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STUDY OF THE SUSTAINABLE ENTERPRISES DEVELOPMENT IN THE UNCERTAIN ECONOMIC ENVIRONMENT

ДОСЛІДЖЕННЯ СТІЙКОГО РОЗВИТКУ ПІДПРИЄМСТВ У НЕВИЗНАЧЕНОМУ ЕКОНОМІЧНОМУ СЕРЕДОВИЩІ

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Abstract. Here we have given the recommendations for the improvement of the effectiveness of management of the sustainable enterprise development. The article deals with the algorithm for the sustainable enterprise development and factors which affect its further advancing in the changing economic environment. The algorithm and the indices of the influence on the sustainable development of the enterprise under changing conditions have been discussed. We emphasize that the enterprise development together with the economic environment and the adaptation to its changes is the main factor of the enterprise stability. The mechanism of the detection of the factors which destabilize the enterprise development and affects the possibilities of the crisis tendencies growth is given. The performance reports of four large enterprises' are analyzed. The given periodic reports were formed according to the key factors of the enterprise activity which cover the all aspects of sustainability. Based on the individuated factors of the sustainable development the general index of the sustainable development for each enterprise is calculated. The obtained indices are brought in the table and the leader of the industry is detected.

Keywords: sustainable development; economic environment; algorithm; sustainable development factors.

Анотація. Досліджено алгоритм розвитку підприємства та показники, які впливають на стійкість розвитку підприємства в невизначеному економічному середовищі. Проаналізовано звіти діяльності чотирьох великих підприємств окремої галузі. На підставі виділених показників сталого розвитку розраховано загальний індекс сталого розвитку для кожного з підприємств з визначенням лідера.

Ключові слова: сталий розвиток; економічне середовище; алгоритм; показники сталого розвитку.

Аннотация. Исследованы алгоритм развития предприятия и показатели, которые влияют на устойчивость развития предприятия в неопределенной экономической среде. Проанализированы отчеты деятельности четырех крупных предприятий отдельной отрасли. На основании выделенных показателей устойчивого развития рассчитан общий индекс устойчивого развития для каждого из предприятий с определением лидера.

Ключевые слова: устойчивое развитие; экономическая среда; алгоритм; показатели устойчивого развития.

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PROBLEM STATEMENT

The enterprise development is possible only in the process of the interaction of the enterprise and the economic environment. The latter is continuously evol-

ving due to the changes of consumer values, market size, technology, prices, laws, etc. If the enterprise does not develop together with the economic environment and does not adapt to its changes, sooner or later it loses the stable market position and faces the crisis or even goes bankrupt.

This raises the main issue of the enterprise: the obligative enterprise development with the adaptation to the changes in the economic environment. And this in turn requires the obligative management of the enterprise development.

The main integrative feature of the enterprise deals directly with the major aim of the enterprise development which is maintaining and broadening the capabilities in order to meet the market demand. Thus, the properly planned market analysis is a prerequisite for making the effective management decisions in terms of the sustainable enterprise development.

ANALYSIS OF THE LATEST STUDIES AND PUBLICATIONS

Traditionally, when analyzing the mechanisms of the management of the enterprise development it is taken into account that the separate consideration of certain aspects and specific tasks of the development, such as the development of new products and services, the improvement of the manufacturing technology, the market development, etc., reduces the effectiveness, leads to the disagreement and often to the nonrealizability of the management decisions, and reduces the system flexibility and mobility. Therefore it is necessary to provide the integrity of the study of all the processes. They cover the analysis of the market environment, the formation and optimization of the variants of the technical, technological and organizational development, the financial and economic schemes of their realization, as well as the improvement of the management system.

Apart from that, the processes of the development has to be considered in conjunction with the measures aimed at the improvement of the current activity (the improvement in the quality of production and services, the cost reduction, the improvement in current calendar planning, the reduction of pools of uncompleted construction, etc.). That will enable improving the coordination, revealing the reserves and reducing the system disturbances.

The sustainable enterprise development is the development wherein the value of the involved resource pools exceeds the value of the resource pools needed for the implementation of the development scenario and for the attenuation of the external environment disturbances according to the obtained in the assumption of the middle level of optimistic (pessimistic) estimation of the external environment disturbance.

THE AIM OF THE ARTICLE. The study includes the analysis of the sustainability of the enterprise development in the changing external environment and the analysis of the reports on the sustainable enterprise development according to the indices of the sustainable development.

PRESENTATION OF THE BASIC MATERIAL

The management of the sustainable development involves the time-limited goal-directed impacts on the enterprise's elements and structure with the specified requirements for the eventual result and constrained resources when providing the sustainability of the development.

