

stimulate training and competitive activity and alternation of all these processes. The most essential aspect is to establish quality goals and specifications for individual actions, to anticipate their control, and to manage with physical loads accurately. Technical athletes' preparedness is of major importance. When planning athletes' training process for London Olympic Games it is necessary to consider the tendencies of sport discipline development and prognosis, the analysis

data of athlete's main characteristics, the changes in sport training methods and strategy, and the changes of highest training loads and material-technical facilities; it is necessary to comprehend, accurately analyze and summarize athletes' as well as competitors' preparing principles in trainings and competitions. Then coach's insights, that become reasonable prognosis for high sport results, can be expected.

Keywords: sport training control, coaches' work, Olympic Games.

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Problems of determining the sportsmanship of a country

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Summary

Nowadays, the most popular indicator, according to which the sportsmanship of a country is evaluated, is the number of medals won in the Olympic Games. In parallel with this index, an informal Olympic point counting system is used, when the first eight places are evaluated. It is obvious, that these are not the best indices, when trying to assess the sportsmanship of a country. For instance, is it appropriate to state, that a country, whose athlete, a swimmer, has won seven gold medals, is seven times more sportive than a country, whose football team has become the winner of the Olympic Games?

In the article two techniques of assessing the sportsmanship of every country, when the amount of points, collected by them, is known, are suggested. In both cases points are counted per one million inhabitants. According to the first technique, countries are grouped by the total number of inhabitants, and the country of the greatest sportsmanship is assessed in each group. According to the second technique, the sportsmanship of all countries is assessed using the methods of mathematical statistics. The algorithm and techniques presented are illustrated using the results of the Beijing Olympics. Conclusions and suggestions are presented.

Keywords: Sportsmanship, Olympic Games, point counting system, mathematical statistics.

Introduction

Is a country, whose athlete, for instance, a swimmer, has won seven gold medals really seven times more sportive than a country, whose football team has become the winner of the Olympic Games? Is really a country, whose sportsman has won a single gold medal in an individual event more sportive than a country, whose several teams have taken, for example, fourth places? It is so nowadays, as the only criterion, reflecting the achievements of a country in the Olympic Games (just like in other sport events) is the amount of medals won. This is beneficial for large countries; that is why this criterion is frequently used. However, it is not necessary to have a degree in technical education to realize, that wood is not stronger than steel because of a wooden rod with a radius of half a meter holds a greater load than a guitar string.

Let us assume that we have chosen an appropriate point counting system. How to evaluate the sportsmanship of a country, when all the points, collected by every country, are known? It seems that the simplest and the most accurate way would be to count the points per one million inhabitants. Nevertheless, such calculation is faulty in regard to great countries, as they could send more athletes and teams, that match the qualification requirements of the Olympic Games and the amount of the collected points would increase dramatically. Having eliminated this method of calculation, there are only two ways to determine the country of the greatest sportsmanship:

- Dividing countries into groups by number of inhabitants and deciding which country is the most sportive in a corresponding group. Boxers and wrestlers are categorized in such a way, only the

criterion of the categorization is the weight of an athlete.

- Trying to find an algorithm which could help in determining the best of the best. In this instance we could apply the methods of mathematical statistics that are successfully used comparing indices of various objects and phenomena (Aivazian, & Mkhitarian, 2001; Montgomery, 1977; Sivilevičius, & Vislavičius, 2008). For instance, they have been successfully applied for determination of the best veteran athlete in any track-and-field event, although the veterans are competing in different age groups and are using implements of different weight (Vislavičius, Pocius, & Pečiūra, 2003). It would be wise to use this experience in determining the most sportive country in the planet. There are plenty of data, according to which the statistical calculations could be made. It is obvious, that only results from the last four or five Olympic Games should be taken into account, since only recently economical problems, depending on the location, where the Olympic Games are held, have become less relevant (just imagine, what problems the small countries faced in 1956, when the Olympics were held in Melbourne). Having chosen the methods of mathematical statistics, when trying to determine the country of the greatest sportsmanship, the fact, that small countries lack in human resources and the fact, that large countries could send much more athletes and teams that match the qualification requirements for the Olympic Games, would also be taken into account.

