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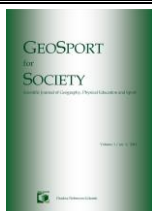
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Aspects of aerobic endurance in middle school students

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Abstract: The general, harmonious physical development of school youth is a major desideratum included among the aims of physical education promoted by all authors with concerns in this field, being the most important requirement of the ideal of physical education, a presence in any stage of design, planning, organization and development. this activity. In accordance with this task of great importance for school physical education, we mention that this paper aims primarily at the student, but also to improve the activities of teachers in the direction of achieving higher levels, a very important goal in general physical training of students and mainly the development / optimization of aerobic endurance. Goal: the role of this paper is to highlight the effects that "application paths" can generate as means oriented towards the development of aerobic endurance. Methods: In carrying out the research we mainly used the field test method, the observation method and the statistical-mathematical method. Results: The means used in the form of "application path" influence and demand at the same time the cardiovascular and respiratory systems and automatically lead to the increase of somato-functional indices of students.

Keywords: skills, application path, aerobic endurance, middle school, student

Introduction

In accordance with the current requirements, the theory and methodology of school physical education amplifies the role of a better knowledge of age peculiarities, real possibilities of students, orientation of the instructive-educational process towards the good organization of physical education activities, improvement of methods and technologies used, selection and the standardization of the most efficient means in order to amplify the efficiency of the activities (Sopa and Pomohaci, 2021). The permanent modernization of physical education and

sports activities in school, requires finding new procedures and means to act in practice (Erdely et al., 2020), as well as the continuous adaptation of existing ones, even in terms of "tools" for the development of aerobic endurance (Pálincás et al., 2022; Armstrong and Welsman, 1997), legătura dintre capacitatea de efort, fitness-ul aerob (Rodas et al., 2021), puterea aerobă, frecvența cardiacă pe de o parte și starea generală de sănătate nemaifiind o noutate.

The Curricular area of Physical Education and Sports has specific contributions in all eight areas of key competencies and to a greater extent to the competencies: learning to learn, interpersonal, intercultural, social and civic competences, sensitivity to culture and subsequently to other key competencies such as: communication in the native language, communication in foreign languages, mathematics, science and technology, information and communication technology (ICT), entrepreneurial culture (Dragomir and Scarlat, 2004).

The permanent modernization of the physical education and sports activities in schools, requires the finding of new methods, procedures and means to act in practice, as well as the continuous improvement of the existing ones, including the exercises aimed at developing aerobic endurance (Gavarry et al., 2003). In accordance with this task of great importance for school physical education, we mention that this paper aims primarily at the student, but also to improve the activities of teachers in the direction of achieving higher levels, a very important goal in general physical training of students, namely development of motor quality - aerobic endurance, the absence of this category of concerns causing over time a degradation of the functional capacity of the human body (Islam et al., 2005).

In order to make the instructive-educational activity more efficient, the teacher has a wide range of ways and means starting with the didactic design according to his human and material resources, specifying the objectives (Kinczel et al., 2020), structure and content of the lesson, essentializing, updating and adapting the content to the level of the students ability of understanding (Kyröläinen et al., 2001).

In middle school students, the need for movement is in fact a need for physical, mental, motor development and this is manifested by their permanent desire to play, run, jump, throw, to "fly" either spontaneously or organized (in kindergarten or school), the mobility of the superior nervous processes making games, relays and application paths, particularly important means of influence. The most suitable age for the development of the optimal physical capacity for effort is the age of 11-16 years. Taking into account the developmental characteristics of children at this age, we consider that the application paths, through the effect of mobilizing mental resources and creating a favorable emotional background, are a viable solution for developing aerobic endurance in middle school students, in relation to the consecrated methods (continuous effort method, interval method etc).

Without going exhaustively through all the formulas of definition produced over time, we resume the opinion of T. Ardelean (quoted by Tudor, 2001) that resistance is primarily "a problem of oxidative muscle metabolism", completed (Demeter, 1981) with the fact that the dimensional factors and the functional

capacities of the cardiovascular and respiratory system occupy a secondary place in the current conception about the development of motor capacities (Benson and Connolly, 2011). Depending on the metabolic characteristics of the energy-supplying processes, resistance can be anaerobic or aerobic (Demeter, 1981). For reasons related to age-specific features and physiological effects produced by physical effort, the concern was to observe the involvement of the aerobic component of endurance (Bassett and Howley, 2000).

Methodology

The research took place in the 2nd semester of the current school year, during nine effective working weeks (to which were added two weeks for initial and final measurements and evaluations), involving a number of 52 students (boys) from the 6th and 7th grades (Table 1), from “Zelk Zoltan” Secondary School from Valea lui Mihai, Bihor County.

Table 1. Distribution of subjects by number, grade and gender

Grade		Number of subjects		Gender	Total
6 th	A	14		Male	24
	B	10		Male	
7 th	A	15		Male	28
	B	13		Male	

The data obtained from somato-functional measurements were processed using 4 statistical indicators: average, standard deviation, coefficient of variability and average error.

For a more eloquent characterization of the sample, the research began with the evaluation of somato-functional parameters (weight, height, Body Mass Index - BMI, resting heart rate, thoracic perimeter in forced expiration). In order to highlight the possible effects of the use of application paths on aerobic endurance, the standardized 1000 m test was used, carried out under the same conditions, the measurements being made using an electronic timer with 100 memories.

Results and discussions

The data obtained during the two tests (initial-1 and final-2), together with the values of the statistical indicators used, are illustrated in Table 2 and Table 3.

Table 2. Data obtained from somato-functional measurements (6th grade students)

Statistical indicators	WEIGHT (kg.)		HEIGHT (cm.)		B.M.I.		CHEST PERIMETER (cm.)		HEART RATE (beat/min)	
	T 1	T 2	T 1	T 2	T 1	T 2	T 1	T 2	T 1	T 2
AVERAGE	61.48	61.46	163	164	22.9	22.02	65.24	65.96	69.24	65.48
STDEV	4.73	4.46	0.04	0.04	1.64	1.67	3.08	3.40	3.81	4.73
COVAR	7.79	7.20	2.98	2.90	7.17	7.27	4.73	5.16	5.50	5.70
AVERROR	0.18	0.17	0.01	0.01	0.06	0.06	0.12	0.13	0.15	0.13

Table 3. Data obtained from somato-functional measurements (7th grade students)

Statistical indicators	WEIGHT (kg.)		HEIGHT (cm.)		B.M.I.		CHEST PERIMETER (cm.)		HEART RATE (beat/min)	
	T 1	T 2	T 1	T 2	T 1	T 2	T 1	T 2	T 1	T 2
<i>AVERAGE</i>	62.9	62.56	166	167	20.74	19.91	65.4	66.6	69.6	69.3
<i>STDEV</i>	7.5	7.66	0.05	0.05	2.22	2.35	3.08	3.07	3.37	2.21
<i>COVAR</i>	12.9	13.08	3.31	3.27	10.72	11.25	4.70	4.61	4.84	3.19
<i>AVERROR</i>	0.30	0.30	0.01	0.01	0.08	0.09	0.12	0.12	0.13	0.08

The intervention took place over nine effective working weeks (divided into three cycles of three weeks each), to which were added two weeks for initial and final measurements and evaluations. In each three-week cycle, a package of means was used, each consisting of two application paths, each week carrying out two physical education lessons lasting 50 minutes each. Details regarding the dosing of the efforts, the means used and the frequency of the interventions are given below (Table 4).

Table 4. Effort dosing in intervention cycles for aerobic endurance (power)

		I st cycle	II nd cycle	III rd cycle
Intensity		70-80% Vmax/ Passive rest	70-80% Vmax/ Active rest	70-80% Vmax/ Active rest
Volume/lesson	Minutes	15	15	15
	Term	3x2x2:30 min.	3x2x2:30 min.	3x2x2:30 min.
Load time		2:30 min.	2:30 min.	2:30 min.
Rest period		90 sec.	90 sec.	90 sec.
Means		Application path (1 st batch)	Application path (2 nd batch)	Application path (3 rd batch)
Frequency		2/week	2/week	2/week

In the first and last week of the study, in addition to somato-functional measurements, the level of development of aerobic endurance was assessed. To evaluate the aerobic power (aerobic endurance parameter), we used the 1000 m field test, the collected results being highlighted below (Table 5). The measurement was performed using a digital timer with 100 memories, recording the order of arrival being performed manually.

Table 5. Data obtained at the 1000m test

Statistical indicator	6 th grade		Progress		7 th grade		Progress	
	1000m (min, sec)				1000m (min, sec)			
	T 1	T 2	+	%	T 1	T 2	+	%
<i>AVERAGE</i>	4:20	4:11	9	3.47	3:51	3:46	5	2.17
<i>STDEV</i>	0.53	0.52			0.17	0.17		
<i>COVAR</i>	13.99	14.14			5.04	4.99		

AVERROR	0.02	0.02		0.007	0.006	
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We need to clarify that the choice of means (application paths) for the development of aerobic endurance was also influenced by their variety in terms of content, which may lead in parallel to the development of general motor skills, as a basis for easier acquisition of specialized skills. Also, the choice of a field test to assess aerobic endurance capacity was determined by the possibility to estimate the probability of success and to establish possible strategies for the physical education lesson in perspective (Bunc et al., 1992; Neumann et al., 1999).

Conclusions

Even if the progress does not seem to be very consistent, it occurred on a favorable emotional background, the students being totally involved in the specific effort of the lessons, avoiding the monotony produced by the method of continuous efforts. The analysis of data on somato-functional indices reveals an improvement, even if the general positive trend can also be attributed to the natural process of somatic and functional growth and maturation. In the context of increasing the impact of obesity, especially among young people, improving BMI is a good signal, especially if in the future, physical exertion will be accompanied by an increase in information on healthy nutrition. The increase of the thoracic perimeter in correlation with the decrease of the heart rate level, reveals positive physiological effects that can be correlated with the improvement of the aerobic endurance indices. Equally, we can observe a decrease in the value of the spread and an improvement in the homogeneity around the average in all the analyzed parameters.

Regarding the most important aspects, we find a progress in absolute value of the average time in the 1000 m field test of 9 seconds in the 6th grade and 5 seconds in the 7th grade, which corresponds to a relative value of 3.47% in the 6th grade and 2.17% in the 7th grade, thus highlighting an improvement of the aerobic endurance indices.

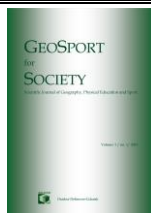
We can also assume that, as a result of the use of the chosen means (application path), through their diversity of content, the general motor background of the students has improved, favoring in perspective the more efficient acquisition of other elements of content specific to physical education.

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The development of speed, agility and coordination in young football players of the U12 category

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Abstract: Physical training has been given special attention in recent years in the world of high-performance sports in general and in football in particular. In the context where we are witnessing a standardization of technical-tactical values, many times the level of physical training is what makes it possible to tie the teams. Sports performance has progressed a lot, we meet more and more often performances that in the past seemed impossible to achieve, but currently this fact is possible thanks to the accumulation of several factors such as: streamlining the selection process, modernizing the materials and facilities used in training and competition, the improvement of training methodologies, better trained specialists and the direct involvement of science in the sports training process. Thus, the current study proposes the development and application of training cycles centered on the development of speed, agility and coordination in children under 12 years old who practice football. To evaluate the results, a battery of tests was prepared that includes specific evaluations for each motor quality considered. The results show that the selection of means and methods aimed at developing speed, agility and coordination/skill are essential in the training process of young footballers, and the applied training cycle gives very good results for the analyzed age group. All the athletes improved their results between the initial and the final testing period, which indicates a maximum effectiveness of the training.

Keywords: physical fitness, sports performance, motor quality, training program

Introduction

Physical activity is one of the essential components of human existence which, together with intellectual activity, ensured the uniqueness of our species on the evolutionary path of the biosphere. Starting from the principle of the father of modern Olympism, Pierre de Coubertin, according to which "*sport must bring calm, philosophy,*

health and beauty", Joffre Dumazedier comes to the conclusion that in capitalist society things are just the opposite, sport being dominated by the specter of spectacle and that of profit (Dumazedier, 1967).

Physical training has two main purposes: increasing the athlete's physical potential, and the second is aimed at maximizing the biomotor skills specific to the practiced sport. In a periodized training plan, physical training is carried out according to a sequential scheme (Table 1).

Table 1. Sequential approach to physical training development (Bomba and Haff, 2009)

Training stage	The preparatory stage		Competitive stage
Development stage	1	2	3
Duration (weeks)	≥ 3	≥ 6	≥ 4
Objection	1. Initiation of general physical training	1. Initiation of sport-specific training 2. Improving specific skills	1. Improving specific skills 2. Maintenance of the physiological base

The training of athletes involves the preparation of the body, both from the point of view of increasing the morpho-functional indices, and as a psychological preparation to support continuous efforts and intensity (Papp et al., 2019). Physical training in sports, whether individual or team, has a very important role, the other components being influenced by its level. In the specialized literature we find many definitions of physical training, such as: *"The organized and hierarchical ensemble of training procedures aimed at the use and development of the athlete's physical qualities. It must be permanent at the different levels of sports training and be put at the service of the priority technical-tactical aspects of the activity"* (Marinău, 2021).

The growth and development of children is one of the problems with a particular theoretical and practical significance. Working with juniors during growth spurts is often a difficult time for coaches. Girls go through growth spurts around the age of 12, while boys start feeling them a little later, around the age of 13-14 (Marinău, 2016). The main reference elements regarding the orientation of the training of young athletes are the clear determination of the training models reported both at the level of the development of the sports branch at the given time (Alexe, 1972). At the junior level, training must take into account several aspects, ensuring the satisfaction through movement of a permanent emotional sphere and as rich as possible, skills constituted in attracting and maintaining systematic sports activity (Erdely et al., 2020)

Physical training must be a priority objective of the training of young athletes, so that it becomes a solid base for their further sports activity. In-depth knowledge of the psychomotor characteristics of children classified as junior athletes is necessary because they should not be treated as miniature adults but on the contrary, in their preparation they should be acted upon with means and methods adapted to their possibilities and needs. Modeling in the training of young athletes can be done knowing the structure-characteristics of the competitive effort in football (Bulz et al.,

2022; Ilieș and Caciora, 2020). In practice, it operates with several models, morphologically, data related to waist, weight, length of segments; functional related to effort capacity, the specifics of the game request; the technical-tactical complex of game actions of each player; of training aiming at characteristic elements of the pedagogical training process; competitive, processing data obtained during the game; Testing; motor, highlights the values of the player's general and specific motor qualities.

The multiple somatic, physical and mental transformations have serious repercussions in terms of sports training in each age category. Throughout the junior period, however, a parallel development of coordination (fundamental and specific technical gesture) with physical condition must be attempted, with the amendment that the sensitive phases (optimal periods) of development of each form of manifestation of motor qualities will be taken into account (Cometti, 2002).

The means of preparation are made in a new form, which requires some methodical clarifications of their application and interpretation. When we talk about the physical factor, it is absolutely necessary to talk about the psychological factor, calling it the psycho-physical factor (given the fact that any movement, action, displacement of the body in a direction also requires a mental effort) (Aubert, 2002).

Speed, agility and coordination

The traditional view of speed performance has been that sprinters are born and not made. Although some aspects of sprint performance depend on genetic factors, the consensus on this point has changed in recent years and it is now recognized that speed skills can be trained (Bompa and Haff, 2009).

In an attempt to resolve these debates, there is a growing body of data indicating that both change-of-direction performance and reactive agility can be developed through appropriate training interventions. Various studies have shown that the mechanics of movements that constitute change-of-direction activities are amenable to change through training and appropriate practice of movement skills in a way that reduces injurious loads on the lower limbs and also confers performance improvements (Adil et al., 2018; Gamble, 2012).

Agility is the ability to change the direction of the body efficiently and quickly, and to achieve this, the athlete needs a combination of: balance, coordination, strength and speed. It is very important when it comes to soccer players (Robinson and Owens, 2004). Not only because it is a main component in making passes, dribbling, but it also helps prevent injuries. Optimal activation and inhibition of muscle fibers can prevent muscle tears and even more prevent joint damage. Jullien et al. (2008) point out that short-term agility training, lasting no more than 3 weeks, can improve agility test scores in soccer players. It is also important to note that agility training forms a long-lasting response from motor memory. The ability to control body movement in cooperation with the body's sensory functions, for example catching a ball (ball, hand and eye coordination) (Mackenzie, 2000).

Skill is a complex motor quality, which is found in many situations in combination with other motor qualities, skills and abilities. The content of the skill, the mechanisms of its improvement have not been fully elucidated, a fact that is

reflected in the imprecision of the definition, in the multitude of terms used for this quality: ability, skill, coordination and so on (Pandey and Chaubey, 2015).

