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**ANALYSIS TECHNIQUE
AND RISK ASSESSMENT
OF INSOLVENCY
OF MACHINE-BUILDING
ENTERPRISE**

Monograph

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The monograph is devoted to a problem of production and sale of the concentrating and mountain equipment. The economic evaluation of production and sale is opened in the following sequence. The economic essence of the concept "insolvency" of the entity is stated. The reasons of risk of insolvency, its role in diagnostic approaches to solvency analysis of the entity, are called and analysed possibilities of a risk assessment of insolvency of the entity. By means of assessment of a condition the model of the analysis and a risk assessment of insolvency of the entity, an algorithm of its application in the analysis of machine-building enterprise is developed. Assessment of a condition of production and sale is carried out based on huge statistical material on influence of structure and structure of current assets on solvency of machine-building enterprise, liquidity of balance and assessment of liquidity and efficiency of cash flows for strengthening and optimization of activities. With use of integration of methods approbation of an analysis technique and a risk assessment of insolvency of machine-building enterprise is carried out and the possibilities of its optimization are considered. In an analysis result, assessment and developed offers the management concept is formulated by liquidity of machine-building enterprise and decrease in risk of insolvency, the principles of its forming and the mechanism of implementation are shown.

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Introduction

Relevance of a subject. In modern economic conditions, the risk of insolvency at many entities and the organizations is rather high. At many, the financial discipline "suffers". At the same time, the importance is given to solvency analysis, liquidity assessment, and a risks assessment of insolvency and probability of approach of bankruptcy.

The solvency is a capability of the entity to settle the liabilities to partners, personnel, the budget system, etc. in general, and the liquidity is a capability of the entity in certain periods to be ready to settlement of liabilities, to have at the order enough money, or assets which through certain time will turn into a money (for example, receivables which by certain time will be extinguished by buyers the inventories enclosed in production which through certain time will be provided in the form of finished goods, with subsequent its sale will arrive a money, etc.). With respect thereto assets divide into groups on degree of liquidity, speed of transformation into a money. Therefore from that, how fast assets turn into a money, this or that level of liquidity of the entity, its solvency depends, or there are risks of insolvency.

Availability of receivables (both short-term and long-term) "brakes" liquidity of the entity.

Activities of the entities and organizations of any field of activity don't do without sale of the made products (rendering services or performance of works depending on a selective destination of activities) with a payment deferral the buyer, which leads to forming of receivables. Under the agreement the supplier of goods represents the term during which products (the performed works or the rendered services) shipped to the buyer are paid. At the same time, the main moment is payment of products (works, services) in specific time. If payment due dates passed, and the buyer did not pay products (works, services), then receivables pass into the category doubtful, overdue. Therefore, in work of the entities and organizations in process of management of receivables prevention of the moment of transition of real receivables to the category overdue, establishment of such relations with buyers who would prevent violation of a payment discipline from their party is important.

In addition to receivables in solvency analysis attention is paid to inventories as forming of large supplies of goods, or raw materials for production, negatively affects solvency, withdraws a money from circulation. But at the same time the main form of the reporting in which the payment history of the entity is most informatively provided is the cash flow statement. By means of this form of the reporting it is possible to track on what activities the entity made calculations and payments what cash inflows were created in what

amount all liabilities what balances in cash the entity after perfect calculations what was the level of liquidity and efficiency of its cash flows has at the order were extinguished. Therefore the analysis of cash flows directly will show what risks of insolvency the entity can have.

Thus, the correct use of the existing methodical approaches to the analysis and a risk assessment of insolvency of the entity will allow to reveal these risks in activities and to develop management decisions for their minimization or elimination.

Degree of readiness of a problem. Questions of assessment of solvency gain ground in economic literature and also are a subject of discussions and discussions at various forums. Among the famous domestic authors it should be noted M.S. Abryutina, T.B. Berdnikova, N.V. Voytolovsky, L.V. Dontsova, O.V. Yefimova, V.V. Kovalyov, G.V. Savitskaya, N.N. Seleznyova, A.D. Sheremet's approaches, etc.

Object of a research is large machine-building enterprise – industrial enterprise Kopeisk Engineering Plant (further – IE), an object of research – influence of structure of current assets of IE on risk of its insolvency.

Research purpose – to develop model of the analysis and a risk assessment of insolvency of production enterprise which in a complex will analyze solvency and liquidity of the entity, liquidity and efficiency of its cash flows.

Within implementation of an effective objective in a research it is supposed to solve the following problems:

- 1) to open approaches of different authors to bases of the analysis and a risk assessment of insolvency of the entity;
- 2) to prove need of development of model of the analysis and a risk assessment of insolvency of the entity, an algorithm of its application;
- 3) to carry out approbation of an advanced analysis technique and risk assessments of insolvency of the entity on the example of IE;
- 4) to develop the management concept liquidity of IE for decrease in risk of insolvency, to give an assessment to cost efficiency of the offered recommendations.

Approaches of different authors in evaluating solvency of the entities and organizations and also accounting records of IE for 2014–2016 formed information basis of a research.

The scientific novelty of results of a research consists in reasons and enhancement of methodical approaches to carrying out the analysis and a risk assessment of insolvency of the entity. The scientific results received by the author of a research consist in the following:

- 1) the model of the analysis and a risk assessment of insolvency of the entity is developed;

2) the algorithm of application of developed model in activities of production enterprise is offered;

3) the management concept is developed by liquidity of production enterprise.

The practical importance of work is that the offered management concept liquidity of PE and decrease in risks of insolvency will allow to increase efficiency of use of a money and current assets in general, will have a positive impact on solvency of the entity.

1 Theoretical bases of the analysis and risk assessment of insolvency of the entity

1.1 Economic content of the concept "insolvency" of the entity. Reasons of risk of insolvency

The solvency of the entity is its financial opportunity in a certain time and in full to meet payment requests of suppliers of the equipment and materials according to contractual commitments, to repay bank loans, to pay the salary to personnel, to make obligatory payments in the budget and off-budget funds. An opportunity regularly and timely to settle the available debt obligations finally is determined by presence of a money at the entity that depends on in what degree partners, partners fulfill before it the liabilities. Besides, in case of a certain size of sources of means the entity of subjects has more money, than it is less than other asset types (that can be tracked according to balance sheet layout assessment). In the course of turnover a money is released, again invests as expenses on replenishment of current or non-current assets [18, page 154].

The solvency of the entity consists of two major factors [18, page 155]:

1) Availability of assets (property and a money) sufficient if necessary to realize them, to bring into money in the amount sufficient for settlement of liabilities;

2) The degree of liquidity of the available assets sufficient if necessary to realize them to bring into money in the amount sufficient for settlement of liabilities.

According to Art. 2 of the Federal law of 26.10.2002 No. 127-federal law "About insolvency (bankruptcy)" insolvency is the termination of execution by the debtor of a part of monetary commitments on payment of obligatory payments caused by insufficiency of a money. If the situation in the entity doesn't improve, it is obvious that there is a risk of recognition of the entity by insolvent (bankrupt). Therefore timely carrying out the analysis, a risks assessment of insolvency will allow to warn the similar phenomena, to take measures in case of detection of threats of insolvency, to develop policy of financial management by liquidity, etc.

Now rather large number of the entities stays in difficult financial conditions. The unstable world markets, economic sanctions, the system of public contracts without advance payment of the order, change in tax policy, all this

negatively affects solvency of the entities and increases the importance of competent circulating asset management.

Among a huge number of the specialists and scientists dealing with issues of assessment of solvency of the entities there is a set of approaches to interpretation of the term "solvency" and a formulation of the reasons of insolvency.

So, O.G. Kovalenko distinguishes from the basic reasons bringing the organizations to a state of insolvency such as the overestimated loan interest rates and to loans, the raised rates of taxes, a mutual non-payment of accounts between the cooperating companies.

According to E.N. Gladkovskaya [9] statements, as the main indicator of the coming bankruptcy of the organization suspension of all payments which are available at the moment and also lack of a possibility of payment of settlements with creditors within the next three months, since day of approach of terms of payment under contracts acts. According to the author, as the reasons of insolvency it is possible to allocate non-execution of the plan of production and realization of goods increase in product cost, non-execution of the plan of profit and, as a result to it, deficiency of own means of the organization.

However according to G.V. Savitskaya [29] opinion the reason of change of solvency in a negative side unreasonable and inexpedient management of current assets of the enterprise, for example, formation of receivables with expired for payments, excessive purchase of stocks and materials, superfluous for the organization, can serve.

L.V. Dontsova [12] considers that as the reason of insolvency of the enterprise the non-payment of taxes can act at the scheduled time, thereby leading to excess expenses on payment of penalties, a penalty fee, etc.

According to P.A. Smirnov [31] opinion, contrary to everything, an economic situation of the enterprise in respect of existence of own financial resources, that is the general financial position, extremely floatingly. If today the organization is solvent, tomorrow its state can considerably change. For example, if there comes the period of payment of credit debts, and on the account of the organization there is no money because of untimely receipt of payment for earlier delivered goods, the enterprise can become insolvent because of financial indiscipline of the debtors. Even, in spite of the fact that the organization has liquid balance and full opportunities of attraction of loan resources.

In case the delay of payment has short-term or any character, the condition of the organization in respect of solvency is capable to change in a positive side. Nevertheless, you should not exclude possibility of less favorable options of further development.

According to D.S. Kudryavtsev, determination of solvency as abilities of the debtor to fulfill obligations at approach of term is true, but any of the researchers given above did not consider that it is necessary not only ability to fulfill obligations, but also desire [21]. Thus, insolvency is an impossibility and/or unwillingness of the debtor to fulfill obligations when there comes time. In practice assessment of risk of insolvency has to be made to the conclusion of the transaction. Assessment of risk of insolvency needs to be carried out by the same methods which are used by creditors. Thus, at issuance of credit the creditor estimates risk of insolvency of the borrower. Positive assessment of risk of insolvency allows the creditor to credit. Assessment by the borrower of his own insolvency is necessary for making decision on the appeal of the creditor of the credit. The similar situation repeats in such sphere as "trade and services", in the course of the relations of the seller with buyers. Thus, the causes of risk of insolvency according to D.S. Kudryavtsev:

- 1) lack of desire to fulfill the current obligations;
- 2) lack of money or liquid assets by means of which these obligations can be repaid.

Other reasons of insolvency of the enterprise it is possible to call the following also:

- 1) failure to follow the production plan and sales plan that attracts short-reception of profit and also impossibility to sell more, than is made, smaller inflow of money on the enterprise and a lack of sources of financing of activity from here;

- 2) the high tax load (in particular, a big share of insurance premiums for obligatory pension, social and medical insurance at official employment of employees, high income tax rate, changes in base of the property tax in connection with transition to cadastral cost, compensation for expenses duration to acquisition of the expensive equipment which cost at acceptance to account will be base for calculation of the property tax, etc.);

- 3) misuse of working capital (formation of large sums of receivables that increases risks of its transition to arrears, overestimate of usual need for stocks and formation of reserves of stale raw materials in a warehouse, etc.).

The solvency of the entity changes by means of optimization of structure of assets and liabilities and also by means of the reasoned decrease in an inventory quantity and goods in stock. For the purpose of decrease in financial

tension the entity should determine the reasons of sudden decrease in solvency, and besides increase in inventories of production, work in progress, finished goods [7]. Assessment of solvency represents a part of the mechanism of general management by finance.

It should be noted that often own sources of financing can be not enough for a covering of all financial requirements, or it is less profitable therefore the companies resort to other means: bond issue, bank loans, payment deferral of suppliers, etc.

Because of emergence of high-quality changes in the current business activity each entity should perform a package of measures for increase in solvency [8]. It is also necessary to enhance traditional approaches to carrying out solvency analysis of the entity for the purpose of the accurate forecasting of further financial development of the entity and implementation of a risks assessment having chance to negatively affect solvency of the entity.

1.2 Methodical approaches to solvency analysis of the entity

A number of works is devoted to problems of solvency and methods of its assessment in the Russian special literature. From 1990th years the concept of solvency was a subject of many researches. Many researchers consider solvency as a capability of the debtor to fulfill liabilities when there comes certain time, but there is no consensus on the concept of solvency. To develop own determination, we will carry out the comparative analysis of determinations of various authors.

So, according to V.M. Rodionov and M.A. Fedotov [28] the solvency is an opportunity to pay off only according to the liabilities, and O.V. Yefimov [13] and E.A. Markaryan, G.L. Gerasimenko, S.E. Markaryan [23] in the determinations concretizes urgency of liabilities: short-term or long-term.

In the determination A.P. Gradova, B.I. Kuzina [11] instead of the collective word "liability" uses the private form "borrowed funds" that considerably narrows determination and complicates its application. M.Ya. Korobov [20] considers that the solvent entity shall extinguish the liability "immediately", and M.M. Glazov [10] considers that short-term obligations can be extinguished "within a year".

V.N. Fashevsky [32] in the determination doesn't specify a liability repayment period. According to the author, there is no need to specify the period during which the company shall settle liabilities. It is important to execute the agreement according to liabilities.

In G.V. Savitskaya [29] and G.B. determination. The Pole [26] the solvency is the availability of the company sufficient for settlement of liabilities.

This determination is complemented V.V. Kovalyov V.V. Patrobus V.A. Bykov who in addition to money considers "cash equivalents" as a settlement source. Pole G. B. [26] doesn't exclude participation of the company in short-term financial aid to the third parties. Each determination correct, but it is impossible to take into account all special cases in one determination.

As for evaluation methods of solvency of the entities, it is traditional – it is assessment of liquidity of balance and calculation of liquidity rates which are considered in works of such authors as M.S. Abryutina, T.B. Berdnikova, N.V. Voytolovsky, L.V. Dontsova, O.V. Yefimova, V.V. Kovalyov, O.G. Kovalenko, A.A. Kurilova, G.V. Savitskaya, N.N. Seleznyova, A.D. Sheremet, etc.

General approach to assessment of the current solvency is as follows. Balance sheet items classify as follows: assets – on 4 groups on the speed of transformation into the most liquid category of assets – a money or on speeds of their possible implementation, liabilities – on 4 groups on degree of urgency of settlement of liabilities.

Information source for the analysis – the Balance sheet form No. 1. Therefore in case of solvency assessment traditionally assets divide into the following groups [17]:

A1 – absolutely quick assets. Include a money and cash equivalents (short-term financial investments and other assets which can be sold during the short period of time) in this group;

A2 – fast-negotiable assets. Carry short-term receivables, goods to them the shipped, finished goods and goods for resale;

A3 – slowly negotiable assets (these are assets with sale term from several months to one year). Raw materials, materials, work in progress, deferred expenses concern them;

A4 – slow assets (with implementation term over a year). Carry non-current and illiquid assets to them.

Liability items of balance are grouped in repayment periods:

P1 – urgent liabilities which as a rule shall be extinguished within a month. Include an accounts payable before the budget and off-budget funds in the structure of this group, debt to personnel on compensation and other liabilities which shall be extinguished within a month;

P2 – short-term obligations. This the long-term accounts payable, the credits and loans for up to a year is included;

P3 – long-term obligations (the credits, loans, which repayment period over a year);

P4 – fixed liabilities. It is an equity of the entity.

The balance of the entity is considered absolutely liquid if the following inequality is satisfied [17]:

$$A1 \geq \Pi1; \quad A2 \geq \Pi2; \quad A3 \geq \Pi3; \quad A4 \leq \Pi4. \quad (1.1)$$

The economic sense of the first, second and third inequalities consists in what assets of each group shall be enough for settlement of the corresponding liabilities. The economic sense of the fourth inequality for solvency analysis is absent, it will be carried out "automatically" in case of accomplishment of the first three therefore is excessive.

Assessment of liquidity is carried out by means of relative indicators.

Absolute liquidity index , characterizes solvency of the entity for current date (for date of creation of the reporting) to extinguish the liabilities the available absolutely quick assets. 0,2–0,25 is recognized as recommended value of coefficient. The coefficient is calculated by the following formula [17]:

$$ALI = \frac{FR + FI}{ROC}, \quad (1.2)$$

Where

FR – a money and cash equivalents;

FI – financial investments for up to a year (short-term);

ROC – liabilities about one year (short-term).

The coefficient of intermediate (fast) liquidity , characterizes possibilities of the entity to extinguish liabilities in the short term (after settlement by buyers of the debt). 0,7–1,0 is recognized as recommended value of coefficient. The coefficient is calculated by the following formula [17]:

$$Kpl = \frac{FR + FI + \text{short-term receivables}}{ROC}, \quad (1.3)$$

The coefficient of current liquidity , characterizes solvency of the entity in the long term. 1,0–2,0 is recognized as recommended value of coefficient. The coefficient is calculated by the following formula [17]:

$$Ktl = \frac{FR + FI + \text{short term receivables} + \text{long term receivables} + \text{material current assets (inventories)}}{ROC}, \quad (1.4)$$

Calculation of these coefficients will allow to draw conclusions concerning solvency of the entity during a certain period of time and to make necessary management decisions.

As version of the analysis of security with a money which influences the level of liquidity of the entity E.N. Gladkovskaya [9] suggests to carry out the analysis of cash flows.

The cash flow represents set of flows of financial resources during the certain period of time connected with forming and use of sources of financing of activities and receipt of a resulting effect from its use. The main objectives

of the analysis of any cash flows are identification of the reasons of their imbalance (excess or the shortage of financial resources) and also identification of sources of their receipt and expenses. In the system of the analysis it is also possible to include liquidity indicators of cash flows and their efficiency [9].

The analysis of cash flows of the entity is carried out according to the "Cash flow statement" form No. 4 where cash flows are grouped in three transaction types or activities of the entity (current, investment and financial).

The cash flow from current transactions includes receipts of revenue or advance payments from buyers, other receipts and also money payments to suppliers of raw materials and materials, to contract organizations in connection with accomplishment of the separate work types and services providing the current activities, salary payments to personnel, tax payment in the budget and off-budget funds, interest payment on the attracted bank loans and other payments connected with implementation of the current activities of production enterprise [9].