Firstly, in the article, the problem how the points should be counted in order to avoid the inaccuracies, mentioned in the first paragraph, is discussed. The algorithm for evaluating the influence on the final score of each country, made by individual, team events and sport games is suggested. Afterwards two methods of evaluating the sportsmanship of each country are presented: at first, countries are divided into groups, taking into account the number of inhabitants, secondly, the sportsmanship of the countries is determined by using the regression equation. The suggested methods using the results of the Beijing Olympic Games are illustrated (<http://en.beijing2008.cn/>; <http://www.cbc.ca/olympics>). Conclusions and suggestions are presented.

Point calculation for team ranking

Analysis of current points calculation methods for team ranking

The method of evaluating the sportsmanship of the countries, when only the amount of medals is

calculated is faulty because of several reasons. First of all, individual, team events and sport games are put together. Secondly, in a sense of sportsmanship the third and the fourth places are close enough and reflect the sportsmanship of an athlete or a country. However, when only won medals are considered, a huge gap separates these places. Thirdly, the fact itself, that even making it to the Olympic Games, having passed various qualification rounds or matching the qualification requirements in any kind of sports shows the level of sportsmanship of a country, is not taken into account. Finally, it is obvious, that the indices of any phenomenon or object will be more accurate, if the larger amount of data is used (now only the first three places are evaluated).

The informal Olympic point counting system (when the first eight places are evaluated) indicates the sportsmanship of a country more accurately, as a larger amount of data is used. Despite this, all the other reasons, why the sportsmanship of a country cannot be evaluated more precisely, remain the same.

It is evident, that more accurate point calculation systems will as well be more sophisticated, so many may have doubts, that a more complicated point counting algorithm might be too difficult to understand for sport journalists or sport functionaries, besides, an ordinary sports fan may also find it hard to perceive. These reasons lead to thinking, that innovative point calculation systems will never become popular. The first problem can be easily solved, as the information technologies have reached a significantly high level. Moreover, the second problem should not disturb the establishment of novel point calculation systems, because the ordinary sport fan does not necessarily have to know every single detail. He only has to know the basic principles of formation of the system and be able to evaluate the produced results.

Total points, collected by every country, calculation system

Firstly, it is proposed for each athlete, competing in the Olympic Games, instantly to give one point (because they have had to pass a cycle of qualification competitions, satisfy high qualification requirements etc.). It is hard to select a number of valid athletes (athletes, who provide their teams with additional points). It is indisputable, that athletes, who have won, for example, the third place, should contribute to their team point budget equally, disregarding the type of event. However, the number of competitors varies depending on the event (let us compare, for

instance, the number of tennis players and marathon runners). Furthermore, even the number of teams in sport games differs: there are only 8 teams, competing in softball and 10 teams, competing in women's volleyball competitions, whereas the number of teams in basketball event is 16. Besides, there are only two nominated first prize places in some of the events (for instance, in boxing), while there are all prize places in other events (for example, triathlon). Finding a particular mathematical dependence would be rather complicated. Therefore, taking into account current rules of assigning the position of an athlete or a team and having the aim to illustrate suggested points calculation system using the results of the Beijing Olympic Games, only the first eight positions are valued. In this way, the data, used in the calculations will be reliable, on the other hand, the countries, whose athletes, teams or sport games representatives were slightly away from the top 8 positions, will remain unappreciated.

Let us assume that the number of valid athletes and teams are chosen. Let us sort out, how the points in each kind of sports should be counted. For this reason it is suggested, that all sports should be divided into two large groups: games and sports of separate events, that would be further divided into sport of individual events and sport of individual-team events. In this way, for example, football, basketball and volleyball would be put into the group of games, boxing, wrestling or triathlon – into the group of sport of individual events and, lastly, rowing, gymnastics or swimming would be put into the group of sport of individual-team events.

Sport of individual events. It is suggested, that the first place in an individual event would be worth eight points, the second place – seven points, etc. The eighth place would be worth one point. In this way all the participants of every individual event will collect the total of 36 points. Consequently, both 100 meter runners and boxers of an appropriate weight category would collect the same amount of points. The amount of points, collected by all the valid participants of every individual event, will be marked as P_{ind} .