Manno (1996) notes that good coordination is "*the necessary condition for the most faithful execution of the motor model (program), which in turn depends on the precision of the information coming from the analyzers, whose integrity and level of training plays a determined role here*".

Development of qualities specific to the U12 age

For a long time, specialists in the field have been looking for an answer as close as possible to the truth about the optimal age for the development of motor skills. There is no lower age limit for starting the development of motor skills. There are only methods and means appropriate to this period of more intense development and relative stagnation (Lovell et al., 2015; Saward et al., 2020).

In relation to this conclusion, some clarifications are required regarding the optimal age at which intensive action can be taken to develop each motor quality (Mitra and Mogoş, 1977).

Abilities and skills develop in an order that depends on when they are required. Physical capacities and abilities have their own biological rhythm of development, which must be respected. Therefore, they must be requested at the right time: not before, because this is not possible, and not later, because it can be useless (Rădulescu et al., 2003).

In recent years, studies in the field of physical education and sports for children have mainly focused on the detailed knowledge of the various stages of physical learning (Markovic et al., 2020). Some of these studies have highlighted the existence of more favorable biological periods for the development of specific capacities. In the specialized literature, several authors define these periods as key stages or magical moments.

The most favorable period in which a development peak can be observed is between 7-12 years. The pace of development slows down after this stage, and adaptive stimuli no longer elicit appropriate responses. This hypothesis, tested experimentally, leads to the idea that the plan for development in this period of evolution must be drawn up with great care (FRF, 2018).

After a sudden increase up to 10 years, between 10-12 years it stagnates, 13-14 years presents the most favorable conditions for the development of speed because there is a balance between excitation and inhibition at the level of the cortex. From a technical point of view we find a high frequency of steps with a small length. To ensure total involvement, the most suitable methods are relays, races, and the total volume per training session should not exceed 120-240 m (Pradet, 2001).

One of the main aspects of technical training is the relationship between technique and coordination, expressed by the technical and coordination factor. A very important aspect, which we also mentioned in the previous section, is that in children's football, the performance depends substantially on the degree of mastery of specific techniques, which correlates with the development of coordination capacities (FRF, 2018).

Materials and methods

In the framework of this work, we aimed to highlight the importance and necessity of preparing these qualities (speed, agility, coordination/skill) for the football game; both through specific and non-specific means for football, knowing the particularities of age.

The judicious application of the means and methods of developing speed, agility and coordination will significantly improve the indications of their manifestation in a group of young football players aged 10-12 years, in the pre-competitive period.

In this idea, we set out to design, apply and evaluate a training program for a total of 16 players. They carry out their activity at a professional football club, having training sessions and official matches on a regular basis. The target group used in this study have an average age of 11.14 years, a standard deviation of 0.86, and from an anthropometric point of view, they present the following data: the average weight is 38.05 kg with a standard deviation of 2.89, height 145.93 cm with a deviation of 4.67.

Tests used

1. The "L" test

Was used in order to monitor the development of the athlete's speed of acceleration and deceleration with the change of direction. The "L" test is also known as the "Three Cone Test" (Mackenzie, 2012).

2. Speed running 4x10 meters, starting from the feet (Shuttle 4x10 m)

It considers the evaluation of speed with changes of direction, combining muscle strength, explosive strength, starting force, acceleration and deceleration.

2.1. Sprint 4x10 meters, starting from the feet, with a ball (Shuttle 4x10 m)

For the evaluation of speed with changes of direction, speed in technical mode, combining muscle strength, explosive strength, starting force, acceleration and deceleration.

3. The "zig-zag" test.

Assessment of agility, ability to move with rapid changes of direction at different angles, balance, acceleration and deceleration, specific technique in speed mode. This test aims to monitor the development of the athlete's speed and agility.

3.1. The "zig-zag" test with ball

Assessment of agility, ability to move with rapid changes of direction at different angles, balance, acceleration and deceleration, specific technique in speed mode and coordination with the specific object, the ball. This test aims to monitor the development of the athlete's speed and agility (Mackenzie, 2005).

4. Hand-eye coordination test

These test aims to monitor the ability of the athlete's visual system to coordinate the information received through the eyes to control, guide and direct the hands in catching the ball (hand-eye coordination).

The training of athletes involves the realization of a well-organized preparation, thus in order to obtain visible and lasting results, a planning of the entire

training process is needed. The training of the athletes takes place in an oriented, planned, systematic and long-term way, with the goal of increasing the value of the players and obtaining performance. On the results obtained after the application of the six control samples, we applied a series of statistical-mathematical formulas (arithmetic mean, standard deviation, the coefficient of variability, maximum and minimum value, amplitude, effect size), so that the image of the results is as objective as possible. Following the implementation of the initial tests and the analysis of the results, we developed a training program for the development of the targeted motor qualities in the shortest possible time. It is spread over a period of 14 weeks, being divided into three distinct cycles, comprising three specific trainings per week and one official game.

Table 2. Synthetic presentation of the means and their dosage in training cycles aimed at developing acceleration speed

		CYCLE I	CYCLE II	CYCLE III
Intensity		90-95%	90-100%	95-100%
Duration	Minutes	5-8 min	5-8 min	5-8 min
	Meters	80-90 m	100-120 m	110-120 m
Load duration		4-5 sec	3-6 sec	3-7 sec
Rest duration		45-90 sec	45-90 sec	45-90 sec
Means		4 x 7 m	4 x 12 m	3 x 10 m
		3 x 15 m	2 x 15 m	4 x 15 m
		2 x 20 m	2 x 25 m	2 x 30 m
Frequency		2 times a week	2 times a week	2 times a week

Table 3. Synthetic presentation of the means and their dosage in training cycles aimed at developing agility

		CYCLE I	CYCLE II	CYCLE III
Intensity		90-95%	90-100%	95-100%
Duration	Minutes	10-12 min	10-12 min	10-12 min
	Meters	40 m	40 m	60 m
Load duration		10-12 sec	10-15 sec	10-15 sec
Rest duration		30 sec	30 sec	30-45 sec
Means		2 x (stairs + 10 m slalom)	20 m (5 m front and 1 m behind running)	2 x (stairs + 8 m slalom) 2 x (stairs + 10 m zig-zag running)
		2 x (stairs + 10 m zig-zag running)	20 m (running and 360° turns left-right x 4)	2 x 20 (5 m front running + 1 m left running + 1 m right running)
Frequency		2 times a week	2 times a week	2 times a week

For monday of each week, it was decided to plan homework for force and acceleration speed. Starting from the statement that a true sprint session must be preceded by plyometric exercises, so the two themes will combine through their form of realization exercises that have an influence on, explosive force of the lower body and acceleration speed, changes of direction, being currently combined on monday of each training cycle (Table 2, Table 3).

For wednesday, the training focused on the development of coordination and agility, and friday being dedicated to training that combines agility but also the different forms of speed manifestation, reaction, execution, acceleration and

deceleration. For the development of agility, the means used were different variants of moving on a ladder followed by accelerated running over different distances in zig-zag, slalom, running with changing the direction of movement, forward backward, left right and 180° turns with the continuation movement (between left/right), and for some variants where the degree of complexity was not very high, we also opted for making them with the soccer ball (Table 4).

Table 4. Synthetic presentation of the means and their dosage in training cycles aimed at developing agility, speed through specific means

		CYCLE I	CYCLE II	CYCLE III
Intensity		90-95%	90-100%	95-100%
Duration	Minutes	10-12 min	10-12 min	10-12 min
	Meters	40 m	40 m	60 m
Load duration		15-20 sec	15-20 sec	15-20 sec
Rest duration		30 sec	30 sec	30-45 sec
Means		Agility / speed trail + Psychokinetic training	Agility / speed trail + Psychokinetic training	Agility / speed trail + Psychokinetic training
Frequency		2 times a week	2 times a week	2 times a week

For the training in which we developed speed and agility, the means used for these two qualities contain elements specific to the football game, but not only. The content of each cycle represents the realization of certain routes in which physical training is combined with technical training for the development of qualities, their development and specific to the football game, exercises with the ball, precision etc. And besides these exercises we also added psychokinetic training, through this training we wanted to develop the speed of reaction to visual/auditory stimuli, coordination, the ability to control body movement in cooperation with the body's sensory functions. Through a brief description of this training, with the help of the application or verbally (through the trainer) the athlete must pass/execute the color-specific command, as quickly as possible from receiving the command to the teammate wearing the indicated color/or the color-specific area.

Table 5. Synthetic presentation of the means and their dosage in training cycles aimed at developing coordination/skills

		CYCLE I	CYCLE II	CYCLE III
Intensity		90-100%	95-100%	95-100%
Minutes		10-15 min	15-20 min	15-20 min
Load duration		20-25 sec	20-25 sec	20-25 sec
Rest duration		45-60 sec	45-60 sec	45-60 sec
Means		Warming exercises without ball Movement games	Warming exercises with ball Movement games Relay race	Warming exercises with ball Movement games Relay race
Frequency		2 times a week	2 times a week	2 times a week

For the development of coordination, ladder exercises were used, different types of movements, at first without the ball, then with the ball, games in pairs that required coordination, for example, passes in pairs, with two balls, once with the foot

once with the hand, then alternatively, only one with the foot, the partner with the hand. Also for the development of coordination/skills, different versions of relays were used, which required coordination with the partner or partners, at the same time and with the object used (Table 5).

Results and discussions

After obtaining the results after the two initial and final tests applied to the 16 subjects, we can say the following.

The results obtained following the application of the structured training program over the three cycles, indicate that all subjects recorded improvements in their scores between the two tests (initial and final). Following the application of the statistical-mathematical formulas we can say that the averages of the group in the two tests record results homogeneously improved at the final test, as presented in table 6.

Table 6. The results obtained during the initial tests by the subjects of the experimental group and the statistical-mathematical indicators resulting from their processing

	L test (sec)		Zig-Zag test without ball (sec)		Zig-Zag test with ball (sec)		4 x 10 m test without ball (sec)		4 x 10 m test with ball (sec)		4 x 10 m test with ball (sec)	
	I.A	F.A	I.A	F.A	I.A	F.A	I.A	F.A	I.A	F.A	I.A	F.A
Mean	11.79	10.81	18.48	16.49	24.0	20.5	13.06	10.7	16.81	14.12	17.75	22.63
Std. dev.	0.47	0.61	1.06	1.01	1.91	1.21	0.52	0.54	0.88	1.11	2.02	2.36
Coefficient of variation	4.00	5.60	5.74	6.13	7.94	5.93	3.94	5.07	5.25	7.90	11.36	10.44
Maximum value	12.64	11.82	20.4	18.3	27.6	22.5	13.9	11.5	18.3	16.3	22	26
Minimum value	10.90	9.83	17.2	14.8	20.8	18.4	12.2	9.7	15.7	12.5	15	18
Amplitude	1.74	1.99	3.2	3.5	6.8	4.1	1.7	1.8	2.6	3.8	7	8

In the following we will analyze the results obtained for each test, but the analysis of the results obtained following the application of the formulas.

After the completion of the first test in this work, namely the "L" test, we can observe the fact that following the application of the proposed program, a difference is observed between the average of the initial and final tests, more precisely which concretizes through a progress of 0.98 seconds and in percentage the progress is 8%, aspects that are highlighted in figure 1.

From a statistical point of view, the size of the effect represents the difference between the means and highlights whether this difference is significant. A difference which, in order to be considered significant, must be over an index of 0.8. Following the statistical-mathematical calculations, we can affirm that the difference between the averages recorded is significant, the result of the calculation of the effect size being 1.81.

If we compare the maximum and minimum values obtained in the two assessments in the case of the "L" test, we notice that compared to the initial test, the best value was 10.9 seconds and at the final test performance increased to 9.83

seconds. Looking at the weakest time in the initial testing, this being 12.64 seconds. a much better time value is observed after the final testing 11.82 seconds.

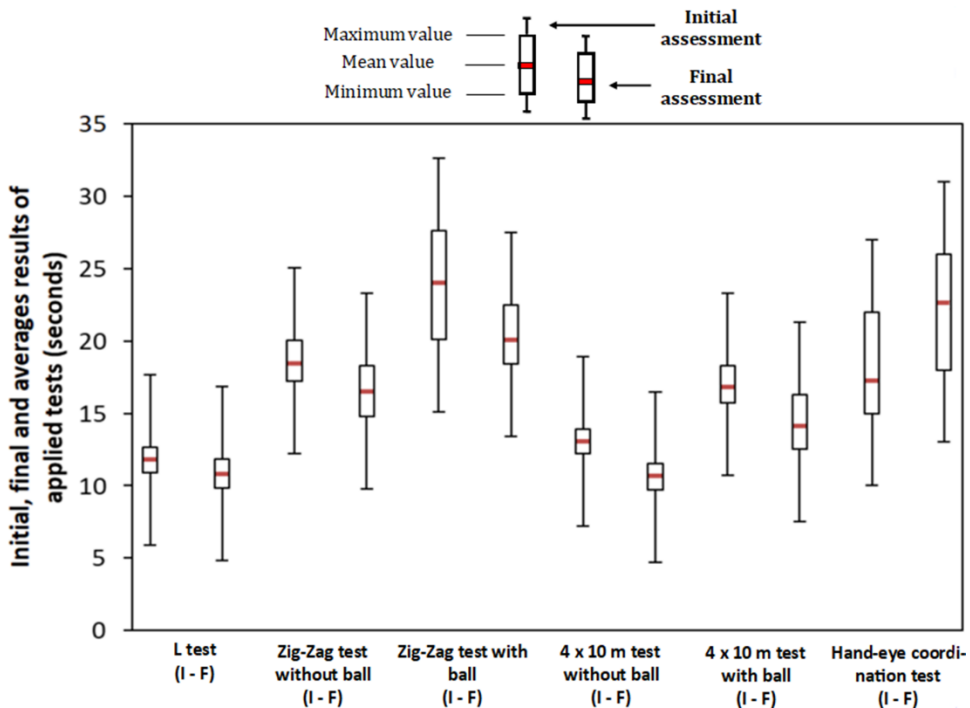


Figure 1. Presentation of the results obtained in terms of the maximum value, the minimum value and the average value of the initial and final assessment for the six implemented tests

The study of the coefficient of variability recorded for each sample provides us with data on the measure of relative dispersion. The lower the coefficient, the greater the homogeneity of the group. A group is considered to be homogeneous when the coefficient is less than 10%, and the homogeneity of the group during the entire testing process regarding the speed tests, both those with the ball and those without the ball, is maintained below the 10% threshold, in fact which entitles us to say that group homogeneity is increased. In this sample, the coefficient of variability is below the threshold of 6% in both tests.

In the "L" test regarding the progress, the average index of the group increased by 0.98 seconds, compared to the initial testing, and the homogeneity of the group remained in very good parameters below 6%. Comparing the averages recorded after the completion of the two tests, respectively the average of the initial testing being 18.48 seconds, instead at the final testing we have an improvement in the group average, this reaching the value of 16.49 seconds, between the two averages from one test to another we observe a progress of 1.99 seconds, and from a percentage point of view a 10% improvement on averages.

In the case of the Zig-Zag test without the ball, regarding the result following the calculation of the effect size, we can affirm the fact that the result of this test is also considered significant, being above the threshold of 0.8, more precisely reaching

the value of 1.85. Both the maximum value and the minimum value from the junior group show an improvement in times, the minimum value, representing the best performance in both tests, a value that registered a progress of 2.4 seconds, a percentage progress of 13%, and the maximum value registering a slightly higher progress of 1.74 seconds compared to the initial tests, thus we have an improvement at the level of the entire team. After performing the statistical-mathematical calculations, the result of the calculation of the coefficient of variability, highlights the fact that the homogeneity of the group is high, with values below the 10%, namely the initial test 5.74%, and the final 6.13%.

At the first test where the object of the work in football appears, namely the ball, testing where the player's technical ability to coordinate the movements specific to the test, but also to control the balls, also comes into play. The average of the two tests shows a progress of 3.98 seconds from the initial test to the final one, a percentage progress of 15%. Following the calculations made for the zig-zag test without the ball, the size of the effect has a statistically significant value above 0.8, more precisely 1.44, this value representing a significant difference in means. Looking at the individual results from the two tests, which represent the best and the weakest value, we can see that in this sample too we have progress in both extremes. The best value from both tests had a progress of 1.68 seconds, the progress from one test to another being 8%, and the weakest value showed a slightly higher progress, respectively 5.1 seconds, the percentage progress being 18%. From the point of view of homogeneity following the calculation and comparison of the data from the two tests, we notice that the homogeneity in both tests is below the 10%, but from the initial to the final test we have a homogeneity progress of 2.03%. By which we observe an increase of the entire team, both in terms of physical and technical training.

