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ADAPTIVE ORGANIZATION – MANAGEMENT TOOL IN VARIABLE ENVIRONMENT

Problem Statement. Instability and uncertainty of the current market environment is becoming a major factor, without which the successful functioning of enterprises is impossible. Analysis of enterprises of Lugansk region shows that only those that were in the process of development of market relations restructuring to reflect changes in the conditions of their operation (such as diesel locomotive Lugansk, Stakhanov railcar plants) retained its activity. Other enterprises that were not promptly respond to changes in the external environment, are now in a state of deep crisis (such major engineering plants in the past as Lugansk machine tool, automobile assembly, for the production of crankshafts and other) [1].

In an increasingly unstable market environment the need for decisive restructuring of enterprise management systems, perfection of all management functions, including the organization, which as a function of management, must adjust to changing conditions, that is to be adaptive. The delay with the necessary reorganization is fraught with severe financial and economic consequences for any economic entities. A feature of the organization is that of all the functions of management, it is the most inert, since it is fixed in the production structure of the company, its management system, internal cooperation relations, distribution of powers, information flow, responsibility for results, etc. Any reorganization more than any other function of management associated with changes in technology, traffic flows, the development of new technology. In the development of the organization asks of enterprises dedicated to the many of scientific research and advanced global companies demonstrate many new organizational solutions that ensure the effective operation of enterprises in a changing environment.

However, in recent years we have seen a serious ideological paradigm shift in terms of understanding of environmental uncertainty. The fact that all the uncertainty inherent in a market economy, economists have noted yet in the 19th century, predicting the economy and business eternal struggle with it, but under uncertain market environment they were understanding as unknown future states of it. Such an understanding of instability explains the application of all the ways to know the future by means of mathematical analysis, forecasting, risk management, etc.

However, over the last 30 years, and especially now after the global financial and economic crisis, comes a different understanding of the uncertainty, not like uncertainty, and as chaotic. In this regard, once again proved to be right, Peter Drucker, which established in 1985, the subsequent development of the market as "an era without laws" [2]. As part of this new paradigm is redefining the nature and organization of enterprises in a randomly changing environment, which determined the need for these issues reviewed in this article.

Analysis of Researches and Publications. Results of studies the organization of enterprises as a category, subject to adjustment to changing conditions of the market environment, highlights the many works of well-known western authors: W. Bridges, O. Toffler, M. Hammer and J. Champi [3; 4; 5]. Their followers in Ukraine and Russia O.V. Vasilenko, A.P. Gradov and B.I Kuzin, A.A. Sadekov, A.M. Tkachenko and S. Tielin, focused on crisis management and management of sustainable development of enterprises in uncertain market environment conditions [6; 7; 8; 9]. An attempt to define a model of enterprise behavior in the process of self-organization is made in the article of G.S. Lihonosov [10]. The monograph of the author of this article [11] considered the methodology of adaptive activity. But all published works not yet reflect the new elements regarding the use of adaptive organization as an effective tool of management in changing environment.

The objective of the article is to considerate new elements regarding the use of adaptive organization as an effective tool of management in changing environment.

Presentation of the Main Material. Adaptive organization of the enterprise is an alternative to the practice of discrete reorganization, which always has retarded character, resulting in negative economic and financial results. Adaptive organizations differ:

1) constant monitoring of the operational environment of the enterprise;

2) parameterization of environment with the help of simple, but effective indicators: the volume of orders, market consumption, prices, etc;

3) adjustment of the existing organization when the parameter of environment reaches a certain value.

However, there are at least two major problems of an adaptive organization.

The first – is determined by the essence of the organization as a system category that displays only composition of elements of the system and the interaction among elements without forming their own idea of the quality of the organization. Good organization is the one in which the activity is effective, that is, the

goals are more or less achieved. But as soon as manifest negative results of operations: unprofitability, lower sales volumes, losing to competitors, organization, yesterday considered good becomes bad, as first proposed by one of the pioneers of a systematic approach to the management of W. R. Ashby [12].

The second problem is, in many it determined by the first, – it is not clear how to change the organization to increase the efficiency of the system, and this problem is not solved by all formed so far the theory of organization.

