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ASSESSMENT OF SELECTED AREAS OF SPORT IN EU COUNTRIES

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ABSTRACT. Sport is an important sector of economic activity and is closely linked to other areas of the service sector (culture, education, tourism, recreation and leisure time). The aim of the study is evaluation of selected areas of sport in the EU countries with focus on economic matters of sport and areas associated with the development of sports services. This study makes use of multivariate methods (factor analysis and cluster analysis). The results of the factor analysis, based on the assessed factors in sports focused on economic matters in sport and development of sports services have shown that, with exceptions, the EU countries vary in their sport policies. The most notable differences in terms of the evaluated areas of sport have been found in Performing Physical Activities and Employment in Sport. The findings on the evaluated areas of sports, received by use of cluster analysis, the K-means method, show that despite marked differences in sport policies, partial similarities can be found between certain groups of countries and mutual ties to identical sport policy systems. The findings may be beneficial not only to creators of sport policies in the individual EU countries but also to other actors in the sport industry and services in both the public and the private sectors.

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Introduction

A dynamic development of new sectors and areas of national economies has been observed over the past two decades (AlShehail, *et al.*, 2022; Campmas, *et al.*, 2022; Duernecker & Sanchez-Martinez, 2023). The service sector has become the dominant area, which is also referred to as the tertiary sector from the vantage point of national economy (Hoekman & Shepherd, 2017). This sector includes all areas of human activity that are based on the provision of services, namely the provision of labour, knowledge, financial means, infrastructure, products, and their mutual combinations (Management Mania, 2019; Linhartová, 2020; Shpak *et al.*, 2022; Cao, *et al.*, 2023; He, 2024). Gradually, areas have created in the service sector that generate services with an effect on one's development, hence human potential. Areas such as education, health care, social care, culture and sport have also been placed into this socio-economic structure (Stejskal *et al.*, 2017, p. 247; Macmillan & Paine, 2021; Sonderskov & Ronning, 2021).

The definition of sport can be, to a certain extent, derived from related areas that have already been more scientifically scrutinised at the European level (Mana, 2021). Sport is tightly linked to other areas of the service sector, such as culture, healthcare, tourism, free time, recreation or education (Clifton *et al.*, 2016; Porcceli, & Vidoli, 2020; Milon *et al.*, 2024) and also eliminates risky behaviour of the population (Bejtkovský & Snopek, 2021; Snopek & Bejtkovský, 2022). Physical and sport activities performed in the nature have increased in their importance and are becoming a tool towards the development and use of land with a special emphasis on sustainability of the environment (Radicchi, 2013). In a broad context, body culture can be regarded a service. Body culture is usually associated with four main sub-systems (physical education, sport, hiking, and recreation), (Jarvie, 2017). Sport is an important sector of economic activity that is closely related to increased competition in sport equipment and services (Wisniewski, 2020; Ma *et al.*, 2021; Lu & Wei, 2022; Vamplew, 2023). Sport as a service can be defined according to the International Classifications of Non-profit Organisations (ICNPO), which places it as a main group of service areas, along with culture and leisure time (Šebo, 2011). Another definition is provided through the Classification of the Purposes of Non-Profit Institutions with the UN, where sport is listed under the category of sport and culture services (Šebo, 2011). The classification of economic activities (NACE) offers another viewpoint on sport. Sport belongs in the category of recreational, cultural and sport activities. In terms of the classification of the functions of government institutions (COFOG), sport also belongs in the category of recreation, culture and religion, where recreational and sports services represent an individual category (Eurostat, 2019).

The economic definition of sport in Europe is based on the Vilnius definition of sport, which distinguishes between three layers of definition of sport, namely the statistical, narrow, and broad definitions. As regard the economic dimension of sport, the statistical definition is the most relevant, which only includes sport activities (Eurostat, 2018; Mana, 2021; Pletosu *et al.*, 2021).

Previous research topics concerning sport in the international, European or national contexts mainly examined the service sector including leisure sports services, the role of sports and the industry (Chen, 2019; Dong, 2022; Zhai *et al.*, 2024), sports tourism, sports environment and infrastructure (Bilan *et al.*, 2023; Radicchi, 2013; Thomas & Guett, 2014), but

also economic changes of sport, or the efficiency and quality of sport and recreation services (Ma *et al.*, 2021; Seong, 2021; Szabo *et al.*, 2021; Wang, 2022). Other studies focused on competition in sport, the role of sport policies and national sport and leisure-time programmes (Wisniewski; 2020; Koibichuk *et al.*, 2022; Segui-Urbaneja *et al.*, 2022; Emmonds, *et al.*, 2024) or the specification of sports services and the possibility of their funding on the national or local levels (Jaworek *et al.*, 2020; Kucera & Nemeč, 2022 Ungheri & Isayama, 2022). Previously carried research (Li, 2015; Taylor & Thomass, 2017; Sun & Hu, 2021; Sustarsic *et al.*, 2022) paid close attention to only specific parts of sport (sports environment and infrastructure) or selected categories of disciplines and services, for instance high-performance sports, winter sports, summer sports, or Olympic sports (Wicker & Frick, 2020; Koibichuk *et al.*, 2022; Antunovic & Bartoluci, 2023).

Compared to other research, our motivation is to evaluate selected areas of sport in the European context (using the sample of 27 EU countries) by use of multivariate methods (factor and cluster analyses). Our aims are to fill the gap in this research area by using a more comprehensive approach towards the areas in question with an emphasis on economic matters in sport (employment in sport, trade in sport equipment) and an area associated with the development of selected sports services.

1. Literature review

A number of authors address sport in the narrow sense (mainly with emphasis on sports services and sport infrastructure) or in the broad sense in relation to sport environment and sport industry (Thomas & Guett, 2014; Cheerder *et al.* 2017; Chen, 2019; Dong, 2022; Kashcha *et al.*, 2022; Sustarsic *et al.*, 2022; Wang, 2022; Antunovic & Bartoluci, 2023; Zhai *et al.*, 2024).