The cash flow from investment transactions characterizes the payments and cash inflows connected with real and financial investments, sale of a property, plant and equipment and intangible assets, control of long-term financial instruments of an investment portfolio and other similar cash flows serving investing activities of the entity [9].

Cash flow from financial transactions characterizes obtaining and payment of the money connected with involvement of additional shareholders and capital stock in general, receipt of the credits and loans, payment of payments for finance lease (leasing).

Evaluating cash flows of production enterprise includes assessment of their dynamics and structure and also liquidity and efficiency.

Assessment of dynamics and structure of cash flows is carried out as on each of types of activity (current, investment and financial), and in general on a cumulative cash flow by receipt and expenditure of a money.

Assessment of liquidity of cash flows of the entity allows to draw conclusions concerning balance of inflow and a cash outflow in the conditions of activities: whether the amount of expenses, whether in sufficient amount becomes covered by receipt amount whether there are free balances in cash after all made expenses.

Assessment of liquidity of cash flows is carried out by means of liquidity rate of a cumulative cash flow and its crushing on types of activity of the entity (transaction types): from the current, investing and financial activities. The liquidity rate of a cumulative cash flow is determined by the following formula [9]:

$$Kcfl = \text{cumulative cash inflow} / \text{cumulative cash outflow} \quad (1.5)$$

The coefficient of liquidity of a cash flow from the current activities is calculated by the following formula [9]:

$$KCA = \text{cumulative cash inflow CA} / \text{cumulative cash outflow CA} \quad (1.6)$$

This coefficient recommended value – equally or there is more unit. It is connected with the fact that current transactions create the main amount of cash flows (both receipts, and payments) therefore the amount of cash receipts shall cover amount of their expenditure.

The liquidity rate of a cash flow from investing activities is determined by the following formula [9]:

$$KIA = \text{cumulative cash inflow IA} / \text{cumulative cash outflow IA} \quad (1.7)$$

In case of assessment of liquidity of cash flows from investing activities it is necessary to consider that this direction to a thicket is connected with expenditure in bigger amount, than with receipt (for example, acquisition of new fixed asset objects, acquisition of securities with a long cycle time, investment of capital in affiliated enterprises or joint business). Therefore the liquidity of a flow from investment transactions will be below liquidity of a flow from current transactions, besides, negative impact on the level of liquidity of a cumulative cash flow will be exerted by value of a scarce cash flow from investing activities [9].

The liquidity rate of a cash flow from financial activities is calculated by the following formula [9]:

$$KFA = \text{cumulative cash inflow FA} / \text{cumulative cash outflow FA} \quad (1.8)$$

The financial activities are usually connected with the organization of external sources of financing of the entity: use of bank loans and loans of the entities, issue of own shares, bonds, acquisition of a property, plant and equipment in leasing. Cash flow is usually connected with obtaining and return of the main amount of debt, dividend payout to founders. Therefore the liquidity of cash flows from financial activities depends on a possibility of the entity to extinguish the liabilities in the time which is precisely determined by the agreement.

The efficiency evaluation of cash flows allows to determine sufficiency of a money for carrying out settlements with suppliers of raw materials and materials, with personnel by compensation, with the budget and off-budget funds for tax payment and obligatory payments, with shareholders, creditors, etc. The efficiency evaluation includes determination of a pure cash flow as dif-

ferences between cash receipt and their expenditure. If this difference positive, then it is possible to speak about free balances in cash after making of calculations if negative – it means that the entity has a deficit of means which can be covered only at the expense of the available balances in cash at the beginning of the period (if to speak about efficiency of a cumulative cash flow).

The effectiveness ratio of a cumulative cash flow of the entity is calculated by the following formula [9]:

$$\text{Kecf} = \text{cumulative pure cash flow} / \text{cumulative cash outflow} \quad (1.8)$$

Calculation of effectiveness ratio of cash flows from the current, investing and financial activities will be some kind of assessment of the factors exerting impact on cash flows on types of activity, transaction types [9].

The effectiveness ratio of cash flows from the current activities is determined by a formula [9]:

$$\text{KecfCA} = \text{cumulative pure cash flowCA} / \text{cumulative cash outflowCA} \quad (1.9)$$

The effectiveness ratio of cash flows from investing activities is determined by the following formula [9]:

$$\text{KecfIA} = \text{cumulative pure cash flowIA} / \text{cumulative cash outflowIA} \quad (1.10)$$

The effectiveness ratio of cash flows from financial activities is determined by a formula [9]:

$$\text{KecfFA} = \text{cumulative pure cash flowFA} / \text{cumulative cash outflowFA} \quad (1.11)$$

Thus, calculation of effectiveness ratio of cash flows for activities will allow to study their influence on effectiveness ratio of a cumulative flow of the entity.

The methodological recommendations about carrying out the analysis of financial and economic organization activity approved by Goskomstat of Russia 28.11.2002 within evaluating solvency of the entity contain in addition to calculation of liquidity rates, assessment of coefficients of turnover of current assets in general and on elements. Assets conversion cycle will also allow to create opinion concerning speed transformation of these or those asset types into a money.

1.3 Risk assessment of insolvency of the entity

The analysis and assessment of business risks, including studying of risk of insolvency, are considered in works of many scientists. Thus, V.A. Bykov deeply studied a question of assessment of a capability of the entity to fulfill the liabilities on balance sheet indicators. M.M. Glazov offered methodology and methodology of the economic analysis, opened an essence of the diagnostic method used in an analytical research of the entity. A.P. Gradov offered the scheme of an algorithm of the comprehensive analysis of security status of the entity.

N.I. Ilyenkov opened an essence of financial economy of the company, paying special attention to the factors influencing financial results and a financial condition of the company and offered the management concept risks for economic activity on the basis of risk of unclaimed products. M.Ya. Korobov researched a financial position of the entities. R.M. Kachalov determined and systematized factors of economic risk, offered the specification of methods of management of economic risk. G.B. Kleyner stated the theory of production functions and made practical recommendations about their construction and use. V.I. Cousins I offered tools for assessment of indicators of the balance sheet of the entity and I revealed factors and indicators of solvency. S.A. Markaryan studied forming and the analysis of financial results of activities of the entity, its financial condition, business activity. V.N. Fashchevsky carried out comparison and revealed distinctive signs between the concepts "solvency" and "liquidity".

M.A. Fedotova offered model of solvency of impact of the entity on its cost. At the same time any of researchers didn't pay adequate attention to a behavioral model of the small entity that reflects its relation to settlement of debt obligations before partners [21].

E. Altman who offered integrated assessment of probability of bankruptcy of the entity on the basis of several financial indicators was the founder of modeling of a financial condition of the entity. Modern Russian scientists among whom there are V.I. Barilenko, M.I. Bakanov, G.P. Gerasimenko, D.A. Endovitsky, L.V. Dontsova, O.V. Yefimova, the Lake. Korolyev, V.V. Kovalyov, M.V. Melnik, N.A. Nikiforova, E.V. Nikiforova, A.D. Shernet expanded the list of financial performance, the offered criteria for evaluation of a financial condition and solvency of the entity. Nevertheless, in works of these scientists not enough attention is paid to insolvency risk assessment questions, questions of practical application of results of use of methods of a financial analysis [21].

Despite the growing attention of researchers to a risk assessment of insolvency of the entities, the complete technique of its analysis was provided only by D.S. Kudryavtsev, but also that only on the example of subjects of small business and from a line item of assessment of solvency of partners, but not the entity. In the dissertation research it determines three types of risk inherent in activities of small businesses: credit, operational and market.

The operational risk is a risk of emergence of losses in connection with insufficient qualification of employees, owing to assumption of mistakes, in connection with approach of external events. Approach of an external event, as a rule, leads to the fact that the entity supplier can't make delivery of goods or perform work in the stipulated time that can lead to significant financial consequences, including risk of bankruptcy. In practice for minimization of losses in connection with such risks use insurance. Besides, one of effective methods of minimization of an operational risk is preparation of instructions for personnel which regulate business procedures [21].

The market risk is a risk of a change in value of assets of the entity owing to impact of market factors. The interest rate realignment, costs of exchange goods can be the cause of a market risk. Types of market risks are percentage, share, currency, commodity risks. Concluding contact in foreign currency both with the buyer – the partner, and with the seller-contractor with a payment deferral, the entity signs the agreement on one rate, owing to change in the exchange rate of currency also the amount of the signed agreement will change. Therefore for minimization of market risks of the entity sign contracts in that currency in which the realization is enabled and also use derivative financial instruments for hedging of a market risk.

The credit risk is one of the main risks to which the entities can be subject. Credit risks can arise in cases of failure to deliver of goods by the entity seller in the specified time that will lead to failure to carry out of own agreement obligations by the entity buyer, including payment under the agreement and thus, can lead to decrease in solvency, loss of liquidity and even bankruptcy of the entity if amount of debt is huge.

One of options of emergence of a credit risk is provision of a loan to the entity partner. If the partner won't perform loan repayment in time, the borrower entity has a solvency downside risk that can become the reason of its bankruptcy.

In the course of the analysis of a credit risk D.S. Kudryavtsev revealed one of the main problems – insolvency of partners. In this connection, for development of criteria for evaluation of compliance of techniques of a risk assessment of insolvency to requirements of the companies which are interested in carrying out this analysis – a risk assessment of insolvency of small enterprises this author used method of expert evaluations. It conducted survey of group of 80 entities (stakeholders) who are daily facing a risk assessment of insolvency of small enterprises. Poll allowed to determine requirements to a risk assessment of insolvency of small businesses, to formulate criteria requirements to a technique of a risk assessment of insolvency of small enterprise. Survey results are provided in table 1.1. [21].

Table 1.1

Criteria of the choice of a technique of a risk assessment of insolvency of small businesses

Criterion	Importance of criterion	Quantity of votes
Ease	High	68
Cost	High	60
Speed	High	52
Accuracy	Middle	47
Openness	Middle	40
Universality	Middle	39
Multiapplicability	Middle	38
Confidentiality	Middle	30
Distantionnost	Middle	27
General availability	Middle	20

The conducted survey allowed to determine degree of its importance for each qualification criterion. The criteria which collected more than 20 expert votes were recognized significant and were included in the general list of criteria. The criteria which collected more than 50 votes were acknowledged highly – significant. As a result the author is selected seven average and significant criteria and three is high – significant (that can be seen in table 1.1).

We will consider evolution of techniques of assessment of insolvency and we will estimate them from an application line item for the purposes of calculation of probability of approach of risk of insolvency of the entities, according to the elaborated criteria. In practice several types of the techniques having the distinctive features are used today. The historical aspect from origin is provided in table 1.2 [21].

Evolution of techniques of assessment of solvency

Beginning of use / Year of initial development	Name of a technique of assessment of solvency
1909 till present	Rating models of Moody's
1916 till present	Rating S&P models
1924 till present	Rating models of Fitch
1868 e	Altman's Z-model
1977	Zeta model
1999	L.V. Dontsova and N.A. Nikiforova's technique
2000	Moody's KMV RiskCalc v1.0
2010	Moody's KMV RiskCalc v3.1 Russia
2011	Model E.V. Sinelnikova
2011	Model of business discretion of the Interfax company
2013	Model of assessment of financial risk of the Interfax company

One of the first models developed by Edward Altman, professor of finance in New York University "Z-model" as it was called by the author, appeared in 1968 and became one of the most successful and almost applied to assessment solvency. "Z-model" allows to estimate probability of a default of the company on the basis of the calculated financial performance. On its basis new models which are also based on the analysis of the indicators calculated on the basis of accounting data began to appear. Altman's model was developed with use of the multiple linear discriminant analysis that allowed to choose significant variables. Its creation consists in the course of consecutive inclusion and an exception of variables in models for the purpose of improvement of its prognostic capability. Originally the model included 22 variables, 22 different financial factors. A choice of financial factors for model was made on the basis of the discriminant analysis of 33 "good" companies and 33 "bad" companies [21]. The variables having the smallest statistical certainty were excluded from model then the analysis of the importance of variables was repeated. As a result the model began to include only five the significant variables provided in table 1.3 [21]. Elimination of the fifth variable already led to decrease in a prognostic capability of model. Proceeding from this fact, the conclusion was drawn that discriminant five-factorial function has the largest prognostic force. We will provide a general view of model [21]:

$$Z=1,2x_1+1,4x_2+3,3x_3+0,6x_4+0.999x_5, \quad (1.9)$$

where

Z – the index of solvency;

x_n – value of a n-factor.

The factors used in Altman's model

Factorial variable (xn)	Average value on group of the insolvent companies, %	Average value on group of the steady companies, %	F-statistics
Own working capital/In total assets	-6,1	41,4	32,60
Retained earnings /All assets	-62,6	35,5	58,86
Profit before interest payment and taxes /All assets	-31,8	15,4	26,56
Market value of the equity / Book value of liabilities	40,1	247,7	33,26
Sales proceeds / All assets	150	190	2,84

In an analysis result was critical values of the index are established solvencies (Z) 1,81 and 2,99. It means that at those entities which value of the index of solvency (Z) was determined at the level of less than 1,81 the probability of approach of bankruptcy or a default is high in the nearest future, such entities treat group of unconditional and insolvent. For those entities by which the value of the index of solvency (Z) was determined at the level of more than 2,99 probability of approach of bankruptcy or a default low, such entities treat group of financial and steady. If the index of solvency accepts value in an interval between 1,81 and 2,99, the forecast of probability of approach of a default is difficult.

Approach of model consists in classifying the companies on two groups: the companies which unconditionally are insolvent and the companies which are financially stable.

Results of testings of the entities allowed to draw a conclusion that, "Z-model" Altmana gives rather exact forecast of probability of approach of a default on the temporary horizon both two years, and one. But it is possible to apply it only to large enterprises which constitute a complete set of accounting records (small enterprises hand over the simplified option of balance and the report on financial results, and don't constitute the application to these forms of the reporting in this connection, there is a difficulty of access to data for carrying out the analysis). Therefore it is reasonable to supplement assessment of solvency with the analysis of cash flows which will provide a real picture concerning the amounts of the arrived and spent money, will reveal risks of insufficiency of a money to a certain date and will allow to develop the schedule of receipts and payments for the purpose of management of cash flows.

2 Development of model of the analysis and the risk assessment of insolvency of the entity on the example of industrial enterprise kopeisk engineering plant

2.1 Organizational and economic characteristic of the entity of industrial enterprise «Kopeisk Engineering Plant»

Industrial enterprise Kopeisk Engineering Plant (further – IE) is a joint-stock company which performs the activities in the sphere of mechanical engineering. Is the largest entity of Russia on production of the mountain equipment for underground mining of coalfields, potash ore and rock salt. Legal and actual address of the entity: 456618, Kopeysk of Chelyabinsk region, Lenin St., 24.

IE performs production and sale more than 50 types of the concentrating and mountain equipment [website]:

- 1) concentrating equipment;
- 2) driving and clearing combines;
- 3) tunnelling omplexes;
- 4) self-propelled drilling rigs;
- 5) loading, drillloading and coal cutters;
- 6) products of general mechanical engineering.

For ensuring effective activities at the entity strategy is formulated – it is the strategy of focusing which assumes restriction of scales of activities of the entity and satisfaction of a small customer group. But, at the same time, as a part of the purposes it should be noted a rate of the entity on search of new clients, customers, an exit to the new markets of the extracting equipment. This purpose isn't accidental. Carrying out marketing research proved a monopolism of IE in the sphere of production of salt-mining combines, besides, this sphere is really specific, connected with natural resources (production of food and technical salt) and it is natural, a limited circle of consumers who are concentrated in places of production.

IE in addition to the mining equipment produces also the road equipment, and in this industry there are competitors from outside "The mechanical-repair plant" (Mr. Mikhnevo of the Moscow region) and "the Dmitrovsky excavator plant" (Dmitrov of the Moscow region). Nevertheless, it should be noted that the planned strategy of IE brings quite satisfactory results. Even in

the presence of competitors of IE has an opportunity to take highly competitive position in the corresponding segment of the market at the expense of the level of the production readiness and enhancement of engineering procedure.

Now tasks of activities of IE include release of the high-quality products directed to a requirements satisfaction of buyers who not only representatives of the Russian Federation, but also the neighboring countries are: entities of Kazakhstan, Belarus, Estonia and also foreign countries: China, Iran.

The organizational structure of IE is provided in Appendix A.

Different types of services, shops submit to the corresponding director (to the director of economy, the director of production, the commercial director, the deputy director general of legal issues, the deputy director general of quality, the deputy director general of personnel problems, the head of the security service).

Activities of production enterprise would be impossible without the corresponding logistics, sale of products, its transportation, etc. Regulation of these questions is performed by the commercial director, but the chief is at the head of each service.

So, the head of department on the logistics (L) deals with issues of security of the entity with resource base. The head of marketing department is engaged in regulation of sale of products and it is sold (OMIS). Regulation of ensuring requirement of the entity for transportations by third-party transport is engaged the head of the logistics department.

The technical director is responsible for a technical part of production process. The deputy and the chief of the power-mechanical control (PMC) submit to it. Are under authority of the deputy technical director:

- 1) tool department;
- 2) tool shop;
- 3) department of the chief designer (DCD);
- 4) department of standardization and management of the quality system (OSS and USK);
- 5) department of metrology .

Are under authority of the chief of the EMU department of the chief mechanical engineer; mechanical-repair shop (MRS); department of the chief power engineer (DCPE); gas service; power shop; electroshop.

As the listed services ensuring technical training of production, passing with products of standardization, metrological control which are turned out by IE for the purposes of compliance to the standard rates established at the national level joins.

The director of production bears responsibility for the organization of production process, the organization of work of production services and

shops, accomplishment of the production program. The production director, the chief of the production and dispatching department (PDD) submit to the director of production. Mechanical shops (M-1,3,4,5,10,11,16) performing production, assembly of products of IE are under authority of the production director; foundry shop; forge shop.

