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E-mail: info@economics-msu.com.ua  
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## Algorithm for Selecting Alternative Strategies for Sustainable Intensification of Agricultural Enterprises

*Svitlana I. Strapchuk\**, *Olena P. Mykolenko*

*V.N. Karazin Kharkiv National University  
61022, 4 Svobody Sq., Kharkiv, Ukraine*

**Abstract.** Growing food shortage encourage businesses to increase yields, mainly through extensive capacity building. However, this path often leads to a negative impact on the environment and does not consider social issues. Increasing yields requires the implementation of strategies for sustainable agricultural development and intensification of production. Selecting such strategies at the level of agricultural enterprises requires their classification and analysis. The purpose of the study is to group agrarian enterprises in Kharkiv Oblast and identify clusters with high potential for the implementation of alternative strategies for sustainable intensification. Based on the concept proposed by J. Pretty, the study classifies enterprises by the ecological and economic, socio-economic and environmental dimensions on the basis of such factors as crop diversity, depreciation, organic fertiliser application, labour costs, use of mineral fertilisers, fuel materials per hectare of land. Data from 514 agricultural production enterprises in Kharkiv Oblast in 2019 and 510 enterprises in 2020 were used for the categorisation. The data were processed through a cluster analysis method using specialised Microsoft Excel and SPSS21 software. The study presents an algorithm for choosing strategies for sustainable development and sustainable intensification of agricultural enterprises based on cluster analysis. Classification of enterprises by the level of diversity of agricultural crops, application of organic fertilisers, labour costs, application of mineral fertilisers, depreciation level, fuel materials per hectare of land allowed identifying agricultural enterprises that have the greatest potential to implement sustainable intensification practices from the proposed alternatives. The introduction of integrated pest management tools has been suggested for companies that consume significant amounts of mineral fertilisers and fuels and lubricants. The practical significance of the findings lies in providing recommendations for selecting sustainable intensification strategies depending on the level of enterprise yields, the amount of mineral fertiliser and fuel and lubricants used, the diversity of crops, etc.

**Keywords:** sustainable development, sustainable development strategies, cluster analysis, one-way ANOVA, agriculture, Kharkiv Oblast

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\*Corresponding author

## Introduction

One of the most important strategies for economic growth is the development of the agricultural sector, which is the main source of income for a significant number of households, and also provides a significant part of Ukraine's exports, 26.6% of which are products of animal and plant origin [1]. Agriculture accounts for 9.3% of the country's gross domestic product (GDP) [2]. Although this sector constitutes a small part of GDP, it is considered one of the most important sectors in terms of employment and food supply. Agriculture offers employment for almost 20% of the active population and creates a significant export potential for the agro-industrial complex and food industry, which amounted to 45.1% in 2020 [3]. In addition, Ukraine's deeper integration into global economic processes requires increasing its capacity to ensure food security. In fact, by 2050 food production may need to increase by 60-110% in order to feed the growing world population [4]. At the same time, in many developing countries, including Ukraine, the expansion of production comes at the expense of extensive use of natural resources, reduced agricultural diversity, accompanied by a decline in opportunities and employment. This requires strategies to intensify agricultural production. The rationale for intensification has been well formulated in the literature, both in terms of increasing production through the cultivation of high-yielding crops, increasing irrigation, mechanization and use of chemicals, and in terms of preserving millions of hectares of forests and about 590 billion tons of CO<sub>2</sub>, which could not be released into the atmosphere [5]. A growing number of studies demonstrate that sustainable agricultural practices can increase productivity (yield) and meet sustainability dimensions [6].

Therefore, the government of the country faces an urgent issue of agribusiness development through the constant intensification and implementation of strategies for the sustainable development of agricultural enterprises [7]. The importance of sustainable agriculture lies not only in ensuring ecological balance but also in taking into account the values of the environment and society [8].

Strategies for achieving the sustainable development goals are being adopted at the national level. An example is the Sustainable Development Strategy 2030 in Ukraine [9]. The main aspect of its development was to incorporate the 2030 Sustainable Development Goals adapted for Ukraine and the main provisions of the EU's annual Sustainable Growth Strategy [10]. However, the issue of developing and implementing sustainable development strategies at the enterprise level remains equally important. The search for alternative strategies for sustainable development at the level of agricultural enterprises requires, first of all, their classification [6].

In any realistic assessment of the constraints and opportunities that economic actors can exploit, typology is an important step [11]. Typology studies can be used to analyse factors affecting the productivity of agricultural enterprises, determine the potential for sustainable intensification practices, and identify opportunities and constraints

for implementing development strategies. Provided a database is available, multivariate statistical methods make it possible to find such typologies based on the concept of stable intensification and its factors identified in previous studies. In one of his first works, J. Pretty suggested that continuous intensification should be considered in the context of increasing output without harming the environment [12]. The team of authors further analysed the possibilities of redesigning the agro-system to introduce specific practices for sustainable production and increase its volume [13]. Case studies on agricultural intensification and the factors identified in different countries can be found in [4; 14; 15]. At the same time, researchers have identified factors for the sustainable intensification of agriculture in Ukraine in the ecological and economic, socio-economic, and ecological dimensions [7].

*The purpose of the study* is to group agrarian enterprises in Kharkiv Oblast according to pre-determined factors and identify clusters with high potential for the implementation of alternative strategies for sustainable intensification.

## Materials and Methods

To achieve this goal, the study clustered enterprises by factors of constant intensification using the k-means clustering method. In particular, the grouping was based on the level of crop diversity, application of organic fertilisers, labour costs, use of mineral fertilisers, depreciation, use of fuel materials per hectare of land [7]. Cluster analysis was conducted with the data for the years 2019 and 2020 for 514 and 510 enterprises, respectively, engaged in agricultural activities in Kharkiv Oblast.

The clustering method was chosen primarily for its ease of use and informative content compared to hierarchical methods [16]. However, determining the most appropriate number of clusters required the use of a hierarchical method and a distribution method [17].

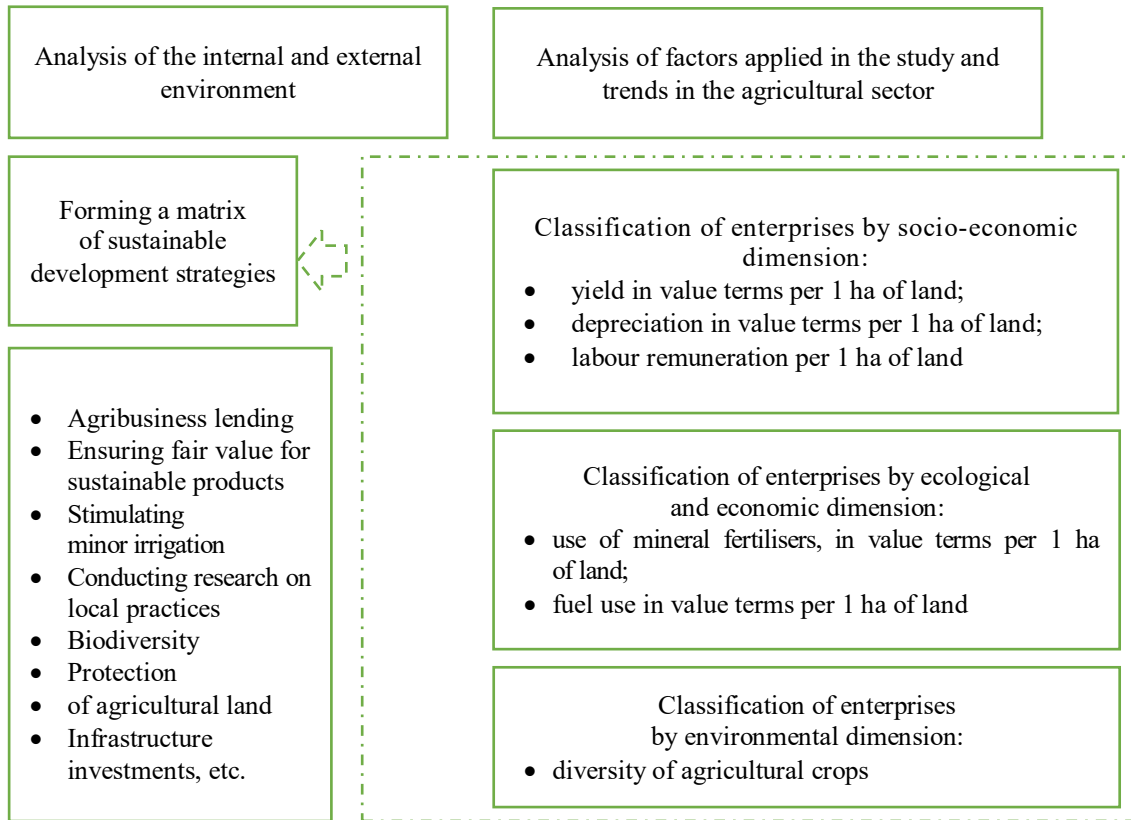
The approach of J. Lattin et al. was applied, according to which the k-cluster solution can be found by combining two clusters from the k+1 cluster solution, while at the same time the distribution method classified agricultural enterprises into a certain number of clusters [18]. To find the best solution for a cluster, Ward's hierarchical procedure was used to minimise changes in each cluster and identify clusters of the same size [19]. The solution was achieved by finding the number of clusters based on the change between the distance coefficient at one clustering stage and the previous one. Clusters of the best solutions were further analysed using the k-means clustering method for the most realistic final solution.

As a result, four clusters of agricultural enterprises were formed based on a set of indicators for the 2019 data and three, four and five clusters for the 2020 data in the context of the socio-economic, ecological, and economic and environmental dimension respectively. As a result, the k-means found the most realistic and significant final

**Results and Discussion**

solution, followed by one-way analysis of the variance test, demonstrating the significance of the results (<0.001). The cluster analysis method was carried out using the SPSS21 software package.

The algorithm for selecting alternative strategies for sustainable development and sustainable intensification of agricultural enterprises based on cluster analysis is shown in Figure 1.



**Figure 1.** Algorithm for selecting alternative strategies for sustainable intensification of agricultural enterprises  
**Source:** compiled by the author based on [12]

For each of the three dimensions, a certain number of enterprises (within 1-2% of the total population) do not fall into any cluster. In particular, in 2019, clustering covered 98% of observations (504 observations for the socio-economic dimension, 506 observations for the ecological and economic dimension and 507 observations for the environmental dimension). Accordingly, in 2020, the cluster analysis

explained mostly 99% of the observations (505, 507 and 505 respectively). Using the k-mean method, the best solution for classifying businesses by socio-economic dimension is to isolate the four clusters that show the lowest p-values for a one-way analysis of variance for each variable (Table 1). The lower p-value represents a more significant difference in the variable among the groups.

**Table 1.** Characteristics of the selected cluster statistics of one-way ANOVA by socio-economic dimension (2019), UAH per 1 ha of land

Factors	Cluster 1 N=235	Cluster 2 N=56	Cluster 3 N=4	Cluster 4 N=209	F-dimension	P-value
Socio-economic dimension of clustering						
Yield	11963	31480	72100	19470	490.419	<0.001
Standard deviation	3071	5840	14210	2691		
Depreciation	1109	2020	1934	1659	578.704	<0.001
Standard deviation	1084	1583	1214	1332		
Labour Remuneration	1329	1174	3465	1248	299.041	<0.001
Standard deviation	1325	1209	3947	1151		
Other factors of sustained intensification						
Use of mineral fertilisers	2266	5319	6022	3474	-	-
Standard deviation	1400	3171	5079	1618		
Use of fuels	1835	4068	6863	2034	-	-
Standard deviation	1157	5094	2841	1159		
Number of crops cultivated	4.2	4.3	4	4.5	-	-
Standard deviation	1.7	1.7	0.81	1.82		

**Source:** compiled by the author based on data from enterprise financial statements [6]

Cluster 1 is characterised by the lowest yield, average depreciation and remuneration. However, enterprises of this type consume fewer resources to produce agricultural products compared to other clusters. The higher values of Cluster 4, and greater yields resulted in a slightly increased consumption of resources. Enterprises in Cluster 2 are the least efficient, as wages are low and the cost of fertiliser

and fuel and lubricants used is slightly lower than in Cluster 3. The average yield of the latter is UAH 72,100 per 1 ha of land, which exceeds the yield of Cluster 2 enterprises by more than 2 times. At the same time, enterprises are resource-intensive.

According to the ecological and economic dimensions, enterprises were also divided into 4 clusters (Table 2).

**Table 2.** Characteristics of the selected cluster statistics of one-way ANOVA by ecological and economic dimension (2019), UAH per 1 ha of land

Factors	Cluster 1 N=311	Cluster 2 N=60	Cluster 3 N=118	Cluster 4 N=17	F-dimension	P-value
Ecological and economic dimension of clustering						
Use of mineral fertilisers	2080	3360	5095	9080	208.015	<0.001
Standard deviation	837	955	1305	3605		
Use of fuels	1560	4078	1952	6660	483.583	<0.001
Standard deviation	636	1238	670	3176		
Other factors of sustained intensification						
Yield	15286	20853	19435	34563	–	–
Standard deviation	6200	11421	5707	16929		
Depreciation	1284	2337	1540	2400	–	–
Standard deviation	1160	2627	1268	1755		
Labour Remuneration	1175	3068	1065	3007	–	–
Standard deviation	1019	4078	874	5174		
Number of crops cultivated	4.4	4.63	4.1	4.1	–	
Standard deviation	1.69	1.92	1.85	1.59		

**Source:** compiled by the author based on data from enterprise financial statements [6]

Cluster 1 enterprises are the least resource-intensive, but yields, remuneration, and depreciation are significantly lower compared to other clusters. Cluster 2 and Cluster 3 show low efficiency, as enterprises have slightly higher yields than those in Cluster 1, but their operations require significant resources. Cluster 4 enterprises are resource-intensive. The

last dimension, the number of crops cultivated, has demonstrated that crop diversity increases yield under equal other conditions. Enterprises that cultivate three basic and highly profitable crops in Kharkiv Oblast such as wheat, maize and sunflower have high yields (Table 3).

**Table 3.** Characteristics of the selected cluster statistics of one-way ANOVA by ecological dimension (2019), UAH per 1 ha of land

Factors	Cluster 1 N=201	Cluster 2 N=208	Cluster 3 N=19	Cluster 4 N=79	F-dimension	P-value
Ecological dimension of clustering						
Number of crops cultivated	5.6	3.6	8.4	1.8	931.883	<0.001
Standard deviation	0.8	0.5	0.5	0.4		
Other factors of sustained intensification						
Use of mineral fertilisers	3095	3119	3484	3630	–	–
Standard deviation	1949	1990	2242	2335		
Use of fuels	2128	2436	2323	2099	–	–
Standard deviation	1300	3020	1059	2685		
Yield	17530	18051	18943	16643	–	–
Standard deviation	7286	10072	6163	7767		
Depreciation	1647	1285	1840	2662	–	–
Standard deviation	1295	1233	1544	9430		
Labour remuneration	1555	1388	1978	1582	–	–
Standard deviation	1629	2236	1600	4858		

**Source:** compiled by the author based on data from enterprise financial statements [6]

Furthermore, a cluster analysis based on 2020 data was carried out and three clusters were identified according to the socio-economic dimension (Table 4). Compared to 2019, the cluster with the highest yields (in 2020 – Cluster 1) showed a higher performance of enterprises, but the

consumption of mineral fertilisers and especially of fuels and lubricants also increased. At the same time, Cluster 3 enterprises have the greatest potential for sustainable intensification of economic activity. Cluster 2 contains enterprises with the lowest yield.

**Table 4.** Characteristics of the selected cluster statistics of one-way ANOVA by socio-economic dimension (2020), UAH per 1 ha of land

Factors	Cluster 1 N=23	Cluster 2 N=290	Cluster 3 N=192	F-dimension	P-value
Socio-economic dimension of clustering					
Yield	74156	16814	31800	896.462	<0.001
Standard deviation	13080	4786	6227		
Depreciation	2263	1051	1733	148.793	<0.001
Standard deviation	1662	1063	1350		
Labour Remuneration	5649	967	1498	148.793	<0.001
Standard deviation	5474	787	1324		
Other factors of sustained intensification					
Use of mineral fertilisers	6271	2624	3746	–	–
Standard deviation	8573	2826	2155		
Use of fuels	8156	1534	2384	–	–
Standard deviation	9935	1372	3288		
Number of crops cultivated	5.43	5.33	5.88	–	–
Standard deviation	2.35	2.17	2.49		

**Source:** compiled by the author based on data from enterprise financial statements [6]

According to the ecological and economic dimension, 4 clusters were also obtained, as in the 2019 data (Table 5). Enterprises in Cluster 3 with significant consumption of minerals and Cluster 4 with increasing costs of fuel and

lubricants are inefficient. Clusters 1 and 2 have the potential for sustained production intensification, although the yield is lower compared to other clusters. Cluster 3 needs to reduce the consumption of mineral fertilisers.

