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Article

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MANAGEMENT OF THE SPORTS INDUSTRY FOR ENSURING THE PUBLIC HEALTH: PROSPECT OF IMPLEMENTING THE INNOVATIONS

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Abstract: *The article is devoted to studying the relationship between sports management and ensuring the population's health. The study of current trends in the development of sports industry management was carried out with the help of bibliometric analysis. The results proved that the modern sports management system should consider the quality of the provision of sports services and the opportunities for their commercialization, the impact of the dispute on people's lives and health, the role of sports in ensuring sustainable development, and the financial support of the sports industry. In order to assess the impact of the sports industry on public health and the quality of life, a set of statistical indicators was formed. These indicators characterize the functioning of the sports industry (the number of sports facilities, the involvement of the population in sports and recreational activities) and the state of the population's health (parameters of life expectancy, morbidity, and mortality) of Ukraine for 2000-2021. Calculations were made by regression modeling using the Prais-Winsten method, including a time lag from 0 to 4 years. The obtained results proved that, at the current stage, the development of the sports industry has a limited impact on the health indicators of the population. In particular, it was found that engaging in the population's physical culture and health activities contributes to reducing its mortality rate. Besides, engaging the population in such activity at enterprises, institutions, and organizations contributes to reducing the overweight population. On the other hand, a direct connection was also recorded between the growth of the population's sports activity and the deterioration of certain public health parameters (in particular, the incidence of tuberculosis, hypertension, and mortality from certain diseases). At the same time, it was confirmed that the population's activity in sports largely depends on the number of sports facilities. It made it possible to assess the transmission effects of the presence of sports facilities on the population's health. Calculations have shown that the growth of the number of sports facilities for professional sports mostly has a negative impact on the health and life indicators of the population. In contrast, the impact of playgrounds with exercise equipment is mostly positive. That makes it possible to substantiate the areas on which the management of the sports industry should be focused to ensure the maximization of its positive impact on public health.*
Keywords: sport, management, public health, modeling, innovation, physical culture and health activities, sports facilities, life expectancy, mortality.
JEL Classification: I18, L83, O31, P36, Z2

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Introduction. Economic and technological progress provided a decrease in the population's physical activity. It led to problems with health and the deterioration of the physical development of the population. At the same time, the gradual deterioration of the environment causes new risks of diseases among the population. The achievements of modern medicine make it possible to generally increase the average life expectancy of the population. However, the effectiveness of disease prevention and maintaining a healthy lifestyle remain important. In this context, it is essential to evaluate the role played by sports in improving human health, considering the need for physical activity to maintain the tone of the human body. Recommendations of experts in the field of health care indicate the need to follow a healthy lifestyle in the context of disease prevention, maintaining immunity, and prolonging human life. At the same time, modern studies only partially highlight the impact of sports as an industry on the health of the country's population. In this connection, there is a need to conduct an empirical analysis of cause-and-effect relationships between the population's sports activity and its health and quality of life indicators.

Literature Review. Sports development is traditionally the subject of attention of the general population. It is important for the country's image (participation in international sports competitions, the popularity of sports clubs, the development of professional athletes, etc.). However, this field has been studied in a rather limited scientific context. Thus, the bibliometric analysis conducted by Sustarsic et al. (2022) shows that the first serious publications devoted to sports research appeared only in 2013. Sports development at the current stage has already transformed from a set of activities to a separate industry that needs systematic management to ensure its growth prospects. Accordingly, the management of the sports industry includes both the entire complex of management of the internal parameters of the sports industry (sports, infrastructure, financing, personnel support, etc.) and the determination of external targets achieved as a result of the development of the sports industry (for the image of the country, for the development of human potential, etc.). In this regard, more and more scientific studies are dedicated to studying internal and external factors of the development of the sports industry. Thus, in particular, it has been proven that employment in the sports business in recent years has been characterized by a significant change in the set of skills and qualifications for employment (Finch et al., 2022). On the other hand, the study of external factors influencing the development of the sports industry proved that the effectiveness of its development depends on resource provision, environmental regulation, economic development, human capital, etc. (Chen and Wang, 2022). Importantly, however, this effect differs by region of study. It indicates that not only the created external conditions are important, but also the effectiveness of the internal management of the sports industry.

