PROBLEMATIC DIAGNOSIS OF ECONOMIC DEVELOPMENT OF TEXTILE ENTERPRISES

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Abstract. The global financial crisis has shown that the old economic models for diagnosing the economic development of enterprises do not work with the necessary efficiency. Today, they have lost their relevance due to changes in economic systems and economic relations between them. Therefore, the problem of developing such models, methods and forms of assessing economic development, which would best meet the requirements of today, is acute. The paper considers the problematic diagnosis of economic development of textile enterprises. Since economic development is a system-driven development, the basis of its manageability is a systematic approach, and modern information technology, which allows quickly modeling of different options for development, it is proposed to apply the "Cybernetic concept of management in the space of boundaryresources and states of the object of development" (CURSOR+) to the problematic diagnosis of the development of textile enterprises. As a result, an integrated model of system-situational development and a balanced scorecard (BSC) is proposed. The causal relationships that exist between all four indicators of the BSC are a reflection of the business strategy adopted by the enterprise. Such correlations are assessed using a correlation coefficient. To obtain a single diagnostic indicator of development, it is proposed to carry out the procedure of convolution of all correlation coefficients. The analysis of necessary and sufficient conditions for the existence of the extremum of the development indicator as a function of many variables allowed determining the differential levels of economic development of textile enterprises.

Keywords. problematic diagnosis of economic development, textile enterprises.

Introduction
One of the components of economic development of textile enterprises is the development of cluster entrepreneurship in light industry. It is a strong chain that illuminates the continuous connection between integral segments: science - business - cluster. As Gryshchenko I.M. (2020) notes: "Cooperation between science, business and government are extremely important components of socio-economic development of Ukraine. This combination provides the basis for development on an innovative basis, taking into account the needs of the country".

Light industry is one of the strategic segments of Ukraine's national economy, providing almost 5% of budget revenues and 2.6% of Ukrainian merchandise exports before the pandemic. There are more than 2.5 thousand companies in the industry, which employs about 250 thousand workers. More than 40% of the products are exported, most - to EU countries (Germany, Denmark, Poland) (2020).
The most developed branches of light industry in Ukraine are the production of clothing and fabrics. The structure of sold products of light industry of Ukraine is 38.3% of the textile industry, 36.3% of clothing and 25.3% of leather and footwear (2022).

The positive dynamics in textile production is due to an increase in production of other textiles (blankets, bedding and kitchen linen, etc.) 105% compared to last year. On the contrary, weaving production decreased by about 20.5% compared to last year (2022).

Clothing production decreased by 6.7%, including textile clothing production decreased by 7.9% compared to last year.

The negative trends of sectoral development in 2019-2020 led to a decrease from 1% to 0.8% of the share of light industry in total industrial production.

The development of Ukrainian light industry is constrained by unequal conditions of competition in the domestic market, instability of tax legislation, outdated mechanism of product safety control, as well as high dependence on imported raw materials and components; low price competitiveness of products.

In the management of textile enterprises, which operate, as a rule, on toll schemes, there are problems to prevent bankruptcy and ensure the stability of development.

![Figure 1 Industrial production index in Ukraine for 2013-2020,%](image)

The wide arsenal of various methods and models of managing the economic development of enterprises is based on the establishment of the most important causal links between traditional economic indicators of costs and results. Today, the efficiency of the enterprise is increasingly influenced by intangible assets, especially the knowledge and experience of employees, relationships with customers and partners, the use of advanced technologies.

**Literature review**

Philosophical sciences interpret development as a process of natural change, transition from one state to another, more perfect; transition from the old qualitative state to the new one, from simple to complex, from lower to higher (2004).

In addition, from a philosophical point of view, development are directed, irreversible qualitative changes in the system.

According to R. Ackoff (1991), development means increasing abilities and competencies.
S. Mocherny (2002) defines economic development as irreversible, natural changes in the technological mode of production (production method based on technical and economic combination of material and personal factors of production, the complex of technical and technological relations between material elements of productive forces in the system of technical and economic relations).

N. Afanasyev, V. Rogozhyn, V. Rudyka (2003) consider the concept of "enterprise development" as an objective change only in the qualitative characteristics of the system, caused by the fundamental laws of nature (unity and struggle of opposites, transition from quantity to quality, development of society in an upward spiral), and the laws of functioning of specific systems (aging equipment, accumulation of experience and knowledge by employees, depletion of natural resources) when new properties of the system are formed.