**Table 5.** Characteristics of the selected cluster statistics of one-way ANOVA by ecological and economic dimension (2020), UAH per 1 ha of land

Factors	Cluster 1 N=201	Cluster 2 N=249	Cluster 3 N=45	Cluster 4 N=12	F-dimension	P-value
Ecological and economic dimension of clustering						
Use of mineral fertilisers	3649	1686	7457	7680	1355.510	<0.001
Standard deviation	787	708	1532	4269		
Use of fuels	2089	1333	2963	18247	805.962	<0.001
Standard deviation	1088	678	1252	11055		
Other factors of sustained intensification						
Yield	29184	20139	31997	69990	–	–
Standard deviation	16871	8621	21236	69992		
Depreciation	1715	1117	1675	6251	–	–
Standard deviation	1324	1095	1326	9788		
Labour Remuneration	1643	1108	1197	6965	–	–
Standard deviation	1944	951	1460	13239		
Number of crops cultivated	5.9	5.48	4.95	3.75	–	
Standard deviation	2.35	2.28	2.23	1.54		

**Source:** compiled by the author based on data from enterprise financial statements [6]

In terms of the number of crops cultivated, yields increase with greater diversity, which is a positive sign for sustainable production (Table 6). Clusters 3 and 4 are optimal in terms of resource consumption and yield. At the same time, Cluster 5 enterprises have the highest yield, since

they only cultivate one or two agricultural crops that generate the greatest profitability (corn, wheat, sunflower), and depend significantly on mineral fertilisers. Enterprises in Cluster 1 and Cluster 2 provide the lowest labour remuneration and lower yields compared to other clusters.

**Table 6.** Characteristics of the selected cluster statistics of one-way ANOVA by ecological dimension (2020), UAH per 1 ha of land

Factors	Cluster 1 N=125	Cluster 2 N=265	Cluster 3 N=32	Cluster 4 N=57	Cluster 5 N=26	F-dimension	P-value
Ecological dimension of clustering							
Number of crops cultivated	6.53	4.09	10.5	8.4	1.58	1164.5	<0.001
Standard deviation	0.5	0.77	0.5	0.5	0.64	–	–
Other factors of sustained intensification							
Use of mineral fertilisers	3039	3296	2929	2584	11054	–	–
Standard deviation	2098	2111	1477	1340	15602	–	–
Use of fuels	1844	2465	2153	1839	6209	–	–
Standard deviation	1426	4142	865	895	6106	–	–
Yield	26585	24496	28000	27616	39656	–	–
Standard deviation	17123	20031	11656	15341	41262	–	–
Depreciation	1525	1317	2062	1810	2650	–	–
Standard deviation	1336	1553	1481	1451	6463	–	–
Labour Remuneration	1398	1133	2850	2101	2620	–	–
Standard deviation	1229	3001	1850	2141	4185	–	–

**Source:** compiled by the author based on data from enterprise financial statements [6]

The cluster analysis allowed identifying groups of enterprises with significant potential for sustainable intensification for each dimension. In 2020, the number of such enterprises increased. According to the socio-economic dimension – 192 enterprises, ecological and economic dimension – 450, ecological dimension – 89. For such

enterprises, it is proposed to use various alternative strategies for sustainable production intensification (Table 7). The analysis also considers the results of previous studies, which show that yields can be reduced when changing from conventional to more sustainable farming practices [5].

**Table 7.** Strategies for sustainable intensification of agricultural enterprises

Development strategies	Application / implementation
Agribusiness lending	Sustainable production requires the transfer of technology and its acquisition, in turn, requires adequate funding
Ensuring fair prices for sustainable products	Creating conditions for maintaining fair prices Formation of non-traditional commodity markets and direct sales markets (via farmers' markets and/or the Internet); obtaining premiums with marked features (e.g., organic, naturally raised livestock), increasing participation in value chains
Soil conservation (land cultivation)	Sustainable agriculture consists of a group of strategies aimed at minimising soil disturbance, maintenance of cover and crop rotations. Their realisation is possible with the accessibility of water, soil structure and biotic activity. Strategies are almost never used by small businesses, which often meet the need for food products locally and cannot afford the transition period
Conducting research on local practices	Short-term local studies of biodiversity and sustainable practices, the impact of their implementation. Today, commercial varieties are mainly characterised by herbicide resistance and pest resistance. Some other traits have been introduced to provide the nutritional benefits of food
Diversity of agricultural crops	Incentives for farmers to produce diversified crops (more than 50% of the analysed enterprises grew 6 or more crops in 2020), apply crop rotations
Infrastructure investments	Reduce costs, including marketing costs, related to damage and other factors. Development of social infrastructure
Agricultural research	More and more farmers are willing to use fertilisers containing micro-nutrients such as gypsum, zinc sulphate and borax and to use siderates.
Irrigation expansion	Bringing more land under irrigation will create employment opportunities, help produce more food and generate income
Provision of mineral fertilisers	The import and distribution of fertilisers remain under the control of private companies, and prices are adjusted depending on the competition. The government should establish rules to ensure proper labelling of fertiliser containers; also encourage the production and sale of mixed fertilisers

Table 7, Continued

Development strategies	Application / implementation
Use of mineral fertilisers	Most of the enterprises in question demonstrate unbalanced use of fertilisers and excessive use of pesticides, leading to environmental concerns such as soil acidification, pest attacks, water pollution and deteriorating health conditions. At the legislative level, restrictions should be imposed on the import, distribution, labelling and use of chemicals
Economic regulation	A national revenue accounting system should take into account the true value of natural resources to avoid over-exploitation
Implementation of integrated pest management	Integrated pest management means planning pesticide applications based on monitoring and setting economic thresholds
Development of alternative energy sources	Government programmes to encourage the production and use of alternative energy sources through "green tariffs", etc.
Introducing environmental services	Development of compensation programmes for loss of profits due to the introduction of new practices or environmental services (intensity of tillage, soil use, crop diversity, level of plant protection, etc.).
Development of agricultural education	Establish broad, system-oriented training in agriculture; support vocational training to increase farmers' profits

**Source:** compiled from materials [21-24]

The cluster analysis also showed that the implementation of integrated pest management (IPM) is particularly important in enterprises that use significant amounts of mineral fertilisers and pesticides to maintain high crop yields. Excessive dependence on agrochemicals as the only form of plant protection is not a sustainable and effective practice [20]. Pest management consists of a set of tools for making managerial decisions and measures aimed at combining the use of targeted compounds, as well as agronomic and biological methods of crop pest control.

IPM strategies evolved from local practices to coordinated community-based decision-making. The experience of implementing IRM at individual agricultural enterprises in 26 developing countries has shown four possible scenarios of changes in the volume of chemicals used and yields, in particular: 1) an increase in the use of pesticides is accompanied by an increase in yield; 2) the use of pesticides increases, but the yield decreases; 3) a decrease in the use of pesticides is accompanied by a decrease in yield; 4) the use of pesticides decreases, but the yield increases [12]. More than 60% of the projects were in the category where pesticide use decreased and yield increased.

One of the most efficient and quickly adopted IPM systems is push-pull, which demonstrates significant success with the redesign of the monocrop crop system [25]. A promising direction is the introduction of systems to improve varieties [13], nutrient content, resource efficiency and the reduction of greenhouse gas emissions [26]. Variety development is also necessary to produce perennials with desirable traits such as larger seed size, stronger stems, improved palatability and increased yield [14]. Breeding plants with deeper and shrubby root systems can help improve soil structure, absorb water and carbon, retain nutrients, and produce higher yields.

Thus, sustainability in agriculture means applying practices that allow preserving natural resources by eliminating

extensive farming methods and using chemicals in significant volumes [27]. On the other hand, sustainable agriculture can be seen from a social standpoint as the ability to respond to the growing demand for food [28]. Sustainability can also be observed in the processes of a business model that functions according to a circular economy [25]. Such a business model offers alternative management methods that are less resource-intensive but provide the necessary level of profitability [14].

The concept of sustainability, known as the triple bottom line (TBL), involves balancing 3P's (planet, people, and profit). The concept of sustainable business (sustainable enterprise) has additional aspects, namely 3E (ethics, efficiency, and effectiveness). This concept is called the triple top line (TTL) [29]. The combination of both concepts prompted further exploration of different dimensions for sustainability in the environment, and social and economic aspects of the enterprise. At the same time, sustainable business needs to design and implement appropriate balanced development strategies in the framework of the combined dimensions. Therefore, there is a strong argument for the adoption of sustainable intensification of agriculture as a strategy to achieve the goals of the combined 3P and 3E concepts.

## Conclusions

Based on a cluster analysis of the data, groups of agricultural enterprises similar to each other in terms of the set of time-varying factors were identified. To determine patterns, heterogeneity between clusters was studied using k-means, based on representative samples over 2019-2020. Thus, in 2020, agricultural enterprises in Kharkiv Oblast were increasingly expanding the number of crops, raising costs for depreciation, labour and mineral fertilisers. The developed algorithm for selecting alternative strategies for sustainable intensification of agricultural enterprises made

it possible to select strategies for improving their agricultural potential using an approach that, unlike others, is based on comparing clusters of enterprises formed using sustainable intensification factors - the level of crop diversity, application of organic fertilisers, labour costs, use of mineral fertilisers, depreciation level, use of fuel materials per 1 ha of land area. The use of fertiliser compared to yield levels across clusters shows a directly proportional relationship in five of the six cases measured in different dimensions.

Excessive use of fertilisers contaminates soils and causes repeated outbreaks of pests, potentially leading to long-term economic losses. Therefore, acquiring the knowledge on how to apply and implement sustainable intensification strategies, such as water, soil and nutrient management, will enable agricultural producers to invest some of the money saved from fertilisers in other inputs, such as top-quality seeds and inorganic fertilisers. The effects of the latter are the next potential area of investigation.

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## Алгоритм вибору альтернативних стратегій сталої інтенсифікації аграрних підприємств

**Світлана Іванівна Страпчук, Олена Петрівна Миколенко**

Харківський національний університет імені В.Н. Каразіна  
61022, майдан Свободи, 4, м. Харків, Україна

**Анотація.** Зростаючі потреби у продуктах харчування спонукають підприємства до збільшення урожайності, здебільшого за рахунок екстенсивного нарощування потенціалу. Проте такий шлях нерідко призводить до негативного впливу на навколишнє середовище та не враховує соціальні проблеми. Збільшення врожайності потребує імплементації стратегій сталого розвитку сільського господарства та сталої інтенсифікації виробництва. Обрання таких стратегій на рівні аграрних підприємств вимагає їх класифікації та аналізу. Метою дослідження є групування аграрних підприємств Харківської області та виокремлення кластерів з найвищим потенціалом до впровадження альтернативних стратегій сталої інтенсифікації. Спираючись на концепцію, запропоновану Дж. Претті, в дослідженні було здійснено класифікацію підприємств у еколого-економічному, соціально-економічному та екологічному вимірах за такими факторами, як: рівень різноманіття сільськогосподарських культур, амортизації, внесення органічних добрив, витрати на оплату праці, застосування мінеральних добрив, паливних матеріалів на 1 га площі землі. Для групування було використано дані 514 підприємств Харківської області у 2019 році та 510 підприємств у 2020 році, що вирощували сільськогосподарську продукцію. За допомогою методу кластерного аналізу здійснено обробку даних з використанням спеціалізованих програм Microsoft Excel та SPSS21. У роботі представлено алгоритм обрання стратегій сталого розвитку та сталої інтенсифікації аграрних підприємств, спираючись на кластерний аналіз. Класифікація підприємств за рівнем різноманіття сільськогосподарських культур, внесення органічних добрив, витрат на оплату праці, застосування мінеральних добрив, рівня амортизації, використання паливних матеріалів на 1 га площі землі дозволила виокремити аграрні підприємства, що мають найбільший потенціал до впровадження практик сталої інтенсифікації із запропонованих альтернатив. Для підприємств, які споживають значні обсяги мінеральних добрив та паливно-мастильних матеріалів, запропоновано впровадження інструментів інтегрованого pest-менеджменту. Практична значущість отриманих результатів полягає у наданні пропозицій щодо вибору стратегій сталої інтенсифікації виробництва в залежності від рівня урожайності підприємств, обсягів застосування мінеральних добрив та паливно-мастильних матеріалів, різноманіття сільськогосподарських культур тощо

**Ключові слова:** сталий розвиток, стратегії сталого розвитку, кластерний аналіз, одностороння ANOVA, сільське господарство, Харківська область

## Attributes of Formalisation Risk Culture and Its Typification in the Enterprise

*Iryna V. Fedulova\**, *Ivan V. Makarchuk*, *Viktoriia V. Hanushevych*

*State University of Trade and Economics*

*02156, 19 Kioto Str., Kyiv, Ukraine*

**Abstract.** Forming a risk management culture requires an understanding of the attributes of formalising a risk culture and defining its type depending on the efficiency of its certain parameters. The purpose of the study is to systematise the attributes of formalisation of risk culture and identify the type of risk culture in the enterprise. To achieve the objectives, the attributes of formalising the risk culture in the enterprise were analysed and synthesised, defining their characteristics and definition parameters. To identify the type of risk culture at the enterprise, a matrix approach was used, according to which the type of risk culture was described in two parameters: “methods and control” and “level of personnel engagement”. Each of these parameters is considered according to two qualitative levels of impact. The “methods and controls” parameter is considered in terms of the existence of hard and soft risk management controls in the enterprise. The level of “personnel engagement” parameter can be either high or low and it indicates the level of staff motivation and support of the employees by supervisors on risk management. As a result of the formalisation, four types of company risk culture were identified, characterising the behavioural patterns and motivational factors of company employees, depending on the efficiency of regulations, the understanding of risks by personnel and risk management techniques. The practical value of the findings is that each employee will understand their role and responsibilities regarding their participation in the company’s risk management system, and managers will be able to assess the level of alignment of all employees in terms of using risk management practices and determine the best management styles and practices

**Keywords:** risk management, risk factors, risk culture, risk management culture, risk factors, risk culture typification

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\*Corresponding author

## Introduction

As companies operate in the marketplace, they seek to prevent the threats they may encounter during their activity. At the same time, a number of challenges must be addressed. First, it is necessary to establish and implement the main stages and activities of the risk management process, namely: context determination, identification, analysis, certification, use of risk management tools, monitoring and auditing of risks, systematic use of risk management mechanisms (standards, policies, decisions, procedures). Secondly, to incorporate them into the business operations and management system of the enterprise. Thirdly, to ensure the formation and promotion of risk culture and its organic integration with the organisational culture in the entire company. The first two tasks seem to resonate in the management practices of the enterprise, at least through the control and communication system that has been built. However, the biggest challenge is to understand the existing risk management culture at the enterprise and create an organisational environment that will facilitate the identification, assessment and processing of risks, and form an open communication about risks between all employees of the company. These are the values, beliefs, awareness, knowledge and practices for dealing with shared risks that apply to the activities of all employees in the enterprise. As a result, risk-oriented management and risk culture are formed at all levels of management from an individual employee, line manager and top manager to senior management.

The organisation formalises the risk management process according to its own terms. It depends on the characteristics and specifics of the business itself, the management system, the organisational structure and how the company's employees perceive and manage risk. The risk management culture is part of the overall organisational culture of the enterprise and determines its risk-oriented aspect, namely the behaviour of employees regarding the understanding, perception and use of risk management in their activities. That is why it is important to understand how the organisational culture is formed within the enterprise in terms of integrating the risk management system into it. To understand how much the values and beliefs of management at the enterprise are involved in the risk management process, it is advisable to define and systematise the attributes of risk culture formation.

*The purpose of the study* is to systematise the attributes of forming a risk management culture at the enterprise and formalise the type of risk culture of the enterprise by significant parameters.

According to the objective, the article defines the following *tasks*: to investigate the attributes of risk management culture formation, to conduct their systematisation and to propose a scientific methodological approach to the formalisation of risk culture with the definition of its four types in the enterprise.

## Literature Review

An important part of understanding and, accordingly, forming a risk culture in an organisation is identifying the

main attributes by which company employees perceive risk management, carry out management procedures and analyse the effectiveness of risk management in the company.

O. Dyugovanets & I. Dovba have identified a broad list of determinants of risk culture development in the corporate governance system as: the integration of risk identification, analysis and management processes when making management decisions; the regular nature of risk culture development in the corporate governance system; transparency and disclosure of information about the results and effectiveness of risk management; continuous development and improvement of approaches to risk management within the organisation; implementation of international principles in the corporate governance system, ensuring the protection of shareholders' rights, equal treatment of shareholders, recognition of the rights of interested parties provided for by law, timely and accurate disclosure of information on all important issues related to the organisation, effective control over activities management by the management board (supervisory board), as well as accountability of the management board to shareholders; coordination of measures and formation of a clear strategy in the sphere of risk management by executives, and in corporate governance; integration of risk management system with business processes of the enterprise [1]. This broad list of attributes of risk culture development must be systematised in terms of the organisation of the risk management process in companies. In addition, this list is more concerned with protecting shareholders, board members and management against risks, while a significant number of risks in other areas of the company are left unaddressed. Risk management should be integrated harmoniously into the company's overall management system, and to do so, it is appropriate to eliminate control procedures that overlap. Excessive control does not always contribute to ensuring the security of the company's activities.