The researchers proved that at the current stage, the management of the sports industry is accompanied by significant structural changes in terms of its goals and strategies. So, in particular, the role of branding of sports organizations is increasing, affecting both the financial indicators of companies and the popularity of sports among the population (Sinha et al., 2022). On the other hand, Moyo et al. (2022) proved that the modern system of sports marketing also adapts to general trends in marketing and management of companies, particularly regarding implementing the concept of corporate social responsibility. It changes the very paradigm of sports management. It should be noted that the development of the digital industry has led to the emergence of new types of sports - eSports and eSports, which are fundamentally different from traditional ones. It led to the need for transformations in the sports management system and consideration of new determinants of its development. In particular, Pumsanguan and Thithathan (2022) found that the most significant factors that determine the features of eSports management are the activities of government organizations, the level of development of society and culture, the competitiveness of eSports, the state of infrastructure, the variety of types of games, the development of the private sector and technological development. Recently, the study of the connection between sports development and health care has been gaining relevance. The era of information technologies makes it possible to form large arrays of statistical data for conducting theoretical and empirical research. Yes, in particular, Chen (2021) offers a strategy for the integrated development of the healthcare and sports industry based on various methods of big data analysis. Researching the problems of the health of professional athletes, scientists are currently starting a new direction of studying the specifics of the influence of e-sports on the health of athletes. Thus, the differences in general health risks arising between e-athletes and people engaged in traditional sports were determined (Tan et al., 2022). It made it possible to determine the prospects for research into the impact of eSports on the population's health. At the same time, the possibilities of applying these methods remain limited, given the lack of accumulated statistical arrays. Existing research focuses on studying theoretical causal relationships between sports and health care. For example, Patchett et al. (2016) considered the promotion of sports as one of the tools used by states to counter the problem of obesity. Flint and Peake (2016) analyzed the impact of sports in countering unhealthy consumption behavior. Thus, there is a need for empirical studies of the relationship

between the sports industry and the population's health. It will make it possible to assess the consequences of the development of sports for the country's human capital and to identify directions for the development of sports management to ensure the improvement of the population's health.

Methodology and research methods. The study of the prospects for developing sports management in the context of ensuring the population's health is structured in two stages. In the first stage, the bibliometric analysis revealed the key directions of the development of modern sports management. This stage was implemented by selecting scientific publications indexed by the scientometric database Scopus, which simultaneously contains the words «sports industry» and «management» in the titles, list of keywords, or abstracts. The definition of the main blocks forming the directions of modern sports management was carried out by grouping keywords into clusters according to their coincidence. With the help of a chronological analysis of the evolution of the appearance of keywords in scientific research, the most relevant trends in the development of sports management were determined. The analysis of existing scientific research in sports management and health care made it possible to put forward the hypothesis that the development of the sports system allows for reducing the risks that exist for the population's health. In order to test this hypothesis, it is advisable to assess the impact of the development of the sports industry on the health parameters of the population of Ukraine. The analysis of official statistics published by the State Statistics Service of Ukraine (2022) proved that the following main indicators characterize the development of the sports industry:

– number of people engaged in sports, thousands of people;
– number of people engaged in physical culture and health activities, thousands of people, including in educational institutions, enterprises, institutions, organizations, in organizations that carry out physical culture and health activities;
– number of sports facilities: stadiums, sports fields, football fields, shooting ranges, swimming pools, sports halls, and playgrounds with exercise equipment.

On the other hand, it is also advisable to form statistical parameters of the population's health. For their characterization, a number of indicators accumulated by the State Statistics Service of Ukraine (2022) and the statistical database of the World Bank (2022) were selected. In particular, the following indicators were selected as relevant indicators of the population's health and quality of life:

– average life expectancy of the population, years;
– incidence of influenza and acute upper respiratory tract infections, million cases;
– the number of patients with a diagnosis of tuberculosis, established for the first time in their life, thousands of people;
– hypertension, % of the adult population aged 30-79 years;
– prevalence of overweight, % of the adult population;
– mortality of the population per 100,000 of the existing population;
– mortality from some infectious and parasitic diseases per 100,000 existing population;
– mortality from neoplasms per 100,000 existing population;
– mortality from diseases of the circulatory system per 100,000 of the existing population;
– mortality from respiratory diseases per 100,000 of the existing population;
– mortality from diseases of the digestive organs per 100,000 of the existing population.

The next stage of the research consists of the analysis of cause-and-effect relationships between the parameters of the sports industry's development and the population's health indicators. This study used the regression modeling technique for the assessment. Testing various specifications of the model proved that the highest adequacy indicators are demonstrated by using the Price-Winsten method. The research hypothesis suggests that sports' impact on the population's health is most likely delayed in time. That is why the factor variables were entered into the model with a time lag of 0 to 4 years.

Results. Contemporary tasks of sports management are determined using bibliometric analysis of publications indexed by scientometric databases (Fig. 1). Scopus has indexed 1,663 publications containing the words «management» and «sports industry» in their titles, keywords, or abstracts. According to the results of the bibliometric analysis, the keywords characterizing these articles were grouped into five clusters describing the main areas of sports management.

