

Original Article

Statistical analysis of collecting and recycling sports waste in romania, using a representative focus group of sportsmen and possible prospects

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Abstract:

This original article comprises four sections. The introduction is a brief incursion into the emerging field of sports waste, the second is devoted to a method and a questionnaire exploring the specific activities of collecting and recycling sports waste (selective investigative method and questionnaire research are focused on intensely), the third section presents and discusses a set of questions and statistical results of the survey and their significant impact, while the last section summarizes the survey findings on this issue, by configuring a potential future strategy, imminent in this new multidisciplinary field. Some final aspects highlight the pioneering role of Romanian sportsmen and originality of collecting and recycling, with a significant impact on sports, economy and the environment.

Keywords: *survey, selective research, sports waste, collecting and recycling, ecological project in sports*

1. Introduction

The environmental impact of sportsmen, supporters and sports activities in general increasingly extends from equipment, footwear or materials to devices, and other sports-related items generating waste. At European and international level, the ecological literature has several criteria for the classification of waste according to: origin (industrial, construction, medical, agricultural, household, commercial or toxic waste etc.) composition (organic, inorganic, glass, paper, textiles, plastic waste etc.) and biodegradable capacity, which are also valid for waste sports. In activity classification the latest decades include sports waste by their particular dynamics, thus becoming increasingly important with their expanding impact. Recycling of this new type of waste is barely felt internationally, with weak echoes in Romania.

So far, it seems that only the corporation Decathlon held in Romania an interesting recycling program in 2013 focused on environmental and educational strategy, reflected in recycling campaign entitled: *Sell your old equipment and get a new one!* Nike Corporation also offers a recycling program, exploiting material items to repair sports fields and playgrounds, but not in Romania. Each sportsman's activity inevitably produces an amount between 6 and 7 pounds of waste annually (sneakers, tracksuits, T-shirts, shorts, leggings, socks, balls, tennis rackets, etc..) resulting in a minimum amount of 6000 tons of waste annually per million professionals or amateur sportsmen. These wastes consist mainly of materials such as rubber, natural textiles (wool, cotton, flax, etc.), synthetic textiles (polyester), leather, synthetic leather, and many other materials. To these, we can add equipment, materials, and damaged devices resulting from sports activities in primary, secondary and higher education (wood waste resulting from football gates, handball, plastic resulting from destruction of chairs on the stadiums and gyms, rubber from damaged running tracks, etc.).

2. Questionnaire and methods

In this paper we have investigated and analyzed the views of practitioners of various sports in Romania, reflected in the data series finally established by statistical scaling specific to a thematic questionnaire about sports waste. The descriptive statistical analysis of the processed survey results and some general considerations open a completely original approach and show that projects and programs are needed for collecting and recycling of sport waste in Romania on a very short and short term. The material processed in the paper is provided by a quasi-random selective research achieved in autumn sports competitions with a final focus group of 273 amateur sportsmen (survey error is 5% and the 275 opinions to the main questions were analyzed using descriptive statistical software package EViews. The questionnaire, by the opinions or responses to the nine closed and scaled questions are detailed further in table 1 and generated new data series that have been subject to

refined methods of statistical analysis and interpretation about homogeneity, symmetry, vaulting and normality of value distribution.

The brief contents of the work questionnaire

Table 1

No.	Brief contents of the questions for professional or amateur sportsmen	Series encoding
1	What form does the amateur sportsman have? 1. Private club 2. State funded club 3. Hobby 4. Club and hobby	Sports_form
2	General importance of selective collecting of sports waste Very high (2) High (1) Medium (0) Low (-1) Very low (-2)	Collect_selective
3	Annual amount of sports waste	Annual waste
4	The share of reused equipment– 10 equal percentage intervals	Structure_reuse
5	Importance of collecting containers in sports areas Very high (2) High (1) Medium (0) Low (-1) Very low (-2)	Container_spacesport
6	Results of sports waste selecting can influence sports image Rezultatele selectării deșeurilor din sport pot influența imaginea sportului Very high (2) High (1) Medium (0) Low (-1) Very low (-2)	Recycling_image_sport
7	Sportsman's family income – 10 income intervals	Family income
8	Number of family members – 9 intervals (from 1 to 9 persons)	Family members
9	Need for a sports ecology project at the personal and national level High (1) Medium (0) Low (-1)	Project_ecologic_sport

The selective survey results used the views of 273 amateur sportsmen and were finally processed with the software package EViews.

