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FROM THE RESEARCH OF ECONOMIC MOTIVATION AND METROLOGICAL BEHAVIOUR OF ECONOMIC ENTITIES TO THE RESEARCH OF METROLOGICAL SYSTEMS IN ECONOMICS AS A SPECIFIC TYPE OF SYSTEMS

Abstract. The basic historical types of economic motivation of economic entities as fundamentals of forming both the main historical types of metrological behavior and the most fundamental types of economic measurement are defined. A general characteristic of nominal, real and super-real economic measurements as the main subject of an economic metrology being a general theory of economic measurement is given. Based on the previous definition of the basic types of economic measurement a general characteristic of appropriate metrological systems in economics, namely, nominal, real and super-real ones is offered.

Key words: economic motivation, metrological behavior, economic measurement, nominal, real and super-real economic measurement, metrological systems, nominal, real and super-real metrological systems, economic metrology, metrological economy.

Introduction. The aim of this article is to carry out research of the general characteristics of metrological systems in economics on the basis of generalization of their historical and functional practice of formation as well as to analyze modern literature on these economic issues. The main idea of the article is to prove that the practice of economic measurements as well as of the metrological system, which is formed on its basis, is derived from, firstly, the **economic motivation** of **economic entities** and, secondly, the **metrological behavior** of these entities. According to the author, on the basis of his research, metrological systems in economics are determined by the nature of both economic behavior of economic entities and their metrological behavior. In this perspective, metrological systems in economics are studied **for the first time** in modern economic literature, unless, of course, we do not take into account the previous publications of the author on the above mentioned issues.

The main results of the study. The main result of the scientific analysis of the economic measurement practice carried out by the author is formation of the theoretical statement that the character, or nature, of economic measurement is determined by **capital scales,** the **scales** of economic class **systems** in which it is implemented. The **larger really** (just really, not nominally, as the author of this article notes) the system's scales are, the scales of certain capital, which always acts as a material-economic basis of these systems, the **more perfect** economic measurement is as well as an appropriate type of metrological systems being formed on its basis. The main goal of the scientific economic analysis is achieved in the plane of characterizing historical types of economic motivation of business entities, their metrological behavior and the most fundamental types of economic measurements. Such a research plane affected the structure of this article. First, the main historical types of economic motivation and metrological behavior of **economic entities** are analyzed, and later – the most fundamental types of economic measurements.

1. About the main historical types of economic entities economic motivation

In econometric studies of the **latest** (current or most modern) period we should not go from economic and mathematical models to the actual economic practice (and practice of economic measurement) but **vice versa.** Until now econometric studies have been done "upside down". First, there was constructed this or that economic and mathematical model using mathematical instruments without sufficient understanding of the real economic life, and later based on its mathematical (at best – economic-mathematical) analysis some recommendations for economic practice were made. At this, economists-mathematicians (traditional econometrists) little thought about the principles of economic measurement used by a certain economic practice, about how it creates certain economic parameters. This essential economic problem remained outside econometric analysis. We are among the first in modern economic literature who attempted to move away from this style of econometric research. We put

it as the main goal to return to econometric researches their genuine **economic substance and economic nature.** Econometrics is primarily and mainly **economic science,** though it is also **metrological science** and only then it is or may be **mathematical science** (and even then only in strictly defined limits determined not by subjective intentions or desires of researchers, but by economic practice). To consider it otherwise is once again to turn it "upside down".

Study of principles, methods, rules or algorithms for forming and modifying the basic economic parameters should be based not on studying the various parts of economic and mathematical models (or economic and mathematical functions), as is still done in traditional or post-traditional branch (version) of econometric science (econometric research since its birth and in fact today has assigned great importance to partial derivatives of linear economic and mathematical models, considering it to be one of the forms of evaluating goods and services) but on studying the actual economic practice, especially its specific part or aspect – practice of economic measurement. It is in the practice of economic measurement that we should identify certain metrological procedures based on the principles or rules of economic parameters formation. The practice of economic measurement, as we noted in our previous metrological works, comprises **two sectors.** On the one hand, we can single out its **market part** (the practice of the so-called market pricing) and, on the other hand, there is its **beyond-the- market part**. However, common to both parts is the fact that they are forming economic parameters **through a certain metrological activity of business entities, certain metrological behavior.** Different economic entities in different economic conditions (historical and economic conditions) form economic parameters in different ways, and they do it **before the market, a priori.** In the compromise-based market (which is also determined by a number of factors) different approaches to economic measurement are only "agreed", and are reduced to a single compromise value. Therefore, metrological activity of businesses **starts** "before the market", among the major economic agents – producers and consumers, and it just **ends** at the stage of the market and market structures.

This important circumstance of operation and development of the practice of economic measurement cannot be understood by liberal economists (to whom the majority of domestic reformers-practitioners of the national economy belong together with other economists from post-socialist countries).They think that the market mechanism performs the economic measurement procedure **automatically** and without any subjective activity of the main economic agents, at least, this concerns such a fundamental economic parameters as **value.** We follow a different perspective: the value is actually formed through the market mechanism, but through appropriate metrological procedures undertaken by major economic entities. Its content is usually an **objective** metrological form of final order (as it is formed by the economic entities with the account of certain factors), but at the same time it is a **subjective** form (as economic entities are "creating" it following strictly determined rules that correspond to their own interests and exactly reflect them). Economic entities "are placed" by an objective economic development in certain "metrological framework" and act within it. The main task of economic metrology as part of theoretical econometrics in a broad sense is to identify and theoretically fix these objective limits of subjective metrological activity of the major agents of a particular market or the economy as a whole. Therefore, we can definitely say that the main subject (or object if the latter is somewhat narrowly understood) of economic metrology (and econometrics in general) should be detecting and "decoding" of **metrological behavior** of economic entities because it is just through it that economic measurements are made. Such understanding of economic metrology subject was presented in our previous works. Being aware of the **specifics** of metrological researches in economics, we did not want to bring them down just to the economic analysis of economic and mathematical models or functions.

However, having defined the subject of economic metrology in this way, we have not answered the question: **what factors** objectively determine the metrological behavior of businesses? Why is it different in different economic situations? In some cases it is based on one type metrological principles, in others – on the other. Careful study of the practice of economic measurement and metrological behavior of businesses has given reasons for the fundamental conclusion that the metrological behavior of economic entities is determined by their **economic motivation** (this point of view is shared by I. M. Kopych who is one of major "developers" of general economic metrology as both theoretical and

fundamental part of econometrics in a broad sense); with changing the nature of economic motivation the metrological behavior of economic entities is changing correspondingly. The first means the **ultimate direction or the main purpose of a certain business activity.** It gives the answer to the question – why, for what purpose we carry out this or that economic activity (fig. 1).

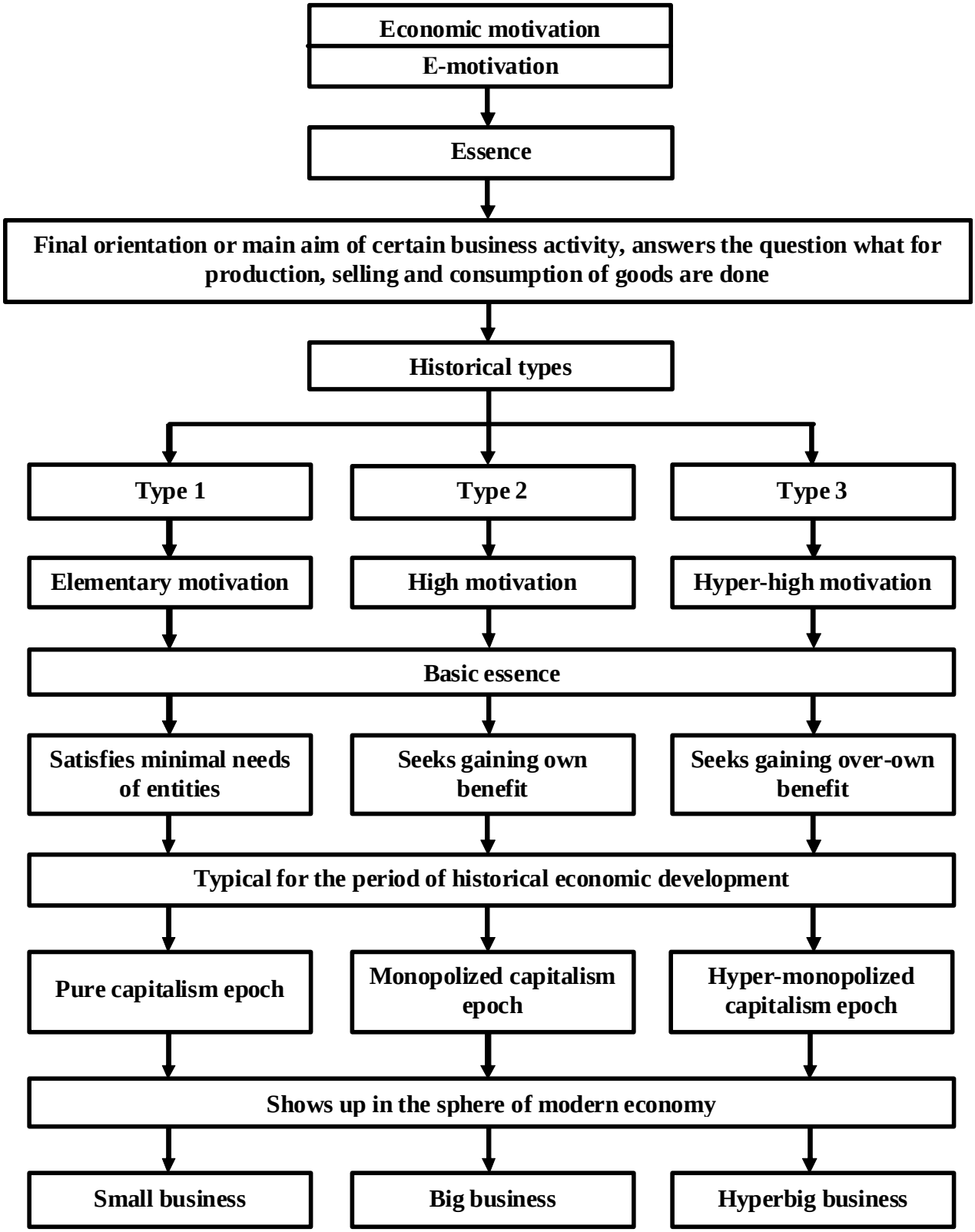

Fig. 1. Main historical types of economic motivation of business entities

This economic motivation also changes with the course of historical and economic development. Its careful study in this historical context gives us reason to single out at least three types of such economic motivation (see fig. 2).

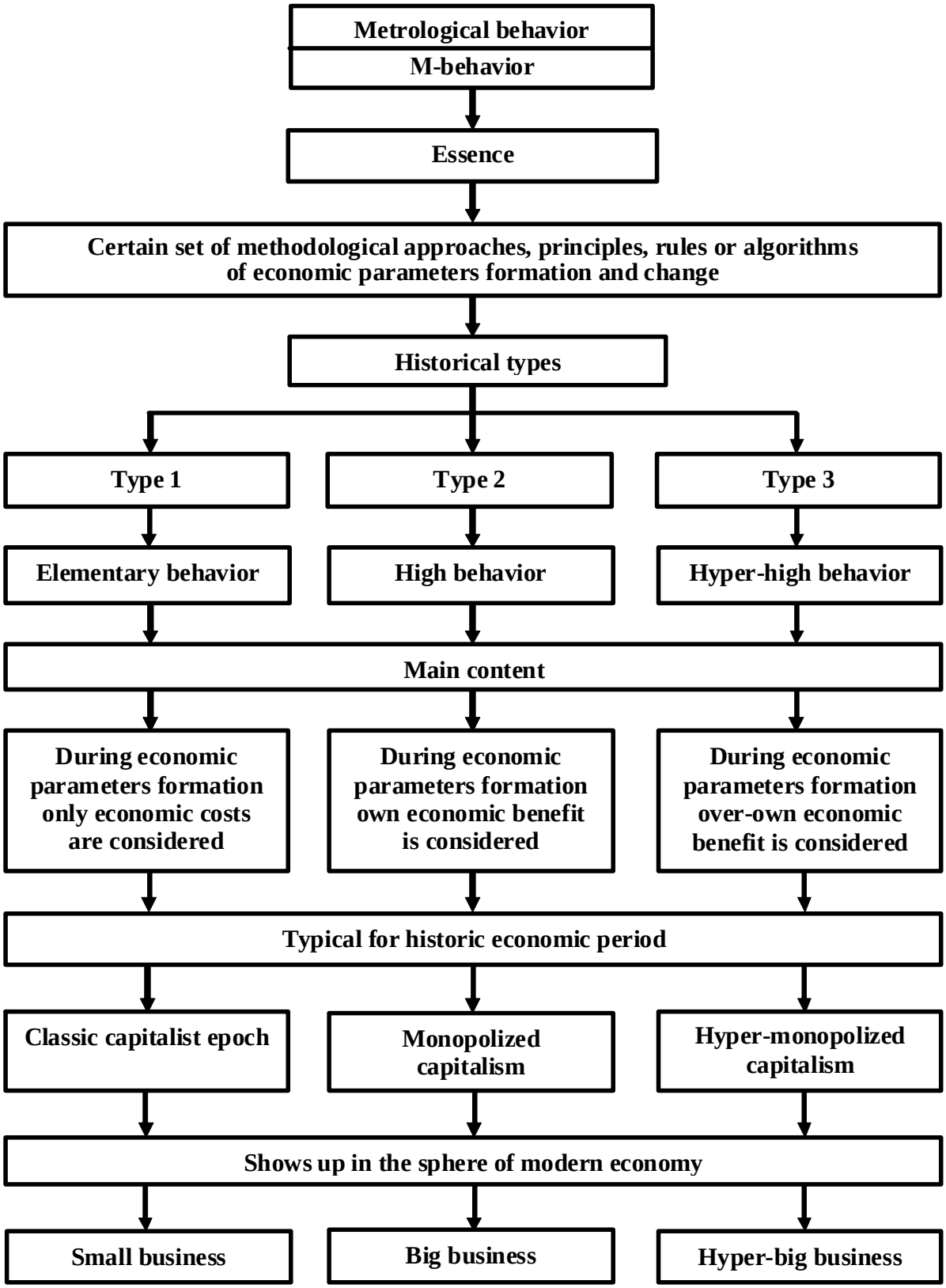

Fig. 2. Main historical types of metrological behavior of economic entities

Type 1 is an **elementary economic motivation** (EE-motivation), typical for businesses in a free competitive period of historic economic development in an era of **small** (or simple) economic **systems** dominance. In the field of small business entities do not set a higher goal than to **satisfy** their **minimum economic** (or socio-economic) **needs.** This is the essence of elementary economic motivation. In such conditions entities do not aim at getting any economic benefit. The criterion of economic benefit is not yet urgent. The historical era that did not bring economic benefit to the forefront as the primary criterion, or driving force of economic development, was called by K. Marx **simple commodity production.** This era of simple commodity production continued chronologically (in the modern world's most developed countries) until the XV-XVI centuries, so it can be called **proto-capitalistic** (or pre-capitalistic). However, if it were relevant only in the historical context, there would not be a necessity to research it in modern times. But it is researched. Small commodity production sector or small businesses remain today a **separate segment** of national economy. It is in this area that the given type of economic motivation dominates, when economic entities do not go beyond minimal satisfaction of their own needs. In this segment of economy the economic benefit **has not yet become** the major criterion, or driving force of the economic development. Further we show that the mentioned type of economic motivation determines the corresponding type of metrological behavior of entities that form the basic economic parameters by strictly determined and usually the **most primitive** rules.

Type 2 is high economic motivation (HE-motivation), in which the entities conduct economic activities not only to meet their minimum needs but also to get certain **economic benefit.** The criterion of economic benefit already comes **to the forefront.** However, the lower criteria of own minimum needs satisfaction is not eliminated completely, and begins to perform a supporting role or function. Historically, economy enters this criterion dominance zone in the period of emerging **monopolized economic systems.** It is then that the economic activity begins to be associated with the economic benefit, i.e. any economically beneficial economic activity is considered as **economic activity.** Thus, truly "**economic substance",** begins its "life" then and only then when the economic benefit comes to the forefront of any economic activity, to be exact, it is not economic benefit but rather one's own benefit (benefit for the company, though in this early period of modern economic development this benefit is almost always economic benefit; it transforms in the social or socio-economic or socio-spiritual benefit in the next period of economic historical development).

Karl Marx was the first to notice and theoretically fix this **significant economic principle** in "The Capital"**.** However, he made one "small" (but methodologically essential) mistake – he **identified** the principle of economic benefit as a fundamental principle of economic development and economic functioning with the **bourgeois, or capitalist, principle.** He thought that only the bourgeoisie as a class can, in its economic activities, be guided by the principle of economic benefit, and as soon as the proletariat removes the bourgeoisie in a revolutionary way, history "will reverse" immediately to the lower principle – that of meeting the minimum needs of its members. This principle of economic development (it is more correct to call it the principle of proto-economic development) was qualified by K.Marx as the **natural** one that is conditioned by the historical process of economic development and the principle of economic benefit was qualified as a **bourgeois one** that is **deformed.** We call this approach and such understanding of economic development motivation **retrograded.**

The principle of economic benefit or benefit in general is not a bourgeois one, although at some stage it acts as bourgeois. It is, without doubt, the **most efficient economic principle, the first great principle of free economic development.** Since the time when it begins to dominate, the economy leaves the **proto-economic** state of development and enters into an era of **true** development, actually becoming the economy in its modern sense. Hence, to fight against the principle of economic benefit, as Marxists did and continue doing now, means to **fight against economic development,** strive to "return the economy back" into its **proto-economic** condition. However, class ideological conclusions, arising from the general characteristics of the principle of economic benefit, are not major for us. More important is to find and theoretically fix **metrological consequences** of economic motivation principle emergence on the historical scene.

Type 3. With the appearance of the principle of **benefit** the progress in changing the structure of economic motivation of businesses does not end. In the **post-capitalistic** (current) period of historical economic development there gradually appears even higher principle of economic motivation, we conditionally qualify it as the **hyper-high** one (see fig. 1). It corresponds to **hyper-high economic motivation,** which means that certain entities conduct certain business activities not only to meet their minimum needs or get certain benefit or for their own benefit, but for **over-own benefit** to meet the specific needs of society as a whole or for the benefit of a certain industry or field of economy. This hyper-high motivation of business gradually began to come to the foreground in the second half of the twentieth century (in the most developed economies of modern world, or in the so-called traditional past capitalism). For its actual formation the process of capital integration had to move beyond big business and enter the zone of **hyper-big business.** It is such extremely big business that is the form of economy where the subjects stop putting their own benefit in the first place.

Sometimes for them the benefit, which, at first, is not necessarily their own but is the benefit to other businesses has sometimes much more economic significance, we call it **over-own or hyper-real** benefit; secondly, it is not necessarily purely economic, but may be socio-economic or even social and spiritual, so it can be qualified as **over-economic** (not only economic but also social or socio-spiritual) benefit; thirdly, it does not necessarily have a static nature, i.e. act as a static benefit, and may be remote in time to a particular economic period, it can also be defined as **over-static benefit**).

An extremely big businessman (or an extremely big monopolist, as K. Marx would put it) no longer wants to receive only that benefit, which is, of purely his own, purely economic, and purely static character. Horizons and criteria of his business **are significantly expanding,** and due to this, a new higher-quality spiral of **economic progress** occurs**.** If in **medium or large** economies (actually capitalistic) economic progress was made through implementing the principle of **own or real benefit,** now, in an era of ever larger business when there appeared **hyper-big economic systems** (the definition given by the author – **G.B.**), the economy develops on the basis of this hyper-high economic motivation. The more different economic systems are focused on the practical implementation of the highest motivational approach, the more sophisticated and developed they become. From the moment when the motivational approach entered the historical arena, economic development transformed from capitalist into **post-capitalist.** Truly economic is not only economically **profitable** for this company, but also for the economy as a whole and not only at this time, but in the long run. The economic motivation of economic activity in the recent historical era becomes **long-term** in terms of **time and functional level** and much **more colorful** in terms of **formation** (not only "economic" but also "social" and "socio-spiritual" color of objective economic activity are taken account of).

This change (being already the second one in order) of economic motivation of economic activity becomes the determining factor of all socio-economic development. It marks **another revolution** in the economic practice. In modern economic literature it is sufficiently covered, but today almost no analysis of its **metrological** (measurement) **consequences** is being conducted. That is why we set a goal to make a deep scientific analysis of the **metrological side** of the problem, or the described above change in the nature of economic motivation of economic entities. Meanwhile, the hyper-real economic motivation is especially strongly manifested in the **hyper-big sector** of the national economy, the sector of **hyper-big business.**

To sum up, the transition from elementary to high and hyper-high (real and hyper-real) economic motivation of economic activity is influenced by fundamental factors such as **consolidation of capital.** The general trend is as follows: the more capital an economic entity possesses, the more perfect and progressive its economic motivation, its **motivation policy** will be**.** Economic motivation is the most perfect not in conditions of perfectly competitive market, as the liberal economists believe, but in conditions of the market that is **the most "distant"** from the pure competition. Economic progress of various economic systems is growing with their scales growth. Gradual transition from **extra-small, small** or **medium economic systems** to **large or hyper-big ones** simultaneously defines the primary direction of **social and economic progress,** the change of elementary motivation to high or hyper high.

Liberal economists (both of classical and modern postclassical branches of economic science) turned the socio-economic development "upside down". They continue to believe the pure perfect market to be the most progressive, it being in reality the least progressive of all currently existing types of markets, i.e., they **idealize small or extra-small** economic systems. Only when the market is transformed from the pure perfect into the imperfect (being monopolized in this or that way, i.e. big or hyper-big) market, **it progresses**, changing its economic motivation from elementary to high or hyper-high. This theoretical conclusion has a very great **methodological** importance for the research of operation and development of metrological systems in the economy, a special study of which the author began in the early 80s and today actively and purposefully continues to analyze in his works.

2. About the main historical types of metrological behavior of economic entities

As has already been noted, economic motivation and its nature (and its historical transformation) determines **metrological behavior** of economic entities. It also transforms historically, moving from a lower to a higher degree of development. It is understood as a **set of methodological approaches, principles, rules or algorithms to the formation and change of the key economic parameters.** Since among these parameters there are **primary** (the formation of value, for example) and **secondary** (all those derived from the value or price), then the metrological behavior of economic entities can be differentiated as **primary,** basic, major, and **secondary.** The first should be explored within the **general** economic metrology, and the second within the **special one.** In this part of our analysis we focus on the issues of general economic metrology; we are primarily interested **in the part of** metrological behavior of economic entities limited to the formation of such parameter as **the value or price**. The author began the study of the nature of metrological behavior of economic entities in the 80s. Steadily and consistently following the **historical approach** to the analysis of metrological issues, we managed, on its basis and in its methodological paradigm, to single out a number of historical types of metrological behavior of economic entities, each of which is the subjective environment, in which the appropriate type of economic measurement is formed (fig. 2).

Type 1 is **elementary,** or **lower** degree of development of the economic entities **metrological behavior**, which prevailed in the classical **capitalist era** (in the era of simple commodity production, according to Maxist periodization of economic development) and today it is saved in the purest form in **small business** (in small economic systems, in our terminology **– G.B.**). This elementary metrological behavior of economic entities means that the latter in determining, for example, the value – price or economic evaluation (in the absence of inflation, and when economic evaluation stands in cash, these three concepts, or measurement forms, act as de facto identical) take into account, first of all, **economic costs.** The greater they are in the production or consumption of certain goods, the **greater value** these goods have.

Although elementary metrological behavior of economic entities was historically considered to be **primary,** it is still preserved in those sectors of the economy in which **small business** dominates. Thus, elementary metrological behavior is the **measurement ideology of the poorest group of businessmen,** and so it appears to be **the most left** during **political assessment** (more precisely, "the most left" among the "right" ideologies of measurement). Small businesses do not aim at getting any economic benefit from their economic activities. It is more important for them, as we have already pointed out, to fully meet their minimum material and economic needs.

So, small businesses want, with an objective necessity, to produce or consume the goods the value of which gives the opportunity, on the one hand, to recover all costs of economic resources (including their own entrepreneurial skills), and on the other hand, to most fully meet their minimum needs. That is why they will "choose" for doing business (consciously or unconsciously) only those "niches" in which goods or services have only **nominal value.** Such goods, firstly, must be technologically simple, secondly, perfectly competitive, thirdly, their production or consumption should be possible with **small capital** (their capital capacity must be the lowest). Such goods with very low capital capacity give, firstly, very small, and secondly, almost **sudden** money income, which almost always goes to meet a particular entity's own needs.