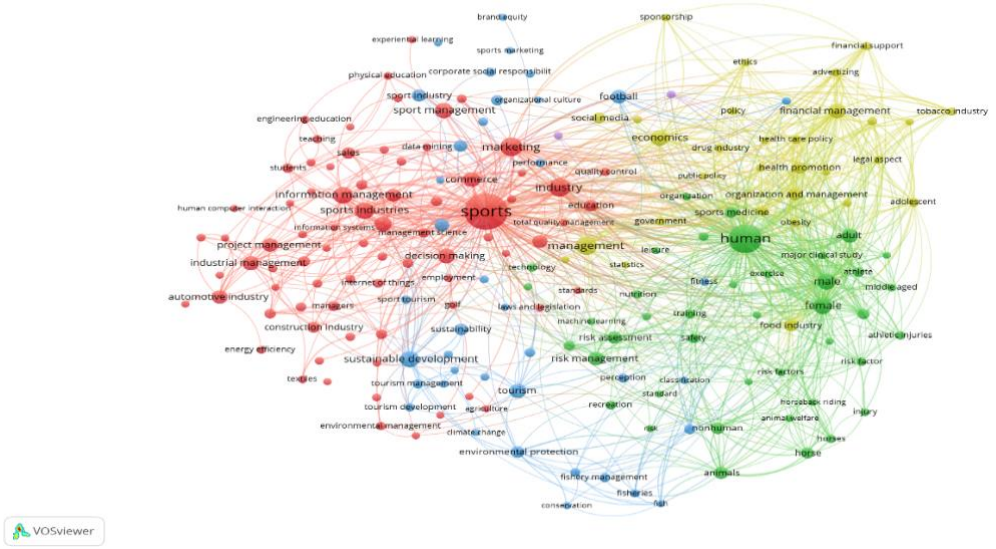

Figure 1. Results of bibliometric analysis of co-occurrence keywords on the request both «man a gement» and «sport industry» based on Scopus publications

The largest cluster (red) contains 78 keywords, the most significant of which are «information management», «decision making», «industrial management», «marketing», «project management», «management systems», «commerce», «health», «education», «sales», «service quality», «total quality management», «personnel training», «quality control», «environmental management», «supply chain management». This cluster characterizes all aspects related to the commercialization of the sports industry and ensuring the quality of sports services. The second cluster (green) is formed by 41 keywords, which include «human», «female», «male», «training», «physical activity», «risk management», «recreation», «accident prevention», «psychology», «sports medicine», «leisure», «nutrition», etc. This cluster reflects the direction of sports' influence on people's life and health. The third cluster (blue) consists of 39 keywords, including «sustainable development», «environmental protection», «sports tourism», «tourism development», and «conservation». This cluster characterizes the connections of the sports industry with nature. The yellow cluster includes 30 keywords, including «economics», «financial management», «organization and management», «government», «health promotion», «policy making», and «financial support». This cluster characterizes the general policy of the development of the sports industry, its goals, and financial support. The fifth cluster (purple) combines «human experiment» and «leadership», which reflects the social aspects of the development of the sports industry. At the same time, the chronology of the development of scientific research (Figure 2) shows that the most relevant aspects of the management of the sports industry now are the development of information management and marketing of sports, increasing the effectiveness of sports industry networks and sports rehabilitation.

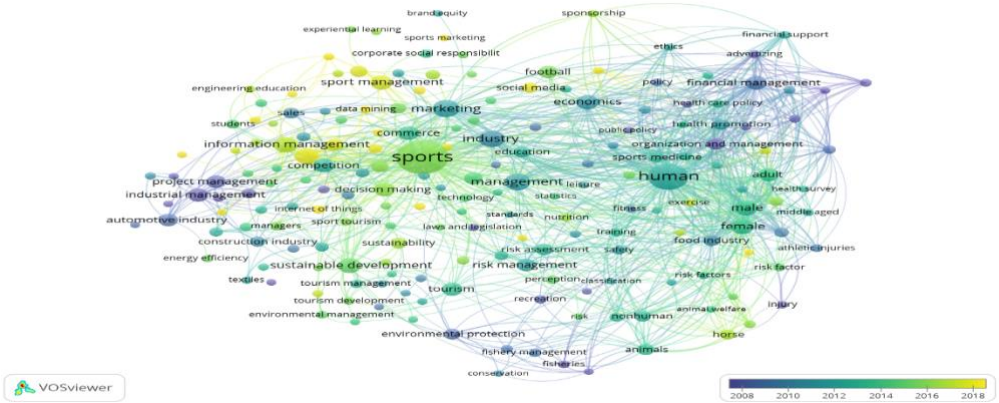

Figure 2. Results of bibliometric analysis of keywords chronology on the request both «man a gement» and «sport industry» based on Scopus publications

The conducted analysis proves that the modern tasks of the sports management system are aimed not only at increasing the performance of professional athletes but also at popularizing physical culture and health activities among the population. Table 1 presents the results of the assessment of the impact of sports activity on the population on health parameters.

