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**Economic processes management at microlevel**

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**SCIENTIFIC AND METHODIC APPROACHES TO REVEAL STABILITY  
ESSENCE AT THE INDUSTRIAL ENTERPRISES AND ITS  
FUNCTIONAL COMPONENTS**

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*The article deals with theoretical analysis of the scientific approaches concerning definition of the concept “stability”, which exist in the scientific literature. There are five different approaches to interpret the concept “enterprise stability”, as an open economic system. On this base, the author’s definition of the enterprise stability is formed. Due to the carried out analysis of the main tendencies in changes of the industry development factors for 2006-2015 and future expectations, the main functional constituents of the enterprise stability. The author suggests to use an approach of self-organizational artificial neural networks to evaluate stability degree at the industrial enterprises.*

**Keywords:** *open system, industrial enterprise, self-organizing artificial neural networks, system, stability, functional component of stability.*

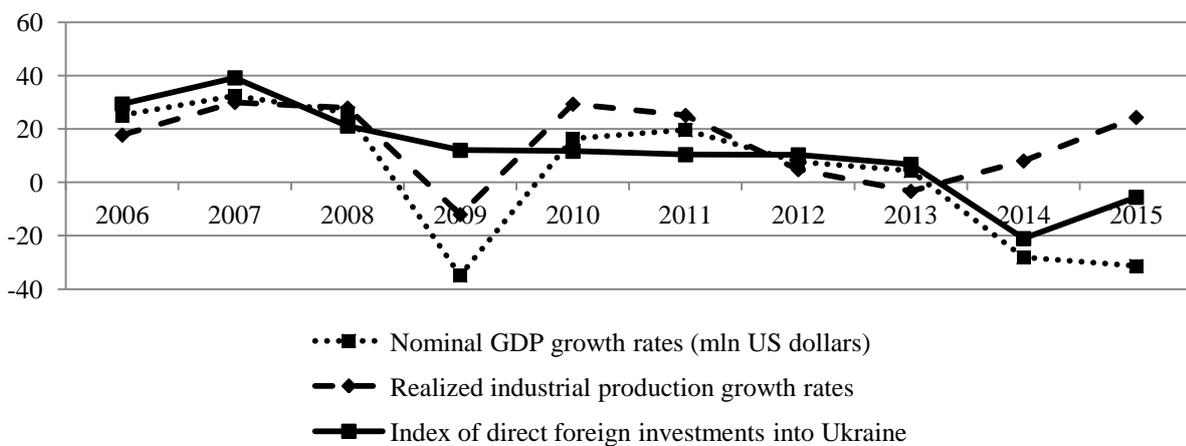
**Introduction.** Stable functioning of the enterprise structures under conditions of globalization, scientific and technical progress, constant integrating processes, national and global competition growing, present the effective economic development strategy. The higher organizations’ stability is, the higher their independence on market conjuncture change, ability to involve investments, to introduce innovations, to receive credits, to chose suppliers and to select qualified staff is, and thus, the risk to be bankrupt, is lower.

**Analysis of the recent research and publications.** The problems, connected with economic system stability, sustainable development and enterprises stability estimation, were studied by many native scientists, particularly: O.V. Arefyeva [15], O.V. Dzyublyuk [12], R.V. Feshchur [19], D.M. Horodyanska [15], S.V. Kozlovsky [11], L.H. Melnyk [8], R.V. Mykhaylyuk [12], G.O. Partyn [18], M.A. Pavlovsky [9], D.S. Revenko [14], V.V. Semenenko [11], R.Yu. Shevchuk [11], N.G. Slobodyan [17],

Yu.S. Tsyamryuk [13], B.I. Yatsenko [10], O.O. Tarasova [13] and etc. As a result of the authors' scientific works investigation one found out that although scientists have made great contribution, hyperdynamic changes in the environment, internal and external factors impacts require theoretical and methodological aspects improvements, including constantly acting mechanism for monitoring and managing of the enterprise stability.

**The object of an article** is to study existing approaches to determine the concept "stability" of the industrial enterprises and its functional constituents to specify the proper concept main point.