V. Dovbenko (2003) notes that development should be considered the process of changing the state of the object by upgrading (improving) its characteristics and qualitative, quantitative increase in parameters.

A. Dakus and N. Simchenko (2012) define the economic development of the enterprise as irreversible, manageable, measurable, purposeful, natural quantitative-qualitative and substantive changes in the economic system in the long run, influenced by economic contradictions, needs and interests, which are characterized by the basic laws of dialectics that do not go beyond the boundaries of the deep inner essence of such a system, to ensure its most optimal and efficient functioning of the enterprise in the environment it operates.

A. Dakus and N. Simchenko (2012) believe that economic development is an economic process, the elements of which are: 1) economic growth, which is carried out due to structural changes in the economy and provides an increase in gross domestic product and per capita income; 2) economic decline. Economic growth is a positive component of economic dynamics whereas economic decline is negative. The combination of both components forms an economic cycle characterized by periodic rises and falls of economic activity that are directly caused by the fluctuations between consumption and investment. Economic development includes periods of economic growth and economic downturn over time.

Economic development, according to D. Evdokimova (2002), is a dynamic multivariate cyclic process, which has a spiral shape and is manifested through quantitative and qualitative changes in the structure of the system while maintaining its integrity and stability is provided only if it is controlled by the system.

Economic development is irreversible, directed, natural (quantitative-qualitative and essential) change in the economic system (in our case, enterprises) in the long run, which is influenced by economic contradictions, needs and interests, which conditionality is characterized by the basic laws of dialectics that do not go beyond the deep inner essence of such a system.

Economic development is also characterized by manageability, purposefulness, measurability.

V. Zalutsky (2009) distinguishes three forms of development: market development, which reflects the process of expanding the range of consumers, customers; organizational development, which reflects the process of development of individuals, groups, areas of responsibility, management systems, initiatives, etc.; business development is the direction of resources where they should ensure maximum competitiveness over the longest possible period of time.
A. Dakus and N. Simchenko (2012) note that the possible strategies for enterprise development are in a very wide range: 1) Intensive growth and increase in sales. The implementation of the strategy of intensive growth is associated with the consistent implementation of several phases, which differ in different methods of enterprise management. 2) Product development. The characteristics of the developed product coincide with the requirements of the market, therefore, the product must be improved by adapting to needs. 3) Market development. The market is not aware of the quality of the new product, there are new, previously not covered, but potentially interesting market segments. 4) Diversification. The need for diversification is caused by problems resulting from unexpected changes in the external environment, when the company is forced to hastily change market strategy, start a new activity, production of new products, change the direction of investment activities. The main task of diversification is to increase the stability of the enterprise due to the possibility of maneuvering resources. 5) Integration: horizontal integration, unification between competitors; vertical integration, association in the chain of producer-consumer.

Furthermore, according to A. Dakus and N. Simchenko (2012) the formation of the strategy of economic development of the enterprise in the context of globalization is a long process depending on the activities, needs, state policy, formulated forecasts, doctrines, concepts, scenarios, programs of all levels of government. Based on this, the mission of the enterprise is formed, in choosing which any strategy should be evaluated from the standpoint of socio-economic efficiency.

In our opinion, the economic literature in general focuses on traditional financial-oriented concepts of diagnosing the economic development of enterprises. However, at the present stage, these concepts have begun to lose their relevance to real processes. This is due to the following factors: lack of non-financial indicators; insufficient connection with strategic planning; significant focus on past results; short-term; focusing only on a certain part of the external and internal environment of the enterprise and more.

Accordingly, this topic is poorly covered in the economic literature. Theoretical and practical solutions are still underdeveloped. It is also clear that the issue of problematic diagnosis of economic development of textile enterprises, as noted above, is one of the most urgent issues of the modern economy.

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Accordingly, this topic is poorly covered in the economic literature. Theoretical and practical solutions are still underdeveloped. It is also clear that the issue of problematic diagnosis of economic development of textile enterprises, as noted above, is one of the most topical issues of the modern economy.
Methodology

The global financial crisis has shown that the old economic models for diagnosing the economic development of enterprises do not work with the necessary efficiency. They have lost their relevance due to changes in economic systems and economic relations between them. The task of today’s scientists is to develop such models, methods and forms of assessing economic development, which would best meet the contemporary requirements of today.

In this regard, the formation of new paradigms for assessing the economic development of textile enterprises should be carried out by combining the fundamental concepts of economics, system and situational views.