In contrast to scientific and technological progress, the results of which are material and have always manifested in the creation of new technology, today, especially in the development of IT technology, ways of improving the organization of both production and management are ambiguous and quite different for enterprises of mass, serial or single production of products and services. In some cases, has the advantage, for example, the subject specialization of production units, in others – technological and so on.

For decades, the progressive development of the organization considered the development of advanced experiences – especially foreign companies, in today's language – benchmarking. It was believed, who first successfully stepped into the future, and he is a role model. Thus, decades of development trends of the organization identified the experience of «General Electric», the Japanese «kanban» system, business process reengineering by M. Hammer and J. Champy, balanced scorecard planning by D. Norton and R. Kaplan, etc.

Companies are afraid to experiment in the sphere organization of its activity, and as a result the most of them replicated standard solutions. For example, enterprise management system by 90% presented the traditional linear-functional structures with a rare the inclusion of the target or the matrix elements.

Functionalism of today's control systems is a serious anachronism, even though he has a seemingly serious objective base. Enterprise management system is based on the principle: the goals are generating functions, and functions – executive bodies – service departments, bureaus, etc.

These systems, as experience shows, quite tough, functional service cling to their function and did not want to fulfill the emerging goals, although they appear with an accelerating rate. It generates inevitable internal horizontal conflicts, the resolution of which requires considerable efforts. Theory of organization recommends a timely response to the emergence of new goals by updating new features, giving rise to a process of restructuring the organizational structure, which is already in an updated form still remains mostly functional.

Thus, a critical goal of adaptive organization of enterprise management systems is to overcome the functionalism. In practice, this means a departure from the strict regulation functions, rights, obligations and liability for their execution, and the transfer of all activities under the regulation aimed to solution emerging problems. We illustrate this simple circuit in Fig. 1, which shows that the level of the regulation of should decrease with the growth of the variability in the environment, while showing the equilibrium relations between regulation and self-organization, between the since olden times established principles of bureaucracy and adhocracy, as it the contrary, a departure from the rigid hierarchy to create a non-hierarchical teams, etc. This inevitably raises the role of self-organization. Regulation itself takes the form of the well-known management cycle, including the necessary set of functions. However, as actually running this cycle under conditions of uncertainty, illustrate the scheme in Fig. 2.

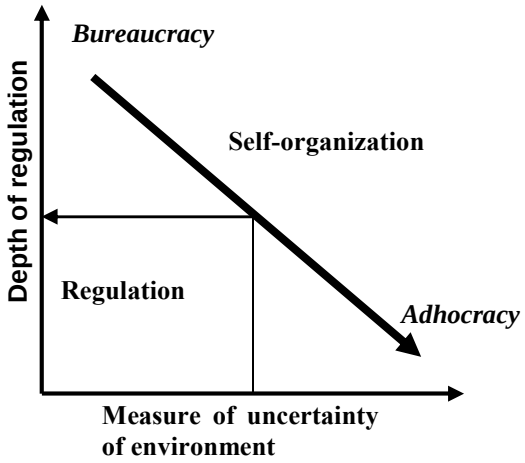


Fig. 1. Inverse relationship of depth of regulation in dependence of the measure of uncertainty of environment

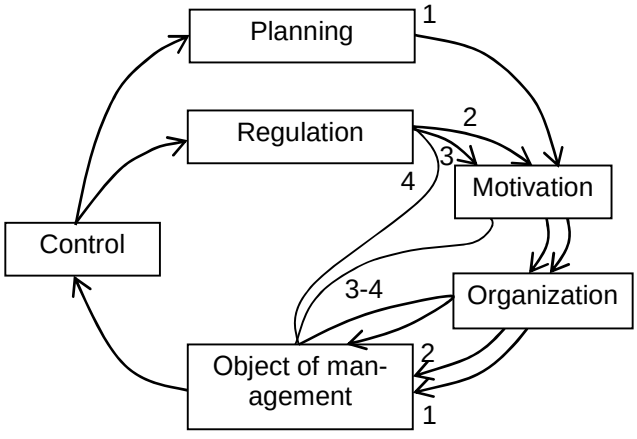


Fig. 2. The composition of the functions of management circuit depending on the uncertainty of environment

Only in a constant environment management is carried out on the basis of all functions: planning, organization, motivation, control and regulation. In unpredictable situations from this range of functions can fail planning, or organization, or motivation at the same time, sometimes only one good motivation supports the achievement of the desired result. When a managed object is left alone with the set task, what is the basis for its decisions: an accident, experience, luck? In any case, without specific self-organization in the object itself can not do. In the case of greater uncertainty of the environment the more responsibility must be transmitted to lower levels of management and production.