Comparing the averages recorded in the 4 x 10 m shuttle test without the ball shows a difference from the initial testing (13.06 seconds) to the final testing (10.7 seconds). The average of the tests showing an improvement in time by 2.36 seconds, in percentage the increase is 18%. For this test, the result of the effect size value can be considered significant as well, having a high value of 2.01. Both the maximum value and the minimum value from the group of soccer players show an improvement in times. The minimum value, representing the best performance in both tests, a value that registered a progress of 2.5 seconds, a percentage progress of 20% and the maximum value registering a progress of 2.4 seconds, the percentage being 17% compared to the initial tests, very close positive progress in terms of growth in both cases, thus we have an improvement at the level of the entire team.

After performing the statistical-mathematical calculations, it can be observed that the homogeneity of the group has the best values in the running tests. The strongest homogeneity can be found in the 4 x 10 meter shuttle test without the ball, a value below 5 in the initial testing, and very close to 5 and 5.07 in the final testing, which demonstrates a very good homogeneity of the entire group even after the training period.

In the case of the Zig-Zag test in which the technique and coordination with the ball are also tested, we observe from one test to another a progress of the averages from 16.81 seconds in the initial test, to 14.12 seconds in the final test, the progress

expressed in percentages of from one test to another being 16%. Based on the calculations, we notice that from the point of view of the effect size, the most significant difference in the means we have in this test, the value being 2.32. Analyzing the result of the minimum and maximum values, we notice that in both cases we have a progress. The maximum value recorded a progress of 2 seconds compared to the initial testing, and the greater progress compared to the best time since the initial testing, had a slightly greater increase, respectively 3.2 seconds. The homogeneity of the group at the initial testing had a value of 5.25, and after the preparation period, at the final testing the homogeneity increased negatively by 2.65, but even with this increase both values are below the 10%, a fact by which we can affirm the fact that the group is homogeneous in both tests.

In the hand-eye coordination test, which aims to measure coordination, we have a progress between the two environments. The initial testing having the value of 17.25 seconds, the final with 22.63 seconds, the progress being 5.38 seconds, the percentage being 30%, in this sample we have registered the greatest progress of the averages compared to the previous tests. The value of the effect size remained significantly high in all the samples made, thus the last sample registering the value closest to the standard one, exceeding the threshold of 0.8 by a little over, respectively 1.11. Being a test that is realized by the number of repetitions performed correctly, this maximum value represents the value with the best result being 26 repetitions, recorded at the final test, the value with a progress of four repetitions compared to the initial test. The minimum value express a progression of three repetitions from one test to the next, with the highest number of repetitions for this statistic being 18 repetitions achieved in the final test.

From the point of view of homogeneity in this sample, the value from the test is 11.36%, a percentage from which it follows that the group has relative homogeneity, and after the training period, the percentage knows a little progress, namely 0.92, reaching the value of 10.44%, the homogeneity of the group being still relative. Being a test in which we evaluate coordination, its specifics can benefit goalkeepers, who have specific training where they often use such elements, and hence the reason why the homogeneity of the group suffered a little.

Interpreting progress through effect size calculation

The values in figure 2 represent the standardized difference between the averages and highlight whether or not this difference is statistically significant.

This is a method by which the level of efficiency achieved after the training period can be found. For the difference to be considered small, this value must be less than or equal to 0.2, for an average efficiency of the group, this value must be between 0.2-0.8, and for a statistically high efficiency, this value must be more greater than or equal to 0.8.

For each test the same series of statistical-mathematical calculations was applied, so from a statistical point of view the value of the effect size for each individual sample is above the threshold of 0.8. The highest value is present in the 4x10m test. with the ball respectively 2.32, and the lowest value in the coordination test where we have the value of 1.11.

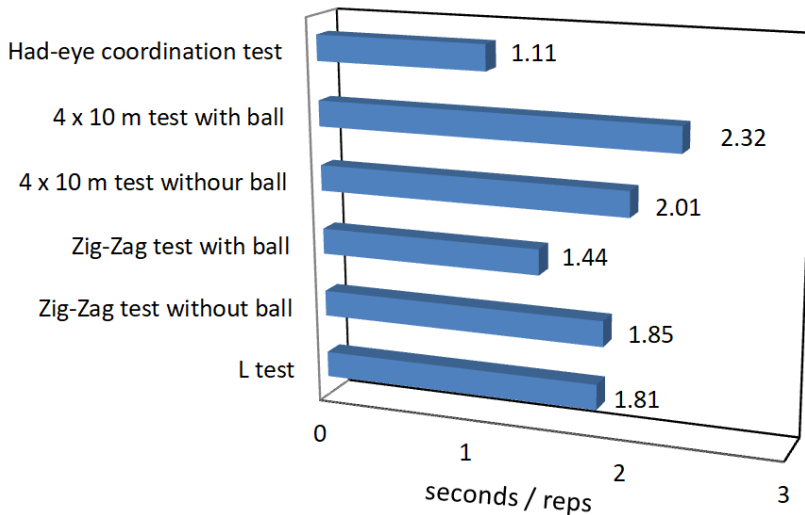


Figure 2. Graphic representation of the effect size values for the six tests applied to the target group

Through everything mentioned in the previous lines, we can affirm the fact that the size of the effect is large, which entitles us to say that we are dealing with a significant difference between the averages of the initial and final testing.

Conclusions

In conclusion, following the statistical-mathematical calculations, the tabulation and graphic representation of the results obtained and the analysis of these data, an improvement can be observed from a statistical point of view, from which we draw the conclusion that there is also an improvement from the motor point of view of the targeted qualities during the training period, a fact that demonstrates the effectiveness of the exercises designed and put into practice.

Physical training must be a priority objective of the training of young junior footballers so that it becomes a solid basis for their further sporting activity. The data we collected and the results obtained in this study mainly prove that the training and preparation process had an efficiency in the development of motor qualities aimed at speed, agility and coordination, as can be seen in the tables above at all the samples taken, between the initial and final testing there was a progress highlighted by the effective value between the averages as well as by the percentage difference calculated for each sample.

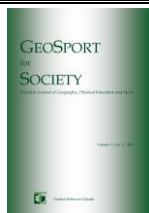
Following the achievements of the entire process of development of the targeted qualities, we can say that, in the design of a well-directed training program from the perspective of all aspects of periodization, dosage, means used, they are essential elements, which can have a direct impact on the level of development of those targeted.

Another conclusion that emerges from the recorded values confirms the fact that our activity was effective, is the fact that the effect size presents values greater than 0.8 in all the tests carried out on the junior soccer players U12, a fact that confirms to us that the difference between the performance averages recorded at the two tests, initial and final, is statistically significant.

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Analysis of the effectiveness of RFID Systems in triathlon

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Abstract: Accuracy is paramount in sports competitions. Between competitions around the world, tenths of a second or a hundred seconds can be decisive when comparing individuals and race results. The measurement of time results is now done by machines and devices, almost automatically. One of the most widespread and accurate time measurements is made with the help of chips and tags. The study deals with the RFID (Radio Frequency Identification System) devices used for measurement in Hungary. It examines and compares these systems according to different aspects. Based on the results, it provides support to the organizer based on weather conditions, either economic constraints or the number of participants, which system is more advantageous to use. The findings in the study can be used by competition organizers and it may be easier to choose the system required for the competition. The limits of the organization of the competition can be determined more easily.

Keywords: Triathlon, RFID, measurement, system

Introduction

Technology is constantly changing and the pace of change seems to be accelerating year by year in all sectors. What we consider common today, 50 years ago was a science fiction (Sheldon, 2001). The development of ICT technologies and innovative solutions has also changed the field of sports, as in competitive sports (Liebermann et al., 2002; Adesida et al., 2019; Karikás and Ráthonyi, 2021), recreational sports (Ráthonyi et al., 2018, 2019a) or even in the stimulation of physical activity (Ráthonyi et al., 2019b, 2021), they are also used for different purposes in health promotion.

In this respect, sport is closely related to development. The transfer and integration of knowledge into a wide range of sciences and industries has led to rapid technological development. In recent years, not only the world of professional but also the world of leisure sports has undergone tremendous development (Ujihashi, 2008). Investors have realized that the world of hobby athletes provides a huge investment space (Wenyan, 2015). Huge crowds are moved week by week by various amateur sporting events in many parts of the world. Mass-running events, such as marathons, have become an important segment of sporting events, as evidenced by the growing number of events and participants (Running USA, 2010). In Germany, for example, the market for runners was already huge in 2010, with more than 180 marathon races and several other smaller races (Statista GmbH, 2011). Here we can also mention running, cycling, hurdles, triathlon and other competitions.

In order to increase the number of visitors to sporting events, the organizers tried to broaden their attractiveness by expanding and supplementing the possibilities of using modern technology at their events. These extra services provide a useful basis for promoting events and making the event attractive (Christine Green, 2001).

Each market player strives for continuous improvement. That is why we need to offer a little more to entrants at every event, so continuous improvement needs to be maintained so that more and more entrants and visitors attend each event.

For participants in sporting events, the attitudes towards technology-related products and sporting events and the fact that control-related factors (technical functionality and facilitation) influence the impact are of paramount importance for smart sport products (Song et al., 2018)

In the past, 20-25 years ago, the organizers measured the time of the entrants in hobby running competitions with a stopwatch, whereas today a smaller volume competition is unthinkable without chip timing systems. It has become a basic requirement during sports events, but in Hungary, too, several companies deal with such measurements, and they are measured with several different systems. We would like to present these in the next writing. Why is chip timing necessary? First, because it is much more convenient than memorizing the time of arrivals by hand. Secondly, because it is almost impossible to coordinate a larger competition and measure accurate times. In addition, it is not practical to describe the results on paper or in an Excel document, because there is a lot of possibility of deterioration, and it is almost impossible to do this properly for a larger mass. Participants cannot wait for hours or days to collect data.

Triathlon field performance reflect triathlon specificity. The results depends on a field and actual weather performance and from the other environmental parameter the individual performance (Seidl et al., 2015).

The needs of identification systems

With the development of information technology, there is a growing need to find out as much information as possible about a given product, service, or a particular person. Modern logistics and manufacturing are now unthinkable without

product identification technology and automation. Accordingly, there have been a number of technological advances in this field: from simple barcodes to smart tags - from simple data to artificial intelligence (Ten Hompel et al., 2008).

While in the case of goods, at the dawn of product identification systems, a barcode was able to store only relatively little data (product name, price, stock data) and these data also became known only with the help of a special barcode scanner. Later, with the spread of QR (data matrix codes) it is possible to find out much more information about a product, the raw material of the products, when and where it was made, the warranty period etc. Reading these codes is also very easy, as no special reader is required, but a smartphone is enough.

This technology is also becoming more common for service companies, as in the case of an airline, for example, the code may contain passenger and flight information for the flight ticket or personal data for a concert or movie ticket. Educational institutions are also actively using these 21st century tools to engage key stakeholders, i.e. students. Scanning the code takes the user into an online digital world (Burns, 2017).

Personal identification is also extremely important, in the event of a fire alarm in an office building, it is easy to identify whether someone is in the building. Blood type, drug sensitivity etc., are also becoming more common in medical care for data storage. To use QR codes, you need a smartphone with a QR code reader and an internet connection. The QR code reader is usually free to download from apps, and some phones already have a built-in QR code reader (Law and So, 2010).

As technology advances, RFID technology is beginning to become more prevalent. The possibilities of using radio frequency identification technology are almost endless. In addition to clear logistics, identification, security and registration tasks, RFID solutions are emerging in more and more areas. Clearly, with the reduction in chip manufacturing costs, chips that it can be produced more and more cheaply can displace even the most common barcodes in some areas.

RFID technology, combined with modern positioning systems (GPS), enables the complete tracking and optimization of road, air and water transport. Some countries protect their valuable products from dangers in this way. Thanks to the advantages of the technology, most express postal services know exactly where our item is need to deliver. Identification and security capabilities are increasingly used in modern passports, digital IDs and the latest payment solutions. Attempts are being made to set up automated shops, and RFID-based highway payment solutions have already been introduced in many places around the world. The automotive industry has also recognized that RFID can create new opportunities for security solutions, so today most immobilizers and electronic keys already work with this technology.

Material and Methods

RFID (Radio Frequency Identification) systems are grouped in three ways:

According to energy supply

Passive cards or labels

Passive RFID Cards or Tags do not have their own power source (battery or accumulator). They are able to collect the electric current, which is essential for their operation, through the antenna built into them. Passive cards or tags do not contain their own transducer like active cards or tags, they only cause a change in the electromagnetic field generated by the reader through modulation, which the reader senses and then converts it into computer-readable digital signals:

- Simple design;
- Easy to make water and dust resistant version;
- Very small footprint;
- Produced in the form of a self-adhesive sticker;
- Produced under the skin.

The disadvantage is the short range, their use is usually in bank cards for contactless payment transactions.

Semi-active / semi-passive

Devices known as semi-passive or semi-active RFID tags are also called battery-assisted passive (BAP) or battery-assisted tags (BAT). Semi-active cards or tags, like their passive counterparts, have an antenna without an encoder and can only communicate in the reader's magnetic field through modulation, just like passive cards or tags, but the microchips are not powered by the antenna but by the built-in battery.

Its advantage is the relatively large reading distance and easier tracking. The disadvantages are the relatively short service life, the large space requirement, the complicated structure and the higher price compared to the passive chip.

Semi-active tags or transponders are often use in secure access control and toll systems.

Active

There are two groups of active cards and tags, the first is called transponder and the second is beacons.

Transponder: The device contains both the antenna and the power source (battery), as shown in the semi-active tags. It is not possible to use to power the antenna, but the antenna is an integral part of its own transmitter, so it modulates the reader's electromagnetic field and emits its own signals, which can detected by several readers at the same time. Transponder RFID tags do not emit a signal in their basic state, they work passively, they only respond to a query generated by the reader, which is why they are called transponders. These devices are now less implementable in a standard card format due to their higher capacity battery requirements, whereas they are often use in labels due to their significantly longer range. Reader performance and sensitivity, as well as label performance, also affect reading distance.

Signal transmitters: Both devices contain both the antenna and the power source (battery or accumulator) as in the semi-active labels and it is not possible to

use to power the antenna, but the antenna is an integral part of its own transmitter, so there is no need for the reader to be electromagnetic. Modulates its space, radiating its own signals that can be perceived by multiple readers even simultaneously. Active devices (transmitters) constantly radiate the radio signal, regardless of the presence of the reader, like a lighthouse.

Installed readers, as soon as the signals emitted by the tags are detected and the reading takes place, there is no query. Instead of continuous broadcasting, depending on the label, the identification signal is sent every few seconds, so their lifespan can be longer. The life of batteries or accumulators determines the usability of the device (Figure 1).

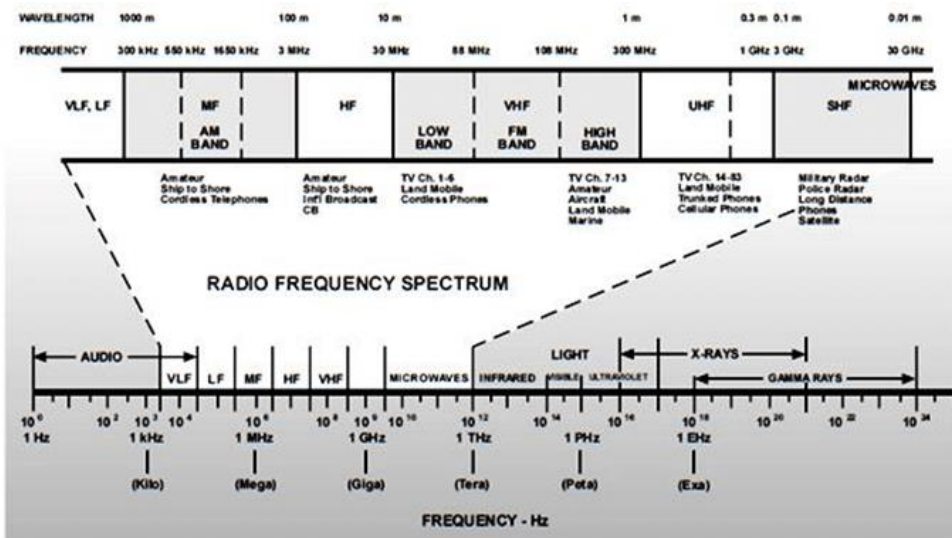


Figure 1. Operating Radio frequency spectrum (Radio Communications in the Digital Age, 1996)

Active RFID tags typically have a lifespan of 3-5 years, but in the event of a battery failure, the active tag must be replaced. Signals from the modern active label can be read from hundreds of meters away, but to conserve battery life, they are usually set to lower transmission power, to reach approx. 100 meter reading range. Reader sensitivity and label performance affect reading distance.

Its advantages are long reading distance and easy tracking. Disadvantages are short service life, space requirements, complicated construction and high cost

Transmitters are very common in the oil and gas industry, used in shipping and logistics, construction, mining and high value manufacturing.

RFID-based technology is used worldwide for sports timing. These technologies are also present in Hungary. It allows a very accurate number of identifications. Use MyLaps, MTS J-Chip, WinningTime Active or RaceResults, among others.