The study provided an opportunity to conclude that the economic development of the enterprise is considered effective when the ratio of costs and results in the transition from extensive to intensive rate of expanded reproduction improves (increases). Management of economic development of the enterprise contains two stages: determining the trajectory of effective economic development of the enterprise with the formation of goals and ways to achieve them; keeping it on this trajectory.

The first stage of assessing the economic development of textile enterprises is related to the diagnostic analysis of its economic development, which involves determining such an indicator that allows to determine whether the company is under control and signals extraordinary events that require immediate action.

Thus, the problematic diagnosis of economic development of textile enterprises is based on an integrated model of system-situational development and BSC.

![Integrated model of system-situational development and BSC](image)

**Figure 2** Integrated model of system-situational development and BSC

The system-situational model of development is an integral part of the "Cybernetic concept of management of boundary resources and states of the object of development (CURSOR +)".
Since the 90s of the last century, the "cybernetic concept of management of boundary resources and states of the object of development" has become widespread in numerous functional and applied research and development. It has the following components: system-situational model of development; problem-diagnostic model of the object; object state universe model; model of the universe of knowledge about the state of the object.

We adapt the main provisions of this concept to the new object of modeling - to modern textile enterprises.

The vertical of the shell corresponds to the system-situational space of functioning and development of the enterprise, and the horizontal - the space of marginal resources that ensure the viability and implementation of functional purposes. Both the vertical of development states and the horizontal of resources are limited by the corresponding poles.

The horizontal of resources is limited by the pole of time as an extremely non-reproducible resource, and the pole of knowledge as an extremely inexhaustible resource that grows progressively as it is used. The financial and material-energy resources located between these poles are situational and temporal.

The system-forming factors of economic development are the limit of perfection and the limit of danger of this development.

The limit of perfection (ideal) of economic development can be set by the limit values of financial and economic indicators, corporate culture, value system, mission, vision, and other qualitative indicators. The limit of perfection, like any ideal, is unattainable, but it can be approached indefinitely. This property of the ideal creates the potential of virtually unlimited in the development of the textile enterprise.

The danger limit (catastrophe) corresponds to the state of premature termination of the enterprise, such as its bankruptcy and liquidation.

Located between the poles, the target, current and forecast states characterize the situation of economic development of textile enterprises.

Balanced Scorecard (BSC) was proposed by American scientists R. Kaplan and D. Norton (1996) in the 90s of last century.

BSC considers four equivalent market factors: financial component, internal business processes, customer base and personnel, i.e. in this system the key is not individual indicators, but the results of their interaction and balance, which allows assessing the dynamics, identifying possible deviations from the trajectory of effective economic development and meets the requirements of enterprise management modeling.

The causal links that exist between all four indicators of the BSC are an expression of the company's business strategy. Such correlations are estimated using a correlation coefficient $r$.

To obtain a single diagnostic indicator of development, it is proposed to carry out the procedure of convolution of all correlation coefficients $W = F(r_1; r_2; \ldots)$.)

This convolution can be specified as a sum with some weights: 
$$W = \gamma_1|r_{12}| + \gamma_2|r_{13}| + \ldots.$$ 

Due to the property of correlation coefficients, the value of the development indicator $W$ will be in the interval between zero and one, so the limit of perfection (ideal) is defined as 1, and the limit of danger (catastrophe) as 0. Such diagnostics is carried out periodically (the period is defined depending on the state of the system, its direction of activity and other factors). Therefore, in practice we will have a set of values that can be displayed graphically.
Analysis of necessary and sufficient conditions for the existence of the extremum of the development indicator \( W = F(r_{12}; r_{13}; \ldots) \) as functions of many variables allowed determining the differential levels of economic development of textile enterprises:

Level I - textile enterprises, which have the highest probability of bankruptcy;

Level II - textile enterprises, which are threatened with bankruptcy, they need to develop anti-crisis measures;

Level III - textile enterprises, bankruptcy is not threatened, in the dynamics they are characterized by the stable dynamics of economic development;

Level IV - textile enterprises, characterized by stable dynamics of economic development;

Level V - high-tech, competitive textile enterprises that meet the needs of shareholders, consumers and employees.

Table 1 Levels of economic development of textile enterprises

<table>
<thead>
<tr>
<th>Level</th>
<th>Level I</th>
<th>Level II</th>
<th>Level III</th>
<th>Level IV</th>
<th>Level V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textile enterprises</td>
<td>(0 &lt; W \leq 0.1)</td>
<td>(0.1 &lt; W \leq 0.2)</td>
<td>(0.2 &lt; W \leq 0.8)</td>
<td>(0.8 &lt; W \leq 0.9)</td>
<td>(0.9 &lt; W &lt; 1)</td>
</tr>
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</table>

According to the results of the assessing economic development management at the textile enterprises of level I and level II, it is necessary to develop and implement the program of anti-crisis measures.