However, in the exaggerated functionalism is very difficult to do because of the resistance of the internal environment of the enterprise. Analysis shows that the units of the enterprises have varying degrees of its economic independence within the whole that demonstrated in Fig. 3, in which the forms of organization units ranked in order of increasing their level of independence.

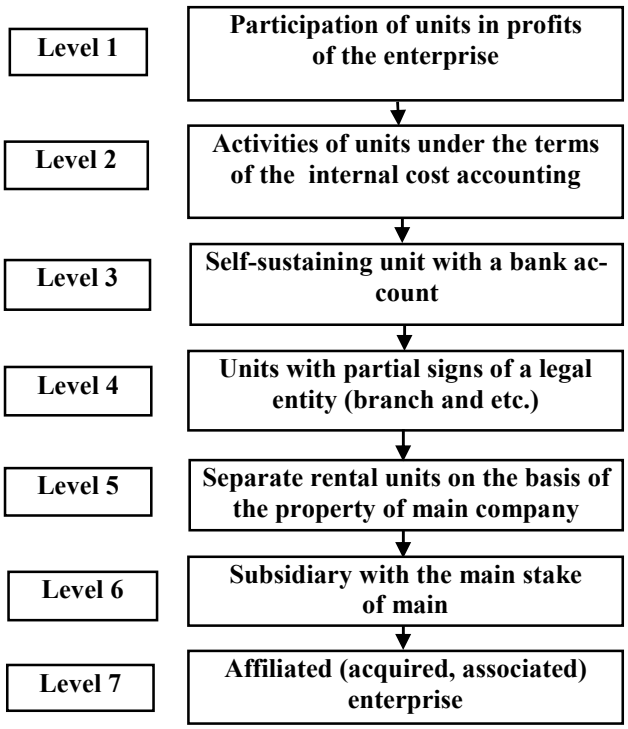


Fig. 3. Levels of independence of the units of enterprise

If external circumstances dictate, the will of business owners or management of the companies must be to reorganize the company on the basis of decentralization. Economic basis for this may be the presence of various structural business units (SBU) as parts of the company, working on their own market sectors. Then in the decentralization process earlier unitary enterprises will reorganized into divisional, holding, outsourcing and network, as shown in Fig. 4.

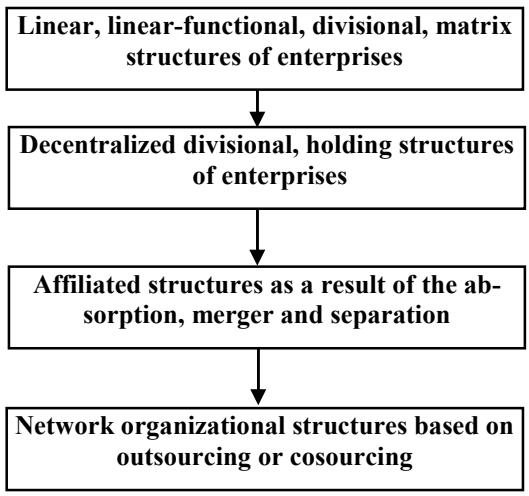


Fig. 4. The general trend of decentralization of organizational structures of the enterprises

Objective parameters for assessing the need for the next step in the decentralization of the company is the share that in common transactions of the enterprise (the upper curve of the graph displayed in Fig. 5) takes the unit (shown in the lower curve).

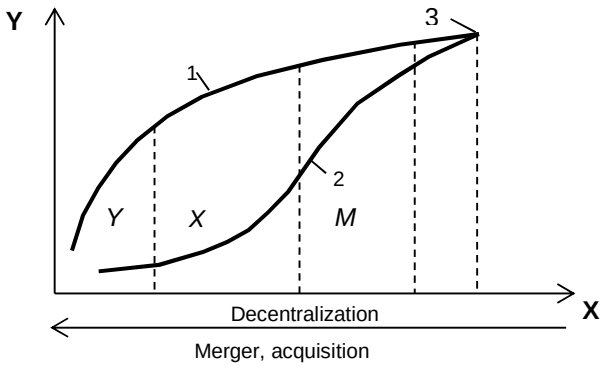


Fig. 5. Parameterization of solutions on reorganization of enterprises:
Y – the volume of transactions; 1 – variation of common volume of transactions; 2 – volume of transactions carried out by unit; 3 – the highest point of self-sufficiency of unit; *Y* – area of unitary enterprises; *X* – area of holding enterprises; *M* – area of divisional enterprises.