**Main material representation.** Analysis of the main macroeconomic indexes concerning Ukrainian economy development for 2006-2015 shows the systematic and structural nature of crisis, in which national economy in functioning (fig.1). Therefore, authors of the work [1] suppose that main internal stimulators of possible decline have to be: crucial slowing down of the economic development in Ukraine and worsening of main macroeconomic indexes (macroeconomic balance shift by main indexes); production phasing down; economic activity decrease, first of all investment activity; worsening of the people's welfare (household) and growth of the unemployment degree; посилення боргового тиску, mostly, in the state sector; increase of the economic activity shadowing growing.



**Fig. 1. Dynamics of the macroeconomic indexes in economic development in Ukraine for 2006-2015, % to previous period**

Source: it was formed by authors on the basis of [2].

Particularly, although one could observe positive annual dynamics of the real GDP growth since 2010, which was equal or exceeded the nominal GDP of the previous year, rapid change of dollar rate in winter 2015 caused nominal GDP growth rate decrease by 41190 mln. US dollars or 31,3% from pervious 2014. Therefore part of Ukraine in the global GDP in comparison with 1990 during 2010-2014 was shortened almost three times and was equal to 0,38 %. It is one of the worst indexes among post-Soviet countries [3].

The factor, which plays an important role in the GDP structure and dynamics, is industrial production amount, which is about 25 % of the total GDP in Ukraine [2]. In 2015 the industrial production realization amount transferred from stagnation stage y in the fist half of 2015 to the growing stage in the second half of 2015 and was 1917185,6 mln hrn. At

the same time the level of operational activity profitability at the industrial enterprises was two times reduced in 2015 in comparison with last period and was equal to 0,9 %. Decrease of the financial result degree is regular at the industrial enterprises. Loses of industrial enterprises were firstly established in 2014-2015 for the last years. In 2014 it was equal to 166414,0 mln hrn., and in 2015 – 181360,9 mln hrn. According to analysis of business activity state data at the industrial enterprises, The State Statistics Service of Ukraine distinguishes the following respondents' expectations in 2016: decrease of the foreign orders amounts for goods producing (export demand); growth of the transfer prices for industrial production; workers' number reducing at the industrial enterprises; decrease of financial limitations impact on production, therefore insufficient demand is the most keeping factor; increase of productive capability load for 0,4 p.p., which in average is 61,8% [3].

Since generally the effective economy development is based on stability at the enterprise level, which is the main (initial) element in the economic system, it is necessary to analyze the existing views about the concept "stability" at the macro-level in more details. Speaking about enterprise, one has to notice, that it may be observed as a system. Broadly speaking, the system is any conceptual or physical essence, which consists of interdependent parts [4, p. 145]. To V.A. Kharchenko's mind [5, p. 157], industrial enterprise is to be considered a complicated, open, dynamic, producing, social and technical self-controlled system, which satisfies consumers' demands with the help of produced values and is able to achieve functioning aims under conditions of market relations from dynamic by external environment. Ukrainian scientists M.V. Bormotova, S.K. Zolotaryev consider the economic system category as a complex results-oriented, controlled dynamic set of elements, which perform production, distribution and consumption of material values with purpose to satisfy increasing human's needs with limited resources [6].

The essential aspect to reveal the concept "system" consists in distinguishing of different systems types. Due to the modern viewpoint, systems are classified into integral and summative; organic and mechanical; dynamic and static; open and closed; self-organized and inorganized and others. [7, p. 55]. Depending on system state change in time, one distinguishes: static (state and time are constant) and dynamic (it changes its state in time) systems [8, p. 173]. There are closed and open systems by the nature of interconnection. The main difference of the open system is ability to exchange mass, energy and information with external environment, therefore an external environment is a set of objects, which are not elements of the given complex system, but interconnection with it is considered while studying. Thus, openness means that a system carries out metabolism, i.e. matter-energy-informational exchange with external environment, peculiar for enterprises [8, p. 40]. Metabolism is a source of incomings to the free energy system and life wastage removal from a system. Thus, ability to show enterprise as an open system, allows to state its structural constituents, interconnections and interrelations between elements, to distinguish various influencing factors and factors to provide enterprise stability.

