; the accuracy of the recognition result; continuity of the process of diagnostics.

Since diagnostics is classified as the express and fundamental, we would suggest in the short-term to conduct the express – diagnostics. In the case of substantial deterioration, the fundamental diagnostics of the bankruptcy probability should take place.

7. In this research work we applied the methodological approach of the system-based economic analysis. The method implies the dynamic normative, requires forming the normative (benchmark) analytical model. The proposed method of diagnosing the likelihood of bankruptcy is carried out in two stages: the development of a regulatory model that takes into account the specifics of the company and conducting the diagnostics.

8. To develop a normative model it is necessary to conduct a comprehensive analysis of the financial condition of the company. Considering a large number of financial ratios and studying the literature in the field of financial analysis, we believe that it is better to rely only on a few substantial and most useful financial ratios. For a systematic diagnostics of the bankruptcy probability, we recommend 6 to 12 indicators as the best option. Therefore, it is necessary to identify the most important indicators, the largest number of negative deviations of which can lead to the bankruptcy. Key indicators defined as the most important are assigned the ranks. Based on the ranks, the matrix of the normative model of diagnostics can be built.

9. During diagnostics, the number of inversions (deviations) of the actual values from the normative are computed. Further the assessment of the probability of bankruptcy takes place and its causes are determined. Thus, in this research, for the

first time, proposed the method of diagnostics, based on the dynamical normative, determining the probability of bankruptcy for the production and services industries. The new method was tested on the examples in the field of telecommunications services and the food industry. A distinctive feature and the practical value of our proposed method is that it is applicable to all enterprises engaged in economic activity in these areas, since they take into account the specifics and peculiarities of the national economy.

10. Based on the research findings for service and production industries to identify the probability of bankruptcy, we recommend using the four basic ratios: liquidity, profitability, turnover, and capital structure, which are presented as the interrelation of indicators. From the definitions (calculation formulas) of selected ratios the following indicators were obtained: total assets, average assets, operating income, sales or service revenue, total equity, total current assets, total current liabilities. Indicators were assigned a normative rank based on the industry specifics. Better dynamic financial condition of the company corresponds to the normative order of indicators' trends, which reflect the financial position and financial performance of the company.

11. Thus, according to the developed normative model in service industry the highest growth rates should be shown by total assets and their average cost. While current liabilities should have the slowest growth rate. In the production sector the fastest growth rate should have the indicator of revenue, then EBIT, total assets, total equity, and the slowest in the industry should grow index of liabilities.

12. The main advantage of the developed method is that the results have a clear economic interpretation and are of great use as benchmarks for the financial planning of the company. Diagnostics data can serve as material for a more in-depth analysis of the company. Therefore, the author's method, with its analytical value, can be used to assess the financial condition of the company as well.

Moreover, this method allows to give a final assessment of the financial activity of the enterprise, expressed by one integral indicator; to identify and assign priority ranks based on the risks of the enterprise; to determine the list of financial measures to remedy the situation.

It is important to note that under the cyclic occurrence of the global crisis, the diagnostics of the bankruptcy probability of the enterprise must be carried out continuously, and the results must influence the management decisions. All of these contribute to the essence of timely diagnostics of the bankruptcy probability, which is conducted in order to prevent the bankruptcy.

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