The current topics of research studies are sport and recreation services, their organisation, procurement and evaluation (Li, 2015; Taylor & Thomass, 2017; Liang, 2021; Sun & Hu, 2021; Lu & Wei, 2022; Wang, 2022). Szabo *et al.* (2021) evaluated recreation and sports services and noted a certain level of change (above the EU28 average) and an increase in the number of producers of sport equipment and their turnover in four countries (Czechia, Croatia, Hungary, and Slovakia). Liang (2021) evaluated the current structure of the public sports service, which has several deficiencies. It is necessary to improve the system applied to evaluate the efficiency of public sports services and to extend the structure of investment channels. These measures can lead to a better quality of public sports service and to an improved system from the viewpoint of public health. Other studies (e.g. Eime *et al.*, 2017; Ma *et al.*, 2021; Sun & Hu, 2021; Swadźba *et al.*, 2024) in which sports services were analysed reach the agreement that public sports service may encourage some groups of people (e.g. senior citizens or other age groups) to participate in exercising and thus to have a positive effect on their health. In connection with this, Thomas & Guett (2014) looked into the options of the provision of sport to the disabled in 19 European countries, including the infrastructure of sports services. The findings have shown that the organisation and structure of sport activities for the disable is scattered and complicated in Europe.

In relation to the quality and efficiency of sports services, Halaskova & Halaskova, (2020); Jaworek *et al.*, (2020); Kucera & Nemeč (2022) deal with questions associated with funding and an optimal allocation of resources, the analysis of allocated expenditures on sports services, or investment in sports services and sport infrastructure. Yang *et al.* (2022) focused on investment, performance and effect of selected sports services in eastern, central, western and north-eastern regions. Based on their findings, the authors claim that the eastern region demonstrates good results and the best investment in public sports services, which also reflects on the performance and effect of sports services. Jaworek *et al.* (2020) evaluated government

expenditures on recreation and sport in Poland and other EU countries, including the intensity of investment in sport infrastructure. On the basis of their results, Poland lags behind many EU countries and a gap exists between sport needs and the possibility to satisfy them. Bridging this gap is then one of key conditions for a sustainable development of the Polish society. Halaskova & Halaskova (2020) analysed public expenditures on sport, recreation and leisure activities in regions of Czechia at the NUTS III level, including the assessment of changes, similarities and differences. Kucera & Nemeč (2022) identified changes in the methodology of funding national sport associations and redistribution of public resources in Slovakia. The findings demonstrate that the new system of funding national sport associations from the standpoint of public resources is not more just, which also brings about fundamental problems in implementation.

Economic changes and new trends have a strong impact on the whole service sector, including leisure sports services. Szabo *et al.* (2021) states that economic changes have a strong impact on leisure sports services in Central and Eastern Europe and brought great opportunities and challenges for service providers. According to Chen (2019); Dong (2022) or Sustarsic *et al.* (2022), sport industry is also a prerequisite for economic changes in sport, i.e. an industry activity focused on sports in which people, activities, business, and organisations are involved in producing, promoting or organising any sport activity. A rapid growth of IT has also had an impact on the development of the sport industry. As a result, the sport industry and sport management aim for high-quality services provided to clients (Campmas *et al.*, 2022; Sustarsic *et al.*, 2022). Dong (2022) states that it is mainly digital economy that embraces good-quality development of sport industry, supporting industrial innovation and providing consumers with diversified, personalised services. Another author, Seong (2021), analyses theoretical approaches towards management in sport industry that contribute to an increased quality of services. Chen (2019) or Szabo *et al.* (2021) address the importance of the individual sectors (public, non-profit, and private sectors) in relation to sport industry. In particular, Chen (2019) emphasises the key position of three organisational sectors (public, non-profit, and business sectors) in the sport industry, which include the creation and production of sporting goods, services, programmes, and facilities. In this context, Szabo *et al.* (2021) argue that state and non-governmental sectors need to step up their activity and involve as many people as possible in leisure sports.

One of the most dynamic sectors of the contemporary leisure-time industry is sports tourism. According to Radicchi (2013, p. 50) “*sports tourism stimulated a reflection on the role that the synergies between tourism and sport, combined with the use of resources, services and local products may have for the development of a specific territory. It is a very important socio-cultural and economic phenomenon which combines elements of tourism and sport by offering a wide variety of activities dedicated to different target groups (e.g. children, women, youth, senior citizens).*”

In terms of sport policy, other areas of the development of sport, sports services and leisure time activities, including their evaluation and monitoring, must be mentioned (Ungheri *et al.*, 2022). Cheerder *et al.* (2017); Kucera & Nemeč (2022); Segui-Urbaneja *et al.* (2022) argue that the economic situation of a country and its sport support policies have a significant influence on active population and the achievement of the national sport federations. According to Segui-Urbaneja *et al.* (2022, p. 1), “*main promoters of sport at a national level, sport federations, and their complex management involves coordinating relations with private entities, public administrations, and international organisations*” Koibichuk *et al.* (2022, p. 264) focused on the evaluation of the efficiency of the sport management system in 30 European countries. The authors have found that “*the efficiency of high-performance sports is in countries with an above-average efficiency of the system of sport management dependent upon the amount of state resources for the development of sport. The more massive the development of*

sport is in a given country, the more probable it is that the country will achieve high ranks in high-performance sports.” Veal (2022) assessed the performance of states in assuring the right to participate in sports in EU countries. Antunovic & Bartoluci (2023) evaluated the media coverage in selected sports, representation of sportspeople, their gender balance and the role of national interests in Central and East European countries. However, also supranational trends as well as local specifics should be taken into consideration.

2. Methodological approach

The subject of research are areas of sports and sport policy. The present study aims to evaluate selected areas of sports in EU countries with a focus on economic matters in sport and areas associated with the development of sports services. For the sake of reaching the goal, the following research questions (RQ) are verified using the sample of the 27 EU countries. The source of the research questions is the current state of sport, sport policy and sports services and conclusions of selected empirical studies handling this issue.

RQ1: Are there any differences between the EU countries in the evaluated areas of sport and sport policy (in the economic dimension and areas of sports services)?

RQ2: Is it possible to place similar groups of EU countries (according to the economic dimension of sport and sports services) into the same types of systems of sport policies?