I.V. Semenyutina considers the attributes by which the level of risk management culture can be identified: the existence of a common understanding of basic concepts, principles and goals in risk management; the principles for determining risk tolerance, which are consistent with all interested parties in the company's activities, its resources and goals; the level of management competencies in risk management; interaction and consultation of the management team in identifying risks and justification of the optimal solutions for risk management; financial incentives for staff to assist in solving risk management problems; integration of risk management methods and procedures in all areas of business activities; standardization of the risk management process; availability of standards and regulations for risk management in the enterprise [2]. This list of attributes for establishing a risk management culture is quite comprehensive and tied to the risk management process, yet it would also be useful to define the values of the employee team when dealing with risk.

C. Turkoglu sees risk culture as an oxymoron. He argues that it is impossible to achieve common values, beliefs,

and behaviours in relation to risk [3]. However, a common understanding of risk and reporting risk at different levels in an organisation is vital for its effective management. His concept of risk management culture includes all stages of the risk management process, namely risk identification, analysis, assessment, mitigation, how risk information is communicated to different levels of the organisation, how risk decisions are made, and how acceptable risks are defined. After all, it is the formalisation of a common understanding of risk management that is important in the formation of risk culture. However, the consideration of these aspects of risk culture formation is incomplete and needs to be completed with regard to the formation of risk-oriented management.

S. Unterrheiner identifies eight aspects of risk culture: governance, tone at the top, accountability, incidents and escalation, encouragement and reward, training, succession planning and talent management, acceptance, and core competence support [4; 5]. But what the author neglected was the issue of communicating within the company when dealing with risk.

J. DeLoach considers the following elements in identifying an organisation's risk culture: the tone of the organisation; the physical mechanisms that control the risk culture; the internal attributes that stimulate the risk culture; the external attributes that stimulate the risk culture; the subcultures that can influence risk management; and the attitude towards the overall culture [6]. But a more specific understanding of the tone of the organisation when dealing with risk would be helpful.

B. Kpodo & K. Agyekum consider four elements that identify the risk culture in an organisation: tone from the top (management's demonstration of support for risk management); accountability (the requirement to report on risk management); effective incident management (the ability of staff to make effective risk decisions); and compensation (the link between reward and risk management behaviour) [7]. This list lacks an understanding of the organisational and communication aspects that determine staff behaviour regarding risk and reward management.

K. Bakker & S. Somani, considering the organisation's culture, of which risk culture is a part, define it as the overall system of messages through which the organisation shapes its business behaviour, its response to the challenges and threats of the external environment and its perception of the world [8]. They define the following elements of the risk culture: attitudes towards operating a business, personnel behaviour, ethics, communication patterns and etiquette. All these components should certainly be reflected in the formation of the organisation's risk culture, but they are not exhaustive, and control procedures and support for risk management in the company are also not reflected here.

Ph. Silberzan & M. Jones (2012) see risk not only as a threat but also as an opportunity for development, so they suggest developing a culture of uncertainty rather than a culture of risk [9]. The risk culture is based on the traditional decision-making paradigm, which consists in choosing from a number of options the best in terms of benefit

and risk. The culture of uncertainty, in their opinion, characterises the future, which is not only unknown but also objectively impossible to understand, even theoretically. This is especially true for completely new, unexpected events. In an uncertain environment, the decision-maker does not choose among the options that already exist but rather creates those options. The paradigm for decisions under uncertainty becomes the creation of options and their implementation in the face of uncertainty. Thus, the culture of uncertainty is based on creative and intuitive action planning and decision-making. However, not all threats are associated with uncertainty, for a certain proportion of threats it is possible and necessary to use standard risk management procedures.

M. Power, S. Ashby & T. Palermo view an organisation's risk management culture as a set of interrelated factors and compromises [10]. They also refer to risk culture as an ongoing process or as recurring and renewing processes; a combination of formal and informal governance processes involving multiple behaviours and habits that collectively form a risk culture at any given time. However, they note that an organisation may not necessarily have a single risk culture, meaning that the risk culture may be unevenly distributed within the organisation. The most important thing, in this case, is the organisation's awareness of the balance between risk acceptance and control. Studies in [10] show that there are organisations that approach risk culture management in a more organic and less structured way, rather than through management and control-oriented approaches. There is a need to identify the main factors of risk culture formation that are subject to formal and informal management.

R. Abuzarqa looks at the relationship between organisational culture, risk management and company performance [11]. He hypothesises that organisational culture influences risk management and company performance. The confirmation of this hypothesis is that if the culture and operating principles of employees are compatible with those of the company, it is determined by high performance and efficiency. One cannot fully agree with this thesis. Ensuring high performance can be a result of how the company manages risks. However, this will not answer the question of how this management is carried out and how the process of forming a risk culture in the company takes place. The development of organisational culture and risk culture also occurs through the feedback mechanism, both from top to bottom and from bottom to top.

A. Paalanen proposed sixteen types of risk culture, which are formed in four dimensions [12]. These four dimensions were selected using factor analysis to describe the risk culture in organisations. Each culture type represents one end of all four dimensions: the level of formality of management procedures; the decision-making process; risk perception; and focus [12]. The dimension of formalities of procedures is related to the formality or flexibility of management methods and business processes. It describes how units are managed, how flexible or rigid processes are, what is the attitude towards adhering to or bending rules,

and how much intuition is used compared to predefined rules and procedures. The extreme ends of this dimension are the level of formality and flexibility of management procedures. The decision-making dimension is about how decisions are made. It describes how much effort is spent to prepare for decisions, how fast decisions are made, and how detailed decisions are. The extreme ends of this dimension are called a reasonable and dynamic decision-making process. The risk perception dimension is about how risk is understood by all employees of the company. It describes the attitude towards risk in the company, namely whether risk is seen as an acceptable or unacceptable part of life, as a threat or a possible deviation. The extreme ends of this dimension are called risk acceptance and risk avoidance. The focus dimension describes whether a business is seen via technical assets or via people and processes. It determines how much risk management focuses on technical aspects, such as profit or production, or behavioural factors, such as motivation, competence, or reputation. The extreme ends of this dimension are technical and behavioural focus. Usually, such a thorough analysis is very interesting and allows for comprehensive coverage of the main aspects of a company's risk culture, but it is also quite complex. Sixteen types of risk culture are difficult not only to identify but also to comprehend.

D. Hillson proposed an A-B-C model of the company's risk management culture using three components: attitude, behaviour, and culture [13]. Attitude defines the position of an individual or group towards risk and risk perception. Risk behaviour comprises external observable risk-related actions, including risk-based decision-making, risk processes, risk communications etc. Risk culture is values, beliefs, knowledge, and understanding shared by a group of people with a common goal. The A-B-C model is straightforward in describing how risk culture relates to risk attitudes and risk-taking behaviours. However, this does not help to understand the management aspect of the risk culture, the role and support of the management of employees in the process of communication and risk decision-making.

S. Mushnikova considers the need for a company to develop a "risk-based mindset" and its recommended vision as an element of an enterprise's safety management culture [14]. Such a vision, according to S. Mushnikova, is aimed at the formation of managerial competencies for risk assessment and analysis, identification and implementation of opportunities in achieving strategic and tactical goals of enterprise development at all levels of enterprise management. At the same time, the level of competence of decision-makers and their personal qualities are brought to the fore. Indeed, the risk culture is formed by the behaviour of the company's employees. However, what the author neglects is how and by which management techniques the perception of risk management in the company, the engagement of employees in risk management and their attitude to the decision-making process under conditions of risk and uncertainty are shaped.

J.M. Farrell & A. Hoon characterise the risk management culture as an organisation's system of values and

behaviours that determine the content and form of decisions made for risk management [15]. They believe, that the risk management culture is effective when employees know the attitude of the organization's management to risk management, the limits of their powers, and can openly discuss with management the risks that they will have to take in order to achieve the company's long-term strategic goals. However, the risk culture influences the decisions made, even if the company does not analyse possible risks. The process of building a company's risk culture cannot only be formalised and must include the development of values and preferences when developing risk management practices.

O. Vovchenko defines the following determinants of the effective risk culture of the bank: the unity of individual and corporate goals, values and ethics of business behaviour; the implementation of a risk-oriented approach to management; the dynamism of development, which is determined by the readiness of risk departments responsible for risk management to implement and improve risk management technologies; openness and transparency of internal corporate communication regarding risks and their management; orientation to create additional value of the organisation through the creation of an established system of motivation of personnel to manage risks, justification of the impact of the effectiveness of the functioning of the risk management system on the market value of the company; the application of both individual and collective responsibility for the risks of the bank, which forms corporate unity risk management [16]. However, while considering various approaches to the interpretation of the economic content of risk culture, O. Vovchenko does not define how its determinants shape it. This study lacks the very process of forming a bank's risk culture and the specifics of its development, and the attributes of its definition are vague and do not reflect a controlling function in risk management.

L.M. Titarenko, B.Yu. Rostiyarov, V.A. Yatsenko, considering the organisational aspects of risk management, determine the behaviour and forms of management activity of managers, their ability to give explanations, make an expert assessment of management decisions made, create conditions for identifying problems, and guarantee the objectivity and comprehensiveness of information analysis at a professional level [17]. This approach focuses more on the behaviour and competencies of staff when dealing with risk and does not reveal the essence of all the attributes of establishing an organisation's risk culture.

I.O. Bashinska defines five elements of the risk management system at the enterprise: risk identification, analysis and prioritisation, risk minimisation and reporting, monitoring and revision, and risk management culture [18]. She sees the culture of risk management as creating an environment within the organisation that facilitates the identification, assessment and mitigation of risks and communicates openly about risks. However, this approach lacks the behavioural and managerial aspects of forming an enterprise's risk culture.

V.M. Moroz & S. A. Moroz note that the level of risk culture development in an organisation can be assessed through the awareness of its staff about the place and role of risk management in the management system, as well as

through the level of personnel engagement in risk management processes [19]. The authors refer the following to the elements of risk culture formation: formation of an internal information interactive database on the theory and practice of risk management; planning the budget for risk management measures; formation of a system of risk management effectiveness evaluation; planning and organization of staff training on the risk management programme; certification of risk management subjects. This list of attributes of risk culture formation is not exhaustive, the role and types of controls when dealing with risk, responsibility for risk decisions, availability and use of tools and practices of risk analysis and assessment, and how values of employees and values of the company as a whole are formed in the process of risk management are not considered.

O. Gerasimenko conducted a survey of Ukrainian enterprises on the specifics of forming a risk-based approach to management, which showed that this approach is determined by the attitude of management to risk identification, the application of risk management measures and the search for an optimal balance between profit maximisation and long-term sustainable development and protection of shareholders' rights [20]. Key to building an effective enterprise risk management system according to her investigation are: 31% – development and implementation of risk management policy/concept, 44% – implementation of risk management process in all functional units of the enterprise, 41% – active support from executive management [20]. This study prioritises the development and implementation of a core document regulating risk management coordination processes and practical actions to embed the approach across all business functions. However, despite the fact that risk and control are always around, formalised control procedures and the implementation of risk management regulations alone will not build a risk-oriented management and risk management culture in the enterprise. Employees should not only have management support but also be motivated and proactive in managing risks.

A review of scientific articles has shown that numerous authors consider various attributes for identifying the risk culture in an enterprise. Their findings provide a more complete systematic list of these attributes and highlight the extent to which they are used in the enterprise.

## Materials and Methods

The methodological basis of the study is a bibliographic analysis of the definition of the essence of risk management

culture, which made it possible to systematise approaches to defining the main value attributes of its formation.

Analysis and synthesis of the main attributes of the formation of a risk management culture at the enterprise allowed systematising them by types and parameters of their definition.

Matrix formalisation of the risk management culture at the enterprise was also carried out. The matrix model of formalisation of the risk management culture in an enterprise is a graphical and textual description of the types of risk cultures according to two selected parameters. As a result of the analysis of existing models of risk culture formation and the systematisation of attributes of risk culture formation, it was proposed to carry out matrix identification of risk culture according to the parameters "methods and control" and "level of personnel engagement". Each parameter has two qualitative levels of definition. "Methods and control" are seen as a compromise between hard and soft controls in risk management. The "level of personnel engagement" in the company's risk management system can be either high or low and determines how motivated, proactive and supported the company's employees are by supervisors on risk management. This formalisation allowed identifying four types of risk management culture. As a result, it was possible to outline an approach to developing a risk management culture, by taking these important parameters into account, to summarise briefly and clearly how they affect the implementation of a company's risk management activities when dealing with risk.

## Results and Discussion

### **Attributes of risk culture formation in the enterprise**

Culture is socially constructed, legitimised, maintained or changed by the people who work in the company; they shape and inherit already established patterns of managerial behaviour. The role of management is to create a risk-based management culture in the company in the most optimal way. It is important to understand and make adequate use of risk-culture formation factors, which can be systematised in the process of studying best practices.

C. Levy, E. Lamarre & J. Twining consider the structure of risk culture formation by four groups of factors (Table 1) [21]. They believe, these ten factors will identify whether a company's risk culture is strong or weak. A study and evaluation of each factor will help to describe the characteristics, advantages and disadvantages of each organisation in the process of developing a risk culture.

**Table 1.** Risk culture framework

Group of factors	Element of risk culture analysis
Transparency of risk	Communication Tolerance Level of insight
Acknowledgement of risk	Confidence Challenge Openness
Responsiveness to risk	Level of care Speed of response
Respect for risk	Cooperation Adherence for rules

Source: [21]

However, with this approach, it is also important to understand the tools for identifying the strengths and weaknesses of the elements of risk culture analysis.

According to the concept of R. Smith-Bingham risk culture requires positioning a company according to two dimensions: structural and behavioural [22]. The structural dimension is based on the provisions of the enterprise risk management (ERM) framework, in particular the definition and communication of risk appetite, clear lines of responsibility for risk management, the definition of rules and procedures, the establishment of reporting forms and deadlines, appropriate training and agreed incentives for compensation and sanctions. The behavioural dimension refers to an individual employee's disposition, their respect for colleagues, customers, and suppliers, their level of engagement in risk management, and the company's values. The structural dimension aims to curb bad behaviour, while the behavioural dimension focuses on promoting good practices. On the one hand, companies try to standardise management business processes, but even pre-defined decision-making and risk handling rules must coexist alongside the process of personnel communication regarding

risk incidents, interpersonal discussions and self-expression. Thus, all personnel should be encouraged to self-select and use the best risk management practices appropriate to their circumstances, rather than being tasked with choosing the right behaviour among the approved norms and regulations.

The model developed by the Institute of Risk management (IRM) identifies eight aspects of risk culture, grouped into four themes, that are consistent with the organization's business model and used as a practical diagnostic tool for assessing the risk culture: risk leadership, how the organisation responds to bad news, risk management, the transparency of risk information, resource of the risk, risk skills, informing about risk decisions, rewarding compliance with the corresponding risk [23]. For each of the eight dimensions of risk culture, a four-level assessment mechanism was used, ranging from "good practice" to "particularly dangerous".

A review of the leading academics' perspectives on aspects of risk culture formation in the enterprise provided the basis for summarising and systematising its identification attributes, which, in turn, can be used to analyse and assess the state of its development in the organisation (Table 2).