At textile enterprises of level III and level IV the essential attention should be paid to organizational and economic measures of risk reduction in activity of the enterprise.

Textile enterprises of economic development level V must maintain economic balance in their activities. To further ensure the stable operation and development of enterprises at this level, it is necessary to rationally use existing experience and knowledge, maintain and improve key success factors, support innovation and change.

Analysis and results

Problematic diagnostics of economic development of textile enterprises of Ukraine was carried out on the basis of "VESNA" Ltd. Limited Liability Company "VESNA" Ltd. was registered on April 25, 1994. The city of Rozdil is located in Lviv region. The amount of the authorized capital is UAH 1,150,500. Main activity 14.39 - manufacture of other knitted and crocheted apparel. Other activities:

- 13.92-manufacture of finished textile articles, except apparel
- 13.99-manufacture of other textile products, not included in other categories
- 47.82 Retail sale of clothing, footwear and textile goods in stalls and in the market.

The results of problematic diagnostics of economic development of textile enterprises: "VESNA" Ltd., include reasonable strategic goals and indicators of BSC.

The formula for determining the integrated development indicator for the company "VESNA" Ltd.:

\[ W = \sum_{i=5}^{13} 0.02(|r_{1,i}| + |r_{2,i}| + |r_{3,i}| + |r_{4,i}|) + \sum_{i=9}^{13} 0.01(|r_{5,i}| + |r_{6,i}| + |r_{7,i}| + |r_{8,i}|) + \sum_{i=12}^{13} 0.01(|r_{9,i}| + |r_{10,i}| + |r_{11,i}|) \]
\[
    r_{ij} = \frac{n \sum_{i=1}^{n} x_i y_i - (\sum_{i=1}^{n} x_i)(\sum_{i=1}^{n} y_i)}{\sqrt{n \sum_{i=1}^{n} x_i^2 - (\sum_{i=1}^{n} x_i)^2} \sqrt{n \sum_{i=1}^{n} y_i^2 - (\sum_{i=1}^{n} y_i)^2}}
\]  

- correlation coefficients

\[\gamma_i\] – weights, which were determined by expert and analytical methods.

Table 2 Balanced Scorecard for the enterprise “VESNA” Ltd.

<table>
<thead>
<tr>
<th>BSC component</th>
<th>Strategic aim</th>
<th>Indicator</th>
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<tbody>
<tr>
<td><strong>Finance</strong></td>
<td>▪ Obtaining a steadily growing profit</td>
<td>▪ Sales volume</td>
</tr>
<tr>
<td></td>
<td>▪ Increasing the volume of orders</td>
<td>▪ Income from new types of products and activities</td>
</tr>
<tr>
<td></td>
<td>▪ Maintaining stability</td>
<td>▪ Other types of income</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Total costs</td>
</tr>
<tr>
<td><strong>Customers</strong></td>
<td>▪ Precise performance of customers’ orders</td>
<td>▪ Income from new customers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Loss of customers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Advertising costs</td>
</tr>
<tr>
<td><strong>Business processes</strong></td>
<td>▪ Expanding the range of products</td>
<td>▪ Cost of finished products</td>
</tr>
<tr>
<td></td>
<td>▪ Performance of non-standard orders</td>
<td>▪ Costs for creating new types of products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Total costs for production and technical development</td>
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<tr>
<td></td>
<td></td>
<td>▪ Income from additional services</td>
</tr>
<tr>
<td><strong>Training and development of personnel</strong></td>
<td>▪ Increasing professionalism of employees</td>
<td>▪ Total costs of education</td>
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<td></td>
<td></td>
<td>▪ Wage fund</td>
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</table>

Based on the financial report of the small business entity, the report on financial results and the report on the main indicators of the enterprise for 2017-2021, the numerical values of the selected indicators of the current state of the enterprise are determined.

The values of the target state of BSC indicators were obtained by the extrapolation planning method: the reporting year was taken as the basis for calculations and, assuming that the trends of the previous year will continue in the future, the planned indicators were determined.

The values of the BSC indicators of the forecast state were determined using adaptive forecasting models - the method of exponential smoothing.