2.1. Data

For the analyses in this article, data from the Eurostat statistical database “Population and social conditions with a focus on sport (sport participation, employment in sport, physical activity and time spent in sport)” were used (Eurostat, 2024). In addition, available data from the EIGE gender statistical database “Decision-making in sport” (EIGE, 2024) were also used. These data include statistics on the representation of women and men in the highest decision-making bodies of national sports federations in each country (including national sports federations based on a sample of the ten most funded Olympic sports and national sports federations covering a sample of the ten most popular Olympic sports).

For the analysis, the year 2019 was chosen as the year with the most available data on sport issues in EU countries. It is the last available year for the five variables in the Eurostat database. More recent data for these variables in sports are not available. Indicators focused on physical activities (see Table 1) are considered default for the purposes of our analysis, which is why other variables (indicators) from sport were examined also in 2019.

Authors are aware of certain limitations of the analysis. However, should indicators focused on physical activities (available only until 2019) excluded from the analysis, it would affect the total content and results of the analysis already performed. For the other variables used (from the Eurostat and EIGE databases), more recent data were available. On the basis of the assessed trend of these variables, there were no significant changes in subsequent years. In order to preserve the current content of the analysis, we are therefore working with variables for 2019.

The sample consists of 27 EU countries (namely Belgium: BE, Bulgaria: BG, Czech Republic: CZ, Denmark: DK, Germany: DE, Estonia: EE, Ireland: IE, Greece: EL, Spain: ES, France: FR, Croatia: HR, Italy: IT, Cyprus: CY, Latvia: LV, Lithuania: LT, Luxembourg: LU, Hungary: HU, Netherlands: NL, Austria: AT, Poland: PL, Portugal: PT, Romania: RO, Slovenia: SI, Slovakia: SK, Finland: FI, Sweden: SE).

Initially, 21 variables from the field of sport were included in the analysis. However, some variables had to be excluded from the analysis because they did not meet the conditions

of the factor model (low communalities). In the end, 13 indicators were used in the analysis. An overview of the indicators used is documented in more detail in *Table 1*.

Table 1. Used indicators in sports

Indicator	Abbreviation	Unit	Source
Performing health-enhancing physical activity (Aerobic and muscle-strengthening) - total	PPAAS	Percentage	Eurostat
Performing health-enhancing physical activity (Aerobic) - total	PPAA	Percentage	Eurostat
Performing (non-work-related) physical activities (Muscle-strengthening) - total	NWPAS	Percentage	Eurostat
Performing (non-work-related) physical activities (Aerobic sports) - total	NWPAA	Percentage	Eurostat
Time spent on health-enhancing (non-work-related) aerobic physical activity ((150 minutes or over) - total	TSAPA	Percentage	Eurostat
Employment in sport - males	EMPSM	% of total employment	Eurostat
Employment in sport - females	EMPSF	% of total employment	Eurostat
Trade in sporting goods- exports total	TSGE	Thousand euro	Eurostat
Trade in sporting goods- imports total	TSGI	Thousand euro	Eurostat
National sports federations - top ten most popular Olympic sports (Members of the highest decision-making body) - Men	TPOSM	Number	EIGE
National sports federations - top ten most popular Olympic sports (Members of the highest decision-making body) - Women	TPOSW	Number	EIGE
National sports federations- top ten most funded Olympic sports (Members of the highest decision-making body) - Men	TFOSM	Number	EIGE
National sports federations - top ten most funded Olympic sports (Members of the highest decision-making body) - Women	TFOSW	Number	EIGE

Source: *Eurostat (2023), EIGE (2023)*

The correlation matrix (*Table 2*) shows the relationships between the values of the individual variables of the model in sport for the 27 EU countries. Asterisks indicate strong correlations between the variables that form the kernels of the emerging factors in the model. *Table 2* shows a strong consistency between the four emerging factors (in the highlighted squares), but also a relative closeness between the first two factors (hereafter denoted as PPA and EMS, see 3.2). There is also a partial positive correlation between the items of the 3rd and 4th factors (to be denoted as TTS and TSG), while a partial negative correlation between the items of the first and second factors on the one hand (PPA and EMS) and the third factor (TTS) on the other hand.

Table 2. Correlation matrix between individual variables in the field of sports

Corr. coef.	PPAAS	PPAA	NWPAS	TSAPA	NWPAA	EMPSM	EMPSF	TFOSM	TPOS	TFOSF	TPOSW	TSGE	TSGI
PPAAS	1	0.954**	0.963**	0.959**	0.922**	0.622**	0.684**	-0.546**	-0.510**	0.210	0.195	0.155	0.279
PPAA	0.954**	1	0.910**	0.989**	0.941**	0.621**	0.666**	-0.449*	-0.405*	0.249	0.225	0.194	0.328
NWPAS	0.963**	0.910**	1	0.930**	0.937**	0.624**	0.673**	-0.465*	-0.497**	0.187	0.184	0.031	0.179
TSAPA	0.959**	0.989**	0.930**	1	0.962**	0.553**	0.588**	-0.399	-0.357	0.227	0.196	0.185	0.334
NWPAA	0.922**	0.941**	0.937**	0.962**	1	0.619**	0.613**	-0.366	-0.357	0.247	0.225	0.174	0.332
EMPSM	0.622**	0.621**	0.624**	0.553**	0.619**	1	0.967**	-0.452*	-0.436*	0.223	0.325	-0.110	0.033
EMPSF	0.684**	0.666**	0.673**	0.588**	0.613**	0.967**	1	-0.520**	-0.501**	0.209	0.278	-0.076	0.048
TFOSM	-0.546**	-0.449*	-0.465*	-0.399	-0.366	-0.452*	-0.520**	1	0.958**	0.472*	0.389*	0.052	0.196
TPOS	-0.510**	-0.405*	-0.497**	-0.357	-0.357	-0.436*	-0.501**	0.958**	1	0.492*	0.399*	0.026	0.114
TFOSF	0.210	0.249	0.187	0.227	0.247	0.223	0.209	0.472*	0.492*	1	0.962**	0.330	0.601**
TPOSW	0.195	0.225	0.184	0.196	0.225	0.325	0.278	0.389*	0.399*	0.962**	1	0.202	0.383*
TSGE	0.155	0.194	0.031	0.185	0.174	-0.110	-0.076	0.052	0.026	0.330	0.202	1	0.918**
TSGI	0.279	0.328	0.179	0.334	0.332	0.033	0.048	0.196	0.114	0.601**	0.383*	0.918**	1

Note: significance levels * = 0.05, ** = 0.01

Source: Authors calculations, software IBM SPSS Statistics 29

2.2. Statistical methods

Exploratory factor analysis (EFA) was used to analyse and evaluate indicators in sport in EU countries. Exploratory factor analysis is a multivariate statistical method that has become a fundamental tool in the development and validation of theories and measurements. The main function of EFA is to reduce the number of variables in the data set. The purpose of this statistical method is to analyse the correlations in a set of measurable (manifest) variables and based on this analysis, to identify groups of variables that are explained by a common factor (latent variable). main function is. The number of factors found should be as small as possible and the observed relationships should be explained as simply as possible. Once the individual factors are identified, they can appear as new variables in the analyses, representing the original items (Watkins, 2018).