Type 2 is a **high or higher metrological behavior** of economic entities, which becomes real in the sphere of **big business** or in the era of **monopolized capitalism** (the era of imperfect competition). In its conditions, economic entities assess the value of goods and services (or other economic processes and economic activities) not only on the basis of their economic costs (that is still typical today for the elementary metrological behavior) (the goods accompanied by more economic costs are "attributed" or "imposed" higher or greater value), but also on the basis of their **effectiveness,** economic benefit or economic effect that accompany production or consumption of certain goods. More cost-effective goods and services have higher real value, are **worth more.**

At high or higher type of economic entities metrological behavior the criterion of economic benefit (more precisely, not only **economic** but also **own** benefit, such as the one being formed at the moment, i.e. **sudden** benefit) comes to the foreground. Cost-effective goods are treated as goods which possess **conventionally greater value, they cost more** (metrological estimation in the economic sphere of the economy and in the society as a whole always has **conventional**, more exactly, **formal** nature since it characterizes the measure of **importance** of goods and services and that is why it concerns only a formal part of the economic matter movement; it is similar to economics itself that is a formal rather than real science, thus being close to the sciences of mathematic cycle**).** This metrological behavior of business entities **is projected** on other (but for economic) structures of the society. In its system more beneficial processes receive **higher evaluation**; this evaluation can be both economic and beyond economic. But beyond the economic sphere the value already exists as a rating, or as a **non-economic value** (social value, social and ethical value etc.). In this part of work we put an **economic value** as a major form of metrological outcome in the economic sphere of the society.

High (or higher) metrological behavior of economic entities historically was formed in the era of classical capitalist structures transformation into monopolized capitalist systems, or **post-traditional capitalist economic systems, big capital** (big business) being the material basis for their operation and development. .And it was dominant throughout the whole postclassical stage of capitalist development, i.e. until the end of the first half of the twentieth century (in modern most developed countries of the world). In conditions of post-traditional capitalism all or almost all economic processes, economic actions or economic goods and services **are evaluated** (i.e., are reflected metrologically) almost exclusively on the basis of their **benefit,** which is, firstly, **economic,** secondly, **own,** serving as a benefit for a particular company, thirdly, **static** which can be received **practically immediately,** at the moment of performing certain economic activities or economic spending. Such a businessman (a big businessman) is not interested in any other benefit (it being non-economic, non-microeconomic, not his/her own and non-static), he/she ignores it, so he/she pays attention only to economic projects or economic decisions that can bring him immediate benefit, necessarily "in money" but not in any other goods or services.

This metrological behavior is a step forward compared to the elementary one, because it no longer limits the measurement activity to accounting only economic costs, it is **more progressive.** But it also has some disadvantages, in particular, it has a purely **economic nature** (uneconomic part of benefit or effect is not included in the evaluation activity), and secondly, it considers only **local benefit,** i.e. a competitive advantage for a firm (**own benefit**); thirdly, it also takes into account only the **static benefit,** i.e. the one that is formed immediately at the time of performing certain economic activities (the so-called zero time lag). Economic, local and static natures of higher metrological behaviour are essential to its further transformation into a still higher one, which we qualify as **hyper-high.**

Type 3. The process of escalation, or transformation of high metrological behavior into **hyper-high** (a third historical and functional type) began in the most developed countries in the second half of the twentieth century, and have not yet ended. Now at the beginning of the XXI century we can observe the **hyper-high** metrological behavior that was scientifically described by the author in 80s, and further investigated in 90s. The hyper-high metrological behavior is especially clearly manifested in **hyper-big** business or **hyper-big or hyper complex economic systems.** In such a business system,

economic entities, purely metrologically, begin to act more rationally, more perfectly, more precisely than, say, in big business. For them, **their own benefit ceases to be** the main criterion of value of certain goods (moreover, it being non-economic and static).They are more targeting not only and not so much their own benefit (of economic and static order), but more the **over-own benefit.** The latter is not only static but dynamic, can be formed and implemented not only at this time, but in the distant period, it is also not only necessarily just economic but also social and economic or even social and spiritual. Here, for the first time in history the economic entities begin to act not only economically, not purely statistically, and not purely micro-economically, but also **socio-economically, dynamically and increasingly globally.** Local benefit (only for this very company) ceases to dominate, but retains the role of the **partial** formation parameter of a new (more precisely, contemporary) **metrological behavior.**

If the **traditional** (elementary) metrological behavior of economic entities was sufficiently investigated in classical and modern neoclassical economic literature, and **the new** metrological behavior – in the classical literature (especially Marxist, but only as a context), **the newest** metrological behavior**,** peculiar to modern era of the global economic development, is almost totally unexplored. The author started its study in 80-90s, making a significant contribution to its research. And so a new or modern turn in the development of econometrics should be based primarily on a preliminary analysis of modern metrological behavior that is characteristic for the sphere of big business. Its detailed and careful study gave us reason to conclude that the newest (hyper-high) metrological behavior is based on the account of, firstly, not only micro- but also **global** (macro-, national economic etc.) **effect or benefit;** secondly, not only static but **dynamic effect or benefit**, thirdly, not only economic but also **socio-economic** or **socio-spiritual effect or benefit.** Hyper-big capital embodied in certain economic entities is, firstly, **more farsighted in terms of time;** secondly, **more farsighted in terms of functional levels,** and thirdly, **more farsighted terms of formation.** In "metrological terms" it sees farther and higher, and therefore the results of measurements at this metrological behavior are **more accurate,** in metrological terms. **From the point of view of politics**, they are **more right-wing** If a small business **leads "a classical right"** policy, then large or very large business conducts **hyper-right** or **over-right** policy, which metrologically is the most **accurate and most advanced policy.**

This conclusion, of course, will shock the representatives of the "left wing" of the political spectrum of society, but it is objectively conditioned and reflects the real development of business practice in general and such an important part of it as the practice of economic measurement, that is materialized in the corresponding metro-logical behavior of businesses and transforms in a particular direction in the course of historic and economic development. Such approach and such assessment is presented in metrological work of the author, particularly in those published in 80-90s of the twentieth century.

3. About fundamental types of economic measurement

Three types of metrological behavior of economic entities conditioned three types of economic measurement – elementary, or nominal; high, or real; and hyper-high, or hyper-real (or, respectively, traditional, post-traditional, or new and modern) (fig. 3).

Type 1 is **elementary, nominal, or traditional** economic measurement based on the **nominal measurement** ideology. Its essence is that in determining (assessing) the value of certain goods and services only economic cost of the basic resources is taken into account. The greater they are, the greater the value (importance) is attributed to (or "imposed on") a particular good. Under the dominance of the nominal ideology of economic measurement the major economic parameters (particularly value) fully reflect the movement or the value of economic costs. Economic costs, thus, serve as some **economic measure** of all major economic parameters, economic forms or economic processes. For example, the value of any good in full (without any remainder) **is reduced to economic costs**, i.e., it will always be possible "to decompose" its value (also without any "remainder") into costs of the economic order.

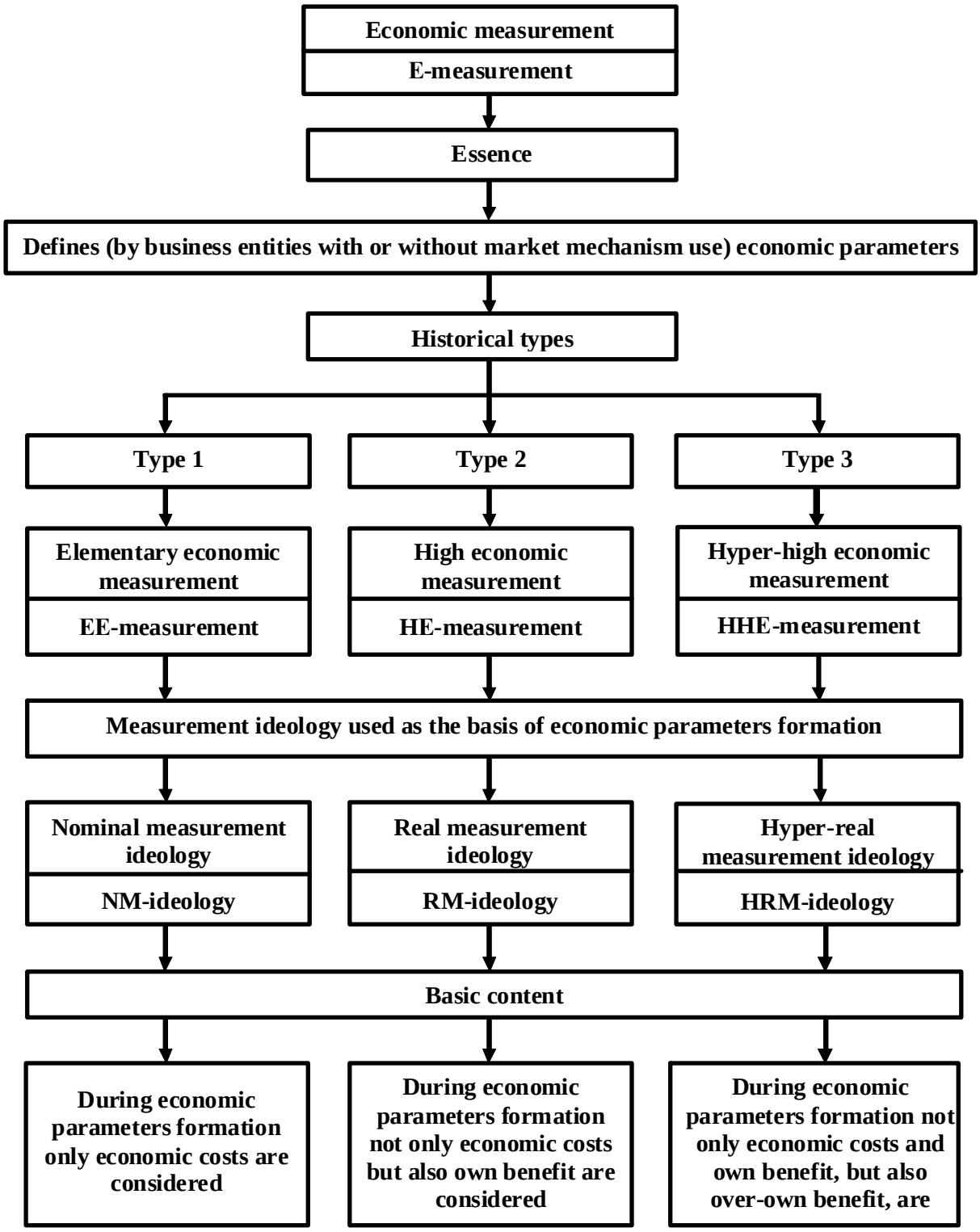

Fig. 3. The most fundamental historical types of economic measurement

To define this or that parameter **by its nominal** means to make an accurate calculation of economic costs that "represent" this parameter or act as a form of it. Nominal ideology of economic measurement "works" more or less sufficiently under two conditions. First, under the so-called **pure competitive market** conditions, or pure competitive economic systems in which certain economic activities are more or less **"equally effective"** that gives equal and rather miserable economic benefit. The latter, under such economic conditions, is not larger (as a rule) than **the normal**

profit, the amount of which more or less coincides with the costs of such a specific type of economic resources as **entrepreneurial skills.** The normal profit practically (both qualitatively and quantitatively) does not differ from wages as a sort of metrological reflection of labor costs, particularly concerning physical labor (as the nominal ideology of economic measurement dominated in the era of traditional labor based on physical labor, and mental labor did not play any significant role). The second case when the nominal ideology and (the corresponding type) economic measurement also dominate, is that when the economy is functioning as **an administrative economy.** During the rule of **administrative economic systems** economic measurement can be only **elementary,** or **nominal.** This conclusion is confirmed by all the experience of the so-called socialist and later communist construction in the countries of the so-called real socialism (or the socialist camp). In such economies, the economic cost is the **measure** of all key economic parameters, without "the remainder", i.e., in fact, the **only** measure that excludes the application of any other measures.

But the deeper cause of the practical existence of the nominal ideology (or the type) of economic measurement is the character of **economic motivation** of economic entities. Until the economic entities set a higher goal than a minimum satisfaction of their needs, the practice of economic measurement is always carried out according to **a nominal scheme** that best corresponds to the economic motivation of **small business.** In the system of such business, economic measurement can only be **nominal** by the character, or nature. In other words, for the nominal ideology of economic measurement to be practically real, the capital while consolidating should not go beyond a **small capital.** It is this capital that is, on the one hand, the material basis for the existence of **small (hyper-small)** economic systems, and, on the other hand, gives rise to the nominal ideology of economic measurement.

From the historical background, it can be noted that the economic dominance of the nominal measurement was most characteristic of the classical **capitalist era** of modern economic evolution, when the capital was still too small for perfect, more advanced measurement ideology to enter the historical scene. The c**ulture** of economic measurement in that historical era was still very low, was at the **elementary level,** where **only economic costs** were the criterion or measure of all major economic parameters. The objective "undermining" of this nominal ideology of economic measurement began when the capital evolved beyond small capital, stopped being too small, somewhat **concentrated.** So, the epoch of post-traditional capitalism (post-capitalist economic systems) formation is the era of **"the beginning of moving away"** from the nominal ideology and culture of economic measurement. It was this epoch that called to life a **new** historical type of economic measurement, which we qualify as a **real, post-traditional, and actually new.**

Type 2 is the **real** type of economic measurement, which historically replaced the nominal type; it is characterized by the fact that **only economic costs** stop being **the measure** of value of certain goods or services; these costs are not eliminated as a measure of value and preserve their role, but already as a **separate option.** When this or post-traditional (new) type of economic measurement is used, the value of goods is determined by the economic benefit as well, by the degree of efficiency of goods and services. Better goods are regarded as having greater value. We call this ideology of economic measurement, which prevailed in the era of monopolized capitalist development, the **real ideology** (and the corresponding type of economic measurement based on this metrological ideology could also be qualified as real). However, in this case "real" is understood not in the sense of its **price** (as it is often done in modern economic literature), but in the meaning of its **formation and function** when economic magnitudes, whose values or structures also reflect **the degree of effectiveness** of certain goods or services, certain economic processes and economic activities, represent real economic volumes. Nominal measurement, in its turn, is seen as **indifferent** to this economic parameter, i.e., it has no relation to the reflection of degree or measure of effectiveness (in the modern economic literature the nominal volumes of economic parameters are their volumes in the so-called real prices, i.e. with the account of the inflation component. This understanding of nominal can also be considered as traditional).

The real ideology of economic measurement is more perfect than the nominal one; it marks a

new stage in the development and formation of the economic measurement **culture**. Using the outlined real approaches to measurement of economic parameters as the basis, we raise the general culture of economic measurement to a higher level, make its results more precise and perfect. Real ideology of economic measurement is implemented through the corresponding mechanism of market pricing. For the market and market structures to transform nominal economic measurement into the real one, the market should transform from the perfectly competitive into the imperfect (i.e. monopolistic) market, which possesses the methods and mechanisms that allow, due to the combined effect, transforming nominal economic measurement into the real, higher and more perfect. However, the monopolistic market is formed by the same economic factor as the corresponding metrological behavior of economic entities – due to the **increase of the capital scale.** The scale of capital, or the total money income, which the economic entity possess or have at their disposal, is the driving force that transforms not only the nature of the market but also the corresponding metrological behavior; and at the same time the type or nature of economic measurement is transformed too. Since the beginning of the formation and development of **large economic systems** (based on large capital) metrological behavior of economic entities has changed drastically. It is based not on the nominal but on the **real** ideology defining the basic economic parameters which no longer are indifferent to the effectiveness of certain goods or certain actions. This interpretation of the real ideology of economic measurement (and the appropriate type of measurement based on this ideology) for the first time in modern economic literature was suggested by the author in the late 80s, and in some publications of the first half of 90s. Later it has been developed in our metrological works in the second half of 90s in which we clearly and unambiguously connected the real approach to economic measurement with the so-called **effect-based one.** We recommend to determine the **real volume** of certain economic parameters with the account of the **effect** (economic effect), which is formed in the process of undertaking respective economic activities. Goods with **greater effect** are recommended to be regarded as having **greater value** (what we call the real value).

However, the real economic ideology of measurement has several shortcomings, is not perfect, if to evaluate it, say, by the degree of economic progress or the accuracy of measurement results. Its main drawbacks are: firstly, it takes into account only its **own effect** in the real volumes of certain parameters, which some competitive firm receives. The part of economic effect formed outside the firm, is not considered when using the traditional approaches to real economic measurement. Sometimes this part of effect is quite significant and ignoring it means a significant reduction in the accuracy of economic measurement. When using the real ideology of economic measurement we consider (due to the corresponding metrological behavior and through appropriate market mechanism) only the **local effect,** and the real ideology of economic measurement has the **local** character. Secondly, based on the practical use of the real ideology of economic measurement in real volumes of various economic parameters, we present only the **net economic effect.** As it is known, the integral effect in any modern economic activities is only rarely reduced only to the economic part. It more or less represents **socio-economic, social and spiritual** parts, which are not covered and displayed by this type of measurement ideology. Finally, the third drawback in the real ideology of economic measurement is as follows: on its basis we can detect and display only that part of integral effect, which is formed **at the moment,** suddenly, almost simultaneously with certain economic activities.

The above disadvantages of real ideology and economic measurement technology often go unnoticed in the modern economic literature. It (especially in its neoclassical branch) considers that competitive market is the **most perfect and most accurate** economic measurement tool. We show here that this is not so. On the one hand, a perfectly competitive market is indeed a more accurate measurement mechanism than, say, its historical predecessor (the market of the simple commodity production era). It is the first type of market that really starts to take into account such a parameter as **effect, benefit** in the formation of economic variables**.** This market is oriented towards efficient economic activities. This is its undoubted advantage over the **proto-market** that prevailed in the pre-capitalist era. However, on the other hand, the **measure of reflection** of the

"**effect"** parameter is obviously **incomplete, insufficient.** Only in the objective limits of big capital, which "selects" for production those goods and services that possess only economic, micro-economic (local) and only static effects, the perfectly competitive market is a more or less accurate measurement tool. Outside, in the zone of hyper-big capital, which draws in its area those goods and services that possess not only local but also global, not only economic but also socio-economic or socio-spiritual, not just static but the dynamic effects, the perfect competitive market is **inaccurate and imperfect.** Such a conclusion was first made by the author in the late 80s.

Type 3. Imperfection and inaccuracy of the perfectly competitive market are eliminated in the course of its historical transformation into the **monopolistic,** especially **hyper-monopolistic market,** which operates and develops on the basis of practical use of the **hyper-real ideology** of economic measurement, within which the appropriate type of economic measurement is formed (through the appropriate metrological behavior of entities), which we qualify as **modern, hyper-high, or hyper-real.** The hyper-monopolistic market, formation of which took place in the second half of the twentieth century (in today's most developed countries or the countries of the so-called traditional capitalism) is the market mechanism within which the hyper-real (hyper-high, modern) ideology of economic measurement became true. According to its terms, economic entities (usually hyper-big businessmen) begin to determine the real value of goods not only in terms of economic costs, not only in terms of **real effect** (under real effect we understand, firstly, the economic effect without the part that has socio-economic or socio-spiritual nature, and secondly, micro-economic effect only as a quite general level of local or global, otherwise, the integral effect and thirdly, the static effect as that part of the functional-dynamic effect, which is formed at a given time, actually or virtually simultaneously with certain economic actions), but also in terms of the **hyper-real effect** (the term is also actively used in our previous metrological works), the effect, which is formed not only at this moment of time, but in the nearest or somewhat longer perspective, which acts not only as its own (micro-economic) benefit but also as the benefit of the global order, which has not only economic nature but also socio-economic or socio-spiritual one.

The hyper-high (hyper-real) ideology of economic measurement that can be practically implemented only in conditions of the **hyper-monopolistic** (hyper-monopolized) **market** is **an order higher** than high, or, as we marked it earlier, the post-traditional ideology, which is most clearly manifested in conditions of the monopolized market. Thus, the historical transition from the perfectly competitive market to the less perfectly competitive market (hyper-competitive, quazi-competitive, hypo-competitive, absolutely imperfect competitive market) marks and practically reflects the ideology of economic measurement. It gradually transforms from high or post-traditional (real, in our terminology) into hyper-real, newest, hyper-high, most common for **modern economic era** (which chronologically covers the second half of the XX century and the beginning of the XXI century). And this fundamental historical transformation of the perfectly competitive market with its own state into the monopolistic and hyper-monopolistic market, on the other hand, is not a manifestation of economic recession, how it is considered in modern liberal (neoclassical) literature, but a manifestation of **economic progress.**

From purely metrological position, this historic transition to a new stage of market economy means at the same time the increase of the economic measurement **accuracy.** The hyper-high, or hyper-real ideology of economic measurement is based on the account of the **full effect, or full benefit** (in functional-level, functional-formation, and functional-dynamic respects) while in fact the real ideology takes into account this benefit or effect in the process of certain economic parameters determination only **partially,** only to some extent. This gives grounds to qualifying hyper-real measurement as **general,** and real or even nominal – as a **special case** of the first. The hyper-real measuring ideology is the **product of historical development** of the real ideology that plays the same role in respect to the nominal ideology. There is or there should be a certain **historical relevance** between them, which in the quantitative form can be reflected as **metrological relevance**.

Therefore, examining the structure and features of hyper-real measuring ideology (and

technology), we should be able to search for some coefficients of **conduction** or **reduction** (transformation) of one type of measurement into another. All the three basic types of economic measurement – nominal, real, and hyper-real – are both **monistic** in its basis (all of them can be reduced to a nominal measurement as the historical basis, or historical pre-condition) and **pluralistic, diverse, heterogeneous.** A heterogeneous element in them is **an effect or benefit** of the corresponding type (hyper-real or real effect or benefit). It is this element that is the **historical increase** of the economic matter, more precisely, a reflection of this historical increase.

Conclusions. As a result of scientific analysis of both historical and functional practice of economic measurement the author reached a fundamental conclusion that the character (nature, type) of economic measurement is determined by such economic factors as, firstly, the historical type of economic motivation of economic entities and, secondly, by the historical type of their metro-logical behavior. In the basis of these two factors there is even a more fundamental factor the functions of which are fulfilled by **capital scales, system's real scales,** in which a certain type of economic measurement is implemented. **The larger the capital scales** are in a certain economic system under study, **the more perfect,** and, consequently, **the more accurate** an appropriate type of economic measurement is. Three types of both economic measurement and metrological systems in economics are: **nominal – real – super-real** types of measurement; and appropriate metrological systems in economics correspond to three fundamental scale classes of economic systems – small, large and super-large. Nominal systems of metrological class are formed in the environment of small capital, small business, but real and super-real – in the environment of, accordingly, big and super-big capital and business. Capital scales, as the author of the article concludes, **change the "length",** "scale", "measure", so to say, both of the main "economic ruler", or the main "econometer", the functions of which are fulfilled by money and of the main measurement result – the **economic value** and the **economic price** of traditional goods. As system's real scales grow (capital real scale), which are determined by the income scheme rather than costs scheme, like, for example, nominal scales, the main "econometer' (money, "economic money") "**shrinks", reduces its "length"** as a kind of "economic ruler" and the value and price of goods, by contrast, "**lengthens" "increases its length"** in a somewhat geometric style. Thus, capital scales (but real, not nominal) play a role in the practice of economic measurement as a kind of "**economic gravity",** they, like the power of "gravitation" in the natural world, also "lengthen" or "shorten" space and time, but already "economic space" and "economic time", which are "embodied", on the one hand, in the **real value of money** as the main "economic ruler" and, on the other hand, in the **real value and real price of goods** as the main economic measurement result in economic life. This article is namely dedicated to the justification of this fundamental theoretical conclusion, which proves that, firstly, the metrological behavior of economic entities is derived from their motivational behavior, and, secondly, in the basis of changing the nature of economic measurement practice there is such a more fundamental factor as **capital real scales,** in the "environment" of which this or that type of both economic measurement and metrological systems in general as somehow organized practice of economic measurement is formed.

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APPROACHES TO RANKING CAUSES OF MANAGEMENT CRISES IN AN INDUSTRIAL AND COMMERCIAL ASSOCIATION

Abstract. The paper presents the improved method for ranking causes of management crises in industrial and commercial associations (ICA) in the changing environment, the peculiarity of which is designing management procedures focused on groups of similar causes of problem situations. Visualization of a set of causes leading to emergence of problem situations allows making more thorough decisions concerning the impact to be made on a particular object of ICA to ensure its economic security.

Key words: economic security, rehabilitation, ranking causes, situational approach, managerial situation, industrial and commercial associations.

Statement of the problem. Changes in the global and national economic environment require changes in paradigms and concepts of managing rehabilitation of ICAs in an attempt to make them adequate, using special methods, appropriate methods of calculation etc. and providing efficient planning, organizing, motivating, controlling and regulating the work of the organization in terms of sanation transformations.

Economic situation in Ukraine is characterized by the presence of a large number of enterprises that are in a crisis. This problem was relevant at the beginning of the independence of Ukraine, just as it is now. The relevance of research into the problems of managing rehabilitation at industrial and commercial associations (ICAs) is explained by the need in innovative scientifically grounded methods of managing economic processes to ensure economic security.

The presence of significant divergencies in the theory and practice of providing economic security while managing sanation transformations in ICAs predetermine the necessity of developing theoretical-methodological and methodical bases of formation and application of approaches to ranking causes of management crisis situations in ICA. The need for scientific development of these tasks taking into account the characteristics of the domestic economy led to the choice of research theme, identified its goals and objectives.