Table 1. Results of the assessment of the impact of the population's activity in sports and physical culture and health activities on the health parameters of the population of Ukraine (2000-2021)

Time lag in the model	Average life expectancy, years	Incidence of influenza and acute infections of the upper respiratory tract, million cases	The number of patients with a diagnosis of tuberculosis, established for the first time, thousand	Hypertension, % of the adult population aged 30-79	Prevalence of overweight % of the adult population
The number of people engaged in sports, thousand					
No lag	0.0005	0.0012	0.0188***	0.0005**	-0.0004
Lag 1 year	-0.0011	0.0019	0.0087	0.0001	-0.0002
Lag 2 years	-0.0010	0.0009	0.0029	0.0011**	0.0002
Lag 3 years	-0.0005	0.0027	-0.0022	0.0013	0.0031
Lag 4 years	0.0008	0.0008	-0.0006	0.0008**	0.0031
The number of people engaged in physical culture and health activities, thousand					
No lag	0.0007	-0.0011	0.0048***	0.0002***	0.0000
Lag 1 year	0.0001	-0.0008	0.0006	0.0001	0.0000
Lag 2 years	-0.0004	-0.0008	0.0002	0.0002***	0.0001**
Lag 3 years	-0.0004	0.0008	-0.0007	0.0001	0.0012*
Lag 4 years	-0.0001	0.0002	-0.0004	0.0000	0.0001**
The number of persons engaged in physical culture and health activities in educational institutions, thousand					
No lag	-0.0001	0.0005	0.0038	-0.0005	-2.02e-07
Lag 1 year	-0.0007	-0.0009	-0.0033	-0.0005	-0.0008
Lag 2 years	-0.0015*	0.0000	-0.0022	-0.0001	-0.0011
Lag 3 years	-0.0018**	0.0014	-0.0014	-0.0001	-0.0007
Lag 4 years	-0.0027***	0.0016	-0.0059	0.0011	-0.0018
The number of people engaged in physical culture and health activities at enterprises, institutions, and organizations during the working day and in their free time, thousand.					
No lag	0.0007	-0.0018	0.0114**	0.0017	-0.0029**
Lag 1 year	-0.0011	0.0028	0.0069	0.0015	-0.0028*
Lag 2 years	-0.0009	0.0032*	0.0032	0.0018	-0.0026
Lag 3 years	-0.0010	0.0035***	-0.0019	0.0039**	-0.0029
Lag 4 years	-0.0015	0.0029**	0.0110	0.0039*	-0.0039
The number of persons engaged in physical culture and health activities in organizations that carry out physical culture and health activities, by place of residence, thousand					
No lag	0.0023	-0.0022	0.0043	0.0004	-0.0014
Lag 1 year	0.0008	0.0008	0.0001	0.0003	0.0006
Lag 2 years	0.0007	0.0011	-0.0014	0.0009	0.0005**
Lag 3 years	-0.0020	0.0024	-0.0035	0.0021	0.0052
Lag 4 years	0.0022	0.0008	0.0156	-0.0004	0.0049

The calculations showed that the population's activity in sports has a rather limited effect on the population's health indicators. So, in particular, it has been determined that the increase in the population's participation in sports even slightly increases the incidence of tuberculosis in the population. In addition, it was found that an increase in the growth of sports leads to an increase in the incidence of hypertension in the population. At the same time, such influence is both short-term and delayed in time. The calculations also revealed that the population's physical and health activities also directly impact the increase in the incidence of tuberculosis and hypertension. The positive impact of physical education and health activities on increasing the number of the population suffering from excess weight was also unexpected. In this context, it is also necessary to investigate the influence of the characteristics of the physical culture and health activities of the population in terms of individual organizations. So, in particular, it was found that increasing the population's involvement in physical culture and health work in educational institutions (not taking into account classes within the curriculum) is associated with a reduction in the average life expectancy at birth. It is important

that this effect is manifested with a time lag of 2 to 4 years. On the other hand, let's note that the physical culture and health activities of the population at enterprises, institutions, and organizations are associated with increased influenza and acute respiratory infections. However, that leads to a reduced proportion of the overweight population. At the same time, physical culture and health activities in organizations at the place of residence have almost no effect on the health parameters of the population (the exception is a slight positive effect on the increase in the percentage of the population with excess weight).

The next block of research is the evaluation of the impact of sports on the mortality parameters of the population. Based on the specifics of the study, we note that such an impact may be delayed for a rather long period. However, taking into account the available statistical base, we will conduct calculations with a time lag of 0 to 4 years. Their results, presented in Table 2, testified that the increase in the population's activity in sports leads to an increase in mortality from some infectious and parasitic diseases with a time lag of 2 years.