The maximum likelihood method (MLM) was used to extract factors from the 13 sport indicators (see Table 1). Maximum likelihood estimation is a very common procedure which allows testing whether the selected number of common factors is sufficient. The initial number of factors was estimated according to Kaiser's rule (eigenmatrix number > 1), which should yield 6 factors. However, for this proposed number of factors the analysis failed (not significant), due to the very similar values of the 4th to 7th eigenvalues. Therefore, 4 factors were finally chosen. At this point the Cattell curve breaks most significantly and the proposed 4 factors appear to be satisfactory for the use of factor analysis (Fabrigar & Wegener, 1999).

Table 3. Total Variance Explained

Factor	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.339	11.694	11.694	5.582	27.910	27.910
2	2.965	14.826	26.520	3.209	16.043	43.953
3	7.192	35.960	62.480	2.600	12.998	56.952
4	1.040	5.200	67.680	2.146	10.728	67.680

Source: *Authors calculations, software IBM SPSS Statistics 29*

As shown in *Table 3*, the four extracted factors cover about 68% of the variability of the original correlation matrix, which is a very good predictive value. This is also shown using the χ^2 likelihood ratio test, whose p -value (significance) is greater than 0.05, confirming the hypothesis that the four-factor model shows a good fit to the input data.

The VARIMAX method was used to rotate the factors, which has the advantage that it distributes the information from the input data evenly among the resulting factors, making them easier to interpret. As shown in *Table 4* with the extracted factors, the ratio between the explanatory value of the "strongest" and "weakest" factor was almost 7: 1 before rotation. Rotation reduced this ratio to less than 3:1. The extracted factors are uncorrelated with each other (orthogonal), which is one of the implications of the VARIMAX rotation used in factor analysis (Härdle & Simar, 2015).

The basic statistics of the factor scores were obtained using Bartlett's method (DiStefano, Zhu & Mindrila, 2009). The factors are normalized, i.e., they have zero mean and a standard deviation (variability) equal to one. All four factors are positively skewed, with the third and fourth factors (TTS and TSG) significantly. In addition, the third factor (TTS) has also significantly high kurtosis, i.e., concentration of values.

Table 4. Descriptive Statistics of factors

	Mean	Std. Deviation	Skewness	Kurtosis
Factor 1 - Performing Physical Activities	0.00	1.01	0.657	-0.926
Factor 2 - Employment in Sport	0.00	1.00	0.634	-0.480
Factor 3 - Top Ten Sports	0.00	1.01	2.030	5.456
Factor 4 - Trade in Sporting Goods	0.00	1.00	1.537	1.125

Source: *Authors calculations, software IBM SPSS Statistics 29*

Based on the created factor variables (F1 to F4), a cluster analysis was used to rank the EU27 countries according to the similarity of the observed sport areas. Cluster analysis (CA) is a multivariate statistical method that is used to classify objects. It is used to categorize units into groups (clusters) based on their characteristics so that units belonging to the same group are more similar than objects from other groups (Everitt, 2011). The K-means method was used for clustering. This is a frequently used algorithm for non-hierarchical cluster analysis when the number of clusters to be formed k is known in priori. The method presumes that the clustered objects can be interpreted as points in multidimensional Euclidean space. The individual clusters are represented by their geometric midpoints - centroids. The iterative algorithm proceeds by classifying each point into the cluster whose centroid is closest to. After each run of the algorithm, the centroids are recomputed, and the procedure is repeated until the position of the centroids is stable (Steinley, 2006).

3. Results

In this section are presented results of the analysis of the selected sport indicators from 27 EU countries with the use of factor and cluster analyses.

3.1. Results of sport indicators in EU countries with the use of factor analysis

The results of factor analysis of the selected sport indicators in 2019 for 27 EU countries are shown in *Table 5*. A total of 13 input variables were introduced into the final factor model in the form of a factor matrix. Only the values of the saturation coefficient are depicted in the factor matrix (correlation between factors and variables in sport) above 0.6. The resulting model can be considered balanced. The connection between factors and variables in sport is clear: no variable saturates more than one factor (at the selected limit of 0.6).

Table 5. Factor matrix of variables (indicators) in sport

Rotated Factor Matrix ^a	Factor 1	Factor 2	Factor 3	Factor 4
PPAAS	0.925			
PPAA	0.912			
NWPAS	0.899			
TSAPA	0.884			
NWPAA	0.819			
EMPSM		0.924		
EMPSF		0.820		
TPOSM			0.833	
TFOSM			0.813	
TFOSW			0.739	
TPOSW			0.692	
TSGE				0.991
TSGI				0.890

Source: *Authors' calculation, software IBM SPSS Statistics 29*

The resulting factors in sport (F1 through F4) can be described by means of structural equations in which only such variables occur that the given factor saturates significantly. A strong correlation is present between all four resulting factors F1 through F4 and the variables saturating them. That means that the higher the value of the given factor is, the higher are the results of the variables (indicators) in sport of which the factor consists, and vice versa.

Therefore, in the following analyses, factor **F1** = PPAAS + PPAA + NWPAS + TSAPA + NWPAA will refer to Performing Physical Activities (PPA). Factor **F2** = EMPSM + EMPSF will refer to Employment in Sport (EMS). Factor **F3** = TPOSM + TFOSM + TFOSW + TPOSW will represent Top Ten Sports (TTS), and factor **F4** = TSGE + TSGI Trade in Sporting Goods (TSG).

