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Section 1. Innovations

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CONCEPTUAL ASPECTS OF THE FUNCTIONING AND DEVELOPMENT OF CORPORATE GOVERNANCE IN AN INNOVATIVE ECONOMY

Abstract. The article deals with the development of corporate governance, which opens up new opportunities for the development of the economy, investment flows based on innovative approaches. World practice shows that corporate governance, regardless of the applied theoretical tools, is generally recognized, ensuring the protection of a certain circle of participants in corporate relations. The novelty of the research suggests using an expert method for assessing problems. The main directions of improving the corporate management system for the near term and in the long term will be: diagnostics of companies as a business system, clarification of information about its structural elements, analysis of the compliance of the corporate management system with the mission and the hierarchy of its goals; assessment of the effectiveness of the existing organization of business processes; development of functional and information models of the business system, the formation of proposals for changing and adjusting the organizational structure, management system and information support; evaluation of the effectiveness and consequences of the proposed solutions, clarification of the quantitative and qualitative indicators of the main activity and efficiency. The concept of corporate governance development is based on the principle of convergence, identification of the levels of decomposition of control (financial, corporate structure) in a company with the hierarchical links of the management system (organizational structure).

Keywords: innovation, innovative development, corporate governance, competitiveness, innovative economy.

At present, solving the issue of achieving economic growth in Russia is closely connected with the accelerated development of innovation sector.

Intensity of companies' innovation activity under today's conditions influences to a large extent the level of economic development, while build-up of an innovation economy is one of the most efficient ways to increase the country's competitive ability.

The position of national companies in the country's innovation and technological development is conditioned by their peculiar financial possibilities and the large scientific potential, as well as by the structural peculiarity of Russia's economy, wherein state-owned corporations dominate practically in all branches of economy. These companies form a considerable portion of budget revenues, thus having a strong influence on providing stability in functioning of the national economy.

Quest for a corporate management system adequate to the market economy becomes ever more topical in corporations within Russia.

One of essential principles of creating corporations is their goal orientation on innovation processes.

There are various approaches to creation and implementation of innovations around the world. For instance, Japan is featured with the line of acquiring licenses and patents but not with creation of global innovations inside the country, while Korea tends to increase its own developments. Besides, in the innovation sector there is a certain specialization when each country creates some own special type of innovation developments or products¹.

The linear approach to creation and implementation of innovations has been formed in the Russian Federation the essence whereof consists in the position that an innovation process is a chain like that: fundamental researches – applied researches – technological developments – implementation – manufacture – selling; all these phases, first, make the period of coming the effect from innovations more retarded, and, second, are characterized with the effect of growth of results from “value added summing-up” and, consequently, with growth of sell-off prices of newly-created items (both as novelties, novations or know-hows).

Developed countries are characterized with non-linear approach based on plotting of intersecting contours of added value from using transfer prices with feedback couplings and with a well-developed network structure, which is possible only in conditions of structuring corporate management and by means of appraisal of factors influencing the corporate management quality.

Since recently, active actions are undertaken aimed at improvement of innovation activity on the government's part. However, they are realized not from below (which is more efficient) but from the upper level, on the initiative of management authorities or the state as a whole.

¹ Rasskazova A.N. Assessment of the economic efficiency of corporate governance: abstracts of reports and messages of the 2nd international scientific conference “Industrial infrastructure in a stationary and non-stationary economy”. – St. Petersburg, 2013.

Moreover, one can note a certain crudity and unpreparedness of innovation ideas and their insufficient elaboration.

The Russian Federation badly lacks venture funds and ways of contracting funds of outside agencies for innovation developments.

Moreover, innovation business is a high risk activity, whereas the general risk grows sharply, taking into account production risks, and thus wouldn't inspire a lot of businessmen for being involved into investment activity.

As a result, the country's budget funds assigned for organization of scientific researches get atomized and encourage priority lines of innovation creation but to a small extent.

To allow corporations to exist, it is necessary to define the ways of supporting their vital activities in form of systems of functioning and development of the organization as its individual elements, withy taking the following into account:

1) Functioning is a mechanism of maintaining stability of the organization's vital activities and its functions defining integrity, qualitative certainty and essential features of its every element.

2) Development is acquisition of a new quality strengthening vital activities of all elements of the corporation under conditions of the changing environment, even though such changes would lead to a situation which is not the best on the macro level.

Functioning and development within the system of corporate management is very closely connected with each other, reflecting a dialectical unity of basic trends of socio-economic systems and their interaction on all elements of the corporation and on each of them in separate.

Corporations are characterized with changes in the subject, in instruments of labour and in the human, at the same time maintaining the motivation of relation to them based on private property possession.

A corporation in its essence is one of forms of joint activity of individual elements thereof crated by business partners for running commercial activity, gaining and distribution of profits among its investors¹.

When selecting ways of organizing corporations and corporate management, one should account for the impact of the whole variety of factors existing in the market economy and of each of them in separate.

In aggregate, evaluation of factors is the very basis whereon one should choose a definite model of corporate management structuring.

Nevertheless, the following can be recommended at organizing corporations:

- to account for peculiarity of the branch wherein the corporation is planned to be founded;

¹ Yakutin Yu.V. Integrated corporate structures: development and efficiency.– M.: ZAO Publishing House "Economic newspaper", 2018.– 295 p.