**Table 2.** Attributes for identifying the risk culture in the enterprise

Risk culture formation attribute	Description	Definition parameters
Management support	Top management and senior management set an example of the right attitude to risk and compliance with the core values of the organisation, and have a clear understanding of the risk culture of their company	Top management and senior executives demonstrate a positive attitude towards risk management; promote, monitor and evaluate the risk culture; consider the impact of the risk culture on safety; make changes as necessary; and from budget to address risks
Risk management methodology	Interested parties develop and establish provisions of the risk management methodology and standards in functional business areas that do not contradict the unified corporate management policy and standards. The risk culture is reflected in the company's management rules	Compliance with the relevant rules, requirements and conditions (requirements of the country's legislation, advanced international standards on risk management, project management, business processes, etc., requirements of corporate risk management). Risk management methodology: standards, regulations, programmes, and methodological tools for identifying, analysing, evaluating, processing, and monitoring risks
Organisational structure	Risk-based management structure. Coordination of the board of directors, organisational units and employees on risk management. Risk management is represented by three levels of protection	Availability of a single integrated risk management infrastructure. The elements of a risk-based structure can be individual employees, services and separate parts of the management apparatus, and the interrelationships between those are maintained through established horizontal and vertical links
Responsibility	Employees understand the core values and approaches to risk management, are aware of the responsibility for their actions and disregard for risk and are able to fulfil their intended roles	The duties, rights and responsibilities of employees regarding risk management are set out in the job descriptions

Table 2, Continued

Risk culture formation attribute	Description	Definition parameters
Responding to macro-environment changes	Effective decisions are made in response to external challenges and promote an open and constructive dialogue	Continuous monitoring of external sources of risk, revision of goals and risks, adaptation and flexibility
Incentives and compensation	Risk management is embedded in economic incentives. Reward opportunities for effective risk management	At all levels, financial and non-financial incentives are used to perform risk management tasks that support core values and risk culture
Risk appetite	Risk appetite determines the opportunities and limitations of a company's operations by setting an acceptable level of targets, which allows for identifying problems at an early stage and developing the necessary changes in the process or control	Risk appetite is effectively transformed into operational limits. Decisions are consistent with the level of risk and established limits and restrictions. The limits are periodically revised. Risk appetite is formalised and documented
Communication	Risk culture is determined by the level of consistency of employees' views on culture and is implemented through communication. A partnership spirit among all employees of the company	There are mechanisms for sharing risk management information between structural elements of the organisational structure, which are supported through established horizontal and vertical relationships
Competence level	The risk management team should be equipped with key competencies: standards, risk quantification, risk psychology, risk management techniques, business specifics	Training of personnel on existing risk management tools
Monitoring and reporting	Risk management is monitored at all levels. Effective management reporting supports strategic risk analysis and decision-making	Development of control procedures that ensure that planned measures are properly implemented. Risk management reports are in the established form and frequency
Risk awareness	The attitude towards risk determined by the awareness of risk	Clear employee expectations for monitoring, reporting, and responding to risks. Establishing mechanisms for employees to understand and communicate their risk management concerns and to be aware of their role in minimising them and using them to their advantage

**Source:** summarised from [15-23]

Such a list of attributes of risk culture formation in an enterprise can be used to analyse its effectiveness and maturity.

### **Typification of risk culture of the enterprise**

The study of both risk culture and corporate culture is carried out to determine their impact on the result of the enterprise's activities.

Practical experience confirms how the risk management culture affects the company's performance. Thus, an interesting example is how the owners of the Porsche company, having found themselves in a crisis situation and on the verge of bankruptcy in 1992-1995, hired a new executive director, Wendelin Wiedeking. Wiedeking has made a real change in organisational culture and risk management culture thereby saving the company. This was done by transferring the management of the production of the classic German company to a team of Japanese managers, who not

only reorganised the business processes, but also radically changed the management style and staff attitudes towards change and risk, which had been extremely negative at the beginning of the reorganisation [24]. This was reflected in the fact that the company developed risk-based flexible management, according to which management supported the initiatives of employees to take risks that promised acceptable remuneration.

Another example is the international company IKEA, which has a strong brand and strong culture that has been formed since the company was founded in 1943. The main features of this culture are informality, equality, simplicity, respect, commitment to learning, opportunities for career building and development. Opening its international branches in different countries of the world, the company faced difficulties in rejecting the corporate culture of IKEA employees in some countries, for example, Germany, China and others. To sustain its brand and its culture around the

world, IKEA used so-called “culture bearers” – employees deployed directly from Sweden, who carried out communication, adaptation and training of new personnel in the company’s culture [23].

For millions, Kodak has been a leading brand trusted for over a century. Its bankruptcy in 2012 demonstrates a strategic failure to adapt to change and a missed opportunity to implement digital technologies that it invented in 1975 but failed to use. Kodak’s management created an organisational culture tied to rules, where making radical decisions was impossible. Kodak’s business model was based on being the world’s best film supplier, but it wasn’t set up to change customer expectations to recognise that its core competencies might become unnecessary over time. Kodak had a risk management system, excellent market analysis, and was able to analyse and assess the impact of digital technologies on its business. Its intelligence division predicted that early adoption of digital technologies will be slow, but will grow rapidly once critical mass is reached. But the style and complexity of management and the level of staff engagement in management demonstrated the inability to make complex

decisions. Kodak has lost its relevance in its core markets, and new competitors, unencumbered by history and with more innovative business models, have moved faster [23].

A review of the literature on the main concepts of risk culture in the enterprise showed that there are different approaches to defining their types. Understanding the culture and risk culture of management and other employees of the company allows to better understand its predictable and unpredictable consequences; assess the level of consistency of employees’ views on culture; identify subcultures that may cause higher or lower productivity in the group; understand the differences between traditional cultures during mergers or acquisitions; quickly orient new managers to the culture they join and help them determine the most effective way to manage employees; measure the degree of consistency between individual leadership styles and organisational culture to determine what impact the manager can have; develop the desired culture and report changes necessary for its implementation [25]. R. Smith-Bingham suggests defining the type of risk culture from the perspective of two parameters: “structure and management” and “behaviour and messages” (Table 3) [22].

**Table 3.** Typification of enterprise behaviour from a risk culture perspective

Structure and management	Behaviour and messages		
	Separation	Engagement	Proactivity
Strength	<b>PROHIBITION</b> There are too many rules, making it hard to achieve anything in the time available	<b>CONTROL</b> I follow the established rules and procedures, although they can sometimes be a little pathetic	<b>ADVANCE</b> I have a powerful risk platform for my work, and I’m constantly thinking about improving it
	<b>INDIFFERENCE</b> There is enough freedom in the risk guidance so that I can do my part as and when it suits me	<b>COMPLIANCE</b> I mostly adhere to existing requirements to avoid penalties for violating them	<b>SATISFACTION</b> I try to make good risk decisions and guide others on this, but the gaps in our standards are concerning
Limitations	<b>MISMATCH</b> The company is simply interested in getting the job done with as little bureaucracy as possible – which is fine with me	<b>QUESTIONS</b> There is not enough guidance, so I make judgements about what is best for me and what makes sense	<b>PROHIBITION</b> I do my best to anticipate risks, but I would appreciate more support from the firm and my colleagues

Source: [22]

Stable rules and business processes that are formed in a company to manage risk must co-exist together with efforts to improve interpersonal discussion and value-based behaviour. Over-reliance on structure and documentation can create an illusion of control and lead to some exhaustion. On the other hand, a focus on behaviour can lead to inefficiency and risk due to unclear guidelines, inconsistent practices, inconsistent communication between teams and differing behaviour standards.

Strengthening personal responsibility requires the coexistence of two aspects of management: rational and emotional, formal and informal, conscious and subconscious.

Personnel must be oriented towards performing responsibly, they should feel that they are choosing the right way to behave. To do this, companies must take a creative approach to staff recruitment opportunities, namely, develop training cycles to develop new risk behaviours, combining formal training with informal incentives. The art of forming desired behaviours is to be aware of subconscious decisions and then reintroduce new practices into subconscious behaviour.

Staff behaviour in accordance with two dimensions of risk culture the level of understanding of risks and the degree of protection from risks according to the concept of C. Turkoglu is shown in Table 4 [3].

**Table 4.** Typification of enterprise behaviour from a risk culture perspective

Degree of protection against risk	Risk understanding	
	Low level of risk understanding	High level of risk understanding
High risk protection	Risk-aversion	A reasonable attitude towards risk
Low risk protection	Ignoring risks	A carefree attitude towards risk

Source: [3]

The author of the concept Cengiz Turkoglu notes that these two dimensions should be taken into account when identifying a risk management culture [3]. On the one hand, excessive control of the risk management system in the form of established rules and standards can lead to confusion and excessive bureaucracy. On the other hand, focusing on behaviour can lead to inefficiency and reduced attention to risks due to unclear guidelines, inconsistent communication between teams, and differences in expected standards of behaviour. Personnel should be guided to use the best risk management solutions, procedures and tools (identification, assessment, risk impact measures) in certain circumstances, rather than expecting management to provide clear guidance on how to handle risk. This is especially true in situations where managers have to develop management tactics in circumstances where the usual methods of problem solving are not available.

The issue of risk control and perception is always acute for management [3]. Excessive control makes the control system inflexible and not adaptive to unpredictable changes, on the other hand, the expense of control may exceed the potential damage from risks [3]. Lack of control can make a company vulnerable to risks, especially when employees do not have sufficient skills in identifying, assessing, certifying risks, developing measures to mitigate them, and do not feel responsible for risks.

According to the Cultural Theory of Risk or simply Cultural Theory developed by the anthropologist M. Douglas and political scientist A. Wildavsky, each organisational culture of an enterprise understands and considers risks differently. Thus, according to this theory, there are four cultural ways of life or worldviews regarding risk: hierarchical, individualistic, egalitarian and fatalistic (Table 5) [26].

**Table 5.** Model for defining types of organisational culture according to the cultural theory of risk

Low	<b>Fatalist</b> Pragmatist The future is uncertain Therefore, strategic planning is not an advantage, and all that can be done is to influence changing circumstances	<b>Hierarchists</b> Manager The risk assessor needs help in determining how much risk can be accepted and how much reward is sufficient, balancing risk and reward
	<b>Individualist</b> Maximiser Risk creates opportunities to make a profit. Large risks can therefore be taken in the event of sufficient winnings resulting in a satisfactory reward	<b>Egalitarian</b> Conservative Avoiding losses is more important than making a profit. Therefore, it is best to avoid, control, or mitigate the risk
High	Low collectivism	High collectivism
Level of flexibility of the management system	Degree of collectivism	

Source: [26]

Hierarchists seek to implement a system of risk management in the enterprise, which determines the risk appetite and establishes the relationship between risk and reward. Individualists focus on making a profit from risky activities. Egalitarians will prefer a policy of avoiding risks. Fatalists do not see the point in risk management, because it simply prevents them from responding to changes in circumstances [26].

The level of collectivism determines the degree of attachment of a person to the opinion of other members of the team. "High collectivism" means that a person puts the group's goals above their own, while "low collectivism" means that the person considers their own goals more important.

The level of flexibility of the management system refers to the degree of freedom an individual has in choosing their social role in the collective. "High level of flexibility" means that there are no restrictions on an individual's choice of social role, while "low level of flexibility" means that there are restrictions and people cannot freely choose with whom they want to cooperate [26].

An important aspect of cultural theory is that it is assumed that all four types of culture will be present in each organisation, one of which may be dominant for a certain period, but also change over time [26].

The cultural theory of risk also states that managers of an organisation can identify four cultures and their attitudes

to risk, and they can encourage each culture to interact with other cultures [27]. If all four voices are heard, they can be useful for understanding risks and allow managing them in the best possible way.

Understanding risk management is vital for effective enterprise management. It allows organisations to understand the opportunities and areas for improvement in their risk culture. M. Power, S. Ashby & T. Palermo consider an organic and engineering approach to the formation of a risk culture [28]. An organic approach involves an interactive risk management style, risk decisions are made within constraints, less third-party consultants are used, there is a chance to resist regulatory standardisation, and special

attention is paid to ethics and mission. The engineering approach is focused on centralisation in risk management, more formal approaches in risk management, often with the help of external consultants, this is a more conservative approach to risk management, which is closely consistent with regulatory risk appetites, in which official levers form incentives for behaviour change.

The identification and systematisation of attribute-characteristics of risk culture allowed the authors to propose an approach to formalising the risk culture of an enterprise along two important dimensions: “methods and controls” and “level of personnel engagement” (Table 6).

**Table 6.** Identifying a company's risk culture along the dimensions: “methods and control” and “level of personnel engagement”

Level of insight	Methods and control	
	Soft	Hard
Low	Spontaneity	Competition
High	Humanism	Methodicity

**Source:** compiled by the authors

“Methodologies and controls” means that the enterprise has a regulated methodological framework for risk management and that compliance with its use is monitored. This dimension compromises between hard and soft control, with or without compliance with existing risk management regulations, norms, procedures and programmes. The second dimension [29] of this model is the “level of personnel engagement” in the management system, which determines how supported the company's employees are by supervisors on risk management, understands the risks they are working with and how to manage them. It is measured by the extent to which risk management is reflected in economic incentives in line with risk appetite, the extent to which management supports staff risk management initiatives, and the quality and effectiveness of interaction with management, risk units and internal audits. The high level of personnel engagement demonstrates management's support for staff initiatives, and also that employees themselves understand the risks in their area of activity and are motivated to influence them. The low level of personnel engagement indicates that employees are not motivated to manage risks, do not fully understand the essence of risk, are creative in performing their management tasks and carry them out based on their own beliefs.

The result of this model is the identification of four types of risk management culture:

1. *Spontaneity*. For enterprises with this type of risk culture, it is important to get what they want without having to worry about processes and going into details; management is carried out without prior planning, it is a constant movement in search of effective forms of management, quick decision-making, the problem is resolved by adapting to the situation. There are no or poor quality risk management policies and rules. Formal nature of risk management and audit functions. Employees formally comply with rules and

agreements, so that they are comfortable in any situation, open to communication, adapt easily to the given circumstances and are constantly looking for new opportunities for self-realisation, always eager to get what they want. In such companies, an individual approach to risk management is valued and new experience is always welcome, but they do not like to go into details and, as a rule, make quick decisions, the emphasis in management is placed on informal communications and beliefs, management influences are chaotic and selective.

2. *Humanism*. Enterprises with this type of risk culture have risk management policies and rules, but they are not of high quality. Employees of the company usually put the interests of others first, actively participate in all communications that are organised at the enterprise, highly value relationships between people, and respect the opinion of others. Decisions take a long time and once the overall picture is clear, the decision-making process searches for similar problems and considers alternative methods of solving them. The main values of the company are public approval, personal freedom, mutual assistance, opportunities for personal growth, communication and persuasion.

3. *Methodical approach*. For businesses with this type of risk culture, precision is required and everything must be carefully prepared and organised. Risk culture permeates the organisation and determines the actions of employees. For employees, the fact of completing a task is a reward for their hard work; they are happy to follow detailed instructions, adhere to clear decision-making criteria, do not tolerate clutter, discuss details extensively, and fear unpleasant surprises and irresponsibility. The company's management compares reality with a certain ideal and looks for inconsistencies (where something is wrong or missing). The company's values are the availability and reliability of information, a logical orderly description of prescribed risk

management regulations and their observance by staff, the influence on personnel through communication and risk-oriented compensation.

4. *Competition*. Businesses with this type of risk culture value results, a professional approach to risk management, and staff training in the most effective risk management practices. Management wants to understand all the risks, creates procedures for controlling a risk event, and looks for the best solution for each task. Employees are inquisitive, learn a lot, appreciate the opportunity to test their skills, sometimes lose control of the situation, are highly motivated, good at time management, aim for success and place a high value on their reputation. In decision-making, much attention is given to analysing the situation, after which managerial action is taken. The values of the company are persuasion, the ability to sacrifice self-interest for future success, and the willingness to control risk management through work instructions.

By examining all four types of risk culture, it is possible to identify and understand the behavioural patterns and motivational factors of a company's employees. This will contribute to the most effective risk management and establish a balance between control and risk-based management, as well as between hard and soft management influences. The types described represent a generalisation. Every business is a complex system and any typification simplifies their individuality. Each enterprise may have signs of all four types of risk culture. One set of qualities may be dominant, while others may manifest themselves only from time to time when performing specific tasks or under the influence of external circumstances.

## Conclusions

Risk culture includes values, beliefs, understanding and knowledge in risk management, which are effectively distributed and applied in practice by employees of the enterprise at all levels of management.

There are many factors-attributes to identifying the risk culture in an enterprise. It is advisable to systematise and generalise the attributes of risk culture formation according to the organisation of the company's risk management process, which should include: determining the internal and external context of risks, identifying, assessing, attesting and analysing risks, monitoring, controlling and auditing risks, developing risk measures both in terms of

probability of their realisation and in terms of the significance of their consequences for the company's objectives, and interaction and advice to the team when dealing with risks. All this together defines the formation of risk-based management in the enterprise and also creates an organisational environment where values, beliefs, experiences, competencies and skills are understood, shared and put into practice by all employees in the organisation. This analysis allowed for systematisation of the eleven attributes of risk culture, defining each content and definition parameters.

Awareness of the type of risk culture that prevails in the company allows understanding the level of unity and consistency of opinions of all employees of the company in managing the company as a whole and in managing risks in particular. At the same time, managers can determine for themselves the most effective management practices in the team, incentives for engaging staff, and management styles. This will create a desirable risk culture that corresponds to the desired types of managerial behaviour. Risk culture should be systematically forecasted at all levels of the company's management. Ideally, it should become a sustainable feature of the company, rather than being based on the authority of individual executives. In organisations with a high level of risk culture, knowledge and competencies of risk management are always in demand. It is not only the set level of authority, responsibility and incentives that is important, but also the level of involvement of employees in management activities, with their value orientations defined.