3.1.1. Analysis of the created factors in sport in EU countries

The box plot (*Figure 1*) shows the mutual division of values according to the created factors in the selected areas of sport policy in the EU countries in 2019. The extrapolated sport factors in the individual EU countries (*Figure 1* and *Table 6*) make it clear that Denmark (1.81), Germany (1.79), Sweden (1.66), and Finland (1.56) reach the highest values in the first factor – Performing Physical Activities (PPA). Among the countries with the lowest PPA values are

Romania (-1.18), Portugal (-1.17), and Latvia (-1.16). The highest value in the second factor, Employment in sport (EMS) is reached by Sweden (2.26), whereas the lowest by Romania (-1.41). In terms of the factor Top Ten Sports (TTS), France has a markedly higher value when compared to the other countries (3.63), while also Spain or Cyprus reach a high value (1.68 and 1.30, respectively). By contrast, Slovakia (-1.07) and Lithuania (-1.06) reach the lowest value in TTS. Regarding factor F4 – Trade in Sporting Goods (TSG), the outlying values are Germany (2.39), Belgium (2.43), the Netherlands (1.89), and Italy (1.70), as opposed to Luxembourg (-0.87) with the lowest value.

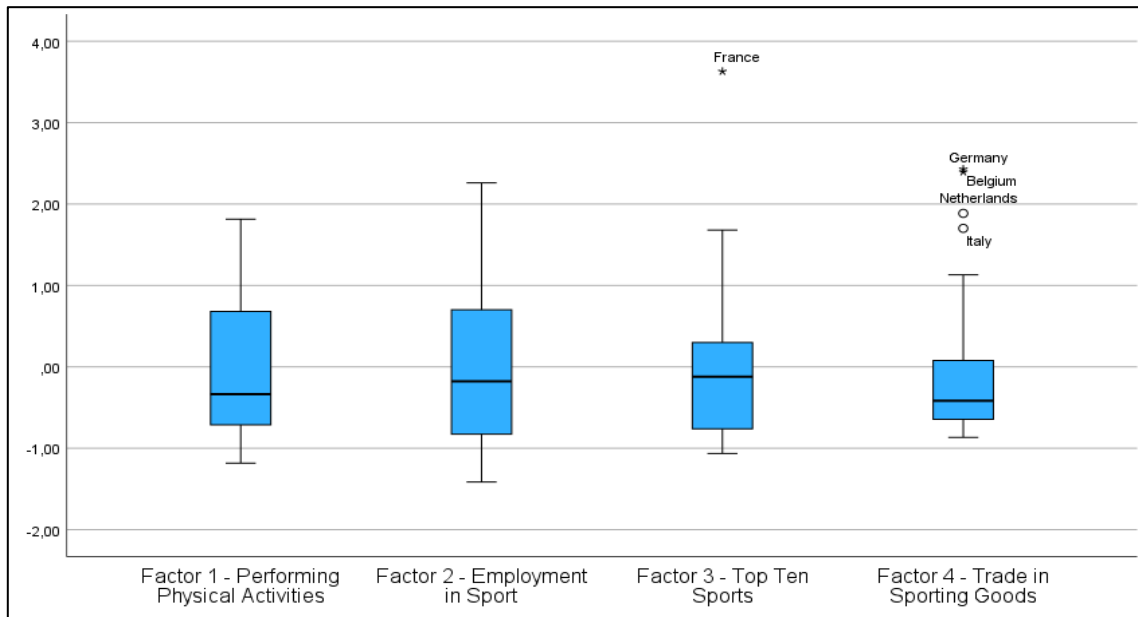


Figure 1. Factor values in sport in EU countries

Source: *Authors' calculation, software IBM SPSS Statistics 29*

Table 6 details the values of the four extrapolated factors in sport for the individual countries of the EU27 in 2019. The values of the score factors in sport (F1-F4) and the order of the EU countries show which areas are significant for the countries according to the factors (i.e., to which areas of the sports sector they attached importance)—the sector of sports services and the economic dimension of sport.

Among the countries with values above the median values in at least three factors of sport (according to the areas evaluated) are Sweden and Spain (F1-F4), Ireland (F1– PPA, F2 - EMS, F3 -TTS), France (F1- PPA, F3-TTS, F4-TSG) and Italy (F3- EMS, F3-TTS, F4-TSG).

The countries with values above the median in two sport areas evaluated in 2019 are Denmark and Finland (F1-PPA, F2-EMS), Germany and Austria (F1-PPA, F4-TSG), the Netherlands and Portugal (F2-EMS, F4-TSG), and Slovenia (F1-PPA, F3-TTS). In contrast, values below the median in the majority of the areas evaluated (according to the factors) were Romania, Bulgaria, and Lithuania. Table 6 documents more detailed results in the individual EU countries.

Table 6. Score of factors in sport in EU countries in 2019

country	F1 - PPA	F1- PPA rank	F2-EMS	F2 - EMS rank	F3 -TTS	F3 - TTS rank	F4-TSG	F4 - TSG rank
BE	-0.34	14.	-0.38	15.	-1.02	26.	2.43 +++	1.
BG	-1.09	23.	-0.54	18.	-0.78	21.	-0.42	14.-15.
CZ	-0.70	19.-20.	0.13	11.	-0.40	17.	-0.03	9.
DK	1.81 ++	1.	0.43	9.	-0.44	18.	-0.61	19.
DE	1.79 ++	2.	-0.89	21.	-0.19	15.	2.39 +++	2.
EE	-0.58	17.	0.76	7.	-0.11	12.-13.	-0.57	16.
IE	0.21	9.	0.89	6.	0.34	5.-6.	-0.69	22.-23.
EL	-0.42	15.	-0.68	19.	1.24	4.	-0.75	25.
ES	-0.11	12.	1.16	4.-5.	1.68 ++	2.	0.08	7.-8.
FR	0.16	10.	-0.48	16.	3.63 +++	1.	1.13	5.
HR	-0.47	16.	-0.18	14.	0.28	8..	-0.64	20.
IT	-0.88	22.	-0.10	13.	0.14	9.	1.70 ++	4.
CY	-0.73	21.	0.09	12.	1.30	3.	-0.76	26.
LV	-1.16	25.	1.89 ++	2.	-0.87	24.	-0.40	13.
LT	-0.17	13.	-0.96	22.	-1.06	27.	-0.60	18.
LU	1.48 +	5.	-1.03	23.	-0.11	12.-13.	-0.87	27.
HU	0.74	7.	-1.13	25.	-0.27	16.	-0.69	22.-23.
MT	-1.10	24.	0.34	10.	0.34	5.-6.	-0.65	21.
NL	-0.59	18.	1.48 +	3.	-0.82	22.	1.89 ++	3.
AU	1.28 +	6.	-0.49	17.	-0.92	25.	0.08	7.-8.
PL	-0.70	19.-20.	-0.77	20.	-0.02	10.	0.55	6.
PT	-1.17	26.	0.64	8.	-0.74	20.	-0.18	10.
RO	-1.18	27.	-1.41 -	27.	-0.46	19.	-0.36	12.
SI	0.62	8.	-1.14	26.	0.32	7.	-0.73	24.
SK	0.05	11.	-1.07	24.	-0.84	23.	-0.58	17.
FI	1.56 +	4.	1.16	4.-5.	-0.12	14.	-0.42	14.-15.
SE	1.66 ++	3.	2.26 ++	1.	-0.09	11.	-0.31	11.