The department of marketing and sale bears responsibility for accomplishment of the plan of implementation, advertizing activities (promotion of products in the markets, search of the new markets, new clients, etc.). The director of production closely cooperates with department of marketing and sale as on the basis of plans of implementation the production program for every month is developed, loading of the entity, utilization of capacity, etc. is determined.

The department of logistics performs functions on timely and high-quality logistic ensuring activities of IE. Is independent structural division and is under direct supervision at the chief of logistics. The department of logistics is headed by the head of department. In IE logistic activities are provided:

1) complete and timely satisfaction of requirement of the entity for transportations by third-party transport and special equipment based on requests of divisions of the entity;

2) organization of a customs clearance of export and import of finished goods, equipment, spare parts, accessories, consumable materials;

3) systematic decrease in cost value and increase in profitability of logistic processes without loss of quality;

4) the organization of works on development of methods of packaging, stacking of the new equipment, development of schemes of loading of finished goods and spare parts on all transport modes;

5) the organization of tenders for the purpose of search of the companies providing goods and services of optimum quality for needs of the entity.

Activities of IE are impossible without accounting processes which promote preparation and forming of the accounting records acting as information base for the analysis and assessment of solvency, financial stability. The organization of accounting, analysis and financial planning joins in competence of the director of economy to whom the accounts department, the finance department (TD), the economical department (ED), department of automated control systems (OASUP), department of work and the salary (OTIZ), office submit.

When using of the automated forms of the organization of accounting at the entity the special part is assigned to department of automated control systems which is engaged in automation of accounting information, data transmission on the entity by means of networks, in the organization of work

of internal networks for operational handling and transfer of internal information on divisions. The called departments are engaged in reflection of accounting information in business and tax accounting, carrying out calculations and payments, creation of annual accounting (financial) accounts, evaluating a financial condition of the entity following the results of activities in the accounting periods, creation of plans of consumption of materials and other cost elements for production.

The deputy director general according to legal issues controls work of legal department which keeps all legal issues of activities of IE, since execution of agreements and finishing with legal proceedings. The deputy director general on quality controls product quality, quality of training of personnel to work at this entity, quality of system of management of the entity, etc.

The deputy director general on personnel problems controls work of personnel service of the entity which is engaged in personnel recruitment: production, technical, managerial, accounting, etc.

Safety issues of the organization of activities concern any entity now. The security service of IE is headed by the head of the security service under whose authority the department of safety, the headquarters of civil defense, the 2nd department (department of a special purpose) also is.

According to the report on financial results (Application B) of IE we will provide results of assessment of an income behavior, expenses, profits for 2014–2016 (Table 2.1).

Table 2.1

Assessment of financial results of IE

Indicator	Value, thousand rubles.			Change (+/-), thousand rubles.		Growth rate, %	
	2014	2015	2016	2014 –2015	2015 –2016	2014- 2015	2015 –2016
Revenue	3036730	2251306	2430094	785424	178788	74,14	107,94
Cost of sales	2196154	1750899	1809711	445255	58812	79,73	103,36
Gross profit	840576	500407	620383	–340169	119976	59,53	123,98
Business expenses	34290	–24437	–44151	9853	19714	71,27	180,67
Management expenses	571684	–525748	–523427	45936	–2321	91,96	99,56
Profit (loss) from sales	234602	–49778	52805	–284380	102583	–21,22	–106,08
Income from participation in other organizations	0	10362	30556	10362	20194	-	294,89

Interest receivable	3156	348	119	-2808	-229	11,03	34,20
Percent to payment	-29678	-21560	-38986	-8118	-17426	72,65	180,83
Other incomes	51048	31011	49308	-20037	18297	60,75	159,00
Other expenses	-93462	-74326	-85106	19136	-10780	79,53	114,50
Profit (loss) before the taxation	165666	-103943	8696	-269609	112639	-62,74	-8,37
Current tax on profit	-24186	0	0	24186	0	-	-
Change of deferred tax liabilities	0	-2522	-54865	-2522	-52343	-	2175,46
Change of deferred tax assets	0	28205	47525	28205	19320	-	168,50
Other	0	6980	0	6980	-6980	-	-
Net profit	141480	-71280	1356	-212760	72636	-50,38	-1,90

Graphically change of financial results from primary activity of IE in 2014–2016 is representable in the figure 2.1.

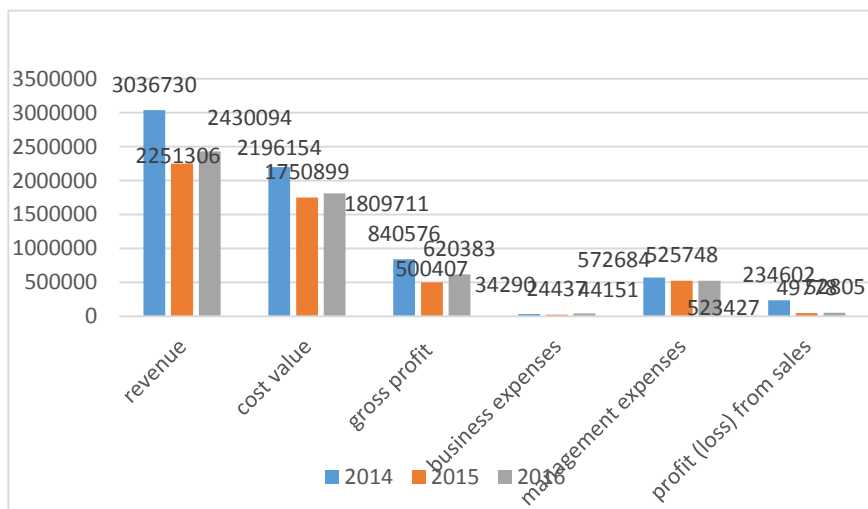


Figure 2.1 – Change of income, expenses and profit (loss) from primary activity of IE, thousand rubles.

By results of the carried-out assessment of dynamics of financial results of IE it is possible to draw the following conclusions.

Decline in income and expenses from the core business of the entity in 2014–2015 is observed:

- 1) revenue decreased by 785 424 thousand rubles or 25,86%;
- 2) cost value decreased by 445 225 thousand rubles or 20,27%;
- 3) the gross profit decreased by 340 169 thousand rubles or 40,47%;
- 4) business expenses were cut on 9853 thousand rubles or 28,73%;
- 5) management expenses were cut down for 45 936 thousand rubles or 8,04%;
- 6) the sales profit of 2014 decreased to a loss in 2015 on 284 380 thousand rubles.

Excess of other expenses over revenues of the entity in 2015 and also the received loss from sales didn't allow IE to work with a net profit. The loss in the amount of 71 280 thousand rubles was as a result recognized. Deterioration in an economic country situation this year negatively affected activities of many of production enterprise therefore also IE became not an exception.

For the period 2015–2016 the situation changes to the best. Income and expenses from the core business grew that led to a positive financial result of the core business – a sales profit:

- 1) revenue increased by 178 788 thousand rubles or 7,94%;
- 2) cost value increased by 58 812 thousand rubles or 3,36%;
- 3) the gross profit increased by 119 976 thousand rubles or 23,98%;
- 4) business expenses increased by 19 714 thousand rubles or 80,67%;
- 5) management expenses were cut down for 2321 thousand rubles or 0,44%;
- 6) the sales profit grew by 102 583 thousand rubles (from a loss in 2015 to profit in 2016 in the amount of 52 805 thousand rubles);

Excess of other incomes over expenses and also profit earning from sales on the core business of IE allowed to cover losses of 2016 and to come to profit before the taxation in the amount of 8696 thousand rubles and a net profit in the amount of 1356 thousand rubles (against net loss of 2015 of 71 280 thousand rubles).

We will analyse structure and structure of property, sources of financing of activities of IE. Information basis of assessment was constituted by data of the balance sheet of IE (Application B). For evaluating we use methods of the horizontal and vertical analysis. By means of the horizontal analysis we will carry out calculation of absolute and relative deviations. By means of the vertical analysis we will calculate a share (specific weight) of each indicator in an asset and a liability of the balance sheet of IE.

In tables 2.2, 2.3 we will provide results of assessment of dynamics of a change in value of assets and liabilities of the entity.

Table 2.2

Assessment of dynamics of assets of IE

Indicator	Value, thousand rubles.			Absolute change, thousand rubles		Growth rate, %	
	On 31.12.2014	On 31.12.2015	On 31.12.2016	2014–2015 rr.	2015–2016 rr.	2014–2015 rr.	2015–2016 rr.
I. Non-current assets							
Intangible assets	9	0	0	-9	0	-	-
Deferred tax assets	0	28205	75730	28205	47525	-	268,50
Property, plant and equipment	1873200	2010000	2241260	136800	231260	107,30	111,51
Financial investments	34576	30308	30298	-4268	-10	87,66	99,97
Other non-current assets	47346	118377	828886	71031	710509	250,03	700,21
Total according to the section I	1955131	2186890	3176174	231759	989284	111,85	145,24
II. current assets							
Inventories	679317	604606	821090	-74711	216484	89,00	135,81
The VAT on the purchased values	45	74509	194539	74464	120030	165575,56	261,09
Receivables	196564	332221	294898	135657	-37323	169,01	88,77
Financial investments (except for cash equivalents)	0	0	11035	0	11035	-	-
Money and cash equivalents	152847	12026	81713	-140821	69687	7,87	679,47
Other current assets	16148	0	1437	-16148	1437	-	-
Total according to the section II	1044921	1023362	1404712	-21559	381350	97,94	137,26
BALANCE	3000052	3210252	4580886	210200	1370634	107,01	142,70

Graphically change of cost of assets of IE in 2014–2016 is presented in the figure 2.2

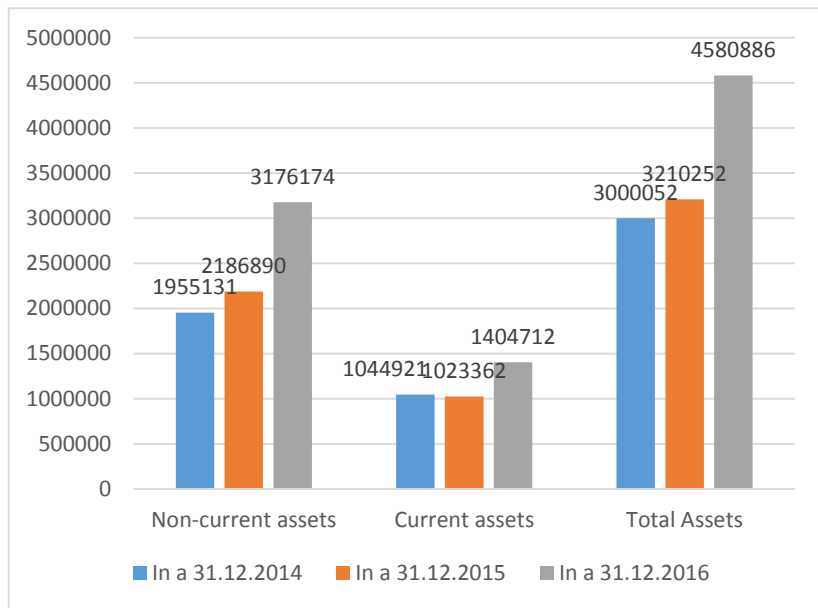


Figure 2.2 – Change of cost of assets of the IE

As a part of assets of IE there were following changes:

1) in 2014–2015 the cost of non-current assets increases by 231 759 thousand rubles or for 11,85% due to growth of cost of a property, plant and equipment (the surplus constituted 7,30%), other non-current assets (the surplus constituted 150,03%). The cost of financial investments fell for 4268 thousand rubles or 12,34%;

2) in 2014–2015 the cost of current assets falls for 21 559 thousand rubles or 2,06% for the cost reduction account of inventories (for 74 711 thousand rubles or 11,0%) and also essential reduction in cost of a money (for 140 821 thousand rubles or 92,13%);

3) in 2015–2016 cost the *vneobrotnykh* of assets grew: the surplus constituted 989 284 thousand rubles or 45,24% at the expense of strong growth of other non-current assets by 710 509 thousand rubles or 600,21% and also deferred tax assets – on 47 525 thousand rubles or 168,50%. Also the cost of a property, plant and equipment due to their updating for new production grew: on 231 260 thousand rubles or 11,51%;

4) the cost of current assets in 2015–2016 grew by 381 350 thousand rubles or 37,26% due to strong increase by security of the entity with a money: on 68 686 thousand rubles or 579,47%, value increases of inventories – on 216 484 thousand rubles or 35,81%. At the same time receivables decreased by 37 323 thousand rubles or 11,23% that can be regarded as the positive phenomenon in liquidity of PE KMZ what the cash inflow in 2015–2016 is connected with.

So, by results of dynamics assessment the total cost of assets of the entity increased in general in the analyzed period of 2013–2016, at the same time growth in 2014–2015 constituted 210 200 thousand rubles or 7,01%, in 2015–2016 – 1 370 634 thousand rubles or 42,70%.

Results of assessment of dynamics of sources of financing of activities of IE it is representable in table 2.3. Information basis was also constituted by data of the balance sheet of IE (Application B).

Table 2.3

Assessment of dynamics of liabilities of IE

Indicator	Value, thousand rubles.			Absolute change, thousand rubles		Growth rate, %	
	on 31.12.2014	on 31.12.2015	On 31.12.2016	2014–2015 rr.	2015–2016 rr.	2014–2015 rr.	2015–2016 rr.
III. Equity and allowances							
Authorized capital	164	164	164	0	0	100,00	100,00
Revaluation of non-current assets	272100	193813	227298	-78287	33485	71,23	117,28
Reserve capital	575	575	575	0	0	100,00	100,00
Retained earnings (uncovered loss)	1788776	1795908	1763880	7132	-32028	100,40	98,22
Total according to the section II	2061615	1990460	1991917	-71155	1457	96,55	100,07
IV. non-current liability							
borrowed funds	213782	0	185834	-213782	185834	-	-
The postponed tax liabilities	0	2522	57387	2522	54865	-	2275,46
Other liabilities	341759	497960	1223573	156201	725613	145,71	245,72
Total according to the section IV	555541	500482	1466794	-55059	966312	90,09	293,08
V. current liability							
Borrowed funds	0	294402	556424	294402	262022	-	189,00
Accounts payable	382697	424732	501124	42035	76392	110,98	117,99
Deferred revenues	199	176	50124	-23	49948	88,44	28479,55
Estimative liabilities	0	0	1461	0	1461	-	-

Other liabilities	0	0	13042	0	13042	-	-
Total according to the section V	382896	719310	1122175	336414	402865	187,86	156,01
BALANCE	3000052	3210252	4580886	210200	1370634	107,01	142,70

General decrease in an equity of IE in 2014–2015 constituted 71 155 thousand rubles or 3,45% at the expense of the received loss in 2015, in 2015–2016 an equity grew by 1457 thousand rubles or for 0,07% at the expense of a small net profit for 2016.

The considerable increase in value of sources of means of IE in 2015–2016 was connected with growth of liabilities (and both long-term, and short-term): in 2016 the new long-term loan in the amount of 185 834 thousand rubles was obtained and also a short-term loan in the amount of 262 022 thousand rubles. Besides, the accounts payable grew: on 42 035 thousand rubles or 10,98% in 2014–2015, and on 76 392 thousand rubles or 17,99% in 2015–2016. At the same time it should be noted that growth of liabilities will negatively affect a financial condition of the entity.

Graphically change of cost of liabilities of the IE enterprise it is representable in the figure 2.3.

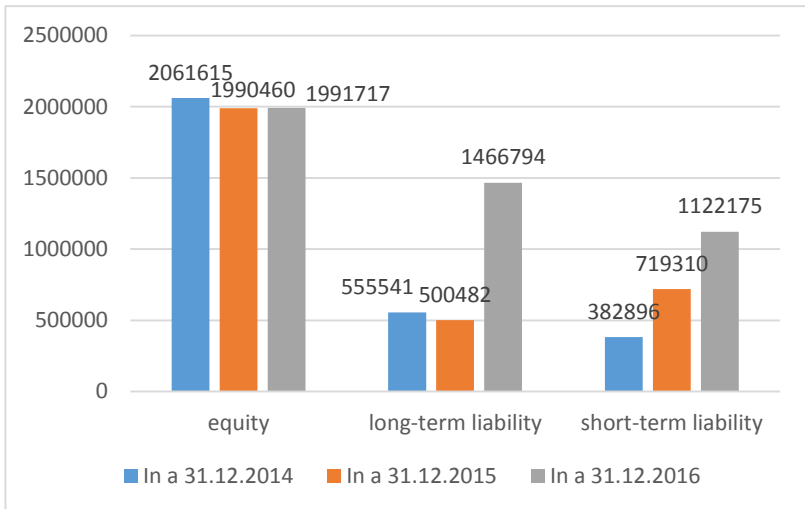


Figure 2.3 – Change of cost of own and loan capital of IE in 2014–2016

We will analyse structure of assets and liabilities of IE. Results of this assessment it is representable in table 2.4, 2.5

Table 2.4

Assessment of structure of assets and liabilities of IE

Indicator	Specific weight, %		
	2014	2015	2016
I. Non-current assets			
Intangible assets	0,00	0,00	0,00
Deferred tax assets	0,00	0,88	1,65
Property, plant and equipment	62,44	62,61	48,93
Financial investments	1,15	0,94	0,66
Other non-current assets	1,58	3,69	18,09
Total according to the section I	65,17	68,12	69,34
II. Current assets			
Inventories	22,64	18,83	17,92
The VAT on the purchased values	0,00	2,32	4,25
Receivables	6,55	10,35	6,44
Financial investments (except for cash equivalents)	0,00	0,00	0,24
Money and cash equivalents	5,09	0,37	1,78
Other current assets	0,54	0,00	0,03
Total according to the section II	34,83	31,88	30,66
BALANCE	100,00	100,00	100,00

In structure of assets the greatest share is occupied by non-current assets: 65,17% in 2014, 68,17% in 2015 and 69,34% in 2016 that quite justifies production activity which is usually connected with big derivation of the capital in security of production with means of labor. The share of current assets in the analyzed period gradually decreased from 34,83% in 2014, to 31,88% in 2015 and to 30,66% in 2016 (figure 2.4).