A review of existing risk culture models and a systematic list of attributes for forming a risk culture made it possible to propose a model for identifying the type of risk culture of a company by two parameters: "methods and control" and "level of personnel engagement". This identified four types of company risk culture: "spontaneity", "humanism", "competition" and "methodicality". Determining these types helps to identify tensions and balance the individual values of employees, their initiative and level of support from the management on the one hand with the requirement to comply with prescribed regulations and risk management standards on the other.

Further research will be aimed at forming theoretical and methodological approaches to assessing the level of maturity of the risk culture in the company based on the identified attributes.

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## Атрибути формалізації ризик культури і її типізація на підприємстві

**Ірина Валентинівна Федулова, Іван Віталійович Макачук,**

**Вікторія Василівна Ганушевич**

*Державний торговельно-економічний університет*

*02156, вул. Кіото, 19, м. Київ, Україна*

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**Анотація.** Формування культури управління ризиками потребує розуміння атрибутів формалізації ризик-культури і визначення її типу в залежності від сили дії тих чи інших параметрів її визначення. Метою дослідження є систематизація атрибутів формалізації ризик-культури і ідентифікація типу ризик-культури на підприємстві. Для досягнення поставленої мети було здійснено аналіз і синтез атрибутів формалізації ризик-культури на підприємстві із визначенням їх особливостей і параметрів визначення. Для ідентифікації типу ризик-культури на підприємстві було використано матричний підхід, відповідно до якого здійснено опис типу ризик-культури за двома параметрами: «методики і контроль» і «рівень залучення персоналу». Кожен з цих параметрів розглядається за двома якісними рівнями впливу. Параметр «методики і контроль» розглядається з точки зору існування на підприємстві жорсткого і м'якого контролю ризик-менеджменту. Параметр «рівень залучення персоналу» розглядається як високий і низький і свідчить про рівень вмотивованості персоналу і його підтримки керівництвом щодо управління ризиками. Унаслідок проведеної формалізації було визначено чотири типи ризик-культури компанії, які характеризують модель поведінки і мотиваційні чинники співробітників компанії залежно від сили використання регламентів, розуміння персоналом ризиків і методів управління ними. Практична цінність отриманих результатів полягає у тому, що кожен співробітник компанії буде розуміти свої повноваження і відповідальності стосовно своєї участі в системі ризик-менеджменту компанії, а керівники зможуть оцінити рівень узгодженості поглядів всіх співробітників з точки зору використання практик поводження з ризиком і визначити найкращі стилі і практики управління

**Ключові слова:** ризик-менеджмент, фактори ризиків, ризик-культура, культура управління ризиками, фактори ризиків, типізація ризик-культури

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## Perspectives of Implementing Agricultural Land Market in Ukraine within the Context of Reforms of Agrarian Sector

*Jakub Pietrzyk\**

*Maria Curie-Skłodowska University  
20-400, 5 Marii Curie-Skłodowskiej Str., Lublin, Republic of Poland*

**Abstract.** The relevance of the study comes from Ukraine being the largest agricultural country on the European continent by its size, with 41.5 million ha, and the second-largest arable land on the continent, mainly comprising humus-rich chernozems. Agriculture and agribusiness remain one of the driving forces of Ukraine's economy, generating 15% of its GDP, employing 20% of the working population and accounting for 40% of the country's exports. To support and bolster the agricultural sector, the state is developing and implementing reforms, the most significant of which is the introduction of a land market. In this context, Ukrainian agriculture has favourable conditions for development, but the exact effect of the implemented reforms remains unclear. The purpose of the study is to assess the state and trends in the development of agriculture in Ukraine in the context of ongoing reforms. The study employed the following methods: abstract-logical (through this method the main aspects of land reform and economic reform development strategy were identified), system analysis (the state of the Ukrainian economy was assessed), retrospective (the development of the agro-sector since Ukraine gained its independence was considered) and predictive (possible development scenarios were suggested). It was determined that it will take some time to manifest all the positive aspects of the reform, and its implementation involves a number of risks for small-scale farming. It became clear that climate changes also have an impact on agricultural productivity, and under its influence, some lands in Ukraine (e.g., the south) have already started to lose their value due to global environmental issues. The practical significance lies in determining the status and trends of agricultural development in the context of the structural reform of the national economy of Ukraine

**Keywords:** agrarian reform, agricultural sector, rural areas, farm, organic products

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\*Corresponding author

## Introduction

Ukraine is one of the largest agricultural producers. The country produces 80 million tonnes of grain and oilseeds per year, of which 50 million tonnes are exported. In 2020, Ukraine was the world's 6th largest producer of wheat and maize with average yields of 3.8 tonnes/ha per 6.6 million ha and respectively 5.2 tonnes/ha per 5.1 million ha, and a leader in potato production (20 million tonnes), vegetables (9.6 million tonnes) and fruit (2.1 million tonnes) [1; 2].

Crop production accounts for 69% of Ukraine's agricultural production. The main products are maize, wheat, potatoes, sunflowers, beetroot, barley, rapeseed, tomatoes, cabbage, apple, pumpkin, cucumber, carrot, dried peas, rye, buckwheat, walnut, soy, onion, grape, oats, watermelon and cherry. Viticulture is represented by the production of wines in the south of the country. Ukraine is established as a major supplier of poultry products to the EU and also has a large herd of cattle and pigs [3]; it is one of the world's leading exporters of sunflower oil, rapeseed, nuts and honey, corn, barley and wheat [4; 5].

One factor influencing Ukraine's position on international markets is yields. It is limited by low levels of resource use and irrigation, and sometimes by cultivation methods that could be improved. The lack of irrigation networks or their mediocre quality, especially in the south, poses significant risks to drought-sensitive spring crops, which are increasingly affected by the consequences of global warming [6]. Thus, between September 2019 and May 2020, the lack of rainfall compared to normal averages resulted in a lower yield compared to 2019 [7].

The impact of climate change must also be taken into account. S. Wegren & I. Trotsuk argued that climate change is likely to aggravate the agricultural system and cause revolutionary changes in the food system, which would also have a negative impact on food security [2]. S. Shokri et al. state that a large share of agricultural production has been reduced over the past decade due to persistent climate change and flawed institutional arrangements. Rural communities and agricultural producers, especially small and medium-sized businesses, have been affected by climate change and man-made disasters in the form of droughts, floods, abnormal heat and cold [8].

Agriculture is an important source of employment and socio-economic stability in Ukraine. Therefore, another factor affecting Ukraine's exports is the structure of farms. They can be divided into two groups, namely large farms (agricultural holdings) and micro-farms (family farms). Agrohholdings are companies that unite farms involved in agricultural production under their ownership. The owners of agricultural holdings are people who do not work in the company, their main goal is to maximize profits. Such holdings use the labour of hired workers, special equipment with high technological added value, and pesticides. They are also characterised by the predominance of Ukraine's largest land banks. Thus, the two largest agricultural holdings Kernel and UkrLandFarming have land banks of 524,000 ha and 500,000 ha respectively, and the land banks

of the next 8 largest holdings range from 120-380,000 ha [9]. Agricultural holdings account for the largest part of grain and oilseeds production, a significant share of which is exported to foreign markets [10]. The advantage of agricultural holdings is simplified access to investments and loans for their member companies, and, accordingly, greater opportunities for mechanisation and modernisation of production in comparison with other categories of farms, and the creation of non-productive jobs [11]. The negative aspect of agricultural holding is that, due to the modernisation mentioned earlier, many people in rural areas remain unemployed, i.e., without their main source of livelihood, which leads to rural depopulation [12].

Micro-farms, also known as family farms, are farms of several dozen acres, the model of which is based on manual labour or animal traction. In family farms, the role of labour is performed by the owner of the land and their family members. Hired labour is also allowed [13]. Their goal is to maximise the added value created on the agricultural land they own. Family farms provide 60% of gross agricultural output, mainly fruits, vegetables and animal products [14].

An optimal balance between agricultural holdings, which have more financial resources and contribute to progressive rural depopulation, and micro-farms, which help to limit rural desertification but have less access to finance, is one of the key elements for the Ukrainian agricultural sector. Less financial capacity makes it more difficult for micro-farms to modernise production and thereby improve efficiency. Another important factor is that Ukraine has a moratorium on selling land so that landowners can only lease it for up to 50 years. The legislative regulation of land relations is also addressed by A.N. Artyomkin. According to him, smallholder farmers need to be provided with a number of new rights and opportunities, which will make them more competitive [1].

The state is also attempting to find the balance mentioned earlier, to ensure the development of the agricultural sector and empower landowners to use their land. In March 2020, the Verkhovna Rada adopted a land reform, and in April 2021, the law was signed by the president [15]. The document was received ambiguously by the public and agricultural producers and by some in a strongly negative light. This perception of the law can be explained by the low public awareness of the reforms, a large number of myths regarding the introduction of the land market, and the possible negative consequences of the reforms for small producers.

Given the above, *the purpose of this study* is to examine the agricultural sector of Ukraine's economy in the context of its ongoing reforms in order to assess its effectiveness.

## Materials and Methods

The methodological basis for the study was provided by the following approaches: monographic, abstract-logical, structural, predictive, retrospective and systematic analysis.

The monographic approach makes it possible to define the strategic objectives of the state in the agricultural

dimension, to analyse the means at its disposal to achieve its objectives and, finally, to examine the results of the strategy. For this purpose, the text of the land reform [15] will be analysed, as well as the strategy for the development of Ukraine's agricultural, food and processing industry exports for the period up to 2026 [16]. The study of the documents will determine the main steps to reform the industry.

The abstract-logical method was used to summarise the provisions of the documents reviewed in the study and to compare the goals stated in the Development Strategy with the reforms adopted. This made it possible to determine whether the reform is in line with the overall development plan for the sector – whether it is a continuation of the reforms initiated by the previous government, or whether it represents an alternative way of developing agriculture.

The system analysis method was used to assess the level of economic development in Ukraine, and the measures taken by the government to facilitate agriculture and access to finance for small-scale farmers. This made it possible to identify the main problems in the economy targeted by the reforms and to assess the effect of the ongoing reforms.

The retrospective method was used by the authors to study the development of agriculture since Ukraine's independence and the reforms implemented between 2014 and 2019 that directly or indirectly affected agriculture and the rights and obligations of actors involved in it. Such an analysis is essential as it is not possible to get a full impression of the changes adopted outside the context of the events that preceded it.

The predictive method is used to make hypotheses about possible scenarios for land reform implementation and their effects.

## Results and Discussion

An analysis of the sources showed that the first reforms in the agricultural sector were already being implemented in 2015. Then regulations were adopted aimed at reducing the number of certificates and permits required by the administration for the production and sale of agricultural products. These simplifications have accelerated the pace of production modernisation carried out by private investors and driven by the need to improve food quality. Today's Ukrainian farms are heavily dependent on imported genetic resources and machinery. This context opens up opportunities for suppliers of agrifood equipment and technology, materials, genetics and breeding animals. The main appliance brands operating in Ukraine are often leaders in their industries. Fiscal benefits in the form of tax incentives and input support remain relatively small but have contributed to the overall positive support for producers seen over the past two years. General interest service support has been increasing since 2015 but remains low compared to other countries. During 2017-2019, GSEs accounted on average for 1.7% of value-added in agriculture [17].

In Ukraine, producer support as measured by PSE has been volatile over the past three decades, mainly due to changes in market price support, reflecting average producer

prices below international reference prices, but with significant differences depending on one product and from one period to another. Import-tariff-protected prices for sugar and some meat products have exceeded world prices. Prices for some cereals, sunflower seeds and milk were generally slightly below the reference prices. The impact on prices of the interventions of the Agrarian Fund and the Public Food and Grain Company, both state bodies, as well as the Annual Wheat Export Memorandum, is likely to be limited. This approach is more specifically related to land use, job creation, innovation and digital technologies, and market regulation. Ukraine has adopted new support measures for small and medium-sized producers. New farms receive higher payments for the first three years after their establishment, provided that the land in question is used for agricultural purposes. Another new measure provides for the reimbursement of amounts invested in the construction or reconstruction of grain storage and processing infrastructure, up to 30%.

In Ukraine, producer prices remain below world levels in some export-oriented sectors, especially sunflower seeds and milk. Export duties applied to certain products, trade activities of state-owned enterprises and restrictions on export infrastructure can all contribute to negative support [18]. To benefit from the competitiveness of its agriculture, Ukraine needs to take additional measures to facilitate exports, such as continued investment in its logistics and transport system to match the increase in export volumes. It is expected that after the abolition of special VAT regimes that helped producers acquire various resources, the integration of farmers into the general economic VAT system will increase the efficiency of the sector and reduce administrative costs. Ensuring the proper functioning of the means of production market, including in terms of providing loans to farmers, remains important for improving producers' access to agricultural production. Agricultural productivity has increased rapidly over the past decade, but equipment wear and tear, probably caused by political and economic uncertainty, threatens its future growth. Political and macroeconomic stability will be of key importance for maintaining and then increasing the productivity of the agricultural sector [19; 20].

Public spending on services of general interest has begun to recover from the economic downturn of 2014-2015 but remains low in relative terms. The emphasis on the inspection and control system is necessary to support export-oriented activities. However, to guarantee the high performance of this sector, which is very sensitive to the variability of meteorological conditions, specifically in the context of climate change, Ukraine will also have to provide itself with effective knowledge and information management system with sufficient means. This approach must be supported by improvements in regulatory efficiency and infrastructure [21].

Although Ukraine has made significant progress, the country's efforts to carry out democratic and economic reforms have been seriously affected by Russian aggression

in east Ukraine. This conflict poses a threat to the territorial integrity of the country, as well as its social, economic and political development [22]. Development assistance for Ukraine aims to reduce poverty in the country by supporting efforts to stabilise the economy and reduce citizens' vulnerability through increased participation in the democratic process, strengthening the independent media and judiciary, and promoting the rule of law, particularly in crucial areas such as public administration, taxation and agriculture. In this regard, one of the priorities of socio-political reforms in Ukraine has become the reform of land relations, that is, agricultural land trade. The land reform initiated in the 1990s has acquired strategic importance [23]. Global economic processes, which influence the dynamics of development processes in almost all sectors of the economy in every country, cannot ignore the agricultural sector. Therefore, the further course of agrarian reform, one of the main goals of which is free trade in agricultural land, becomes a very relevant issue. Reform will help to improve the sectors of the economy based on the exploitation of natural resources, especially agricultural land [23].

The dynamic changes in modern life caused by the implementation of many reforms show the need for further clarification of the directions of agrarian reform, especially at its final stage. The initiated land reform is part of the general socio-political process of moving away from the system of economic and legal relations that was introduced in Ukraine during the long Soviet period. Land reform has become part of Ukraine's national strategy for socio-economic development. Its main purpose was to redistribute land between private and common property and promote the equal development of different forms of land management and the formation of a multi-faceted economic system. In recent years, there have been gradual and continuous changes in the sphere of agricultural land trade, collateral lending, including mortgage lending, and the improvement of the legislative framework. There was no further guidance on where reforms should be directed, so several regional programmes were set up to regulate and protect land trade. The development of the agricultural land market was one of the fundamental issues in the concepts for reforming the sphere [24]. The strategy developed at the time suggested the need for a unified system of state registration of agricultural property and agricultural property rights; stimulating the privatisation of non-agricultural and agricultural land; functional separation of the agricultural land market from other land uses; creation of favourable conditions for equal participation of territorial clusters in the land market by the relevant local authorities; and intensification of work on financial value assessment.

The context of legal regulation of land relations shows that the process of creating agrarian law in Ukraine is slow and, as a result, in practice leads to partial implementation of legal norms in this area. In the process of reforming agricultural legislation, an agricultural property market has emerged in which the demand for other plots depends not on the fertility of the land, but the location of the plot. The market for non-agricultural land is in place and constantly

expanding. This situation is caused by the lack of a regulatory framework and inconsistent state policy in agrarian reform. Law is the main element of the continuous development of the state and European integration. For Ukraine, EU membership is a strategic goal, a way to modernise its economy and a multitude of investment opportunities. For this reason, in the further reform of the agricultural land market, it is important to take into account the European principles and norms of EU legislation. An analysis of judicial practice, state-building experience, and research into the regulation of land law shows that there is still no clear model for the reform of agriculture, in particular the arable land market. The state pursues a policy of shaping land relations and defines directions for reform based on its own historical experience and the experience of other countries, which introduces electronic land auctions, a chance for every Ukrainian to participate in an auction and set up their own farm [25].