Note: the +/- sign scheme is used to express the significance levels: above average: +++ = 1%, ++ = 5%, + = 10%; below average: - = 10%

Source: *Authors' calculations, software IBM SPSS Statistics 29*

3.2. Similarity of EU countries by factors in sport with the use of cluster analysis by K-means method

On the basis of the created sport factors (F1-F4), the countries of the EU27 have been divided into four clusters, using the K-means method. The EU countries are not equally distributed into clusters by their similarity. The first cluster comprises five countries, the third cluster is only two countries, and the second and fourth clusters are composed of 10 countries. EU countries located in a specific cluster show similarity according to the sports factors (F1-F4), which is also indicated by the distances of the individual countries from the center of the cluster. The lower the value is, the stronger the link to the given cluster is. *Table 7* shows the division of the EU countries into clusters according to the sports factors evaluated in 2019 (Performing Physical Activities, Employment in Sports, Top Ten Sports, and Trade in Sporting Goods).

Countries in the **first cluster** are similar mainly according to factor 4 – Trade in Sporting Goods (the highest values). Among the countries of the first cluster, large distances from the

center of the cluster are apparent in DE and NL, which confirms a lower attachment to the given cluster. Compared to the other countries in the cluster, DE has an above-average value (1.79) in F1-Performing Physical Activities, and NL has an above-average value (1.48) in F2-Employment in Sport. Countries located in the **second cluster** are similar mainly according to factor 1-Performing Physical Activities (the lowest values) and factor 2-Employment in sport (the highest values, mainly LV and SE). Certain differences exist in the case of LV and SE (F2-Employment in sport, above average) and CY (F3-Top Ten Sports, above average) in comparison to the other countries in this cluster. Differences can also be seen in the distances from the centre of the cluster (see *Table 7*).

Table 7. The division of EU countries in clusters by the evaluated sport factors in 2019

Cluster	Distance	Country	Factor in sport				Cluster	Distance	Country	Factor in sport			
			PPA	EMS	TTS	TSG				PPA	EMS	TTS	TSG
1.	0.952	BE	-0.34	-0.38	-1.02	2.43	2.	0.980	PT	-1.17	0.64	-0.74	-0.18
1.	2.170	DE	1.79	-0.89	-0.19	2.39	2.	2.723	SE	1.66	2.26	-0.09	-0.31
1.	0.908	IT	-0.88	-0.10	0.14	1.70	3.	1.385	ES	-0.11	1.16	1.68	0.08
1.	1.728	NL	-0.59	1.48	-0.82	1.89	3.	1.385	FR	0.16	-0.48	3.63	1.13
1.	1.542	PL	-0.70	-0.77	-0.02	0.55	4.	1.642	DK	1.81	0.43	-0.44	-0.61
2.	1.481	BG	-1.09	-0.54	-0.78	-0.42	4.	1.818	EL	-0.42	-0.68	1.24	-0.75
2.	0.766	CZ	-0.70	0.13	-0.40	-0.03	4.	1.143	LT	-0.17	-0.96	-1.06	-0.60
2.	0.185	EE	-0.58	0.76	-0.11	-0.57	4.	1.049	LU	1.48	-1.03	-0.11	-0.87
2.	0.902	IE	0.21	0.89	0.34	-0.69	4.	0.539	HU	0.74	-1.13	-0.27	-0.69
2.	0.898	HR	-0.47	-0.18	0.28	-0.64	4.	1.151	AT	1.28	-0.49	-0.92	0.08
2.	1.523	CY	-0.73	0.09	1.30	-0.76	4.	1.946	RO	-1.18	-1.41	-0.46	-0.36
2.	1.632	LV	-1.16	1.89	-0.87	-0.40	4.	0.792	SI	0.62	-1.14	0.32	-0.73
2.	0.796	MT	-1.10	0.34	0.34	-0.65	4.	0.894	SK	0.05	-1.07	-0.84	-0.58
							4.	2.054	FI	1.56	1.16	-0.12	-0.42

Source: *Authors' calculation, software IBM SPSS Statistics 29*

Countries of the **third cluster** (ES, FR) are similar mainly in terms of factor F3-Top Ten Sports (highest values). At the same time, these countries also reach the second highest values in F4-Trade in Sporting Goods in comparison to the remaining countries. Countries of the **fourth cluster** show similarity according to factor F1-Performing Physical Activities (with DK, FI, LU, AT, and SI reaching the highest values). Simultaneously, countries in this cluster have the lowest values in factor F4-Trade in Sporting Goods. In comparison to the other clusters, a weaker link to the cluster is seen in DK, FI, RO, and EL, as can be observed at longer distances from the center of the cluster. Specifically, DK and FI have a dominant position (above average values) in F2-Employment in Sport, whereas RO has the weakest position (below average value) in F2, and EL reaches above average value in F3-Top Ten Sports.

In addition to the results of the division of the EU countries by similarities of sports factors, the countries can also be categorised according to national sports policy systems (see *Table 8*).