Table 2. Results of the assessment of the impact of the population's activity in sports and physical culture and health activities on the mortality parameters of Ukraine (2000-2021)

Time lag in the model	Mortality of the population per 100,000 of the existing population					
	general	from some infectious and parasitic diseases	from neoplasms	from diseases of the circulatory system	from respiratory diseases	from diseases of the digestive organs
The number of people engaged in sports, thousand						
No lag	-0.1535	0.0215	-0.0745	-0.3914	-0.0166	0.0018
Lag 1 year	-0.0894	0.0209	-0.0649	-0.3251	-0.0092	0.0109
Lag 2 years	0.0561	0.0348**	0.0470	0.5689	0.0299	0.0341
Lag 3 years	0.0221	0.0133	-0.0479	-0.2339	-0.0019	-0.0193
Lag 4 years	-0.1349	-0.0144	-0.1153	-0.7059	-0.0462	-0.0367
The number of people engaged in physical culture and health activities, thousand						
No lag	-0.1240*	0.0074	0.0105	-0.0014	-0.0083	0.0070
Lag 1 year	-0.0493	-0.0010	-0.0128	-0.0317	-0.0053	0.0077
Lag 2 years	0.0828	0.0034	0.0147	0.1639	0.0119	0.0098
Lag 3 years	0.0909	-0.0038	-0.0318	-0.0905	0.0061	-0.0088
Lag 4 years	0.0479	-0.0086	-0.0509	-0.2656	-0.0062	-0.0156
The number of persons engaged in physical culture and health activities in educational institutions, thousand						
No lag	0.0264	-0.0043	0.0351	0.2007	0.0145	0.0109
Lag 1 year	0.0173	-0.0071	0.0083	0.1200	0.0192	0.0147
Lag 3 years	0.3765**	-0.0081	-0.0103	0.0572	0.0235	-0.0050
Lag 4 years	0.1268	-0.0146**	-0.0719	-0.2497	0.0222	-0.0112
The number of people engaged in physical culture and health activities at enterprises, institutions, and organizations during the working day and in their free time, thousand.						
No lag	-0.3380**	0.0187*	-0.0072	-0.1599	-0.0259	0.0077
Lag 1 year	-0.2343	0.0226*	-0.0086	-0.0697	-0.0119	0.0079
Lag 2 years	0.1207	0.0114	-0.0563	-0.0525	0.0041	-0.0238
Lag 3 years	0.0693	-0.0104	-0.1975**	-0.9633**	-0.0178	-0.0610**
Lag 4 years	0.1911	-0.0149	-0.1419**	-0.8591**	-0.0326	-0.0276***
The number of persons engaged in physical culture and health activities in organizations that carry out physical culture and health activities, by place of residence, thousand						
No lag	-0.3795	0.0086	-0.1254	-0.7403	-0.0428	-0.0260
Lag 1 year	0.0511	0.0004	-0.1418	-0.7548	-0.0288	-0.0345
Lag 2 years	-0.0133	0.0022	-0.1099	-0.6553	-0.0297	-0.0372
Lag 3 years	0.1764***	0.0152	0.0279	0.1805	0.0325	0.0109
Lag 4 years	-0.6143**	0.0232***	0.0418	0.0185	-0.0430	-0.0132

Source: developed by the authors.

On the other hand, the increase in the population engaged in physical and recreational activities is the reason for the decrease in the overall mortality rate. Analysis of individual directions classes physical culture – health activity among people indicates on that the fact that growth indicator coverage people physical culture - health activity in institutions education is associated with delayed growth parameter him general mortality and mortality from diseases bodies breathing, but with another side determines delayed abbreviation equal mortality from some infectious and parasitic diseases. At the same time, activation classes people's physical culture health activity on enterprises, institutions, and organizations determine general abbreviation equal

mortality (without time lag), postponed abbreviation equal mortality from neoplasms, diseases systems blood circulation and diseases bodies digestion. Still, on another side, there is a reasonable increase in equal mortality from some infectious and parasitic diseases. At the same time, attention should be paid to the fact that the increase in the level of employment of the population in physical culture and health activities in organizations at the place of residence has a direct effect on the mortality rates of the population with a time lag of three years, which changes to an inverse effect with the introduction of the time lag of the study lasting four years. It confirms the proposed hypothesis about the delayed duration of the influence of sports activities on the health indicators of the population. At the same time, this parameter directly impacts the increase in the population's mortality rate from some infectious and parasitic diseases. The conducted research proved that despite the limited influence of the population's activity in physical education and sports on the population's health, certain dependencies positively characterize this relationship. Based on this, it is advisable also to investigate the role of the development of sports infrastructure in stimulating the population's involvement in physical activity. Therefore, the results of the calculations (Table 3), characterize the cause-and-effect relationships between the number of sports facilities and the population's activity in physical education and sports.

Table 3. Results of the assessment of the impact of the presence of sports facilities on the activity of the population of Ukraine in sports and physical culture and health activities (2000-2021)

Sports facilities	The number of people engaged in sports, thousand	The number of people engaged in physical culture and health activities, thousand			
		everything	in educational institutions	at enterprises, institutions, and organizations during the working day and during free time	in organizations that carry out physical culture and health activities, at the place of residence
Stadiums	1.6933***	4.3165***	1.5428	2.6618***	1.3855***
Sports grounds	0.0343***	0.0799**	0.0405	0.0475**	0.0346***
Football fields	0.1559***	0.4703***	0.3012	0.1631	0.0895
shooting range	0.0643*	-0.0198	0.1726	0.3410***	0.1193**
Swimming pools	0.6806	1.3575	3.0778**	-1.7049	-0.6766
Sports halls	0.1042***	0.2784***	0.1350*	0.1489***	0.0739***
Playgrounds with exercise equipment	0.0116	0.1456**	0.0916	0.0951**	0.0375

