Decision making system for industrial companies

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Abstract. In a competitive business, successful transactions play a significant role of industrial enterprises’ management. The decision support system that is offered by the author provides using the diagnosis of supplier, which is based on the financial statements by calculating financial ratios and assessing the dynamics of changes values of ratios and indicators of financial statements.

1.Introduction
Decision support is an important problem in science and technology. This is especially true for industrial enterprises in which the following the conditions of the contract is an essential condition for the health economic.

The decision support system provides using diagnosis of supplier, which is based on the provided financial statements by calculating financial ratios and assessing the dynamics of changes values of ratios and indicators of reporting items (Figure 1).

Figure 1. Scheme of Decision Support process

2.Results and Discussion
Diagnostics is based on the following documents (data): Accounting documents for the 3 (three) last reporting years and for the last reporting period, drawn up in accordance with paragraph 3 of Art. 14;
Section 1. Art. 30 of the Federal Law of 06.12.2011 № 402 “O buhgaltscom ychete”, p. 48 PBU 4/99: Balance Sheet; Profit and Losses Statement; Cash Flow Statement [1]

Diagnostics may be supplemented by information from the following sources:

- The current structure of shareholders (owners), indicating their names;
- The list (name) of the main service provider of banks.
- Availability of insurance policies (indicating the type of insurance, the term of the policy and the liability limit of the insurance company).
- Distribution of total revenue by types of products (works, services) and by geography of sales.
- Information is describing what proportion of sales is own-produced products and what proportion of the company's total sales is made by products produced by subcontractors. Consolidated revenue by group (if the company is in a group of related companies).
- Interpretation of receivables and (or) accounts payable with a share of details up to 10%.
- Interpretation of fixed assets’ structure [2].

Table 1 is based on the above documents (data), (in the appropriate units of measurement):

| Parameters of planning deal | value |
|-----------------------------|-------|
| Contract price, thousand roubles. |       |
| Term of agreement, years |       |

**Common parameters**

- The lifetime of the Counterparty, years
- Share of the Russian Federation and organizations affiliated with the Russian Federation in the authorized capital, %

**Indicators of financial and economic activity**

| Balance Sheet (form №1) | code term of balance sheet | value |
|--------------------------|----------------------------|-------|
| Financial investments, thousand rubles | 1170 |       |
| Total section I, thousand rubles | 1100 |       |
| Financial investments (with the exception of cash equivalents), thousand rubles | 1240 |       |
| Cash and cash equivalents, thousand rubles | 1250 |       |
| Total section II, thousand rubles | 1200 |       |
| Total section III, thousand rubles | 1300 |       |
| Total section IV, thousand rubles | 1400 |       |
| Revenues of future periods, thousand rubles | 1530 |       |
| Estimated liabilities, RUB thousand | 1540 |       |
| Total section V, thousand rubles | 1500 |       |
| Balance, thousand rubles | 1600 |       |

**Report on financial results (form №2)**

| code term of balance sheet | value |
|---------------------------|-------|
| Revenue, thousand rubles Profit (loss) from sales, thousand rubles | 2110 |       |
| Revenue, thousand rubles Profit (loss) from sales, thousand rubles | 2200 |       |

Financial condition of the Counterparty are calculated on the contract information and reporting data, the coefficients characterizing. The ratio of the transaction volume and the net assets of the Counterparty [3]. Calculated with the data of the draft contract and financial statements (form No. 1) according to the formula: K1= Contract price/ (code 1600- (code1400+code1500-code1530))

The profitability ratio of the supplier’s financial and business activities (the ratio of profit to revenue). Calculated on the basis of Balance Sheet (form No. 2) according to the formula: K2= code 2200/code2110

Leverage ratio of the supplier (the ratio of balance to capital). Calculated on the basis of accounting data (form No. 1) according to the formula:
K3 = (code 1400 + code 1500)/code1600
The absolute liquidity ratio (the ratio of cash and short-term financial investments to short-term liabilities). Calculated on the basis of Balance Sheet (form No. 1) according to the formula: K4=( code 1240 + code 1250)/(code 1500 - code 1530 - code 1540)
Determining the total credit risk of the company. Each indicator, depending on its value, is assigned a score from 1 to 5 according to Table 2.