Demonstrate conducted with the participation of the author an example of separation from Lisichansk plant of rubber products (Lugansk region) the department for processing of rubber waste and turning it into a separate company while increasing its share in total transactions of the enterprise, associated with the purchase of raw materials and improving the technology of its processing, as reflected in Table. 1.

Table 1

Changes in the share of raw rubber processing department in the total amount of transactions of the plant and increasing the level of its economic independence

Phase	The main content of transactions and shares in it of plant (*a*) and department (*b*) in%				Conversion steps of the department
	Functions of the enterprise, *a*	Functions of the department, *в*	*a*	*в*	
1	Purchase of raw rubber	Participation in purchase of raw rubber	80	20	The shop within the enterprise
2	The sharp reduction in purchases due to lack of processing technology of tires with metallic cord	Self loading of the shop by external orders	30	70	The shop as leased enterprise
3	The termination of participation in the work of the shop	Development the technology of processing the tires with metallic cord, full self-sufficiency in raw materials and orders	0	100	Creation of a separate joint-stock company

Of course, that getting a parametric assessment of the unstable environment – this task becomes very important. But wrongly to consider uncertain and chaotic conditions as not to be evaluated. These are the signs of that an environment perceived as chaotic, has properties to self-organization, which is being the object of study of science synergetic. The object of synergetic, as the science of self-organizing systems, are undeniable, as it is believed that the phenomena that are perceived as a system were emerged in the process of self-transformation, when their former estate was considered as chaotic.

The current market environment is made under the influence of many unaccounted factors that can be considered as open, dissipative system, which is the object of study of synergy. Recent research in physics, biology, social sphere, and now in the economy show that instability – namely through chaotic system – prompts changes within her way asymptotic translating it into a new, relatively stable state. Such asymptotically stable stationary states which seek any open system, called attractors.

Attractors, in contrast to traditional research tools of social processes by mathematical analysis, programming and others differ by so important property as the invariance, i.e. independence from the previous state of the process. This property has very important ideological and practical importance, since through this attractors can be studied without the history of interpretation of massive processes, many factors that affect it, and only the stationary states in which they evolve.

Formally the evolution of such systems can be described for example by means of so-called Poincare maps, which is as follows:

$$X_{n+1} = F(X_n), \qquad (1)$$

where Xn – coordinate crossing phase trajectory evolution of the cutting plane in the n-th moment of the time;

$Xn+1$ – coordinate of phase trajectory crossing the cutting plane in the $(n+1)$-th moment.

As an example, show in Fig. 6 fragment chart daily fluctuations in load of furnaces in the shop of the enterprise as a fragment of the usual diagram. To display the dynamics of loading of furnaces as a point mapping input data represented in the Table 2 in a form that meets the requirements of the creation the function (1).

According to data from the Table 2 display the point map of the process on Fig. 7, where the abscissa indicates the value of today, and ordinate – tomorrow, and so on, changing places. The resulting locus of evolution shows unstable process. If it was a constant, then displayed to a point at bissektrissa of quadrant, but in this case shows a decrease boot, revealing three points of time delay of the process of decline. These points are characterizing the attempts of internal self-organization of the system, which can not be called attractors, i.e. new stable states, to which it aspires.

As a highly successful example of an attractor show process of variable fluctuations in sales in a supermarket on weekdays, as presented in Table 3.

According to data of Table 3 the point mapping of process is shown in Fig. 8a, and averaging in the form of an attractor in Fig. 8b. The data of these attractors are the reliable tool for planning and organizing activities. Stability of the attractor tested for two years, that shows the graph in Fig. 9, where for two years only a few have changed the price parameters of the process, but steady state is preserved.