The obtained results turned out to be quite interesting. So, in general, there is a direct connection between the development of sports infrastructure and the activity of the population in sports and physical culture and health activities. At the same time, there is a certain specificity regarding the influence of certain types of sports facilities. So, in particular, almost all types of sports facilities except swimming pools and playgrounds with exercise equipment are incentives for the population to participate in sports. At the same time, the population's physical and recreational activities depend on the availability of almost all types of sports facilities except shooting ranges and swimming pools. It is quite interesting that the increase in participation in physical culture and health activities in educational institutions depends only on the number of accessible sports halls and swimming pools. At the same time, the population's involvement in physical culture and health activities at enterprises, institutions, and organizations depends on the availability of stadiums, sports fields, shooting ranges, sports halls, and areas with exercise equipment. Still, the activation of classes in organizations that carry out physical culture and health activities at the place of residence depends on an almost similar list of determinants except for playgrounds with exercise equipment. The conducted research allows us to hypothesize that the presence of sports facilities has a transmission effect on the health indicators of the population. Table 4 shows the results of testing this hypothesis.

The results certify that the growth of the stadiums' quantity is associated with increased equal morbidity on flu and sharp respiratory infections, hypertension, and tuberculosis. However, it leads to the abbreviation spreading excessive balance among adults. On the other hand, the increase of sports platforms' quantity directly communicates with growth equal morbidity on tuberculosis and the growth particles population that suffers from excessive weight. The rise of football fields is also associated with increased rates of tuberculosis, hypertension, and the spread of the problem of being overweight among the population. A wide negative

impact of the number of shooting ranges on population health indicators was also noted, accompanied by an inverse relationship between the number of shooting ranges and the proportion of the population suffering from excess weight.

Table 4. Results of the assessment of the impact of the presence of sports facilities on the health parameters of the population of Ukraine (2000-2021)

Time lag in the model	Average life expectancy, years	Incidence of influenza and acute upper respiratory tract infections, million cases	The number of patients with a diagnosis of tuberculosis, established for the first time, thousand	Hypertension, % of the adult population aged 30-79	Prevalence of overweight, % of the adult population
Stadiums					
No lag	0.0016	0.0090	0.0419**	0.0056*	-0.0055*
Lag 1 year	-0.0032	0.0083***	0.0211	0.0053	-0.0048
Lag 2 years	-0.0037	0.0071**	0.0193	0.0059*	-0.0046
Lag 3 years	-0.0054	0.0084**	0.0114	0.0074**	-0.0145
Lag 4 years	-0.0022	0.0076**	0.0264	0.0067*	-0.0145
Sports grounds					
No lag	-6.99e-06	0.0002	0.0007***	0.0000	3.48e-06
Lag 1 year	0.0001	-0.0001	0.0005	0.0000	5.02e-06
Lag 2 years	4.85e-06	-0.0001	-0.0000	0.0000	4.06e-06
Lag 3 years	-0.0000	0.0001	-0.0000	6.38e-06	0.0003**
Lag 4 years	0.0000	0.0001	-0.0001	2.78e-06	0.0003**
Football fields					
No lag	-0.0003	-0.0000	0.0053***	0.0002***	0.0000
Lag 1 year	0.0005	-0.0003	0.0022	0.0001	0.0001
Lag 2 years	0.0006	-0.0005	0.0004	0.0002**	0.0001***
Lag 3 years	0.0001	-0.0003	0.0002	0.0001	-0.0001
Lag 4 years	0.0003	-0.0003	0.0011	0.0000	0.0000
shooting range					
No lag	-0.0002	0.0006***	0.0033**	0.0011***	-0.0018***
Lag 1 year	-0.0005	0.0006***	0.0039**	0.0011***	-0.0017***
Lag 2 years	-0.0005	0.0005***	0.0033**	0.0012***	-0.0017***
Lag 3 years	-0.0008**	0.0006***	0.0044**	0.0013***	-0.0017***
Lag 4 years	-0.0005	0.0006***	0.0067***	0.0013***	-0.0018***
Swimming pools					
No lag	-0.0024	0.0066	0.0168	0.0005	0.0011
Lag 1 year	0.0032	-0.0064	-0.0124	-0.0005	0.0003
Lag 2 years	0.0022	-0.0067	0.0187	-0.0015	-0.0005
Lag 3 years	0.0033	-0.0067	-0.0112	-0.0004	0.0035
Lag 4 years	-0.0048	-0.0095	-0.0394*	-0.0012	0.0037
Sports halls					
No lag	0.0001	0.0006***	0.0023**	0.0001	-0.0002
Lag 1 year	-0.0000	0.0005***	0.0010	0.0001	-0.0002
Lag 2 years	-0.0001	0.0004	0.0004	0.0003	-0.0002
Lag 3 years	-0.0002	0.0005**	0.0006	0.0003	0.0023
Lag 4 years	0.0001	0.0003	0.0007	0.0003	0.0031
Playgrounds with exercise equipment					
No lag	0.0004***	-0.0008***	-0.0007	-0.0008***	0.0009
Lag 1 year	-0.0002	-0.0005**	-0.0027*	-0.0007**	0.0009
Lag 2 years	-0.0000	-0.0004	-0.0025	-0.0007**	0.0008
Lag 3 years	-0.0004	-0.0001	-0.0047***	-0.0011	0.0005
Lag 4 years	-0.0007	0.0003	-0.0014	-0.0011	0.0004