Sport of individual-team events. The point calculation system of individual-team events is substantially different. It is proposed, that points of the participants of an event should be multiplied by the number of team members, setting a coefficient depending on the number of team members. If a team, consisting of n athletes won i -th place, the

collected amount of points can be calculated by using the following formula:

$$P_{com,i} = p_i \cdot n \cdot A_n \quad (1)$$

Here p_i stands for the coefficient ($p_1 = 8, \dots, p_8 = 1$), of the i -th place, A_n - coefficient for reduction of the influence of team events for a team, consisting of n members (recommended coefficients for each event are provided in the Table 1). For example, a quadruple skulls team, which has won the third place, will add 16.8 points to the country's point budget ($P_{com,3} = 6 \cdot 4 \cdot 0.70 = 16.8$), like according to the informal Olympic point counting system, the team would have collected only 6 points. If the suggested point calculation system were selected, the influence of an individual-team event on the determination of the most sportive country would increase. The contribution of corresponding individual-team event participants to the point budget can be calculated in the following way:

$$P_{com} = P_{ind} \cdot n \cdot A_n \quad (2)$$

Let us apply this formula to, for instance, quadruple skulls teams. All together they would complement the collected point budget with 100.8 points ($P_{com} = 36 \cdot 4 \cdot 0.70 = 100.8$).

Table 1

Team event coefficients depending on the number of team members

Number of athletes in a team (n)	2	3	4	5	6	7	8
Coefficient (A_n)	0.80	0.75	0.70	0.65	0.60	0.55	0.50

Why is the team event coefficient necessary? Let us remember, that we are trying to determine the country of the greatest sportsmanship, i.e. the country, in which sport is a mass phenomenon and in which even the best athlete cannot significantly increase rate by himself, whereas the athletes, who had participated in individual events, usually also participate in team events, for instance, athletes, who take part in 100 meters sprint individual event usually also take part in 4x100 meters relay race, this could also be applied to gymnastics, etc. So why is this coefficient different? This is because if the more athletes participate in team events, the better chances are for them to earn points for their country for the second time.

It is important to note that the coefficients presented in the Table 1 are recommendatory. They must be corrected by using expert investigation

methods (Kendall, 1970; Saaty, 1980). For different sports they may be different.

Games. The points for the games should be counted depending on the number of players in a team, who are on the field at the same time. If there are m such players and the team has won the i -th place, the amount of collected points $P_{gam,i}$ will be counted according to the following formula:

$$P_{gam,i} = p_i \cdot m \quad (3)$$

Considering the formula, the second place winners in basketball would earn their country 35 points ($P_{gam,2} = 7 \cdot 5 = 35$).

It is obvious, that the contribution to the total points in the Olympic Games by each game is:

$$P_{gam} = P_{ind} \cdot m \cdot k \quad (4)$$

Here k stands for the number of tournaments organized in the Olympic Games (for example, only men compete in baseball, as in volleyball both men and women tournaments are organized). Let us apply this formula, for instance, for handball. We shall see, that members of handball teams (both men and women) would add 504 points to the total budget of the points, collected in the Olympic Games ($P_{gam} = 36 \cdot 7 \cdot 2 = 504$).

Summary of the value of each sport. Having selected the suggested point calculation system, the most 'generous' sport would be athletics. Its participants would earn their countries the total of 1951.4 points. The second event, according to the generosity, would be swimming. The swimmers could collect 1612.8 points; participants of the rowing would be the third in the list, obtaining 1104.8 points. The competitors of modern pentathlon, trampoline and triathlon would be able to collect the least – 72 points. It seems interesting, that, according to the suggested point calculation system, the representatives of the sport games would earn their countries 4176 points, whereas using the informal Olympic point counting system they would earn only 576 points. The contribution to the total point budget by each sport is shown in the Table 2.