**Table 2. Scoring indicators.**

| Score | Score corresponding to score |
|---|---|
| General indicators | |
| The term of the transaction, years | 5 years 3 - 5 years 2 - 3 years 1 year 2 < 1 year |
| Time of existence, years | 1 year 1 - 5 years 5 - 10 years 10 years 20 > 20 years |
| Share of the Russian Federation and organizations affiliated with the Russian Federation in the authorized capital, % | < 2% 2% - 25% 25% - 50% 50% - 100% |

**Indicators of financial and economic activity**

| Evaluation parameters | Weight indicator | Value of the indicator | Score | Total score |
|---|---|---|---|---|
| Term of agreement, years | 10% | | | |
| General indicators | 20% | | | |
| The lifetime of the Counterparty, years | 10% | | | |
| Share of the Russian Federation and organizations affiliated with the RF in the authorized capital of the counterparty, % | 10% | | | |
| Indicators of financial and economic activity | 70% | | | |
| The ratio of transaction volume and net assets, % | 17.5% | | | |
| Profitability of financial and economic activity, % | 17.5% | | | |
| Leverage ratio, % | 17.5% | | | |
| Absolute liquidity ratio, % | 17.5% | | | |
| Total risk | 100% | | | |

The actual value of each indicator, as well as its corresponding score, are recorded in the columns of Table 3 “Indicator Value”, “Indicator Score”, respectively.
In the column "Final Score" of table 3 indicates the point value of the indicator based on its weight, determined by the formula:

Total score of the indicator = Weight of the indicator * Score of the indicator

The final risk score is calculated by summing the calculated in accordance with the final points of each indicator: Total risk indicator = \( \sum \) Weight of indicator * Score of indicator

The final indicator is indicated in the lower right field of Table 2.

Characteristics of the Counterparty’s credit risk. The total risk index has limits from 1 to 5, which corresponds to the probability of realization of credit risk from low to very high.

The decision support system proposed by the author helps to minimize the following types of risks of industrial enterprises in the process of interaction with suppliers:

- losses associated with the counterparty’s failure to fulfill contractual obligations. The risk of default by banks.
- non-fulfillment of obligations by counterparties when providing organizations of the Group of financing non-performance by counterparties of their obligations under contracts (other than financial contracts) involving the occurrence of receivables. failure to fulfill obligations by suppliers (performers) / buyers (customers) of products (works, services)[4].

The expediency of provision and the amount of advance payment security is determined on the basis of various options proposed by the decision support system. Solutions are proposed on the basis of an assessment of the financial condition of the counterparty and the risk of non-performance of obligations by the counterparty under contracts entered into on a non-competitive basis. It also determines the volume (total value) of goods, works, services sold by the organization on terms with a deferred payment [5].

The information that is necessary to conduct a risk assessment (financial (accounting) reporting, other documents and materials) are submitted to the Responsible Division by the structural units that initiate the conclusion of the relevant contract. The Responsible Division make a decision about the expediency of the provision and the amount of the collateral for the advance payment of the contract and permissible forms of payment. It is determined on the basis of the final indicator (Table 4)

| Total risk | The bank guarantee, % of the advance | Acceptable form of payment / security |
|------------|--------------------------------------|-------------------------------------|
| 1 <= indicator < 1.5 | Low <25% | Without security, or a pledge, or a guarantee of an organization with a “Low” assessment of the probability of credit risk, or a bank guarantee of at least 25% of the amount of the delivery on credit |
| 1.5 <= indicator < 2 | >25% | A pledge or guarantee of an organization with a “Low” assessment of the probability of the realization of credit risk or a bank guarantee in the amount of at least 50% of the amount of the delivery on credit |
| 2 <= indicator < 2.5 | Middl e >50% | Bank guarantee for 100% of the amount of delivery on credit |
| 2.5 <= indicator < 3 | High 100% | Prepayment or bank guarantee for 100% of the amount of delivery on credit |
| 3 <= indicator < 5 | Very high | Acceptable form of payment / security |

3. Conclusions
In this way, based on the support system, the company decides whether or not to provide collateral for the advance / deferred payment under the contract and the form and amount of the security (if it is reasonable to provide collateral) and forms the terms of the contracts in terms of advance / installment
payments, the amount of security of receivables. This article is concerning the problem in choosing the most stable business partner. Taking into the consideration the specific function of industrial enterprises some terms of the contract may lead to the failure of all process. The decision support system offered by the author is economically justified.

References
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