It is worth noting that no uniform stance exists both in the assessment of legal relations in the Ukrainian agricultural land market and in the assessment of the market itself. The financial difficulties of most Ukrainian enterprises deprive them of the opportunity to buy agricultural land. The rural population, most of which are people of retirement age, cannot work effectively on the land. The fundamental issue is not only the reform of the agricultural land market but also the prospects for foreign agricultural investment. Agriculture in Ukraine is experiencing a serious shortage of working capital. Short-term loans are issued at high-interest rates, and long-term loans are not available due to the lack of real estate for collateral. Hence the need to include encumbrance of agricultural plots with a mortgage. In assessing the lengthy process of introducing agricultural land trade, it is worth noting that the lack of a unified concept regarding the final effect of agrarian reform, especially with regard to the agricultural land market, remains a concern. At the present stage of socio-economic development of Ukraine, many of the proposed changes create new social needs. First and foremost, the land market must be analysed through the prism of the tasks and responsibilities related to the protection of property rights and ensuring continuous agro-industrial development. In addition, the applicable national legislation must be brought into line with the legislation of the European Union. The introduction of mechanisms for the development of the agricultural sector of Ukraine is necessary to create a market for agricultural land. It is beyond doubt that these issues must be addressed and that the discussion on free trade in agricultural land is virtually meaningless without their resolution.

For the purposes of this context, consideration should be given to land reform. According to the authors and supporters of the law, its main purpose is to unblock the possibility for citizens to sell their land, thus ensuring the full implementation of the constitutionally enshrined right to property [26; 27]. Landowners will be able to sell their land, or vice versa, buy it from others. At the same time, the priority right to purchase a land plot will be with those persons who rent it. It is also possible to issue bank loans for

the purchase of land, using the purchased land as collateral. The maximum size of the plot that one person can buy is 100 hectares. As from January 1, 2024, individuals and legal entities can purchase up to 10,000 hectares [28]. Part of the state-owned land outside settlements will be transferred to territorial communities. The possibility of selling land will increase its liquidity, thus solving one of the issues causing difficulties in attracting investment and credit funds faced by agrarians. [29]. The reform involves the creation of special databases on land transactions and the transfer of these operations to an online format, which will lead to greater market transparency and reduce corruption. The introduction of a land market is expected to raise the value of land and hence the cost of leasing land, thus solving another problem: landlords not receiving revenue for renting out their shares. The implementation of the reform also echoes the strategy for the development of agricultural, food and processing industry exports in Ukraine until 2026, in particular by facilitating access to land to increase production with little domestic demand [16].

Considering the reform in a broader context, it should be noted that land trade in Ukraine is not possible without the participation of the state, as it affects the formation of new social relations and the creation of clear mechanisms of land relations [30]. In addition, the fundamental issue of reform and the basis for the development of any society is the protection of property rights. Regarding the involvement of the local community in the agricultural land trade, it is mainly the current reform of local government that is causing many changes in the concept of socio-economic development of Ukraine and thus in the vision of the completion of land reform. The most important aspect of the reform is its result, namely the participation of the local community in the use of local agricultural land and the possibility of its participation in the creation of a land market. Other ongoing reforms are definitely important, as they affect various spheres of public life. In Ukraine, almost all spheres of life are being reformed, which is a consequence of the new challenges of society. It should also be remembered that due to the specific nature of each area of activity, its regulation must be appropriate. For the agricultural land market to function to its fullest potential, relevant amendments to the Land Code of Ukraine must be made, and a number of other laws must be passed to consider the transfer of state-owned land outside of settlements to municipal ownership in settlements, suburban settlements and city councils, providing for substantial simplification of the procedure for changing the designation of especially valuable land.

After the law establishing the land market came into force on 1 July 2021 [31], supporters of the law say that the land market is a necessary condition to attract foreign investment, which will allow Ukrainian agriculture to reach its full economic potential, estimated at \$50-85 billion profit in the next 10 years [32], and a GDP growth rate of 1-2% annually for 5 years [33]. Their vision of the effect of the reform was presented in more detail above. However, many citizens, in particular landowners, are distrustful of the reform [34; 35] and believe that this law will have the

effect of increasing corruption in the agricultural sector. Banks are able to seize land pledged as collateral for a loan if the rent is not paid but will have to sell it at auction for agricultural use within a maximum of 2 years. Although the ban on foreign individuals and companies buying land in Ukraine will remain in place, it is still possible to lease it, which also raises fears on the part of sceptics. The government positions agricultural reform as a way to “unlock” the full potential of Ukrainian farmland, making this sector more attractive to international investors, which will allow Ukraine to realise its economic potential and improve the lives of Ukrainians [36].

The expected positive impact of the agrarian reform on economic growth remains the key argument put forward by its supporters. However, there is concern that many small farmers will not be able to buy much land before 2024 due to high prices and many of them are already experiencing financial difficulties and debts. While farmers may hope to benefit from the right of the first refusal guaranteed by the new law to current tenants, this clause could actually encourage the concentration of land in the hands of larger ones, since many of the tenants are also large agricultural enterprises. As a result, most land may be concentrated under the ownership of a few large companies [37].

## Conclusions

The agricultural sector plays an important role in the economy and international trade of Ukraine, thus necessitating its development and reform. One of the main reforms urgently needed by the agricultural sector is the creation of an open, civilised land market that would increase the investment appeal of agriculture, establish an objective market value of agricultural land and, above all, ensure the realisation of the right of private ownership for all subjects of agrarian relations.

However, the process of introducing a land market will be a lengthy one, as a number of laws still need to be passed to complete the reform. Under favourable conditions, the free sale of agricultural land will further contribute to the development of monetary relations in Ukraine and raise its status as a reliable partner in the international arena. Applying truly effective and open instruments can help to balance supply and demand in the agricultural land market and become a driver of the country's economy in the long term. The effectiveness of these instruments will be evaluated only after the entry of legal entities into the land market. It is assumed that by 2024, land acquisition by small and medium-sized farms will be the most realistic part of market opening. However, the exercise of this priority right will be greatly hampered by factors such as financing and the willingness to sell the land to owners. In the south of the country, land is already losing its value due to increasing droughts and soil degradation associated with global warming. Currently, only a small number of Ukrainian farmers have sufficient financial resources to buy them out, and Ukrainian banks will not be able to provide a loan to anyone wishing to buy land, as they need to have good financial records and provide adequate collateral to obtain such a loan.

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## Перспективи запровадження ринку землі сільськогосподарського призначення в Україні у контексті реформування аграрного сектору

Якуб Петржик

Університет Марі Кюрі-Складовської  
20-400, вул. Марії Кюрі-Складовської, 5, м. Люблін, Республіка Польща

**Анотація.** Актуальність дослідження полягає в тому, що Україна є найбільшою аграрною країною на Європейському континенті за своїми розмірами з її 41,5 млн га, а також другими за обсягом орними землями на континенті, основу яких становлять чорноземи, багаті на особливо родючий гумус. Сільське господарство та агробізнес залишаються однією з рушійних сил економіки України, генеруючи 15% її ВВП, забезпечуючи зайнятість 20% працездатного населення та 40% експорту країни. Для підтримки та нарощування агросектору держава розробляє та впроваджує реформи, найбільш значною з яких є створення ринку землі. У цьому контексті сільське господарство має сприятливі умови для розвитку в Україні, однак точний ефект від реформ, що впроваджуються, залишається неочевидним. Мета дослідження – оцінити стан та тенденції розвитку сільського господарства в Україні в контексті реформ. При написанні статті було використано такі методи: абстрактно-логічний (завдяки цьому методу було визначено основні аспекти земельної реформи та стратегії розвитку економічної реформи), системний аналіз (було оцінено стан української економіки), ретроспективний (розглянуто розвиток агросектору з моменту здобуття незалежності України) та прогностичний (запропоновано можливі сценарії розвитку). Було визначено, що для прояву всіх позитивних аспектів реформи потрібен певний час, а її впровадження пов'язане з багатьма ризиками для дрібного фермерства. Стало зрозуміло, що вплив на продуктивність агросектору також справляють кліматичні зміни, і під їх впливом деякі землі в Україні (наприклад, південь) вже почали втрачати свою цінність. Практична значимість полягає у визначенні стану та тенденцій розвитку сільського господарства у контексті структурного реформування національної економіки України

**Ключові слова:** аграрна реформа, сільські території, ферма, органічна продукція

## Turkmenistan's Strategy and Policy Regarding Energy Resources

**Sabir I. Shukurov\***

*Azerbaijan University of Tourism and Management  
1172, 822/23 Koroghlu Rahimov Str., Baku, Republic of Azerbaijan*

**Abstract.** The relevance of the study is based, on the one hand, on the persisting importance and demand for minerals as energy carriers in the context of the global economy, and, on the other hand, on the recognition of the current economic processes taking place in the region of interest ( for this study, Central Asia) when building a strategy for the reintegration of the post-Soviet space. The purpose of the investigation is to characterise Turkmenistan's current energy trade policy to anticipate further steps in building a system of strategic cooperation with its immediate neighbours as well as other political actors. The study uses general scientific methods and a range of special methods, such as deduction and induction methods, content analysis, event analysis, systematic approach and historical analysis. The study first outlines major developments in international politics (with a focus on past and current economic processes, specifically in trade and energy production) in the region as a whole and Turkmenistan in particular, and second, it proposes a scenario for the state's likely development in the region of interest, based on historical assumptions and available data. The information set out in this study can be used to adjust actions in building a long-term relationship with Turkmenistan, and to assess and understand the motivations behind the actions of Turkmenistan's officials

**Keywords:** energy resources, geopolitics, international relations, fuel and energy exports, Central Asia

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\*Corresponding author

## Introduction

An inevitable consequence of globalisation is the growing cohesion and indissolubility of the economies of different states. This can take a variety of forms, such as supranational economic and political unions and alliances: the Shanghai Cooperation Organisation (SCO), the European Union (EU), the Customs Union, the Eurasian Economic Union and so on [1]. The role of energy carriers, i.e. combustible minerals, as well as their processed products, which are a source of energy (coal, gas, petroleum products, etc.) remains important. There is a certain disproportion of countries in terms of their availability/inaccessibility to energy resources [2]. Given its substantial natural gas reserves, Turkmenistan, which is of interest to this study, is clearly an important international player and a partner that benefits from cooperation with interested countries and other political and economic actors. In addition to its mineral wealth, Turkmenistan is also an important actor in the global economy due to its access to the Caspian Sea, which automatically provides prospects for long-term cooperation with a number of states, including Iran, Azerbaijan and Kazakhstan [3].

With the exception of its immediate neighbours and those states with which there are established and close economic ties, the development of comprehensive relations with Afghanistan, Turkey, Pakistan, India, and China is very promising. Turkmenistan is also at the crossroads of the interests of several states: Turkey (especially in light of a number of important agreements with Azerbaijan in 2020-2021 - the Shusha Declaration, the Memorandum of Understanding On the Supply of Natural Gas to the Nakhichevan Autonomous Republic, etc.), Russia, China and Iran. All of this has an impact on building a long-term strategy for Turkmenistan's cooperation with the international community, and a proper awareness of these aspects enables the international community to take more effective and pragmatic action to maintain socio-political stability and balance in the Central Asian region [4].

When analysing the available literature devoted to the issue under consideration, it should be noted that Turkmenistan's policy in energy trade has not received sufficient dissemination in domestic historiography. One of the reasons for this has been (and to some extent continues to be) the state's isolation over many years. However, since the accession of incumbent President Gurbanguly Berdimukhamedov to power, Turkmenistan has begun to reassess its position in the world, both globally and in the Central Asian region in particular. Interest in Turkmenistan increased at the turn of the year 2000-2010, due to the events of the Arab Spring and the growing popularity of radical Islamism in Central Asia, which resulted in the rise of terrorism [5]. Nevertheless, some issues have been addressed in the scientific publications – for example, the studies of A.M. Penjiyev, in particular, his dissertation “Scientific justification of energy technologies use based on renewable energy sources in Turkmenistan” are of interest [2]. R. Satymov studied Turkmenistan's transition to a sustainable energy system [6], pointing out that Turkmenistan is a

country completely dependent on fossil fuels, and that the development of a renewable energy system will be more profitable for the country than permanent dependence on fossil fuels.

Also of interest is V.A. Avatkov's study “Turkey and the Arab Countries”, which devotes considerable attention to the aspect of energy resources [1]. The current trends in the energy sector in Turkey are investigated in the studies by S. Erat et al. [7]. In this context, the key problem is the shortage of in-country reserves of oil and natural gas and the need to use them efficiently. F.V. Bekun [8] drew attention to the links between foreign direct investment and income levels, electricity production and income levels, and between urbanisation and economic growth. H. Zhang [9] studied the specifics of Chinese overseas energy investments financed by Chinese development banks going into fossil fuel and coal-fired power plants.

The above-mentioned studies only partially address the issue of Turkmenistan's foreign policy, which justifies the need for a more detailed study of this topic. *The purpose* of this study is to provide a descriptive description of Turkmenistan's current foreign policy in energy trade. Furthermore, a forecast regarding the future actions of the Turkmen authorities towards building a system of international strategic cooperation should be calculated.

## Materials and Methods

The current system of cooperation of Turkmenistan in the area of energy trade was reviewed using both general scientific and specialised methods of examining international relations. Through the general scientific methods of analysis and synthesis, it has been possible to identify key aspects that influence the preservation of Turkmenistan's current position in the international arena, to identify the existing international treaties and agreements that determine the state's economic and political course, and to predict future steps for building mutually beneficial cooperation with third countries. A descriptive overview of Turkmenistan's foreign policy from its independence in the early 1990s to the present day was drawn up by using the deduction method. The induction method made it possible to summarise the available information, describe key features of Turkmenistan's foreign policy (including in the economic sphere) and draw conclusions about the extent to which regional processes influence the country's foreign policy.

The historical study methods made it possible, on the one hand, to indicate the key preconditions and motivations of the state leadership for certain political acts, including certain international agreements, and, on the other, to recreate a chronologically substantiated picture of Turkmenistan's foreign policy during its years of independence. This study also employed such methods as content and event analysis. Event analysis allowed identifying a number of elements of the process under study, such as the historical characteristics of the country's current foreign policy and the claims of other actors in the international arena to

strengthen their position, both in the state in question and in the Central Asian region.

The content analysis used in the study allowed for the formation of conclusions about Turkmenistan's foreign policy, based on the systematisation of voluminous material (in particular media publications and official speeches by the country's highest authorities). The combination of methods used in the study has offered a holistic picture that, firstly, describes the current situation in Turkmenistan's foreign policy and, secondly, allows conclusions to be drawn about the Turkmen government's next steps.

The study was conducted in three stages:

1. The first stage involved an analysis of the available historical sources and materials to identify the characteristics and role of both the region of interest and Turkmenistan in particular (in retrospect). The historical background and sources of the current political processes, the role of other countries in these processes, as well as the cultural, geographical and political features of this state are determined.

2. The second stage consisted of a content and event analysis of Turkmenistan's current system of relations with other countries on the basis of international relations and treaties, along with a review of the current political regime.

3. In the third stage, a forecast of the Turkmenistan government's next steps in establishing cooperation with third countries was drawn up, conclusions were drawn and the results were summarised and systematised.

## Results and Discussion

### ***The main stages in the development of Turkmenistan. Key foreign policy and economic events***

The collapse of the Soviet Union in 1991 resulted in a brief political vacuum in the Central Asian region. Despite Turkey's renewed ambition to infiltrate the region with Pan-Turkic ideas of uniting all Turkic-speaking peoples in a single international political entity (the so-called "Turan") and to impose its own model of the socio-political structure, the influence of Russia remained very strong during Central Asia's early years of independence (1). This was conditioned both by the preserved unified economic system and the interconnections between the "centre" and the former republics of the USSR and also by the persistence of the Russian-speaking population and the migration (of various nationalities) to the Russian Federation. Nevertheless, Russia's political influence was gradually declining. Taking measures to preserve national sovereignty, the Constitution was adopted in Turkmenistan on May 18, 1992. Regulating the fundamentals of state power, secularism and neutrality were also defined as the foundations of the constitutional order. The neutral status of the state was reinforced by United Nations General Assembly Resolution 50/80A [10], which expressed the hope that Turkmenistan's current status as a neutral state would contribute to peace and security in the region. The country has embarked on a neutral course of policy aimed at establishing a system of strong and mutually beneficial relations with the countries of the region,

which have the qualities of good-neighbourly relations and mutual understanding [11].

As was the case in the first phase of the state's foreign policy development, the declared status of neutrality of Turkmenistan was challenged, by its regional specificities. As early as late 1991, a civil war broke out in Tajikistan between the politically moderate leaders of the republic and a radical Islamist insurgency; an extremist organisation, the Islamic Movement of Uzbekistan, was founded in Uzbekistan; and in 1996 an Islamist organisation, the Taliban, which proclaimed Afghanistan an Islamic Emirate, assumed power in Afghanistan. Nevertheless, the Turkmen government refused to participate in an emergency consultative summit that had been convened on the initiative of Russia and the Central Asian republics to deal with the situation in Afghanistan, arguing that the nature of these events was a domestic political issue [12].