How to determine the country of the greatest sportsmanship

Analysis of possible solutions

So, how to determine which country is the most sportive? It looks that the simplest and the most accurate method of determination of the country of the greatest sportsmanship would be to count the points per one million inhabitants or so (let us

Table 2

Amount of points that can be collected in each sport

No.	Sport	Total points	Number of events	Type
1.	Archery	234.0	4	Individual
2.	Athletics	1951.4	47	Individual-team
3.	Badminton	244.8	5	Individual-team
4.	Basketball	360.0	2	Games
5.	Baseball	324.0	1	Games
6.	Beach volleyball	144.0	2	Games
7.	Boxing	396.0	11	Individual
8.	Canoe/Kayak	830.4	16	Individual-team
9.	Cycling	779.4	18	Individual-team
10.	Diving	374.4	8	Individual-team
11.	Equestrian	406.8	6	Individual-team
12.	Fencing	540.0	10	Individual-team
13.	Field hockey	792.0	2	Games
14.	Football	792.0	2	Games
15.	Gymnastics (artistic)	165.6	2	Individual-team
16.	Gymnastics (rhythmic)	691.2	14	Individual-team
17.	Handball	504.0	2	Games
18.	Judo	504.0	14	Individual
19.	Modern pentathlon	72.0	2	Individual
20.	Rowing	1104.8	14	Individual-team
21.	Sailing	549.0	11	Individual-team
22.	Shooting	537.0	15	Individual
23.	Softball	324.0	1	Games
24.	Swimming	1612.8	34	Individual-team
25.	Synchronized swimming	201.6	2	Individual-team
26.	Table tennis	234.0	4	Individual-team
27.	Taekwondo	288.0	8	Individual
28.	Tennis	187.2	4	Individual-team
29.	Trampoline	72.0	2	Individual
30.	Triathlon	72.0	2	Individual
31.	Volleyball	432.0	2	Games
32.	Water polo	504.0	2	Games
33.	Weight-lifting	538.0	15	Individual
34.	Wrestling	648.0	14	Individual
Total		17410.4		

remember the example of the strength comparison of wood and steel in the introduction). But this method would be unhandy for large countries. Some of them could send more athletes and teams that could pass the qualification requirements and points of their countries in the Olympic Games would significantly increase. So, having this method rejected, we still have two ways mentioned in the introduction:

- To divide countries into groups according to the number of inhabitants and to determine the best countries in a corresponding group.

- To use mathematical statistic methods to find an algorithm, which could allow us to determine the best of the best.

Distribution of the countries into groups according to the number of inhabitants

When dividing countries according to the number of inhabitants, it is suggested that the inhabitant ratio of the biggest and the smallest countries in a single group would not be larger than two. Then possibilities of gaining points for all the countries in

a single group would be about the same. With such an assumption, the simplest and quite precise method of determination of the country of the greatest sportsmanship in a corresponding group would be to count the points per million inhabitants.

Taking a look at the list of the countries that belong to the Olympic committee (205 in total) sorted by number of inhabitants, we cannot look through the fact, that neighbouring countries both at the top and at the bottom of the list have a large difference in the number of inhabitants (http://www.photius.com/rankings/population/population_2008_0.html). So this is the reason why there are only two countries both in the first and the last groups. Furthermore, there are some groups that contain 35 countries. So, having chosen the suggested system, China will compete with India in the first group and Tuvalu will compete with Nauru in the last one for a long time.

In the Table 3 the country order in all fifteen country groups (exactly as much groups form assuming that the inhabitant ratio of neighbouring countries in a single group is not larger than two) is provided. In space saving purposes, points per one million inhabitants are provided for the first three countries in a single group only.

Counting of points per one million inhabitants (according to the method presented) will be illustrated with an example of a country. We have chosen Norway, a country that has athletes who have won points in all sports. **Athletics** – 19 points (men's javelin throw – 1st place, 8 points; women's 20 km race walk – 2nd place, 7 points; men's 50 km race walk – 5th place, 4 points), **canoe-kayak flat-water** – 12 points (men's K-1 500 m – 4th place, 5 points; men's K-1 1000 m – 2nd place, 7 points), **equestrian** – 16.8 (jumping mixed team – 3rd place, 16,8 points (6 multiplied by 4 multiplied by 0,7), **football** – 7th place, 22 points (2 multiplied by 11), **handball** – 1st place, 56 points (8 multiplied by 7), **rowing** – 8 points (men's single sculls – 1st place, 8 points), **shooting** – 13 points (men's 50 m free rifle prone – 4th place, 5 points; men's skeet -2nd place, 7 points; men's 50 m free rifle 3 positions -8th place, 1 point), **swimming** – 13 points (men's 100m breast – 2nd place, 7 points; women's 200 m breast – 3rd place, 6 points), **taekwondo** – 7 points (women's heavy (+67kg) – 2nd plane, 7 points), **weightlifting** -2 points (women's 58-63 kg – 7th place, 2 points). The sum of points equals 168.8 points (19+12+22+56+16.8+8+13+13+7+2). Summing up

these points with the number of Norwegian athletes who had competed in the Olympic Games, we can see that Norway has got 253.8 points (168.8+85). If we had counted points according to the informal Olympic point counting system, the amount of points, collected by the Norwegian athletes would have been equal to 90. All that remains now is to count points per one million inhabitants. We know that Norway has 4.628 million inhabitants, so this index is equal to 54.840.