Analysis of recent studies and publications. Assessing approaches of Ukrainian and foreign scientists [1–10 etc.] as well as practical tools, it should be stressed that in ranking causes of managerial crisis situations that emerge in ICAs it is necessary to strictly stick to the strategic plan to ensure economic security of an ICA development.

Significant contribution to the development of the theory and methodology of enterprise management during rehabilitation has been made by works of the following authors: E. Altman, I. Blank, V. Beaver, I. Balabanov, M. Kizim, E. Korotkov, O. Kuzmin, M. Pushkar, P. Pererva, L. Sukhareva, R. Smith, L. Burton, M. Porter, O. Trydìd, Z. Shershniova, I. Alekseyev, A. Moroz, M. Zveryakov, M. Carlin, O. Tereshchenko and others. However, the existing diversity of views on this important category requires attention and development of methodological principles of ranking causes of managerial crisis situations in ICAs in conditions of the changing environment to ensure the viability and competitiveness of the ICA.

The purpose of the study is the improvement of theoretical-methodological and methodical bases of formation and use of approaches to ranking causes of managerial situations in ICAs to ensure economic security while managing rehabilitation transformations in ICAs.

Summary of the basic material. Creation of industrial and commercial associations makes it possible to integrate production with finances and science, as within the ICA it is possible to redistribute resources in favor of enterprises that are at the stage of innovative transformations. Introduction of innovative technologies, modern equipment and new technological processes into production requires changes in the system of rehabilitation transformations management. In production and technology this is provided by using uniform production lines, automation of production and production management. Significant

changes also occur in the financial-economic, organizational and legal and social spheres.

Modern ICAs take advantage of integration of production with finance, scientific research, design and research developments, i.e., ICAs are characterized by production and technical, financial and economic, social and organizational unity. In conditions of crisis situations in the industrial and commercial associations there are taken the appropriate rehabilitation measures that are the objects of economic security in ICAs management.

Having analyzed a significant number of sources the author developed the classifier of management problem situations in ICAs, which permits to accurately reflect and forecast the situations development as well as affect the assessment of managerial problems solutions: the more complicated is the predictable situation, the more urgent its solution is. The classification of managerial situations features is offered in the form of a 3D model that is reduced to the final result of the ICA activities.

Based on the concept of rehabilitation management in the ICA and provision of economic security, the paper presents peculiarities of the situational approach. So, the management situation is the characteristics of conditions of a ICA and its participants, which, from the point of view of the subject, can be satisfactory or unsatisfactory. In the latter case the situation becomes problematic and characterizes the real discrepancy of the desired and actual levels of meeting the needs of the subject. One and the same problem situation is formulated as different problems. Target orientation in the characteristics of the organization activities and its external environment should be the main one when detecting the signs of problem situations. Note that all situations are related, first of all, either to implementation of previously established objectives (performance of production program, reconstruction, modernization, personnel professional development etc.) or formation of new objectives (the ICA development process). Thus, problem situations occur either in the process of functioning of the organization, or in the process of its development. During the solution of crisis situations in the organization, i.e. during affecting the organization with the aim of transferring it into the desired state, a kind of target activities is chosen from the following options: the source of the situation as well as the object of influence is inside the ICA; the source of the situation is in the external environment while the object of influence is inside the organization; the source of the crisis may be both outside and inside the organization while the object of influence is in the external environment. Like any other kind of management, the process of solving situations during rehabilitation is realized according to the determined cycles of management, starting from the stage of the situations identification and finishing with the stage of solving them. Information about the situation (problem, crisis, etc.), which comes to the internal and external environments of the management system is transformed into solutions that are implemented by the influences that are aimed at one or more subsystems of the ICA and the external environment to ensure economic security.

It is substantiated that in the process of solving the situational tasks of management, identification and ranking of causes of crisis situations in the ICAs are of considerable practical interest. Awareness and evaluation of the importance of these causes allow to more thoroughly distribute resources while designing technologies for solving management situational tasks. We agree with the thoughts of many foreign and Ukrainian scholars to adopt the so-called problem trees as a model of the situations emergence and development processes, as it was already mentioned. The result of the analysis of the problem tree is a list of the minimum-inclusion sets the elementary events. Minimum-inclusion means that nonoccurrence of any of input events leads to the fact that the situation does not occur. Each of the elementary-events sets actually represents a cause of the problem situation emergence. Getting this list allows exploring the relationships and the importance of both individual elementary events and their sets. To this end, on the sets of elementary events and complex causes of the situation there are introduced measures of similarity on which the ranking of these causes is based.

Information about the complex causes and the elementary events is presented in the form of a matrix. Its rows correspond to the minimum inclusion sets of elementary events (that cause the occurrence of problem situations), and its columns correspond to the problem tree elementary events. The number of rows of the matrix is equal to the number of complex causes, and the number of columns is the number of elementary events. An

element of the matrix is assumed to be one, if it is located at the intersection of such a row and a column of the matrix that an elementary event corresponding to the column is a part of the complex cause corresponding to the matrix rows. Otherwise, an element of the matrix is assumed to be zero. The matrix of the presented type can be considered to be the characteristic function. When studying the characteristic function it is possible to reveal the structure of relationships of both the set of the situations complex causes and the set of the problem tree elementary events. The complex causes of situations are related because some of them having common elementary events. The elementary events can be assumed to be interrelated because of their joint participation in complex causes.

Let us present the structures, describing the relationship of complex causes and the relationship of elementary events, in the form of columns and rows of the characteristic function. To determine the relationship between Boolean vectors, you can use the similarity values identified by them [1; 2; 6]. It is convenient to introduce the Boolean vectors similarity values in terms of a taxonomic table

a	*b*
c	*d*

where *a* is the number of matches in two Boolean vectors; *b* is the number of units that are only in the first Boolean vector; **c** is the number of units that are only in the second Boolean vector; *d* is the number of units absent in both vectors.

a can be seen as the result of the scalar product of two Boolean vectors; *b* is the difference between the scalar product of the first Boolean vector multiplied by itself and *a*; *c* is the scalar product of the second Boolean vectors multiplied by itself minus *a*; *d* is the difference between a unit Boolean vector and the vector that is formed from two output Boolean vectors by "OR" logical operation. In terms of the taxonomic table it is convenient to write the equations that explain the content of its components:

a	*b*	*a+b*
c	*d*	*c+d*
a+c	*b +d*	

In this case, the sums mean the following: $a + b$ is the number of units in the first vector; $a + c$ is the number of units in the second vector; $c + d$ and $b + d$ are the number of zeros in the first and second vectors, accordingly; $S = a + b + c + d$ is the dimension of the Boolean vector.

So, in terms of the taxonomic table, you can enter a number of legitimate values of similarity. The simplest similarity value defined on the set of elementary events may be the similarity matrix:

$$R_1^{ij} = a_{ij} . \quad (1)$$

In case of determining the similar pairs of elementary events, the elements of the similarity matrix main diagonal will be the number of those complex causes of the situations occurrence the given elementary event is part of. The non-diagonal element of the similarity matrix (rij) is determined by the number of complex causes of the situations in which there are simultaneously present *i* and *j* elementary events.

Analogous similarity matrix can be defined on the set of pairs of complex situations causes. The elements of its main diagonal include the number of elementary events that determine the specific causal complex. The non-diagonal elements are determined as the number of elementary events common for *i* and *j* causal complexes of situations. A more complex similarity value is obtained from equation (1) by bringing it to unit:

$$R_2^{ij} = a_{ij} / (a_{ij} + b_{ij} + c_{ij}). \quad (2)$$

Using this similarity value, let us neglect the number of elementary events and causal complexes of situations. Transition to the relative values in the similarity value makes it more convenient to compare, for example, the role of elementary events in the development of situations being described using different problem trees.

In determining similarities of elementary events and their sets, the similarity values (1) and (2) take into account only the number of common elements of the situations. The similarity can be also determined by simultaneous absence of these elements. The similarity value of this type is determined by modifying value (2):

$$R_3^{ij} = a_{ij} + d_{ij} / (a_{ij} + b_{ij} + c_{ij} + d_{ij}). \quad (3)$$

When determining similarity of two causal complexes, d_{ij} is interpreted as the number of elementary events that are simultaneously absent in them. When the relationship of two elementary events is studied as to their being part of a set of casual complexes, dij represents the number of causal complexes that do not contain these elementary events simultaneously. Similarity value (3) also approximates the unit.

It should be noted that on the basis of each of the values of similarity there can be built the difference index. It is convenient to do this by supplementing the measurement of similarity to the maximum:

$$R^{ij}{}_{difference} = R_{max}{}^{ij} - R^{ij}{}_{similarity}. \qquad (4)$$

Introduction of similarity values to certain concepts (such as "elementary events" and "complex causes of situations") is not intended as concealment by using mathematical symbols. This is justified by both the necessary to characterize the degree of similarity of structured objects and the possibility to get a search result with a simple, meaningfully interpreted procedure. Important is the fact that the similarity values used are metrics and this fact gives ground, while analyzing the similarity matrix, for applying a great number of rigorous and heuristic methods developed within the concept of data analysis.

Similarity matrices contain full information on relationships of both complex causes and elementary events. Using this information, it is necessary to start ranking both these phenomena. In this case, of course, there is some loss of information, but the resulting rankings are a convenient tool for practical use in the process of solving tasks of handling situations in conditions of the changing environment. The idea of the similarity matrix starting ranking is as follows. Firstly, the higher the degree of an elementary event interconnection with other elementary events is, the more important it is considered to be. Secondly, the closer the given complex cause of the situation occurrence is related to other complex causes of the situation occurrence in conditions of the changing environment, the more important it is.

Let us define the importance of an elementary event as the sum of values of its interrelations with other elementary events. As a measure of the relationship let us use the numerical value of the similarity of the event with other elementary events:

$$V_i = \sum r_{ij} . \qquad (5)$$

Summing the similarity values in (5) is performed for all elementary events, excluding the given one. The resulting estimate of the importance of the event is only the first approximation, since here all the relationships of the event are included as equal, at the same time the elementary events being not equal in importance. Therefore, in the iterative calculation of the elementary events importance that is necessary for their ranking, one needs to consider the estimates obtained in the subsequent iterations:

$$V_i^k = \sum (V_i^{k-1} / \sum V_i^{k-1}) r_{ij} . \qquad (6)$$

Obtained during the calculation of V_i are the elements of its own vector corresponding to the maximum eigenvalue of the reduced similarity matrix. Similarly, you can get the quantitative evaluation of the importance of complex causes of the need of ICA in rehabilitation. The obtained evaluations are sure to determine the ranks of both elementary events and complex causes of the situations occurrence in conditions of the changing environment.

It should be noted that the similarity matrix permits to solve a number of other tasks of economic security and situational management in ICAs, for example:

1) designing management procedures focused on groups of similar causes of the problem situations occurrence. To do this, on the basis of the similarity matrix analysis, using algorithms of cluster analysis and automatic classification there are specified homogeneous groups of causes of the problem situations occurrence in ICAs;

2) visualizing a set of the problem situations causes with minimal loss of the structure and interrelations that permits to take more thorough decisions concerning the effects on this or that unit of the ICA. For this purpose there is used the method that is similar to the method of the main component that allows, with minimal geometric differences, to present the structure of the process of emergence and development of the need in rehabilitation.

Conclusions. The proposed concept of solving situational tasks of rehabilitation management and methodical bases of its realization in the system of industrial and commercial associations permit to classify the managerial situations, typical procedures and methods of their solution, the structure of the management information database in an integrated way and effectively ensure the economic security of the ICA. The feasibility of implementing the situational approach in the management of ICA is due to the necessity of the organizational structures improvement during taking rehabilitation measures. Predicting problem situations that arise in the organization at all stages

of its operation, permits to develop in advance the procedures to deal with them with regard to restrictions over the period of developing a managerial decision and impact, the availability of human, material and financial resources as well as the scientific and technical basis as conditions of the economic security of the ICA.

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CONCEPTS OF FIRMNESS AND BALANCING IN MARKETING LOGISTICS

Abstract: Concepts of firmness and balancing are considered. Place of firmness and balancing in marketing logistics is defined.

The authors have come to the conclusion that the system which is considered stable for any moment is not necessarily simultaneously balanced. According to the integrated continuum of logistics development intensity and marketing concepts balancing of marketing logistics have a place in social and ethical marketing concept. Firmness of marketing logistics can be observed in any point of continuum if situation is constant for a long time.

Key words: marketing logistics, concepts, firmness, balancing, continuum.

Introduction. During economic crisis supporting firmness and balancing in various spheres of economy is of particular significance. This is also true about marketing logistics.

Now marketing, whose centre of attention is the interests of buyers, is in the process of revival. It is displayed in the evolution of marketing concepts, in particular, in occurrence of numerous directions of using marketing concepts. In this article the authors deal with firmness and balancing in the sphere of marketing logistics.

Questions concerning development of marketing logistics were considered by A. Izekenova, F. Kotler, G. Plahuta, I. Popova, R. Taylor and others. But firmness and balancing in general and of marketing logistics, in particular, still remains insufficiently investigated and definitely demands additional attention. The purpose of the authors is research of concepts of firmness and balancing in marketing logistics. The tasks set are: to consider concepts of firmness and balancing; to define the place of firmness and balancing in marketing logistics.

Concepts of firmness and balancing. As a whole, the concept of firmness is fundamental; it is impossible to realise economic growth and public progressive development without it. This concept began to be used widely in the humanitarian sphere scientific literature only in the end of XX century. In the meantime in technical sphere it became widely used in the end of XIX century after the concept of firmness has been defined and theorems about firmness and instability of technical systems were formulated.

Now the term “firmness” is widely used in such concepts as financial system firmness, industry structure firmness, proof growth company, physical firmness of goods production etc. But, unfortunately, only in a few works there are accurately formulated necessary conditions of firmness, and also necessary and sufficient conditions of developing instability of the whole society and its separate elements.

It is necessary to notice that though at first sight concepts of firmness and balance of a separately taken system are equivalent, actually between them there is an exact difference.

Thus, the system that is considered at certain moment as stable is not necessarily is simultaneously balanced. And the process of any system balancing obviously contradicts to main principles of firmness.

In general, concepts of firmness and balancing can be displayed with the help of corresponding schemes (fig. 1 and 2). In particular, in fig. 1 it is seen that firmness is characterised by the system ability to return to the initial condition of comparison of positive and negative influence factors over time.

In addition, it is necessary to notice that in this case the simplified variant is considered in which the system is firm and balanced (because of the conformity of positive and negative influence factors, the aforementioned influences being equal to zero). The same situation would be observed in the condition of placing the system firmness point on one of the medians of any quarter of positive and negative factors. And in case of any other placing of a firmness point, the system would be considered as firm in the presence of positive or negative misbalancing.

The action of an element of balancing is schematically presented in fig. 2. Unlike the previous scheme, there is a change of the system condition over time. The main purpose in this case is searching for the ways to balance positive and negative factors influencing the investigated system.

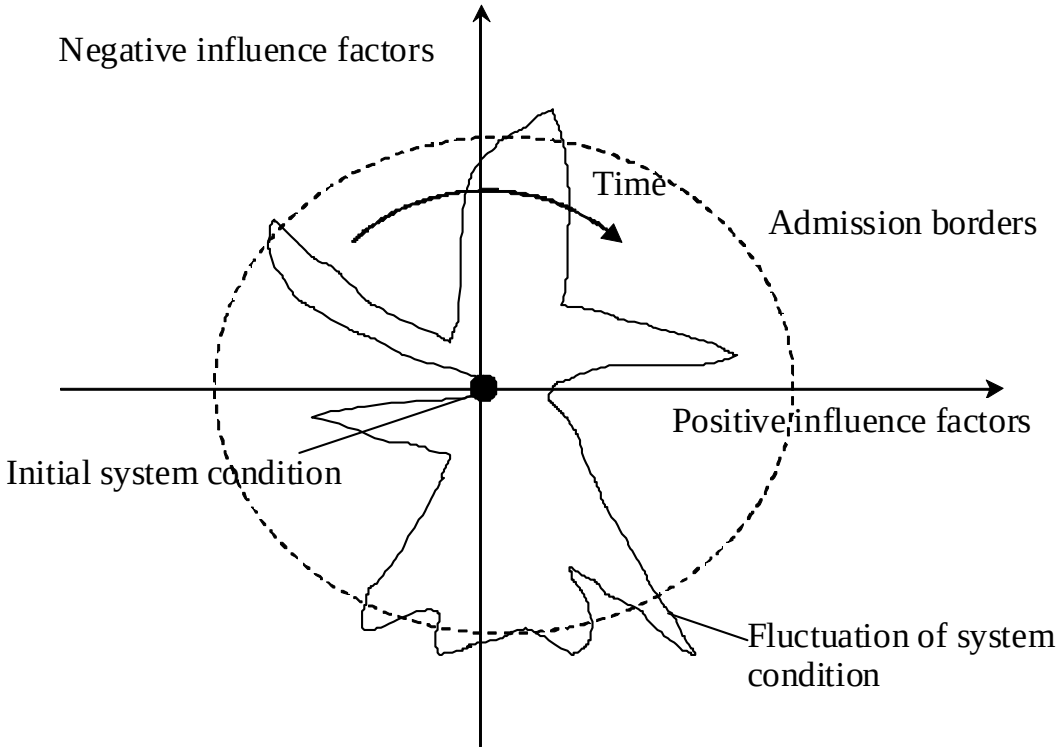

Fig. 1. The schematic display of the separately taken system firmness element action principle
Source: [1]

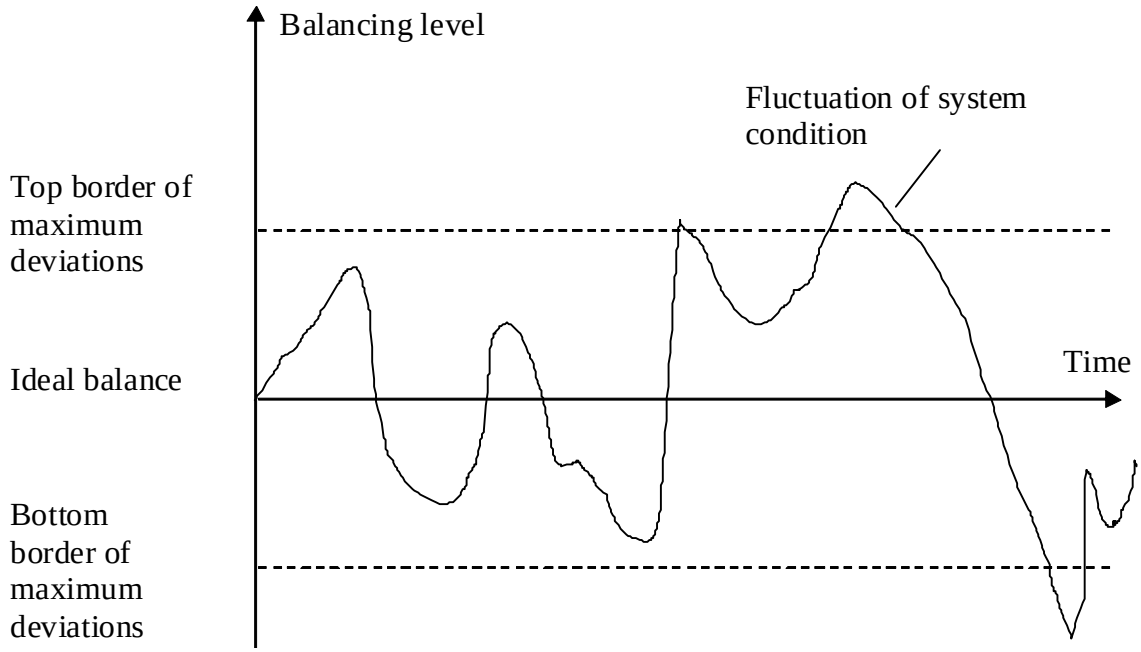

Fig. 2. The schematic display of separately taken system balance element action principle
Source: [1]

It is also necessary to remember that close to concept "balance" there is its direct antipode, or "unbalance" that confirms necessity of adequate measures for system reduction in a balance condition more visually.

Unbalance as something imperfect exists from the origin of society. Even at constant tracing of negative tendencies in ideally balanced environment, any (at first sight insignificant) influence factor can essentially infringe a condition of balance and will

lead to unbalance. Certainly, it is possible to express the opinion that balancing of environment (including global financial system) is superfluous, unnecessary – in the long run influence of positive and negative factors will be counterbalanced, and time unbalance from which we cannot completely be protected, will avoid nobody, and in addition will stimulate development of concrete territory. But it is far not so. Self-balancing is possible only at minimum (or zero) state influence on the financial processes, and it basically is impossible because of existence of external influence and necessity of fulfilment state functions (at least because of the requirement of the existence justification). To some extent, self-balancing occurs in the long-term period, but time necessary for a complete equilibration of system without additional actions is extremely difficult to measure, it is almost impossible. And, consequently, such expectation of "the best times" may be considered groundless [1].

It is necessary to note that ideal balance (as well as the absolute unbalance) is practically impossible to reach. Therefore it is necessary to speak not about balance achievement but about a maximum level of balance (or minimum unbalance).

Firmness and balancing in marketing logistics. We should not underestimate the role of marketing at enterprise in revealing steady buyers' preferences and maintaining steady market positions. But in practice marketing programs are not always supported by necessary financial maintenance and coordinated with plans of other functional divisions that can promote occurrence of internal conflicts [2].

According to F. Kotler, marketing has arisen with the advent of the market which causes commodity – money relations between the seller and the consumer of goods, being beneficial for both sides [3]. During sustainable development there is an evolution of marketing or process of constant changes of theory and practice of marketing under the influence of market condition factors, change of consumer behavior and alternativeness of competitors actions, directed on receiving the desirable profit by businesses. It is possible to display marketing evolution by means of dynamics of its concepts. In its turn, marketing concepts are a system and a mainstream of business activity under the influence of market requirements which are expedient in a concrete situation and allow providing profitability. Almost in all F. Kotler's works [3, 4] the basic concepts of marketing are presented. The authors have decided to arrange these concepts on a continuum (fig. 3).

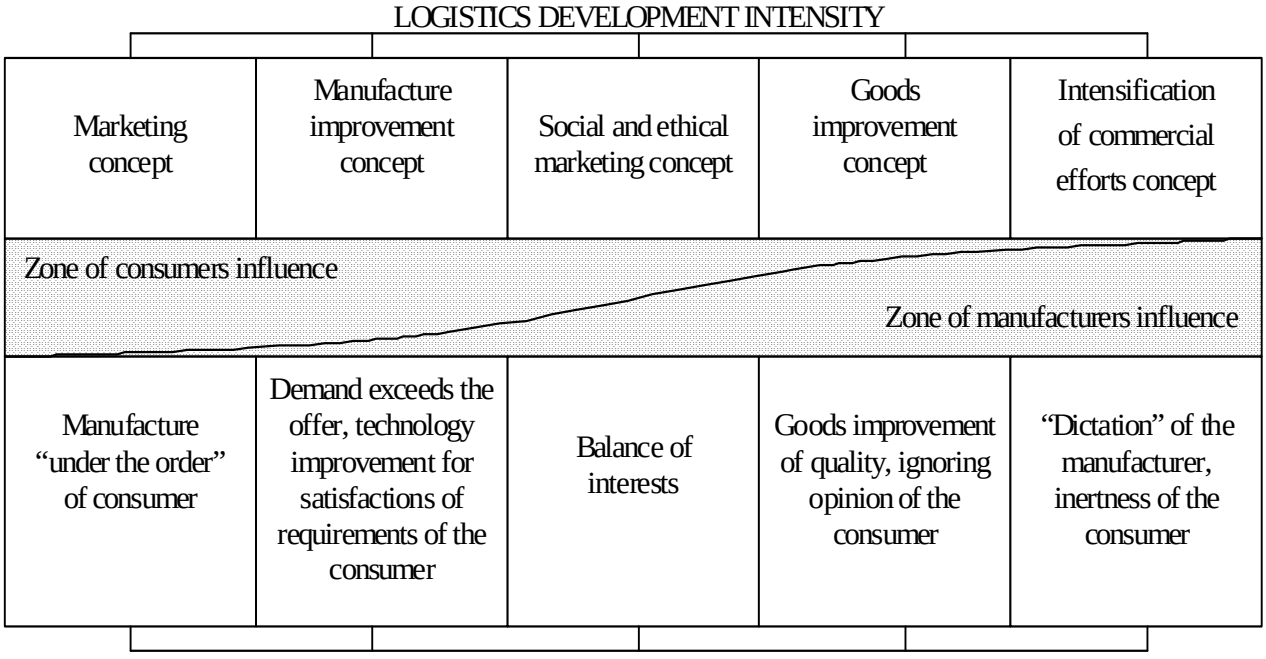

Fig. 3. The integrated continuum of logistics development intensity and marketing concepts
Source: Authors' generalisations

Intensity of development and value of logistics increases in the process of increasing the consumer influence at a commodity and services market as optimization of resource maintenance, transport decisions, and service improvement are additional factors of influence on consumers' preferences.