Table 8. Clustering of EU countries by selected areas of sport and types of national sports policy systems

Clusters countries by similarities of sport factors	Type of Sports system
1. Cluster: BE, DE, IT, NL, PL	Bureaucratic configuration: BE, PL Social configuration-NL Missionary configuration: DE, IT
2. Cluster: BG, CZ, EE, IE, HR, CY, LV, MT, PT, SE	Bureaucratic configuration: CY, CZ, EE, LV, MT, PT, BG, HR Entrepreneurial configuration: IE Missionary configuration: SE
3. Cluster: ES, FR	Bureaucratic configuration: ES, FR,
4. Cluster: DK, EL, LT, LU, HU, AT, RO, SI, SK, FI	Bureaucratic configuration: FI, SK, EL HU, LT, RO, SI Missionary configuration: AT, DK, LU

Source: *Authors according to Henry (2009)*

Table 8 shows that out of the 27 EU countries, 19 countries show signs of Bureaucratic configuration sport policy system, which exhibits high degrees of state involvement. This model of sport policy is found in the selected countries of all clusters, with the highest representation in the second and fourth clusters. Six EU countries are characterised by the Missionary configuration sports policy system. Two countries have a specific position, with the Netherlands representing social configuration and Ireland's Entrepreneurial configuration sports policy system.

Table 9 shows the relation between the four clusters of the EU countries and the evaluated sport factors (F1-F4) according to the average values in 2019.

Table 9. Clusters of EU countries according to average values of factors in sport

Factors in sport	Clusters of countries			
	1	2	3	4
Factor 1 - Performing Physical Activities (PPA)	-0.14	-0.51	0.03	0.58
Factor 2 - Employment in Sport (EMS)	-0.13	0.63	0.34	-0.63
Factor 3 - Top Ten Sports (TTS)	-0.38	-0.07	2.65	-0.27
Factor 4 – Trade in Sporting Goods (TSG)	1.79	-0.46	0.60	-0.55

Source: *Authors' calculations, software IBM SPSS Statistics 29*

The clusters of countries based on average values of factors (areas) related to sport (*Table 9*) clearly show that F4-Trade in Sporting Goods is the dominant area in the **first cluster**. The other factors of the sport sector have a weaker representation, which is demonstrated by below average values (F3-Top Ten Sports) or slightly below average values (F1-Performing Physical Activities and F2-Employment in Sport). F2-Employment in Sport has a dominant position in the **second cluster** (above average values). By contrast, F1-Performing Physical Activities and F4-Trade in Sporting Goods have a weak position in this cluster (below average values). F3-Top Ten Sports has a dominant position with markedly above-average values in the **third cluster** (FR, ES). Also, the factors F4-Trade in Sporting Goods and F2-Employment in Sport reach above-average values. The **fourth cluster** of countries has a significant position in terms of F1-Performing Physical Activities (in particular, in DK, FI, LU, AT). Conversely,

countries in this cluster show below-average values in F2-Employment in Sport and F4-Trade in Sporting Goods.

4. Discussion

Based on the findings of research studies on the topic of sport, it can be stated that sports services play an increasingly important role in the service sector. Sport is closely linked to other areas in services, such as tourism, recreation, and leisure time. A number of authors examined sports services in a broader sense, and they used a variety of approaches with an emphasis on specific issues in sports (Eime *et al.*, 2017; Jaworek *et al.*, 2020; Ma *et al.*, 2021; Lu & Wei, 2022). In recent years, physical activities performed in the natural environment have been increasing in importance and are becoming a tool to develop and sustain the land (Radicchi, 2013; Wicker, 2019 or Mittag & Naul, 2021; Sennett *et al.*, 2022). Other authors also confirm this fact (Sennett *et al.*, 2022), stating that endogenous resources have been connected with specific sport activities as a strategic instrument, with some sports having quite notable touristic specificities (e.g. alpine skiing, cross-country skiing, sailing, cycling, paragliding). Leoisaac.com (2022) points out that many activities can be included in sport and recreation services, such as an organisation of programmes and events, registration and accreditation services, fundraising services, information services, clothing and equipment provision or health services. As also other research studies show (Mittag & Naul, 2021), an active sport participation includes travel between practice and home, training camps or day trips, and use of sports equipment and clothing. Similarly, Wicker (2019) argues that active team sports participants perform a little better than those in individual sports and outdoor sports in participation-induced travel.

Literature on the topic shows us diversity of sport models related to different traditions in the European context. A comparison of national structures in EU countries is therefore difficult on account of different definitions of sport, different forms of organisation of, management of or volunteering in sport, or due to various models of funding sport (Ostlinning, 2011). We also assume that sport is an exclusive competence of the EU member states, and as a result that, different national approaches and tendencies toward sport policy exist (Mittag & Naul, 2021; Sennett *et al.*, 2022). In connection to this, RQ1 is investigated: “*Are there any differences between the EU countries in the evaluated areas of sport and sport policy (in the economic dimension and areas of sports services)?*” From the results of our research, a different role of EU countries has been confirmed according to the evaluated areas of sport (F1-F4). The most significant differences in the evaluated areas of sport are seen in Performing Physical Activities (F1) and Employment in Sport (F2). However, differences between countries are clear also in other evaluated areas, namely Top Ten Sports (F3) and Trade in Sporting Goods (F4), where some countries reach extreme values (see *Figure 1*). On the basis of the results, it can be said that the EU countries prioritise the evaluated factors in sport differently. While some countries have a dominant position in one area, they show a markedly weaker position in other areas (*Table 6*). It is, therefore, clear from the evaluation of the given areas (factors) which areas (factors in sport) the countries accentuated the most/the least. Based on the findings of the research, the answer to research question 1 (RQ1) is affirmative (YES).