Table 3

List of countries of the greatest sportsmanship in corresponding single groups

Groups of countries Nr.	Largest and smallest number of inhabitants (million)	Number of countries (units)	Group rank	Country	Points per million inhabitants
1	1321.851-1129.866	2	1.	China	1.611
			2.	India	0.074
2	301.139-150.448	5	1.	United States	7.877
			2.	Brazil	3.668
			3.	Indonesia	0.342
3	141.377-71.158	10	1.	Germany	16.482
			2.	Russia	11.293
			3.	Japan	7.345
4	65.751-33.333	20	1.	Canada	23.473
			2.	Spain	19.335
			3.	United Kingdom	18.023
5	31.188-16.284	23	1.	Australia	68.270
			2.	Netherlands	47.668
			3.	Romania	13.681
6	15.284-8.078	33	1.	Hungary	50.145
			2.	Belarus	47.682
			3.	Cuba	43.127
7	7.554-3.800	35	1.	New Zealand	89.630
			2.	Norway	54.840
			3.	Croatia	49.490
8	3.600-1.815	19	1.	Jamaica	75.032
			2.	Slovenia	73.360
			3.	Lithuania	41.533
9	1.688-0.907	10	1.	Trinidad and Tob.	57.353
			2.	Estonia	50.307
			3.	Qatar	27.556
10	0.788-0.401	12	1.	Montenegro	96.387
			2.	Bahrain	45.161
			3.	Cyprus	35.512
11	0.374-0.199	10	1.	Iceland	255.025
			2.	Bahamas, The	183.540
			3.	Samoa	51.338
12	0.173-0.089	9	1.	Micronesia	139.066
			2.	US Virgin Islands	46.105
			3.	Saint Lucia	35.159
13	0.081-0.046	8	1.	American Samoa	156.079
			2.	Cayman Islands	107.296
			3.	Seychelles	97.686
14	0.039-0.020	7	1.	Monaco	1193.719
			2.	Palau	287.880
			3.	Cook Islands	183.908
15	0.013-0.011	2	1.	Tuvalu	250.166
			2.	Nauru	73.920

The algorithm of determination of the country of the greatest sportsmanship

So, we still have the desire to know which country is the best of the best. The following algorithm is suggested.

- Having taken the points obtained by the countries in the last four or five Olympic Games (estimated by the method described before), to calculate the point averages of all countries, i.e. points per one million inhabitants.

- Having these point averages to determine the regression equation by using minimum squared method. This equation will show how much points would have to obtain countries, for example, with 60 million and 3 million inhabitants to have the same level of sportsmanship. Having this equation assessed, the fact that small countries lack human resources and that large countries can send more athletes and teams to the Olympic Games, that had passed the qualification requirements, will be taken into consideration. We should not forget that the equation depends on the number of sports, the number of events and the point counting system. If any of these indices were changed, the analytical form of equation of regression would be changed too. It is important to know that the number of inhabitants of the countries of the World distribute not according the Gauss law, so to process data using mathematical statistics method is complex. For this purpose for separate countries, which sportsmanship indices are essentially different comparing with sportsmanship indices of other countries, expert investigation methods must be used.

- Using the equation of regression to determine the standard point average for each country.

- To determine the sportsmanship index for all countries. This index would show how many times the point average in the period under consideration is larger or smaller than the standard point average.