As there exists a partial or full "dictation" of the manufacturer in conditions of the minimum influence of the consumer on a commodity and services market, to invest additional funds into developing logistics isn't the manufacturers' urgent requirement. Thus, value of logistics in the struggle for the consumer, in this case, remains practically imperceptible.

Principal aims of introducing and using marketing in Ukraine in the period of its transition to market economy have been summarized by V. Hrutsky:

1. Assistance in transforming work into productive activities.

2. Economy of time and other non-material and material resources in carrying out activities characteristic to market economy.

3. Application of advanced foreign administrative technologies in the country during its transition to market economy.

4. Transformation of bureaucratic economy into free business.

5. Effective participation in the international market economy.

6. The correct use of foreign investments into economies of the Post-Soviet state [5].

Later the science of marketing developed in the following way: in the early 90s of XX century the majority of educational literature on the marketing theory contained up to 95 % of the material from F. Kotler's books; there were attempts to apply features of domestic marketing in the operation of Ukrainian enterprises later. In references the differential approach to marketing activities is reflected, the description of the theory and practice of specialized marketing (integration of the classical theory of marketing and features of concrete entity of marketing activities) is given as the result.

Development of scientific activity in the sphere of marketing in Ukraine began in the mid-nineties of XX century. Thus, specialization and differentiation of marketing actions became a feature of marketing science. Later in 1997 the Ukrainian Association of Marketing was created. Its members were responsible for almost 90 % of marketing research in Ukraine.

Key scientists-researchers in the sphere of marketing are in the management of the Association. And among its members one can find research laboratories, advertising agencies etc. The main tasks of the Association are: creation of professional association of experts in marketing; development of standards of their work; development of marketing as a science; formation of the civilized business environment in Ukraine; support of small and average business due to introduction of marketing principles into economic activities; contribution to formation of the transparent mechanism of interaction between scientific institutions, businesses and state bodies in the sphere of marketing education.

The scientific research devoted to problems of sales, satisfaction of consumers requirements, integration of marketing with other economic categories have started to appear in the beginning of second half of XX century.

Thus, P. Druker, D. Kalinton and P. Konvers emphasized the importance of integrated approach, distribution and marketing development in the early sixties. The first printing editions, in which the term "marketing logistics" was used, appeared in the end 60s – the beginning of 70s. During the following years management of deliveries developed, can ban, "just in time" being examples of various approaches, which have visually shown necessity of integration of logistic processes with all directions of company activities for the purpose of maximization of their efficiency.

And in the early 90s ideas of the complex, systems approach to management of delivery chains have widely extended. Together with it, the concept of marketing logistics as an approach to management of deliveries chain with market orientation for achievement of competitive advantages was extended. The given concept is based, first of all, on M. Christopher's works which have laid out bases of enterprises functioning taking into account theoretical bases of marketing logistics.

Among other things, it is necessary to notice that the unequivocal approach to definition of the concept of marketing logistics does not exist. Definitions of this concept in works of foreign and Ukrainian researchers differ by degree of detailed elaboration and generalization of the deliveries chain components.

G. Plahuta and I. Popova define marketing logistics (or marketing-logistics) as the activity

concerning planning, realization and control of physical movement of all kinds of streams (finished goods, materials, information) which are accompanied by goods movement through the selected channel from the manufacturer to the consumer for the purpose of satisfying consumers requirements and getting profit [6].

Authors focus attention on the part of deliveries chain which works with consumers as on the base component of marketing logistics. It is also necessary to take into account certain aspects of personnel logistics, some of which have already been objects of the authors' research [7].

F. Kotler in his work "Marketing-management" also pays considerable attention to the concept of marketing logistics. He defines it as the approach according to which the manufacturer should analyze market requirements, and only after that form a chain of deliveries. According to Kotler, the marketing logistics includes planning, introduction and control of material streams, from points of an origin to final destinations for the purpose of buyers' requirements satisfaction [3].

Martin Christopher, one of the founders of the "marketing logistics" concept in his works does not provide a uniform exact concept, but notices that the marketing logistics concentrates on how servicing can be used for gaining competitive advantages. Besides, it is directed towards management of interaction between marketing and logistics for the purpose of coordinating perspective strategies in a context of wider chain of deliveries [8].

Marketing logistics is defined as planning, organization, calculation and control, analysis regulation of all operations on transporting and warehousing, related to the flow of finished goods from the manufacturing line to the products arrival to the market; distributional channels, necessary for organization, and interaction of support between the manufacturer and the market are also included.

Summary. Though at first sight concepts of firmness and balance of a separately taken system are equivalent, actually there is an exact difference between them. The system which is considered stable at a given moment is not necessarily simultaneously balanced. The process of any system balancing obviously contradicts to the main principles of firmness. The ideal balance (as well as the absolute unbalance) is practically impossible to reach. Therefore it is necessary to speak not about balance achievement but about a maximum level of balance (or minimum unbalance).

According to the integrated continuum of logistics development intensity and marketing concepts, balancing of marketing logistics has a place in social and ethical marketing concept. Firmness of marketing logistics can be observed in any point of continuum if situation is constant for a long time.

In their further research the authors plan to determine the influence of marketing logistics firmness and balancing on the efficiency of Ukrainian enterprises.

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ECONOMIC EVALUATION OF THE MECHANISMS OF ATTRACTING CORPORATIZATION-FOCUSED INVESTMENTS

Abstract. The modern interpretation of the investment concept is analyzed. The modern methods of investments economic evaluation are presented. The nature of investments-attracting mechanisms is defined. A method of investments-attracting mechanisms economic evaluation is proposed.

Key words: investments, investor, investments-attracting mechanisms, economic evaluation, method of economic evaluation of investments-attracting mechanisms.

Materials and methods. Due to transformation processes occurring in the economy there appeared a new interpretation of the investment concept. Thus, the analysis of the recent research works [1, 2, 3] showed that the scientists provide wider interpretation of the concept of investment. Investments are considered to be any item of tangible or intangible property that is invested by the subject investment activities to achieve certain goals. A new interpretation of the nature of investments requires new ways of evaluating investment activities.

Research into this issue is carried out in many directions. One of the most common ones is based on the use of economic-mathematical methods for economic evaluation of investments. Such researchers as Yes, Lewis, Lipsitz, Golderberger [4] suggest that scientific research in this direction be differentiated into two branches: linear and non-linear dynamics. Both scientific paradigms are competitive, though recently preference has been given to non-linear methods of dynamics analysis. These researchers identify two groups of methods that are used within the paradigm of nonlinear dynamics: fractal analysis and chaos theory. A fractal, as defined by Lewis, Lipsitz, Golderberger, is a structural concept based on a wide range of objects of various geometries presented in a certain sequence. The concept of a fractal is widely considered by Abboud, Berenfeld and Sadeh [5]. The concept of “chaos” is treated by these scientists, following the works of Mandelbrot [6], as the unpredictable behavior of a variable being researched.

The chaos theory has become widely used in the models of economic growth dynamics. Nonlinear mathematical methods were first applied in economics by Frisch, Lundberg and Samuelson [7, p. 78]. These scientists used differential and recurrence equations to explain the dynamics of economic processes.

The mathematical tools proposed by Frisch, Lundberg and Semuelson appeared to be insufficient for solving certain problems being inherent for economic processes. Such problems seemed to be solvable only by using the generalized Semuelson model. This has been proven and put into practice by Hiks and Goodwin [7, p. 79], who used nonlinear regression to justify their own understanding of mathematical interdependencies characteristic for the elements of economic systems.

Prediction of chaotic dynamics of economic processes is an extremely difficult problem, the solution of which requires preliminary determination of the mathematical models that can simulate the chaotic dynamics. The problem was first studied by Baumol & Quandt [8] and Philips [9, 10]. As a result, Baumol and Benhabib proposed the recurrence equation that could be used for modeling the chaotic behavior of certain economic processes.

The use of the chaos theory was also actively studied by Guckenheimer and Holmes [11], Grandmount [12, 13], Arrowsmith [14] and others. Boldrin and Woodford [15], Hommes [16], Medio [17, 18], Day [19] and Rosser [20] have greatly expanded the application of the chaos theory in economics.

The theory of fractals has not been applied in economics as widely as the chaos theory so far, though some works in this direction already exist. Among those dealing with the issue there are Mantegna, and Stanley [21]; Gao, Hu, Tung, Cao [22]; Michel [23] and others.

Investments can be attracted by using investments-attracting mechanisms. Thus, in [24, 25], the nature of the concept is defined and the expediency of doing research into the issues of

economic evaluation mechanisms is substantiated. Given the above and the fact that the most common mechanisms to attract investments are those focused on incorporation, we have chosen proposing a method of economic evaluation of mechanisms to attract investment to the company as the goal of our study.

Results. To present this method let us assume that in the capital market there is one investor and there are several companies (for example, four) whose shares are presented on the stock market. Selection of such simplified conditions can be compared with the "ideal gas" in physics. The purpose of this approach is to analyze of ability of each company's mechanism to attract investments from this assumed investor. Let us also assume that for various reasons all the companies do not pay dividends and the future investor's income will be formed only due to changes in the market price of the shares purchased by him. The investor can make both direct and portfolio investments.

Let us start presenting this method by providing market prices for the shares of the four assumed companies, they being companies A, B, C, D (Table 1).

Table 1

The shares market prices of four A, B, C, D companies

Date	*A*	*B*	*C*	*D*	*Date*	*A*	*B*	*C*	*D*
30.09.2014	9.75	117.53	14.79	19.36	31.08.2014	10.32	117.21	17.43	19.59
29.09.2014	9.51	117.52	15.11	19.56	30.08.2014	10.31	116.89	17.31	19.39
28.09.2014	9.52	11.65	16.33	19.73	29.08.2014	10.3	117.74	17.43	19.5
27.09.2014	9.41	117.87	16.2	19.53	28.08.2014	10.05	117.93	17.42	19.59
26.09.2014	9.66	118.25	16.41	19.86	27.08.2014	10.05	117.24	17.21	19.26
25.09.2014	9.92	118.25	16.17	19.71	26.08.2014	10.22	116.76	17.17	19.22
24.09.2014	9.89	119.01	16.36	19.67	25.08.2014	10.28	117.63	17.09	19.17
23.09.2014	10.26	118.76	16.65	19.66	24.08.2014	10.37	116.68	16.82	18.88
22.09.2014	10.17	119.43	16.58	19.6	23.08.2014	10.42	116.61	16.98	19.1
21.09.2014	10.02	117.35	16.53	19.54	22.08.2014	10.38	119.03	16.87	19.21
20.09.2014	9.99	117.59	16.52	19.77	21.08.2014	10.09	118.12	17.02	19.58
19.09.2014	9.86	117.16	16.47	19.59	20.08.2014	10.05	117.59	16.81	19.63
18.09.2014	9.98	117.11	16.59	19.63	19.08.2014	9.96	117.99	17.02	19.66
17.09.2014	10	116.37	16.66	19.65	18.08.2014	10.02	120.04	17.46	19.97
16.09.2014	10.03	116.49	16.63	19.64	17.08.2014	10.09	120.58	17.57	19.93
15.09.2014	10.09	115.02	16.63	19.38	16.08.2014	10.13	120.58	17.64	20.19
14.09.2014	10.12	116.04	16.8	19.57	15.08.2014	10.53	119.63	17.62	19.44
13.09.2014	10.08	116.39	17.14	19.5	14.08.2014	10.66	119.38	17.84	19.6
12.09.2014	10.06	116.05	17.27	19.5	13.08.2014	10.39	119.43	17.78	19.31
11.09.2014	9.9	115.96	17.47	19.32	12.08.2014	10.2	119.18	17.82	19.45
10.09.2014	9.87	116.2	17.6	19.31	11.08.2014	10.42	118.66	17.7	19.5
09.09.2014	10.04	114.32	17.41	19.21	10.08.2014	10.54	118.9	17.72	19.55
08.09.2014	10	114.43	17.42	19.31	09.08.2014	10.52	118.38	17.74	19.35
07.09.2014	10.37	114.91	17.36	19.42	08.08.2014	10.75	119.15	17.8	19.66
06.09.2014	10.07	115.08	17.19	19.46	07.08.2014	10.65	118.71	17.54	19.46
05.09.2014	10.27	114.87	17.23	19.5	06.08.2014	10.67	119	17.55	19.43
04.09.2014	10.24	114.09	17.17	19.49	05.08.2014	11	118.52	17.47	19.15
03.09.2014	10.29	115.78	17.4	19.54	04.08.2014	11.14	118	17.3	18.97
02.09.2014	10.23	115.7	17.41	19.56	03.08.2014	11.09	120.04	17.43	19.21
01.09.2014	10.37	116.95	17.36	19.57	02.08.2014	11.21	120.3	17.11	19.26

Under such conditions any investor will begin his/her analysis using exclusively statistical indicators. This is because the number of potential recipients is not large. All other possible factors are omitted and will be considered as "noise", as random changes of different factors affecting the process of decision-taking by the investor.

One of the most common indicators used while taking decisions concerning investments into a particular enterprise is the standard deviation that is used for risk assessment (in this case, we neglect the assumption that the standard deviation can also be an indicator of the potential return on investment). In addition, let us calculate the correlation matrix of prices on shares of the four investigated companies; this will enable us to assess the degree of independence of the companies from each other and the level of competition existing between them. These calculations are presented in Tables 2, 3.

Table 2

Correlation matrix based on the data from Table 1

	A	*B*	*C*	*D*
A	1	-0.45437	0.631262	-0.17852
B	-0.45437	1	-0.6052	0.677127
C	0.631262	-0.6052	1	-0.3501
D	-0.17852	0.677127	-0.3501	1

Table 3

Absolute and relative standard deviations based on the data from Table 1

	A	*B*	*C*	*D*
Absolute values	0.24496	1.47731	0.66031	0.148519
Relative values*	0.02449	0.012666	0.03939	0.007602

** Notes: The relative value is calculated as the ratio of the standard deviation absolute value to the arithmetic mean value of the market prices on the company's shares.*

As can be seen from Tables 2 and 3, especially significant is the directly proportional dependence between the shares of B, D and A, C companies as well as the inversely proportional dependence between the shares of companies A, B and B, C. This allows us to assume that the defined two groups of companies (B, D and A, C) can be used to create individual portfolios. This is due to the fact that the interdependence between these companies is directly proportional, so they can hardly be seen as competitors. In their turn, groups of A, B and B, C companies cannot be taken as a basis for forming the investment portfolios as the market values of their shares are inversely proportional. The D company is the least dependent on others.

Analysis of the values of the absolute and relative standard deviations makes it possible to establish the level of risk to be assessed by potential investors. Thus, the lowest level of risk is observed for shares of D company.

Further analysis can be made in different ways. For example, we can analyze the dependence of the stock prices of the most independent company and the company with the least risk of the values of stock prices of other companies. This will make it possible to analyze the nature of the relationship that exists between these time series. Choosing the least independent and low risk company is a priority for investors planning to make direct investments. The review of the "portfolio investor" decisions is presented below.

Thus, the analysis has shown that the D company is the most attractive for direct investments. Confirmation or refutation of this assumption is possible with further analysis which will concern the definition of the nature of the relationship that exists between the stocks selected in the previous step and the shares of other companies. To demonstrate the visibility of this method let us assume that the investor is still not sure of their choice in favor of D. He decides to analyze the shares of this company and those of company B, the risk of which is the lowest after the shares of D. A significant relationship between the dynamics of stock prices of the two companies also shows the necessity for further analysis.

Let us analyze the nature of the relationship on the basis of the following regression equation:

$$p_3 = \lambda_0 + \lambda_1 p_1 + \lambda_2 p_2 + \lambda_{12} p_1 p_2 + \\ + \lambda_{11} p_1^2 + \lambda_{22} p_2^2 + \lambda_{33} p_1^3 + \lambda_{44} p_2^3, \quad (1)$$

where: λ_0, λ_1, λ_2, λ_{12}, λ_{11}, λ_{22}, λ_{33}, λ_{44} are coefficients of the equation; p_1, p_2 – values of stock prices of companies that serve as independent variables; p_3 – values of the companies prices, the parameter being researched.

Let us present the obtained equations for companies B, D (Table. 4).

As can be seen from Table 4, both companies are equally dependent on their competitors. As the obtained correlation coefficients for the two companies are practically identical, the further analysis of the dynamics of stock prices of these companies is necessary.

Table 4

Regression equations of dependencies of companies B, D share prices on the values of the stock prices of other companies

D (*A*, *C*)	$p_3 = -1831,64 + 363,05\,p_1 + 115,76\,p_2 + 0,91\,p_1 p_2 - 36,33\,p_1^2 - -7,47\,p_2^2 + 1,16\,p_1^3 + 0,15\,p_2^3$	$R^2 = 0,394$
B (*A*, *C*)	$p_3 = -8443,84 + 1773,76\,p_1 - 328,71\,p_2 - 3,64\,p_1 p_2 - 107,26\,p_1^2 + +35,71\,p_2^2 + 2,2\,p_1^3 - 1,08\,p_2^3$	$R^2 = 0,396$

The further analysis is possible if the studied values are presented in the same coordinate system and compared. To do this, we calculate the relative change in share prices of the two companies and re-construct the regression equation of the form (1). Let us calculate the relative change as follows:

$$R_i = \frac{(p_i - p_{i-1})}{\max(p_i)}, \qquad (2)$$

where: p_i, p_{i-1} are the current and the previous values of the price on a share of the company.

The calculated relative changes in stock prices are shown in Table 5.

On the basis of the data of Table 5 we can construct two dependence functions of form (1). These equations are presented in Table 6.

Table 5

The relative changes in stock prices of companies B and D

Date	*B*	*D*	*Date*	*B*	*D*
30.09.2014	–	–	31.08.2014	0.002156	0.000991
29.09.2014	-8.3E-05	0.009906	30.08.2014	-0.00265	-0.00991
28.09.2014	0.009371	0.00842	29.08.2014	0.007049	0.005448
27.09.2014	-0.00647	-0.00991	28.08.2014	0.001576	0.004458
26.09.2014	0.003151	0.016345	27.08.2014	-0.00572	-0.01634
25.09.2014	0	-0.00743	26.08.2014	-0.00398	-0.00198
24.09.2014	0.006303	-0.00198	25.08.2014	0.007215	-0.00248
23.09.2014	-0.00207	-0.0005	24.08.2014	-0.00788	-0.01436
22.09.2014	0.005556	-0.00297	23.08.2014	-0.00058	0.010896
21.09.2014	-0.01725	-0.00297	22.08.2014	0.02007	0.005448
20.09.2014	0.00199	0.011392	21.08.2014	-0.00755	0.018326
19.09.2014	-0.00357	-0.00892	20.08.2014	-0.0044	0.002476
18.09.2014	-0.00041	0.001981	19.08.2014	0.003317	0.001486
17.09.2014	-0.00614	0.000991	18.08.2014	0.017001	0.015354
16.09.2014	0.000995	-0.0005	17.08.2014	0.004478	-0.00198
15.09.2014	-0.01219	-0.01288	16.08.2014	0	0.012878
14.09.2014	0.008459	0.009411	15.08.2014	-0.00788	-0.03715
13.09.2014	0.002903	-0.00347	14.08.2014	-0.00208	0.008138
12.09.2014	-0.00282	0	13.08.2014	0.000416	-0.01475
11.09.2014	-0.00075	-0.00892	12.08.2014	-0.00208	0.007121
10.09.2014	0.00199	-0.0005	11.08.2014	-0.00432	0.002543
09.09.2014	-0.01559	-0.00495	10.08.2014	0.001995	0.002543
08.09.2014	0.000912	0.004953	09.08.2014	-0.00432	-0.01017
07.09.2014	0.003981	0.005448	08.08.2014	0.006401	0.015768
06.09.2014	0.00141	0.001981	07.08.2014	-0.00366	-0.01017
05.09.2014	-0.00174	0.001981	06.08.2014	0.002411	-0.00154
04.09.2014	-0.00647	-0.0005	05.08.2014	-0.00399	-0.01441
03.09.2014	0.014016	0.002476	04.08.2014	-0.00432	-0.00935
02.09.2014	-0.00066	0.000991	03.08.2014	0.016958	0.012461
01.09.2014	0.010367	0.000495	02.08.2014	0.002161	0.002596

Table 6[*]

D (*A*, *C*)	$\Delta_D = -20,28 + 7,98p_1 - 1,16p_2 + 0,015p_1p_2 - 0,79p_1^2 + 0,061p_2^2 + 0,026p_1^3 - 0,0013p_2^3$
B (*A*, *C*)	$\Delta_B = 15,42 - 1,49p_1 - 2,13p_2 - 0,004p_1p_2 + 0,092p_1^2 - 0,21p_2^2 - 0,002p_1^3 - 0,007p_2^3$

[*]*Notes:* Δ *– dependence of the values obtained from relation (2) and the values of shares of companies A and C.*

The next step is calculating the ratio changes depending on the level of stock prices of one of the two companies studied (B, D) on stock price values of other companies. This can be done by calculating the relationship between the volumes of figures formed by the functions presented in Table 6.

Then such a relationship can be represented by the following equation:

$$E = \frac{\iint_T \Delta_D dp_1 dp_2}{\iint_T \Delta_B dp_1 dp_2}, T \in [\min p_1; \max p_1]. \quad (3)$$

If this value is greater than 1, then the company whose data are above the line is more dependent on its competitors than the other of the researched companies; if it is less than 1, the company is less dependent.

Although this method is meant for helping investors choose the potential company for direct investments, it is also an economic evaluation of investments-attracting mechanisms, as it involves determining the enterprise whose investments-attracting mechanism is most likely to attract investments, and therefore deserves the highest economic evaluation.

In our case, $E > 1$, indicating a high dependence of company D on its competitors. Therefore, investments-attracting mechanisms used by company B may be regarded as having the best chance to attract direct investments. The further research into these issues may deal with developing the similar method of evaluating investments-attracting mechanisms but for "portfolio" investors.

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H. M. Zakharchyn, Y. M. Kosmyna

APPLICATION OF MODERN METHODS OF SOCIOMETRIC ANALYSIS FOR MODELLING PERSONNEL OPTIMAL BEHAVIOR AT THE ENTERPRISE

Abstract. The article focuses on the analysis of the sociomapping method used for modeling the personnel optimal behavior at the enterprise, as well as on the method efficiency evaluation within the framework of the conducted research. It is suggested to apply the sociomapping method for evaluating the efficiency of the enterprise corporate culture and for the analyzing the enterprise collective organizational behavior in general.

The key benefits and drawbacks of the sociomapping method application are considered within the framework of the enterprise social networks analysis.

Key words: personnel, HR management, personnel behavior management, sociometry, sociomapping, organizational behavior, corporate culture.

Formation of the problem. Forming the efficient personnel behavior management system requires an effective tool for modeling optimal processes in the microenvironment of personnel. The tool should cover all the socio-psychological factors, cultural and behavioral characteristics of communications. For this purpose, the method of sociomapping, based on the model of fuzzy sets has been suggested. The topicality of the research lies in the fact that the sociomapping method has never virtually been applied to the analysis of personnel social networks at domestic enterprises.

Analysis of recent research and publications. Foreign experience comprises a variety of sociometric analysis models. The method of sociomapping has been relatively recently elaborated as part of sociometry and social networks theory. R. Bahbouh and R. Warrenfeltz [1;2] were the first to suggest the method of sociomapping for social network analysis. All further research with the application of sociomapping method was concentrated on forming development programmes for personnel management, team efficiency analysis, interpersonal cooperation and team communication. However, particular significance of personnel behavior within the context of organizational culture was not taken into account in these works. Thus, the models proposed in the research works require further detailed review and specification. Moreover, analyzing the recent research which was conducted using instruments of sociomapping, we have found that none of them have been used for the modeling of optimal personnel behavior in a changing, dynamic environment.

Research objectives. The main objectives of the article are analyzing and researching the effectiveness of the sociomapping method, describing its key benefits for modeling personnel optimal behavior at the enterprise.

Presentation of the main research material. In the context of this research we address the personnel behavior management in view of cultural aspect influences, using the set of tools of corporate culture and socio-psychological motives of behavior.

Taking into consideration the determination of person's behavior by his or her psychological structure, it is technologically impossible to unify the process of personnel behavior management by shaping it into certain standard. It is to some extent a creative process that it requires creativity and knowledge of psychology by managers. It is therefore unreasonable to apply only the methods of mathematical and economic modeling, as we are faced with the socio-psychological characteristics which cannot be assigned any values or given quantitative evaluation.

Forming the efficient personnel behavior management system needs an effective tool for modeling optimal processes in the microenvironment of personnel covering all the socio-psychological factors, cultural and behavioral characteristics of communications. With this aim we suggest the method for modeling the effective behavior of personnel at the enterprise. This method, unlike others, reveals the process of forming the effective personnel behavior and

covers all the socio-psychological aspects of formal, informal and cultural networks among the staff of the enterprise.

Sociomapping is a new method for conducting profound analysis of socio-economic systems which reveals hidden structural elements within the complex socio-psychological human resources system by analyzing its dynamics [4].

Sociomapping is also a unique visualization instrument, which enables comprehensive depiction of complex systems, such as work teams. It provides both experts and laymen with the opportunity for swift and intuitive orientation within the analyzed system and provides them with support for making decisions on its management [7].