3. Results and discussions

The focus group structure is dominated by the category of those who practise sports as a hobby (over 60%), while amateur sportsmen carrying out club activities (private or state funded) have about 21%, the rest being represented by those who regularly or occasionally combine the two previous memberships.

Except for the fourth question in the questionnaire, all the others describe by their values generally heterogeneous, asymmetric, vaulted and abnormal distributions according to Jarque – Bera test which is a reflection of very different sports activities and scattered opinions in relation to the central tendency. Descriptive statistics are relevant in terms of diversity of amateur sportsmen and sports waste implicitly.

Descriptive statistics of data series of the survey questions

Table 2

Sample: 1 273									
	I1	I2	I3	I4	I5	I6	I7	I8	I9
Mean	2.816850	1.278388	6.831502	43.89011	0.864469	1.102564	7.219780	3.600733	0.703297
Median	3.000000	1.000000	7.000000	40.00000	1.000000	1.000000	7.000000	4.000000	1.000000
Maximum	4.000000	2.000000	14.00000	90.00000	4.000000	2.000000	19.00000	9.000000	1.000000
Minimum	1.000000	-2.000000	2.000000	10.00000	-2.000000	-2.000000	1.000000	1.000000	-1.000000
Std. Dev.	0.787873	0.863565	2.601081	16.88746	1.131087	0.760051	3.770441	0.957708	0.627105
Skewness	-0.975671	-1.425804	0.825797	0.192101	-1.274770	-0.626155	1.087865	0.592072	-1.921496
Kurtosis	3.799897	5.478196	3.818641	2.509306	4.344422	3.457379	4.348663	6.618607	5.241780
Jarque-Bera	50.59113	162.3568	38.65148	4.417948	94.49922	20.21876	74.53691	164.8978	225.1587
Probability	0.000000	0.000000	0.000000	0.109813	0.000000	0.000041	0.000000	0.000000	0.000000
Sum	769.0000	349.0000	1865.000	11982.00	236.0000	301.0000	1971.000	983.0000	192.0000
Sum Sq. Dev.	168.8425	202.8425	1840.249	77570.70	347.9853	157.1282	3866.813	249.4799	106.9670
Observations	273	273	273	273	273	273	273	273	273

Note: I1-I9 are questions generating data series

Also with an average positive score higher than one, i.e. 1.28 points on a Likert scale, the traditional general importance of selective collecting of sports waste is best rated and felt by sportsmen, while the importance of selective collecting containers in sports areas is less acknowledged but felt right in the sports world (the average score on the same Likert scale is only 0.86 points).

The same complex and varied world of amateur sportsmen shows a high score of 1.10 points for the option according to which the selection results of sports waste collecting and careful recycling can influence sports overall image. Analysis of correlations between variables scaled with the same Likert scale emphasizes three priorities in any new project focused on the collecting and recycling of sports waste in Romania.