As it has already been mentioned all statements of the article are illustrated with the results of Beijing Olympics. Having point averages and using *TableCurve* program, the following regression equation was obtained:

$$\bar{P} = 0.0669776 + \frac{30.0625}{\sqrt{N}} \quad (5)$$

Here \bar{P} stands for the standard point average of a country with N inhabitants. For example: Norway has 4.628 million inhabitants, and its standard point average is equal to 14.041, the United Kingdom

with 60.776 million inhabitants has a standard point average of 3.923. If both countries reached such point averages, their sportsmanship would be the same. But Norway's point average, collected in Beijing Olympics is equal to 54.841 (3.9057 times more than standard) and the United Kingdom scored 18.024 (4.5941 times more than standard). So, according to the results in Beijing the United Kingdom was greater in sportsmanship than Norway. The example is illustrated in the Fig. 1. The picture displays a part of sportsmanship curve, which includes countries that have from 1 to 100 million inhabitants. Standard and scored point averages of the researched countries (Norway and the United Kingdom) are marked with circles.

When equation of regression has been set the data of the biggest countries (China and India) and the smallest countries (from Tuvalu to Barbados) were not included, because the sportsmanship indices of these countries are essentially different in comparison with the sportsmanship indices of other countries. Remember, that to determine the countries, expert investigation methods must be used.

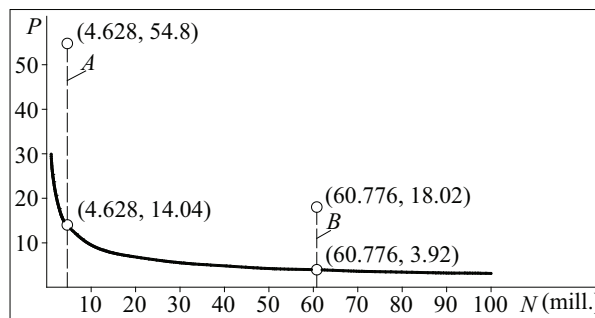


Fig. 1. The part of sportsmanship curve: letter *A* marks the data related to Norway, letter *B* – to the United Kingdom

Sportsmanship indices determined according to the represented algorithm are shown in the Table 4. The table displays only 50 most sportive countries.

Conclusion

The analysis of the results shows that when only the first eight places are taken into account, the influence of the number of athletes participating in the Olympic Games is too big. The sportsmanship indices of small countries are notably corrupted, because their athletes make their way to the Olympic Games without even passing qualification requirements, but by getting personal invitations. This problem would be solved if the first twelve, sixteen, or even more leading places were taken into account.

Good indices of the Oceanic countries Australia

Table 4

List of the most sportive countries

No.	Country	Sportsmanship index	No.	Country	Sportsmanship index
1.	Australia	10.1633	26.	Japan	2.6905
2.	Monaco	7.1744	27.	Ukraine	2.6546
3.	Netherlands	6.3967	28.	Montenegro	2.6482
4.	New Zealand	6.0214	29.	Lithuania	2.6014
5.	Hungary	5.2264	30.	Czech Republic	2.5364
6.	Belarus	4.9121	31.	Greece	2.5131
7.	Germany	4.8784	32.	Kazakhstan	2.3069
8.	Cuba	4.8064	33.	Belgium	2.2375
9.	Iceland	4.6557	34.	Switzerland	2.2064
10.	United Kingdom	4.5941	35.	Romania	2.1256
11.	Canada	4.4547	36.	Serbia	2.0496
12.	United States	4.3783	37.	Trinidad and Tob.	1.9566
13.	Russia	4.3515	38.	Korea. North	1.9424
14.	France	4.1505	39.	Estonia	1.9147
15.	Jamaica	4.1462	40.	Argentina	1.8414
16.	Spain	4.0334	41.	Austria	1.8044
17.	Italy	4.0050	42.	China	1.8035
18.	Norway	3.9057	43.	Bulgaria	1.7546
19.	Croatia	3.4732	44.	Finland	1.6687
20.	Slovenia	3.4482	45.	Brazil	1.6321
21.	Bahamas	3.3712	46.	Latvia	1.6011
22.	Denmark	3.3539	47.	Armenia	1.5282
23.	Poland	3.1960	48.	Micronesia	1.5181
24.	Sweden	3.0693	49.	Georgia	1.4284
25.	Korea. South	2.7909	50.	Slovakia	1.4150

and New Zealand are slightly subjective: in this area it is easier to pass the qualification requirements and gain the access to the Olympic Games than, for example, in Europe.

The results in the article are quite approximate because only the results of single Olympic Games were used when determining the regression curve.