Sociomapping monitors the most important characteristics of inter-elemental relationships— from capturing the degree of stability and the composition of these relationships (including their inner conflicts and disagreements), to mapping communication currents (the degree of their functionality in each direction) and uncovering the weaknesses in the social system structure. Additionally, it reflects the system's dynamic development and tension build-up, and allows for the short-term prediction of future behavior (conflicts, performance issues etc.) [1].

It is common knowledge that numerous factors can promote the development and success of the enterprise. But none of them is as significant as the management ability to manage the complex human resources system, their behavior, in particular, accomplishing the goals of the organization efficient operation with a cohesive team. The effective personnel behavior management leads to the enterprise development and achievement of its goals and objectives.

The aim of the sociomapping method is to diagnose the causes of low personnel efficiency, reveal positive and negative impact of communication in professional, informal and personal networks of the personnel. The sociomapping method is based on fuzzy sets theory and mathematical topology. The theoretical principles of the latter have been actively developing and being applied to modeling of decision-making process under the conditions of incomplete data [5].

The sociomapping method combines the information on human resources system obtained from various sources. Such important inter-element connections as stability level of personnel behavior and level of inner tensions can be controlled by means of sociomapping. It is also possible to plan the level of functional efficiency of each worker that is, in this or other way, an element of informal network of the enterprise staff. Sociomapping can be useful in revealing weaknesses of the socio-psychological system of an organization. The method permits the short-term prediction of the personnel behavior (level of staff cohesiveness, level of personnel affiliation, conflicts, and effectiveness level).

Technological realization of the sociomapping method envisages preliminary surveys of the enterprise workers by means of individual interviewing. The aim of the method realization is to prepare the map of formal and informal connections within the personnel.

The respondents were asked specific questions in order to define the level of professional and non-professional contacts within the enterprise staff. They were also invited to estimate the level of affiliation using the scale of 1 – 10 points, in accordance with the model of fuzzy sets.

The survey provided the evaluation of attribution of each separate factor to the corresponding set of fuzzy terms (linguistic variables) using the point scale (1-10; 1 – low level, 5 – average level, 10 – high level). The proposed model is based on the assumption that if the degree of affiliation exeeds 0.5 points, the efficiency grows. Proceeding from this assumption, relatively average degree of affiliation can be regarded as one of the predictors of efficiency.

Based on the information received from 91 surveyed workers of PLC Leoni Wiring UA GmbH, the conceptual socio-maps of formal and informal networks have been produced. Figure 1 depicts the typical example of the formal network socio-map at PLC Leoni Wiring UA GmbH enterprise. Figure 2 depicts its informal network.

The sociometric map of personnel formal network at the estimated enterprise (fig. 1) traces effective and non-effective interpersonal connections [6] in accordance with the assumptions made where the lines represent formal connections between personnel of the network [3].

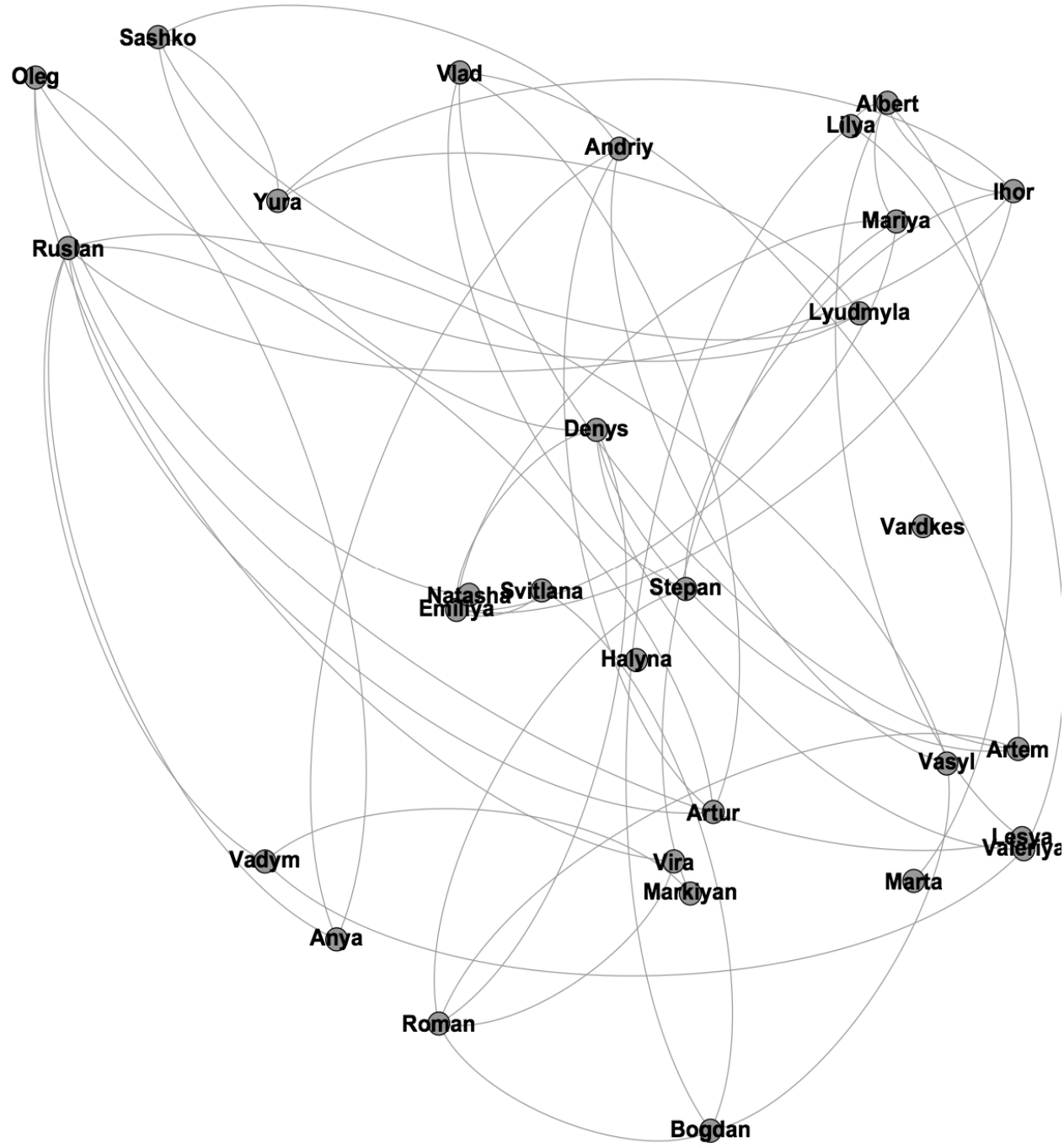

Fig. 1. Sociometric map of the personnel formal network at PLC Leoni Wiring UA GmbH.; done by author

After analyzing the informal network sociometric map of Leoni Wiring UA GmbH (fig. 2) it was established that the enterprise has three informal groups of personnel interpersonal connections which proved the inefficiency of corporate culture implementation. Separate groups of this subculture perform different tasks and functions moving the enterprise away from common goals and declared values. Thus, the key tasks of the enterprise management in such conditions are to form and adapt corporate culture by means of cross-cultural communication instruments, evaluate the efficiency level of both groups in order to determine priority targets in personnel behavior management in the long run.

The lines in figure 2 reflect the closeness of connections inside the informal network; the length of the line between vertices corresponds to the of connections between them.

In graph theory closeness is a centrality measure of a vertex within a graph (network). Vertices that are 'shallow' to other vertices have higher closeness. Closeness is preferred in network analysis to mean shortest-path length, as it gives higher values to more central vertices, and so is usually positively associated with other measures such as degree. In the network theory, closeness is a sophisticated measure of centrality. It is defined as the mean geodesic distance (i.e., the shortest path) between a vertex and all other vertices reachable from it [7].

Three interpersonal close groups of workers (also called ‘subcultures’) are showed on the map for the illustration purposes. Each subject depicted on the map has the membership degree, clustering coefficient and the distance-between-nodes (connections) defined. Comparative analysis of formal and informal networks of the researched enterprise was conducted covering these average indexes as well as the closeness centrality index and diameter of the network (graph).

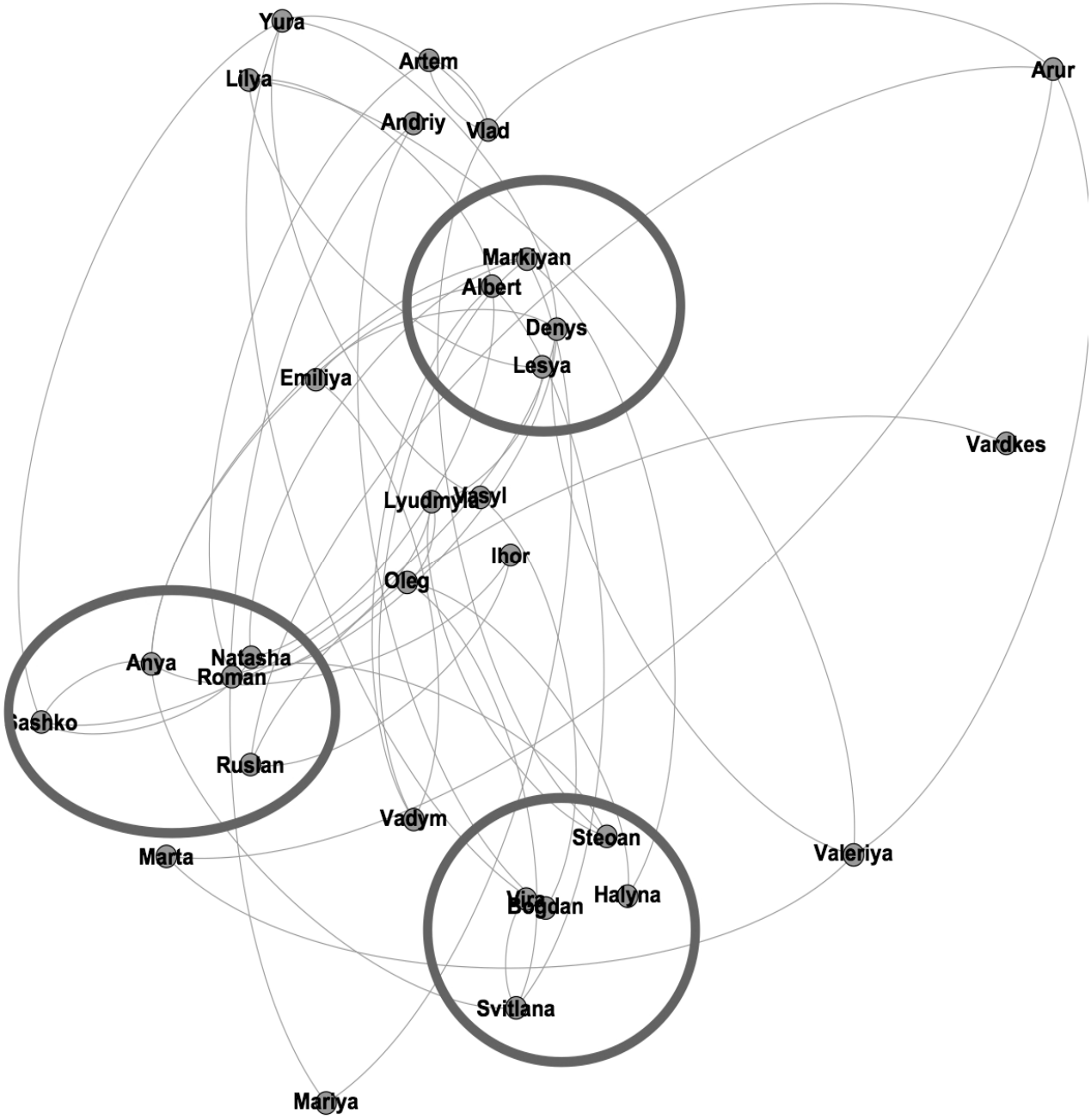

Fig. 2. Sociometric map of informal network at PLC Leoni Wiring UA GmbH.; done by author

The average membership degree shows the level of staff cohesiveness. As the average level of affiliation grows, the effectiveness of team work improves as well. Average clustering coefficient reveals closeness of connections within a team. It serves to validate the hypothesis about the existence of close subcultures in the team.

Betweenness is a centrality measure of a vertex within a graph. Vertices that occur on many shortest paths between other vertices have higher betweenness than those that do not. [6] In other words, the betweeness centrality index reveals the distance between all the pairs of vertices within the network. Lower index stands for better level of team communication which facilitates efficiency of personnel behavior management. Higher clustering coefficient in the informal network means the increase of its efficiency. Forming small sub-cultures within formal networks in professional relations at the enterprise does not promote development and transparency. Calculated indexes at the researched enterprise speak for quite a high level of efficiency of the formal network.

Relatively low indexes of informal network are indicative of weak informal network at the enterprise which in its turn can hamper the formation process of optimal behavior of the personnel and the development of efficient corporate culture of the enterprise.

Table 1

Comparison of formal and informal networks at PLC Leoni Wiring UA GmbH

FORMAL NETWORK			
	Average membership degree index	Average clustering coefficient	Average betweeness centrality index
Leoni Wiring	3.267	0.053	2.738
INFORMAL NETWORK			
Leoni Wiring	Average membership degree index	Average clustering coefficient	Average betweeness centrality index
	1.6	0.069	4.113

Source: Author

The benefits of proposed method for modeling the optimal personnel behavior based on sociomapping are the following:

– relatively low labor content as regards construction and usage;

– objective possibility of receiving data for modeling by means of surveying;

– flexibility of the method as in conditions of change there is a possibility of quickly respond to changing mood and behavior of the personnel;

– the method enables quantitative evaluation of qualitative characteristics such as the team cohesiveness, loyalty, formal and informal connections etc.

– Enables holistic analysis of efficiency of personnel behavior management at the enterprise.

Conclusions

The method for visualization of team profiles has been suggested. The main advantage of the method proposed is that it is able to visualize the similarity of profiles in a way which is more friendly to human perception than when presenting profiles by line-graphs or just through a matrix of numbers. The final visualization through the sociomap picture provides a general overview of differences between profiles.

From the research done the following conclusions can be made: the method of sociomapping will facilitate prediction of the future personnel behavior; it will enable analysis of behavioral characteristics of each separate worker of the enterprise with the aim to maximally reveal the workers' potential and realize it; it will enable to analyze the process of forming sub-cultures within the enterprise for their constructive integration into the unified corporate culture; the sociomapping method allows to determine objectively the level of efficiency of corporate culture formation, reveal its strengths and weaknesses; it will enable to increase personnel efficiency using the informal network advantages.

We are convinced that Sociomapping is a promising method for analysis and visualization of the social ties development andd also for the detection of potentially critical situations.

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NECESSITY OF RESTRUCTURING UKRAINIAN AIRLINES BUSINESS AND IMPROVING THEIR VALUE MANAGEMENT IN CONDITIONS OF EUROPEAN INTEGRATION AND INCREASED COMPETITION

Abstract. The article describes the qualitative and quantitative changes reflecting dynamics of the airlines development in the domestic and foreign air passenger transport markets. The reasons that caused bankruptcy of "Dniproavia" joint stock company are characterized; the results of regression models are assesssed. The factors that dictate the need for restructuring Ukrainian airlines business on the basis of the international airlines experience are determined.

Key words: restructuring, market value, market capitalization, value management, competition, airline, air passenger transport market.

Problem. Modern processes of integrated global aviation business development show a significant effect that organizational structures, functional, technological and socio-political changes have on the increase of airlines capitalization and their economic security. Inclusion into the scientific analysis of social, moral, and political factors that affect the aviation industry economy as a whole and individual business entities, in particular, is a feature of the institutional approach to the of the airlines development prospects assessment.

At the beginning of the 21st century in conditions of deepening recession in Ukraine it is important to establish public-private partnerships, search for new target markets and choose innovative solutions of strategic nature that will determine the content of restructuring in the real economy and the airlines capitalization dynamics [1–3].

Analysis of recent publications. In today's business world all economic resources have become mobile, losing their national characteristics and geographic peculiarities of target markets. The corporate globalization has become a real world power as the monopolization of investment resources is about 90 %. Economic competition intensifies the global development conflict. The growing capitalization of industrialized countries in general and airlines, in particular, become relevant issues.

High-tech sectors of the world economy are demonstrating high rates of growth in the value of intangible assets, showing practical interest in the possibilities of using concepts of marketing and logistics in international management. Every year these sectors are increasing capitalization rates, the cost of national airlines brands is growing, revenues from leasing of aircraft and other facilities necessary for the passenger flows servicing are going up.

Global airlines are the driving force of structural and functional changes in national economies. The structure of their real assets reflects the effect of organizational innovations. In addition, ROI dependence on the volume of material resources involved in the sphere of air services is decreasing. During the world crisis famous brand airlines are gradually reducing transaction costs in the process of conquering new international markets (economies of scale). All of these phenomena eventually lead to changes of:

– aviation market competitive environment and critical resources coverage;

– redistribution of market power through M & A transactions;

– increase the investment attractiveness of effective airlines.

Thus, after the stock market collapse in 2008 the market capitalization of the world largest companies has grown by more than $10 trillion. From 2008 to August 2013 only 67 companies preserved their positions in the ranking of the best 100 companies. In August 2013 the market capitalization of 100 world largest companies was $13.6 trillion; the difference between the first and the 20th positions in the rating was $215 billion. [4]. The phenomena of globalization in the business world reflect the high rate of change in the activities scale of large companies that carry out extensive maneuvers to create new barriers to market access. They are active in introducing into

practice the new rules on the market and an aggressive marketing policy. From 2008 to 2013 33 large companies were squeezed out from the list of TOP-100 not having the necessary resources for maintaining competitive positions. In recent years, due to strengthening influence of the financial and political capital market positions of major world leaders of aviation market are rapidly changing. More tough become political and trade restrictions by the EU against Russian international airlines in conditions of military conflict aggravation between Ukraine and Russia.

Global airlines are actively expanding its presence in the markets of the EU and Ukraine. In particular, the airline *Emirates*, based in Dubai International airport, on January 16, 2014 performed its first flight from Dubai to Kyiv [5]. According to experts, the direction of passenger flights Ukraine – United Arab Emirates (UAE) is dynamically growing and is expected to be one of the most competitive international destinations. Today direct flights between the two countries, in addition to *Emirates*, are performed by 5 more airlines – 3 Ukrainian and 2 from the Middle East. According to analysts, when *Emirates* enters this market sector the frequency of flights between the "Boryspil" and Dubai International will grow by 30 %. This will have a positive impact on the cash flows dynamics of the airline and the airports that are serving it. It should be noted that by 2020 the company plans to double its fleet. Since the beginning of its operation *Emirates* received over 500 international awards for its high level of service. Therefore, savings on transaction costs due to its famous brand is an important competitive advantage of the company. With the presence of such a large airline in the Ukrainian market the competitive environment is going to change. For small airlines that are engaged mainly in charter flights ordered by tour operators, the prospects of further survival in tough competitive environment are poor [6, 7]. Low-costers carrying tourists from tour operators are significant competitors to charter airlines. According to the government aviation agency, services of Ukrainian airlines in January-June 2014 were used by 1.8 mln. people, and charter flights were used by 815.8 thousand people, which is 21.1 % less than the same indicator for the previous period (charter services in June 2014 were received by 229.8 thousand people.). Because of the lack of demand in 2014 charter flights were partially canceled. At the beginning of 2013 Ukrainian air company "Aerosvit" stopped its operation.

Management of domestic airlines should focus their particular attention on shaping the image of their companies and gaining customer loyalty, on creating high value services to clients. The rating compiled by Business Insider, presents 20 worst airlines of the world. Ukrainian International Airlines (UIA) is placed the third from the end in this rating [8]. The main players in the market of charter airlines are two companies "Ukraine International Airlines" and Windrose. "Kharkiv Airlines" provides less volume of similar services. None of the Ukrainian airlines can match the level of capitalization of any foreign company, even that of AirAsia (7.6 bln.) [9].

Management of Ukrainian airlines should look for reponses to existing challenge in strengthening the core competencies of all the employees; this will allow them to competently conduct business restructuring. Generalization of the above problem tasks suggests that scientific research focused on identifying opportunities of increasing airlines capitalization on the basis of restructuring their business is of special interest.

The purpose of the research is to summarize foreign and domestic experience of airlines operation and define peculiarities of factor interaction in the process of restructuring their business; to estimate possibilities of improving value-oriented management system of Ukrainian airlines in an unstable market environment.

The main results of the research. For more than twenty years the Ukrainian market of air passenger traffic, unfortunately, remains a monopoly and is closed to using modern marketing tools and innovative management technologies; this results in the air services price increase (for both passenger and cargo air transportation).

Introduction of modern paradigm of value-based management into the practice of managing airlines in conditions of their target markets instability (concerning cargo and / or passenger traffic) requires the simulation of different types of relationships at different levels – production and operational, organizational, marketing, intellectual and financial – to identify potential growth and cost increase.

In practice of enterprise management and assessment of restructuring in the system of value-

oriented management [9-12] the added value, in particular, the added value for shareholders, is the most commonly used indicator, which includes the following indicators:

– Market Value Added,
– Economic Value Added,
– Shareholders Value Added,
– Total Shareholders Return

However, due to different interpretations of the term, we consider appropriate to note the following criticisms of the category of "added value":

Traditionally, the added value is treated as a multidimensional category covering functional and emotional benefits, estimated through consumers (clients) compared to competitors, but this category can also measure performance of the airline itself and of the real possibilities of its innovation and investment potential. Critical remarks on understanding and application of the concept of "value added" in the practice of airlines management are the following:

– Value added is the result of the airline success (e.g., efficient strategy application in the competitive aviation market within the national economy and international business);

– This category should be seen as a way to ensure the functioning of the airline as a single unit based on the integrated management system;

– Value added is part of intangible assets and / or internal processes that control cost, so a larger set of services is to provide the adequate benefit to the company;

– Value Added and added value should serve as the key categories of the management strategic thinking;

– the rate of the value added growth should be compared with the rate of income growth, this being an important condition for strengthening the airline economic security and its market position;

– to evaluate the performance of the majority of enterprises they use concepts, analysis methods and techniques based on financial indicators (Cash Flow, EVA, WACC etc.), but the category of "added value" should be treated multidimensionally, in particular, through non-financial indicators (Balanced Scorecard methodology (BSC);

– the scope of airlines value added formation is broad and covers a range of customers – both internal and external (creating value for customers – the external value, and creating value for the company – internal value);

– on the basis of enriching knowledge in the airlines strategic management it is expedient to point out innovative products, intellectual resources and value added in intellectual products;

– systematic measurement of the company value added permits to make an informed choice of airline development directions;

– enriching the meaning of the concept "airlines value creation chain" allows to understand the the added value formation mechanism both within individual airlines and aviation industry as a whole.

At the present stage of the aviation market development political constraints for international airlines that affect their ability to generate cash flows become severe. Thus, the total loss of capitalization of the major European and US airlines in August 2014 due to cancelling many charter flights in response to sanctions against "Dobrolet" Russian low-coster (100 % subsidiary of "Aeroflot"), amounted to about $4.5 bln. [13].

Modern conditions of domestic aircompanies operation have become stricter, changing their marketing vectors geography due to annexation of the Crimea and military events in Donbas. Fundamentals of industrial capital reproduction of both domestic and foreign air carriers are broken, conditions of credit resources attraction are worsening that negatively affects the process of generating net cash flows. Statistics of foreign companies shows that the dynamics of value added indicator (EVA) doesn't not determine sales increase, but spread – the difference between ROI and the weighted average cost WACC.

The urgency of this problem can be shown by the example of the high performance dynamics of PAT "Dniproavia" (Table 1). This company was practically not ready to work in tough competitive environment and to the power redistribution on the aviation market. There has been a sharp reduction of scale – income from sales of services reduced from 408 mln. in 2008 to 174 mln. in 2013. This led to significant losses, gross loss in 2013 was 134.336 mln. Operating activities were extremely inefficient: in 2013 unprofitable sales reached 76.8 %; and net loss amounted to 378.729 million.

These continuous losses suffered by PAT "Dniproavia" during 2008–2013 are the consequence of the absence of the systems integrated management of different types of the company activities as well as strategic thinking of management. In fact, a quite significant share in the operating expenses was taken

by other operating costs (costs of research and development, financial losses due to assets depreciation, changes in exchange rates etc.): in 2012 they were 70% and the share of labor costs was only 18.6 % of total operating expenses. We believe that the effective intellectual work should be sufficiently motivated, otherwise the airline will not have a stable foundation for innovative development.