Correlation matrix

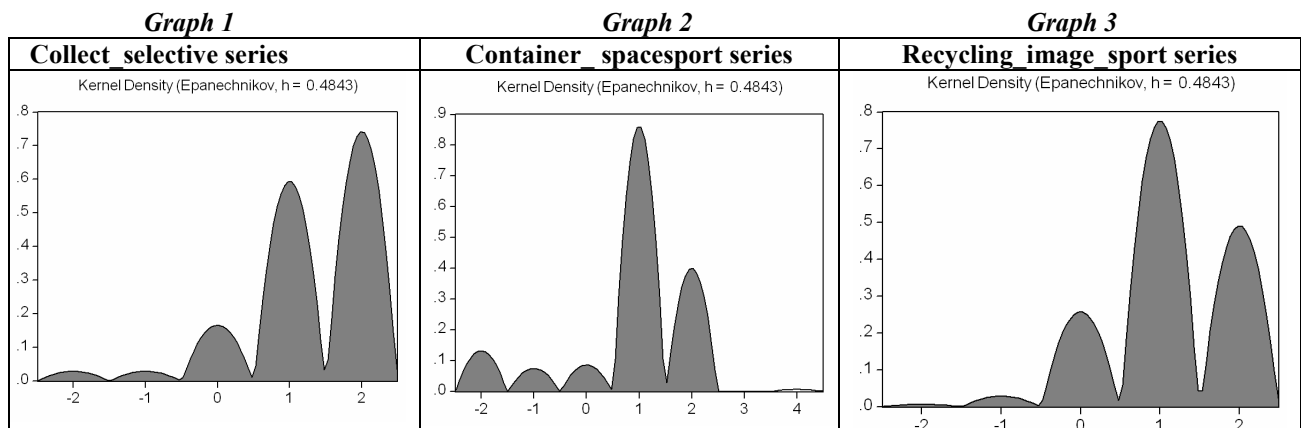
Table 3

	Collect_selective	Container_spacesport	Recycling_image_sport	Project_ecologic_sport
Collect_selective	1.000000	0.087701	0.085169	0.200606
Container_spacesport	0.087701	1.000000	0.071824	0.549529
Recycling_image_sport	0.085169	0.071824	1.000000	0.148929
Project_ecologic_sport	0.200606	0.549529	0.148929	1.000000

Software used Eviews

A project in the future will depend on the intensity of the links between variables generated by the survey questions, with great emphasis on selective collecting containers in sports areas, the general importance given to selective collecting of sports waste and the appreciation of an ecological project at national level in sports.

Similarities and differences between the three scales Likert regarding the essential questions of the survey



Software used Eviews

As can be seen from the three graphs, the defined series of sports waste results that can influence the sports image is the most balanced option: the importance series of selective collecting containers in sports areas, the largest number of followers in the positive area, and general importance series given to selective collecting of sports waste as the most dynamic and asymmetric scaling at the same time.

4. Some final remarks

By providing all centers and spaces for carrying out sports activities (fields, gyms, pools, skating rinks, slopes, clubs, etc.) with separate collecting containers for all types of waste that may result from this type of activity and responsibility of sportsmen, coaches and sports club management regarding the need and importance of collecting such waste in society, involving both professional and amateur sportsmen in helping low-income and disadvantaged families by promoting and publicizing results of this work, or by using these locally produced materials as fuel, sportsmen who are often models for the younger generation will be the main driver of this gear that is selective collecting and recycling as a continuous process.

Structured collecting of sports waste identifies in only 15% of recyclable waste category as „second-hand” appliances and equipment, second hand that can be directed towards orphanages, day centers, low-income or disadvantaged families, centers for the elderly and so on, with the remaining waste restructured as follows: 80% are fuel waste that could be used effectively for the population and only about 5% is non-combustible waste

(aluminum, iron etc.). Recyclable wastes can reach the categories of persons mentioned above after having first been cleaned and prepared for re-use by humanitarian organizations, local councils and even by sports clubs and other institutions.

Responsibility and personal example given by the best sportsmen may have the impact of an avalanche in sports helping to reduce pollution and maintaining a clean environment, both in moral and ecological terms. Contemporary ecology in sports activities requires a moral and ethical side while reshaping human community, and dignity of the individual, based on the competitive example of the professional or amateur sportsman, as the basis of human uniqueness in relation to the rest of creation. This new shape requires responsibility from the sportsman in particular and man in general, who is unable to fully discover himself, except in self-giving and sincere concern for others and others' future. Sports priority is to activate and expand consciousness that manifest quickly in people's lives so that present generations may reveal a world in which the whole human can flourish in harmony with nature and unpolluted environment on this precious planet.

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