Low Frequency (123-134 kHz)

It is very sensitive to environmental noise and has difficult logistics. This is a passive system. The big disadvantage is that the antenna can only communicate with

one chip at a time. This is a problem if more than one person arrives at the start line at the same time. Several alternative methods have already developed to address this; MyLaps and WinningTime also use this.

This is the 1st generation RFID technology, mature, simple and inexpensive. The reading distance is very short, and the reading speed is low. It is characterized by an extremely long wavelength usually a short reading range. Its operating distance is 1 to 50 centimeters. Access cards, parking cards etc.

Most common card types in this frequency range:

- EM4102
- HID® Indala®
- HID® Proximit



Figure 2. Low Frequency chips

The LF chip, which is in a small plastic protective case show in figure 2, must be worn in a shoelace in individual competitions, in relay competitions where the change is made by handing over the chip, it must be fastened to the ankle with a velcro, as in triathlon competitions. The LF chips ideally have a measuring height of 50 cm from the carpet. This can be as little as 25 cm, depending on the circumstances, so it is important to have the chip on your foot.

High Frequency (HF) & Near-Field Communication (NFC) (13.56 MHz)

Simple and cheap technology. Few companies use it, due to the deteriorating scan rate in noisy and wet environments. IPICO Sport Timing and the DAG System use this system.

High frequency range (10-15 MHz, the most common frequency is 13.56 MHz) Development in this frequency band is very significant. These cards are mature,

inexpensive, medium read speed, work in wet environments but not in metallic environments. Its average reading range is from 1 centimeter to 1 meter. Thanks to continuous improvements, this is the frequency that appears on most cards (RFID and NFC).

Ultra High Frequency UHF (865 - 960 MHz)

A particularly sensitive system so you do not have to place the chip on your foot. It is usually placed on the start number. Its cost is low, barely a few cents abroad. It is constantly being developed and communicates perfectly with rubber cover, even in water or under neoprene. RFID is a system used by RTS Ultra, RaceResult and many other companies.

RFID cards or tags operating at ultrahigh frequencies can operate in both passive and active ways. The reading distance is very long, from 1 to 100 meters, the reading speed is high and it works even in wet environments, but the waves are easily absorbed. With the increase in commercial application, very significant growth in this sector. Used to track containers, goods, vehicles.

The UHF chip is already glued to the back of the start number, you don't have to do anything with it anymore. The start number should be recorded on the chest, on the top layer of clothing. It is important that nothing is forced on this anymore, as it can affect the measurement efficiency.

Microwave frequency range SHF: 2.45 or 5.8 GHz: super high frequencies

The reading distance is much larger than 1.5 meters, the reading speed is high. It requires the construction of an expensive, complex system and requires a direct view of its operation (this does not make it more attractive to barcode systems in many applications), used for vehicle access systems.

Active-mode microwave labels operating at 2.45 GHz have already become widespread in shipping due to their long range.

In order for communication between a card and a reader to work reliably, especially when several cards are in the reader's range at the same time, certain pre-laid rules are needed, the sum of these rules being what we call a protocol.

According to the communication protocol, we distinguish two main groups:

- RTF or (so-called reader-talks-first) protocol - "the reader speaks first";
 - According to EPC Global Gen2 standard.
- TTF (so-called tags-talk-first) protocol - "the tag speaks first";
 - Safer, Cheaper Label or card, but more complex reading algorithm.

Or a combination of these systems:

- RFID and Infrared Transmitters;
- RFID and GPS / GPRS transmitters and receivers;
- IEEE 802.15.4 RFID sensor networks;
- Metal fiber identification based on RF reflection;

- Ultrasound solutions;
- 2D codes as RFID "back-up".

Investigation of chip timing methods related to running competitions in the case of Hungarian companies

In Hungary, several companies deal with chip timing. There are companies in the market that use foreign developments, but most companies use Hungarian development in Hungary. The most significant companies are:

- MyLaps;
- RaceResults;
- EvoChip Hungary;
- DarkTiming;
- Viking Timing;
- Köridő;
- Fair Timing.

MyLaps

MyLaps was founded in 1982. The invention of automatic sports time measurement is associated with the name of the company. The development of the system is named after two Dutch inventors. They decided to capitalize on their technical skills and came up with the idea of transponder timing. They installed transponders on their cars and built the world's first automatic timing system on a racetrack. They managed to create a user-friendly system.

Millions of athletes, event organizers, racetrack owners and associations around the world also use this technology. This system is used at the Olympics, NASCAR, Le Mans 24 Hours, Boston Marathon, Giro d'Italia or Ironman Triathlon. More than 20 million athletes and competitors compete in MYLAPS-measured competitions each year, and more than 700,000 users regularly use mylaps.com to analyze and share their time and performance on their social networking site.

In Hungary, the Watchman team operates this system. MyLaps uses two types of timing technologies to measure leisure sports competitions: the BibTag system and the ProChip system. The first system is used in running, cycling, triathlon, cross-country and obstacle races, while the second system is used in urban cycling, triathlon, BMX, cross-country, and skating competitions.

BibTag system

The measurement has several components. Not just every type of race, but every single race has its own characteristics. There is a specific standard equipment for measuring competition types and customers can choose several other extras. Timing can be done with the following electronic equipment:

Basic equipment:

- Label decoder: connected to carpets. This will identify the competitors. They can identify up to 50 simultaneous transmissions;

- Carpet: these are sensor mats. It must also be placed at the start and finish. These serve as antennas for the system. You can place more than one in a tournament;
- Labels: these are identified by the system. Competitors must wear these during the race to measure their results. They are designed for different weather conditions;
- Timer and measurement system: this software has been developed for this purpose. Provides easy operation.

Premium electronic accessories:

- Lightweight carpet: an improved version of the former sensor. It can be installed quickly even in busier places, and the cabling is integrated into the carpet;
- Handheld reader: a mobile decoder that is easy to carry due to its small size. It is used in places where carpets are difficult to install;
- Multi sport label: type of label used in triathlon and hurdles. Used in wet and muddy terrain;
- Saddle Tube Label: A label used in bicycle races;
- Side antenna: stronger speed is possible with this development.

Accessories:

- Live event application: provides a greater experience for participants and spectators. Participants can follow the competition live;
- Photo and video: photos and video of the competitors can be taken;
- Photo and video integrator: an innovative development that enables reliable and high-quality images, easy and fast setup, as well as fast and intelligent data management.

The technology allows for much more accurate, real-time measurement. There are sports where tenths of a second are a decisive difference. One of the characteristics of mass sports is the crowd, i.e. the many participants. With human resources, it is not possible to perfectly record the exact time result of everyone. Even if you manage to write down everyone's target time, it will be just a piece of paper with numbers, you still have to make a list of results, by gender, age group, etc. This is a lot of time and the competitor needs to know the result as soon as possible. Among the services of a good competition, chip timing and its benefits play a key role.

Net-Gross time measurement

Net timing is the measurement of the race time of each competitor from the time of the individual start to the finish. In this case, a timing point is installed on the start line, so the time of the start will be recorded for each competitor. Net timing in high-weight races is a photos, as there can be a significant time difference between the start time of the first-row and last-race competitors. In gross time, everyone will

have the same start time and the race time will run from that time until they reach the finish line (net time = own time, gross time = start time) (Figure 3).

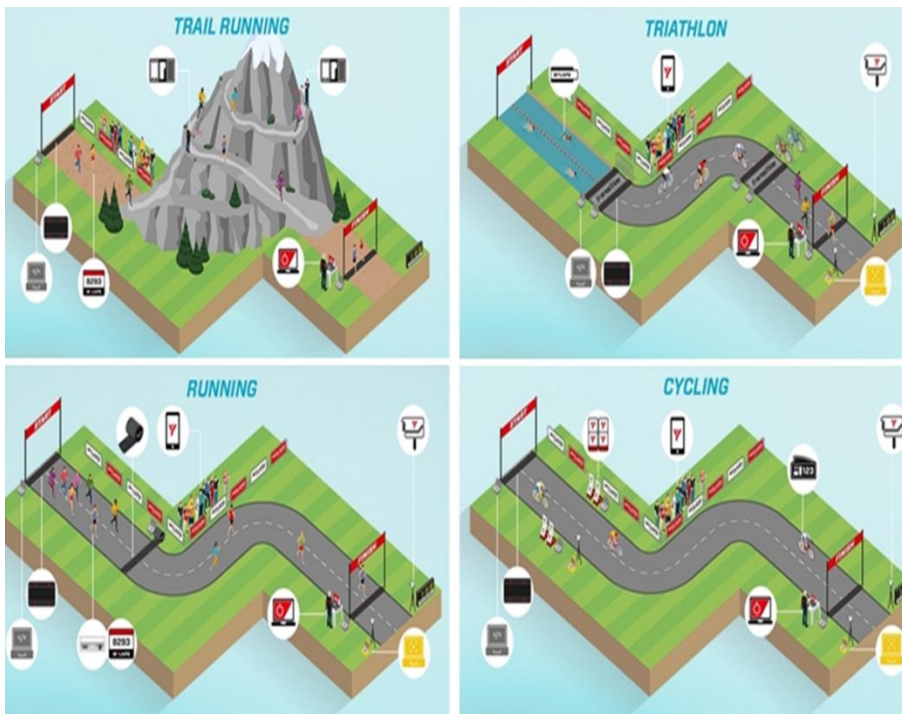


Figure 3. Timing solution for Triathlon (Timing solution for triathlon, 2022)

Wide application

Technology has also conquered other sports, not only in outdoor activities.

In indoor sports it is used already in basketball where other parameters need to be measured, such as the physical condition of individuals or the exact location of the ball (Blake et al., 2018).

The system can be used to collect a lot of data, but it is important not to get lost in the data. The big data problem is the case. The analysis should determine exactly what data is needed and focus only on it.

Also in the case of sports marketing, managers who make strategic decisions need to be aware of how to use or not to use RFID technology (Mumcu and Fried, 2016).

Results

Competition organizers have to take into account several aspects when and what timing systems to use. The possibilities are compared in table 1. First of all, the budget of the organizing team, the sport in which the measurement takes place (street running, cross-country running, obstacle course, triathlon etc), how many entrants take part in the competition, how many organizers can take part in the event etc.

Table 1. Comparison according to different aspects

Characteristics	Traditional timing	Passive RFID chip	Active RFID chip
Measurement speed	Between 1-5 seconds	0.0005-0.02 seconds	0.1 seconds
Number of measurable runners	One operator/ one person	Hundreds of people	Hundreds of people
Measuring distance	It depends on the operator	1.5 meter	0.2-3 meters
Data entry mode	Manually	Automatically uploads to the website	Automatically uploads to the website
Water resistance	-	Only drip-proof	Waterproof
Recommended competition	Small number of runners or bike races	Street, cross-country race	Any type of competition
Deployment time	No build time	30-60 minutes	30-60 minutes
Number of operators	Minimum 6 people	1 person- In case of part time 2 people	1 person- In case of part time 2 people
Weather safety	Human factors	Soaking (chip with sponge)	It is not affected by the weather
Lifetime	-	It is easily damaged and is replaced by race	Up to 6 years
Accuracy	It depends on human factors	0.0005-0.02 seconds	0.1 seconds
Data entry speed	It depends on human factors	0.1 seconds	0.1 seconds
Cost of rent	Relatively low (stopwatch, phone, laptop / Excel)	Basic Package: measuring carpet, speaker, monitor, laptop, RFID chip	Basic Package: measuring carpet, speaker, monitor, laptop, RFID chip
System price and components	-	Basic Package	Basic Package
Suitable for	Relatively cheap, small, friendly competition	Street, cross-country, bicycle race	Any type of competition

In the case of the size proposed for the type of competition, any type of competition includes triathlon, cycling, obstacle course, open water swimming.

For smaller events, such as a rural running race where 30-40 entrants are present, there is no need to rent such a system because it is not the main attraction for a participant here. With such a small number of people, they can solve the measurement manually. Regardless, if the budget allows, they can increase the level of competition by renting a chip system.

The active and passive timing systems are similar and identical in many ways. The measurement speed is almost the same, the number of measurable runs is the same, there is a small difference between the measurement distance, the number of measurable runs, the type of data entry, the system set-up time, the number of operators, the accuracy or the data entry speed agree.

There are significant differences in water resistance, among other things. In sports such as triathlon or hurdles, organizers cannot use a passive system. In this case, they can only work with an active system. So the passive system can be used in far fewer sports. Another such difference is the lifespan, as the chips in the passive system can only be used in one race because they are easily damaged, but instead, they do not have to be collected at the finish gate after the race. Another important factor is that the rent for a passive system is much cheaper than that for an active system. Based on an average race of 300 people, the basic package, which includes a measuring

mat, speaker monitor, chip and laptop, is approximately 25-30% cheaper to rent than a similar package from an active system.

The starting package for the passive chip system consists of the following elements: Timing system € 4.500 -5.000 + mat 2.500 - € 3.000 + laptop software € 1.000 - € 1.500. For an average tournament of 300 people, this amount costs a system cost of € 8.000 to € 9.500.

The starting package for a system with an active chip consists of the following elements: Timing system € 3.500 - 5.000 + active chip € 50-80 / person. For an average tournament of 300 people, this amount costs a system cost of € 18.500 to € 29.000.

Conclusion

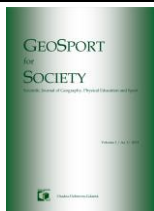
Based on the results, depending on the type of planned system to build, the ideal system can be developed depending on the accuracy, and depending of the risks, such as weather conditions.

The study is a suitable tool for companies organizing triathlon competitions. It provides a kind of support depending on the participants in the competition, the method of data collection and the financial constraints, which system should be built. The study is possible to extend and developed with the analysis in the timing aspects of other sports.

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The Impact of COVID-19 on Small-Scale Sporting Events in South Africa

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Abstract: This article evaluates the impact that COVID-19 has had on small-scale sporting events within the context of South Africa. To this end, it considers the impacts that the pandemic has had on these types of events, and reflects on the strategic direction in the management and organisation of these events going forward. To achieve this, a content analysis of existing frameworks and documentary analysis of government policies and strategies, coupled with interviews with stakeholders involved in the organisation and management of small-scale sporting events domain was conducted. Through a purposive sampling technique, as well as snowballing, key stakeholders in the small-scale sporting event domain were interviewed using a semi-structured interview schedule. The key findings revealed that small-scale sport events experienced great financial loss due to the global pandemic which resulted in some of these events having to cease their operations during the hard lockdown levels. However, the lessons learnt during these times have offered event organisers ideas and guidelines for dealing with future external shocks. A key observation is made for increased governmental support for small-scale sporting events in this regard. This research forms a basis for improved understanding of sport tourism, and specifically small-scale events especially in changing times.

Keywords: sport tourism, small-scale events, COVID-19, South Africa, environmental management

Introduction

The sport tourism sector has grown considerably over the last few decades and has thus become one of the leading sectors in the global tourism industry which has led to significant academic attention (Gibson, 2013; Hinch et al., 2016; Nyikana and Tichaawa, 2018a; McKay et al., 2019; Hemmonsbey and Tichaawa, 2020; Higham, 2021). Growth in the sector has been especially observed in the emerging world, resulting in increased research focus which seeks to analyse the socio-economic implications of the sector on these economies (Gibson, 2017; Swart et al., 2018; Tichaawa et al., 2018; Tinaz and Knott, 2021; Nyikana et al., 2021; Higham, 2021). The rapid development of the sport tourism sector in this region has significantly contributed to the overall growth of the tourism industry because it is a vibrant sector that presents various socio-economic as well as environmental benefits for sporting destinations in this context (United Nations, 2020; Higham, 2021; Mchunu et al., 2021). Many countries, especially those in the Global South have recognised the benefits offered by the sport tourism sector, and as a result, have sought to develop their countries by strategically promoting sporting events, specifically major and mega-events in order to achieve this aim (Fourie and Santana-Gallego, 2011; Njoroge et al., 2017; Bama and Tichaawa, 2020a). Hemmonsbey and Tichaawa (2019) argue that sport tourism has, indeed, contributed towards the socio-economic growth of many African countries including South Africa, Gabon and Cameroon amongst others. However, they have also observed that some developing countries have somewhat become overly-dependent on sport tourism for economic growth. This is evident in the current state of the world, where countries are actually trying to find ways to revive the sport tourism sector so as to aid in the recovery of the tourism sector especially in the economies that have been most significantly affected by the COVID-19 pandemic (Daniels and Tichaawa, 2021). The importance of the sport tourism sector is further emphasised by observations that sport tourism, as a tourism activity, is used to market host destinations owing to its ability to serve as a multi-purpose tool for development and marketing (Hinch and Higham, 2011; Uvinha et al., 2018). Additionally, the sector has been used by many countries as a development tool, and a vehicle for fast-tracking economic growth and as a regeneration tool for local economic development (LED) (Badurina et al., 2020; Nyikana and Tichaawa, 2020). Resultantly, many countries have sought to focus on revitalizing and relaunching sport tourism so as to fast-track economic growth in the face of the COVID-19 global pandemic and beyond.