Suggestions

The article was written assuming that the main event reflecting the sportsmanship of a country is the Olympic Games. This choice was influenced by the fact that it is easy to get the results of all the games and the program of the events combines almost every popular sport. Of course, when trying to determine the country of the greatest sportsmanship, not only the results of the Olympics need to be evaluated, but also the results achieved in every event of all sports. Furthermore, there should not be a limit of valid athletes for one country. It would not be complicated if federations of all the sports approved the idea. Federations would only need to provide the

ratings of their athletes, teams or game teams at the end of the year. These ratings could be determined according to the individual rules of that sport. Obviously, the rating list should contain as many athletes as possible. It would be worth determining the country of the greatest sportsmanship only if all the sport federations presented a list of at least 32 athletes, teams or game teams. After receiving these data, it would remain only to count the points scored by each country, determine the number of points per one million inhabitants, assess the curve of regression and compute averages of standard points and sport indices. It is suggested to evaluate data of at least four years: to add the results of the most recent sport season and to remove the results of the games achieved four years ago.

Of course, the question is: who should take this up. There are several choices: the International Olympic Committee, most popular sports federations, broadcasting corporations BBC, CBC, television network CNN CNN and others. It is believed, that the list of the greatest countries in sportsmanship announced to the society would be interesting for sport functionaries, sport fans and inhabitants of a country. After all, sport has been a part of politics for a long time.

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SPORTIŠKIAUSIOS ŠALIES NUSTATYMO PROBLEMAS

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SANTRAUKA

Populiariausias rodiklis, šiuo metu taikomas šalies sportiškumui įvertinti, – medalių, iškovotų olimpinėse žaidynėse, spalva ir skaičius. Kartais naudojama neoficiali olimpinė taškų skaičiavimo sistema, kai įvertinamos pirmosios aštuonios vietos. Akivaizdu, kad tai nėra geriausi rodikliai siekiant įvertinti šalies sportiškumą. Pavyzdžiui, ar galima teigti, kad šalis, kurios vienas sportininkas, pavyzdžiui, plaukikas, olimpinėse žaidynėse iškovojo septynis aukso medalius, yra septynis kartus sportiškesnė už šalį, kurios futbolo komanda tapo olimpinių žaidynių nugalėtoja? Arba ar tikrai šalis, individualiojoje rungtyje pelnusi vieną aukso medalį, yra sportiškesnė už šalį, kurios kelios komandos užėmė, pavyzdžiui, ketvirtąsias vietas?

Tyrimo tikslas – naudojant ekspertinius ir matematinės statistikos metodus sukurti šalių sportiškumo nustatymo metodiką. Tikslui pasiekti buvo išspręsti trys uždaviniai. Pirma, nustatytos taisyklės, kaip skaičiuoti sportiškumo taškus atsižvelgiant į kiekvienos sporto šakos ypatumus. Antra, pasiūlyti du metodai, įvertinantys skirtingą šalių gyventojų skaičių. Abiem

metodais skaičiuojami sportiškumo taškai, tenkantys vienam milijonui gyventojų. Taikant pirmą metodą šalys skirstomos į grupes pagal gyventojų skaičių ir nustatomos kiekvienos grupės sportiškiausios šalys. Antruoju metodu nustatomas visų šalių sportiškumas taikant matematinės statistikos metodus. Trečia, aptartas sporto šakų ir renginių, kuriuos reikėtų pasirinkti siekiant nustatyti šalies sportiškumą, ratas.

Siūloma šalių sportiškumo įvertinimo metodika iliustruota naudojant Pekino olimpinių žaidynių rezultatus. Tačiau akivaizdu, kad šalių sportiškumą geriau apibūdintų ne vienu olimpinių žaidynių rezultatai, bet sporto šakų federacijų pateikti sportinio sezono geriausių sportininkų, komandų ar žaidimų rinktinių sąrašai. Be to, reikėtų įvertinti mažiausiai ketverių metų duomenis: prie turimų duomenų pridėti paskutinio sportinio sezono rezultatus, o prieš ketverius metus vykusių varžybų duomenis išimti.

Raktažodžiai: sportiškumas, olimpinės žaidynės, sportiškumo taškų skaičiavimo metodika, matematinė statistika.

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