- to take into account not only peculiarities of organizing corporations and developing corporate relations but the level of attraction and adherence of population in relation to them;
- to analyze the chronological experience of corporations' development in the international economic area;
- to evaluate the evolution of build-up of market relation nature in the country;
- to take into account the actual financial position as that of potential investors;
- to review possibility of participation as one of members of the state or ways of its influence on the corporation's activity;
- to define possibility of supervision authorities' participation in corporations' activity and the ways of undertaking by supervision authorities of their activities.

Corporations can be classified as follows:

- by their activity type (profit; non-profit);
- by their size (small-, medium-, large-sized entities, mega-corporations);
- by their legal status (state-owned, private, cooperative, mixed-type);
- by their management structure (linear, functional, divisional, matrix, independent profit centres, holding);
- by their sectoral affiliation (producing consumer goods, producing industrial goods, export- or import-oriented);
- by territorial expansion (national, regional, transnational).

However, corporations may be structured also by a complicated centralized management system which is a hierarchical ladder of centralized forms of connecting elements as production items.

In such a case, the following should be basic features connecting elements into one united corporate management system:

- 1) integrity of the system as unity of the mission, objectives and actions;
- 2) definition of borders of the system scale as a combination of individual elements;
- 3) complexity of multi-channel links adapted to the maximum possible simplicity;
- 4) stochastic behaviour of the whole system independently on its complexity and the number of elements included therein;
- 5) divisibility: possibility to break down the system into its elements and to unite them into one integral item;
- 6) presence of a competitive situation wherein an element striving for decreasing of the system efficiency shall always be present;
- 7) isolability, i.e. each element can be divided from the system and function on its own;
- 8) hierarchical structure which allows the system to be broken down and to modify the management system top down and by the components.

Elements of a corporation as a system are investors, shareholders, managers and employees, and also physical and legal persons who are able to act an element of the system and to form its structure¹.

Elements of corporate management as a system have a property to possess the ability of conversion structure; the mentioned conversions may be performed by means of:

- association and dissociation;
- change of a number;
- rearrangement of elements according to intensity of management action;
- polymerization as a method of associating into a new system, and oligomerization as the opposite process;
- conjunction as constancy of association of two or more heterogeneous systems and hybridization as a method of establishment of contacts;
- achieving of the trigger effect, i.e. a very fast transition of a system from one state into another, in presence of triggering (i.e. acting at the beginning) processes which are able to develop avalanche-like;
- parallel and convergent conversion, i.e. presence of similarity of processes or identity of the environment;
- heterobathy as a pattern of various steps in conversion or presence of relatively independent components within them.

In reality there is no identity in the structure of corporations, as well as there are no any absolutely similar systems.

Consequently, one should seek for an individual arrangement pattern, set of elements and system of functioning for each definite corporation.

When arranging a corporation from various production items as its elements, the main rule is such a selection thereof which would be able to ensure consistency of functioning of the system. At the same time, there is no universal selective principle here.

One should take into account general laws of arrangement of systems:

1. The law of self-preservation and creation of a persistence mechanism. In this case, categories of *persistence* and *stability* are taken as analogous. It is not so, as persistence means ability to resist changes of the environment and promptly (with a high response speed) adapt to these changes, while stability should be perceived as a type of permanence, i.e. qualitative certainty attached to a certain period of time but never to changes in form of static behaviour.

2. Law of equilibrium consists of existing of objectives and development of ways to achieve them in an unstable environment.

3. Law of strength ratio the essence whereof is that during each period of time the system is subjected to impacts of various types and intensity; but there

¹ Balgarin A. A private investor will invest his money in a company with a well-built corporate governance system // Bulletin of corporate governance. 2016. – No. 1 – P. 17–18.

is always a “weak link” which would not withstand even smallest impacts of the environment (“the thread breaks where it is weakest”). So, such elements of the system should be under constant control, and special operating procedures should be created for them.

4. Synergism law, according to which the effect of association of elements should be larger than the result of simple addition of effects from their individual action, and the potential of their fusion should be larger than the aggregate potential of their individual functioning.

Synergetic relations and contacts in a corporation can be described as:

- concentration;
- specialization;
- interchangeability;
- complementarity;
- completeness;
- optimality;
- aiming at the maximum effect.

5. Developmental law, according to which abilities for development in a system should be not only maintained but also grow. It should become a self-developing system at the expense of upgrading of the organization’s forms and ability to constantly achieve equilibrium in response to external situation and their changes, to independently seek for ways of adaptation in the competitive practices with simultaneous maintaining of interest concord of all elements included into the system.

Uniting the elements into a corporation should possess the following common features:

- an organization is always determined by its personnel and management, regardless on the extent of technical equipping of their elements and data processing sphere;
- it is necessary to actively intervene into operative processes;
- to unite processes which interact with each other not purposefully or inefficiently;
- each commercial system point (CSP as an object thereof) exists only in the unity of organization of productive work processes and managerial processes;
- stability in CPS as the organization’s object is achieved by organizational adjustment of corporate management;
- stability of an organizational state will be achieved by constant development of equipment, technologies and organizational methods, in search of new markets and achieving products’ high quality.

Elements of corporate management can act as organizers of:

- production represented by managers of various management levels;
- the management as managers who form activity of the administrative personnel.

When arranging a corporation, one should account for elements of each CSP included into it, in form of:

- materials and equipment, subjects of labour, technological rules regulating processes of manufacture and distribution of products, ways of obtaining organization-technological data;
- socio-economic production potential: personnel, their professional training and capability for labour activity, availability of average conditions of life standard and social wealth, norms, rules and methods of establishing relations between the labour collective members¹.