We will analyse also structure of sources of financing of activities of production enterprise IE, having allocated a share of an equity and a share of liabilities (loan capital). Results of this assessment it is representable in table 2.5.

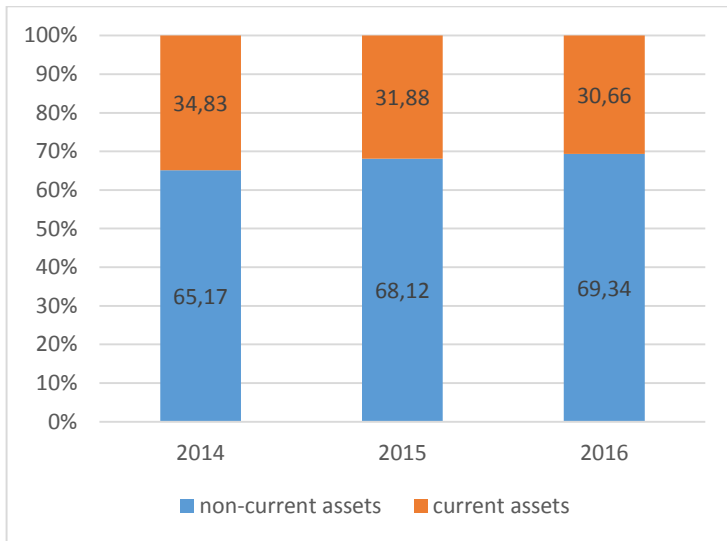


Figure 2.4. Structure of assets of the enterprise in 2014–2016

Table 2.5

Assessment of structure of liabilities of IE

Indicator	Specific weight, %		
	2014г.	2015г.	2016г.
III. Capital and allowances			
Authorized capital	0,01	0,01	0,00
Revaluation of non-current assets	9,07	6,04	4,96
Reserve capital	0,02	0,02	0,01
Retained earnings (uncovered loss)	59,62	55,94	38,51
Total according to the section III	68,72	62,00	43,48
IV. non-current liability			
Borrowed funds	7,13	0,00	4,06
Deferred tax liabilities	0,00	0,08	1,25
Other liabilities	11,39	15,51	26,71
Total according to the section IV	18,52	15,59	32,02

V. current liability			
Borrowed funds	0,00	9,17	12,15
Accounts payable	12,76	13,23	10,94
Deferred revenues	0,01	0,01	1,09
Estimative liabilities	0,00	0,00	0,03
Other liabilities	0,00	0,00	0,28
Total according to the section V	12,76	22,41	24,50
BALANCE	100,00	100,00	100,00

As for sources of financing of activities of IE, in 2014 the entity had a high security with an equity which share constituted 68,72%. In 2015 the share of own means for the loss account decreased to 62,0%, in 2016 – to 43,48%. Thus, the dependence of the entity on external sources of financing of activities increases: the share of short-term obligations grew from 12,76% in 2014, to 22,41% in 2015 and further growth up to 24,50% in 2016; the share of long-term obligations decreased from 18,52% in 2014 to 15,59% in 2015 and further was doubled up to 32,02% in 2016. Thus, the share of an equity of IE was at the level of 68,72% of–43,48% in 2014–2016, a share of the loan capital – 31,28%–56,52% in 2014–2016. Graphically change of structure of liabilities of IE in 2014–2016 is presented in the figure 2.5.

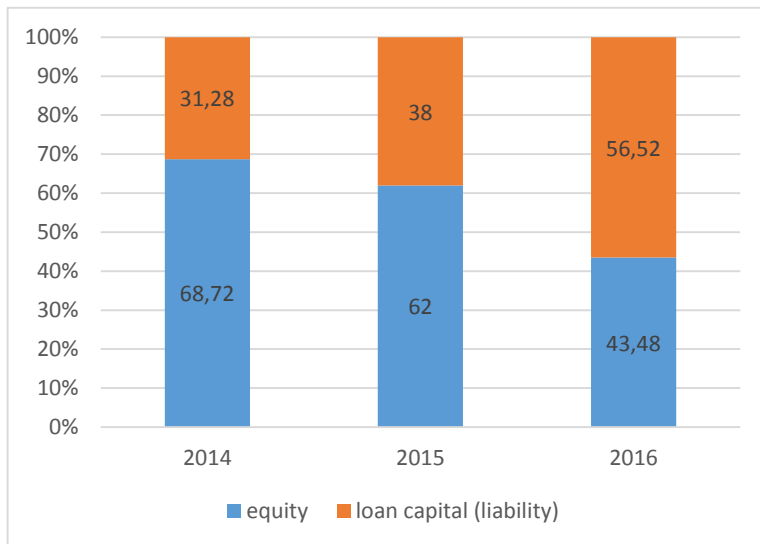


Figure 2.5. Change of structure of liabilities of IE

Thus, by results of assessment of assets and sources of their financing in activities of IE in 2014–2016 security with both the non-current, and current assets necessary for productive activity of the entity increases. At the same time in 2016 liabilities (the credits, an accounts payable) became the main source of financing of assets, the specific weight of an equity for the period was almost twice lost 2012–2014 that negatively affects financial stability of IE.

In activities of the entity its solvency is significant. At the same time it should be noted that the entity can work at the expense of the credits, to be financially unstable, to have a low share of an equity, but if it has means to settle the liabilities, there are products which it turns out, there is a fixed cash inflow from buyers without payment delay, then these credits will be successfully repaid, liabilities to partners are fulfilled. In this connection, solvency analysis, a risks assessment of insolvency are important more, than the level of financial stability. The analysis of theoretical approaches of different authors provided in work earlier allowed to formulate own line item of the author concerning an analysis technique and a risks assessment of insolvency and to develop model of this direction of a financial analysis in relation to production enterprise.

2.2 Model of the analysis and risk assessment of insolvency of the entity. An algorithm of its application in the analysis of IE

Studying of approaches of different authors to assessment of solvency allowed to determine that any of authors doesn't consider in the techniques risk of assessment of insolvency for the entity seller. The operating techniques include assessment of liquidity of balance and calculation of liquidity rates. At best they are complemented with assessment of probability of bankruptcy (though even this direction of assessment functions as the independent direction in the analysis). D.S. Kudryavtsev made attempt of development of an analysis technique and risk assessment of insolvency but not the entity seller, but entities partners that to the seller to avoid risks of emergence of an overdue debt of the buyers, such analysis is necessary. In our research the model of the analysis and a risk assessment of insolvency which any entity both for own analysis, and for the analysis of the entities partners can use is offered.

Thus, the author of a research offers model of the analysis and a risk assessment of insolvency of the entity which shall include the following directions of assessment:

- 1) assessment of liquidity of balance and calculation of liquidity rates;

- 2) assessment of turnover of current assets;
- 3) assessment of liquidity and efficiency of cash flows;
- 4) assessment of loss (recovery) of solvency;
- 5) The SWOT analysis revealing downside risks of liquidity of the entity.

We will develop model of the analysis and a risk assessment of insolvency in relation to production enterprise, we will provide reasons for the purposes of each direction in the offered model, the applied coefficients (table 2.6).

Table 2.6

Model of the analysis and risk assessment of insolvency of the entity

Direction of the analysis and risk assessment of insolvency analysis	Purpose analysis	Structure of coefficients
1. Assessment of liquidity of balance and calculation of liquidity rates.	To group assets in the speed of transformation into a money (and liabilities on degree of urgency of settlement of liabilities) for the characteristic of security with the quickest assets, determination of a possibility of settlement of the most urgent liabilities.	1.1. Group of assets on liquidity degree: A1 – absolutely quick assets; A2 – quickly negotiable assets; A3 – slowly negotiable assets; A4 – difficult negotiable assets. 1.2. Group of liabilities on degree of urgency of settlement of liabilities: P1 – the most urgent liabilities; P2 – short-term obligations; P3 – long-term obligations; P4 – fixed liabilities. 1.3. Liquidity rates: absolute liquidity index; coefficient of intermediate (urgent) liquidity; coefficient of current liquidity.
2. Assessment of loss (recovery) of solvency.	To determine a downward tendency (increases) of current liquidity	2.1. Coefficient of loss of solvency; 2.2. Coefficient of recovery of solvency; 2.3. Factorial analysis of current liquidity.
Direction of the analysis and risk assessment of insolvency analysis	Purpose analysis	Structure of coefficients

3. Assessment of turnover of current assets.	To determine efficiency of use of resources by the entity by means of calculation of duration of the address of current assets.	3.1. Turnover of current assets; 3.2. Turnover of a money; 3.3. Accounts receivable turnover; 3.4. Accounts payable turnover; 3.5. Inventory turnover.
4. Assessment of liquidity of cash flows.	To determine sufficiency of a cash inflow for making of all calculations and payments.	4.1. Liquidity rate of a cash flow from current transactions; 4.2. Liquidity rate of a cash flow from investment transactions; 4.3. Liquidity rate of a cash flow from financial transactions; 4.4. Liquidity rate of a cumulative cash flow; 4.5. Liquidity rate of a cumulative cash flow taking into account a balance in cash at the beginning of the period.
5. Efficiency evaluation of cash flows	To determine possibilities of forming of a loose stock of a money by the entity for a certain date after making of all calculations and payments	5.1. Effectiveness ratio of a cash flow from current transactions; 5.2. Effectiveness ratio of a cash flow from investment transactions; 5.3. Effectiveness ratio of a cash flow from financial transactions; 5.4. Effectiveness ratio of a cumulative cash flow.
6. SWOT analysis from the point of view of emergence of risk of insolvency.	To determine possibilities of the entity to settlement of the available liabilities, to reveal threats, risks of insolvency and to plan ways of their decrease.	6.1. Strengths following the results of solvency analysis; 6.2. Weaknesses; 6.3. Possibilities of the entity regarding timely settlement of liabilities; 6.4. Insolvency threats.

We will provide an algorithm of use to the given model of the analysis and a risk assessment of insolvency of the entity in the figure 2.6.

We will lead explanations to model regarding the analysis of cash flows and assessment of loss (recovery) of solvency of the entity.

Approaches of E.N. Gladkovskaya [9] who suggests to break general liquidity rate of a cash flow and general effectiveness ratio of a cash flow into factors as which inflows and cash outflows on types of activity of the entity act acted as a basis of the analysis of cash flows of the entity (current, investment, financial). Thus, the analysis of cash flows will be carried out by all types of activity with calculation of general level of liquidity and efficiency of a cash flow of the entity.

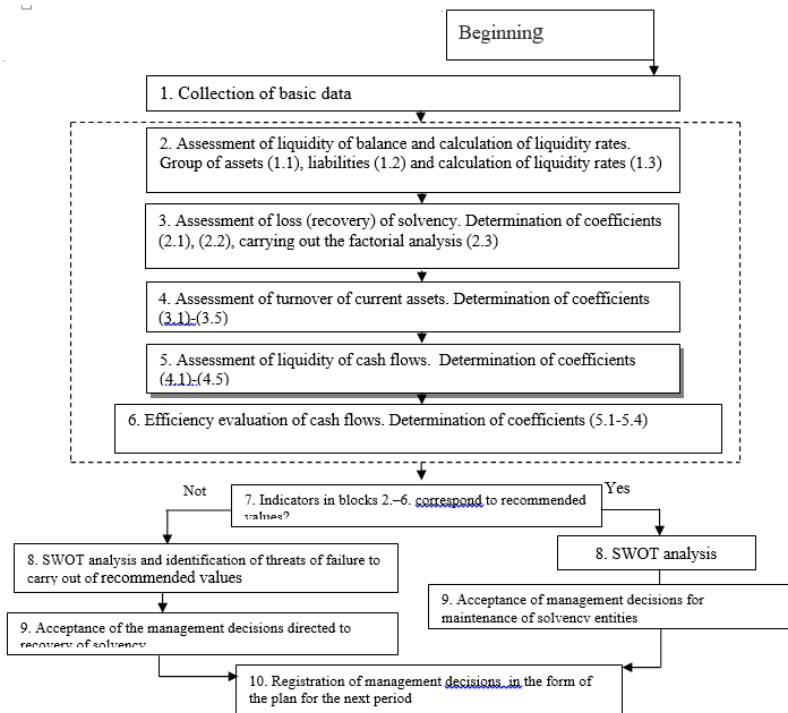


Figure 2.6. Algorithm of use of model of the analysis and risk assessment of insolvency of the entity

Perhaps, the most important in the offered model of assessment is the analysis of cash flows, and its interrelation with balance of parts of assessment of sufficiency of quick assets for settlement of liabilities. Therefore it is offered to carry out the analysis and a risk assessment of insolvency not only according to account balances on which the balance sheet, but also using the cash flow statement which in details deciphers sources of a money and the calculations made with their help is constituted.

The importance in the course of the analysis is allocated for assessment of loss (recovery) of solvency. The methodical approaches developed by G.V. Savitskaya [29] who suggests to carry out this assessment in addition to calculation of liquidity rates acted as a basis of this assessment. So, if by results of assessment the value of coefficient of current liquidity is less than established standard rate, but the tendency of its growth during the analyzed periods was planned, it is necessary to carry out calculation of coefficient of

recovery of solvency for the period, equal to six months on the following formula:

$$K_{RS} = \frac{K_{CL} + \frac{6}{T}(K_{CL_1} - K_{CL_0})}{K_{CL_{norm}}}, \quad (2.1)$$

where KCL1 and KCL0 – result of calculation of coefficient of current liquidity for the end and the beginning of the analyzed period;

KCL.NORM – standard value of coefficient of current liquidity;

6 – renewal period of liquidity, month;

T – the accounting period, month.

If $KRS > 1$, then at the entity is every chance and opportunities to recover liquidity of balance if Quarter. There is no $KRS < 1$, the entity of such opportunities in the nearest future.

If the result of calculation of coefficient of current liquidity is equal to the standard rate or above it for the end of the analyzed period, but the tendency of its decrease is planned, calculate coefficient of loss of liquidity (KLL) for the period, equal to three months on the following formula:

$$K_{LL} = \frac{K_{CL} + \frac{3}{T}(K_{CL_1} - K_{CL_0})}{K_{CL_{norm}}}, \quad (2.2)$$

In the conditions of the unstable national currency rate, inflation, in case of determination of influence of factors on change of coefficient of current liquidity in order to avoid the distorting impact of inflation it is necessary to take not value of a pure gain of the current assets and liabilities, but change of their share in a general balance sheet total into consideration (the figure 2.7)[29].

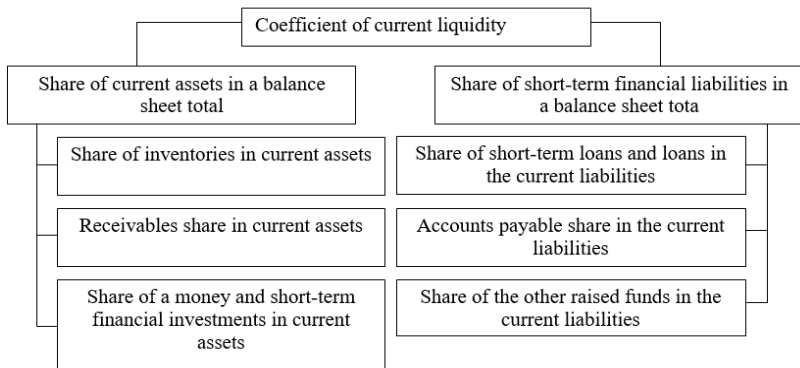


Figure 2.7. Model of the factorial analysis of coefficient of current liquidity

First of all it is necessary to determine how the coefficient of current liquidity at the expense of factors of the first order changed:

$$Kcl0 = \frac{\text{Share of inventories in current assets0}}{\text{Share of short-term loans and loans in the current liabilities0}}, \quad (2.3)$$

$$Kcl(c) = \frac{\text{Share of inventories in current assets1}}{\text{Share of short-term loans and loans in the current liabilities0}}, \quad (2.4)$$

$$Kcl1 = \frac{\text{Share of inventories in current assets1}}{\text{Share of short-term loans and loans in the current liabilities1}}, \quad (2.5)$$

General change of coefficient of current liquidity is determined by a formula:

$$\Delta K_{CL} = K_{CL_1} - K_{CL_0}, \quad (2.6)$$

and also due to change:

1) shares of current assets:

$$\Delta K_{CL} = (\Delta \text{Share of inventories in current assets}) K_{CL(c)} - K_{CL_0},$$

2) shares of the current liabilities:

Considering liquidity indicators, it should be noted, that the received result of their calculation is size quite conditional as the liquidity of assets and urgency of liabilities is determined by the balance sheet approximately (the balance is made for a certain date and depending on duration of the analyzed periods also the level of liquidity can change).

So, the liquidity of inventories depends on turnover of each element in structure of inventories, on a share of scarce, stale materials and finished goods. The liquidity of receivables depends on the speed of debt repayment, its turnover, a share of overdue payments and unreal for collection. Increase in a share of overdue receivables and illiquid inventories demonstrates reduction of the liquidity of current assets. For these reasons the entity can have the high level of liquidity rates, and in fact to be insolvent. Therefore very important to add assessment of liquidity of balance and calculation of liquidity rates with turnover analysis of current assets.

2.3 An impact assessment of structure and structure of current assets on solvency of IE.

Assessment of liquidity of balance

We will carry out approbation of the model of the analysis given above and risk assessments of insolvency on the example of production enterprise IE. Information basis of assessment was constituted by data of the balance sheet (Application B), the report on financial results (Application B)

We will carry out assessment of liquidity of balance of IE according to the balance sheet for the end of 2014–2016 and also we will calculate liquidity rates. Results of assessment of liquidity of balance it is representable in table 2.7.