Beyond the often-mentioned economic benefits that the sector brings, sport tourism is also associated with other implications such as the improvement in the wellbeing of residents, increased employment opportunities and improved infrastructure specifically transportation systems, as well as enhanced environmental awareness (Knott et al., 2015a; Bama and Tichaawa, 2020b; Mchunu et al., 2021). Some scholars (Malchrowicz-Mosko and Munsters, 2018; Zarotis, 2020) have observed that sporting events, as a sport tourism product, promote cultural diversity during their hosting. They argue that this is because sporting events provide insights into the cultural dynamics of the host destination and the events allow for cultural learning to take place among attendees from different cultural

backgrounds. Therefore, sport event tourism, which is an integral part of sport tourism, is considered a tourist attraction because sporting events attract tourists to host destinations and the events positively influence seasonality patterns as well as increased tourist numbers (Wise and Harris, 2017; Richelieu, 2018). Moreover, sporting events promote host destinations as attractive tourist attractions which influences repeat visits to the host destination (Kotus, 2016; Nyikana and Tichaawa, 2020).

According to Tichaawa et al. (2018), sport tourism influences stakeholder relationships between governments, event organisers, businesses and local communities, and such sport tourism stakeholders are interconnected as they share similar characteristics such as the love of sports. In this sense, sport tourism can be seen as an interactive field, and the success and continuity of the field is highly dependent on different stakeholder groups interacting with the sector (Clarkson, 1995; Reid, 2006). As such, sport tourism events of different magnitudes are affected by this interconnectedness, and their direction in the face of external shocks is determined by such fruitful interactions. In the context of the current study, the argument is that all tourism types have been largely devastated by the COVID-19 pandemic from its initial emergence (Bama and Nyikana, 2021; Lekgau et al., 2021; Mbatha et al., 2021; Daniels and Tichaawa, 2021; Rogerson and Rogerson, 2021 and 2022). The COVID-19 pandemic caused disturbances in the success and continuity of the sport tourism sector, and has affected many stakeholders in the sector. This devastation has led to the need for empirical research seeking to unpack the effects of the pandemic on tourism activities, specifically sport tourism events. This paper specifically focuses on the impacts of the pandemic on small-scale sport events in the context of South Africa from the perspective of event organisers. We argue that this typology of events has greatly been affected by the pandemic more so than other typologies of sport events and the restrictions initially placed on the sector has slowed down the growth of small-scale sport events. This study, therefore, offers recommendations that may aid in the kick-starting of small-scale sport events post-pandemic. In terms of organisation and structure, the first section of this paper presents the literature review which focuses on small-scale sport events in the context of developing countries and the impact of COVID-19 on small-scale sport events. This is followed by an explanation of the research methods applied for this study. Thereafter, the findings are discussed and conclusion as well recommendations are provided.

Literature Review

Nature of small-scale sporting events

For many decades, major and mega sporting events dominated sport event tourism literature with small-scale sport events receiving little research attention from sport tourism scholarship (Gibson et al., 2012; Yuan, 2013; Kwiatkowski, 2015). However, in recent years, there has been a growing interest in small-scale sport events and several research studies have advocated for this typology of events to be equally analysed for better comprehension, analysis and evaluation (Gibson et al., 2012; Dingle and Mallen, 2021; Mchunu et al., 2021). These studies have highlighted

the socio-economic benefits of hosting regular small-scale sport events, arguing that these events create long-term benefits that are sustainable for host destinations (Badurina et al., 2020; Van Rheenen et al., 2021). As a result, developing countries are increasingly paying more attention to small-scale sport events because of the potential benefits presented by this typology of events to fast-track economic development and to build strategic, reliable event portfolios (Bob and Swart 2010; Chalip, 2017; Ardiet et al., 2021; Cernaianu et al., 2021). In fact, Mchunu et al. (2021) point out that hosting regular small-scale sport events is in fact more feasible for developing countries since these events require less financial resources compared to larger events. In any case, there are very few countries on the African continent that have successfully hosted major and mega-events, and as such, some scholars suggest that hosting small-scale sport events is more realistic for developing countries (Nyikana et al., 2021). Higham (1999) as well as Hemmonsbey and Tichaawa (2019) further suggest that countries that wish to develop their sport tourism sectors should consider hosting regular small-scale sporting events as such events will positively contribute towards the marketing and branding of host destinations which will assist developing countries in gaining competitive advantages.

Some scholars (Gibson et al., 2012; Fotiadis et al., 2016; Nyikana and Tichaawa, 2018b) argue that small-scale sport events have the potential to improve the socio-economic challenges faced by local communities especially in rural and peripheral destinations. Others (Hemmonsbey and Tichaawa, 2019; McKay et al., 2019) posit that small-scale sport events create more socio-economic benefits for local communities, and as a result these events should be prioritized by local governments as they contribute to sustainable LED and social cohesion. More importantly, small-scale sport events encourage spectators and participants to consume local products and to visit local tourist attractions which results in the development of local economies (Radicchi, 2013; Kwiatkowski and Könecke, 2017; Revindo et al., 2021). According to Taks et al. (2015) as well as Gibson et al. (2012) small-scale sport events are more practical for local communities and rural destinations, because these events are budget-friendly which makes it easily accessible to all stakeholders. Moreover, small-scale sport events mostly operate within existing infrastructure, and in most cases, these events do not require bidding fees thereby lessening the financial burden on developing countries (Giampiccoli et al., 2015; Mchunu et al., 2021; Gibson et al., 2012). As a result, some have argued that hosting regular small-scale sport events presents local communities with opportunities to build sustainable partnerships with other stakeholders and to market their communities as sporting destinations (Taks et al., 2015; Hemmonsbey and Tichaawa, 2019). In this case, small-scale sporting events then become practical and realistic for local communities as the events present opportunities for communities to create their own legacies from which local residents will benefit in the long-term.

According to Higham (1999), small-scale sport events are regular-season, domestic sporting competitions such as soccer, rugby and cricket leagues. Based on this definition, it is evident that the nature of small-scale sport events attracts relatively less spectators when compared to larger sporting events, and that the recurring nature of small-scale sport events is likely to influence repeat visits to

destinations (Gibson et al., 2012). Consequently, the recurring nature of these events can be effectively used as a platform for pro-environmental education through which certain campaigns can be launched for this purpose. For example, they can be used to promote and influence sustainable tourism in host destinations (Gibson et al., 2012; Duglio and Beltramo, 2017; Casper et al., 2020). In fact, small-scale sport events are said to better comply with the principles of sustainable tourism because this typology of events does not harm the environment and rather creates sustainable opportunities for local communities that will benefit future generations as well (Liu, 2003). The above discussion reveals that small-scale sport tourism events can play an important role in the development of many destinations, if well-planned and organised. However, for this to be achieved, the implications of external shocks, such as the topical COVID-19 pandemic have to be considered. The next subsection presents a discussion of the COVID-19 pandemic and its implications on the sport tourism sector, and sporting events in particular.

Contextualising sporting events in the COVID-19 era

Sport event tourism in South Africa has experienced significant growth in the last two decades, and the government has largely focused on continuously growing the sector by marketing and branding the country as a world-renowned sporting destination (Knott et al., 2015b; Nyikana, 2016; Swart et al., 2018; McKay et al., 2019; Daniels and Tichaawa, 2021). South Africa has hosted a series of major and mega-sporting events that have contributed towards the socio-economic development of the country (Bama and Tichaawa, 2020b). More importantly the growth of sport event tourism in South Africa has encouraged other developing countries, particularly in Sub-Saharan Africa to bid and successfully host major sporting events (Achu et al., 2015). However, since the outbreak of the COVID-19 respiratory disease, the sector's growth has slowed down due to the significant impacts caused by the global pandemic (Gössling et al., 2020; Nhamo et al., 2020; Gibson and Fairley, 2022; Kennelly, 2022). Many countries across the globe had to cancel and/or postpone all types of sporting events in the last two years due to the restrictions placed on the sport event tourism sector (Keshkar et al., 2021; Daniels and Tichaawa, 2021; Margvelashvili, 2021). The various actions taken by countries in response to COVID-19 restrictions increased debates on the sustainability of sport event tourism in the era of COVID-19, although such fears are not as dominant now that the pandemic has slowed down significantly (Gössling et al., 2020; Keshkar et al., 2021). For countries in the Global South, specifically developing countries, the restrictions placed on the sport event tourism sector brought forth harsher impacts because of the lack of financial resources to maintain developing economies during the global pandemic. Chuchu et al. (2021) argue that not only did the pandemic have an impact on the global economy, but it has also affected the psychosocial state of athletes and sport fans across the globe because the restrictions placed on the industry prevented social gatherings that provided social support as well as motivation for stakeholders in the sector. Weed (2020) and Margvelashvili (2021) further note that during the first year of the global pandemic, most sport fans experienced sport nostalgia which proves that sport events are fundamental for social interactions as the core purpose of

sporting events is to bring stakeholders from different backgrounds together to experience new cultures and explore new destinations during sporting events. Subsequently, Hemmonsbey et al. (2021) posit that the pandemic will Kotze e the social behaviour and travelling patterns of sport tourists because of the different COVID-19 restrictions that were implemented in different countries that limited social interactions during events or restricted sport tourists from attending events.

In the extant research on sport tourism, the sport event tourism sector has proven to be quite susceptible to crises. The pandemic revealed that many countries did not have an effective crisis management strategy in order to deal with global pandemics or strategies to effectively navigate the various restrictions placed upon the sector (Hemmonsbey et al., 2021; Daniels and Tichaawa, 2021). This implies that if another external shock were to be experienced in future, the sector would still not be adequately prepared, particularly from a regulatory or strategic point of view therefore the sector would remain susceptible to external shocks. The United Nations (UN)(2020) as well as Daniels and Tichaawa (2021) note that despite the impact of the pandemic on sport tourism, the sector has demonstrated its ability to overcome crises since the sector is known to be quite resilient and it is already showing signs of recovery. More recent sport tourism literature has focused on the recovery of the sector, and stakeholders are currently developing strategies that will aid in the sustainable recovery of sport event tourism (Keshkar et al., 2021; Daniels and Tichaawa, 2021; Hemmonsbey et al., 2021; Kennelly, 2022). However, while the pandemic was an external shock and could not have been predicted, the approach being adopted is one that is largely reactionary. As mentioned earlier, sport tourism contributes to the growth of the tourism industry globally. The United Nations World Tourism Organisation (UNWTO) (2021), states that sport tourism is important in the sustainable recovery of the tourism industry, and therefore, different strategies should be developed and implemented which would fast-track the recovery process. Different strategies that could be implemented in order to aid in the recovery of sport tourism have been put forward (Hemmonsbey et al., 2021; UNWTO, 2021). These strategies include the development and implementation of effective risk-communication and management strategies, adhering to the COVID-19 action plans, community engagement plans and the urgent return of mega-sporting events amongst others. Despite such strategies being proposed, the focus still largely leans towards high profile sporting events with limited research studies including small-scale sporting events in the recovery process of the sport tourism sector despite this typology of events exhibiting great potential to aid in the recovery process. In any case, the recovery of sport tourism will depend on the involvement of all stakeholders and investing in all types of events including small-scale sport events to fast-track the recovery of the sport event sector. An advocacy brief by the UN (2021) further recommends collaborations and partnerships between governments, health care services, and the sport tourism sector itself so as to ensure a safe and healthy sporting environment in the post-pandemic era. This study is conceptualised from this ideal, in terms of which the small-scale sporting events sector is reimagined beyond the COVID-19 period, particularly as relating to recovery. The next section of the paper presents the methodological processes that were followed for this study.

Methodology

This study was conducted in the City of Johannesburg, South Africa. The City of Johannesburg, located in the province of Gauteng, has experienced significant growth in the tourism industry in the past two decades, becoming one of the leading tourist destinations in South Africa (Rogerson and Sims, 2012; Booyens and Rogerson, 2019). The city has several well-known destinations that attract different types of tourists ranging from international tourists to domestic (City of Johannesburg, n.d). The City of Johannesburg is considered the economic hub of the province and entire country, with the tourism sector significantly contributing to the rapid economic growth and urban regeneration of the Gauteng province (Pandy and Rogerson, 2019; City of Johannesburg, n.d). The tourism sector in the city has created employment opportunities, promoted social cohesion and improved the transportation systems and other infrastructure. The City of Johannesburg has a thriving events sector which has been named the 'exhibition capital' of the country because it attracts a great number of Meetings, Incentives, Conferences and Exhibitions tourists (MICE) (South African Tourism [SAT], 2019; Lekgau and Tichaawa, 2021). Furthermore, the city is home to many internationally recognized conference facilities that attracts international events as well (Gauteng Tourism Authorities [GTA], 2019). Additionally, the city has world-renowned sporting facilities that have hosted various sporting events ranging from international mega-events such as the 2010 FIFA World Cup to small-scale sport events such as the Varsity Cup games. The city is known to attract domestic and regional sport tourists that attend annual sporting events such as the famous Soweto Derby (football game between two of the country's biggest football clubs). According to Langkilde (2016) and Meyer (2021), approximately 10% of foreign tourists that use Johannesburg as a point of entry into the country through the Oliver Tambo International Airport are sport tourists. The authors argue that since Johannesburg is the most used point of entry into the country for many sport tourists, their sporting experience essentially starts in the City of Johannesburg. Therefore, the City of Johannesburg was chosen as the study area for the present study, owing to its great sport management reputation and its proclaimed title as 'Africa's sporting capital' that has demonstrated potential as a sporting destination (Rogerson, 2012). The frequency at which small-scale sport events are held in Johannesburg presented the authors with the intellectual opportunity to collect data in the area considering that sport tourism and COVID-19 research in the context of Johannesburg remains an under-researched area.

A content analysis of existing sport tourism frameworks and guidelines was conducted as well as a documentary analysis of government policies and strategies particularly relating to the management of the COVID-19 pandemic. In addition, a qualitative research approach was adopted, whereby semi-structured, in-depth interviews were conducted with small-scale sport event organisers (n=12). Currently in South Africa, there is no known database for small-scale sport events or for event organisers that are responsible for this typology of events. As suggested by Daniels and Tichaawa (2021), sport tourism in South Africa has a strong domestic characteristic to it, with many attendees being locals and many such events occurring

in localized spaces and thus not being part of formal governmental regulation. In fact, Mchunu et al. (2021) suggest that the domestic nature of small-scale events make it difficult to have accurate databases and figures for the frequency of these events before the pandemic and beyond due to the informality that can be observed at the small-scale local levels. The researchers, thus, purposively identified three event organisers that possess extensive knowledge and involvement with small-scale sport events in Johannesburg. Thereafter, a snowball sampling technique was adopted, wherein the identified participants were asked to refer the researchers to other event organisers in Johannesburg who had the required information and knowledge on small-scale sport events. The key stakeholders for this research were purposively selected owing to their extensive experiences with small-scale sport events in Johannesburg. This allowed the researcher to probe for in-depth information from the participants in relation to their experiences and intentions for the sector in the face of the pandemic. Given that the focus of the study was a largely exploratory enquiry into the impacts of the pandemic, emphasis was on experiences and views relating to how small-scale event organisers experienced the pandemic in Johannesburg.

The interviews were conducted virtually using the Zoom application and Microsoft Teams. The participants were provided with the interview schedule prior to the actual interview and were also provided with information about the purpose of the interview and the project overall. The interviewees were made aware of the fact that they could withdraw their consent to participate in the project at any given time in the event that they felt uncomfortable or were unable to continue with the interview. More importantly, permission to record the interviews was requested and granted by all participants. On average, each interview lasted approximately 45 minutes, although others were about an hour long. The structure of the interviews allowed the interviewer to be flexible and probe further to gain a better understanding of the research issues (De Vos et al., 2011). The semi-structured interviews consisted of questions regarding the effects of COVID-19 on small-scale sport events as well as the implications of this for the sector going forward. The virtual interviews were recorded and manually transcribed verbatim. The interview transcripts were then analysed using the thematic analysis technique whereby themes were identified from the in-depth discussions with the key stakeholders, and these are discussed in the section below.