Thus, the following should be determined in process of corporate management:

- relations and interrelations that can be established between elements of corporation as economic and legal norms and relations;
- relations and interrelations that cannot be established as availability of processes of specialization, cooperation, collaboration, agreeing, harmonization and other processes which may be changed depending on changes of external or internal environment.

The analysis of system features that form managerial solutions on arrangement of corporations shall be necessary for finding abilities of the scale of its actions and a definite number of shareholders which can be involved into such activity, with taking into account that the aim of involving shareholders is increasing of the investment potential of the corporation and its abilities to create innovations as a way to raise market competition.

Thus, selection of the corporation's elements should be based on the saving multiplication model existing in this country.

The saving multiplication model for investment activity of corporations can be described as follows:

$$bv = \sum_{i=1}^m pv(1+r)^n > pv(1+r)^n \quad (1)$$

where bv – is the consolidated value of funds invested in any form into the production for a certain period of time;

pv – is the current value of one participant's investment placed in the production for gaining future incomes;

r – is the value of planned perspectives of profitableness of future investments;

n – is the number of periods of time during which investments will be returned with revenues;

1,..., m : the number of participants associated for joint investment activities on a corporate basis.

¹ Tees D.J. Obtaining economic benefits from knowledge as assets: "new economy" markets for know-how and intangible assets // Russian Management Journal. 2017. – No. 2(1). – P. 95–120.

To ensure real investment conditions of functioning of corporations, this model should be corrected by the factor of possible inflation even at the beginning of the uniting process.

To solve issues of innovations development by uniting elements into one single corporation, it is necessary to evaluate a life cycle of development of that type of product which the corporation intends to produce and realize in definite market conditions, and phases of development of innovation cycles.

Thus, the priority of forming corporations in a state should become the evaluation of the innovation usefulness which can be made for the society thanks to an associative merger of funds and the resource potential allowing such a corporation to function in the market environment more efficiently than it could be possible for each separate owner of private property.

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Section 2. Religion

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INTELLECTUAL CAPITAL IN THE CONDITIONS OF FORMATION AND DEVELOPMENT OF THE REGIONAL ECONOMY

Abstract. The proposed article examines the essence and content of intellectual capital as a key factor in the development of a modern market economy. the use of intellectual resources as a factor of production is complementary and leads to a decrease in the consumption of other factors of production. at the same time, there is a transition from the traditional industrial economy based on tangible property objects as the basic source of added property to intangible objects that form the "knowledge economy" (or "neo-economics"). it is these processes that the domestic economy should be characterized by today, which determines the relevance of developing a unified concept for the formation and use of intellectual capital in an innovative economy. the novelty of the research can be defined as the basic concept of intellectual capital and defined as one of the forms of capital, consisting of accumulated knowledge and competencies that can bring added value to the company.

Keywords: intellectual capital, innovative economy, efficient use, reproductive approach, sources of investment.

In modern conditions, with the dynamic development of high technologies and fierce competition, intellectual capital, which is the main resource of an organization that ensures its competitiveness, is of particular importance. In a knowledge-based economy and the implementation of innovative development for the state and organizations, intellectual capital plays a decisive role. Using the potential of intellectual capital can provide a breakthrough as the economic development at the enterprise level and at the country level.

For centuries, the great attention of economic thought has been directed to the study of the essence and nature of capital.

The concept of “capital” people interpreted in different ways. It depended on the level of development of productive relations and production forces.

Capital formulates the relationship of ownership regarding the totality of labor factors, informational, tangible, monetary, necessary for the formation, development and use of the provided economic system.

The listed elements, united in a system, form the nature of each of them and thereby become part of the capital. Factors of production, their combination is determined by such conditions as: nature of production, territorial location, etc.

Capital is the relationship of personnel with factors of production and the entrepreneur-owner used in the process of reproduction.

Thus, capital involves a relationship between entities regarding the rational use of labor, financial capital, intangible and material factors of production, and the intellectual potential of personnel, which is aimed at generating income.

There are four forms of capital:

- industrial capital,
- financial capital,
- financial and industrial capital,
- intellectual capital.

Industrial capital arose in the period of 15–16 centuries as a result of the development of commodity relations. Industrial capital operates in any capitalistically organized branch of intangible and tangible production. The concept of industrial capital was introduced into scientific circulation by K. Marx.

Financial capital arose during the development and close connection of heavy industry, trade, banking, with large-scale production. Financial and industrial capital is characteristic of the era of scientific and technological revolution, which is based on the universality of information and electronic technologies.

Intellectual capital is corporate in the nature of communication and organization, scientific and intellectual in nature of labor.

In modern conditions, the formation and development of intellectual capital, which provides a reorientation of the innovation system based on the creation of advanced technologies and radical innovations, deserves special urgency. It is intellectual capital that contributes to high added value and can build an innovative economy.

At the present stage, the value of intangible accumulation has begun to manifest itself in the economic growth of countries, in maximizing corporate profits, in productivity, which associate this with the ability to create new ideas, knowledge, translate them into technical and organizational schemes.

The lines of a fundamentally new national economic formation – the spiritual and material complex – including the production of tangible assets and the creation of information, its processing, use and dissemination, were outlined.

Professionally significant qualities are a combination of psychological qualities of a person, physiological characteristics of personnel, which determine the success of real activities and training.

Professional suitability and professionalism include:

- professional motivation;
- professional and general preparedness (skills, abilities, knowledge necessary for activities in emergency and standard situations);
- level of development of the functional and physical data of the body;
- state of the psychological functions of the body of the employee.

The development of consumer capital has the following directions: the creation of integrated CRM systems; formation of own brand; formation and support of call centers; creating customer databases.