Table 2.7

Group of assets of IE on degree of liquidity and liabilities on degree of urgency of settlement of liabilities

Indicator	2014 г.	2015 г.	2016 г.
A1	152847	12026	92748
A2	196564	332221	294898
A3	695510	679115	1017066
A4	1955131	2186890	3176174
Total Asset	3000052	3210252	4580886
Π1	382697	424732	501124
Π2	199	294578	621051
Π3	555541	500482	1466794
Π4	2061615	1990460	1991917
Total Liability	3000052	3210252	4580886
Payment surplus / shortcoming			
A1-Π1	-229850	-412706	-408376
A2-Π2	196365	37643	-326153
A3-Π3	139969	178633	-449728
Π4-A4	106484	-196430	-1184257

The balance of the entity is considered absolutely liquid if the following inequality is carried out: $A1 \geq \Pi1$; $A2 \geq \Pi2$; $A3 \geq \Pi3$; $A4 \leq \Pi4$.

The economic sense of the first, second and third inequalities consists in what assets of each group shall be enough for settlement of the corresponding liabilities. The economic sense of the fourth inequality is in what own means shall be enough for financing of current assets after acquisition of all non-current assets.

According to table 2.7 the balance of IE can't be considered absolutely liquid as the first inequality in 2014–2016 isn't carried out, the second inequality in 2016 isn't carried out, the third inequality in 2016 isn't carried out, the fourth inequality in 2015–2016 isn't carried out. Therefore we will add assessment of liquidity of balance of IE with calculation of liquidity rates: absolute, intermediate and current liquidity. Results of calculation of coefficients it is representable in table 2.8.

Change of liquidity rates

Indicator	31.12.2014	31.12.2015	31.12.2016	Standard value
Absolute liquidity index	0,399	0,017	0,083	0,2–0,25
Coefficient of intermediate liquidity	0,913	0,479	0,345	0,7–1,0
Coefficient of current Liquidities	2,687	1,319	1,077	1,0–2,0

Graphically change of coefficients of liquidity of IE it is representable in the figure 2.8

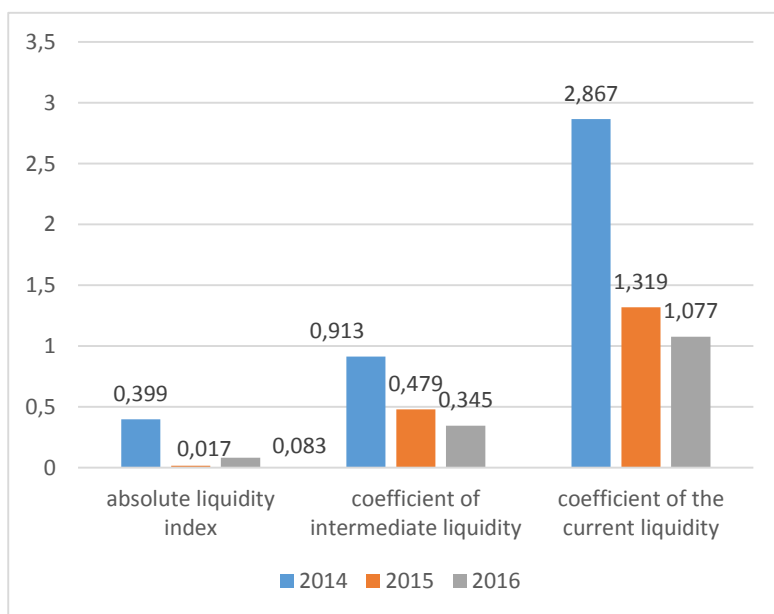


Figure 2.8. Change of coefficients of liquidity of IE

According to the absolute liquidity index of IE the standard value (0,2–0,25) is carried out only at the end of 2014: 0,399; for the end of 2015 the result of calculation made 0,017, for the end of 2016 – 0,083. To the termination of 2016 security of the entity with a money increases that was shown by assessment of dynamics and structure of assets therefore the result of calculation of absolute liquidity index for the period has 2015–2016 positive dynamics. But, nevertheless, with the increased cost of short-term obligations at

31.12.2016 IE has no enough absolutely quick assets for settlement them in the amount established by the standard rate.

According to coefficient of intermediate liquidity of IE the standard value is carried out also only in 2014 from 0,7 possible. At the same time in 2015 the strong failure of intermediate liquidity is observed – the value of coefficient decreases almost twice to 0,479 with further decrease in 2016 to 0,345. Thus, even after settlement by buyers of receivables of IE won't be able to extinguish the liabilities within standard values.

Results of calculation of coefficient of current liquidity within standard value, but show negative dynamics throughout the analyzed period with 2,687 in 2014 to 1,077 in 2016. Therefore it makes a sense to carry out calculation of coefficient of recovery of solvency for a formula (2.1). Results of calculations it is representable in table 2.9.

Table 2.9

Calculation of coefficient of recovery of solvency of IE in 2016

Name of an indicator	measure value
Coefficient of current liquidity on the end of the year	1,077
Coefficient of current liquidity for the beginning of year	1,319
Accounting period (T), month.	12
Standard value of coefficient of current liquidity	2,0
Coefficient of recovery of solvency $((1,077+6/12 \times (1,077-1,319))/2,0=0,478$	0,478

As the received result of calculation of coefficient of recovery of solvency is more than unit, IE has a real opportunity to recover liquidity of balance in the nearest future (within half a year if to be guided by a formula for calculation and the used period of 6 months).

It should be noted that in difference of coefficients of intermediate and current liquidity which have negative dynamics for all analyzed period of 2014–2016 (values decrease with 0,913 to 0,345 on coefficient of intermediate liquidity and with 2,687 to 1,077 on coefficient of current liquidity), the value of absolute liquidity index has negative dynamics in 2014–2015 with 0,399 to 0,017 and further positive growth to 0,083. Nevertheless, this growth isn't enough for "immediate" liquidity of the entity.

We will carry out the analysis of structure of current assets of IE and we will calculate coefficients of turnover of current assets of IE in 2014–2016.

Results of assessment of dynamics and structure of current assets of v it is representable in table 2.10.

Table 2.10

Assessment of dynamics of current assets of IE

Indicator	Value, thousand rubles.			Value, thousand rubles.			Growth rate, %	
	31.12.2014	31.12.2015	31.12.2016	2014-2015	2015-2016	2014-2015	2015-2016	
Inventories	679317	604606	821090	-74711	216484	89,00	135,81	
The VAT on the purchased values	45	74509	194539	74464	120030	165575,56	261,09	
Receivables	196564	332221	294898	135657	-37323	169,01	88,77	
Financial investments (except for cash equivalents)	0	0	11035	0	11035	-	-	
Money and cash equivalents	152847	12026	81713	-40821	69687	7,87	679,47	
Other current assets	16148	0	1437	-16148	1437	-	-	
Total current assets	1044921	1023362	1404712	-21559	381350	97,94	137,26	

By results of the carried-out assessment it should be noted that in 2014–2015 the cost of current assets falls for 21 559 thousand rubles or 2,06% for the cost reduction account of inventories (for 74 711 thousand rubles or 11,0%), costs of a money (on 140 821 thousand rubles or 92,13%). In 2015–2016 the cost of current assets grew by 381 350 thousand rubles or 37,26% due to strong increase in security of the entity with a money: on 68 686 thousand rubles or 579,47% and also value increases of inventories – on 216 484 thousand rubles or 35,81%. But receivables decreased by 37 323 thousand rubles or 11,23% that can be regarded as the positive phenomenon in liquidity of IE what the cash inflow in 2015–2016 is connected with.

Results of assessment of structure of current assets of IE it is representable in table 2.11. The structure was determined within the second section of balance, but not to a balance sheet total.

Table 2.11

Assessment of structure of current assets of IE

Name of an indicator	Measure value %		
	2014	2015	2016
Inventories	65,01	59,08	58,45
The VAT on the purchased values	0,00	7,28	13,85
Receivables	18,81	32,46	20,99
Financial investments (except for cash equivalents)	0,00	0,00	0,79
Money and cash equivalents	14,63	1,18	5,82
Other current assets	1,55	0,00	0,10
Total according to the section II	100,00	100,00	100,00

Graphical change of structure of current assets of IE it is representable in the figure 2.9.

By results of assessment the greatest specific weight in structure of current assets of IE is constituted by inventories: 65,01% in 2014, 59,08% in 2015 and 58,45% in 2016. Small decrease in a share of inventories by 2016 is connected with the amplifying receivables share from 18,81% to 32,46% in 2014–2015, but with its small decrease in 2016 to 20,99%. Considerably the specific weight of the VAT on the purchased values increased: from 0% to 13,85% in 2016. The share of a money (and their equivalents) decreased from 14,63% to 5,82% in 2014–2016.

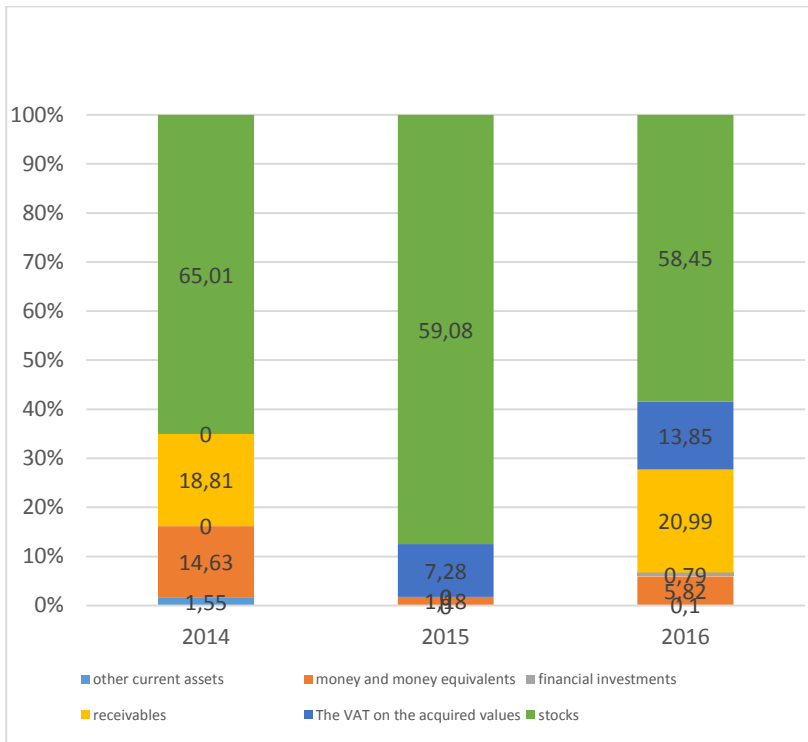


Figure 2.9. Change of structure of current assets

We will carry out also assessment of dynamics of structure of inventories of IE which results it is representable in table 2.12.

Table 2.12

Dynamics and structure of inventories of IE

Indicator	2014.		2015 .		2016 .		Change, thousand rubles.	
	thousand rubles.	specific weigh, %	thousand rubles.	specific weigh, %	thousand rubles.	specific weigh, %	2014	2015
Raw materials	177336	26,11	170432	28,19	207080	25,22	-6904	36648
Costs in work in progress	123843	18,23	154531	25,56	137210	16,71	30688	-17321
Finished goods	377162	55,52	236453	39,11	395151	48,13	-140709	158698
Goods in stock	976	0,14	798	0,13	11574	1,41	-178	10776
Deferred expenses	0	0,00	42392	7,01	70075	8,53	42392	27683
Total	679317	100,00	604606	100,00	821090	100,00	-74711	216484

Change in value of inventories of IE it is representable in the figure 2.10.

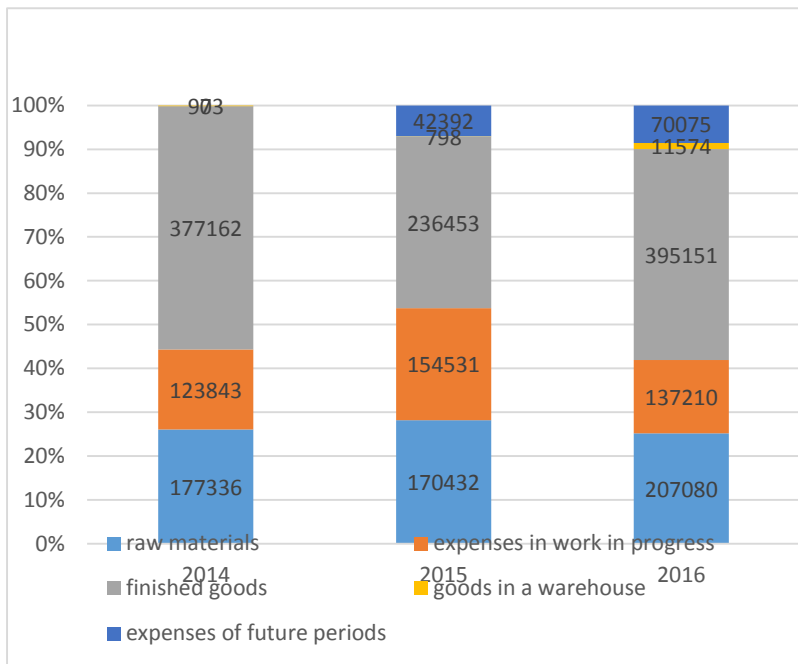


Figure 2.10. Change of cost of stocks of IE

By results of the carried-out assessment of dynamics of structure of inventories of IE on elements it is possible to draw the following conclusions:

1) the greatest specific weight in structure of inventories the finished goods – 55,52% in 2014 occupy, 39,11% in 2015 and 48,13% in 2016. Thus, overstocking of a warehouse is observed that isn't the positive moment;

2) the considerable specific weight is occupied by raw materials and materials (but without them it is impossible to conduct production process therefore their presence is quite justified): 26,11% in 2014, 28,19% in 2015 and 25,22% in 2016; the work in progress share in 2015 of 25,56% against 18,23% in 2014 and 16,71% in 2016 is considerable;

3) the small share is occupied by deferred expenses (0% in 2014, 7,01% in 2015, 8,53% in 2016) and also goods in stock (0,14% in 2014, 0,13% in 2015 and 1,41% in 2016). Graphically change of structure of stocks on elements it is representable in the figure 2.11

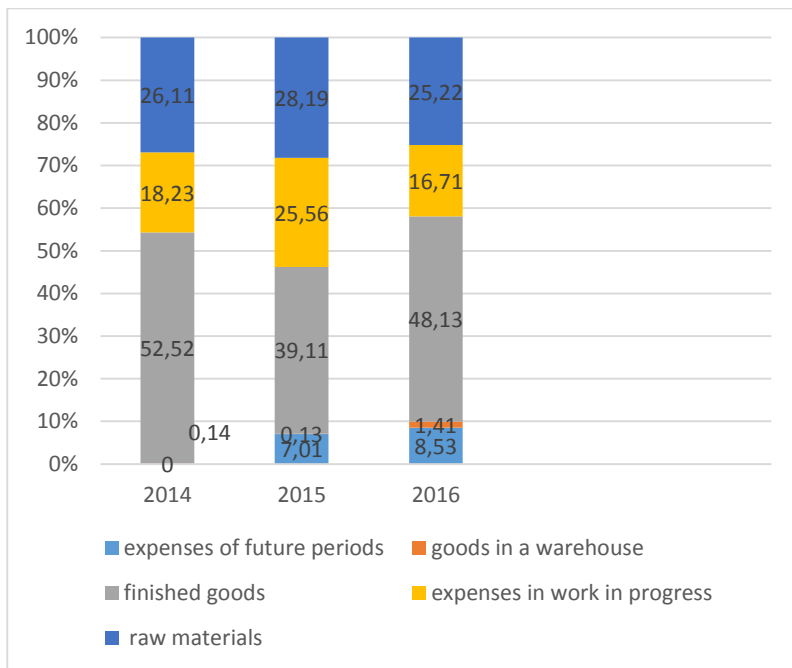


Figure 2.11. Structure of stocks of IE

Thus, assessment of dynamics of structure showed considerable decrease in a share of finished goods in 2014–2015 (–16,41%) with further growth in 2015–2016 (+9,02%) and also growth of a share of costs in work in progress in 2014–2015 (+7,33%) with the subsequent decrease in 2015–2016 (–8,85%).

We will carry out also an efficiency evaluation of use of current assets of IE. Results of this assessment it is representable in table 2.13.

Table 2.13

Efficiency analysis of use of current assets

Indicator	value			change		Growth rate, %	
	2014	2015	2016	2014 2015	2015 2016	2014 2015	2015– 2016
Average cost of current assets,	679317	641961,5	712848	–37355,5	70886,5	94,50	111,04

Coefficient of turnover of current assets, turnovers	4,47	3,51	3,41	-0,96	-0,10	78,45	97,21
Time of the address of current assets, days	80,53	102,65	105,60	22,12	2,95	127,47	102,87
Profit ratio of current assets, %	20,83	-11,10	0,19	-31,93	11,29	-53,31	-1,71

By results of the carried-out assessment it is possible to draw conclusions on decrease in efficiency of use of current assets of IE in general for the period 2014–2016, but with small improvement of a situation in 2016. So, the turnover of current assets from 4,47 turnovers in 2014 to 3,51 in 2015 (or by 21,55%) and to 3,41 in 2016 decreases (or for 2,79%). At the same time increases long one turnover of current assets from 81 days in 2014 up to 103 days in 2015 (or by 27,47%), up to 106 days in 2016 (or for 2,87%). The long operating cycle "refrigerates" current assets. But at the same time it is necessary to consider also specifics of an industry in which the entity of IE – the sphere of mechanical engineering therefore the operating (production) cycle averages of 30 days and more works. Nevertheless, duration of turnover of current assets of 81–106 days is not admissible.

Graphical change of duration of one turnover of current assets it is representable in the figure 2.12.