As also other research studies confirm (Ostlinning, 2011; Mittag & Naul, 2021), only limited general statements can be made about the content dimension of sport development. Ostlinning (2011) claims that the comparison of different national structures in sport is difficult in European countries due to the variety of approaches towards the organisation, management and funding of sports. Mittag & Naul (2021) point out that the European dimension of sport and differences in individual EU countries are closely related with the increase and

differentiation of actors, i.e. that today a wide range of public and private actors are involved in the organisation of sport. Similarly to this study, also other authors (Deelen *et al.*, 2018; Scheerder *et al.*, 2018; Sennett *et al.*, 2022) confirm some different approaches in the individual areas of sport. Empirical findings on sport show significant differences in participation in sport across Europe (Scheerder *et al.*, 2018). Both geographic and social gaps can be observed. Sport thus remains the result of social differentiations and social inequality. According to Scheerder *et al.* (2018), the key explanatory factors are a) the organisation and provision of sport policy in Europe, in particular a large diversity, and, outside the area of sport, b) the influence of social values and cultural preferences. Also the results of other research (Deelen, *et al.*, 2018) indicate that goals are highly interrelated with the choice of a certain sports setting and have an impact on sports frequency. Sports frequency is then higher when participants engage in settings that are more suitable for their motivations and goals. Similarly, Sennett *et al.* (2022) argue in this context that some sports have adopted specific organisational arrangements in their management structure, reflecting the overall structure of their sports. Statistics on sports then show that informal sport participation is growing, and organized sport in Europe faces several challenges (Mittag & Naul, 2021). I. It has to compete for members due to changes in work and leisure, II. to cope with structural and demographic challenges, III. to respond to increased demands and to react to unforeseen situations (the refugee crisis or the COVID-19 pandemic).

On account of the similarity of clusters according to the selected areas of sport (*Table 7*), research question 2 (RQ2) is verified, namely, “*Is it possible to place similar groups of EU countries (according to the economic dimension of sport and sports services) into the same types of systems of sport policies?*”

According to the created factors in sports (F1-F4), we can differentiate and compare similar EU countries in terms of the role of national sports systems of the Member States (see Henry, 2009). National sports systems of the EU member states include Bureaucratic configuration, Entrepreneurial configuration, Missionary configuration and Social configuration (*Table 8*). Judging by the economic dimension of sport and the development of sports services (*Table 7*) with types of sport systems in the EU, we may say that in some cases, attachment to the same system of national sport policy can be seen in similar clusters of EU countries (*Table 8*). These sports systems are composed of four configurations as shown in Henry (2009, p. 42-44): 1) the role of public authorities, specifically the state as represented by the Ministry responsible for sport; 2) the level of coordination of, or engagement by, the various actors involved in the sports system (the form of a legal framework or the roles to be played by various actors); 3) roles of the voluntary, public and private sectors in the delivery of sporting provision and 4) adaptability of the system to changes in demand.

While the results confirm the specific position of sport policy in the individual EU countries, they also show a decisive role of the state in the majority of the evaluated countries associated with the management of sport activities. The results clearly show that Spain and France (as a cluster) represent the same national sports policy systems (Bureaucratic configuration). The other clusters include a large number of countries that represent multiple sports policy systems. Apart from Bureaucratic configuration and Missionary configuration sports policy systems, also the Social configuration sports policy system is found in the first cluster of the EU countries, namely in the Netherlands, and the Entrepreneurial configuration sports policy system in Ireland in the second cluster. Although differentiation in terms of the organisation and management of sports policy and development of sport activities is apparent in the individual EU countries, we also find a common link to national sports policy systems. As a result, the answer to RQ2 is affirmative (YES).

Similarly to our research, also other authors (see Petry *et al.*, 2004) earlier evaluated an overview of the similarities and differences in the sport systems in the European countries, the

role of the different levels of responsibility of the state as well as the role of the National Olympic Committees. Also different aspects of the financial support in various countries and the common principle of European Sport were analysed. Their findings show that the EU member states show a broad spectrum of differences but also similarities ranging from strong responsibility on the part of the state to a complete autonomy of the sport movement.

The lack of available comprehensive data on sport in the EU from a long-term perspective presented limitations to the present study. It is a challenge to compare statistics that were created in various European countries and calculated in different time frames. The availability of data in Eurostat and EIGE databases is relatively limited. Some data are only available for certain countries, cover limited periods or specific years. The absence of comprehensive data on sport in EU countries made it impossible for us to perform an in-depth analysis. For the 5 key variables from the sport sector, it was not possible to assess the trend and changes in sport activities. This was due to the unavailability of more recent data (data are not available in longer time series). It should be noted, however, that for most of the other indicators used in the EU countries, a steady development over the last years can be observed (if data are available). Therefore, we believe that the use of more recent data would not significantly affect our results, and the conclusions are still applicable in practical terms. The evaluation of European sport leads to the conclusion that apart from national differences, which are hard to specify, particular attention should be paid to vertical fragmentation. This could be also the direction of the future research. Thus the authors believe the evaluation of sport policies with emphasis on the development of selected sports and recreation services, sport tourism, including the possibilities for their funding in selected countries and regions of the EU to be the topic for further research.

Conclusion

The aim of this study was to evaluate selected areas of sport with a focus on economic matters and areas associated with the development of sports services in 27 countries of the European Union. On the basis of the research results, we have arrived at interesting conclusions, which confirm the specific position of sport policy in the individual EU countries. It is apparent that the countries adopt different approaches towards the organisation and management of sport, but also a strong role of the state as well as other actors associated with the management of sport activities is seen in the majority of the evaluated countries. Using the findings of other studies, it can be said that apart from a relatively limited comparability of the different structures, the dynamics of the various sports systems must be taken into consideration.

The results of factor analysis of the evaluated areas (factors) in sport focused on economic matters (F2 and F4) and the development of sports services (F1 and F3) have shown that the EU countries have different priorities in the individual areas of sport policies. We have evaluated the given areas in sport with the use of the K-means method and arrived at the conclusion that in spite of marked differences in areas of sport policies, similarities can be found across some clusters of countries. The results have shown that trade in sporting goods is a significant factor in the context of sport policy in countries in the first cluster. Countries in the second cluster put emphasis mainly on employment in sport, whereas they focus less on the development of the selected sports services. Countries in the third cluster mainly prioritise certain types of Olympic sports as well as trade in sporting goods. Countries in the fourth cluster pay attention to the development of certain sports services, while concentrating less on economic matters in sport (employment in sport, trade in sporting goods). These findings can contribute to not only creators of sport policies in the individual EU countries but also other actors in sports and selected sports services in the public and private sectors.

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