The core of the company's consumer capital is information support in the form of CRM systems. This system covers:

description and analysis of the real organizational structure of the organization;

- business processes for working with clients;
- disclosure of basic business needs;
- classification of business goals;
- documentation; determination of expected results and project boundaries.

CRM technologies allow companies to accumulate data about customers and their behavior, preferences, ways of interaction and ways to satisfy needs. The results of the analysis of customer behavior are updated in the process of continuous processing of data that fall directly into the operational systems of enterprises.

Tools for product promotion are the methods of “personal sale”, which involves the personal participation of company representatives in the sale of products, contracts, consultations, negotiations; advertising; sales promotion; propaganda methods, creating the image of a company, public reputation.

The level of consumer capital of the organization depends on the quality of its marketing activities. Therefore, changes in the content of the organization's marketing management over time are inevitable. This is due to an increase in consumer criticality, erosion of the boundaries of markets, and a rapid change in consumer behavior. The key to the company's success in the market is the establishment of long-term sustainable relationships with customers.

Elements of intellectual capital are connected with each other and interacting they create a synergistic effect. It is not enough to invest in each element of intellectual capital separately.

The main principle of the effective formation and development of the company's intellectual capital is a synergistic effect due to all its types. This principle creates a significant amount of intellectual capital only through the successful combination of its elements.

All types of intellectual capital support each other, and comprehensive growth must be undertaken to grow it.

Thus, the relationship between consumer and human capital contributes to the growth of individual competence of company employees, which occurs in direct contact with consumers.

Therefore, many companies are increasing the number of personnel who have contact with the client. Effective interaction of organizational and human capital leads to an increase in total intellectual capital.

So, a large share of personal knowledge in the form of a way of structuring problems, a sequence of actions, principles, approaches, becomes available to all employees of the organization, which leads to the transfer of personal knowledge into joint knowledge, which makes it possible to train effectively new employees in the workplace.

Thus, all elements of intellectual capital are connected with each other and can influence its other elements. In some cases, a low level of one of the elements of intellectual capital can lead to a significant decrease in its entire value.

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Section 3. Agricultural sciences

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STUDY OF THE ENVIRONMENTAL SUITABILITY OF SOFT WHEAT CULTIVARS FROM THE PERSPECTIVE OF STATISTICAL ANALYSIS

Abstract. The presented study shows the production capacity of soft wheat cultivars, as well as the reactions of these productive levels in different ecological environments. So, for a mass production cultivar, matters not only the productive level, but also the stability of production. In this context, it must be acknowledged that conditional genetic stability of production is the most important agronomic feature in terms of size, on which depends the fate of a cultivar or of a whole group of species.

Keywords: Wheat cultivars, production potential, correlation coefficient, regression, production stability, yield, crop, grains.

1. Introduction

Among the group of cereal plants, wheat is considered as one of the most important. The high level of protein content, with up to 14%, 68% of starch, and some irreplaceable amino acids, mineral salts, pigments, etc., rank this crop as first among the four “magic plants”. The first archaeological evidence of wheat cultivation dates back on 8000 years before the New Age (Feldman – 1976)¹.

¹ Feldman M. Wheats. In Evolution of Crop Plants (ed. N. W. Simmonds), Longmans, – London, 1976. – P. 120–8.

The progress of cultural techniques and the genetic improvement made by man since the beginning of the twentieth century, have been accompanied by a significant increase in yields, which have exceeded 8.6 kv/Ha in 1900, and after that period constantly on an increasing trend.

Wheat has a wide cultivation are thanks to the high plasticity that it possesses. The general objectives of improving this plant consist on the reduction of the production costs, improvement yields regularity, technological qualities, etc. (Gate Ph. 1993)¹.

The modern group of this species has reached high harvest value indices, reaching the value of 0.68, (from 15 tons of biomass per 1 Ha, about 10 tons are grain production and 5 tons are straw, while the primitive group possessed 10 tons of straw and 5 tons of grain production).

The main genetic improvements are observed in the following aspects: increase of resistance to parasites: this group includes obligatory fungal parasites. The preservation of the genetic mechanisms of rust resistance has been achieved early, since the discovery of Mendelian laws (Morgan C.L. 1989)². Considering that disease resistance is commanded by monogenic factors, the application of cross-breeding method through a continuous parent component and a donor, after 4–5 back – crosses made it possible to fix the disease – resistant cultivar.

Another direction is related to frost resistance, drought and improvements of physiological parameters. In the last direction, they consist in the adaptation of the biological cycle against drought stress, and this inhibitory factor is mitigated through four mechanisms that act on the wheat plant, on the following mechanisms:

- Rescue mechanism;
- Avoidance mechanism;
- Healing mechanism;
- Tolerance mechanism.

Recently, special attention is being dedicated to the genetic progress of productivity, in order to increase the three elements that define this parameter, such as:

1. Number of productive ears;
2. Number of grains in each cob;
3. Weight of 1000 grains.

It should be admitted that the future of this cultivated plant will be the production of hybrid seeds, even though nowadays its cost is high. The hybrid strength of wheat grain is associated with an increased production over 40% (Group authors 1970)³.

¹ Gate P.H. "L'ecophysiologie du bles", 1993.

² Morgan C.L. "Genetic improvement in the yield of winter wheat" 1989.

³ Group authors. "Improvement soft wheat". 1970.

The evolution of a wheat hybrid compared to a pure line should be considered simultaneously for some important factors:

- Potential of yields;
- Regularity factors;
- Quality of grain.