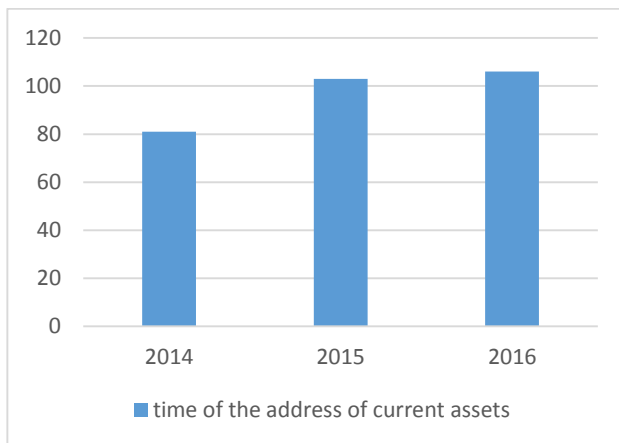


Figure 2.12. Change of time of the address of current assets IE

As for profitability of current assets of IE, it was rather high in 2014 – 20,83%. Losses of 2015 negatively affected result of measure calculation of profitability and resulted in value – 11,10%. In 2016 the situation improves to the level of profitability of 0,19% a little

In table 2.14 we will provide change of inventory turnover ratios of IE in 2013–2015.

Table 2.14

Indicators of inventory turnover of IE

Name of an indicator	2014 г.	2015 г.	2016 г.
Inventory turnover, in turnovers	4,47	3,51	3,41
Revenue, thousand rubles.	3036730	2251306	2430094
Average value of inventories, thousand rubles.	679317	641961,5	712848
Duration of one turnover, in days	81	103	106
Assessment period, in days	360	360	360

Inventory turnover of IE which part raw materials and materials, costs in work in progress, the finished goods, goods shipped are is slowed down. The quantity of turnovers which passed inventories of the entity in 2014 made 4,47, in 2015 decreased to 3,51 turnovers, in 2016 – to 3,41 turnovers. Duration of one turnover decreased from 81 days in 2014 up to 106 days in 2016. Graphical change of duration of one turnover it is representable in the figure 2.13.

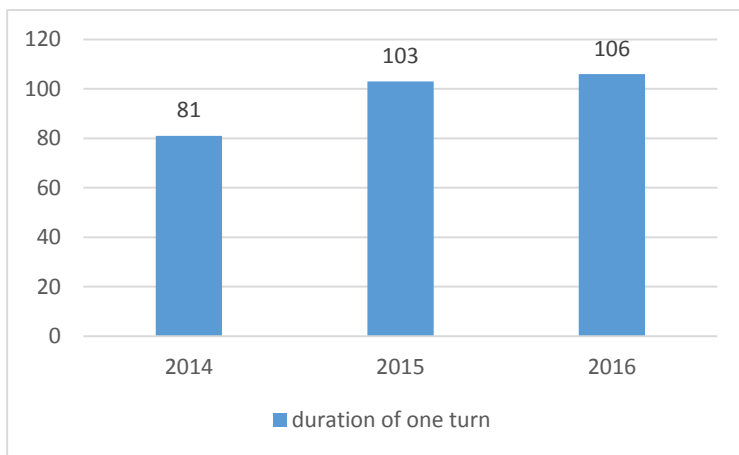


Figure 2.13. Change of Duration of One Inventory Turn IE

In table 2.15 we will provide change of coefficients of turnover of a money of IE in 2013–2015.

Table 2.15

Indicators of turnover of a money of IE

Name of an indicator	2014	2015	2016
Inventory turnover, in turnovers	19,87	27,31	51,85
Revenue, thousand rubles	3036730	2251306	2430094
Average value of inventories, thousand rubles	152847	82437	46870
Duration of one turnover, in days	18	13	7
Assessment period, in days	60	360	360

The turnover of a money of IE increased almost three times in the analyzed period, from 9,87 turnovers in 2014 up to 51,85 turnovers in 2016. Duration of one turnover of a money of the entity was reduced from 18 days to 7 days in the analyzed period that is reflected in the figure 2.14.

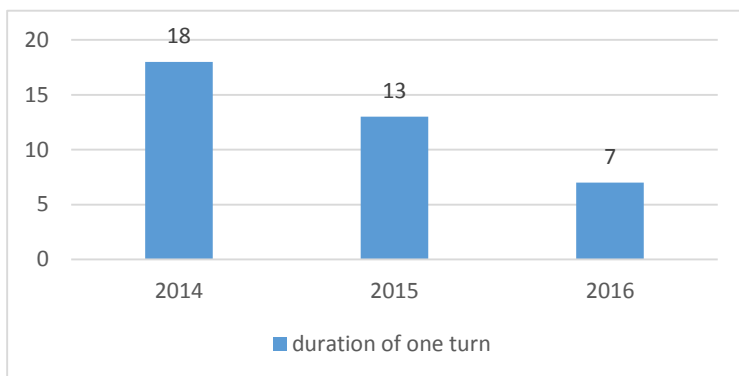


Figure 2.14. Change of duration of one turnover money of IE

In table 2.16 we will provide change of accounts receivable turnover ratios of IE in 2013–2015 .

Table 2.16

Indicators of accounts receivable turnover

Name of an indicator	2014 г.	2015 г.	2016 г.
Inventory turnover, in turnovers	15,45	8,52	7,75
Revenue, thousand rubles.	3036730	2251306	2430094
Average value of inventories, thousand rubles.	196564	264393	313560
Duration of one turnover, in days	23	42	46
Assessment period, in days	360	360	360

Speed of settlement of receivables, the main share as a part of structure are occupied by the debt of buyers, decreased from 15,45 turnovers in 2014 to 7,75 turnovers in 2016. In this connection, duration of one turnover of receivables increased from 23 days in 2014 up to 46 days in 2016 году (figure 2.15).

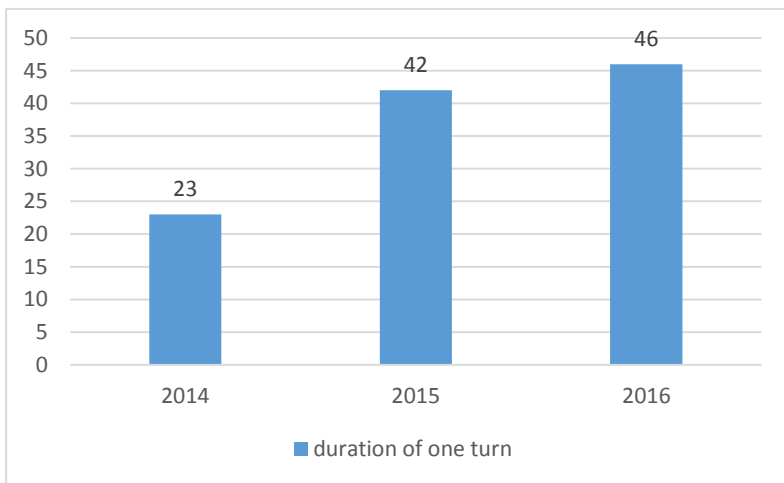


Figure 2.15. Change of duration of one turnover receivables of IE

In table 2.17 we will provide change of accounts payable turnover ratios of IE in 2013–2015 .

Table 2.17

Indicators of accounts payable turnover

Name of an indicator	2014 г.	2015 г.	2016 г.
Inventory turnover, in turnovers	7,94	5,58	5,25
Revenue, thousand rubles.	3036730	2251306	2430094
Average value of inventories, thousand rubles.	382697	403715	462928
Duration of one turnover, in days	45	65	69
Assessment period, in days	360	360	360

As for duration of settlement of an accounts payable of IE, it decreased from 7,94 turnovers in 2014 up to 5,25 turnovers in 2016.

Duration of one turnover at the same time constituted 45 days in 2014, 65 days in 2015, 69 day in 2016 (figure 2.16).

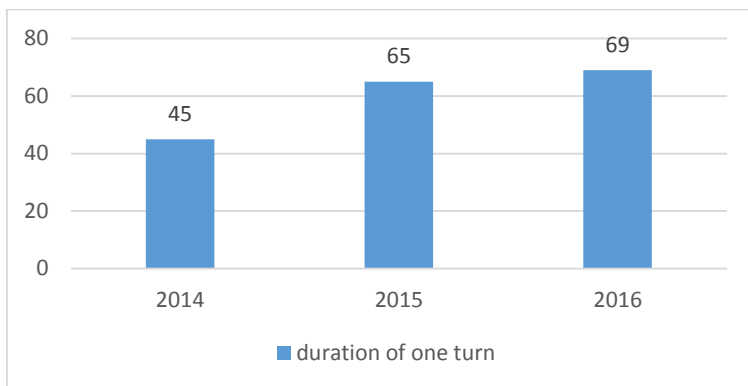


Figure 2.16. Change of duration of one turnover accounts payable of IE

In general by results of assessment of turnover of current assets of IE it is possible to note delay of turnover of current assets in general, inventory turnovers, receivables and payables. But at the same time the turnover of a money increases. Therefore it is necessary to work with the repayment schedule of receivables and payables, to develop ways of increase in speed of their address.

2.4 Assessment of liquidity and efficiency of cash flows IE

We will begin assessment of cash flows with assessment of dynamics and structure of cash flows on the types of activity of IE provided in the "Cash flow statement" form No. 4: current, investment and financial. Results of calculation of an increase in value of inflows and cash outflows and also their structures it is representable in table 2.18

Table 2.18

Assessment of dynamics and structure of cash flows of IE

Name of an indicator	Value, thousand rubles.		Surplus of 2015–2016, %	Specific weight, %	
	2015	2016		2015	2016
1. Cash flows from current transactions					
1.1.Cash inflow, all	3597384	2985771	–17,00	100,00	100,00
from sale of products, goods, works and services	3593738	2523280	–29,79	99,90	84,51
lease payments, license fees, commission charges, etc.	0	489	-	0,00	0,02

Continuation of table 2.18

other receipts	3646	462002	12571,48	0,10	15,47
1.2 Expenditure of a money, all	3800468	2791545	-26,55	100	100
to suppliers (contractors) for raw materials, materials, works and services	1936988	951507	-50,88	50,97	34,09
debenture interests	21560	36932	71,30	0,57	1,32
compensation of workers	828856	874325	5,49	21,81	31,32
other payments	1013064	928781	-8,32	26,66	33,27
1.3. Balance of cash flows from current transactions (a difference between inflow and a cash outflow)	-203084	194226	195,64	-	-
2. Cash flows from investment transactions					
2.1. Cash inflow, all	11096	34432	210,31	100,00	100,00
sale of non-current assets (except financial investments)	385	3499	808,83	3,47	10,16
dividends, percent on debt financial investments, receipts from equity in other organizations	10710	30556	185,30	96,52	88,74
return of the granted loans, sale of debt securities	0	4	-	0,00	0,01
other receipts	1	373	37200,00	0,01	1,08
2.2. Expenditure of a money, all	49712	654836	1217,26	100,00	100,00

on acquisition, creation, reconstruction, upgrade and preparation for use of non-current assets	49712	550904	1008,19	100,00	84,13
the debenture interests included in the cost of an investment asset	0	4769	-	0,00	0,73
other payments	0	99163	-	0,00	15,14
2.3. Balance of cash flows from investment transactions	-38616	-620404	-1506,60		
3. Cash flows from financial transaction					
3.1. Cash inflow, all	1257610	2303738	83,18	100,00	100,00
receipt of the credits and loans	1237351	2253568	82,13	98,39	97,82
other receipts	20259	50170	147,64	1,61	2,18
3.2. Expenditure of a money, all	1156731	1807840	56,29	100,00	100,00
settlement (redemption) of bills of exchange and other debt securities, return of the credits and loans	1156731	1807840	56,29	100,00	100,00
3.3. Balance of cash flows from financial transactions	100879	495898	391,58	-	-
Balance in cash and cash equivalents for the beginning of year	152847	11993	-92,15	-	-
Balance of cash flows in a year	-140821	69720	-149,51	-	-
Balance in cash and cash equivalents on the end of the year	12026	81713	579,47	-	-

By results of assessment cash receipt from current transactions of IE for the period was reduced 2015–2016 by 17,00%, expenditure of a money – for 26,55% that led to formation of an excessive cash flow (a difference between inflow and outflow) a money in 2016 against scarce in 2015. The greatest share in structure of cash flows from current transactions occupy products sales proceeds – 99,90% in 2015 and 84,51% in 2016 that quite corresponds to activities of production enterprise.

The cash inflow from investment transactions of IE increased by 210,31% mainly due to sale of non-current assets (property, plant and equipment), outflow of funds also increased, but is more considerable – for 1217,26% due to acquisition new and upgrades of the available fixed asset objects. At the same time cash deficit from investment transactions (balance of cash flows) grew in 2015–2016 very strongly.

The cash inflow from financial transactions grew by 83,18% due to receipt of the new credit, outflow of funds also grew – by 56,29% in connection with settlement of a principal debt according to credit liabilities. Nevertheless, the balance of cash flows from financial transactions in 2015–2016 remained positive, and positive dynamics – was planned for 391,58%.

Thus, decrease in sales volumes, and as a result became the main problem as a part of cash flows of IE, receipts from current transactions were reduced. IE in 2016 carried out upgrade of fixed assets therefore time spent for installation of the new equipment and upgrade of available led to idle time of the available park of the equipment, and with as a result, less products were made that reduced sales proceeds. We will carry out assessment of liquidity and efficiency of cash flows of IE according to table 2.18, using formulas (1.1)-(1.8), according to chapter 1 of this research (table 2.19).

Table 2.19

Assessment of liquidity and efficiency of cash flows of IE

Name of an indicator	Value, thousand rubles.	
	2015 .	2016 .
PCF from current transactions	3597384	2985771
PCF from investment transactions	11096	34432
PCF from financial transactions	1257610	2303738
NCF from current transactions	3800468	2791545
NCF from investment transaction	49712	654836
NCF from financial transactions	1156731	1807840
PuCF from current transactions	-203084	194226
PuC from investment transaction	-38616	-620404
PuCF from financial transactions	100879	495898
Cumulative PCF	4866090	5323941
Cumulative NCF	5006911	5254221

Cumulative PuCF	-140821	69720
Liquidity of CF from current transactions	0,947	1,070
Liquidity of CF from investment transactions	0,223	0,053
Liquidity of CF from financial transactions	1,087	1,274
Liquidity of cumulative CF	0,972	1,013
Liquidity of cumulative CF taking into account a balance in cash at the beginning of the period	1,002	1,016
Efficiency of CF from current transactions	-0,176	0,107
Efficiency of CF from investment transactions	-0,777	-0,947
Efficiency of cumulative CF	-0,028	0,013

Notes:

PCF – positive cash a flow (cash inflow);

NCF – a negative cash flow (cash outflow);

PuCF – a pure cash flow

CF – a cash flow.

By results of calculations in 2015 really there were problems with solvency level, insufficiently for settlement of the available liabilities arrived a money. So, the value of liquidity rate of a cumulative cash flow is less than unit (0,972) in case of a regulation 1,000. Therefore all calculations and payments were made at the expense of the available balances in cash for the beginning of 2015 that confirms calculation of liquidity rate of a cumulative cash flow taking into account balances in cash at the beginning of the period.

In 2016 the situation improves: the value of liquidity rate of a cumulative cash flow made 1,013, at the same time and there was enough money for the beginning of year, the value of liquidity rate taking into account balances in cash for the beginning of 2016 made 1,016.

Very low level of liquidity of cash flows from investment transactions – 0,223 in 2015 with decrease to 0,053 in 2016 that is connected with excess of a cash outflow over inflow.

Graphical results of assessment of liquidity of cash flows it is representable in the figure 2.17.

As for efficiency of cash flows, it is possible to see the situation similar to their liquidity: in 2015 deficit of means led to forming of inefficient cash flows, in 2016 the situation improves and flows only from investment transactions of the entity (figure 2.18) are inefficient. Nevertheless, the entity can't finance the current activities without the credits, the loans are attracted, so problems with solvency take place.

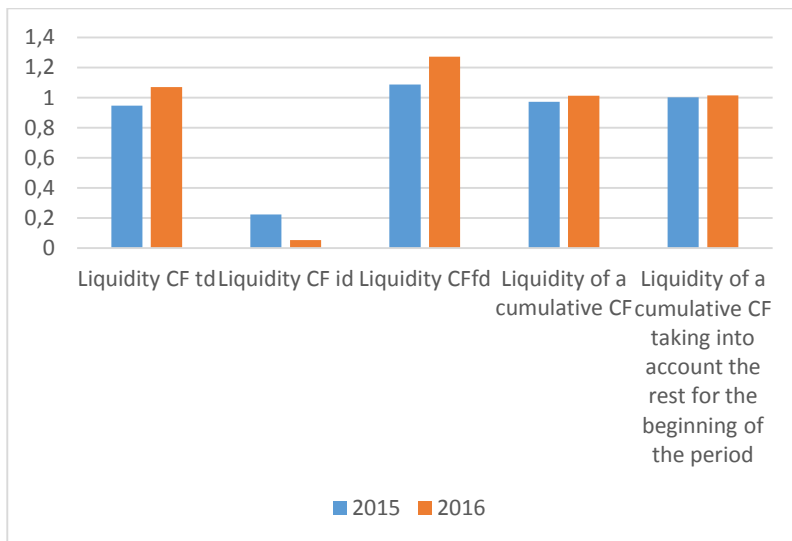


Figure 2.17. Assessment of liquidity of cash flows of IE

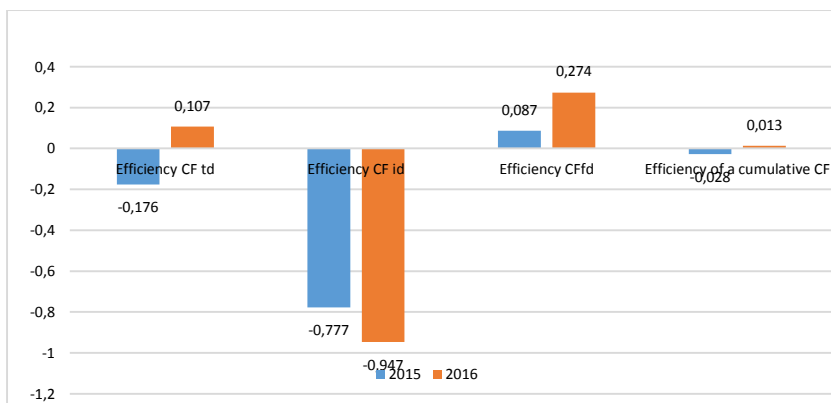


Figure 2.18. the Efficiency evaluation of cash flows of IE

Thus, in general by results of the carried-out calculations it is possible to draw a conclusion that IE has no opportunity to extinguish the short-term obligations at the moment and also after settlement by buyers of the debt. Only in the remote prospect the situation with solvency can positively change, speaking about results of calculation of coefficient of current liquidity. Evaluating liquidity showed the low level of absolute and intermediate liquidity,

it means that a money isn't enough for settlement of the most urgent liabilities for date of preparation of balance, as well as receivables after its settlement by buyers aren't enough for settlement of liabilities. Therefore development of actions is necessary for management of receivables and its turnover.