At the same time, the increase in the number of pools has a positive delayed (with a four-year lag) effect on the parameters of tuberculosis incidence. An increase in the number of sports halls has an inverse relationship with the incidence of influenza, acute respiratory infections, and tuberculosis. In contrast, the impact of the increase in the number of playgrounds with exercise equipment is positive. The increase in their number leads to an increase in the average life expectancy, a reduction in the incidence of influenza, acute respiratory infections, and tuberculosis, and a decrease in the problem of hypertension among the population.

Besides, this study evaluates the transmission effect of the development of sports infrastructure on the parameters of population mortality (Table 5).

Table 5. Results of the assessment of the impact of sports facilities on the mortality parameters of the population of Ukraine (2000-2021)

Time lag in the model	Mortality of the population, per 100,000 of the existing population					
	general	from some infectious and parasitic diseases	from neoplasms	from diseases of the circulatory system	from respiratory diseases	from diseases of the digestive organs
			Stadiums			
No lag	-0.4539	0.0521*	-0.1199	-0.5841	-0.0106	0.0070
Lag 1 year	0.0024	0.0499	-0.1220	-0.5385	0.0042	0.0119
Lag 2 years	0.0279	0.0556**	-0.0831	-0.3509	0.0045	0.0127
Lag 3 years	0.3155	0.0632**	-0.0409	-0.1365	0.0441	0.0179
Lag 4 years	-0.1263	0.0593**	-0.0595	-0.3597	-0.0056	-0.0051
			Sports grounds			
No lag	0.0010	0.0006	-0.0056	-0.0282	0.0003	-0.0002
Lag 1 year	-0.0107	0.0009	-0.0029	-0.0167	-0.0009	0.0004
Lag 2 years	-0.0101	0.0006	-0.0021	-0.0123	-0.0013	-0.0002
Lag 3 years	0.0053	0.0004	-0.0002	0.0006	0.0006	-3.69e-06
Lag 4 years	-0.0016	0.0001	-0.0008	-0.0092	-0.0006	-0.0011
			Football fields			
No lag	0.0898	0.0033	-0.0329	-0.1089	0.0097	0.0012
Lag 1 year	-0.0959	0.0004	-0.0414	-0.2229	-0.0117	-0.0053
Lag 2 years	-0.0756	-0.0007	-0.0386	-0.2236	-0.0142	-0.0099
Lag 3 years	-0.0043	-0.0077	-0.0428*	-0.2583**	-0.0151	-0.0158**
Lag 4 years	-0.0109	-0.0061	-0.0185	-0.1392	-0.0144*	-0.0113
			shooting range			
No lag	-0.0718	-0.0057	-0.0059	-0.0327	-0.0018	0.0011
Lag 1 year	-0.0279	0.0061***	-0.0053	-0.0227	0.0009	0.0025
Lag 2 years	0.1143***	0.0063***	-0.0028	-0.0068	0.0012	0.0032
Lag 3 years	0.1147***	0.0062***	-0.0019	0.0006	0.0048	0.0030
Lag 4 years	-0.0122	0.0058***	-0.0013	0.0021	0.0030	0.0021
			Swimming pools			
No lag	1.0285*	-0.0512	-0.1665	-0.3385	0.0786	-0.0595
Lag 1 year	-0.3462	-0.1549***	-0.7587***	-4.0529***	-0.1707*	-0.2003**
Lag 2 years	0.2525	-0.0074	-0.1756	-0.8676	0.0228	0.0328
Lag 3 years	0.2399	-0.0359	-0.0519	-0.4329	-0.0211	-0.0839
Lag 4 years	0.9335	-0.0587	-0.0395	-0.0350	0.0386	-0.0319
			Sports halls			
No lag	-0.0335	0.0029	-0.0085	-0.0450	-0.0017	0.0002
Lag 1 year	-0.0130	0.0028	-0.0086	-0.0403	-0.0006	0.0006
Lag 2 years	-0.0058	0.0027	-0.0077	-0.0363	-0.0012	-0.0001
Lag 3 years	0.0068	0.0026	-0.0069	-0.0359	0.0003	-0.0007
Lag 4 years	-0.0181	0.0021	-0.0059	-0.0405	-0.0019	-0.0019
			Playgrounds with exercise equipment			
No lag	-0.0618***	-0.0001	0.0046	-0.0050	-0.0065**	-0.0009
Lag 1 year	0.0652	-0.0048**	0.0036	0.0315	0.0024	0.0007
Lag 2 years	0.0561	-0.0051*	0.0054	0.0426	0.0039	0.0005
Lag 3 years	0.1187**	-0.0052	0.0081	0.0773	0.0107*	0.0016
Lag 4 years	0.1569***	-0.0076**	0.0006	0.0488	0.0119	-0.0021