Behavioral characteristics of wheat hybrids such as:

- Early period;
- Type of development;
- Disease resistance, is directly dependent on parental characteristics in terms of genetic determinism (Khaliq I., Parven N. 2004)¹.

2. Materials and methods

The study was realized with 10 cultivars of soft wheat, created by research institutions of the country, as well as introduced from regions with climates close to that of the country where they were studied.

Four ecological points have been selected, two of which are classified with pre-mountainous climate: Korca and Dibra, Lushnja region, which are included in the climatic division of the coastal lowland and the ecological point of Cerrik in the indoor climate region.

The field experiment technique is standard for all four ecological points. This experimentation technique includes three types of testing: field testing, laboratory testing, and laboratory testing. A randomized scheme with four replications with a variant size of 21 m² was implemented. The configuration of the variant is a right-angled quadrilateral with dimensions 6 × 3.5m.

From the 4th repetition of each variant in the study, was created an average sample from which laboratory analyzes of the grain were performed, such as: absolute weight, hectoliter, protein content, carbohydrates, etc.

The agro – technique used is what applied motivated farmers today and specifically: 120 kg/Ha nitrogen active ingredient, 90 kg/Ha phosphorus active ingredient and 80 kg/Ha K₂O, active ingredient. All phenological stages were kept, as well as field descriptions in morpho-physiological and sanitary aspect.

The material representing values in productivity is statistically processed. According to this statistical-mathematical model, all the results of ecological tests are summarized in the matrix $V \times n$ where:

V = the amount of cultivars put to the test

n = number of ecological points

To calculate the stability parameters, mathematical model is used as follow:

$$x_{ij} = \bar{x}_i + b_i \bar{I}_j + d_{ij} \quad (1)$$

x_{ij} = the factual production of the genotype i in the environment j

$\bar{x}_i$ = average production of i – genotype in all ecological environments (test points).

¹ Khaliq I., Parven N. "Correlation and Path coefficient analyses in Bread Wheat". – Vol 6. – No. 4. 2004. – P. 633–635.

$\bar{bi}$ = the regression coefficient of i , under different conditions.

Ij = index of environmental conditions j .

dij = deviation from the regression line of i genotype in environment j .

Since the study is not based on one ecological point, but on 4 such points and moreover on pre-mountainous areas, coastal lowlands and “inland” Albania, we must calculate the index of environmental conditions.

For this purpose, will be used the formula:

$$Ij = \frac{\sum xij}{x} - \frac{\sum xij}{V.n} \quad (2)$$

As shown by the formula (2), the index of environmental conditions represents the deviation of the medium production of all the cultivars in each ecological point.

This index shows to which degree the growth conditions influence in every point of the sample compared to the normal conditions at all points of the study.

In this way the deviation of all indexes should be equal to zero.

Consequently, we reach to the conclusion that $\sum Ij = 0$.

This will be used to control the quality of the evaluations made for this index.

Using the index of environmental conditions, we can calculate the regression coefficient of each cultivar in different ecological environments (Wright. S. 1963)¹.

$$bi = \pm r * \frac{\sqrt{x}}{\sqrt{y}}$$

This coefficient shows the reaction of different cultivars in different environmental conditions. The greater the coefficient, the greater the reaction of the feature productivity under the influence of environmental conditions

3. Results and discussion

In the (table 1) that shows the results in productivity of cultivars in four ecological points, we notice the highest productivity in cultivars “APACHEA” with 56.05 kv/Ha and “EUROPA” with 55.52 kv/Ha. They are followed by “KATERINA” with 53.92 and the most regionalized cultivar with 49.42 kv/Ha.

There are 5 cultivars with a higher productivity than the average of all experimental fields 51.80 kv/Ha, while there are 7 cultivars with higher productivity than that of cultivar “DAJTI”.

$$\begin{aligned} g &= \pm \sqrt{\frac{\sum (xi - \bar{x})}{n}} & C_v &= \frac{g}{x} \cdot 100\% \\ g_1 &= 6.25 & C_{v_1} &= 10.73 \\ g_2 &= 2.79 & C_{v_2} &= 10.70 \end{aligned}$$

¹ Wright S. “Path coefficient and path regression”. Biometrics – 16. 1963.– P. 89–202.

$$g_3 = 3.08 \quad C v_3 = 4.80$$

$$g_4 = 5.49 \quad C v_4 = 9.34$$

Table 1. – Summary table of average yields of two years of study of some soft wheat cultivars in some ecological environments

No.	Cultivars	Yields kv/Ha Ecological environments				Average productivity $\bar{x}\bar{i}$	<i>bi</i>	$\pm r$
		Korce	Lushnje	Cerrik	Diber			
1.	DAJTI	52.70	29.00	59.00	57.00	49.42	0.80	+1.00
2.	LUCIA	51.70	26.40	64.80	58.60	50.37	0.55	+0.05
3.	MIA	51.00	31.80	62.80	51.60	49.30	0.37	+0.98
4.	KATERINA	55.90	24.80	67.50	67.50	53.92	1.13	+0.98
5.	KRAJLICA	58.40	23.70	59.80	59.10	50.25	1.01	+1.0
6.	MATEO	63.30	27.00	62.30	56.10	52.17	0.97	+0.99
7.	EUROPA	68.20	22.40	63.50	68.00	55.52	1.25	+0.98
8.	APACHEA	68.80	27.80	70.80	56.80	56.05	1.1	+0.97
9.	SIMONIT	59.30	22.70	67.80	62.40	53.05	1.19	+1.01
10.	AZUL	53.50	25.40	64.30	50.90	48.52	0.87	+0.94
11.	The average of productivity at the ecological point	58.28	26.02	64.26	58.80	51.80	–	–
12.	AVOIDANCE Quadratic	6.25	2.79	3.08	5.49	–	–	–
13.	Variation Coefficient%	10.73	10.70	4.80	9.34	–	–	–

From the regression analysis, (index ***bi***) we notice that there are three categories of cultivars.