3 Enhancement of the economic safety in liquidity management of industrial enterprise

3.1 Development of the management concept liquidity of IE and decrease in risk of insolvency

In structure of assets of IE in 2016 the greatest share borrow a property, plant and equipment – 48,93%, other non-current assets – 18,09%, inventories – 17,92% and receivables – 6,44%. As for a property, plant and equipment, they can't be reduced as they serve as means of production and create conditions for production. And as for inventory cost and receivables, development of management decisions is necessary here.

Forming of large volumes of raw material stocks of materials, finished goods in stock brakes turnover. At the same time assessment of inventory turnover showed reduction of speed of their turnover from 81 days in 2014 up to 106 days in 2016. The share of inventories in structure of current assets of IE was reduced from 65,01% in 2014 to 58,45% in 2016. In structure of inventories the share of inventories of finished goods in stock – 48,13% in 2016 is high. Graphical it can be seen in the figure 3.1.

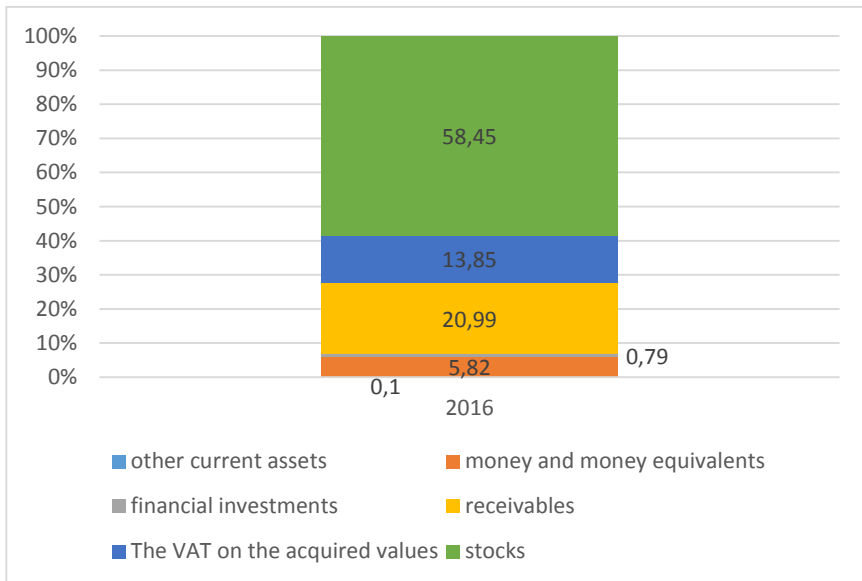


Figure 3.1. Structure of current assets of IE

Receivables share in structure of current assets of IE increased from 18,81% in 2014 to 32,46% in 2015 with lowering of a share to 20,99% in 2016. Nevertheless, and this share is considerable. In terms of money the amount of receivables was reduced from 332 221 thousand rubles in 2015 to 294 898 thousand rubles in 2016.

Big receivables also demonstrate its low turnover. At the same time accounts receivable turnover of IE was slowed down from 23 days in 2014 up to 46 days in 2016 (figure3.2).

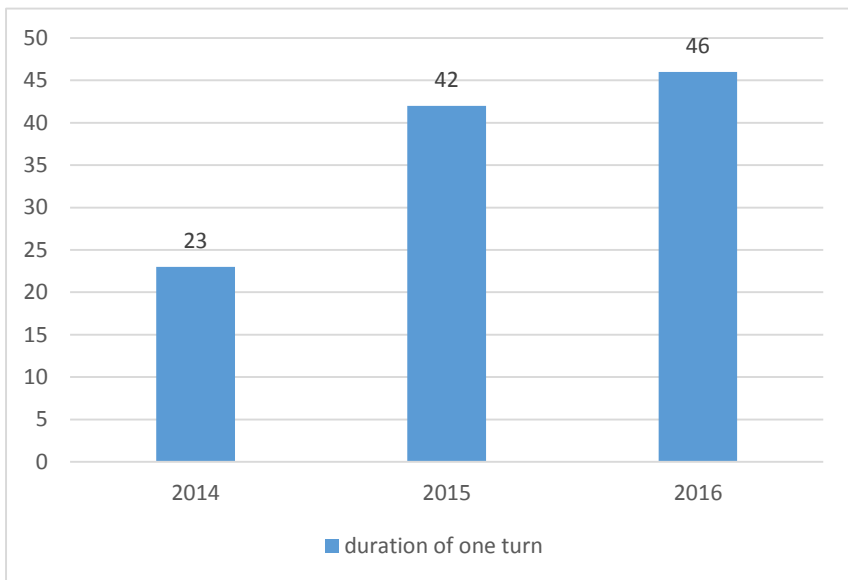


Figure 3.2 – Change of accounts receivable turnover IE in 2014–2016.

Evaluating liquidity and calculation of coefficient of absolute, intermediate and current liquidity showed deterioration in a situation from 2014 to 2016, in 2016 after crisis of 2015 the level of absolute and intermediate liquidity which fall short of standard value decreases, current liquidity is normal, but there is its negative dynamics.

It should be noted that in difference of coefficients of intermediate and current liquidity which have negative dynamics for all analyzed period of 2014–2016 (values decrease with 0,913 to 0,345 on coefficient of intermediate liquidity and with 2,687 to 1,077 on coefficient of current liquidity), the value of absolute liquidity index has negative dynamics in 2014–2015 with 0,399 to 0,017 and further positive growth to 0,083. Nevertheless, this growth isn't enough for "immediate" liquidity of the entity. Graphical change of liquidity rates it is representable in the figure3.3.

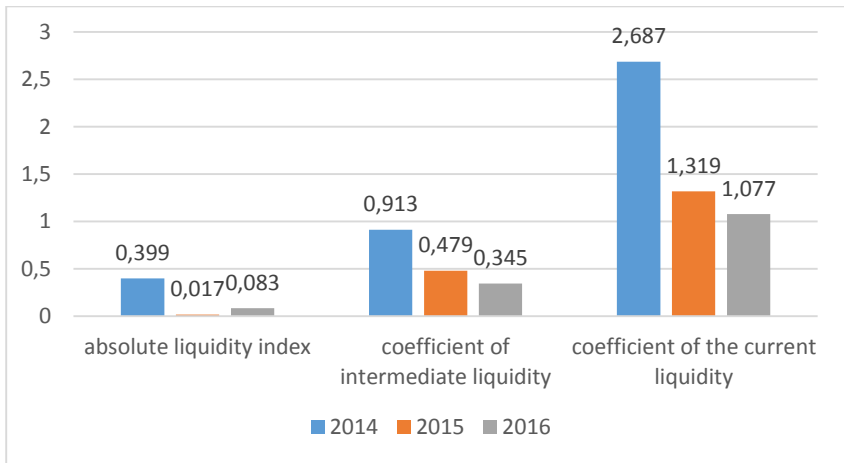


Figure 3.3. Liquidity rates of IE in 2014–2016.

Thus, in general by results of the carried-out calculations it is possible to draw a conclusion that IE has no opportunity to extinguish the short-term obligations at the moment and also after settlement by buyers of the debt. Only in the remote prospect the situation with solvency can positively change, speaking about results of calculation of coefficient of current liquidity.

Also in structure of inventories of IE the share of finished goods in stock is high. These are liquid products, its implementation is possible in a short time. In the figure 3.4 we will provide structure of inventories of IE.

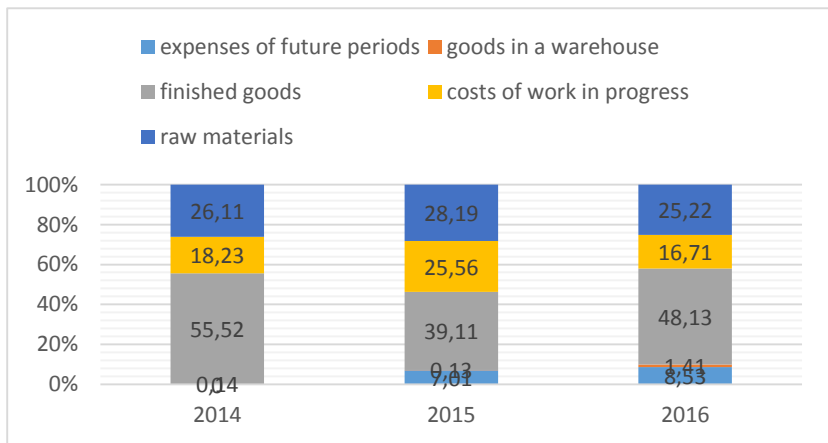


Figure 3.4. Structure of inventories of IE in 2014–2016.

The management concept liquidity of IE shall provide not only the dynamic growth of its absolutely quick assets, increase in speed of transformation of elements of current assets into a money, but also timeliness of settlement of liabilities and decrease in a share of borrowed funds in a general balance sheet layout.

So, in the figure 3.5 it is representable basic provisions of the Management concept liquidity of IE.

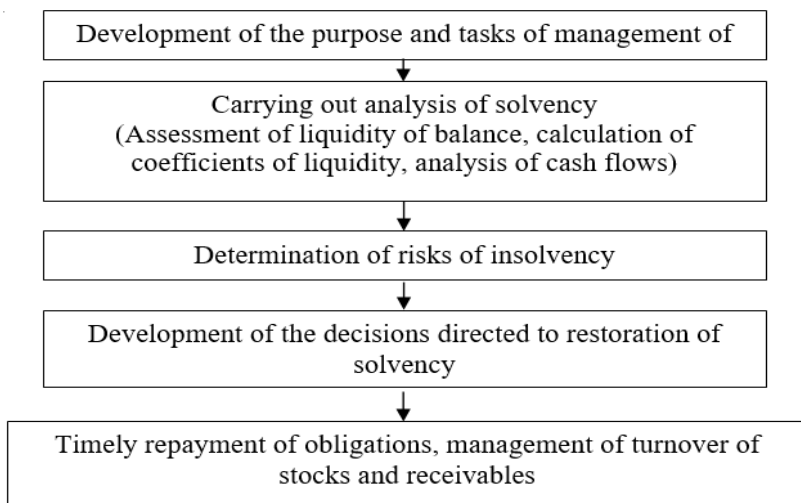


Figure 3.5. Management concept liquidity of production enterprise

The concept shall contain the description of those means which will be used for implementation of process of management of liquidity of production enterprise. For this purpose use of three types of means is obviously possible:

1) organizational is a change of the existing management structure by the entity regarding financial management (creation of the new centers of responsibility – service, department, or responsible persons in division), establishing such communications with partners who will promote risk minimization of reduction of the liquidity of IE;

2) pedagogical is an improvement of quality of personnel capacity of the entity due to advanced training and occupational retraining in the sphere of financial management;

3) economic is a resource allocation between divisions which happens in case of execution of budgets of divisions and budgets of projects implementation.

So, we will develop the management concept liquidity of production enterprise. For this purpose we will provide:

- 1) system of the principles of liquidity management of the entity;
- 2) we will formulate methodical acceptances of financial management which are a basis of developed model of the analysis and a risk assessment of insolvency of the entity, key indicators, an algorithm of application of this model;
- 3) we will determine the criteria and indicators characterizing down-side risks of solvency of the entity.

The basic principles of the Management concept liquidity of production enterprise is the following:

1. The principle of effective management of structure of current assets which assumes forming optimum, from the point of view of liquidity, the share of each element of current assets which isn't leading to braking of their turnover. Check of balance of the entity on liquidity, calculation of liquidity rates and turnover rates of current assets will allow to determine efficiency of implementation of this principle by elements;

2. The principle of efficiency of use of financial resources of the entity which assumes achievement of standard level of liquidity and efficiency of cash flows of the entity. The efficiency of implementation of this principle will allow to reveal the analysis of dynamics and structure of cash flows on transaction types (current, investment and financial) and also assessment of liquidity and efficiency of cash flows;

3. The principle of recovery of solvency which assumes in short terms of a possibility of the entity to increase the level of the solvency in case of not achievement of standard values of liquidity rates, the low level of liquidity of cash flows from current transactions, but with the outlined tendency of growth of these indicators in dynamics of a number of the analyzed periods;

4. The principle of effective management of borrowed funds which assumes decrease in a debt load of the entity, creation of flexible hours of settlement of liabilities, management of an accounts payable;

5. The principle of effective use of a manpower which assumes high performance of work and timely salary payment, encouragement, awards for good results of a labor activity.

We will provide the purposes of creation of the Management concept liquidity of production enterprise:

- 1) economic targets – are directed to increase in turnover of a money, receivables, inventories, an accounts payable;
- 2) financial – are directed to decrease in a debt load of the entity;

3) organizational – are directed to enhancement of financial management by the entity;

4) social – are directed to enhancement of personnel policy in case of high performance of work and timeliness of production.

Interaction of the purposes and the principles the liquidity of production enterprise offered by the author to the Management concept it is representable in the figure 3.6

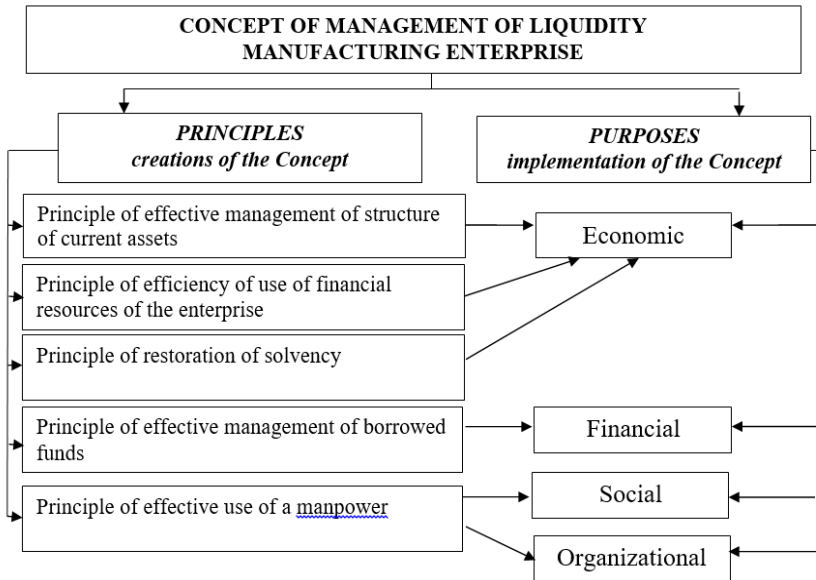


Figure 3.6. Management concept liquidity of Industrial Enterprise

Implementation of the Concept will be carried out in the following directions:

1) organizational support (improvement of organizational structure, change of personnel policy of the company, appointment of responsible persons for each analysis stage and estimates of risk of insolvency);

2) effective use of stocks (including their competent rationing);

3) increase in turnover of receivables, work with debtors, development of terms of payment of the made production, sale of receivables on the terms of factoring.

Adoption of the Concept is intended to achieve the following results:

1) timely analysis of solvency of the enterprise and identification of threats of risks of her decrease;

2) development of the administrative decisions directed to restoration of solvency or its increase at achievement of the established standards of liquidity and also increase in turnover of assets and financial results of activity on this basis.

By results of the carried-out analysis of solvency of IE presented in work earlier at identification of problem zones, we will define the main actions for restructuring of balance of IE and increase in its liquidity:

1) reduction of stocks regarding finished goods in a warehouse;

2) sale of receivables on the terms of factoring and increase in turnover of receivables on this basis.

Economic justification of these actions for increase in liquidity of IE it is representable in work further.

3.2 Assessment of economic efficiency of the offered recommendations

We will define economic efficiency of two offered actions which have to have a positive impact at the level of liquidity of IE:

1) sale of finished goods in a warehouse. The cost of finished goods was 395 151 thousand rubles for the end of 2016. It should be noted that in the main IE on the released equipment about 100% to an advance payment work, the exception is made by spare parts which usually at the order are paid for 50%. Therefore we will assume that the finished goods in a warehouse after her sale will be reduced by 50%;

2) application of factoring for repayment of receivables and change of circulation periods of receivables. At the same time the analysis of the market of factoring in Chelyabinsk has shown that more convenient for IE will be the request for factoring in PJSC Promsvyazbank with which this enterprise works not one year, is served and takes the credits.

So, on the first action the sum of finished goods to realization will be 197 576 thousand rubles. This sum will reduce the cost of stocks, will increase the level of the current liquidity and will increase the sum of money, will increase the level of absolute liquidity in respect of 2018. Calculations of change of level of liquidity of IE after reduction of stocks and increase in liquidity it is representable in table 3.1.

Table 3.1

Assessment of change of liquidity of IE after reduction of stocks

Name of an indicator	measure value			Economic effect
	31.12.2016	change within the action 1	in respect of 2018	
1. Money, one thousand rub.	81713	+197576	279289	+197576
2. Short-term financial investments, thousand rubles.	11035	-	11035	-
3. Receivables	294898	-	294898	-
4. Stocks, including:	821090	-197576	623514	-197576
finished goods in a warehouse	395151	-197576	197575	-197576
5. Short-term liabilities, thousand rubles.	1122175	-	1122175	-
absolute liquidity index $(.1+.2)/n$.	0,083	-	0,259	0,176
Coefficient of intermediate liquidity $(n.1+.2+.3)/.5$	0,345	-	0,522	0,176
Coefficient of the current liquidity $(1+.2+.3)/.5$	1,077	-	1,077	0,000

It turns out that at reduction of finished goods in a warehouse IE will receive inflow of money in the sum of 197 576 thousand rubles. Due to this inflow security with money will increase and it will result in result of absolute liquidity index in respect of 2017 within the established standard 0,2–0,25 (the figure 3.7).