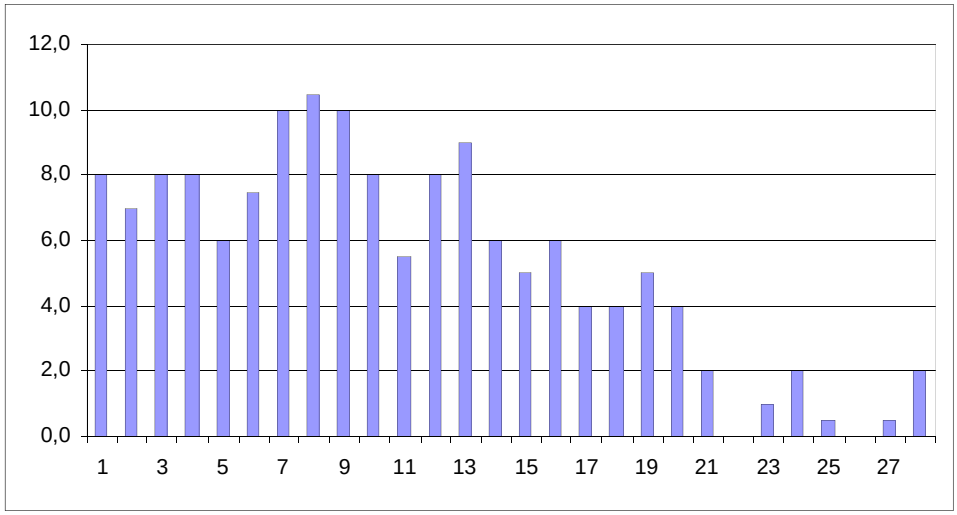


Fig. 6. Chart of download of furnaces

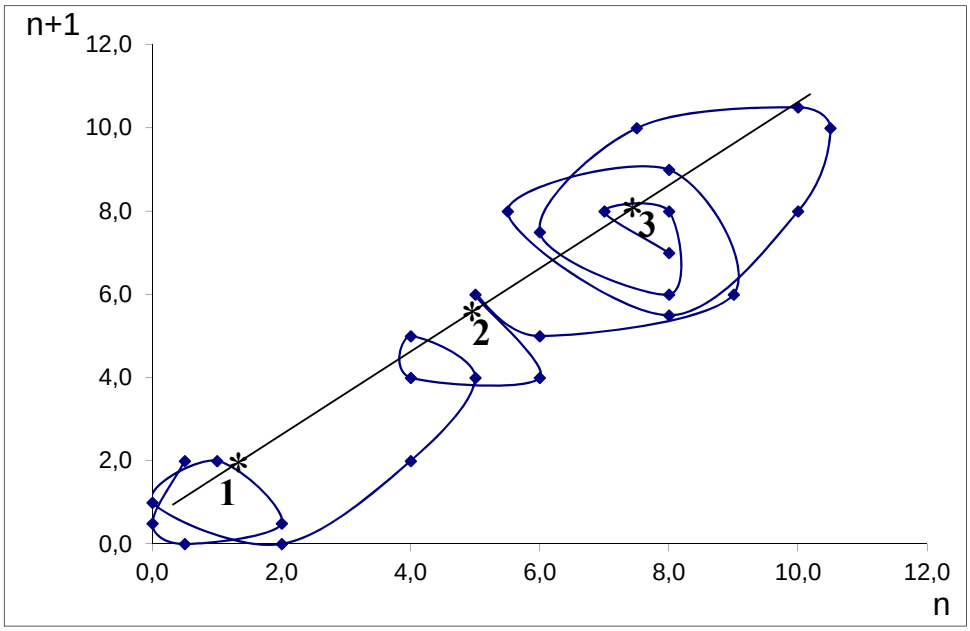


Fig. 7. The point mapping process of download of furnaces

Table 2

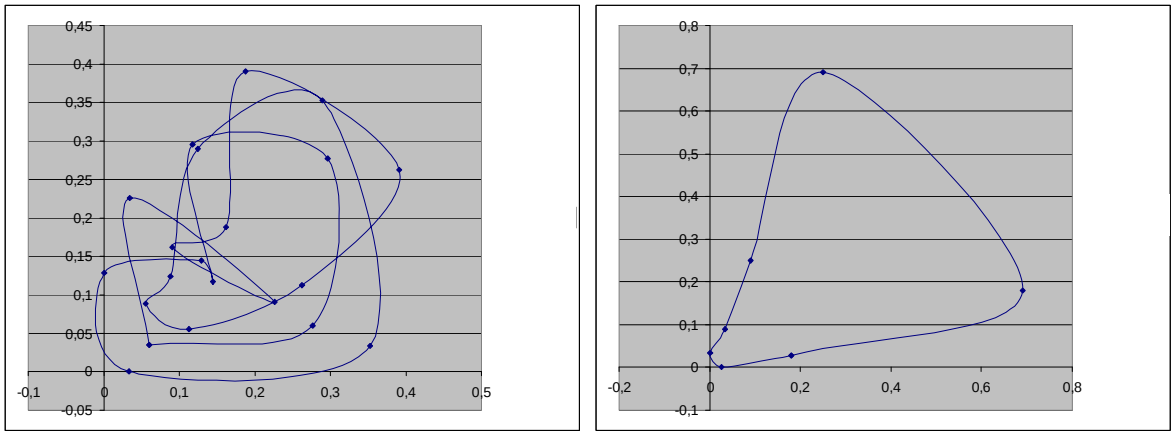
Data for point mapping process changes loading of furnaces

Point	*n*	*n*+1	Point	*n*	*n*+1
1	8	7	15	5	6
2	7	8	16	6	4
3	8	8	17	4	4
4	8	6	18	4	5
5	6	7,5	19	5	4
6	7,5	10	20	4	2
7	10	10,5	21	2	0
8	10,5	10	22	0	1
9	10	8	23	1	2
10	8	5,5	24	2	0,5
11	5,5	8	25	0,5	0
12	8	9	26	0	0,5
13	9	6	27	0,5	2
14	6	5	and so on		

Table 3

Data on the daily fluctuation in revenue in the supermarket (with respect to the lowest value taken for 1)

Weekday	Data on the daily fluctuation in revenue			
	1-st week	2-d week	3-d week	And so on
1. Monday	1,035	1,113	1,0	…
2. Tuesday	1,226	1,055	1,129	…
3. Wednesday	1,091	1,088	1,145	…
4. Thursday	1,162	1,124	1,117	…
5. Friday	1,188	1,29	1,296	…
6. Saturday	1,391	1,353	1,277	…
7. Sunday	1,262	1,033	1,06	…



a) ***b***)

Fig. 8. The point mapping of attractor of self-organization process of consumption by weekdays:
a) point mapping of self-organization process of consumption by weekdays;
b) attractor towards which seeks the process of self-organization of consumption.