Category I $bi = 0.5$

Category II $bi = 0.5 - 1.0$

Category III $bi > 1$

Cultivars “LUÇIA” and “MIA” present ***b*** index higher than **0.5** while in the second category belong cultivars “DAJTI”, “AZUL” and “MATEO”, ***b*** index higher than **1** is noticed in the cultivars “KRAJLICA”, “APACHEA”, “KATERINA”, “SIMONIT” and “EUROPA”.

Cultivars with a higher ***b*** index are associated with higher productivity level than the average of all ecological points of 51.80 kv/Ha.

So, cultivars APACHEA", "EUROPA", "SIMONIT" have a higher productivity compared to the other cultivars whose **b** index is less than 1. Although they have higher productivity levels, on the other hand they are more susceptible to stress during cultivation and their production is unstable.

This phenomenon is noticed even when we compare their productivity with the average value of the experimental field at each ecological point. In the ecological point of Korca, Cerrik and Dibra, cultivar "APACHEA" stands out for high productivity values, while in Lushnja, under stress factors during cultivation, the productivity level decreases and it approaches the average value of the ecological point.

Another important parameter in this correlation analysis that strongly determines productivity is the structural element, absolute weigh, the weight of 1000 grains in gr.

Mathematically in the wheat plant productivity is expressed by

$$y = \frac{K \times Z \times A}{10.10.10}$$

y = Production ton /Ha grain

K = Number of productive spikes/surface unit

Z = number of grains /surface unit

A = weight of 1000 grains in gr.

According to mathematical calculations performed, it turns out that the third structural element, the weight of 1000 grains determine about 21% of productivity.

Table 2. – Correlation analysis between parameters:
Productivity – Weight of 1000 grains

No.	Cultivars	ENVIRONMENTS				$\bar{X}$
		Korce	Lushnje	Diber	Cerrik	
1	2	3	4	5	6	7
1.	DAJTI	40.0	41.7	44	40	41.42
2.	LUÇIA	43.0	42.9	45	41	42.97
3.	MIA	40.0	40.0	51	39	42.50
4.	KATERINA	43.0	40.6	42	42	41.90
5.	KRAJLICA	40.0	39.7	46	39	41.17
6.	MATEO	40.0	39.7	44	43	41.67
7.	EUROPA	43.0	42.0	44	42	42.75
8.	APACHEA	43.0	44.3	45	48	45.07
9.	SIMONIT	45.0	44.4	41	49	44.85
10.	AZUL	44.0	41.9	43	41	42.47
11.	The average of productivity at the ecological point	42.10	41.72	44.50	38.30	–

1	2	3	4	5	6	7
12.	AVOIDANCE Quadratic	1.81	1.82	2.57	5.25	–
13	Variation Coefficient%	4.31	4.34	5.79	13.73	–

Table 3. – Correlation analysis of absolute weight and productivity for “DAJTI” cultivar

Cultivar “DAJTI” Weight of 1000 grains	Productivity kv/Ha
$x_1 = 40.0$	$y_1 = 52.70$ kv/Ha
$x_2 = 41.7$	$y_2 = 29.00$ kv/Ha
$x_3 = 44.0$	$y_3 = 59.00$ kv/Ha
$x_4 = 40.0$	$y_4 = 57.00$ kv/Ha
$\bar{x} = 41.42$	$\bar{y} = 49.42$
$\vartheta_x = 1.7$	$\vartheta_y = 12.00$
$\vartheta_{vx} = 4.11$	$Cvy = 24.43$
$\vartheta_x \cdot \vartheta_y = 20.40$	$r = \pm \frac{\overline{x \cdot y} - \bar{x} \cdot \bar{y}}{\sqrt{x} \cdot \sqrt{y}} = +0.05$
$\bar{x} \cdot \bar{y} = 2046.97$	
$\bar{x} \cdot \bar{y} = 2048.32$	

Table 4. – Correlation analysis of absolute weight and productivity for “APACHEA” cultivar

Cultivar “APACHEA” Weight of 1000 grains	Productivity kv/Ha
$x_1 = 43.0$ gr	$y_1 = 68.80$ kv/Ha
$x_2 = 44.3$	$y_2 = 27.80$ kv/Ha
$x_3 = 45.0$	$y_3 = 70.80$ kv/Ha
$x_4 = 48.0$	$y_4 = 56.80$ kv/Ha
$\bar{x} = 45.07$	$\bar{y} = 56.05$
$\vartheta_x = 1.72$	$\vartheta_y = 16.00$
$C_{vx} = 3.83$	$C_{vy} = 30.30$
$\vartheta_x \cdot \vartheta_y = 29.20$	$r = \pm \frac{\overline{x \cdot y} - \bar{x} \cdot \bar{y}}{\sqrt{x} \cdot \sqrt{y}} = +0.11$
$\bar{x} \cdot \bar{y} = 2525.17$	
$\overline{x \cdot y} = 2528.58$	

In this study as presented in the (table 2), there are cultivars with weight of 1000 grains from 39 gr to 48 gr.