However, further developments suggest that this conclusion is hasty and underestimates the impact of intra-Afghan affairs on the Central Asian region. For example, the migration of ethnic minorities into the region in question increased, a humanitarian catastrophe was looming, and the prospect of the Taliban invading the Central Asian republics in order to spread the ideas of radical Islamism gained more and more attention [13].

The declared status of neutrality of Turkmenistan has also predetermined the information policy of the government. M. Kumukov [5] analysed the publications in the media and speeches of the Turkmen leaders at the turn of the 1990s-2000s and concluded that while the neighbours in the region feared aggravation of interethnic relations, separatism and the rise in popularity of radical Islamist trends, the Turkmen leadership preferred to ignore this topic and avoid public responses and high-profile statements directed against the Afghan leadership. The aspirations of the then ruler of Turkmenistan, S. Niyazov was motivated, among other things, by the fact that the construction of a gas pipeline through Afghan territory remained an urgent issue for the state [5]. As a consequence, the territory of Turkmenistan has become a transit route for narcotics trafficking from Afghanistan. In addition, by the late 1990s, the situation had started to deteriorate and ethnic relations had worsened, with Turkmen persecution being documented in Afghanistan. As a result, a stream of refugees rushed to the territory of Turkmenistan. Despite the relations with Afghanistan turning sour and the termination of discussions on joint transit and energy projects, the Turkmen leadership has continued to refrain from criticising the Taliban regime [11]. The declining stability both in Afghanistan and along its border with Turkmenistan has prompted the freezing of the TAPI (Turkmenistan-Afghanistan-Pakistan-India) gas pipeline project.

Other challenges include the Caspian Sea issue, which remains relevant. Thus, between the 1990s and 2000s, the issue was not only related to the use of biological resources and ecology (i.e. protection of the environment) but was also directly linked to national security and the fight against

organised crime, including drug mafia and drug trafficking [4]. The list of countries whose interests were affected by the Caspian issue was not limited to those with direct access to the Caspian Sea. Turkey, along with countries of the European Union and the United States, were also concerned about the matter. They were motivated by an interest in Caspian energy supplies and in preserving regional stability. For example, Turkey sought not only to realize its energy transit potential, but also to gain access to Turkmenistan's energy potential through the construction of the Trans-Caspian gas pipeline [14].

The other interested party was the United States of America. Along with growing suspicions about Iran building nuclear weapons, the issue of the US using the Caspian Sea as a launching pad for a hypothetical military attack on Iran was widely discussed in the 2000s. It is also worth noting that the US presence in Central Asia increased after the establishment (with Russian consent) of a military base in Kyrgyzstan in 2001 for intervention in Afghanistan, which eventually took place, and the Taliban regime was overthrown, but the military base remained thereafter. The situation that unfolded around the Islamic Republic of Iran and its (hypothetical) nuclear programme, on the one hand, posed a threat to regional security, and also had a significant impact on international relations, including due to the above-mentioned properties of the Central Asian region as a place of intersection of interests of a number of states.

As for Turkey's role in the region, the importance of pipeline construction to Ankara's support for Ashgabat is equally important [2]. The meeting between Turkmen

leader Gurbanguly Berdimuhamedow and Turkish President Recep Tayyip Erdoğan in November 2014 was a significant milestone. During the meeting, the leaders agreed on the importance of developing further cooperation in support of regional security. Furthermore, in terms of Turkey's support for Turkmenistan in resolving the current difficulties caused by the ongoing economic, political and military instability in Afghanistan, a characteristic trend in Ankara-Ashgabat relations should be noted: throughout the years of independency of Turkmenistan, the idea of close rapprochement and cooperation between Turkey and Turkmenistan in various fields, including the development and functioning of the Fuel and Energy Complex (hereinafter referred to as FEC), remains relevant. There are other initiatives aimed at enhancing cooperation with Central Asian countries. For example, the prospect and practice of interaction with these countries within the framework of the Economic Cooperation Organisation is of great importance to the Turkish leadership.

### ***The current status and trends in the economic and political development of Turkmenistan***

Having considered a number of political events that have occurred in Turkmenistan since its declaration of independence (October 2, 1991) and influenced its foreign policy, and analysing the economic sphere, it is possible to draw certain conclusions characterizing the development of the fuel and energy complex (FEC) in Central Asian states, based on the statistics that were presented at the second meeting of the SCO Forum [15] (Tables 1-3).

**Table 1.** Oil production, including gas condensate, per capita, kg

Year	1991	1995	1998	1999	2000	2001	2002	2003
<b>Country</b>								
Kazakhstan	1567	1232	1666	2018	2375	2073	3182	3449
Kyrgyzstan	31.9	19.6	16.4	15.8	15.7	15.3	15.1	13.8
Russia	3110	2071	2065	2086	2224	2406	2645	2927
Tajikistan	19.6	4.7	3.2	3.0	3.0	2.6	2.5	2.7
Turkmenistan	1431	1000	1478	1532	1875	1970	1970	2005
Uzbekistan	133	333	337	333	304	322	338	342

**Table 2.** Natural gas production per capita, m<sup>3</sup>

Year	1991	1995	1998	1999	2000	2001	2002	2003
<b>Country</b>								
Kazakhstan	465	356	511	666	776	783	950	1089
Kyrgyzstan	18.5	7.9	3.8	5.1	6.6	6.6	6.0	5.4
Russia	4329	4020	4026	4044	4011	4016	4145	4307
Tajikistan	16.9	6.7	5.3	5.8	6.5	8.2	5.0	5.0
Turkmenistan	22144	7132	2890	4872	6250	7920	10600	10620
Uzbekistan	1975	2133	2278	2277	2279	2286	2263	2215

**Table 3.** Coal production per capita, kg.

Year	1991	1995	1998	1999	2000	2001	2002	2003
Country								
Kazakhstan	7686	5015	4482	3911	5035	5336	4964	5686
Kyrgyzstan	774	103	91.9	85.7	86.5	95.9	85.9	82.4
Russia	2376	1774	1579	1705	1775	1863	1782	1911
Tajikistan	56.8	5.8	3.0	3.1	3.6	3.8	5.5	7.1
Uzbekistan	280	135	123	121	101	121	123	126

On the basis of the above information, a conclusion can be drawn about the dynamic development of the fuel and energy sectors in these states (including Turkmenistan), even in comparison with their neighbours in the post-Soviet space. However, it is possible to note a certain trend to which they were subject (Tables 1 and 2): production of all types of energy resources experienced a certain decline from 1990 until the mid-1990s, after which rapid growth occurred in a number of countries in the region under consideration.

Analysis of current trends in the functioning and development of the fuel and energy complex [16] shows that, as of the early 2020s, states such as Kazakhstan and Turkmenistan have an economy-beneficial disproportion: states extract significantly more minerals than they use for domestic consumption [16]. As a consequence, a substantial part of the production is exported. Turkmenistan produced 83,772.9 million cubic metres of natural gas in 2021, while its exports for the year amounted to about 45 billion cubic meters [17]. The oil industry in Kazakhstan was estimated to produce 85.7 million tonnes in 2021 and export 67.6 million tonnes [18]. The region's resource-poor neighbours, Kyrgyzstan and Tajikistan, are currently unable to fully cover their oil and gas consumption needs. Kyrgyzstan exports surplus electricity production, while Tajikistan's hydropower potential is less exploited. As for the level of development of pipeline transport, Kazakhstan and Turkmenistan show great potential, whereas in Uzbekistan the gas pipeline infrastructure is highly developed. In countries with few hydrocarbon resources, pipeline transport is not developed [19].

The existing cooperation and coordination system between Turkmenistan and the People's Republic of China is therefore rather interesting. Whereas for Turkey the Pan-Turkism and the unity of the Turkic peoples are used to infiltrate the Central Asian arena, similar arguments can be heard in the case of China, in particular given the presence of the Xinjiang Uygur Autonomous Region within the People's Republic of China (PRC), whose indigenous population (the Uighurs) is also Turkic and practising Islam, the geographical and natural conditions of which are close to those of Central Asia, and all information attacks against China regarding the possible oppression of the Muslim Uighur population are countered and denied. Of all the existing areas of cooperation between China and Turkmenistan, the one that stands out most prominently compared to the others is the gas industry. This can be traced back to an increasing

number of precedents in bilateral relations. In recent years, for example, there have been a number of high-level meetings between Ashgabat and Beijing representatives. Cooperation in the area of energy trade, in particular natural gas, was the main topic of discussion [20].

The foundation for this cooperation is the Turkmenistan-Uzbekistan-Kazakhstan-China gas pipeline. Turkmen gas was transported to the PRC via three lines, while the decision to open a fourth line was announced in May 2014. A visit by President Gurbanguly Berdimukhamedov to the Chinese capital, Beijing, took place at that time. Both parties stressed the importance of increasing cooperation in this area and accelerating the construction of a new, fourth line of the Turkmenistan-China gas pipeline. The current gas pipeline runs from the border of Turkmenistan, passes through Uzbekistan and Kazakhstan, then crosses the border of China in the northwest, then is distributed across the territory of the PRC. Currently, the length of the pipeline is about 10,000 km, and the creation of a similar energy and infrastructure interdependence of the PRC in the Central Asian region aims to strengthen and maintain stability in the existing economic relations between these states in the long term [5].

However, an analysis of the system of relationships built by Beijing, and a detailed consideration of Beijing's motives, leads to the conclusion that China has more far-reaching political ambitions and that building economic relations with neighbouring countries is only an element of these objectives. Central Asia is gradually becoming not only a source of energy resources for the PRC but also its strategic rear [2]. Examining China's increasing investments in the transport infrastructure of Central Asian states through the prism of Chinese geopolitical interests, it can be concluded that they are justified - Beijing's desire to strengthen its position in the region politically as well as economically link all Central Asian states can be clearly identified. Moreover, it is evident that if the current course of Central Asian states continues into the 2020s, China will be capable of meeting its increasing consumption needs and of strengthening its own geopolitical dominance in the region by manipulating the position of economic dominance in the region and the dependence of Central Asian republics on China [5].

### **Prospects for the development of the FEC and international cooperation in energy trade**

In making predictions about the future steps of Turkmenistan's government in the sphere of energy trade, it should be

noted that the specificity of the current political regime in Turkmenistan excludes the possibility to consider separately political and economic factors, as well as factors directly related to the functioning of the Turkmen energy sector. During the presidency of Saparmurat Niyazov (titled "Turkmenbashi", the head of Turkmenistan), funds flowing into the state budget from the export of energy resources were under Niyazov's direct control. There were precedents for channelling most of the money received through various private foundations rather than the national budget), and these funds were also used primarily to consolidate the régime of personal power. This type of economy included corruption, social programmes, reinforcement of state propaganda and role of the intelligence services within the state. Turkmenistan's energy export policy has also been influenced by this objective [19].

The consequence of this system of interaction between state institutions was the construction of a specific architecture for Turkmenistan's international relations in which the main tasks of the state were, on the one hand, to maintain the maximum possible distance from other states (this was achieved by maintaining the agitation and competition for Turkmenistan's resources) and, on the other hand, to completely isolate the state from all possible outside influences [21]. The president of Turkmenistan also maintains a considerable degree of control over the state. Another point worth consideration is that, given the nature of the current political regime, there is a total ideologisation of all spheres of public life, which aims to glorify the role of Turkmenbashi (the first president of Turkmenistan, S. Niyazov). This has led to statistical data being critically unreliable in the analysis of Turkmenistan. There are complications in calculating the population, estimating the actual scale of the economy and even the volume of available gas and oil reserves. For example, it is very challenging to verify the statements of state officials claiming that Turkmenistan has the world's third-largest (by volume) reserves of natural gas. Since Turkmenistan rejected a programme of radical market reforms in the early 1990s (unlike some post-Soviet states, including the Russian Federation), the entire Turkmen energy sector is under direct state control [5].

A specific feature of Turkmenistan's energy trade policy is the near-total export focus of gas production. Turkmenistan aims at establishing gas exports as the main item for generating export revenues. At the same time, export opportunities are limited, primarily due to the insufficient level of development and technical condition of the transit infrastructure. A number of geopolitical factors also play a role. These include, for example, the position of the Russian Federation as a subject that has the ability to monopolistically dictate prices, as well as the volume of extraction and sale of resources. Russia is also a major buyer and also a transit country for resources. Turkmenistan's past disagreements with the Russian company Gazprom, and with a number of CIS gas buyers (primarily Ukraine), have repeatedly led to precedents for stopping gas transit via the northern route altogether.

When reviewing the main milestones of cooperation on this issue, one can mention, for instance, the agreement signed in May 2007 on the construction of the Pre-Caspian gas pipeline (contracted by the Russian Federation, Turkmenistan and Kazakhstan) and, with the integration of Uzbekistan, the quadrilateral agreement on the reconstruction of the Central Asia-Centre gas pipeline system. Analysing the political situation in the region, it can be concluded that it is the northern route for the transit of energy resources that is of greatest interest to the Central Asian states. The economic, military and political instability in Afghanistan, which is cutting off Central Asia from South Asia, also plays a significant role. Also relevant are international ambiguity and the regularly escalating tensions around Iran and its relations with the US - for example, in addition to the aforementioned suspicions about Iran's nuclear programme, there was an international scandal in January 2020 over the death of Iranian Lieutenant General Qassem Suleimani following a US army missile strike on Baghdad airport.

All this makes it impossible to build a mutually beneficial system of oil and gas transit through the Islamic Republic of Iran. Concerning the divide of the Caspian Sea into spheres of influence, there are difficulties arising from the overlapping interests of several states in the region, as well as other economic concerns – such as the 2001 bankruptcy of the US company Enron Corporation, which was actively developing the trans-Caspian gas pipeline. All of these factors complicate attempts to export gas to Europe via the Caspian Sea. Despite the perception that transporting gas to China is a resource-intensive and costly undertaking, shortly before the termination of his presidential term due to passing, President Saparmurat Niyazov signed an agreement to build a gas pipeline from Turkmenistan to the PRC. Moreover, his successor, Gurbanguly Berdimukhamedov, did not denounce the treaty, and in August 2007, Chinese President Jian Zemin and Kazakh President Nursultan Nazarbayev signed an agreement under which the construction of part of this gas pipeline through Kazakhstan was launched [22].

Given all of the above factors, including the ones preventing the researcher from forming an objective analysis of the internal political, foreign policy and economic situation in Turkmenistan, national development programmes, as an object of examination, it is worth paying attention to national development programmes ("Strategy of Economic, Political and Cultural Development of Turkmenistan" [23]), as well as public speeches by the Presidents of Turkmenistan (Saparmurat Niyazov and Gurbanguly Berdimukhamedov). They formulated such strategic objectives:

1. Increasing the volume of production and export of energy resources (in particular, oil and gas).
2. Using revenues derived from the export of the above-mentioned energy resources as the main source of funds, which will be directed to finance the activities of state institutions, the implementation of active social policy, industrial and infrastructure development.
3. Maximum cooperation with all interested gas buyers

and mitigation of possible supply risks through diversification.

1. Reducing dependence on traditional energy traders (above all, the Russian Federation). The purpose of such a policy is to bring energy prices (especially gas) to the world level.

2. Being cautious of economically integrative projects set up in the post-Soviet space, given the potential for these to limit cooperation with other buyers of natural resources. This policy was manifested in the refusal to participate in the Eurasian Economic Union, the Joint Collective Security Treaty, GUAM, OCA and other integration structures. Other examples include the termination of cooperation within the CIS and Turkmenistan's transition to associate membership, the abolition of dual citizenship with Russia, the introduction of a visa regime (for CIS countries), and so on [24-28].

3. Achieving full self-sufficiency in electricity, primarily through the use of natural gas in CHP.

It is worth noting that Turkmenistan's energy trade policy cannot be seen as separate and disconnected from the context of its national security strategy, which is directly linked to the maintenance of its formal status as "positive neutrality". The consequence here is non-participation in military blocs and alliances. Such a policy is seen as facilitating multi-vector contacts with all interested gas buyers [4: 29-30].

## Conclusions

Summing up, a number of pertinent points can be made based on the body of material that has been studied and analysed. These include political stability (Turkmenistan's location in a region characterised by a high degree of political and economic instability), and the state's possession of significant energy resources. For instance, the state extracts more mineral resources than it uses for domestic consumption,

thus developing energy exports. The energy trade, provided that the country has a favourable geographical and geopolitical position, that it remains a neutral state, and that it has a competent and unique foreign policy strategy for Central Asia (which, as noted, is expressed in its refusal to participate in alliances and blocs), significantly elevates Turkmenistan's importance and interest among other Central Asian states for major political players, placing it in the spotlight. Economic relations between Turkmenistan and Kyrgyzstan, Tajikistan, Kazakhstan, Uzbekistan, China and Turkey are of considerable interest, with the Turkmenistan-Uzbekistan-Kazakhstan-China gas pipeline playing an important role. Within the framework of this study, Central Asia was characterised as a region that attracts the foreign policy activities of a number of world and regional powers - being in this region, Turkmenistan seeks to build relations with these countries in a way that maintains their strength and focus on long-term cooperation.