Table 1

Performance dynamics of PAT "Dniproavia" in 2008–2013

Years	Income	Gross profit	Cost of sales	Other operating costs	Net income (loss)
2008	408135	-119165	16433	88493	-216464
2009	734516	-198670	27393	43822	-274723
2010	1198357	-181837	70025	59043	-263289
2011	1068020	-267557	74936	54793	-373820
2012	333836	-134839	28863	233939	-424417
2013	174882	-134336	17636	118126	-378729

Source: compiled by the authors according to [14]

The rate of growing of the value added in PAT "Dniproavia" was significantly lower than the rate of growing of the total costs. This had a negative impact on the results of operating activities and, accordingly, on the investment attractiveness of the airline. At low listing of its shares on the stock markets it was impossible to profitably issue securities and attract external funding for the purpose of introducing modern business technologies, improving quality of services and entering international markets. Figure 1 shows a trend that reflects Dniproavia public company income dynamics in 2008–2013. The passengers flows decreased after 2008 because of the deepening financial crisis and that undermined the economic stability of the company to external threats, particularly to unfavorable market conditions (Fig. 2).

In conditions of high hryvnia devaluation airlines operating costs spent on servicing passangers flows grow exponentially, leading to deterioration of their financial results. Small or low-cost airlines can not introduce advanced technology and provide high quality services due to lack of the working capital and falling demand for such services.

As can be seen in Fig. 2, even decrease of the number of unprofitable operations at PAT "Dniproavia" in 2013 could not offset the accumulated net loss and reduce the gap between the gross loss from sales of services and the net loss from all company activities – operational, financial and investment (net cash flows from operating and financing activities in 2013 were negative and amounted UAH76.165 mln. and UAH300.552 mln. loss, respectively).

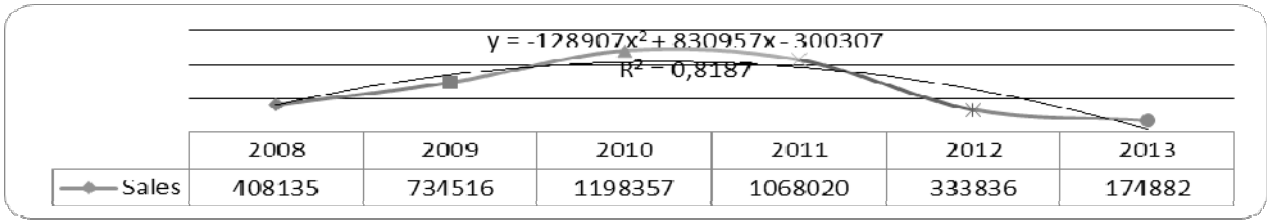


Fig. 1. The trend reflecting PAT "Dniproavia" income dynamics in 2008–2013 (in thousand UAH)

Note: constructed by the authors on the data from [14]

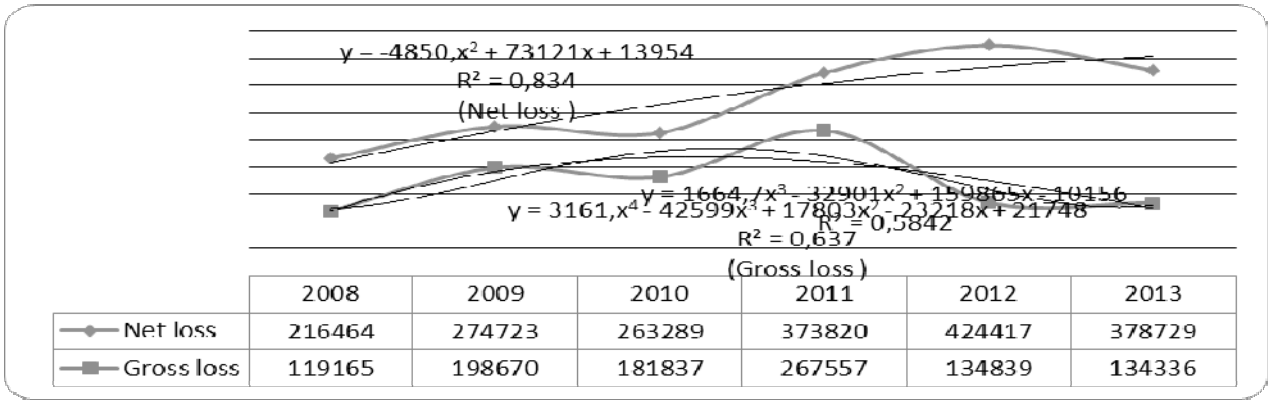


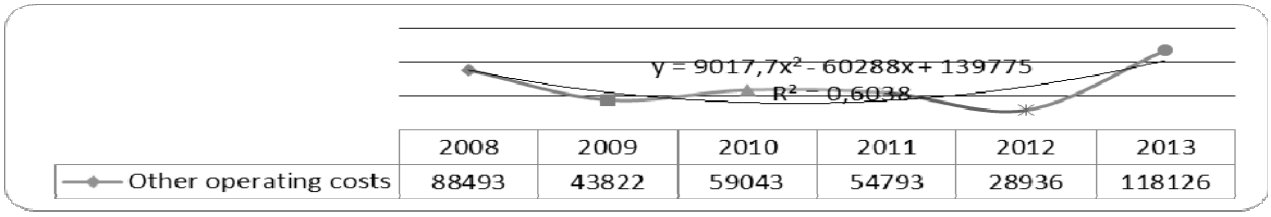
Fig. 2. Trends of gross and net losses of PAT "Dniproavia" (in thousand UAH)

Note: constructed by the authors on the data from [14]

The main long-term plans of PAT "Aviation Company" Dniproavia ", according to managers, cover the following areas: development of new internal and international air transportation directions; increase of passenger traffic; optimization of the aircraft fleet; business development in therelated fields. However, implementation of each of these development directions, in our opinion, requires high concentration of intellectual resources of the company to develop the competent business model and identify key parameters of business restructuring.

Proper cost management is impossible without revealing problems in operating activities and identifying the optimal combinations of services in the sectors of "low cost" and "full service". Their solution mproves the financial results of the airline, in particular, due to reducing operating costs (Fig. 3).

In Fig. 4 the authors identify factors that determine the need to restructure the airline business and implement innovative approaches to the practice of passenger service.



	2008	2009	2010	2011	2012	2013
Other operating costs	88493	43822	59043	54793	28936	118126

Fig. 3. Dynamics of other operating costs taken into account to assess the financial results of PAT "Dniproavia" operating activities (in thousands UAH)

Note: constructed by the authors on the data from[14]

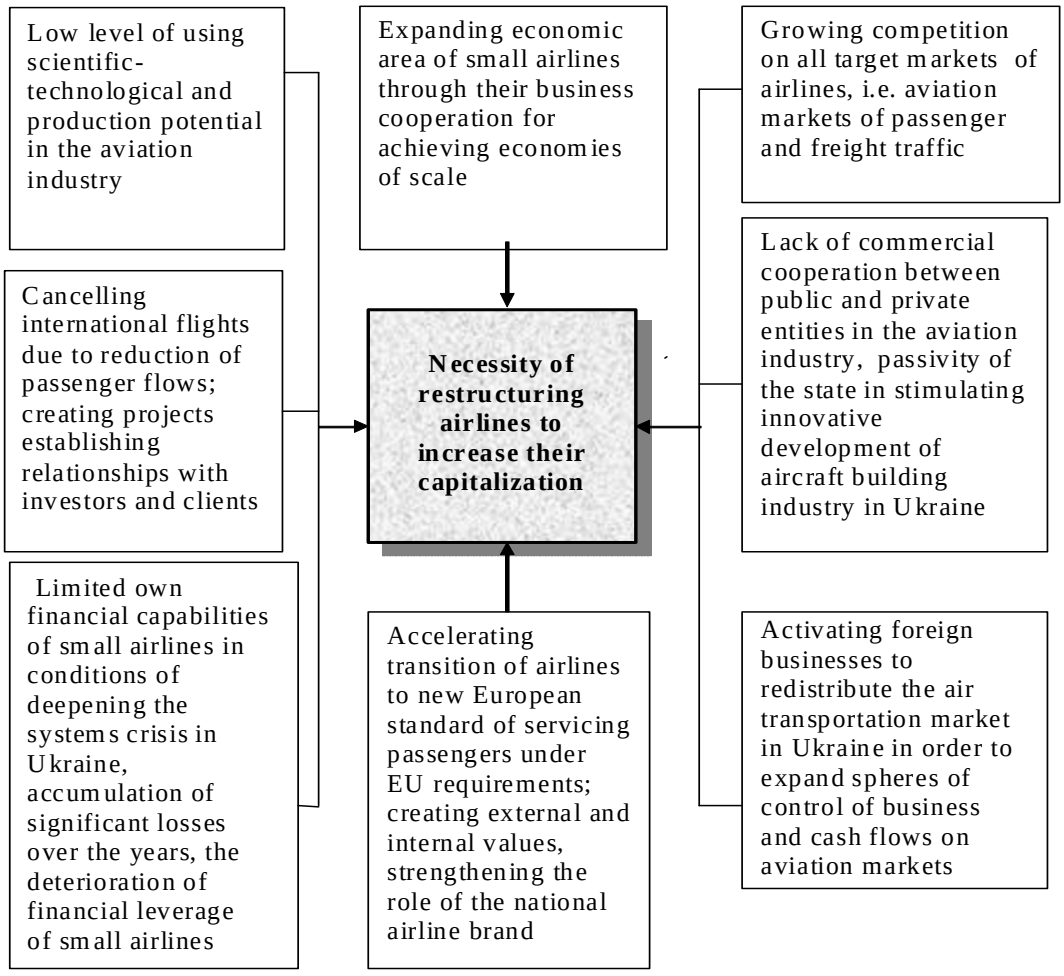


Fig. 4. Factors determining the need to restructure the Ukrainian airlines business and to implement innovative approaches to the practice of passenger servicing

The increasing dynamics of losses of Ukrainian airlines is affected, in particular, by an increase in airport charges. Thus, during 2007–2012 sales of services at the airport "Borispol" (services dealing with taking-off and landing of aircraft, ensuring aviation safety, providing extra parking time for aircraft, passenger service at the airport etc.) increased by 16 %. In Ukraine airfare increased by 30 % over night (February 5 – February 6, 2015) due to changes in the dollar exchange rate in the system of mutual settlements according to the requirements of International Air Transport Association IATA [15].

To reduce the negative impact of the devaluation of hryvnia on the cost of factors of production and finished products the management practice should implement business cooperation and the so-called model of joint actions. As noted by Porter [16], this approach requires the specific organizational context encouraging cooperation between subsidiary airlines.

Tough competition and debt burden significantly limit possibilities of airlines development and their access to credit resources (mainly due to the low value of liquid assets). So, another way to solve the problem of funding is to issue securities and their activation in the stock markets. For example, in 2009-2011 14 airlines IPO were announced totaling $7.4 billion, 6 placements reached $1.9 billion, three of them being in Asia. Until 2030, according to experts, the cost of new aircraft in Europe will be about $800 billions ($4060 billion in the world).

The growth of debt liabilities requires a comprehensive analysis of the processes of value creation and consumption by airlines. Hence, an indicator EV / EBITDAR (enterprise value / earnings before interest, tax, depreciation, amortization, rent), i.e. the ratio of enterprise value (market value plus accounts receivable minus cash) to its income before taxes, interest, depreciation and operating leasing is important in the system of value-based management. Operational leasing costs account for significant share of Ukrainian airlines expenditures as they rent expensive foreign airliners. After the bankruptcy of "Aerosvit"there also failed "Dniproavia" and "Donbassaero" airlinse. Experts prove the role of political capital in artificial bankruptcy and redistribution of airlines resources [17].

Specialized investment companies that serve the needs of airlines, particularly during their mergers, are actively working in the world. Yet in 2010 American air companies United Airlines and Continental Airlines have agreed to unite by exchanging shares for 3.7 billion dollars. The effects of transactions like M&A of different airlines should be considered in quantitative and qualitative terms – through changing capitalization of the new company, its brand value as well as through changes in external values (for customers) and internal values (for own company) that it creates. Note that the portal Airline Ratings has prepared a list of the safest airlines for 2015 based on inspection carried out by the Federal Administration and the International Civil Aviation Organization. Safety is assessed for each airline by seven criteria. Australia's largest airline Qantas was ranked first. The rest top-rated safest airlines are: Air New Zealand – New Zealand's national airline, British Airways – one of Europe's largest British carrier, Cathay Pacific – Hong Kong's flagship airline, Emirates – one of the world's largest airlines in Dubai and others. [18,19].

Conclusions. In today's competitive business environment domestic airlines, especially low-budget ones, should seek competent business restructuring and formation of the core competence as their main strategic goal. This course allows airlines to get a synergistic effect and to get rid of their non-performing assets. Airlines management should develop strategic thinking towards elaborating strategies of interaction with customers and investors and setting up public-private partnerships. The problems concerning airlines costs and values should be investigated in a complex system of relationships "society–state–airline as the subject and the object of economic power" and the effectiveness of approaches to their solution should be evaluated in quantitative and qualitative terms. Without necessary timely structural and functional changes and improvement of the business model itself it is impossible to create conditions for formation of value, especially in the current circumstances of losing the aviation market target segments through the annexation of the Crimea, military events in Donbass, force majeure conditions and other events of global nature that are related to the need to harmonize Ukrainian legislation with EU requirements regarding the quality of passenger air services.

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STRENGTHENING MICRO-ENTREPRENEURSHIP FOR THE DISADVANTAGED YOUTH IN MIDDLE EAST AND NORTH AFRICA

Abstract. The article presents the research of tools that stimulate micro-entrepreneurship for unemployed youth, facilitate self-employment, formalize entrepreneurship and lessen the gender gap in business. The proposals developed are aimed at creating new business opportunities for the unemployed young people. Centers of Professional Orientation and Integration (CPOI) create and utilize online database, combining business and education resources. This database is the key element of the system as it accumulates information about labor market for CPOI, creates business education environment for disadvantaged youth and provides non-financial support for entrepreneurs. We address the problem of unemployment by implementing an innovative database system realized using cloud technology with real-time data about participants and business partners. Cloud technology will provide CPOIs with efficient communications, which allows easy monitoring of CPOIs activities across the country. The database will aggregate real-time data and segment it according to economic, social, professional and regional characteristics in order to create appropriate CPOI strategy.

Key words: entrepreneurship, micro-entrepreneurship, business, Centers of Professional Orientation and Integration (CPOI), youth, employment, unemployment, self-employment, Middle East and North Africa (MENA), Morocco.

Problem statement. Unemployment and vulnerable employment create a massive strain on labor markets around the globe. Young people are particularly affected by this. Two out of five unemployed in the world are young people 15 to 24 years of age. These are nearly 75 million young men and women looking for a job. Though the official unemployment rate reaches 40 percent in some Middle East and North Africa (MENA) countries, this is only the tip of the iceberg compared to the global youth unemployment rate of 13.2 per cent in 2014. Two tendencies characterize the employment situation in this region: labour force participation rates of women are low and educated young people are increasingly unable to find jobs that match their qualifications. Amongst economically active youth, many are in unproductive jobs, have low earnings, high levels of insecurity, limited chances for advancement, and a lack of social protection. As adolescence is a critical period for developing skills, such youth unemployment level has significant implications for the future of the global economy.

The urgent need to improve the employment situation of youth is closely linked to the economic, social and political prospects of the region. To combat this problem, governments across the world are developing measures to improve the employment situation of youth. While the evidence base is limited, results of experimental research of the issue are beginning to appear.

Analysis of recent research and publications. The wave of civic protests that has swept the MENA region since the outburst of the Arab Spring has swept across Morocco. The Arab Spring had negative consequences and increased youth unemployment in the MENA region and in Morocco. Jobs are at the forefront of attention and youth unemployment is the main social, political and economic issue. Despite a relatively favorable socio-political situation compared to some other MENA countries, Morocco still has a lot to do to improve its social indicators which remain relatively low compared to the MENA average, and it particularly needs to make major progress to address inequality and vulnerability. The official unemployment rate in Morocco is 9.1 % but it is three times higher for the age group of 15–24 years old. These conditions, combined with the impetus for greater openness and dignity that emerged during the Arab Spring, provided fertile ground for frustration among the population.

Against the background of a new Constitution (2011) and a new government that took office in early 2012, Morocco has engaged in a dynamic process towards strengthening economic opportunities and social inclusion. However, while several high profile development programs and new sectoral strategies in the areas of education, employment, and youth have been initiated, additional efforts are needed to support the country-led reforms. Thus, the Government of Morocco seeks assistance in developing a support system for youth self-employment on the local level that can meet today's pressing needs while as well as in building the institutional architecture and

capacity to provide more and better job opportunities for young people over the long term.

Research objective is to explore a toolkit for strengthening small entrepreneurship among disadvantaged youth, promoting self-employment, formalizing enterprises and reducing a gender gap in business.

Research material. Morocco has taken a steady path of economic recovery since the 1990s stagnation, with sound macroeconomic management and sustained growth in non-agricultural sectors [1]. According to the data collected by Doing Business [2], Morocco is the 56th in the ranking of 185 economies as to the ease of starting a business. Starting a business in Morocco requires 6 procedures, takes 12 days, costs 15.5% of income and requires minimum capital. During 2012 Morocco made starting a business easier (it rose from 94 to 56 place in ranking) by eliminating the minimum capital requirement for limited liability companies [2].

Nevertheless, Morocco is a developing country with the low average income and the main obstacles for developing business and entrepreneurial activities are:

– inefficient government system, tax rates, tax regulations – 24.5 %;
– poor access to financing – 14.8 %;
– corruption – 12.6 %;
– inadequately educated workforce – 11.6 %;
– foreign capital regulations – 10.7 %;
– poor ethics of the national workforce, restrictive labor regulations – 13.4 %;
– other (inadequate provision of infrastructure, crime and theft, low level of health care, policy instability) – 12.4 % [3].

Despite Morocco's strong economic performance over the past 10 years, young people have been disproportionately affected by economic exclusion, with 51 % of all 15–29 year olds being out of school and out of work [1]. This lack of economic opportunities also has serious social implications, as the inability to gain financial autonomy also affects young people's dignity and ability to start a family. While unemployment rates are higher among the more educated youth, the very vast majority of young people suffering from lack of economic opportunities are low-skilled (69 % of all youth have less than a middle-school degree, and 20 % are illiterate). In fact, low-skilled youth represent 63 % of all unemployed youth, 78 % of young people are discouraged to find jobs, and 92 % of the youth are involved in domestic activities. Girls are particularly vulnerable, with a staggering 82 % of those not in schools being out of the labor force either for family reasons (63 %) or for discouragement (19 %).

Moreover, even among those young people who are employed, over 80 % work in the informal sector, often under precarious conditions. Despite this scenario, most policy interventions in Morocco have to date focused on a minority of high-skilled unemployed youth, for example, through the programs of the National Employment Agency ANAPEC, while ill serving the less educated majority.

The most vulnerable are young people (18–35 years) and women that are illiterate and the low skilled. Seventy-two percent of rural women cannot read compared to the already-high national average of 52.7 percent for women [1]. Moroccan women are underrepresented in business, however women are powerful human resource and can boost economy of Morocco, because the smaller gender gap is directly correlated with the growth of economic competitiveness of the country [4]. That is why it is so important to promote women entrepreneurship, break obstacles and stereotypes, decrease illiteracy across rural women population and provide new job opportunities.

The value of non-financial support for the microbusiness in emerging countries is hard to overestimate. According to the research and the experience of NGO "Youth Business International" [5], non-financial support can become the key to the success of microbusiness and entrepreneurs in emerging countries. We offer non-financial support that will be realized through the combination of trainings, mentoring and partnership with unemployed youth. All of these activities will be adapted to the local conditions and realized in cooperation with the government, local businesses and various NGOs.

Youth entrepreneurship is not a quick fix of every economic problem of society. Entrepreneurship should be promoted as part of society, where their government and NGOs will create conditions for new enterprises to flourish. Societies need to raise youth as entrepreneurs. In order to do so we need to work with population (orientation towards self-employment, trust, overcome fear of failure in business, support from families).

For youth and entrepreneurs there must be created a network of Centers of Professional Orientation and Integration (CPOI). These centers will provide access to computers, information resources, Internet and educational materials (fig. 1).

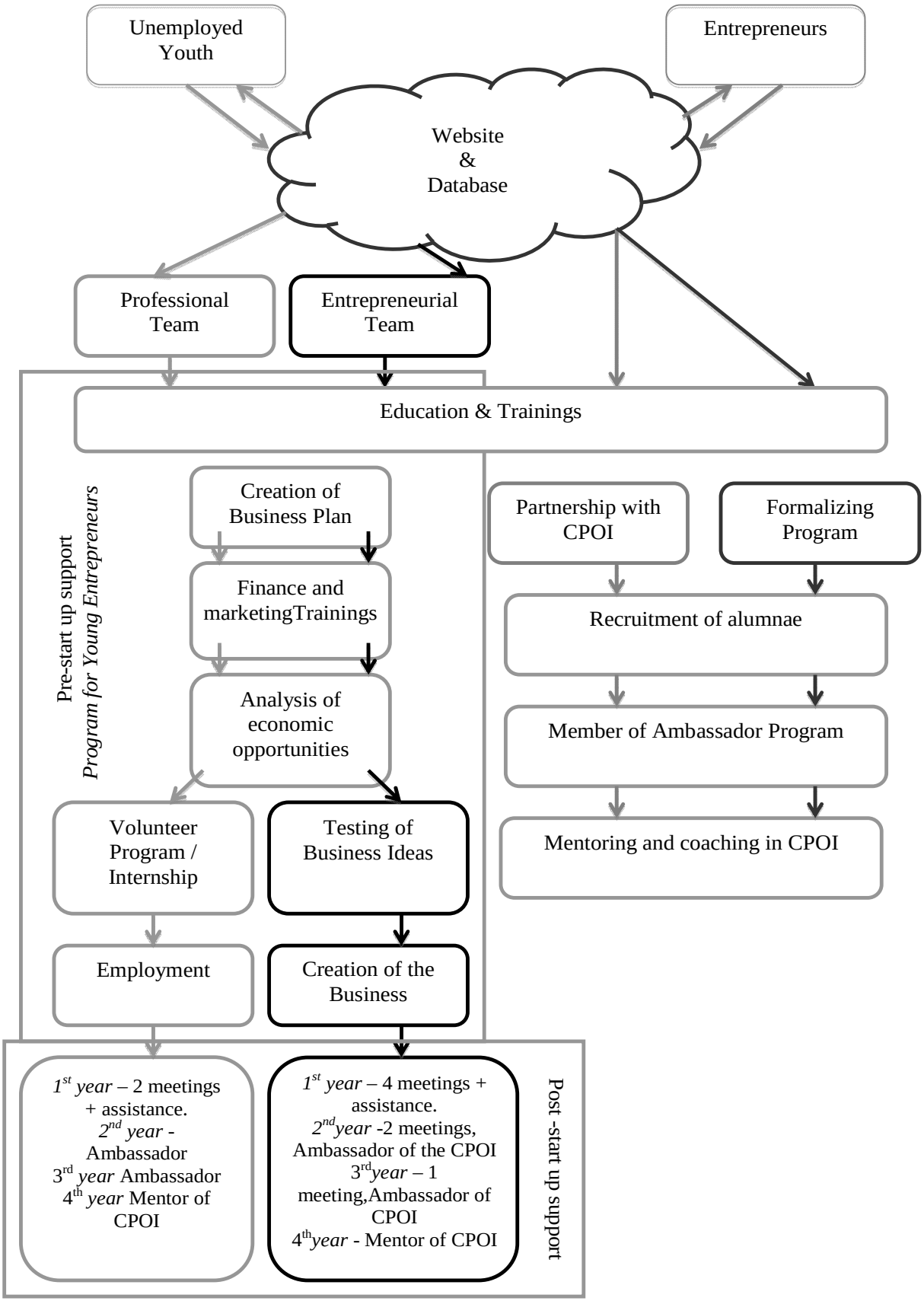

Fig. 1. Concept of Centers of Professional Orientation and Integration

Note: compiled by the authors

CPOI will create and utilize online database, which will combine business and educational resources. This database is key element of the proposal, because it will provide the information about labor market for the CPOI, create environment for business education for disadvantaged youth and provide non-financial support for entrepreneurs.

Target audience:

1) unemployed disadvantaged young (15–29 years) people, who have no right skills for job, but have passion to find a job or create a new company. The users should already be able to read, write and have basic computer skills. Otherwise, the user will be assigned to assistant and appropriate classes;

2) young entrepreneurs, founders of new businesses, "graduates" of the Centers, informal entrepreneurs, who already formed and established small businesses which are looking for employees or business partners.

The problem of unemployment must be addressed by implementing an innovative database system that will be realized on the cloud technology that means CPOI will have real-time data about participants and business partners. Cloud technology will provide CPOIs with efficient connectivity, which allows easy monitoring of CPOIs activities across the country. Database will aggregate real-time data and segment it according to the economic, social, professional and regional characteristics in order to create appropriate strategy of CPOI.

By introducing CPOI we attempt to motivate local communities to create new businesses that will support local economies and break the barriers for new businesses. CPOIs will become business incubators, which will offer entrepreneurship trainings and post-creation development support.

At the Centers there will be a computer laboratory, a conference room for trainings and classes, and Entrepreneurial Consultancy office, where young entrepreneurs will be able to consult an advisor about finance, legal issues, marketing etc. At the beginning, these centers will employ up to 5 specialists from the cities, but later local talents, who went through this project and decided to be representatives of it, can manage these centers. It is important to note that in the village these centers have to have teachers to teach how to read, write and do basic math.