From the correlative analysis of two parameters: productivity and absolute weight (1000 grains) for cultivar “DAJTI” the value of the correlation coefficient is $r = + 0.05$ while for the cultivar “APACHEA” this value is $r = + 0.11$.

The results of this study correspond to the conclusions of other studies made from other Albanian or foreign authors. The higher is the weight of 1000 grains, as much higher is the productivity.

4. Conclusions

- Studied cultivars of soft wheat have satisfactory production levels, higher than 55 kv/Ha;
- Cultivars APACHEA” and “EUROPA” have the highest productivity levels, this is also associated with higher **bi** values;
- Cultivar “DAJTI” in unfavorable ecological environments shows high levels of productivity. This phenomenon is reflected in values of bi smaller than 1;
- Wheat cultivars with high values of bi are characterized from instability, that is associated with low production levels in the ecological point of Lushnja;
- There is a low but positive correlation. The higher is the absolute weight, as much higher is the productivity.

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Section 4. Technical sciences

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THE UNMANNED LOGISTICS CORRIDORS

Abstract. The transport problems identified during the restrictions caused by the COVID-19 pandemic have actualized the need to introduce innovative solutions in the field of transport. The article discusses the development of unmanned road transport for freight transportation, the prospects for the organization of unmanned logistics corridors.

Keywords: cargo transportation, unmanned transport, robomobile, autonomous truck, unmanned logistics corridors, digital transport.

The COVID-19 pandemic has revealed the problems of cargo transportation organizing and providing the population with consumer goods in many countries. Global supply chains have been disrupted, which has already led to shortages, a narrowing of the range of goods and an increase in prices. Restriction of movement freedom for transport workers due to quarantine measures leads to disruption of supplies, disruption of supply of enterprises with material resources, raw materials, dissatisfaction with the increased demand of the population. The identified transport problems have actualized the need to introduce innovative solutions in the field of transport.

In May 2021, the annual summit of the International Transport Forum (ITF) was held in Leipzig, Germany (the theme was “Transport innovations for sustainable development”). The goal of the ITF is to help to formulate the global transport policy, to promote the economic growth, the environmental protection, the social integration and to preserve human life and well-being¹. A meeting of the Council of Ministers of Transport with the participation of ministers and deputy Ministers of Transport of 65 countries was held in the

¹ International Transport Forum 2021 is the 13th annual transport summit. Text: electronic // Expoclub.ru. [site]. 2021. URL: <https://expoclub.ru/db/exhibition/view/8639>

format of a videoconference. In the speech of the Minister of Transport of the Russian Federation the tasks of the transport complex were defined on the basis of the principle of holistic development of the transport system using the latest technologies, including the digital transformation of transport with the introduction of artificial intelligence, highly automated vehicles and digital services, as well as the creation of a network of high-speed highways and the formation of digital transport corridors¹.

The purpose of the introduction of digital technologies in the field of freight transportation by road is to optimize transport and logistics costs, reduce accidents on the roads, in particular, through the introduction of drones. In the conditions of anti-COVID restrictions, this is an option for solving the problem of supplying the population and enterprises.

An unmanned vehicle (robomobile) is a vehicle equipped with an automatic control system that can move safely without human intervention, thanks to special software that controls the operation of all vehicle systems and sensors that collect information about the environment². This opportunity demands the reliable software for perception that may control the robomobile. The system handles the information about the vehicle from different sensors for helping it to navigate and to go ahead. The inside functions, the autonomic driving and the safety system itself is providing by the AI supercomputer³. To organize the movement of the drone, it is necessary to determine the location of the car with high accuracy, to identify the objects around, to predict the possible movements of traffic participants and to plan the actions of the drone itself based on the analysis of all data. The process takes place in real time and does not stop while driving or stopping.

The world experience of using drones to transport passengers is more significant than in cargo delivery. Thus, the “Waymo” company (a division of “Alphabet”) was the first in the United States to launch an unmanned taxi with a fare, while companies such as “General Motors Cruise”, “Uber”, “Apple”, “Tesla” are working in this direction at the same time. The leader of the Chinese market is “Baidu”, which has teamed up with the bus manufacturer King Long United Automotive Industry to create China’s first fully autonomous bus. The “Yandex” company conducts tests on the roads of Russia, Israel and the USA.

The Russian company Cognitive Technologies has created a set of devices for autonomous driving that can be installed on any car of the C-Pilot project, one of its projects is an unmanned truck created jointly with KAMAZ, as well as tests

¹ Meeting of the Council of Ministers of Transport of the International Transport Forum. Text: electronic // Official Internet resource of the Ministry of Transport of the Russian Federation. [site].2021.– URL: <https://mintrans.gov.ru/press-center/news/9933>

² Regulations Hinder Development of Driverless Cars. Text: electronic// NYTimes.com, 2011[site].2021.– URL: <https://www.nytimes.com/2011/05/29/business/economy/29view.html>

³ High-performance, energy-efficient AI compute is heightening autonomous vehicles’ detection capabilities. Katie Burke. Text: electronic //NVIDIA DRIVE. [site].2021.– URL: <https://blogs.nvidia.com/blog/2021/10/14/startups-perception-software-nvidia-drive>

of the control system for unmanned combines and tractors (agrodroids). KAMAZ is developing technologies for unmanned transport management for cargo transportation. The Russian company “StarLine” develops security systems for cars¹.

The goal of creating transport corridors is to ensure the greatest efficiency of supply chains, their safety and environmental friendliness in modern conditions, which are the main structural elements of transport and logistics systems. In addition to transport communications and rolling stock, a special role is played by the legal field in which the logistics transport corridor will operate.