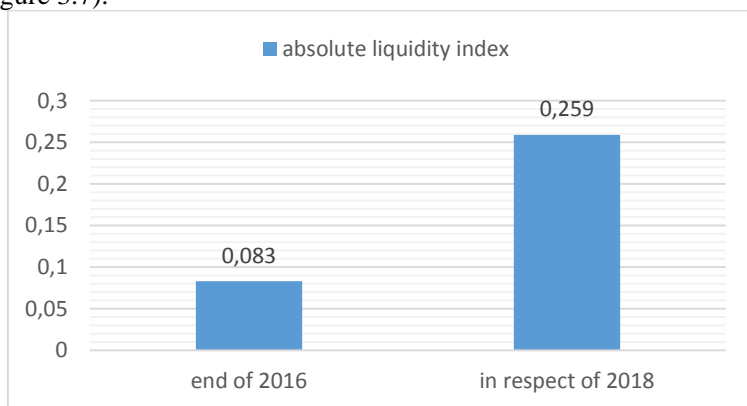


Figure 3.7. Change of absolute liquidity of IE in respect of 2018

If the level of absolute liquidity reaches the standard from 0,2 in respect of 2018, then on intermediate liquidity the standard (0,7–1,0) isn't carried out even in respect of 2018 (figure 3.8).

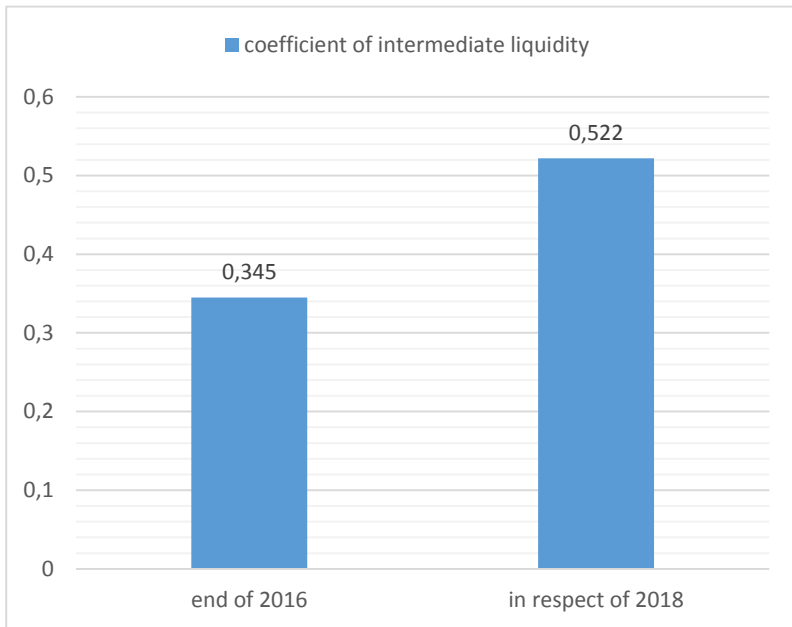


Figure 3.8. Change of intermediate liquidity of IE in respect of 2018

Therefore for increase in level of intermediate liquidity it is necessary to use factoring of PJSC Promsvyazbank, reduction of receivables will lead to increase in security money and reduction of short-term obligations on this basis.

We will carry out assessment of application of factoring in activity of IE and sale to the factoring company of 70% of all sum of receivables (as such percent of debt of buyers has the repayment period, real to collecting, within 55 days from the date of shipment). As the faktorigovy company PJSC Promsvyazbank in which IE is served, besides, in this bank it has been chosen the credit has been taken. Upon purchase of receivables this company repays 100% of the sum of debts of buyers at once. The commission on factoring service of this company makes 9,5% of the amount of transaction. In table 3.2 it is representable economic justification of this action.

Assessment of efficiency of application of factoring in management of liquidity of IE

Name of an indicator	31.12.2016	Change within the action 2	in respect of 2018	Economic effect
1. Receivables are the general, thousand rubles.	294898	-206429	88469	-206429
2. Sale of receivables of the factoring company PJSC Promsvyazbank, thousand rubles (item 1 x 0,7)	-	+206429	206429	+206429
3. Money (the item 2 minus the commission of 9,5% of the sum of receivables sold in factoring), thousand rubles.	-	+186818	186818	+186818
4. Short-term liabilities	1122175	-	1122175	-
Revenue, thousand rubles.	2430094	-	2430094	-
Turnover of receivables, in turns	8,24	+19,23	27,47	+19,23
in days	46	-33	13	-33

Thus, sale on factoring of PJSC Promsvyazbank of 70% of receivables of IE in case of the commission of 9,5% of the amount of the sold receivables will allow to increase accounts receivable turnover of the entity from 46 days in 2016 up to 13 days in respect of 2018.

Graphical change of duration of one turnover of receivables of IE it is representable in the figure 3.9

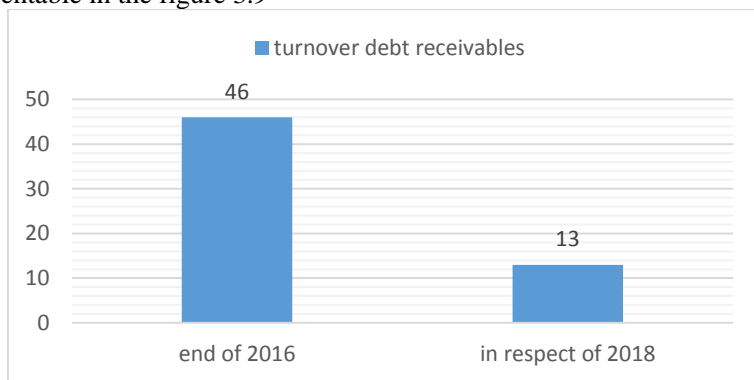


Figure 3.9. Change of accounts receivable turnover the entities after factoring application

Thus, evaluating cost efficiency of the offered actions showed improvement of level of absolute liquidity and accounts receivable turnover of production enterprise IE.

Conclusion

By results of a research it is possible to draw conclusions on achievement of his purpose and tasks, namely:

1. Approaches of different authors to bases of the analysis and assessment of risk of insolvency of the enterprise are opened.

The solvency of the enterprise is his financial opportunity in a certain time and in full to meet payment requirements of suppliers of the equipment and materials according to contractual obligations, to repay the bank loans, to pay the salary to personnel, to make obligatory payments in the budget and off-budget funds. Thus, insolvency is a failure to follow the obligations given above. The causes of risk of insolvency or financial insolvency can be divided into three groups:

1) lack of desire to fulfill the current obligations;

2) lack of money or liquid assets by means of which these obligations can be repaid;

3) misuse of working capital (formation of large sums of receivables that increases risks of her transition to arrears, overestimate of usual need for stocks and formation of reserves of stale raw materials in a warehouse, etc.);

The analysis and assessment of business risks, including studying of risk of insolvency, are considered in works of many scientists. Despite the growing attention of researchers to assessment of risk of insolvency of the enterprises, the complete technique of his analysis has been presented only by D.S. Kudryavtsev, but also that only on the example of subjects of small business and from a position of assessment of solvency of contractors, but not the enterprise.

The author of this research has drawn a conclusion that it is expedient to supplement assessment of solvency with the analysis of cash flows which will present a real picture concerning the sums of the arrived and spent money, will allow to reveal risks of insufficiency of money to a certain date and to develop the schedule of receipts and payments for the purpose of management of cash flows.

2. Need of development of model of the analysis and assessment of risk of insolvency of the enterprise, an algorithm of its application is proved.

The analysis of theoretical approaches of different authors submitted in work earlier has allowed to formulate own position of the author concerning a technique of the analysis and assessment of risks of insolvency and to develop model of this direction of the financial analysis in relation to manufacturing enterprise. The offered model includes carrying out the following directions of the analysis and assessment:

1) assessment of liquidity of balance and calculation of coefficients of liquidity;

2) assessment of turnover of current assets;

3) assessment of liquidity and efficiency of cash flows;

4) assessment of loss (restoration) of solvency;

5) The SWOT analysis revealing risks of reduction of the liquidity of the enterprise.

3. Approbation of an advanced technique of the analysis and assessment of risk of insolvency of the enterprise on the example of IE is carried out

Approbation of this model of the analysis on the example of manufacturing enterprise IE has allowed to draw a conclusion concerning risks of decrease in solvency. So, by results of assessment of IE has no opportunity to repay the short-term obligations at the moment and also after repayment with buyers of the debt. Only in the remote prospect the situation with solvency can positively change, speaking about results of calculation of coefficient of the current liquidity. Evaluating liquidity has shown the low level of absolute and intermediate liquidity, it means that money isn't enough for repayment of the most urgent obligations for date of preparation of balance, as well as receivables after her repayment with buyers aren't enough for repayment of obligations. Therefore the concept of management of liquidity has been developed for IE.

4. The concept of management of liquidity of IE is developed for decrease in risk of insolvency, an assessment of economic efficiency of the offered recommendations is given.

Adoption of this Concept is intended to achieve the following results:

1) timely analysis of solvency of the enterprise and identification of threats of risks of her decrease;

2) development of the administrative decisions directed to restoration of solvency or its increase at achievement of the established standards of liquidity and also increase in turnover of assets and financial results of activity on this basis.

Evaluating a financial condition of IE according to the reporting for 2014–2016 has shown the following:

1) security with both the non-current, and current assets necessary for production activity of the enterprise increases;

2) obligations (the credits, accounts payable) became the main source of financing of assets, the specific weight of equity during 2014–2016 was almost twice lost that negatively affects financial stability of IE;

3) the situation with absolute and intermediate liquidity is extremely hard, only in the remote prospect of IE will be able to repay the short-term obligations (at the same time also the fact that the balance made on the end of

the year quite can not include the big remains of money on accounts of the enterprise is considered).

The main problems in activity of IE to which it would be necessary to direct administrative influence, have determined the following: a high share of stocks (in particular, finished goods in a warehouse) and receivables in structure of assets of IE and the low level of absolute and intermediate liquidity. The solution of these problems within the concept of management of liquidity has been proposed in two ways:

1) reduction of volume of stocks regarding sale of 50% of the remains of finished goods in a warehouse (at the same time 50% of finished goods in the program of production are put with payment in advance payment of 50%);

2) application of factoring for repayment of short-term receivables and change of circulation periods of receivables.

Reduction of a part of the remains of finished goods in a warehouse will change structure of assets of manufacturing enterprise IE will increase security with money, level of absolute liquidity of IE and liquidity of his balance.

Sale of receivables in factoring of PJSC Promsvyazbank of 70% of the sum of the available receivables of IE at the commission of 9,5% will allow to increase turnover of receivables of the enterprise from 46 days to 13 days in respect of 2017.

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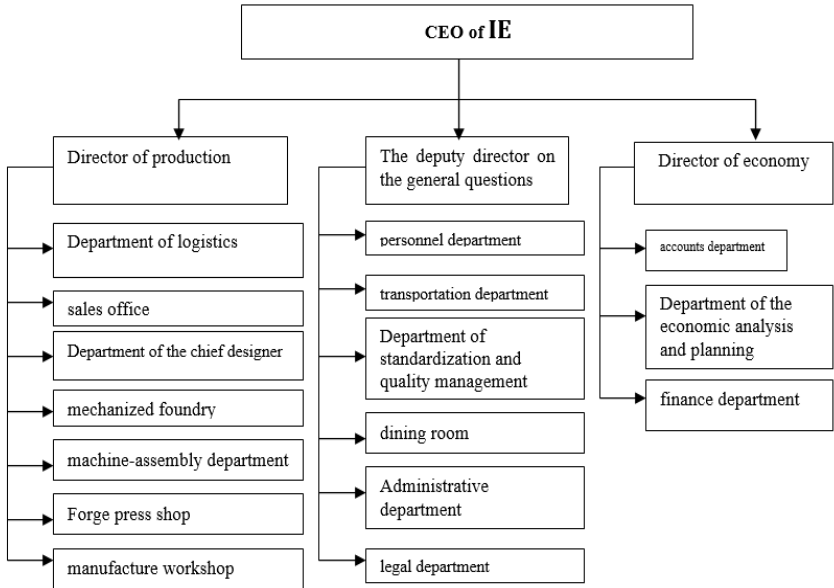
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Applications

Application A. Organizational structure of IE



Application B. The balance sheet of IE for 2014–2016

In a _____ year 20 16

	Form on OKUD
Date (number, month, year)	0710002
Organization _____ IE Kopeisk Engineering Plant	onOKPO
Taxpayer identification number _____	TIN _____
Type of economic activities _____ Production of machines and equipment for mining and construction	on RCEAP
Legal form/form of ownership _____	_____
Unit of measure: thousand rubles (million rubles)	on OKEI
Location (address) 458600, Kopeysk, Lenin St., 24.	384 (385)

Explanations ¹	Name of an indicator ²	December 31 20 16	December 31 20 20 16	December 31 20 20
	ASSET			
	I. NON-CURRENT ASSETS			
	Intangible assets			9
	Results of research and development			
	Intangible search assets			
	Material search assets			
	Fixed assets	2241260	2010000	1873200
	Profitable investments in material values			
	Financial investments	30298	30308	34576
	Deferred tax assets			
	Other non-current assets	828886	118377	47346
	Total according to the section I	3176174	2186890	1955131
	II. CURRENT ASSETS			
	Stocks	821090	604606	679317
	Value added tax on the acquired values	194539	74509	45
	Receivables	294898	332221	196564
	Financial investments (except for money equivalents)	11035	0	0
	Money and money equivalents	81713	12026	152847
	Other current assets	1437	0	16148
	Total according to the section II	1404712	1023362	1044921
	BALANCE	4580886	3210252	3000052

Termination of the Application B

Explanations ¹	Name of an indicator ²	<u>December 31</u>	December 31	December 31
		<u>20 16</u>	<u>20 15</u>	<u>20 14</u>
	PASSIVE			
	III. CAPITAL AND RESERVES⁶			
	Authorized capital (pooled capital, authorized capital, deposits of companions)	164	164	164
	Own shares redeemed from shareholders	()	()	()
	Revaluation of non-current assets	227298	193813	272100
	The additional capital (without revaluation)			
	Reserve capital	575	575	575
	Retained earnings (uncovered loss)	1763880	1795908	1788776
	Total according to the section III	1991917	1990460	2061615
	IV. LONG-TERMLIABILITIES			
	Borrowed funds	185834		213782
	Deferred tax liabilities	57387	2522	
	Estimated obligations			
	Other obligations	1223573	497960	341759
	Total according to the section IV	1466794	500482	555541
	V. SHORT-TERMLIABILITIES			
	Borrowed funds		294402	556424
	Accounts payable	382697	424732	501124
	Income of future periods	199	176	50124
	Estimated obligations			1461
	Other obligations			13042
	Total according to the section V	382896	719310	1122175
	BALANCE	3000052	3210252	4580886

Application C. The report on financial results of IE for 2014–2016

In a	<u> year </u> 20 <u> 15 </u>		Коды
		Form on OKUD	0710002
		Date (number, month, year)	
Organization	IE Kopeisk Engineering Plant	onOKPO	
Taxpayer identification number		TIN	
Type of economic activities	Production of machines and equipment for mining and construction	on RCEAP	
Legal form/form of ownership			
Unit of measure: thousand rubles (million rubles)		on OKEI	384 (385)

Explanations	Name of an indicator	In a <u> year </u>	
		20 <u> 15 </u>	20 <u> 14 </u> r.
Revenue		2251306	3036730
Cost of sales		(1750899)	(2196154)
Gross profit (loss)		500407	840576
Business expenses		(24437)	(34290)
Management expenses		(525748)	(571684)
Profit (loss) from sales		(49778)	234602
Income from participation in other organizations		10362	
Interest receivable		348	3156
Percent to payment		(21560)	(29678)
Other incomes		31011	51048
Other expenses		(74326)	(93462)
Profit (loss) before the taxation		(103943)	165666
Current tax on profit		()	(24186)
including fixed tax liabilities (assets)			
Change of deferred tax liabilities		(2522)	
Change of deferred tax assets		28205	
Other		6980	
Net profit (loss)		(71280)	141480

Termination of the Application C Report on financial results

In a	<u> year </u> 20 <u> 16 </u>		Коды
		Form on OKUD	0710002
		Date (number, month, year)	
Organization	IEKopeisk Engineering Plant	onOKPO	
Taxpayer identification number		TIN	
Type of economic activities	Production of machines and equipment for mining and construction	on RCEAP	
Legal form/form of ownership			
Unit of measure: thousand rubles (million rubles)		on OKEI	384 (385)

Explanations	Name of an indicator	In a	year	In a	year
		20	<u> 16 </u>	20	<u> 15 </u>	r.
	Revenue		2430094		2251306
	Cost of sales	(	1809711	)	( 1750899)
	Gross profit (loss)		620383		500407
	Business expenses	(	44151	)	( 24437)
	Management expenses	(	523427	)	( 525748)
	Profit (loss) from sales		52805		(49778)
	Income from participation in other organizations		30556		10362
	Interest receivable		119		348
	Percent to payment	(	38986	)	( 21560)
	Other incomes		49308		31011
	Other expenses	(	85106	)	( 74326)
	Profit (loss) before the taxation		8696		(103943)
	Current tax on profit	()	()
	including fixed tax liabilities (assets)				
	Change of deferred tax liabilities	(	54865	)	( 2522)
	Change of deferred tax assets		47525		28205
	Other				6980
	Net profit (loss)		1356		(71280)

Yu.V. Lysenko, A.A. Yakushev

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OF INSOLVENCY OF MACHINE-BUILDING ENTERPRISE**

Монография

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