Analysis of the economic literature concerning economic systems stability definitions showed that depending on the research context, five different approaches could be distinguished (table 1):

- 1) stability as an ability of the system to function, develop, grow, achieve competitive advantages effectively;
- 2) stability as a condition of the system dynamic balance;
- 3) stability as a safety, stability, reliability, integrity and system substantiality;
- 4) stability as an ability to avoid bankruptcy and provision of enterprise payment-worthiness;
- 5) stability as an ability to adapt to changes of economy management system conditions.

**Table 1. Generalizing of the scientific approaches concerning concept definition  
“stability of the economic system”**

<i>Stability as an ability of the system to function, develop, grow, achieve competitive advantages effectively</i>	
M.A. Pavlovsky [9]	Stability is observed as an ability of the system to achieve economic growth, with which none of factors set (inflation, production growth, unemployment etc) do not cross the available lines at the given trajectory.
B.I. Yatsenko [10]	Competitiveness is one of the most significant features of the industrial enterprise, which defines its stability.
S.V. Kozlovskij, V.V. Semenenko, R.Yu. Shevchuk [11]	Stability is an ability of economic system to function and develop under conditions of changing internal and external environment.
<i>Stability as a condition of the system dynamic balance</i>	
Dzyublyuk O.V., Mykhaylyuk R.V. [12]	Stability is a performance of the balance state (object, system), which shows ability to keep some features, functional setting is not changed, although there are possible risks, external factors impact and internal transformations (occasional or prognosticated).
O.O. Tarasova, Yu.S. Tsyamryuk [13]	Stability is an ability of the economic system to be returned into a balanced state owing to own or borrowed resources.
D.S. Revenko [14]	Balance state of the system is considered to be stable amid a system ability to be returned into balanced state in case if it was moved away from it.
<i>Stability as stableness, steadiness, integrity and strength of the system</i>	
O.V. Arefyeva, D.M. Horodyanska [15]	Economic stability of the enterprise is a set of interconnected and mutually conditioned structural components, united by one aim, to create, provide and support the general stable functioning of the enterprise
O.M. Melnyk financial stability of the enterprise in modern economy [16]	The concept of stability is considered from the viewpoint of multifactorial state, which unites steadiness and stability of the modern economic entity functioning.
<i>Stability as an ability to avoid bankruptcy and to provide payment-worthiness of the enterprise</i>	
Slobodyan, N. G. [17]	The stable financial state of the enterprise is proved with its ability to pay current debts in time, to support payment-worthiness under unfavourable circumstances, to increase amounts of realization and to get profit. Financial stability provides steady payment-worthiness for perspective, which is the base for assets and liabilities balancing, incomes and expenses and money flow
Partyn, G. O. [18]	Financial stability is an ability of economic entity to function and to develop, to keep balance of its assets and liabilities in external and internal changing environment. It guarantees constant payment-worthiness and investment attractiveness within available risk degree [4, p. 486].
<i>Stability as an ability to be adapted to changes in economic systems conditions</i>	
R.V. Feshchyur, H.S. Baranivska [19]	Economic stability is an ability of the enterprise to react through mechanisms of opposition or adaptation to external and internal environment changes with purpose not only to keep and to form factors, providing its self-protection and effective functioning at the moment, but assist its further development.
Yeremeychuk R. [20]	Stability is an ability of the system to provide stable technical and economic factors with positive dynamics and effectively be adapted to disturbances of the external and internal environment.

\*Source: it is formed and systematized by author

The study of enterprise, as a complex open system, requires its stability analysis, owing to factors, which present different functional constituents. In the work [21] author distinguishes the following constituents of the strategic stability at the enterprise: financial stability – an ability of the enterprise to work with high efficiency, to support an optimal (or planned) level of liquidity and payment-worthiness, a possibility to have sources to provide stable progressive development; production stability – an ability of the enterprise to support the producing potential at the level, which lets to prevent from wasteful production, and constant process of goods production with low percentage of defects and production losses, taking into account market needs; social (personnel) stability – an ability of the enterprise to support low level of staff turnover and personnel high motivating potential; ecological stability – interconnection of the enterprise economy, its ecological safety and minimization of harmful impact, made by economic activity, on the environment; managerial and organizational stability – an ability of the enterprise directors to support high level of the organizational work and management at the enterprise. The carried out analysis of the main factors concerning industrial enterprises activity for 2006-2015 presents necessity to activate investment and innovative processes at the enterprises and to stimulate new sales market searching. Thus, the suggested above constituents of the enterprise stability have to include factors, which would describe marketing and investment-innovative stability. At the same time, we suppose that managerial and organizational stability must illustrate not only directors' ability to support organizational work and management at high level, and also estimation of the value concerning unimproved opportunities of the managerial impact on the enterprise stability in whole.