Results and discussions

This section presents the perceived socio-economic implications of the COVID-19 pandemic on small-scale sport events. Small-scale sport events have been one of the key drivers for economic and domestic tourism growth in many local communities prior to the global pandemic. Such growth has significantly contributed towards local development and has supported small businesses around the venues that depended on the regular events for financial stability (Keshkar et al., 2021; Mchunu et al., 2021). However, the COVID-19 pandemic has significantly affected their contribution to local economic growth which has caused uncertainty regarding the growth of this typology of events post-pandemic. The interviewees stressed the

negative implications that the pandemic has had on the sector, emphasising the unexpected nature of such impacts on their operations. They noted that small-scale sport events had experienced great financial loss during the global pandemic, as some of these events depended on sponsors. Such sponsorship allowed them to host reoccurring events while other small-scale event organisers depended on league affiliation fees from participants in order to maintain the financial backing for the events. In this regard, it is evident that the foremost impact on the sector was financial. Due to the global pandemic, many of these small-scale sport events have not been able to recover from the financial setbacks. For instance, one of the participants that organises university small-scale events expressed this concern in the following manner:

“The problem that many small-scale sport event organisers face is that of financial constraints. For instance, without sponsorship many small-scale sport events will not take place as frequently as they should and that has been the case during the COVID-19 pandemic. We [event organisers] did not have enough money before COVID-19 to host regular sport events and now, we have less money because of it [COVID-19]. Bigger events have the luxury to decline sponsors and the events will still take place and generate economic benefits which is not the case for smaller events”.

The above quote clearly illustrates the financial struggle that has been imposed by the pandemic on small-scale event organisers. This is exacerbated by the lack of sponsorship injections that some of them largely relied upon. Some scholars (Yuan, 2013; Kruger, 2015; Vicente-Molina et al., 2018) posit that the lack of financial support is considered a barrier for the success of small-scale sport events as event organisers may not have enough financial resources to host regular sport events. It is also noted however, that the more informal and smaller events were struggling to even access the sponsors prior to the pandemic - a situation that they observe has worsened since the COVID-19 period. In addition to the direct financial injection from sponsors and events, the participants also highlighted that the sector was already stretched prior to the pandemic where financial resources are concerned. This is understandable as some of these were resource-scarce community events. As a result, event organisers were not able to sustain the events during the global lockdown which caused most small-scale sport events to completely cancel their local leagues due to the lack of financial resources. For example, an event organiser that organises informal small-scale sport events made the following comment:

“One of the major challenges I would highlight is the overall structure of informal small-scale sport events. Remember, we host informal games so the COVID-19 pandemic had definitely impacted us more than structured or formal small-scale sport events. We did not have the money to deal with the impacts of COVID-19 because we have an informal structure, so it raises questions like who exactly will investigate the damages caused by the pandemic on smaller events? We operate in the informal side, so how can we think of formalized recovery if we already don't have the financial muscle to be more formal?”.

Similarly, another key informant involved in hosting community small-scale sport events said:

“In terms of funding and sponsorships, I will use the COVID-19 pandemic as an example. Sponsors have introduced new criteria to be eligible for funding. They will not award you funds if you do not have COVID-19 measures in place like social distancing, hand sanitizers around the venue and ensuring that the venue is thoroughly disinfected after each event. The problem is, as small-scale events in the informal economy if I can call it, we do not have enough money to implement all these measures and we rely on sponsors and donations of some of these to operate. This means that we will not get new sponsors if we don't get a helping hand from good Samaritans in the community”.

The above quotes reveal that most of these event organisers lack the basic financial resources to host regular events. Moreover, the findings reveal that sponsors play an integral role in the success of small-scale sport events. According to Van Niekerk and Getz (2019) as well as Garrod et al. (2012) the financial assistance event sponsors provide to small-scale sport event organisers contributes towards the success of small-scale sport events. In fact, an argument can be made that such sponsorship and financial assistance has become more important for the sector in the era of the COVID-19 pandemic and beyond, particularly in contexts that are lacking in resources and where such events show potential of playing a key role in community development and growth. Considering the economic impact of COVID-19 on smaller events, it can be expected that small-scale sport event organisers will greatly depend on financial support from different stakeholders in order to revive small-scale sport events.

It has been pointed out that apart from the financial benefits, hosting regular small-scale sport events present social benefits for host destinations such as promoting social cohesion and socio-cultural dynamics at events (Knott et al., 2015; Marshall and Barry, 2015; Swart et al., 2018). The participants expressed that the COVID-19 pandemic has affected the social aspect of small-scale sport events as these events really involve the local community. The initial cancellation of these events meant that there were limited opportunities for social benefits to be accrued. The pandemic has been a stressful time and sports fans had been experiencing feelings of sport nostalgia and were craving for a sense of belonging of which the pandemic deprived them. In situations where event organisers were able to host informal small-scale sport events during the different levels of the Disaster Management Act, they were still not able to fully generate the social benefits since people were reluctant to participate or attend these small-scale sport events. The pandemic has changed the atmosphere of the sport event tourism sector as stakeholders are anxious and reluctant to engage in the events. For example, one of the participants that organises local league games offered the following:

“Before the COVID-19 pandemic, we used to involve community members in our events. We have what we call ‘The 5km Walk’ where the entire community, participants and attendees pick up litter around the community during the walk. We also had marathons for the elderly that encouraged them to keep healthy but we have not been able to do all that because of the after effects of the COVID-19 pandemic”.

Relatedly, another key informant that hosts university small-scale sport events observed that:

“Another impact COVID-19 had on small-scale sport events would be from a social perspective. Sport events are social activities and gatherings, the COVID-19 restrictions on events like social distancing and limited number of people at events created challenges for us [event organisers]. We had questions such as “how do we supply entertainment that is worthwhile and worth attending small-scale sport events for?” The pandemic has affected how we conduct our events and engage with spectators especially with local events”.

The views above illustrate the difficulties on a social level that were experienced by event organisers and those who attend such events. By their very nature, small-scale sporting events are community-orientated. The pandemic has therefore caused greater disruptions than just merely the financial costs. The morale and atmosphere has been altered, and the participants suggest that it will take time in order to restore the confidence, as the pandemic is still present in their discussions and activities. They feel that while many people want to come to the current events and the future ones that will be organised, there are still elements of reluctance. Some have high levels of vaccination reluctance while others generally wish to avoid crowded spaces for fear of infections.

Despite the negative socio-economic impacts of the COVID-19 pandemic on small-scale sport events, the participants did express a general positive perception regarding the environmental relationship that the events have with the places they are hosted. In this regard, they felt that the pandemic has encouraged event organisers to consider environmental sustainability in the planning of future small-scale sport events. For example, one of the event organisers who arranges community sport events said the following:

“The COVID-19 pandemic has helped us look more into hosting environmentally sustainable events and making sure that we [event organisers] do not harm the environment in any way. For instance, restrictions such as social distancing and limitation on number of attendees that could attend these events had contributed to less overcrowding at events and that had also decreased the waste that is generated at small-scale sport events. This has given us a ‘new eye’ towards what we do and how we do it”.

The above quote supports what has been widely argued in literature regarding the environmental sustainability of small-scale sport events (Gibson et al., 2012;

Saayman, 2012; Bazzanella et al., 2019). These scholars have argued that small-scale sport events are more environmentally sustainable compared to major and mega-events. Moreover, environmental impacts are easier to manage in a small-scale setting and the implications of the pandemic has strengthened this argument. The above quote further reveals that even in the middle of a global pandemic, small-scale sport events are likely to be more environmentally sustainable compared to larger events.

The perceptions of event organisers regarding the impact of the global pandemic on small-scale sport events suggests that small-scale sport events have severely been affected by the pandemic. The events experienced extreme financial challenges as a result of the restrictions and regulations placed on the sport event tourism sector. As noted by the participants, small-scale sport events may have been more affected by the COVID-19 pandemic because there is limited support structures for these typology of events, especially during the pandemic hence some of the events had to cease operations altogether. Moreover, such decisions have an adverse impact on other stakeholders involved in the events such as participants, attendees, community members and small businesses in local communities hosting these events. Ultimately, from an impact perspective, this study reveals that the pandemic has had a negative influence on small-scale sporting events from a financial and social viewpoint. However, there has been a positive mind-set instilled by the pandemic where environmental management is concerned in the sector. This serves to present a platform from which to build and enhance environmental strategies associated with small-scale sporting event hosting in the City of Johannesburg and South Africa as a whole.

Conclusions

Globally, the COVID-19 restrictions and regulations imposed on the sport event tourism sector has had a great impact on different typologies of sporting events. Sport event tourism literature has widely discussed the impact of the COVID-19 pandemic on major and mega-events with little research focus being directed towards the effect of the pandemic on small-scale sporting events. Despite several research studies (Gibson et al., 2012; Giampiccoli et al., 2015; Badurina et al., 2020) advocating for the promotion of small-scale sport events given their potential socio-economic benefits, there is still limited attention that has been given to small-scale sport events, particularly in the face of the COVID-19 pandemic in the context of developing countries. This paper presents the perceptions of event organisers regarding the impact of COVID-19 on small-scale sport events in the City of Johannesburg, South Africa. One of the recurring themes identified from the current study is the economic impacts of COVID-19 on smaller events. The research revealed that small-scale sport events experienced great financial setback during the hard COVID-19 lockdown and most of the small-scale sport events in Johannesburg are still struggling to recover from the financial losses. The findings also revealed that the global pandemic affected the social aspect of the events. Based on the nature of small-scale sport events, they typically tend to be interactive events that actively involve local communities and allows them to engage with the different stakeholders

involved in the management and coordination of event activities. Therefore, the COVID-19 pandemic has affected stakeholder relationships between event organisers, sponsors, local residents and event attendees alike. In this regard, it has been noted that local communities are important for the success of small-scale sport events because they actively attend local sport leagues and support local businesses that are close to sport venues, whilst engaging in entrepreneurial activities themselves (Fotiadis et al., 2016; McKay et al., 2019; Hemmonsbey et al., 2021). However, in this study it has been found that such activities had been halted and in some cases the events were cancelled indefinitely. In other cases, the temporary halt on the hosting of events has been found to remove the excitement and enjoyment opportunities that are often associated with these events. In fact, some interviewees indicated that they had great concerns about social ills like drug use and unemployment, because before COVID-19, such ills were on the decline since the youth found the event spaces to be good distractions and overall constructive ways to spend their time.

On a more positive note, some of the event organisers expressed that the COVID-19 pandemic has encouraged them to consider environmental sustainability in the planning process of small-scale sport events. It has been argued that it is easier to manage environmental impacts and sustainability at small-scale sport events because there are less spectators attending the events and this particularly worked to the advantage of event organisers during the COVID-19 era (Gibson et al., 2012; Yuan, 2013). Thus, the pandemic brought about some reflections in the part of the event organisers linked to the need to effectively incorporate environmental management strategies in their current and future planning and organising activities. This, they argue, would assist in the hosting of long-lasting, sustainable events, especially in areas where environmental management may not be seen as a priority. In this regard, there is a feeling that the events in question can be used as a platform from which to communicate environmental responsibility messages, which in turn would enhance environmental awareness in the broader communities.

The present study presents recommendations that could aid in the revitalization of small-scale sport events which could ultimately contribute towards the recovery of the sport tourism sector in a post-pandemic era. Whilst there were similarities with other research studies on the impacts of the pandemic on sporting events generally, this study has raised key observations from the specific context of small-scale event perspective, particularly in a developing world context. This paper advocates for policy transformation in the sport event tourism sector and as such, we argue that including small-scale sport events in frameworks and policies will not only fast-track recovery of the sport tourism industry, but it will also contribute to the sustainable development of the industry. Furthermore, this study recommends that government and large companies should increase funding opportunities for small-scale sport events since these events play an important role in community development and LED. We argue that increasing financial investments in this typology of events will equip local communities with the necessary skills and opportunities to create their own legacies from sport tourism events.

As previously mentioned in the methodology section, there is no known database for small-scale sport events in South Africa. This study recommends that the relevant sport tourism stakeholders should create and introduce a database of small-scale sport events around the country. Such a database would allow for government, big companies and other stakeholders to access small-scale sport events for funding purposes. Moreover, the database would also make it easier for local municipalities to keep track of socio-economic growth and the contributions of small-scale sport events in their respective communities. For future purposes, such measures would additionally help to prepare small-scale sport events for any external shocks that might occur and disrupt the growth of this typology of events.

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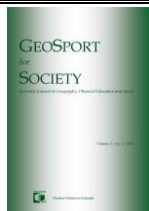
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Methodological Aspects Regarding the Planning and Development of Integrated Tourist Routes and Circuits. Case Study: Luncasprie, Romania

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Abstract: The intensification of tourist activities at the level of the Bihor Tourist Destination, in parallel with the increase in the need to diversify the local tourist offer, led to the need to identify new solutions in this regard. Due to the geographical location of the studied area, in the immediate vicinity of the Oradea Municipality, this space, due to the values with which it is endowed with the natural environment and the existing tourist infrastructure, can be constituted as a viable alternative with a role in reducing the tourist pressure in the Oradea area and in diversifying the tourist offer through rural tourism and agritourism. In this context, the present study aims to propose integrated tourist routes and circuits following the analysis of the local tourist potential. The results obtained consisted in carrying out an analysis of the natural environment from a tourism perspective and making some development proposals (three routes and a tourist circuit).

Keywords: tourist route, tourist circuit, territorial planning, rural tourism

Introduction

The rural area is the result of the multi-millenary cooperation between man and nature. Over time, the rural space has known a series of structural and functional changes, which have been induced to the rural space, constantly, almost imperceptibly on the scale of historical time, against the backdrop of the technological advances that humanity has made. However, in the last period of time, characterized by intensive industrialization and cutting-edge technology, the contribution of structural and functional changes in the rural area has also seen significant progress. Among these, we can mention the actions in the direction of increasing the production capacity of the land (water improvements, terracing, etc.)

and the improvement and modernization of the rural habitat (the development of communication routes, the introduction and development of technical and building facilities, the implantation in the rural area of some activities non-agricultural) (Herman, 2009).

If until yesterday, the rural environment was a space for carrying out agricultural and pastoral activities and for the residence of the population that took care of these activities, against the background of the progress recorded, it is diversifying from a structural and functional point of view, acquiring new connotations and functions between which those with specific industrial, commercial, relaxation, recreation and residence for the non-agricultural population.

Globally, due to the importance of rural space in supporting humanity by providing food resources and raw material for industry, the definition of the concept of rural space knows a multitude of approaches that differ from country to country. The most intensively circulated criteria in the differentiated approach to the concept of rural space are: economic (agricultural activities, processing industry), sociological (specific way of life, behavior and value system distinct from the urban one), geographical (way of occupying space, way of living) (Cândea et al., 2006).

From a structural point of view, the geographical space includes the following elements: the population, the rural settlement and the adjacent land. Among the previously listed components, the rural settlements are subject to the tourist development process. Just as in the case of the definition of the concept of rural space, and in the case of the definition of the notion of rural settlement, at the global level, there is a wide range of approaches, in this sense. Among the most frequently used criteria, we mention the *"statistical, administrative, legislative, functional, etc."* (Cândea et al., 2006, p. 112). At the level of the European Union, the criterion used to separate rural settlements from urban ones is the density of inhabitants / km². In Romania, the status of human settlements (rural and urban) is regulated by law, regardless of their demographic size and population density. So, this is the context in which tourism asserts itself in the Romanian countryside through rural tourism and agritourism.

Rural tourism is a niche form of tourism that takes place in rural areas and is defined by specific activities and services, including accommodation and meals; *"strong socialization with the family of the guesthouse owner"*; *"integration and active participation in household activities"*; *"informing, preparing and accompanying tourists to recreational activities and cultural actions"*; *"guide in the village and outside the village"* (Dincă et al., 2012, p. 44).

Agritourism is a form of tourism that takes place in the countryside and involves only the performance of a part of the activities and services related to rural tourism, namely: accommodation and meals; *"strong socialization with the family of the guesthouse owner"*; integration and active participation in household activities (Dincă et al., 2012, p. 44).

From the comparative analysis of the two notions, namely the notion of rural tourism and agritourism, the following conclusions can be drawn: both types of tourism are carried out and are specific to rural areas; in terms of the activities and services provided within the two types of tourism, there is an overlap of them, rural

tourism incorporating all agritourism activities and services, plus other specific activities and services.

Rural tourism and agritourism has been imposed in the last period of time also in Romania against the background of the following motivations: *"return to unmodified nature", "knowledge and temporary adherence to groups of belonging specific to rural areas", "knowledge, understanding" and "direct contact with pieces of the treasury of national history, folklore, traditional occupations and popular customs", "aesthetic motivations arising from the need for beauty, order, purity, harmony, naturalness", "curiosity satisfied by information on popular hospitality, gastronomic habits, handicrafts and rituals village", "rest, air and fruit cure, consumption of fresh food and occupational therapy", "sport, hunting, sport fishing, ascents and hiking"* (Erdeli and Gheorghilas, 2006, p. 243).

The satisfaction of all the demands of tourists arising from motivational aspects, through rural tourism and agritourism, within rural settlements in Romania and beyond, is conditioned by the following determining factors: *"orographic, climatic and biogeographical characteristics; the location of the locality in relation to the main tourist circulation axes; the degree of development and modernization of the infrastructure and means of transport; the presence of original or unique attractive resources, belonging to the natural setting (geological, speleological, biogeographical, etc.), cultural (traditions, customs, popular customs, activities and traditional architecture) or historical (historical, cultural, architectural objectives) etc."* (Ciangă and Deszi, 2007, p. 245).