The generalization of calculations provided the receipt of the integrated indicator of economic development (IIED) of the current, target and forecast states of the enterprise "VESNA" Ltd.

The obtained results show that “VESNA” Ltd. has the third level of economic development, it is not threatened with bankruptcy, but there is no uniform growth of economic development.
Table 3 Integrated indicator of economic development (IIED) of the enterprise "VESNA" Ltd.

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</thead>
<tbody>
<tr>
<td>IIED of the current state</td>
<td>0.4893</td>
<td>0.6463</td>
<td>0.5248</td>
<td>0.5612</td>
<td>0.6268</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IIED of the target state</td>
<td>0.5573</td>
<td>0.6604</td>
<td>0.6671</td>
<td>0.6086</td>
<td>0.6701</td>
<td>0.7239</td>
<td>0.7456</td>
<td>0.7986</td>
</tr>
<tr>
<td>IIED of the forecast state</td>
<td>0.5989</td>
<td>0.65117</td>
<td>0.6019</td>
<td>0.5751</td>
<td>0.5955</td>
<td>0.6194</td>
<td>0.6569</td>
<td>0.6785</td>
</tr>
</tbody>
</table>

Figure 3 Integral indicator of economic development of “VESNA” Ltd.

To ensure the uniform growth of economic development of "VESNA" Ltd. and the transition to a new level IV, which is characterized by stable dynamics of economic development, VESNA Ltd. must invest in technology and innovation. Namely: in the development and optimization of new products, the purchase of new machines for coating technical textiles, as well as equipment for digital printing. It is also necessary to invest in personnel training. This requires cooperation with science, educational, investment and technology clusters and higher education institutions.

Conclusions

In the conditions of transformational conversion, the need for highly efficient textile enterprises and means of continuous assessment of their economic development is growing significantly. This need can be met by developing methods for diagnosing the problem of economic development of textile enterprises based on system-situational model of development, which is part of the "Cybernetic concept of management of boundary resources and conditions of the object of development."
The essence and content of managing the economic development of textile enterprises as a management category is to determine the trajectory of enterprise development (formation of goals and ways to achieve them) and keep it on this trajectory, which provides a system-situational approach to managing economic development of textile enterprises.

Management of economic development of enterprises using the system-situational model of development allows assessing the functioning and development of the enterprise in the space of its activities taking into account the limits of development: lower - the limit of danger (catastrophe) and upper - the limit of perfection (ideal). Approaching the edge of danger means increasing the likelihood of bankruptcy and liquidation of the enterprise and characterizes the regression of development. Approaching the economic development of a textile enterprise to the limit of perfection is approaching the desired results: strengthening the financial situation, the chosen mission, corporate culture etc.

The space of business activity in the system-situational model of development should be determined using the components of a balanced scorecard (finance, customers, business processes, training and development of personnel), which combines financial indicators and indicators of intangible assets.

The methodological approach to the selection of indicators of a balanced scorecard for textile enterprises includes mission, strategy, strategic goals of the enterprise, experience of the manager and the potential of each individual employee, etc.

The result of diagnostic analysis of economic development of textile enterprises is the calculation and analytical determination of the development indicator as an integral convolution of the correlation coefficients between the indicators of a balanced scorecard, which allows determining the synergy effect at the enterprise. Approaching of the development indicator to the unit indicates the achievement of the adequacy of the chosen strategy and progressive development in the direction of the ideal; approaching zero indicates a regressive movement in the direction of the catastrophe.

Assessment of the integrated indicator of economic development, as a function of many variables allows us to determine five levels of economic development of enterprises: level I - textile enterprises, which have the highest probability of bankruptcy; level II - textile enterprises, which are threatened with bankruptcy, they need to develop anti-crisis measures; level III - textile enterprises, bankruptcy is not threatened, in the dynamics they are characterized by the stable dynamics of economic development; level IV - textile enterprises, characterized by stable dynamics of economic development; level V - high-tech, competitive textile enterprises that meet the needs of shareholders, consumers and employees.

The use of the algorithm for implementing the mechanism of problem diagnosis of economic development allows identifying the problems of textile enterprises "VESNA" Ltd. and ways to solve them: at enterprises of level III economic development should pay attention to organizational and economic measures to reduce risk.

The developed algorithm for implementing the mechanism of problem diagnosis of economic development allows for control and management in real time; record and take into account external trends and local changes in a timely manner; to help strengthen the team's cohesion by increasing the responsibility of each individual employee for the company's image.

References