Under the current conditions the management system should meet the special requirements: it should be flexible and it should correspond to the current manufacturing technology. It should consider the competition on the products and services market. It should be ready for the improvement in service and the accurate observance of the terms of the contract. The system should also be sensitive to the change in the production cost structures, and what is the most notable, it should include and eliminate if possible the impact of uncertainty, risks, and the external environment. Apart from that, the management system should provide the sustainable enterprise development.

The algorithm of the process of the management of the sustainable enterprise development is the following (Fig. 1).

In the algorithm one of the most important stages of the process of the management of the sustainable enterprise development is shown. It is the timely determination of destabilizing factors which lead to the intensification of crisis.

Following the principles of the sustainable development under the current circumstances is one of the main competitive advantages of an enterprise. Many European partners demand for the periodic reporting on the key performance indicators which cover all aspects of the sustainability.

The reports on the sustainable development are drawn up within the enterprise and published at the certain interval, typically, a calendar year. Various organizations have worked out the measures and methodology which help to draw up such reports. Global Reporting Initiative (GRI) with its Secretariat in Amsterdam, Netherlands, is one of these organizations. It has the affiliations all over the world. The special feature of the report is the development of the additional factors of the sustainable development which are indicative for enterprises of a peculiar industry sector.

In such a way the reports of four large companies have been analyzed. The field of the companies' activity is the high-voltage transformer production.

As a result, three groups of factors of the sustainable development have been distinguished. These groups include three components, such as the economic, environmental, and social and institutional measurements. Taking into account the insufficient amount of data and corporate information privacy every measurement is divided into a range of factors. Their values were taken from the companies' reports and estimated by expertise.

So, the general index has been calculated on the basis of the distinguished factors of the sustainable development of the large-scale enterprises (see Fig. 2).

According to the model of sustainable development indexes were determined as follows:

$$I_i = \sum_{j=1}^n w_j x_{i,j}, i = \overline{1, m}, \sum_{j=1}^n w_j = 1, \quad (1)$$

where I_i is the value of the sustainable development index for the i -th enterprise; m is the number of enterprises; w_j is the weight of the j -th component of I index; n is the number of components; $x_{i,j}$ is the value of the j -th factor for the i -th enterprise.