The analysis of all these determining factors at a general and particular level constitutes a premise and a preliminary step in order to start the procedures regarding the planning and tourist development of the rural area. The main beneficiaries of such efforts will be directly *"Local public authorities; Non-profit and non-governmental associations in the locality or region; Tourist service providers; Local population"* and indirectly *"National Tourism Authority, Tour operators; County Council"* (Ilieș, 2007, p. 52).

Although we benefit from a significant rural fund, with many rural settlements, not all of them lend themselves to their development from a tourist point of view. The abundant presence of various attractive resources in the rural area does not constitute a certainty and a guarantee of the viability of the implementation of a tourist development plan for the respective place. As a rule, in the planning and development of tourism in a rural locality, the following essential and vital aspects are assumed: access roads, technical and building facilities (electricity, running water, sewage network, gas, landline or mobile telephony, internet etc.) and other local public services (pharmacy, post office etc.). Another aspect, as important as the previous ones, when we talk about the planning and development of a rural locality is the legislative framework. It is made up of a multitude of legal acts (laws, government decisions, emergency ordinances, local decisions and decisions, etc.) that direct the way of organization and systematization of the territory, in general, and of future tourist developments, in particular (Dincă et al., 2012, p. 250). Among these, we mention those regarding the development of: the territory (Law 350/2001); ski slopes (Decision 263/2001; Order 491/2001);

mountain tourist routes (Decision 77/2003); beaches (OG 19/2006; Order 1204/2010); tourist reception structures with public catering accommodation functions (Order 65/2013; Order 221/2015), tourist information and promotion centers (Order 1096/2008) and tourist resorts (Decision 852/2008).

Tourist localities are extremely important tourist destination spaces for rural tourism, being characterized by a series of specific elements: small community, special activities and occupations, clean environment, etc. These characteristics determined and supported the expansion of tourism in the countryside.

The diversification of the tourist offer and the optimal exploitation of the tourist potential of a certain area, at a given moment, calls for sustained efforts from the interested parties (local public authorities, ministerial structures, NGOs, tourist service providers, specialists from various fields of activity etc.) in the direction of planning and setting up integrated tourist routes and circuits.

In this context, the purpose of the present study is the analysis of the natural and anthropic framework related to the rural town of Luncasprrie, in Bihor County, Romania, in order to make proposals for integrated tourist routes and circuits, with a role in directing tourists in a territorial profile and in the interconnection of the local tourist offer. Thus, a high-performance and operative arrangement can be contained in a factor generating qualitative changes at a mental level for the local community and tourists alike, and last but not least in a business card of the destination it represents (Dincă et al., 2012).

From a conceptual point of view, the tourist route and circuit represent the route or path on which potential tourists are guided to move in order to carry out the touristic act, for physical and mental recovery, relaxation, rediscovery, contemplation, knowledge etc. The act of tourism involves walking or cycling (Ilieș et al., 2013) along a predetermined route, during which the tourist will encounter a series of objectives, the purpose of which is to arouse and maintain interest. According to the specialized literature, *"walking in the open air involves the movement of potential tourists, on foot, from point A to point B, following a certain route for recreation, physical and mental recovery and tourist discovery. These points are not strictly imposed, they are defined in space by a series of characteristics among which the place where the tourist is staying, his needs at a given moment, his preferences for one route or another, etc. stand out"* (Dincă et al., 2012, p. 271), while, *"cycling tourism is a form of active tourism that involves the movement of potential tourists with the help of a bicycle, from a point A to a point B, following a certain route in order to recreation, physical recovery psychic and tourist discovery"* (Dincă et al., 2012, p. 276).

The difference between the notions of *"integrated thematic route"* and *"integrated thematic circuit"* consists in the functionality and operability of the latter, to lead tourists from a starting point "A" to that point "A", but on a separate route, avoiding in this way a possible loss of interest on the part of tourists or even their boredom. In the case of thematic routes, there is the possibility that tourists will be guided from a point "A" to a point "B", where the tourist act is to end or their return on the same route from point "B" to point "A". Regarding the *"integrated"* attribute of those two concepts, previously defined, respectively *"integrated"*

thematic route" and *"integrated thematic circuit"* are derived from one of the fundamental principles according to which the tourist planning and development activity is marked, respectively from the *"integration principle"*. Just as *"tourist planning and development"* is an integral part of the wider process of *"territorial planning and development"*, so too *"planning and development of tourist routes and circuits"* is an integrated part of *"tourist planning and development"*.

Research methodology

The studied area

The locality of Luncașprie is located in the Dobrești territorial administrative unit, Bihor County, Romania. From an orographic point of view, the analyzed area is located in the South-Western part of the Pădurea Craiului Mountains, being crossed in a North-South direction by Valea Vida (Figure 1).

Materials and methods

The information necessary for the development of the present study was obtained through the tourist prospecting method in two distinct stages, the office stage and the field stage (Herman et al., 2016a, b; Caciora et al., 2019; Oanț and Herman, 2022). In the office stage, the specialized references and existing cartographic materials were consulted, the graphic / cartographic materials were drawn up and the related documentation was drawn up. In the field stage, photographs, observations and measurements were taken and recorded in the worksheets used.

The main aspects taken into account in making the proposals (three routes and a tourist circuit) in the present study were the relief, the hydrography, the access roads, the spatial distribution of the households (with their related land) and that of the existing tourist objectives.

The relief is the basic element in making such proposals, through its roles of support and generating factor of touristic motivation. In this context, the elevation, fragmentation and configuration of the relief were analyzed, through the prism of the favorability and the restrictions it imposes on the spatial level of the tourist act, in this case walking and hiking.

The hydrography, represented by the Vida river and the reservoir of the same name, with a north-south layout, represents the backbone of the Luncașprie locality, with all the households gravitating to one side and the other of it. Over time, the Vida River represented a precious source of water supply for domestic and agricultural needs. Currently, in the context of the imposition of tourism, in the studied area, it can also receive touristic functions.

The access roads were studied through the lens of quantitative and qualitative characteristics at the spatial level. They have a role in facilitating the movement of potential tourists along established routes and routes. Thus, at the level of the Luncașprie locality, 48.3 km of communication roads were analyzed, of which 14.2 km (30%) are paved, the remaining 34.1 km (70%) are dirt and stone roads (Figure 1).

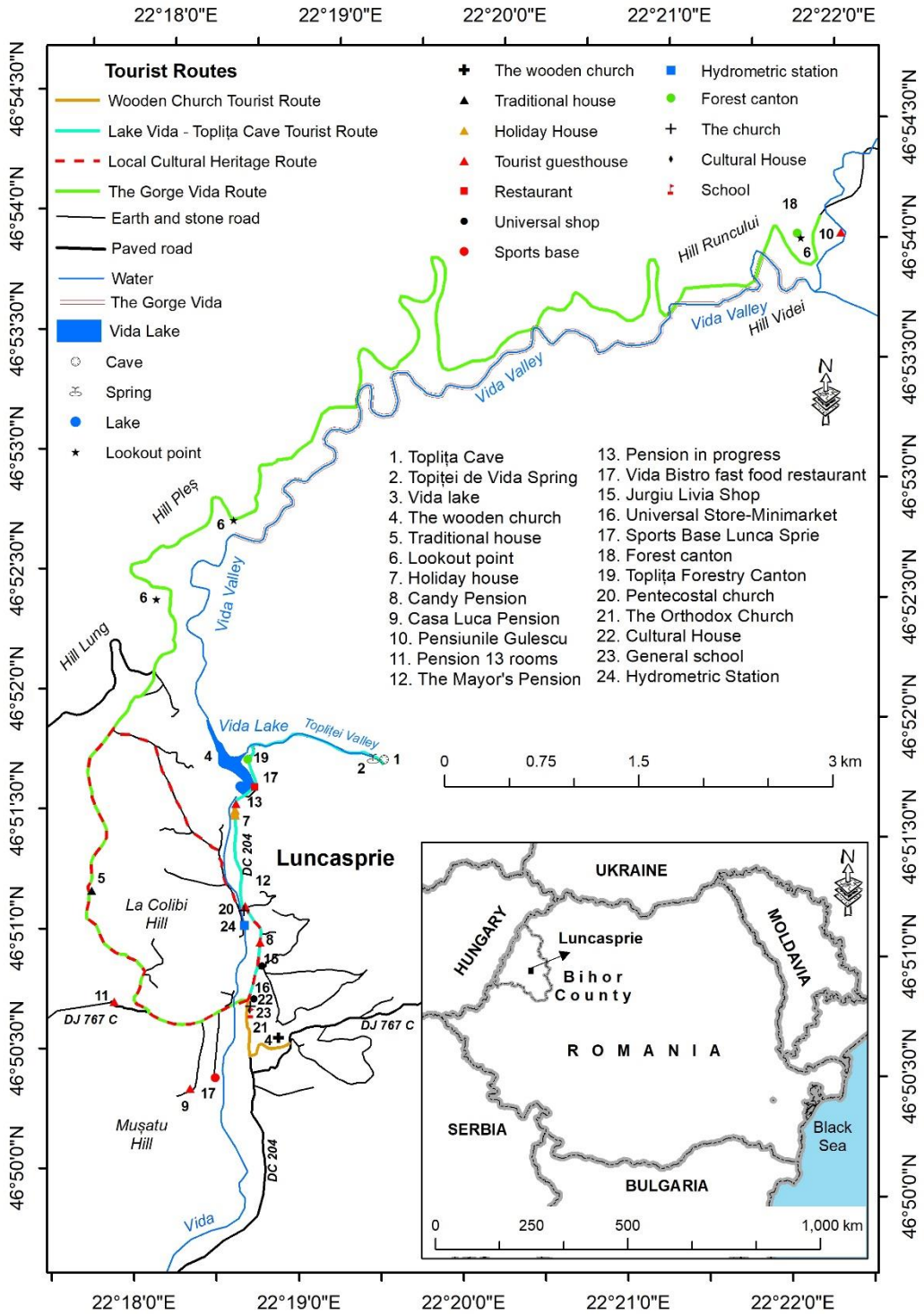


Figure 1. Touristic map

The integrated territorial profile analysis of the households and related lands highlighted the existence of close interdependencies between them, the configuration of the relief, the spatial distribution of the hydrographic network and that of the communication routes.

The spatial distribution of tourist attractions was the key element in establishing the routes and the tourist circuit in Luncasprie. Thus, depending on their spatial location and the favors and restrictions induced by relief, hydrography, communication routes and households with the related land, the present proposals (three routes and a tourist circuit) with a length of 36.7 km were made.

The cartographic materials used were Topographic Map 1:50,000, DEM, Satellite Images. The software used was ArcGis 10.6.

RESULTS AND DISCUSSION

Tourist potential

"The raw material of tourism is space" (Iașu and Muntele, 2003, p. 63), with the two related components, the natural framework (relief, hydrography, climate, vegetation and fauna) and the anthropic one (material and immaterial cultural heritage).

The natural framework is the support for the development of the touristic act, on the one hand, and the generating factor of touristic motivation, on the other. Seen from this perspective, in the process of arranging tourist circuits and routes, it is necessary to carry out a thorough, detailed study, which covers all structural, functional and relational aspects.

The structural aspects will refer to the defining components, which are included in the structure of the natural framework: the abiotic environment (relief - the Vida depression, hydrography - the Videi Valley, the Vida reservoir from Luncasprie) and the biotic environment (plants and animals - specific to the temperate continental climate of the floor of deciduous forests).

Separating the functional aspects from the relational ones is an action with a high degree of sensitivity, because between them there are close relations of interconditioning and interpenetration. However, we can state that the functional aspects will capture as much as possible the role and importance of each element in shaping the analyzed natural system, while the relational ones will try to capture the relationships (conditions) that each individual element develops.

The anthropic framework is represented by human population and settlements. The analysis of the anthropic framework concerned, in this case, the brief analysis of the population and the settlement of Luncasprie where three routes and a tourist circuit were proposed for development, in close correlation with the maximum limit of the degree of bearability, vis-à-vis the number of potential tourists that they can assimilate and support without disturbing the natural gait and good functionality.

Documentarily attested in the year 1508, Luncasprie has known over time an upward, relatively constant evolution, similar to the localities in the Romanian countryside, in terms of the number of inhabitants and the tangible and intangible heritage created by them. In terms of the number of inhabitants, the peak was reached

in 1992 (1072 inhabitants), after which the tendency was to decrease until now (Varga, 1999).

Among the testimonies of the architectural heritage created by the local community, the following stand out: the wooden church dedicated to the patron saint "Saints Archangels Michael and Gabriel", the Luncasprie Orthodox Church, the Bethany Luncasprie Pentecostal Church, the households of the inhabitants, the premises of the grocery stores (Universal Store-Minimarket and Jurjiu Livia Shop) and Vida Lake.

The wooden church dedicated to the "*Saints Archangels Michael and Gabriel*" represents a time capsule through which a series of specific, local particularities are recorded and reproduced regarding: financial possibilities, local beliefs, customs and traditions and last but not least by the technical and technological advances achieved by the society of the time when the place of worship was built. Considering its antiquity (1725) and the previously mentioned reasons, in 2010 this place of worship was included in the list of historical monuments with the LMI code: BH-II-m-B-01169 (List of historical monuments, 2015).

The Orthodox Church is the silent witness of the economic, social and political developments and progress registered in the town of Luncasprie. It is the guarantor of the continuity of the faith of race and language, a guiding beacon in troubled times, of hard trial in which non-values are confused and merge easily with values. At the same time, the Orthodox church is still tributary to some traditions and customs that come from the past, being less open to new things, to new things, something that facilitated the ascent of other cults in an Orthodox space par excellence.

The Bethany Luncasprie Pentecostal Church highlights the changes that took place within the local community in relation to faith, changes that were in close correlation with what happened at the level of the whole country against the background of the expansion of the new cults (Pentecostal and Baptist).

The households of the inhabitants represent the pure expression of the communion between man and nature. Over time, she also underwent major functional and aesthetic changes. Thus, if at the beginning the traditional household was composed of a house, stable, outhouse and other annexes, nowadays, it is structured from a house, a garage and other annexes. In turn, each structural element has undergone quantitative and qualitative structural changes.

The Vida de la Luncasprie dam was built in the northern part of the town of the same name for economic reasons in 1967. The unique element of this lake, in addition to the exceptional landscape offered by the natural setting, is the ingenious solution to evacuate the surplus water through a funnel-type system that connects to Vida Creek downstream through a tube that crosses the lake levee underground in a north-south direction.

Also in the category of local architectural heritage can be included the cultural home, the two forestry cantons, the premises of the grocery stores and the tourist guesthouses. Of these, special attention must be paid to tourist guesthouses because they are essential markers of tourism. Tourist guesthouses appeared and developed in

close correlation with the attractiveness of existing tourist resources, as well as the financial capacity of local investors. Thus, there are currently six pensions, of which three are functional (Candy Pension, Casa Luca Pension, Gulescu Pension) and three are being completed (The Mayor Pension, 13 Rooms Pension, Pension in progress).

These structures with accommodation functions foreshadow the insertion in the analyzed space of a new occupational activity, namely tourism. Tourism can represent an important alternative in the development of the local economy, considering the possibilities of spending free time in the most pleasant way, far from the city bustle, offered by the natural and anthropic environment. The development of the local economy through tourism can aim at the following aspects: creating new jobs, reducing unemployment, stopping migration to the urban environment by fixing the young population in the rural environment, increasing the standard of living, attracting new investments in infrastructure, etc. So, this is the context in which the present study was imposed.

Arrangement proposals

Following the analysis of the natural and anthropic framework related to the area of the town of Luncașprie, three proposals were made for tourist routes (Wooden Church Tourist Route, Lake Vida - Toplița Cave Tourist Route, The Gorge Vida Route) and one for a tourist circuit (Local Cultural Heritage Route).

Each of the proposals made, at the level of the Luncașprie locality, are defined by several parameters, among which the route or route of travel, the name, the marking, the length, the difficulty of the route and the duration of the tourist action and the purpose (Ilieș et al., 2013; Dincă et al., 2012; table 1, figures 1-5).

The travel route related to tourist routes and circuits represents the contact surface between tourists and the elements of the environment. In the field, it is identified with the road / path on which the potential tourists are going to travel.

In order to better orient the tourist, each proposed route benefits from a name (derived from the name of the main tourist attractions they interconnect) and a conventional sign or marking, rendered by a continuous or broken line of various colors and thicknesses (Table 1, Figures 1 -5).

At the level of the studied area, four proposals were made for tourist routes with a length of 36.7 km, which represents a duration of the tourist action of 14.5 hours (Table 1).