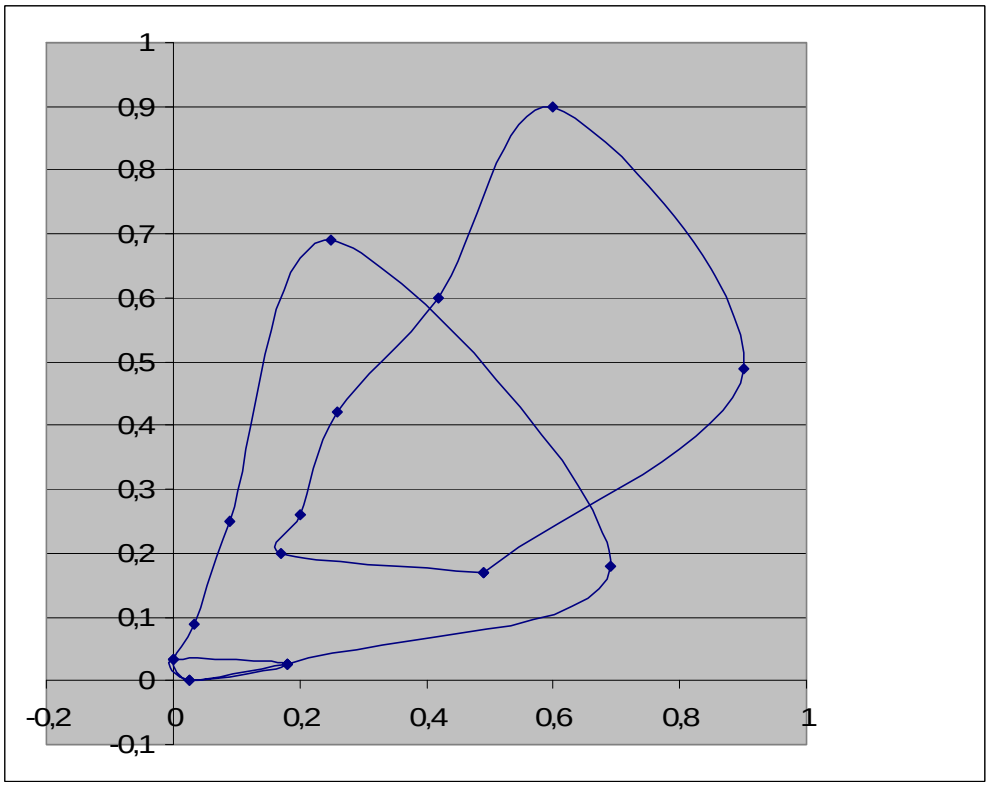


Fig. 9. The evolution attractor of daily sales on weekdays for two years

Such attractors rather accurately reflect the dynamics of consumption and in annual terms, by month of the year, certain groups of goods and the like, at the same time – without public opinion polls and other methods to determine the reasons for why variability of consumption has namely such character. The important thing is that the establishment of such attractors for future states of environment allows us to go from extrapolation to the interpolation parameters of the medium, that is more accurate.

Show in Fig. 10 as a stable attractor value of some general economic indicators of Ukraine compared with the average data of European countries, according to which Ukraine is far behind Europe in terms of domestic market share (DM) in total turnover, the share of small and medium-sized businesses (SB) in gross domestic income and wages (LW) at the same time, having the most taxes on business (Lt) than in European countries. Reduced in adopted Ukrainian budget for

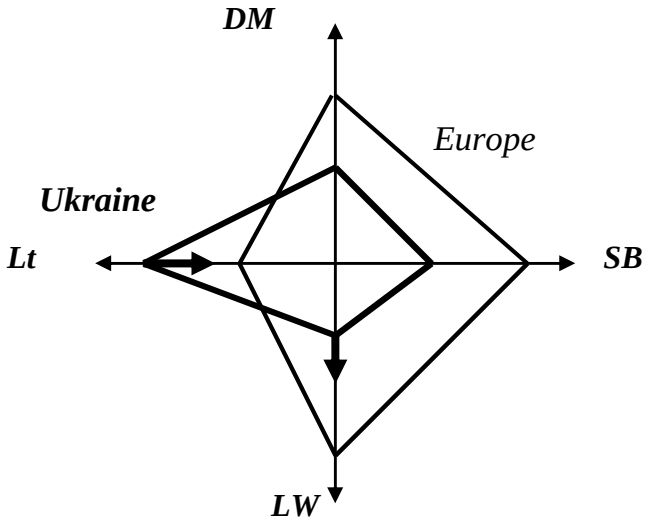


Fig. 10. Attractor sustainable ratio of macroeconomic indicators of Ukraine and Europe:
DM – share of domestic market in total turnover; *SB* – share of small and medium-sized businesses in gross domestic income; *LW* – level of wages; *Lt* – level of taxes on business.

2015 the rate of single social contribution on business while raising wages can move off the ground shown in Fig. 10 attractor towards the performance of European countries that will fully update base budgeting as a whole of Ukraine as within it up to planning the activity of individual enterprises.

Conclusion. Thus, adaptive organization of the company in the variable and chaotic environment in conjunction with its parameterization in the form of attractors of self-organization processes becomes relevant management tool in the conditions of today's market.