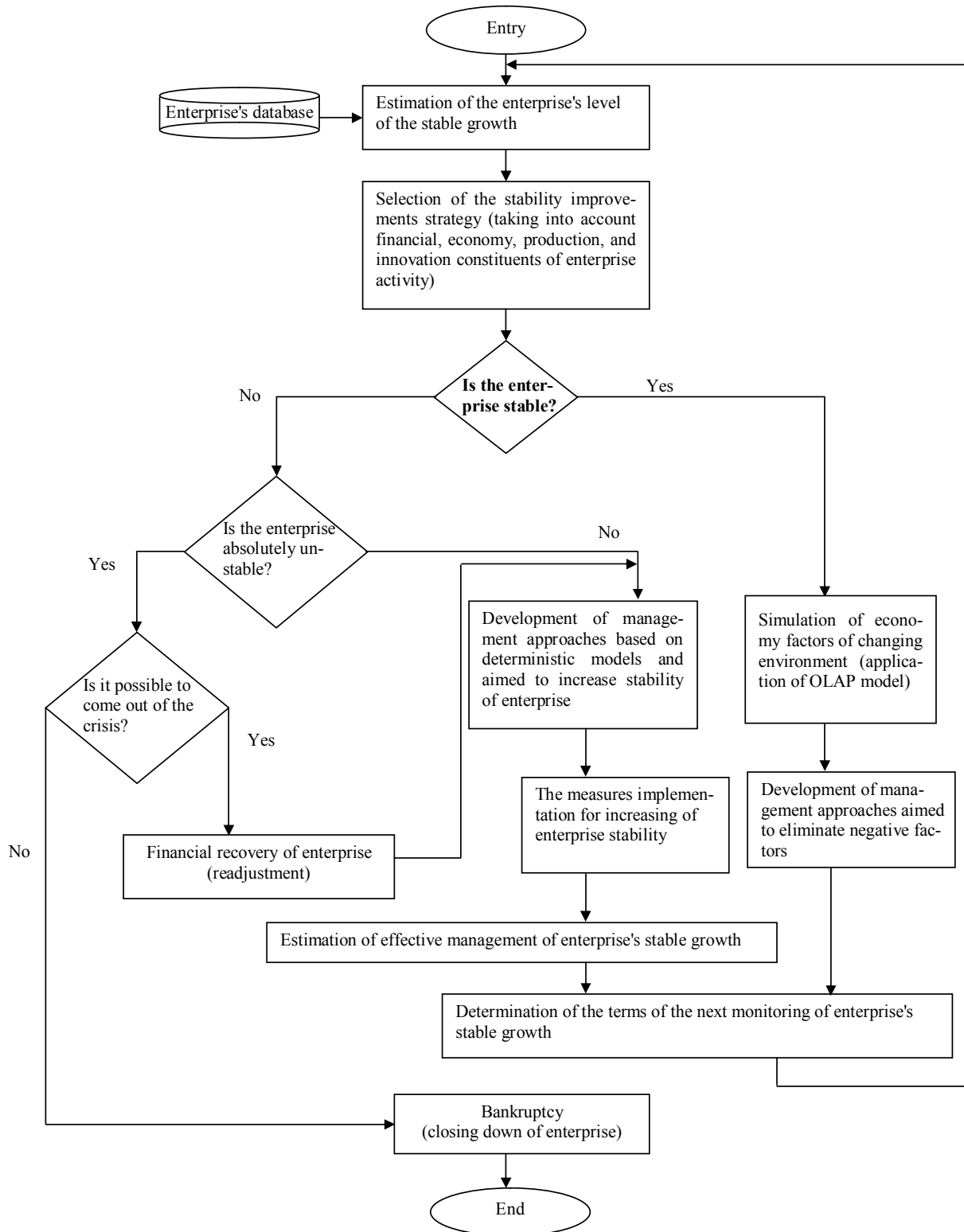


Fig. 1. Algorithm for the Process of Management of Sustainable Enterprise Development

Such choice of the method of the calculation of the integrated factors involves that all the factors are changed within one range. Taking into account that all the data are presented in the form of various values, it is necessary

to carry out the normalization of the factors. After this procedure all the values characterizing one or another enterprise will range from 0 to 1. For the normalization the following equation is used:

$$l_{i,j} = \left(1 + e^{\frac{\bar{x}_j - x_{i,j}}{\sigma(x_j)}} \right)^{-1}, \quad (2)$$

where $l_{i,j}$ is the normalized value of the j -th factor for i -th enterprise; \bar{x}_j is the average value of the x_j factor in the sample; $\sigma(x_j)$ is the corresponding standard deviation.

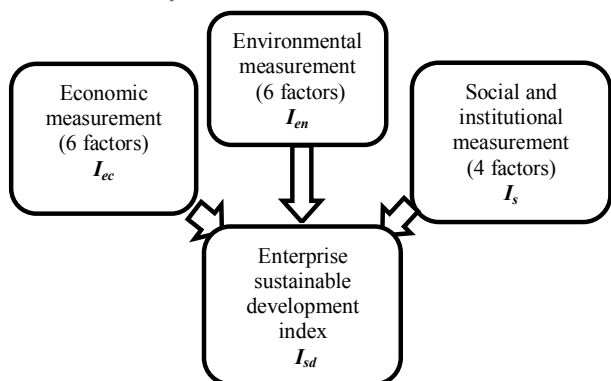


Fig. 2. Mathematical Model for Determination of Sustainable Development Index and Level of Harmonization

This normalization (2) will provide that the worst indices in terms of the sustainable development will be close to 0, and the best ones will be close to 1. Thus, having selected weights of each factor by means of the expertise, we can calculate the sustainable development indices by three measurements, and then the general sustainable development index. To obtain more precise results the average data on the plant were taken for the analysis because some enterprises have 2 or more plants in their capacities. The data on the plants of 2009 were analyzed.

As a result, the following values of the sustainable development indices were obtained.

Table 1. Sustainable development indices of the enterprises according to the data of 2009

Index	ABB	Hyundai	General Electric	Zaporozhtransformator (Ukraine)
I_{ec}	0.424613	0.388915	0.230238	0.282476
I_{en}	0.611504	0.61352	0.184439	0.637908
I_s	0.315644	0.301326	0.091414	0.316251
I_{sd}	0.450587	0.434587	0.168697	0.412212

As we can see from the table the enterprises are arranged in the following order:

- ABB;
- Hyundai;
- Zaporozhtransformator;
- General Electrics.

We see that the most sustainable enterprise is ABB. That is not surprising because its main representative office is located in Switzerland. European countries have long been supporting and actively participating in the development of the sustainable development methods and implementing them. Hyundai occupies the second place. Due to the large-scale innovative activity and the best estimation in terms of the price and quality the Korean company has become the leader in the electrical transformers market. Due to all said above Hyundai Corporation is developing steadily. The next in the rating is the Ukrainian enterprise which has been a major market player since the days of the USSR. The vast experience allows keeping up with the competitors. On the last place of rating are the General Electrics' enterprises. That is due to the low indices in the ecological and social responsibility fields [3, 4].

The annual publication of the reports and the calculation of the general aggregated sustainable development index will help monitor accurately the previous results and make the adequate future forecasts. The reporting will help reduce the environmental stress caused by the enterprise and increase its social responsibility.

CONCLUSIONS

The management of the sustainable enterprises development is based on the setting of the principles, goals, functions and methods of the management, as well as on the selection of the subject and object of the management.

All the elements of the management of the sustainable enterprise development are detailed within the frame of the sustainable development in such a way as to provide the social stability, the ecological balance, and the economic benefit.

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