The indexes, describing motive power factors in the process to provide the mentioned functional constituents of the enterprise stability, let to form a dynamic coordinates system owing to self-organizing artificial neural networks to interpret change of the economic entity state and to define enterprise belonging to proper structural and functional groups, consequence of transfer between them, to define the behavior model in general system of the product markets.

**Conclusions.** Having analyzed the last scientific publications and research, one pointed out that there was no exact definition of stability concept in economic theory and practice. It allowed to distinguish five different approaches to interpret the given category owing to considering an enterprise as an open system: 1) stability as an ability of the system to function, develop, grow, achieve competitive advantages effectively; 2) stability as a condition of the system dynamic balance; 3) stability as a safety, stability, reliability, integrity and system substantiality; 4) stability as an ability to avoid bankruptcy and provision of enterprise payment-worthiness; 5) stability as an ability to adapt to changes of economy management system conditions.

Generalization of the existed viewpoints concerning the concept “stability of the system” allowed to create own definition. It is considered by the author as a system ability to keep some balanced state with various external disturbances, to have its limits, to implement own development goals, and it is a dynamic value, derived from competitive struggle degree and main determinants of the sectorial competitive environment.

The carried out analysis of the main tendencies in industry development factors changes for 2006-2015 and future expectations allowed to distinguish main functional constituents of the enterprise stability. The suggested approach to use self-organizing artificial neural networks to evaluate stability degree at the industrial enterprises, based on factors of the functional components, can be used to model strategies of the enterprise through prognosticated coordinates calculation with some factors changes.

**Further studies** are oriented to define key factors of the enterprise stability functional components and to develop the complex technique for the system stability analysis.

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**НАУКОВО-МЕТОДИЧНІ ПІДХОДИ ДО РОЗКРИТТЯ СУТНОСТІ СТІЙКОСТІ  
ПРОМИСЛОВИХ ПІДПРИЄМСТВ ТА ЇЇ ФУНКЦІОНАЛЬНИХ СКЛАДОВИХ**

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*У статті проведено теоретичний аналіз наукових підходів, що стосуються визначення поняття «стійкість», що нині існують у науковій літературі. Виділено п'ять відмінних один від одного підходів до трактування поняття «стійкість підприємства», як відкритої економічної системи. На цій підставі сформульовано авторське визначення стійкості підприємства. На підставі проведеного аналізу основних тенденцій змін показників розвитку промисловості за 2006-2015 рр. та майбутніх очікувань виділено основні функціональні складові стійкості підприємств. Запропоновано використовувати підхід самоорганізуючих нейронних мереж до оцінки рівня стійкості промислових підприємств.*

***Ключові слова:** відкрита система, промислове підприємство, самоорганізуючі нейронні мережі, система, стійкість, функціональна складова стійкості.*

**НАУЧНО-МЕТОДИЧЕСКИЕ ПОДХОДЫ К РАСКРЫТИЮ СУЩНОСТИ  
УСТОЙЧИВОСТИ ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЙ И ЕЕ  
ФУНКЦИОНАЛЬНЫХ СОСТАВЛЯЮЩИХ**

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*В статье проведен теоретический анализ научных подходов определяющих понятия «устойчивость». Выделено пять отличных друг от друга подходов к трактовке понятия «устойчивость предприятия», как открытой экономической системы. Исходя их этого сформулировано авторское определение устойчивости предприятия. На основе проведенного анализа основных тенденций изменений показателей развития промышленности за 2006-2015 гг. и будущих возможностей выделены основные функциональные составляющие устойчивости предприятий. Предложено использовать подход самоорганизующихся нейронных сетей к оценке уровня устойчивости промышленных предприятий.*

***Ключевые слова:** открытая система, промышленное предприятие, самоорганизующиеся нейронные сети, система, устойчивость, функциональная составляющая устойчивости.*