The network of the Centers will be spread across the cities and villages. In the urban Centers, we propose to focus more on entrepreneurship consultancy, because one of the main goals of our project is to help small businesses from informal sector to formalize their activity, but these centers will also work with youth, who are seeking for job or for assistance in creation of their new businesses. Centers in the villages will be focused more on a human capital and talent management, in order to increase financial literacy among the population, to promote self-employment and culture of savings, to provide trainings and information, to educate illiterate men and women, to empower women. All the Centers will be tailored to the regional and local conditions in order to unleash local talents, to minimize gender gap, to promote entrepreneurial spirit, to facilitate access to informational and financial resources and to embrace productivity and creativity.

The main tool for the implementation of the project is the website that is connected to the database created for young people and entrepreneurs. This database will consist of real-time data (CVs of participants, information about local businesses partners, statistical data about the region), job opportunities, business profiles, legal and financial information about entrepreneurship. Database will aggregate all information and provide Centers with practical information about local businesses and people who are looking for jobs. This information will guide Centers and help them understand local conditions and characteristics.

Two unified questionnaires for entrepreneurs and youth, who will participate in this project, will be created in order to form the database. The questionnaire for youth will consist of questions about skills, hobbies, education, previous job experience, and the desirable job. If the participant is illiterate one of the employees of the Centre will help to fill in the form and advice classes in the Center. Entrepreneurs will have a different questionnaire that will ask them about weaknesses and strengths of their business, about main issues and what kind of help they expect from the Centre as well as about job opportunities in their companies etc.

The questionnaires will help to create a structured database of labor market. According to this database, moderators will analyze pool of

participants and divide them in teams/groups with common interests and professional goals in order to create professional communities that can cooperate to create new businesses. Division can be done in accordance with desirable profession (Professional Team) or business idea (Entrepreneurial Team). Professional Team will gather all participants that want to have a similar job position. Entrepreneurial Team will gather participants that have the similar business idea, but all of them have different skills, for example, team will consist of a salesperson, a delivery person and a craftsman. Though they all have different skills, they all have passion to create textile business, for example. Carefully selected team can evolve into a business where each participant will have a separate role, so each participant will be able to contribute to it.

All participants will attend Program for Young Entrepreneurs that will include the following stages: Education – Creation of a Business Plan – Finance Management Training – Market Analysis – Testing of Business Ideas – Start of the Business.

Main features of the website are:

– easy and accessible interface, which is understandable for people with different levels of computer skills;

– interactivity (mechanism that shows the progress of completing the questionnaire, performance on the trainings, the progress in search of employees, ways to improve the enterprise, possible trainings);

– adaptability (according to the user's data and profile the system will select current vacancies/employees, trainings, contacts etc);

– informational (presence of clear, structured information about laws, taxes, disadvantages of informal versus formal business, the process of formalization of the business).

Website will have two different modes: "Find a job" and "Entrepreneur" (Table 1).

The first participants of the Formalization Program will be companies of the alumnae of the Center; they will be created in accordance with law. After the first results and the success of new enterprises, the program will activate the Ambassador Program that will allow to spread success and experience among all participants and through social media and advertisements in order to engage other businesses and to attract new participants.

Table 1

Comparison of the functions of two modes

"Find a job" Mode	"Entrepreneur" Mode
Description of the Mode	
This mode will create an opportunity to unemployed youth to become "visible" for employers, to familiarize themselves with the laws and regulations, find trainings, new connections and to create a resume, and even later create a business plan of their future company.	This mode will create an opportunity to find new employees, to carry out a little analysis of the labor force, schedule an interview with prospective employees. In order to hire alumnae of the CPOI enterprise should get out of the informal sector within Formalization Program* of the CPOI.
Functions	
CV Builder / Business Plan Builder	Recruitment tools
Access to the volunteer programs (where participant can gain experience and business connections)	Access to the professional forums (discussion of business ideas, partnerships, networking)
Review of the correspondence with	
future employers, mentors, teachers, work contacts, lawyers, economists	prospective employees, mentors, work contacts, lawyers, economists
Choice of business trainings and their schedules, which are chosen according to user's profile	
Informational materials (taxes forms, bank contacts, contracts, memo of Rights, legal and financial documentation etc.)	
Access to the online learning resources	

** The Formalization Program will be fully supervised by experts of the center and will be conducted under tremendous information and other non-financial assistance of the CPOI. During the company's registration in the database of the Center staff will audit companies in order to find ways to legalize, to improve business processes and to find new opportunities for the growth of company-participant.*

Services for women entrepreneurs:

– centers will provide specially designed educational and informational trainings for women about women in business;

– program will create classes for women to teach reading, writing, basic math and finance;

– centers will analyze opportunities and industries on the regional markets that are most friendly to businesswomen. According to our research women-friendly industries are textile, tourism, handcrafts, agroindustry, call-centers, but this list can be expanded;

– CPOI will cooperate with large organizations that support women in Morocco: L'Association marocaine pour les droits des femmes (AMDF), Anarouz, Moroccan Association of Women Entrepreneurs etc.

Scheduled meetings of entrepreneurs with mentors will be used in order to provide informational assistance and to evaluate the state of the enterprise:

– during the first year of existence of the company, we offer to meet quarterly with the mentor and specialists of the CPOI. Quarterly evaluation will provide tremendous financial and legal consultancy;

– during the second year there will be meetings twice a year. Companies will be offered to be Ambassadors of the Program and to promote it in their communities;

– the third year – annual meetings, participation of the enterprise as Ambassador;

– the fourth year – the enterprise will be invited as a mentor in the Center.

In order to assess CPOI's activity we suggest to use the following indices: quantitative indices (the number of created companies, the number of successfully employed people through the Centers, rate of survival of the new companies (after 1st, 2nd, 3rd, 4th years), rate of investment and loans in companies of the graduates of the CPOI, average income of participants, the number of participants (year-by-year comparison), the number of female participants, the number of trainings and classes that were produced by the Center, the number of partners and mentors of the CPOIs); qualitative indices (satisfaction of the participants, variety of the industries where businesses where created, quality of the informational support, awareness and trust to the CPOI, feedback from banks and NGOs).

Conclusion. As a result of the creation of the database and the network of the Centers, the problem is solved from both sides: the staff and the owners of the businesses. The proposal was designed in order to create new opportunities for unemployed disadvantaged youth in the business. The database and the network of the Centers are the key components of our proposal, because they provide a unique environment for each participant, as well as the necessary resources for moderators and mentors of the CPOIs. This database will be created and managed through cloud technologies, which will provide mobility and access from different parts of the country.

However, it should be mentioned that this Proposal is not possible without a qualified staff of the CPOIs, cooperation with governmental organizations (Center Regionaux d'Investissements, Ministry of Youth and Sports, Labor Department etc.) and various NGOs (Moroccan Association of Women Enterpreneurs, Education for Employment, World Bank, Unicef, commercial banks etc.), without prior analysis of market and regional characteristics. So, CPOIs are designed not only to effectively gather information about unemployed youth but also to strengthen the local economic climate, to meet the demand of the labor market, to promote entrepreneurial spirit, to minimize gender gap in business, to educate and decrease illiteracy among the population.

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OPTIMIZATION OF ADMINISTRATIVE MANAGEMENT COSTS

Abstract. It is important to determine the optimal level of administrative costs in order to achieve main targets of any enterprise, to perform definite tasks, to implement these tasks and not to worsen condition and motivation of the workers. Also it is essential to remember about strategic goals in the area of HR on the long run. Therefore, the main idea in using optimization model for assessing the effectiveness of management costs will be to find the minimum level of expenses within the given limits.

Key words: administrative costs, optimization model, levels of management.

Introdaction. Optimization involves finding the best index of the selected function in a particular opportunity set. Thus, the solution of the optimization model means finding its optimal solution or proving that there is no solution [3, 4, 8]. Optimization models are arranged in two categories: minimization problems and maximization problems. In our research, we will use the second category in order to find the optimal level of administrative costs for enterprises of gas industry.

Materials and methods. The peculiarity of forming the optimization model is determination of the efficiency unit. We must set the effectiveness of administrative costs for the selected unit. Many recent studies on construction and solution of optimization models have focused on choosing such measurement units as: product unit, unit of cost, unit of sown area etc. [5, 20]. In our case, it is not relevant to take into account these units of measurement as administrative costs are not included into cost of production [10]. We therefore propose to calculate administrative costs per head of the company. So, the function will look like this:

$$F(x) \to \min, \qquad (1)$$

where: x – number of administrative employees.

However, the analysis of gas industry enterprises proves the importance of assessing the effectiveness of the administration costs on various levels of management, as there is a kind of asymmetry in terms of allocation of administrative expenses. Taking into account this problem we should specify the objective function as follows:

$$a_1 x_1 + a_2 x_2 + a_3 x_3 \to \min, \qquad (2)$$

where: a_1, a_2, a_3 – average amount of administrative costs per top manager, middle manager, low line manager, accordingly, thousands of UAN; x_1, x_2, x_3 – number of top, middle and low line managers accordingly.

Further investigations are needed to choose the most important limits to solve the optimization model. The choice of factors depends on the main objectives and personnel management strategies as well as administration costs of the company. Analysis of the domestic gas sector companies showed the following priority objectives for HR management and administrative costs, which can be displayed in the limits of the optimization model:

– developing chief executive officers, including their qualifications, practical skills, managerial skills and competence [14], active participation in retraining, advanced training and re-qualification;

– rejuvenating staff, particularly managers of industrial subdivisions;

– reducing losses caused by inaccurate management decisions and improving management decisions in the company;

– increasing the loyalty of chief executive officers [1, 6, 9] and reducing the number and level of risk and risk of personnel activity [16];

– reducing the number of duplicate management structures, units and chiefs;

– improving the quality of labor input through the effective selection of personnel;

– reducing bureaucracy and corruption;

– increasing salaries and wages and reducing the number of employees;

– lowering the level of administrative employees turnover;

– reducing administrative costs to raise competitive capacity of a company.

Thus we represent the schematic model of optimization of management costs at the enterprises of gas industry (Fig. 1).

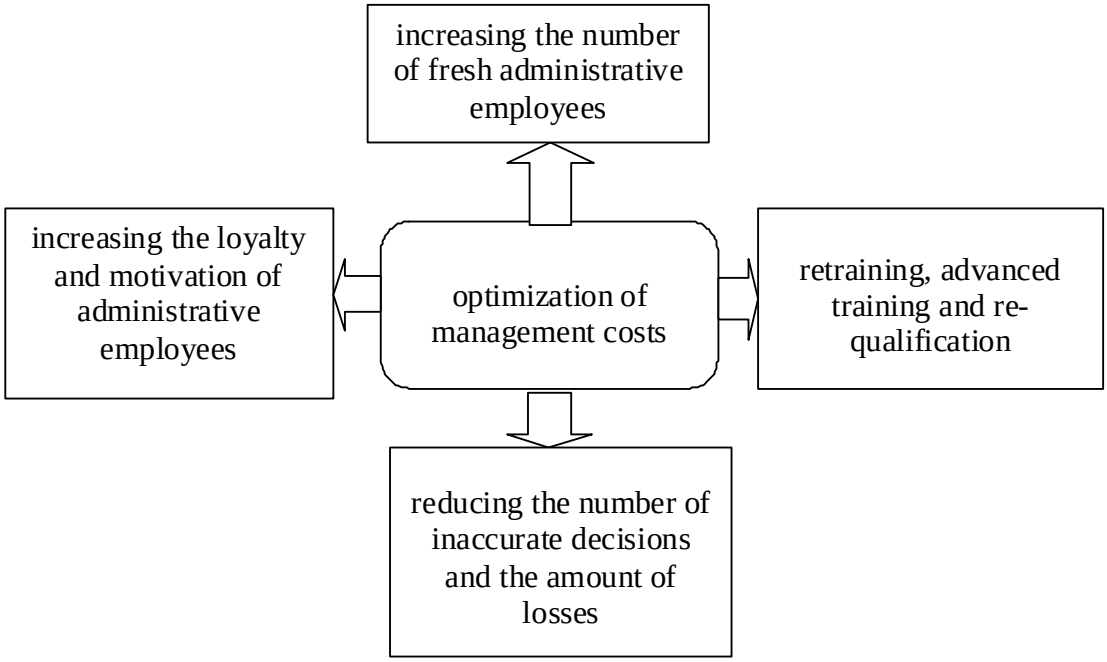

Fig.1. Directions of optimization of the enterprise management costs

The first limit to optimize administrative costs is a wages fund, which on the one hand, should be as low as possible in order to reduce administrative costs and on the other hand, it should be sufficient enough to meet the demands and to stimulate employees. The other aspects of the wages fund are to ensure sufficient loyalty of administrative employees, to avoid the loss of top managers, to create the decent staff reserve [2, 15]. Thereafter, the wages fund function will have the following expression:

$$b_1x_1 + b_2x_2 + b_3x_3 \leq D, \quad (3)$$

where: b_1, b_2, b_3 – average administrative costs for wages per top manager, middle manager, low line manager accordingly, D – wages fund.

According to the priority objectives in the field of personnel management and administrative management costs, it is important to ensure a continuous process of employees training. Any company budgets the expenditures on conducting training. These limits will be as follows:

$$c_1x + c_2x + c_3x \leq K_{max}, \quad (4)$$

$$c_1x + c_2x + c_3x \geq K_{min,} \quad (5)$$

where: c_1, c_2, c_3 – average management costs for training, advanced training and re-qualification of administrative employees; $K_{min,}$, K_{max} – expenditures on training, advanced training and re-qualification of administrative employees, minimum and maximum accordingly.

A significant amount of administrative losses is associated with the correction of errors and defects as a result of inaccuracy of management decision-making. Therefore, we should set the maximum allowed expenditure level aimed at eliminating wrong decisions and minimize the number of such decisions at various levels of management. The amount of additional costs of eliminating mistakes is calculated in terms of the managers' time spent multiplied by their average wages. The function will be as follows:

$$e_1x_1 + e_2x_2 + e_3x_3 \leq P, \quad (6)$$

where: e_1, e_2, e_3 – average management costs spent by top, middle and low line managers on elimination of the result of inaccurate management decisions; P – highest possible management costs spent on elimination of the result of inaccurate management decisions.

Studies have shown that loyalty of staff has the direct impact on productivity and the result of the company's activities. It is therefore important to increase staff loyalty and set clear limits on the level of expenditures on the following measures:

$$g_1x_1 + g_2x_2 + g_3x_3 \leq L, \quad (7)$$

where: g_1, g_2, g_3 – average expenditures for increasing the level of loyalty of top, middle and low line managers; L – highest possible level of expenditures on increasing the level of loyalty of administrative employees of the company.

In general, the proposed optimization model will be as follows:

$$a_1 x_1 + a_2 x_2 + a_3 x_3 \to \min,$$
$$\begin{cases} b_1x_1+b_2x_2+b_3x_3 \le D \\ e_1x_1+e_2x_2+e_3x_3 \le P \\ g_1x_1+g_2x_2+g_3x_3 \le L \\ c_1x_1+c_2x_2+c_3x_3 \le K_{\max} \\ c_1x_1+c_2x_2+c_3x_3 \ge K_{\min} \end{cases} \quad (8)$$

Recently researchers have become increasingly unanimous in declaring that there is no balance between management costs at different levels of management. In particular, there are considerable and often unnecessary expenditures at the top level of management and significantly lower than they should be at the middle and low levels of management of gas industry enterprises. Especially, this imbalance is observed with the administrative costs of the state gas producing companies. Therefore, the objective function will remain the same as in the previous optimization model. Only limits will be changed for the optimization model:

$$a_1x_1 + a_2x_2 + a_3x_3 \to \min. \quad (9)$$

The system will consist of six inequalities that set the maximum and minimum amount of administrative costs for the three levels of management – institutional, administrative and manufacturing [11, 12, 13]. Expenditures are planned and budgeted by the administration of the company. It is possible to establish the amount of administrative costs for each level of management by an expert way. Hereby, the amount of management costs at each level of management should provide staff development at this level and motivate managers to perform their tasks and goals, at the same time it should eliminate duplication, bureaucracy, corruption in the system of management at gas industry enterprises. The system of limits can be written as follows:

$$\begin{cases} l_1x_1+l_2x_2+l_3x_3 \ge R_1 \\ l_1x_1+l_2x_2+l_3x_3 \le R_2 \end{cases}, \quad (10)$$

where R_1, R_2 – minimum and maximum amount of administrative costs for providing the work of administrative employees at the institutional, administrative and manufacturing (technical) level; l_1, l_2, l_3 – amount of administrative costs per top manager, middle manager, low line manager, accordingly.

The process of balancing administrative costs can be carried out not only with aggregate expenditure per each management level but also with the elements of management costs to ensure stable work of each level of management at the enterprises of gas industry. Our research will explore how to balance the following administrative costs elements at three levels of management: material costs, wage bill, amortization, cost of social charges and other administrative costs. These costs at different levels of management will have different amount. Therefore, the proposed model will be as follows:

$$a_1x_1 + a_2x_2 + a_3x_3 \to \min,$$
$$\begin{cases} d_1x_1+m_1x_1+z_1x_1+s_1x_1+f_1x_1 \ge R_{11} \\ d_1x_1+m_1x_1+z_1x_1+s_1x_1+f_1x_1 \le R_{12} \\ d_2x_2+m_2x_2+z_2x_2+s_2x_2+f_2x_2 \ge R_{21} \\ d_2x_2+m_2x_2+z_2x_2+s_2x_2+f_2x_2 \le R_{22} \\ d_3x_3+m_3x_3+z_3x_3+s_3x_3+f_3x_3 \ge R_{31} \\ d_3x_3+m_3x_3+z_3x_3+s_3x_3+f_3x_3 \le R_{32} \end{cases}, \quad (11)$$

where: d_1, d_2, d_3 – management costs for top, middle and low line managers' wages; m_1, m_2, m_3 – material management costs for providing the work of top, middle and low line managers; z_1, z_1, z_3 – depreciation of assets and facilities used for activities of top, middle and low line management; s_1, s_2, s_3 –costs on social payroll at top, middle and low line management levels; f_1, f_2, f_3 – other operation management costs of top, middle and low line managers.

We should also develop databases to record administrative expenses. Thus, the aim of applying ABC analysis tools to administrative expenses is to allocate costs according to management activities and to identify factors that affect these costs [7, 19]. Thereby, ABC analysis, also called functional and value analysis [17], allows us to track the connections between expenditures and their reasons.

After examining peculiarities of gas industry enterprises operation, for distributing expenses to corresponding centres it is reasonable to set the appropriate grouping of management departments done according to similarity of their functions. We can specify the following centres: the financial and economic centre, the centre of production, the centre of legal aid and monitoring, the research centre, the centre of production service, the centre of personnel management.

1. The financial and economic centre (accounting department, planning and economic department, financial department, investment department);
2. The centre of production (manufacturing department, technical department, drilling department, the department of capital construction);
3. The centre of legal aid and monitoring (law department, safe-custody department, internal audit department);
4. The centre of production service (department of chief engineer, logistics department, administration department and secretariat, department of power and water supply, department of occupational safety and health, department of information support and computer service);
5. The research centre (department of geology, laboratories, budgeting department);
6. The centre of personnel management (department of work organization and wages, personnel department).

It is important to identify factors that impact the expenses on the selected centers in the process of their formation. The factors of expenditures of the finance and economic centre can be the number and size of reports (administrative and financial), the number of documents that need processing, organization of record-keeping, the number of mistakes and errors made by employees and identified in the process of different revisions, the amount of fines imposed due to the employees' errors.

The factors of expenditures of the centre of production can be the number of oil wells, the regional location of oil fields, and the production volume of gas, oil and other related products. It is necessary to introduce the value coefficient of complexity and the level of infrastructure development of the area where energy resources are mined.

The factors of expenditures of the centre of legal aid and monitoring can be payment discipline, reliability of suppliers and contractors, the level of prevention of theft and abuse, the amount of leakage of commercial information and losses caused by it, the level of physical and psychological protection of workers (measured in points obtained by surveys).

The factors of expenditures of the centre of production service can be the number of suppliers, the regional location of facility, the size of suppliers and supply chains length, width of supply chains, infrastructure of the area, the number of discounts and amount of resource savings obtained as the result of discounts.

The factors of expenditures of the research centre can be the number of projects, the number of objects of geological research, the complexity of geological research, peculiarities of the projects implementation (joint activity, economic method, and outsourcing), the number of confirmed reserves and successful projects.

The factors of expenditures of the centre of personnel management can be the number of personnel, qualifications and structure of staff, personnel turnover rate, work experience in the company and the industry, the amount of documentary support for every employee, the number of training programs and professional development courses, their frequency and methods of conducting (internal, inviting outside expert trainers and mixed), the number of social programs and staff loyalty development programs.

So, having divided total administrative costs into the appropriate groups of centres, we may follow their dynamics monitoring the factors of expenditures. For example, we may trace the change of expenditures of the finance and economic centre in case of introducing a new accounting program or electronic document control, the change of expenditures of the centre of production service in case of temporary closing down some wells, the change of expenditures of the centre of personnel management in case of changing the number of employees etc. In addition, this division will help to optimize administrative costs, to balance them between centres, to save costs, to improve the organizational management structure and to promote company's development.

Certainly, the expenditures of the centres cannot be proportionally altered following changes in the factors of expenditures, and it is obvious that any change takes time. The changes happen with some delay, there are time lags. It is important to consider the time factor while finding the connection between the amount of expenditures and factors affecting them [18].

It is important to create a sharp system of organizational and informational support to administer management costs by responsibility centres. We suggest appointing responsible persons to the centres to ensure a high level of administration (they can be deputy chiefs in functional areas). They should be in charge of performing system monitoring of the expenses level and dynamics (preliminary, current and final) following changes in the factors related to the centres of administering management costs.

The proposed division into centres of administering management costs can be used to construct

an optimization model to balance administrative costs. The criterion of dividing the administrative costs will be determined by the structure and quality of the staff in each of the proposed centres. Therefore, the proposed model will be as follows:

$$q_1y_1 + q_2y_2 + q_3y_3 + q_4y_4 + q_5y_5 + q_6y_6 \to \min, \quad (12)$$

where: q_1, q_2, q_3, q_4, q_5, q_6 – average amount of management costs per workers in the finance and economic centre, the centre of production, the centre of legal aid and monitoring, the centre of production service, the research centre and the centre of personnel management; y_1, y_2, y_3, y_4, y_5, y_6 – average number of administrative employees in the finance and economic centre, the centre of production, the centre of legal aid and monitoring, the centre of production service, the research centre and the centre of personnel management.

Limits of the optimization model should be formed according to the expenditures on activities of each of the established centres for administering management costs. Therefore, the system of limits will be as follows:

$$\begin{cases} d_{c1}y_1 + m_{c1}y_1 + z_{c1}y_1 + s_{c1}y_1 + f_{c1}y_1 \le \Psi_1 \\ d_{c2}y_2 + m_{c2}y_2 + z_{c2}y_2 + s_{c2}y_2 + f_{c2}y_2 \le \Psi_2 \\ d_{c3}y_3 + m_{c3}y_3 + z_{c3}y_3 + s_{c3}y_3 + f_{c3}y_3 \le \Psi_3 \\ d_{c4}y_4 + m_{c4}y_4 + z_{c4}y_4 + s_{c4}y_4 + f_{c4}y_4 \le \Psi_4 \\ d_{c5}y_5 + m_{c5}y_5 + z_{c5}y_5 + s_{c5}y_5 + f_{c5}y_5 \le \Psi_5 \\ d_{c6}y_6 + m_{c6}y_6 + z_{c6}y_6 + s_{c6}y_6 + f_{c6}y_6 \le \Psi_6 \end{cases} \quad (13)$$

where: d_{c1}, d_{c2}, d_{c3}, d_{c4}, d_{c5}, d_{c6} – administrative expenses on salaries of managers in the finance and economic centre, the centre of production, the centre of legal aid and monitoring, the centre of production service, the research centre and the centre of personnel management; m_{c1}, m_{c2}, m_{c3}, m_{c4}, m_{c5}, m_{c6} – financial management costs for providing the work of administrative employees in the finance and economic centre, the centre of production, the centre of legal aid and monitoring, the centre of production servicing, the research centre and the centre of personnel management; z_{c1}, z_{c2}, z_{c3}, z_{c4}, z_{c5}, z_{c6} – depreciation of assets and facilities used for the activities of administrative employees in the finance and economic centre, the centre of production, the centre of legal aid and monitoring, the centre of production servicing, the research centre and the centre of personnel management; s_{c1}, s_{c2}, s_{c3}, s_{c4}, s_{c5}, s_{c6} – costs on social payroll for administrative employees in the finance and economic centre, the centre of production, the centre of legal aid and monitoring, the centre of production servicing, the research centre and the centre of personnel management; f_{c1}, f_{c2}, f_{c3}, f_{c4}, f_{c5}, f_{c6} – other management costs for providing the work of administrative employees in the finance and economic centre, the centre of production, the centre of legal aid and monitoring, the centre of production servicing, the research centre and the centre of personnel management; $\Psi_1, \Psi_2, \Psi_3, \Psi_4, \Psi_5, \Psi_6$ – maximum level of management costs to provide the work of the finance and economic centre, the centre of production, the centre of legal aid and monitoring, the centre of production servicing, the research centre and the centre of personnel management.