The Ministry of Transport of the Russian Federation together with the Association “Digital Transport and Logistics” plans to organize unmanned logistics corridors: from 2024 on the highway between Moscow and St. Petersburg and by 2030 between Asia and Europe. In 2021, it is planned to launch unmanned trucks in the regions of the Far North. From 2022, test runs of unmanned trucks should begin on sections of the M-11 “Neva” highway, with a length of 660 km. By 2030, about 20 thousand km of federal roads should become the basis of unmanned logistics corridors: sections of the international transport route “Europe-Western China”, highways M-1 “Belarus”, M-4 “Don”, Central Ring Road and M-12².

Representatives of all participants in the chain take part in the development of the project: developers of digital systems and services, road infrastructure, automakers and cargo carriers. A real opportunity to start testing transportation in unmanned mode will allow the inclusion of the project in the “digital sandbox” mode – a special legal regime at the federal level for the development and implementation of digital products: the application of special regulation in the areas of development, testing and implementation of digital innovations to participants for a certain period of time³. In order to launch cargo transportation, the highway must be equipped with the necessary equipment and means of communication.

The methods of organizing an unmanned transport corridor can be based on infrastructure elements embedded in the elements of the route, or on more radical technologies, when drones are able to move autonomously under normal conditions, making decisions about movement based on sensor data. Most manufacturers create autonomous cars capable of driving in the same conditions as a regular car with a driver. In order for the drone to move on public roads, it does not need smart traffic lights with a radio signal transmitting data to vehicles. Cars are able to identify the traffic light signal themselves by using cameras. The

¹ Who is testing drones and what they have achieved: the largest test companies in Russia and the world. E. Delyukin. Text: electronic // Vc. Ru. [site]. 2021. – URL: <https://vc.ru/transport/107896-kto-testiruet-bespilotniki-i-chego-oni-dobilis-krupneyshie-kompanii-ispytateli-v-rossii-i-mire>

² The Ministry of Transport of Russia will launch testing of unmanned trucks from 2022. Text: electronic // Official Internet resource of the Ministry of Transport of the Russian Federation. [site]. 2021. – URL: <https://mintrans.gov.ru/press-center/news/10020>

³ The law on experimental legal regimes in the field of digital innovation in Russia was signed. Text: electronic // Official network resources President of Russia. [site]. 2021. – URL: <http://kremlin.ru/acts/news/63791>

improving of the road infrastructure will provide new opportunities, but this is not a prerequisite for the mass withdrawal of autonomous cars on the roads¹.

Simultaneously with the testing of trucks in unmanned mode, new legal and technical regulations, innovative organizational and technical solutions and logistics business models will be worked out. Recently, specific measures have been taken to introduce highly automated and unmanned vehicles. The participants of the project “Unmanned logistics corridors” were the association “CTL”, “KAMAZ”, “National Telematics Systems”, “SberAvtoTekh”, “Business Lines”, “Globaltruck”, “First Forwarding Company”, “X5 Group”, the companies “Volvo”, “Russian Post”, “State Transport Leasing Company” and “VTB Infrastructure Holding”. The digital infrastructure of logistics corridors will ensure the passage of unmanned trucks of all world developers. The Ministry of Transport of Russia is working on the inclusion of European and Asian automakers in the project².

“Volvo” is the first foreign manufacturer in the project, that has already experience in operating semi-autonomous and autonomous trucks in closed areas in Sweden: in mines, quarries, port and logistics terminals. Tests on sections of the M-11 expressway in Russia could be the next stage in the development of connected “Volvo” unmanned trucks. The use of autonomous trucks on the M-11 will increase the commercial speed of cargo delivery by a quarter. With the further development of the road network for drones, this figure will increase by 150% for trips of more than one day due to traffic at night. At the same time, the project will increase Russia’s share in transportation on the China– Europe route by 10 times. The implementation of the project will reduce the cost of transportation for logistics companies by 15%³.

The transport strategy of the Russian Federation until 2030 with a forecast until 2035 is based on innovations and world experience, accelerated digitalization and breakthrough technological solutions, the introduction of modern technologies, including the pilot transport under consideration. By 2035, the digital systems will accelerate the movement of non-primary cargo due to container trains, electronic document management and drones, according to forecasts – by four times, up to a thousand kilometers per day⁴.

The introduction of unmanned logistics corridors and the use of robomobiles will improve road safety by driving cars according to the rules, reduce the

¹ How drones drive and are they as reliable as they say. Text: electronic // RBC Trends. [site]. 2021. – URL: <https://trends.rbc.ru/trends/industry/5e54e8019a7947f8ae1d65b1>

² The Ministry of Transport of Russia will launch testing of unmanned trucks from 2022. Text: electronic // Official Internet resource of the Ministry of Transport of the Russian Federation. [site]. 2021. – URL: <https://mintrans.gov.ru/press-center/news/10020>

³ The Ministry of Transport of Russia will launch testing of unmanned trucks from 2022. Text: electronic // Official Internet resource of the Ministry of Transport of the Russian Federation. [site]. 2021. – URL: <https://mintrans.gov.ru/press-center/news/10020>

⁴ Meeting of the Presidium of the State Council. Text: electronic // Official network resources of the President of Russia. [site]. 2021. – URL: <http://kremlin.ru/events/president/news/66968>

cost of cargo transportation, by saving on drivers' wages, organize delivery in dangerous zones, as well as during natural and man-made disasters or military operations. The use of unmanned transport during the pandemic would help to avoid shortages of food and industrial goods caused by restrictions on movement, lack of personnel.

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