The material presented in this study may be of interest to experts in geopolitics and international relations, and to political consultants who, by the nature of their work, have a direct impact on government decision-making. This investigation will also be of interest to a wide audience interested in the states of the Central Asian region.

The findings of the study raise a number of questions and issues that must be addressed by researchers in the future. Thus, it is necessary to develop detailed methods that would allow a holistic picture of the economic and political situation of Turkmenistan to be constructed and, on the basis of the data thus obtained, to create the most holistic and realistic forecast of the further development of the state in question, since, in view of the current political regime in Turkmenistan, it is very difficult to access objective, unbiased data that would be free of any ideological influence.

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## Стратегія і політика Туркменістану в контексті енергетичних ресурсів

Сабір Ільгамович Шюкюров

Азербайджанський університет туризму і менеджменту

1172, вул. Короглу Рагімова, 822/823, г. Баку, Азербайджанська Республіка

**Анотація.** Актуальність теми дослідження обумовлена, з одного боку, важливістю і використанням корисних копалин, які виступають у якості енергетичних носіїв у контексті функціонування світової економіки, з іншої – важливістю урахування актуальних економічних процесів, що протікають в цікавому нам регіоні (в рамках дослідження – Середня Азія) при виробленні стратегії реінтеграції пострадянського простору. Ціль статті полягає в характеристиках реалізованої нині політики Туркменістану в аспекті торгівлі енергетичними ресурсами для створення прогнозу щодо подальших кроків у виробленні системи стратегічної співпраці з сусідніми країнами, а також іншими політичними суб'єктами. В рамках дослідження використовуються загальнонаукові методи, а також ряд спеціальних методів, таких як методи дедукції та індукції, контент-аналіз, івент-аналіз, а також системний підхід та історичний аналіз. В рамках дослідження надано, по-перше, опис основних подій у міжнародній політиці (особлива увага при цьому приділяється саме процесам, які відбувалися раніше і продовжуються зараз в економічній сфері, зокрема – у сфері торгівлі та видобутку енергетичних ресурсів), як у регіоні в цілому, так і в Туркменістані, зокрема. По-друге, на основі історичних передумов і наявних даних, запропоновано сценарій ймовірного розвитку держави в царині, яка осліджується. Інформація, викладена в цій роботі, може бути використана з метою корекції дій при створенні довгострокової системи відносин з Туркменістаном, а також для оцінки та розуміння мотивації щодо цих чи інших дій керівництва Туркменістану

**Ключові слова:** енергоресурси, геополітика, міжнародні відносини, експорт палива та енергії, Середня Азія

## Current Trends in Digital Transformation of Public Administration

**Nataliia K. Pasenko\***

*Odessa Regional Institute for Public Administration  
National Academy for Public Administration under the President of Ukraine  
65009, 22 Henuezka Str., Odesa, Ukraine*

**Abstract.** The digitalisation of public administration is a process aimed at improving access to goods and services. The demand for facilitating access to services, in particular public services, and boosting the economy, to which the digital transformation can contribute, makes this study relevant. The purpose of this study is to analyse current trends in the digital transformation of public administration and public authorities. The study employed general scientific methods, in particular analysis and synthesis, and comparative methods. Areas for improving the efficiency of decision-making by public authorities through the use of information and communication technologies and digitalisation were considered. It has been substantiated that the intensified use of the latest information technologies in providing various services by public authorities determines the beginning of the formation of its own model of digitalisation of public administration. The digital transformation of public administration is defined as a problem-solving tool for the society that can provide significant savings in public expenditure, benefiting the administration and the citizens, whose daily needs and concerns are placed at the centre of public administration strategies. The impact of digitising services for citizens has been shown to be effective, in particular in facilitating access to and use of services. The necessary conditions for successful digital transformation were identified

**Keywords:** digital citizenship, digitalisation of public administration, e-government, public administration, digital access

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\*Corresponding author

## Introduction

The modern practice of institutional support of governance processes shows the trend of changing the concept of “public authorities” to “public administration” [1-3], as public authorities demonstrate a tendency towards increasing publicity, transparency, elimination of the practice of direct disposition and imperative prescriptions [4-6]. The international practice of the concept of “public administration and governance” [7-9], emphasises its “people-facing” approach. The process of digitalisation of public administration is part of a strategy aimed at improving access to goods and services throughout Europe – both for citizens and businesses [10-12]. Approved by the Ukrainian government, the Concept for the Development of e-Governance in Ukraine [13] and the Ukrainian Digital Economy and Society Development Concept for 2018-2020 with an action plan for its implementation [14] also aim to harness the potential of information and communication technologies to promote innovation, sustainability, economic growth and progress. That is why the quest for ways to improve the efficiency of managerial decision-making by public authorities through the use of information and communication technologies, digitalisation, and the introduction of e-governance is relevant.

Recent years indicate the activation of not only the use of the latest information technologies in providing a wide variety of processes by public administration but also the accumulation of Ukrainian experience and the formation of our own Ukrainian model of digitalisation of public administration. The studies substantiate the concept of implementation of information and communication technologies in the activities of public administration according to the scheme: “informatisation of public administration” – “e-government” – “digitalisation of public administration and management (digital governance)” [15]. The author notes that, unlike informatisation and e-government, digitalisation transforms management processes, improving them qualitatively, creating new digital services and innovative forms of service activities of state and local authorities using network-, cloud- and smart- technologies. Some studies summarise the Ukrainian and international experience of using information technologies of intellectual management in public management practice [16-18], emphasise the importance of implementing e-government and the advantages of its application in comparison with traditional mechanisms of public administration, etc. [19; 20].

The process of establishment of digital governance in the Ukrainian realities has determined the need to investigate conceptual approaches to assessing the development of digital society and digital governance and develop analytical tools adapted to the specifics of digital development content at the local level [21]. Early 21<sup>st</sup> century studies have already presented strategies for introducing IT initiatives into public e-governance practices [22], and further studies have focused on various aspects of the digitalisation of decision-making processes and public administration.

Current discourses focus on narrower issues of e-governance organisation [23-25], for example: standardisation

of forms (in particular application forms, documents) through benchmarking, which will help minimise governmental efforts by reusing form elements and reduce complexity for citizens by providing a unified presentation of information [26-28]. These forms are a central interface for the exchange of information between the government and citizens, a way to “translate” laws into practice, and facilitate this exchange. Unfortunately, the development of these forms often requires a lot of effort to ensure that they meet legal requirements, as a result of which citizens often describe them as very complex. The authors [28] present a meta-model that can be used to create reference models for electronic forms in the public administration system. The first studies on the standardisation of e-services in public administration pointed to the limitations of their use due to the significant differences between private organisations and public administration [4].

Thus, *the purpose of this study* is to analyse current trends in digital transformation in public administration and public authorities.

## The Concept of Digitalisation and Methods of its Use in Public Administration

Digitalisation is a global trend, a long-term priority and a key driver of all modern processes. The rise of technologies of the Fourth Industrial Revolution significantly changes the nature of production, social processes and the pace of innovation in general. Support for digital transformation is one of the five policy priorities identified by the European Commission in the proposals “Joint Communication: Eastern Partnership Policy for the period up to 2020”, published on March 18, 2020 [29]. A strong digital presence around the EU will promote growth and stimulate Ukraine’s sustainable development. The EU will further invest in the digital transformation of partner countries in line with EU legislation and best practices and will support large-scale, highly innovative digital start-ups in the region.

However, the digital transformation of public administration is now more important and urgent than in any other industry. By promoting digital citizenship rights, digital technologies offer countless opportunities to improve both the performance of administrations and the relationship between administrations and citizens and businesses. The use of information technology in public administration is usually seen as a tool to improve the efficiency of existing public administrations, digitise existing documents, facilitate the dissemination of information and to better control social processes [30-32]. Effective and innovative public administration should provide fast and high-quality services to citizens [33], which means revising and rethinking procedures and services in a digital perspective.

It is important to note that some digital functions have already been implemented and continue to operate in the private and public sectors. For instance, electronic signatures and digital documents have existed in Ukraine and have been functioning alongside paper documents since 2003.

“Digital citizenship”, a set of rights and obligations related to the digital sphere, aims to simplify relations between citizens, businesses and public administration through digital technologies. Digital citizenship ensures that citizens and businesses have access to all data, documents and services of interest digitally, in order to guarantee easier access to services. Among the elements that distinguish digital citizenship are:

- digital access - most importantly, free access to technology must be maintained for digital citizenship;
- digital rights and responsibilities – on the one hand, there are rights related to confidentiality, data processing and freedom of expression; on the other hand, there are duties and responsibilities that provide for the appropriate use of technology in accordance with the law;
- digital skills – technology is constantly evolving and the labour market requires more and more innovative skills in the use of electronic tools and services;
- digital communication – with new technologies, each person can communicate and collaborate with whomever they want, from anywhere, at any time;
- digital commerce – today’s marketplace is digital and online shopping is becoming more common, therefore rules need to be established to protect digital consumers;
- digital health and wellbeing – new technologies can also benefit the health sector (e.g. electronic patient logs or digital prescriptions).

The achievement of digital citizenship is greatly facilitated by the computerisation of public administration, which is simply called “Electronic Governance”. E-governance is defined as the use of information and communication technologies in public administrations in combination with organisational changes and new skills to improve public services, democratic processes, and strengthen support for public policy [34]. However, it is not a homogenous or static phenomenon. E-governance has evolved from an initial web presence to transactional and integrated applications. Thus, in recent years, local authorities in the UK have begun to apply various “smart” technological changes to improve the provision of services, in particular, the wider introduction of computational and algorithmic tools in service areas in local authorities [35]. These changes have a profound impact on the structure of public administration. The focus was on specific cases of artificial intelligence, in particular autonomous agents and predictive analytics, and a combination of desk research, questionnaire and interviews was used to better understand the extent and nature of these changes in local government [35]. The results show that local governments are beginning to adopt intelligent technologies and that these technologies have an unpredictable impact on how government administrators and computational algorithms are implemented in the provision of public services.

The European Commission has established the basic principles on which actions on e-governance should be based [36]:

1. Public administrations and government agencies must be open, efficient, and inclusive, providing limitless, personalised, convenient, and end-to-end digital public services to all citizens and businesses.

2. Innovative approaches are used to develop and provide the best services in accordance with the needs and requests of citizens and businesses.

3. Public administrations use the opportunities offered by the new digital environment to facilitate their interaction with stakeholders and with one another.

### **Experience of Implementing Digitalisation Tools in Public Administration in Ukraine and Other Countries**

Both the quality and the use of digital public services increased in 2019. 67% of people (compared to 57% in 2014) [37] who used the internet and submitted documents to their public administration have reported using online channels, indicating the convenience of online procedures compared to paper ones. The experience of one of the most successful e-governments, the German government, is built on four basic principles of public sector modernisation [16]: allocation of responsibilities, which increases the efficiency of providing services; a focus on citizens as equal partners of the state and their protection in the provision of e-services; diversified development of public services, which will contribute to a more efficient and transparent use of funds; effective management, which enables the recruitment and retention of the employees most interested in the results of their work in the organisation.

In Ukraine, experts monitoring statistics on the digital economy and society in Ukraine state that the country’s digital economy can be assessed with a score of three out of a possible five [38]. Some countries have achieved better results and in some areas even collect data on 100% of the Digital Economy and Society Index (DESI) [39]. At the same time, there are countries that have failed to compile such assessment indicators at all [37]. To climb the “technological ladder”, it is important for Ukraine to make effective use of its scientific and innovation potential and to digitalise all spheres of social life. The public project “Digital Agenda 2020” [40-41], was launched in 2016 and aims to increase the number of high-tech initiatives and projects, create opportunities for the further transformation of the economy, and the establishment and development of competitive and efficient sectors of the economy. This, in turn, can have a significant positive impact on the quality of life of citizens. Though unpredictable global challenges in 2020 have brought adjustments, the groundwork for the digital transformation of Ukrainian society has been laid.

The digitalisation of public administration plays an important role in this process, allowing for significant improvements in the quality of services in public administration practice. A project proclaiming 10 main strategic technologies for Ukraine’s public sector was created in 2020 [40]. It is worth noting that in today’s realities, almost all of them are

actively used or may be implemented in the near future. Thus, the “digital” workplace technology is designed to diversify the work of specialists and save them time spent on processes that can be automated. Multi-channel communication and engagement with citizens provide additional opportunities to reach out to citizens; this process becomes much faster and easier, while at the same time more citizens’ opinions can be considered. Open data allows every citizen to have access to the necessary information. Electronic identification of citizens is primarily needed to enable secure access to information and resources. Ubiquitous analytics technologies, the use of smart machines, and the creation of digital government platforms can improve and facilitate the process of providing public services. The Internet of things, Blockchain and software architectures can fundamentally change the way public and government organisations work.

Thus, the basis for the functioning of modern society is the use of cyberspace. The turn of the twenty-first century is a time of a new global revolution brought about by an avalanche of modern information and communication technologies. Access to mobile phones, computers and the global network has become a determining factor in the development of society. The idea of universal automation, computerisation and the possibility of using high-speed information and communication links extends beyond the realm of academia and large businesses. The spread of internet and telecommunications networks has contributed to the emergence of a new approach to communication between citizens and the state represented by central and local governments. It also allowed the introduction of new solutions, models, and services based on specific social needs and expectations.

According to the e-government concept, the main condition for establishing such a government is to achieve better communication with authorities at all levels and to speed up procedures for resolving management issues. Investing in modern e-administration can bring tangible benefits to citizens and businesses, as well as to public

administration, as its activities become more target-oriented, and based on specific social needs and expectations.

## Conclusions

Digital transformation is radically changing all aspects of society and the economy. The digitalisation of public administration is not only a tool for addressing social issues, it is first and foremost an engine of social development. A digital transformation of public administration would provide significant savings in public expenditure, which would benefit not only the administration but also citizens, whose daily needs and concerns are placed at the centre of public administration strategies. Digitalising most public services for citizens will facilitate greater access and use of such services, extend their outreach and convenience, which will ultimately improve the quality of a consumer’s experience of these services. The necessary conditions for successful digital transformation are: economic development, social integration and good governance in the public administration system.

Summing all the above, it is possible to highlight certain trends of digital transformation in the activity of public authorities, such as widespread use of electronic signatures, digital document production and e-invoicing; promotion of digital citizenship rights, allowing citizens and businesses to access data digitally; computerisation of public administration and formation of e-government.

The authors have proved that the assessment of digital governance will increase the reliability of the decision-making process in the management of complex multi-level socio-economic systems, and the proposed model allows a systematic analysis of the state of digitalisation of public administration and governance at the level of territorial communities.

Further studies on the implementation of digital transformation in the activities of public administration should be oriented towards comprehensive support of digital citizenship and encouragement of digital start-ups in the development of territorial communities.

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## Сучасні тенденції цифрової трансформації у діяльності органів публічної влади

**Наталія Костянтинівна Пасенко**

Одеський регіональний інститут державного управління  
Національної академії державного управління при Президентові України  
65062, вул. Генуезька, 22, м. Одеса, Україна

**Анотація.** Цифровізація діяльності органів публічної влади – процес, спрямований на покращення доступу до товарів та послуг. Необхідність спрощення доступу до послуг, зокрема, державних, стимулювання економіки, чому може значно посприяти цифрова трансформація, зумовлює актуальність цього дослідження. Мета статті – проаналізувати сучасні тенденції цифрової трансформації у системі державного управління і діяльності органів публічної влади. У ході дослідження було використано загальнонаукові методи, зокрема аналіз та синтез, а також метод порівняння. Було розглянуто напрямки підвищення ефективності прийняття управлінських рішень органами публічної влади за допомогою використання інформаційно-комунікаційних технологій та цифровізації. Обґрунтовано, що активізація процесів використання новітніх інформаційних технологій при забезпеченні різноманітних процесів органами публічної влади визначає початок формування власної української моделі цифровізації публічного управління. Цифрова трансформація державного управління визначена інструментом вирішення проблем суспільства, що здатний забезпечити значну економію державних витрат, від чого виграють не лише адміністрація, а й громадяни, щоденні потреби і турботи яких опиняються в центрі стратегій державного управління. Було доведено ефективність наслідків переведення послуг для громадян у цифровий формат, зокрема полегшенню доступу до них та їх використання. Було визначено необхідні умови для успішної цифрової трансформації

**Ключові слова:** цифрове громадянство, цифровізація державного управління, електронний уряд, публічне адміністрування, цифровий доступ

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89600, вул. Ужгородська, 26, м. Мукачево

Закарпатська область, Україна

тел./факс: (03131) 2-11-09, (03131) 2-11-09

E-mail: [info@economics-msu.com.ua](mailto:info@economics-msu.com.ua)

www: <https://economics-msu.com.ua/uk>