In such a model it should also be established the minimum amount of management costs that would ensure the necessary tasks and work performance. Therefore, the model takes the following form:

$$\begin{cases} \chi_1 \le d_{c1}y_1 + m_{c1}y_1 + z_{c1}y_1 + s_{c1}y_1 + f_{c1}y_1 \le \Psi_1 \\ \chi_2 \le d_{c2}y_2 + m_{c2}y_2 + z_{c2}y_2 + s_{c2}y_2 + f_{c2}y_2 \le \Psi_2 \\ \chi_3 \le d_{c3}y_3 + m_{c3}y_3 + z_{c3}y_3 + s_{c3}y_3 + f_{c3}y_3 \le \Psi_3 \\ \chi_4 \le d_{c4}y_4 + m_{c4}y_4 + z_{c4}y_4 + s_{c4}y_4 + f_{c4}y_4 \le \Psi_4 \\ \chi_5 \le d_{c5}y_5 + m_{c5}y_5 + z_{c5}y_5 + s_{c5}y_5 + f_{c5}y_5 \le \Psi_5 \\ \chi_6 \le d_{c6}y_6 + m_{c6}y_6 + z_{c6}y_6 + s_{c6}y_6 + f_{c6}y_6 \le \Psi_6 \end{cases} \quad .(14)$$

where: $\chi_1, \chi_2, \chi_3, \chi_4, \chi_5, \chi_6$ – minimum level of management costs to provide the work of the finance and economic centre, the centre of production, the centre of legal aid and monitoring, the centre of production servicing, the research centre and the centre of personnel management.

We will find the solution of this model using the data of the gas manufacturing department "Lvivhazvydobuvannya". The function with the data will be written as follows:

$$156457y_1 + 160963y_2 + 129917y_3 + 141060y_4 + 146912y_5 + 177716y_6 \to \min,$$

$$\begin{cases} 3730904 \le 156457y_1 \le 5577701 \\ 2971625 \le 160963y_2 \le 4442579 \\ 1299171 \le 129917y_3 \le 1942261 \\ 4991342 \le 141060y_4 \le 7462057 \\ 2373190 \le 146912y_5 \le 3547919 \\ 956933 \le 177717y_6 \le 1430616 \end{cases} . \quad (15)$$

Results. The solution of the optimization model makes it possible to establish the crucial number of employees for each of the centres of administration

management costs: the finance and economic centre – 23 persons, the center of production – 18 persons, the centre of legal aid and monitoring – 10 persons, the centre of production servicing – 35 persons, the research centre – 16 persons, the centre of personnel management – 6 persons.

Our research has proved that this number of administrative employees will lead to reduction of expenditures and the number of managerial staff by combining the individual functions and optimization of interaction processes. The quality and amount of work performed will not be reduced, and in some centres will be increased by improving the social and psychological environment, eliminating duplication of functions, decentralizing operations and improving productivity. Our research has revealed the staff reduction being as follows: the finance and economic centre – 8 persons, the centre of production – 4 persons, the centre of legal aid and monitoring – 4 persons, the centre of production servicing – 11 persons, the research centre – 5 persons, the centre of personnel management – 1 person. Total staff reduction may reach 28 and management costs may be reduced by 30.

Conclusions. Optimization models will enable managers to balance the functioning of different levels of administrative employees, to optimize management costs, and thus to increase productivity and staff loyalty, to reduce economic risks and personnel turnover rate, to develop staff reserve and to improve other financial and economic indicators of enterprises. We have elaborated the model of optimization of management costs spent by top, middle and low line managers, composed the optimization model for three levels of management – institutional, administrative and manufacturing. Using ABC analysis, another optimization model has been formed to administer management costs on the basis of specialized centres: the finance and economic centre, the centre of production, the centre of legal aid and monitoring, the centre of production servicing, the research centre, the centre of personnel management.

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CONSULTING SUPPORT OF THE PROJECT MANAGEMENT DEVELOPMENT IN CONDITIONS OF SOCIETY INFORMATIZATION

Abstract. The article justifies the necessity of changing the management paradigm in the emerging information society. It is proved that project management is a determinant factor in cooperation of businesses during globalization. The processes of consulting environment formation as the basis of information support and the expansion of the project management application scope are analyzed. There are proposed measures to improve the project management methodology and to promote its dissemination.

Key words: project management, businesses, ecosystem, information infrastructure, information society, information.

Problem setting. The emerging information society is characterized by dynamic quality reforms of all industries; the process is accompanied by the formation of fundamentally different operation environment features of new businesses. These changes in organizing business activities are focused on a wide deployment of multi-vector information consulting environment that initiates and supports innovation, and provides a wide range of additional consultancy services. This environment may include classic business incubators, regional industrial zones, export-oriented zones, scientific (technological) parks, and numerous consulting organizations. In this environment effective standardized management methods based on project management tools are not only widely used but also are being further developed. An important role is played by the various Projects Management Associations – non-profit organizations. There is an acute need in mass dissemination and application of advanced management techniques. Thus, special efforts are now being put into the development of effective standardized methods of management, including project management, their accounting features and trends of changes being caused by the emerging information society.

Analysis of recent research and publications. In modern economic literature project management models and methods are widely studied; domestic and foreign experience of its application with regard to particular industries characteristics is reviewed. The results of fundamental research of project management application are presented in numerous works of domestic and foreign scientists and economists such as L. P. Batenko, S. D. Bushuyev, V. Y`. Voropayev, I. V. Kononenko, I. S. Kalenyuk, I. J. Mazur, L. V. Nozdrina, V. Savchuk, V. A. Rach, G. Tarasyuk, I. V. Chumachenko, O. O. Chykarenko, M. L. Razu, V. D. Shapyro, Yu. P. Sharov [1–12]. But there arises the issue concerning peculiarities of project management application by new businesses in the emerging information society that promotes cooperation and rejects tough competition. An ecosystem may be taken as an example. Within an ecosystem, cooperation is developing well and is consistent with the strategy of smoothing competition [13], (for example, in various functional areas, market sectors, countries), which allows business entities to use freely the competitive strengths of opposing competitive concepts in solving a number of mutual urgent tasks. Thus, methods of applying peculiarities of project management by new businesses in the emerging information society require further study.

Setting goals. The main purpose of the article is to develop modern approaches to the application of project management in the emerging information society with regard to advanced businesses development. In terms of this, it is necessary to conduct:

– analysis of tendencies in changing management aspects in conditions of developing advanced business relations;

– study of the role of project management in the the emerging information society;

– evaluation of the of consulting environment level to increase the scope of project management development and implementation.

The main material presentation

1. Change of the management paradigm in the emerging information society. Forming and

dynamic updating of businesses have become a typical feature of the emerging information society at the beginning of the XXI century. The current stage of economic relations involves formation of new market spaces to avoid mutually destructive competition and improve constructive relations in an open market environment, thus ensuring stable growth and efficient use of businesses potential. Communications globalization may become an alternative to expansion of foreign monopolistic businesses, the nature of communication globalization being not the dominance of one or more poles but an equal dialogue of all participants in order to preserve species diversity and freedom of choice of social and economic management models.

The essence of these transformations is that different market participants are functionally linked to one another by branched information flows which accompany the processes of forming and meeting (directly or indirectly) the demand for products / services. As a result, an extensive information infrastructure is dynamically developing, the main objective of it being information flows servicing. In the process of information infrastructure development, parallelly to its capacity increase, there are being intensively developed the related intellectually independent consulting services hubs. This enhances the possibilities of diverse businesses to collaborate and contributes to smoothing the competitive confrontation.

In general, we can distinguish a number of changes in the management systems of businesses, among them being the following:

– use of a single information and communication space of the country for integration in frames of regional, national or international structures;

– systematic introduction of advanced information and communication technologies in the field of enterprise activities;

– transition from information resources management to management of information capital;

– increase of the role of knowledge in information and communication infrastructures at macro- and micro- levels;

– increase of importance of human potential in businesses activities, the emphasis in personnel evaluation being made on qualification, professionalism, creativity, and ability to learn;

– focus on introduction of collective decision-making systems with possible involvement of external expertise.

Changes in emphasis occurring in management systems are primarily manifested at the level of information communications, in forming innovative businesses. The most effective tool of businesses coordinated activities and development is introduction of advanced management information systems where methods of project management are widely used [7]. These changes are due to the fact that in the emerging information society efforts of active businesses should be concentrated on the effective use of knowledge in management and on the democratization of decision-making processes.

As a matter of fact, mutual respect, solidarity and cooperation, openness and partnership create a fundamentally different plane of interaction between partner – companies, manufacturers and customers, as well as between competing companies. Qualitative field of interaction within the internal network creates new understanding of higher values in the economy, opens new perspectives which give rise to the formation of a new economic culture. One of the most valuable results of a collaborative qualitative ecosystem is the formation of “economic patriotism” that is, the introduction of the ancient model “ sviy do svoho po svoie (one goes to oneself for one’s own)".

Development of new businesses may occur, for example, in the form of a consumer ecosystem which operates within the clearly defined macro-marketing environment and may be completely modified due to the appearance of continuous technological innovation. The concept “an ecosystem of entrepreneurship” was introduced in 1996 by a psychologist John. F. Moore from Harvard University in his book “The Death of Competition” [13]. Similar to nature, an ecosystem in a market economy is seen as a complex group of companies and customers, suppliers, competitors, distributors who influence business individuals and groups as well as partners who benefit from each other. In the ecosystem of buyers the market activities (investments, joint development of products, market communication, logistics and transactions) are performed and controlled not only by suppliers but also by consumers. During the ecosystem functioning there arises the necessity to synchronize the efforts of its members who participate in creating innovations and their introduction to the market. In order to limit or avoid direct confrontation of enterprises in the ecosystem it is possible to look for new points of

differentiation, new positioning, try to attract new customers and so on. For example, we may note that some restaurants and souvenir shops in Lviv cooperate with social bakeries, candle shops, furniture stores (commercial projects for disabled people) where prices are generally lower, and the quality of products is high.

Compliance with new ethical norms and rules of businesses interaction in the information society involves interaction based on the following principles: mutual respect; partnership and openness; solidarity; producer and consumer cooperation; consideration of socially important projects; economic patriotism.

Building relationships is a quality indicator of a social ecosystem and its maturity. For example, IT companies in Lviv are united in a cluster of information technologies and services for the development of the industry in the region. Through solidarity in the coordination of regional and national projects and programs businesses received the opportunity to influence the formation of national legal framework or elaboration of regional plans etc. So, this IT-cluster is a coherent business structure with a certain image that should be respected. In general, application of project management principles in distributed businesses opens up entirely new prospects for them.

2. Project management as a determining means of cooperation in the emerging information environment.

The formation of new businesses activates the formation of a new paradigm of their interaction with each other and with the external environment in general. While in the post-industrial environment the emphasis in management was placed on the organization of transparent material flows, in the information society, this interaction takes place at the level of intellectual exchange, which requires the use of high-level language of communication adopted by business entities. We may distinguish the fundamental changes of management paradigm in the emerging information society which are schematically shown in Fig. 1.

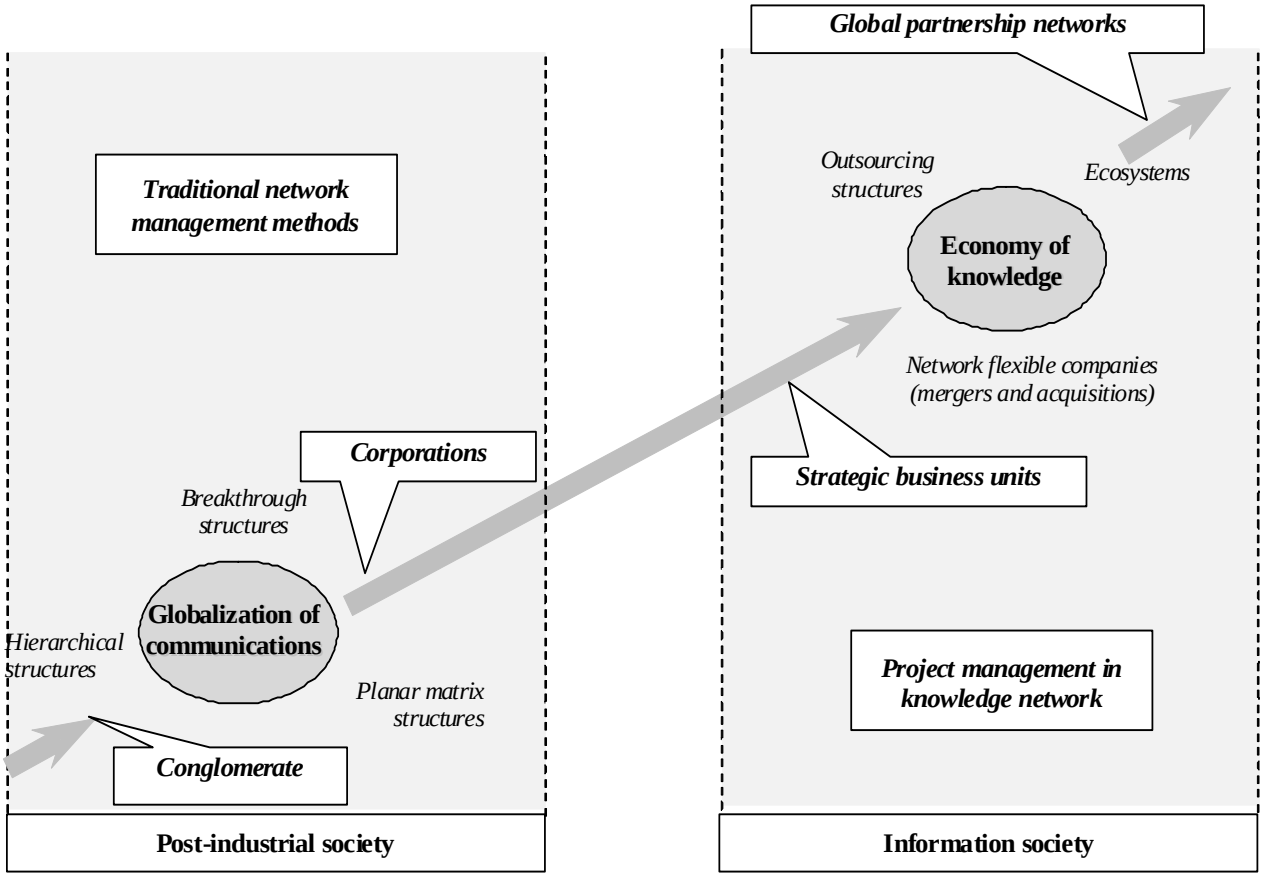


Fig. 1. The essence of management paradigm shift in modern conditions

Source: The authors' development

Expanding the scope of project management application is explained as follows:

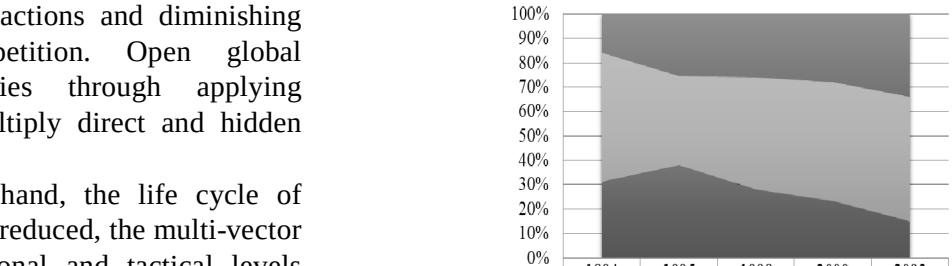
– On the one hand, nowadays it is natural to consider the entire chain of goods / services production as a whole – from the use of necessary resources to products consumption and waste utilization. Matching interests of market participants is primarily manifested in increasing interdependence between them and the dual nature of their interaction, which is consistent within the set of projects and programs, i.e. combining the benefits of coordinated actions and diminishing the loss from competition. Open global management technologies through applying project management multiply direct and hidden profits of businesses.

– On the other hand, the life cycle of products / services being reduced, the multi-vector activities at the operational and tactical levels become the direct object of management and it is natural to support these activities within a set of projects and programs. The turbulence of the external environment generates random fluctuating changes in businesses activities that require reasonable correlating software-caused impact by means of project management. Searching for temporary niche with a satisfactory level of competition, businesses at the market want to accommodate in the most comfortable way. Thus, businesses organizational sustainability is increasing, which refers not to strength or consistency of organization elements (structure, processes, management, relations and so on) but to the ability to participate in various activities with temporary or long-term benefits.

The following are the basic principles of project management: evolutionary and phased development; compliance with ethics and rules; synchronization of management development process with the development of national economy; involvement of the general public to the modern culture of projects management.

The presence and efficient use of projects management systems allows diverse business structures significantly reduce risks and increase the likelihood of successful projects realization. According to statistics, only 37 % of the projects are successful. In enterprises that use methods of project management, 72 % of projects are successful; in those that do not use these methods – only 23 %. We should keep in mind that even when projects are successfully implemented without a clear project management system built on the enthusiasm and dedication of the project organizers the results are achieved with much higher costs.

This is confirmed by studies of 30,000 applied projects in large, medium and small interdisciplinary companies in the USA, which were conducted by Standish Group company since 1994 (Fig. 2).



	1994	1995	1998	2000	2003
Successful completion, units	16	27	26	28	34
Problem completion, units	53	39	46	49	51
Failures, units	31	40	28	23	15

Fig. 2. The study of performance dynamics

Processed source: The Standish Group International, “10th Annual (2003) CHAOS Report,” CHAOS Chronicles 3 (2003): 406.

Application of design approach in businesses management allows:

– to plan the work on the project and coordinate project activities;

– to attract outside funding and effectively use business own funds;

– to minimize costs;

– to create a project team and effectively manage it;

– to reduce risks by minimizing the environment uncertainty of project realization through the use of project management in the network of expertise.

3. Formation of the consulting environment as a base for broadening the scope of applying project management.

To promote and effectively implement a wide range of innovations, methods of project management have been widely applied. This, in turn, caused formation of advanced distributed environment of consulting services. A wide range and classification of consulting services is presented in Table 1.

Table 1

Classification of consulting services

By subject signs, including services in the area:							
management	administration	financial management	HR management	marketing	manufacturing	information technologies	specialist services
By methodological grounds, including advice:							
expert			process			educative	
By subjective features, including:							
government and control		associations of economic agents		business entities		infrastructure subjects of foreign economic activity	individuals
By technological features, including services in areas:							
assessment and forecast of external factors	definition of strategy and tactics, forms and methods of entering foreign markets	production / services, its resource support	transport and logistics	marketing policy in the foreign market	management of financial resources and investment	risk management and safety	management of spatial and structural development

** Source: Authors'development.*

In many businesses (construction, software development, audit and consulting, advertising and marketing) project management has become the core of organizations activities. On the one hand, entirely new needs and business opportunities as well as requirements of cooperation in the environment, particularly in international activities, have become the stimulus for project management application. On the other hand, focus on managing the short product life cycle and the need to maximize the use of available resources became relevant for the most of domestic organizations and companies.

Talking about the development of project management in Ukraine since 1988 we should first of all mention Ukrainian Association of Project Management "UkrNet" (Ukrainian Project Management Association "UPMA"). The main tasks of UKRNET are: development of project management culture with the use of modern methods and information systems, organization of international certification of professional project managers based on IPMA standards, publication of literature on project management, consulting and training courses etc.

In general, PMI as organization and certification PMP is recognized by many non-government and government organizations as well as by various businesses around the world. The results of data analysis PMI Credential Registry, PMI-PMP confirms importance of specialists training in Ukraine. Dynamics of PMP specialists training and its forecast are shown in Fig. 3.

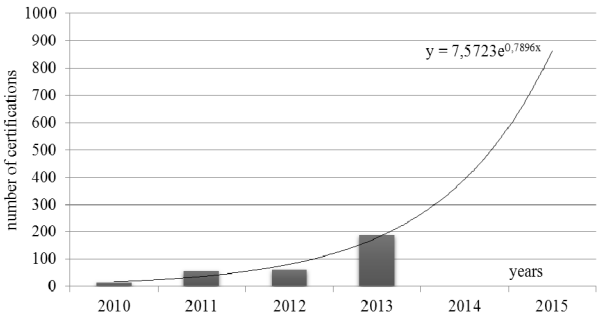


Fig. 3. Analysis of the number and forecast of certifications in Ukraine issued by PMI-PMP Processed Source: P. Tarakanova IT-certification in Ukraine: Analysis and forecasts for 2014 / Pauline Tarakanova http://dou.ua/lenta/articles/it-sertification-in-ukraine-2014/

As we can see, there is exponential growth in the number of specialists in the field of project management. However, to achieve the required number of specialists in Ukraine in the field of project management it is necessary to make great efforts. We should note that in developed countries the number of certified specialists is more than tens of thousands.

But for UKRNET, there are other organizations working towards improving project management methodology in Ukraine: Association "Ukrkonsalting"; SE "Ukrpromzovnishexpertyza" SE "Ukrinvestexpertyza"; "Technology and investment consulting (TIKON)" and others. These and other non-profit organizations, established by

practicing project managers, play a significant role in the systematic development and implementation of project management.

Besides, the scope of project management in developed countries was supported through the development of business incubators, regional industrial zones, export-oriented zones, research (technology) parks and numerous consulting organizations. So, in Ukraine similar consulting facilities are developed, including more than 20 business incubators. However, only about 10 of them are active, among them: Bilotserkivskyi, Slavutyckyi, Ternopilskyi, Lvivskyi, Ivano-Frankivskyi, Donetskyi, Kharkivskyi. Ukrainian Association of Business Incubators and Innovation Centers has practical experience in the creation and development of business incubators, business support centers in Ukraine, comprehensive international contacts, organization experience and conferences, seminars organization at international levels. Though economic conditions are unfavourable these structures continue to work due to government support. As funding is insufficient, their effectiveness in Ukraine remains low.

At the same time in Ukraine commercial consulting organizations are being efficiently created initiating major changes in the development of promising businesses through introduction of information systems based on project management. For example, LEO Consulting, SBS Consulting, Itera Consulting, "Advice Group" consulting company, J & L Consulting, LLC "Project Management Business Consulting" and others, regular clients of which are businesses from various industries. Many of them begin with the development and implementation of various software. The major tasks of intensification of economic development of Ukraine that should be solved with the help of project management are as follows:

– ensuring business transparency through unification and standardization of business management;

– increasing businesses responsibility both internally and externally;

– carrying on modernization and intensification of all branches of Ukrainian economy on the basis of the general principles of management;

– multi-vector development of various Ukrainian industries that will promote sustainable and dynamic development of the Ukrainian economy as a whole;

– increasing education quality standards.

We may note that project management national models and standards are not static and are developing rapidly. Approximately once in every four years PMI updates the standard PMBOK®. The most common version of the document is dated 2000 and the latest version – The Guide to the PMBOK 5-th Edition – 2013. Due to the international network in the field of project management support processes of international cooperation are simplified, comparable development of countries economies is provided due to adherence to national and international standards. This is confirmed by the fact that under the ISO a new project committee ISO / TC 236 "Project Management" was simultaneously created. Due to its efforts ISO 21500: 2012 was introduced. We may summarize that the main areas of research in the field of project management are:

– development of project management within professional associations in the field of projects management;

– development of project management methodology and performance improvement in specific areas of application through businesses initiatives.

Providing innovative development and promotion of progressive businesses requires the formation and maintenance of modern system of project management and training based on the knowledge network. Only continuous development of these components in accordance with national interests and demands of the present moment, long-term strategy, civilization and geopolitical objectives may provide intensive economic growth in Ukraine.

Conclusions. We can conclude that an efficient economy in terms of the emerging information society requires the formation of a developed business environment open to international cooperation. Obviously, the determinant of this task will be the formation of a distributed information infrastructure as a catalyst for the use of project management techniques.

The development of the main components of the innovation and project management should be implemented through balanced integration of the world experience, the country specifics and the national culture of management.

To achieve this goal it is proposed to focus on the following objectives:

– to develop a national network of knowledge for distance learning or providing consulting

services for various population groups (civil servants, teachers, university students, leaders of businesses etc.) using active learning methods, coaching and evaluation techniques, joint consultation of participants, exchange of experience in implementing similar projects, workshops of professionals or managers with the experience in complex projects, online conferences;

– to foster the application range of project management techniques, facilitate its adaptation to specifics of Ukrainian industries;

– to create a favorable legal framework for the development and application of advanced project management techniques;

– to open a permanent network of experts knowledge for the improvement of specialists qualification and project management development.

The mutual enrichment of national and international management cultures and technologies through a balanced approach with the account of regional features may provide real efficiency of the national economy and its projects. It is appropriate to recall the experience of China, which efficiently solves the tasks of its national economy development.

Prospects for further research. It is supposed to examine trends in interpenetration of knowledge in project management related to the adjacent spheres of management through the development of expert knowledge networks as well as to expand the use of artificial intelligence in the field of project management.

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