The calculations showed that the increase in the number of stadiums is associated with an increase in the mortality rate from some infectious and parasitic diseases. Sports grounds and gymnasiums do not have a statistically significant effect on the population's mortality rates. At the same time, the increase in the number of football fields leads in the medium term to a reduction in the incidence of neoplasms, diseases of the circulatory system, respiratory organs, and digestive organs. On the other hand, the increase in the number of shooting ranges is associated with both an increase in the overall mortality rate and an increase in the mortality rate from some infectious and parasitic diseases. The impact of population growth on quality of life parameters

should be positively noted. Even though, in the short term, population growth is associated with an increase in the mortality rate, when a time lag of one year is introduced into the model, the mortality parameters of the population decrease in terms of the investigated causes. A rather interesting trend is observed in the indicators of the development of playgrounds with exercise equipment. Thus, the increase in their number causes a reduction in the population's mortality rate in the short term, a delayed positive effect on the reduction of mortality from some infectious and parasitic diseases, and a decrease in the mortality rate from respiratory diseases.

Conclusions. The conducted research proved a rather limited impact of the sports industry's development on the population's health parameters. These limitations are in some way related to the imperfection of the existing statistical base and the lack of a longer period of statistical data coverage, which would allow for a more objective assessment of delayed effects. On the other hand, the individual results provide a basis for identifying the key directions to which the sports management system should be directed. It will increase the population's involvement in physical culture and sports, as well as improve the health and quality of life indicators of the population. So, in particular, the study confirms that popularizing a healthy lifestyle and practicing amateur sports improves the quality of the population's health while practicing professional sports creates additional risks and dangers. It allows to focus attention on the need for information campaigns in sports management, to balance the focus of the development of the sports industry on professional and amateur, etc.

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Менеджмент спортивної індустрії для забезпечення здоров'я населення: перспективи запровадження інновацій

Стаття присвячена дослідженню взаємозв'язку між менеджментом спорту та забезпеченням здоров'я населення. Дослідження актуальних напрямків розвитку менеджменту спортивної індустрії було проведено за допомогою бібліометричного аналізу. Його результати засвідчили, що сучасна система менеджменту спорту має враховувати якість надання спортивних послуг та можливості їх комерціалізації, вплив спору на життя та здоров'я людей, роль спорту в забезпеченні сталого розвитку, фінансове забезпечення спортивної індустрії. Для оцінювання впливу спортивної галузі на громадське здоров'я та якість життя населення було сформовано набір статистичних індикаторів, що характеризують функціонування спортивної галузі (кількість спортивних споруд, залучення населення до занять спортом та оздоровчою діяльністю) та стан здоров'я населення (параметри очікуваної тривалості життя, захворюваності та смертності) України за 2000-2021 роки. Розрахунки було проведено за допомогою регресійного моделювання за методом Прайса-Вінстена з урахуванням часового лагу від 0 до 4 років. Отримані результати засвідчили, що на сучасному етапі розвиток спортивної галузі має обмежений вплив на показники здоров'я населення. Зокрема, було виявлено, що заняття фізкультурно-оздоровчою активністю населення сприяє скороченню рівня його смертності, а заняття населення такою активністю на підприємствах, в установах та організаціях сприяє також скороченню частки населення, що має надмірну вагу. До того, зафіксовано прямий зв'язок між зростанням спортивної активності населення та погіршенням окремих параметрів громадського здоров'я (зокрема, захворюваності на туберкульоз, гіпертонію, смертності від деяких хвороб). При цьому було підтверджено, що активність населення у заняттях спортом значною мірою залежить від кількості спортивних споруд. Це дозволило оцінити трансмісійні ефекти впливу наявності спортивних споруд на здоров'я населення. Розрахунки засвідчили, що зростання кількості спортивних споруд для занять професійним спортом переважно має негативний вплив на показники здоров'я та життя населення, у той час, як вплив майданчиків з тренажерним обладнанням є переважно позитивним. Це дозволяє обґрунтувати напрямки, на розвиток яких має бути зосереджений менеджмент спортивної галузі для забезпечення максимізації її позитивного впливу на здоров'я населення.

Ключові слова: спорт, менеджмент, громадське здоров'я, моделювання, інновації, фізкультурно-оздоровча діяльність, спортивні споруди, тривалість життя, смертність.