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Колосов А. М. Адаптивна організація – інструмент управління в мінливому середовищі

У статті розкривається поняття адаптивної організації як інструменту управління підприємствами в мінливому середовищі. В умовах все більш нестабільного ринкового середовища зростає необхідність у рішучій реструктуризації систем управління підприємствами, удосконалення всіх функцій управління, включаючи організацію, яка, як функція управління, повинна пристосовуватися до мінливих умов, тобто бути адаптивною. Основна мета адаптивної організації системи управління підприємствами є подолання її надмірного функціоналізму. Тому рівень регламентації процесу управління повинен знижуватися в міру того, як мінливість навколишнього середовища зростає. Це неминуче підвищує роль самоорганізації, як в процесі управління всередині підприємства, так і в хаотичних процесах у навколишньому середовищі. Зміна зовнішніх умов має формувати у власників бізнесу або керуючих компаній волю до реорганізації підприємства на основі децентралізації. Об'єктивним параметром для оцінки необхідності наступного кро-

ку в процесі децентралізації компанії стає частка, яку в загальному обсязі транзакцій підприємства виконує його окремий підрозділ. Поточне ринкове середовище формується під впливом багатьох неврахованих факторів, але в процесі самоорганізації воно рухається до відносно стійких станів, названих атракторами. Формально розвиток таких систем можна описати за допомогою так званого точкового відображення Пуанкаре. У статті представлений досить успішний приклад атрактора, який відображає процес самоорганізації коливань обсягів продажу в супермаркетах по днях тижня. Параметри подібних атракторів формують надійну базу для планування та організації діяльності підприємства в мінливому середовищі.

Ключові слова: організація, адаптивна організація, інструмент управління, мінливе середовище, функціоналізм, децентралізація, самоорганізація, хаотичний процес, атрактор.

Колосов А. Н. Адаптивная организация – инструмент управления в переменной среде

В статье раскрывается понятие адаптивной организации как инструмента управления предприятиями в переменной среде. В условиях все более нестабильной рыночной среды возрастает необходимость в решительной реструктуризации систем управления предприятием, совершенствование всех функций управления, включая организацию, которая, как функция управления, должна приспосабливаться к изменяющимся условиям, то есть быть адаптивной. Основная цель адаптивной организации систем управления предприятием является преодоление ее чрезмерного функционализма. Поэтому уровень регламентации процесса управления должен снижаться по мере того, как переменность окружающей среды нарастает. Это неизбежно повышает роль самоорганизации, как в процессе управления внутри предприятия, так и в хаотических процессах в окружающей среде. Изменение внешних условий должно формировать у владельцев бизнеса или управляющих компаний волю к реорганизации предприятия на основе децентрализации. Объективным параметром для оценки необходимости следующего шага в процессе децентрализации компании становится доля, которую в общем объеме транзакций предприятия выполняет его подразделение. Текущая рыночная среда формируется под влиянием многих неучтенных факторов, но в процессе самоорганизации она движется к относительно устойчивым состояниям, называемым аттракторами. Формально развитие таких систем можно описать в виде так называемого точечного отображения Пуанкаре. В статье представлен достаточно успешный пример аттрактора, который отображает процесс самоорганизации переменных колебаний объемов продаж в супермаркетах по дням недели. Параметры подобных аттракторов формируют надежную базу для планирования и организации деятельности предприятия в переменной среде.

Ключевые слова: организация, адаптивная организация, инструмент управления, переменная среда, функционализм, децентрализация, самоорганизация, хаотический процесс, аттрактор.

Kolosov A. M. Adaptive Organization – Management Tool in Variable Environment

The article argues the notion of adaptive organization as the tool for management enterprises in variable environment. In an increasingly unstable market environment the need for decisive restructuring of enterprise management systems, perfection of all management functions, including the organization, which as a function of management, must adjust to changing conditions, that is to be adaptive. A main goal of adaptive organization of enterprise management systems is to overcome the functionalism. Thus the level of regulation the management process should decrease when variability of environment is growing. This inevitably raises the role of self-organization as in management process within enterprise as in chaotic processes in environment. If external circumstances dictate, the will of business owners or management of the companies must be to reorganize the company on the basis of decentralization. Objective parameters for assessing the need for the next step in the decentralization of the company is the share that in common transactions of the enterprise takes the unit. The current market environment is influenced of many unaccounted factors, but in the process of self-organization it moves to relatively stable states called attractors. Formally the evolution of such systems can be described by means of so-called Poincare maps. Enough successful example of an attractor that show process of variable fluctuations in sales in a supermarket on weekdays is shown in the article. As a highly successful example of an attractor show process of variable fluctuations in sales in a supermarket on weekdays. The data of these attractors are the reliable tool for planning and organizing activities.

Keywords: organization, adaptive organization, tool of management, variable environment, functionalism, decentralization, self-organization, chaotic process, attractor.

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