The level of difficulty of the proposals made oscillates between easy and medium (Table 1). In establishing their degree of difficulty, three essential parameters were taken into account, namely: length, level difference and type of running surface (ground, asphalt). The Gorges Vida Route is defined by an alternation of sections with different degrees of difficulty (easy, medium), values imposed by the difference in level, the configuration of the relief and the running surface (earth and stone). We also mention that the indicator called the level of difficulty contains a certain dose of subjectivity, induced by age, gender, physical condition, the time required to contemplate the touristic objectives encountered, etc.

The duration of travel for potential tourists along the proposed routes varies between 1.5 hours (Wooden Church Tourist Route) and 7 hours (The Gorge Vida

Route). It should be noted that, just as in the case of establishing the degree of difficulty, in this case also the subjectivity notes specific to the level of difficulty persist (Table 1).

Table 1. Proposals for the studied area

No.	Name	Type	The length (km)	Duration of the action (h)	Degree of difficulty
1	Wooden Church Tourist Route	Route	1.65	1.5 h	easy
2	Lake Vida - Toplița Cave Tourist Route	Route	6.5	3 h	easy
3	Local Cultural Heritage Route	Circuit	6.1	3 h	easy
4	The Gorges Vida Route	Route	30.6	7 h	medium
Total			36.7	14.5 h	

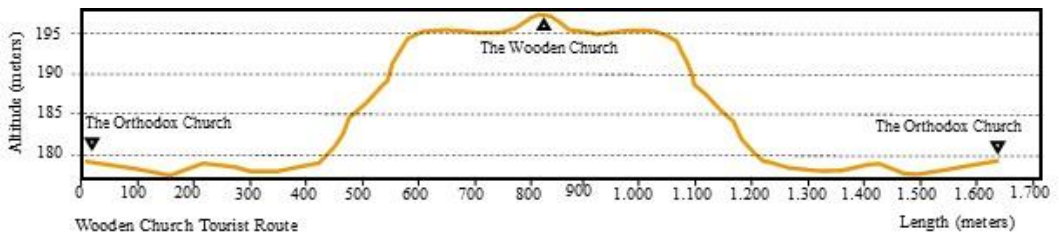


Figure 2. Wooden Church Tourist Route

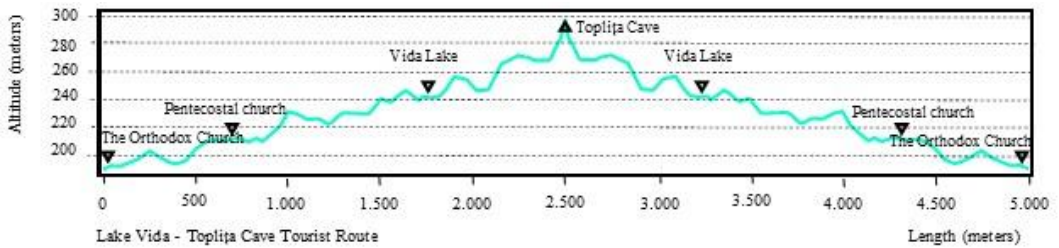


Figure 3. Lake Vida - Toplița Cave Tourist Route

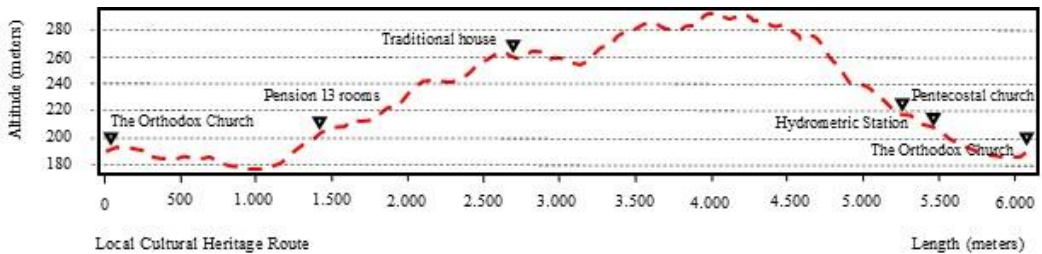


Figure 4. Local Cultural Heritage Route

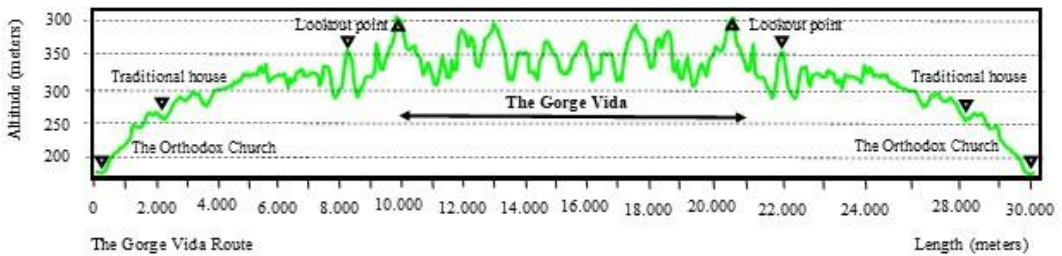


Figure 5. The Gorge Vida Route

Conclusions

The arrangement of tourist routes and circuits are intended to diversify and interconnect the tourist offer of a tourist destination, contributing to the expansion of the retention interval of tourists in the destination of Luncașprie, Romania. Through their design and architecture, they play an essential role in capitalizing on relatively isolated tourist attractions by interconnecting them along travel routes. Moreover, in this way the random movements of potential tourists in the studied area will be restricted, contributing to a better protection and conservation of the biodiversity of the respective site.

The objectives of tourist interest represent both an essential structural element of the arrangements of the integrated thematic tourist routes and circuits, as well as a motivational factor, with functions in triggering the development of the tourist act. From a typological point of view, they can be classified into various objective categories depending on the reference element taken into account. Among the objectives capitalized on by arranging the routes and integrated thematic circuits, we mention the anthropogenic ones (Wooden Church, Orthodox Church, Pentecostal Church, Vida Lake etc.) and natural ones (Toplița Cave, Izbuluc Topiței de Vida, Chei Videi etc.).

Currently, in Romania, we cannot speak of a complete legislative framework, which would regulate the aspects regarding the development of integrated thematic tourist routes and circuits. A particular approach to the present issue is developed within "Decision No. 77 of January 23, 2003, regarding the establishment of measures for the prevention of mountain accidents and the organization of rescue activities in the mountains" in which the aspects regarding the development, homologation and maintenance of mountain tourist routes are detailed (Chap. 2, Section 1, art. 27 - 35). Considering that the mountain tourist routes represent a separate category, which only concerns the mountain space, it is necessary to adopt a unified methodology for the arrangement, homologation and maintenance of the thematic tourist routes and circuits (from the tourist destination areas, located on different altitudinal steps etc.), at national and international level.

Currently, at the National Tourism Authority, a number of 952 mountain trails are registered and approved, distributed in the following mountain units: Baraolt, Bodoc, Bucegi, Călimani, Căndrel, Ciucaș, Domoglet, Făgăraș, Giumalău, Leaota, Lotru, Pădurea Craiului, Perșani, Piatra Craiului, Piatra Mare, Postăvarul, Rărau,

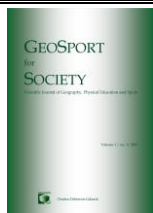
Retezat, Turiai, Vlădeasa, Bârgăului, Bihor, Brețcului, Căpățanii, Cernei, Ciomatu Mare, Giurgeu, Ghurghiu, Gutâi etc. (Approved mountain tourist routes, 2021).

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Study on the possibilities of objectization of the organization's response to altitude variations

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Abstract: Currently, mainly due to the lack of subjects willing to be researched in extreme conditions, but also the lack of working conditions, specialized knowledge, information, publications in the field are quite few, most of them being from American literature, the USA being one of the countries with a tradition in mountaineering, nature offering enough possibilities for practicing this sport. For this reason, I tried to contribute to the completion of current knowledge in this field. Due to the increase in the number of people going to altitude, it is necessary that the specialists who can offer advice or treatment be as well trained as possible, preventing the occurrence of seasickness as much as possible altitude: acute mountain sickness – AMR, high-altitude pulmonary edema – EPMA and high-altitude cerebral edema – ECMA, which are caused by reduced blood oxygen levels. Prevention can be done with specific drugs (Dexamethasone, Ibuprofen) and by descending to a lower altitude. These diseases are very rare below 2.500 m, and from 3.000 m up, they occur in 75% of those who are not acclimatized, they can appear even after 24 - 48 hours, the descent having an important role in their involution, the return can last between 2 - 5 days.

Keywords: mountaineering, altitude, acclimatization, acute mountain sickness (AMS), high-altitude pulmonary edema (HAPE)

Introduction

According to Platonov (2015), we learn that the 19th Olympics in Mexico City – 2.240 m – was the moment when sports specialists focused on the preparation of athletes and competitions at altitude. Initially, only acclimatization was the problem

that the researchers focused on, as it was the condition that most influenced the functional capacity of the athletes, the endurance of the efforts and the activity of the important functional systems of the body.

The study started from the premise that this study can be important both for climbers in particular, and in the training process of athletes at altitude, where the human body accumulates energy and increases the capacity for effort, by increasing the number of red blood cells.

Also, due to the increasing influx of tourists and climbers in the higher areas of the globe, I believe that a study on the accommodation and preparation of the body for altitude is necessary and beneficial for them, most of them coming from low altitude areas.

Prince and Huebner (2022) show that, due to the increase in the number of people going to altitude, is necessary that the specialists who can offer advice or treatment be as well trained as possible (Drăgan, 1977) preventing the occurrence of seasickness as much as possible altitude: acute mountain sickness – AMR, high-altitude pulmonary edema – EPMA and high-altitude cerebral edema – ECMA, which are caused by reduced blood oxygen levels. Prevention can be done with specific drugs (Dexamethasone, Ibuprofen) and by descending to a lower altitude. These diseases are very rare below 2.500 m, and from 3.000 m up, they occur in 75% of those who are not acclimatized, they can appear even after 24 - 48 hours, the descent having an important role in their involution, the return can last between 2 - 5 days (Prince and Huebner, 2022).

Platonov (2015) believes that the experiments related to the influence of training at altitude on the human body, but also in conditions of artificial hypoxia created in barochambers, demonstrate the need for this kind of training not only to increase the efficiency of competitive activity in conditions of medium altitude, but also its efficiency in increasing the possibilities of the functional systems of the athletes' body and the results in floor competitions. Thus, the attention of specialists turned to the active search for methods of using training at medium and high altitude, to increase the efficiency of the sports training process, especially for sports branches related to the manifestation of resistance.

Friedmann-Bette (2008) shows that not all specialists have agreed on the optimal altitude at which training is appropriate, most specialists, as well as the experience of athletes, are related to the altitude from 1.700 - 2.200 m. The high altitude training at 2.500 - is also significant 3,000 m. Training done at 1.000 - 1.500 m is not approved in increasing the efficiency of training preparation. Most specialists consider the altitude of 2.000-2.500 m as optimal in the training process of athletes. According to West et al. (2013), Aristotle himself (384 - 322 BC) when he climbed Mount Olympus - 2.917 m in Greece, claimed that in order to stay alive, he had to use wet sponges with the help of which it was possible to breathe in that rarefied air, and the first article related to mountain sickness was written in 1590 by Joseph de Aosta, a priest who traveled to high altitude in Peru and experienced altitude sickness, even vomiting.

According to Platonov (2015), the conditions of the mountain climate are much different from those on the plains, due to changes in humidity and

temperature, through the decrease in atmospheric pressure and the partial pressure of oxygen in the atmosphere, through the high degree of ionization of the air and through increased solar radiation. Specialists classify altitude zones differently, leading to important contradictions for the definition of altitude, but the major condition is hypoxia, the factor that acts radically on the human body, in addition to natural factors. But lately, thanks to training analyzes and the physiological reactions of athletes, specialists in the field of high-performance sports have established the following classification:

- Low altitude conditions - between 800 – 1.000 m. In these conditions, at moderate efforts and at rest, hypoxia does not have a major influence on physiological functions. Major changes can be seen with high efforts;

- Medium altitude conditions - between 1.000 – 1.500 m. In this area, moderate efforts may cause functional changes, even if the body at rest does not feel the negative influence of hypoxia;

- High altitude conditions—over 2.500 m. At this altitude, in a state of rest, the body undergoes functional changes, due to hypoxia.

According to Saltin (1985), in the case of people not adapted to altitude conditions, the heart rate at rest and during exertion can increase even at 1.000 m, the compensatory reactions of the body are very clear in the case of exertion, confirmation coming from the analysis of the dynamics of lactate growth from blood. Efforts at 1.500 m lead to an increase in lactate concentration by 30%, compared to data from the plateau, it follows that at 3.000 – 3.500 m, it can reach 170 – 240%. If the supply of oxygen to the body suddenly decreases, determined by the decrease in the partial pressure of oxygen in the air, it can lead to a decrease in the results of training, as well as in competitions, requiring high demands on the aerobic energy supply system. The decrease in functional capacity is determined by its connection with the VO₂ max level, manifesting itself obviously from an altitude of 1.500 – 2.000 m.

The main purpose of this study is to verify the methods and tools used to objectify the body's response to altitude variations. This study started from the idea that monitoring and studying climbers at various altitudes can lead to the development of training/preparation structures for those who travel at high altitude—climbers, athletes, workers and tourists.

The objectives of this preliminary study are: objectivization of the body's response to altitude variations; checking the accuracy of measurements according to altitude; the evolution of the physiological changes of climbers or tourists at altitude variations; the choice and establishment of investigation methods usable for the objectification of changes of a physiological nature at altitude variations.

We assume that, by objectifying the body's response to altitude variations, it is possible to improve the body's adaptation level to effort in extreme conditions, obtaining concrete elements in the knowledge of the body's physiological response to demands related to altitude variations.

Methodology

In order to verify the methods of objectifying the body's response to altitude variations, the study part was organized as follows: functional check of the pulse oximeter Heal Force Prince - 100A, device used by the Sibiu County Ambulance Service, through measurements at various altitudes and time; assessment of the climbers regarding their physical, mental and health status using the LLS - Lake Louise Score questionnaire (Table 1).

Table 1. LLS self-assessment questionnaire for AMR-acute mountain sickness

1. Headache	0-No pain 1-Mild pain 2-Moderate pain 3-Severe pain, incapacitation
2. Gastrointestinal symptoms	0-No symptoms 1-Poor appetite or nausea 2-Moderate nausea or vomiting 3-Severe nausea or vomiting, incapacity
3. Fatigue and/or weakness	0-No fatigue or weakness 1-Mild fatigue/weakness 2-Moderate fatigue/weakness 3-Severe fatigue/weakness, incapacity
4. Dizziness/Confusion	0-No dizziness 1-Slight dizziness 2-Moderate dizziness 3-Severe dizziness, incapacity
5. Sleep disorders	0-Slept as usual 1-He didn't sleep as usual 2-Waking up often, insufficient sleep 3-He didn't sleep at all

The conditions for conducting the study were those specific to the mountain area, from summer with temperatures between 10 - 25°C to winter in extreme conditions, with wind of 80 km/h and temperatures of -20°C.

The present study was carried out in the Alps (France), Mont Blanc area.

The experiment included a total number of seven Romanian climbers, marked with "S" in the table, aged between 37 and 49 years, 5 men and 2 women, of which 1 was a smoker, most of them being at high altitude for the first time, with physical condition and good health.

According to the therapeutic effect, balneo and meteorology specialists distinguish:

- the temperate climate - which includes the plain and hilly climate-up to an altitude of 500 m;
- the subalpine climate between 500 - 1.000 m and the forest, lowland climate;
- the exciting climate-which includes the alpine and high-altitude climate (Drăgan, 1977).

Virgil (2005) say that "the test is a test strictly defined in the conditions of application and research, which allows the location of an object in relation to a well-defined collective from a biological and social point of view" and is used when there is a need to evaluate and measure the characteristics of certain human actions and activities.

Results

Previously, in the experimental study, the body's adaptation to effort during the training process was tested by evaluating the effort capacity using the Harvard test (ladder test). These subjects from the preliminary study conducted in Mont Blanc (France) at 1.030 m and 3.823 m altitude (Table 2 and Table 3) had measurements of weight—using a Zelner Typ 34Z012 scale, height, heart rate (HR) and blood oxygen concentration (SaO₂) using the Heal Force Prince-100A pulse oximeter (Figure 1 and Figure 2).

Table 2. Measurements of climbing subjects (male) registered in Mont Blanc (France)

No. years	Weight (kg)	Height (kg)	HR (b/min)		SaO ₂ (%)	
			1.030 m	3.823 m	1.030 m	3.823 m
S1-46	81	192	63	97	85	99
S2-49	80	171	86	103	90	99
S3-43	62	174	70	100	85	99
S4-43-F	63	170	71	103	93	99
S5-42	81	185	60	103	87	99
M	73.40	178.40	70	101.20	88	99
S	9.96	9.66	10.07	2.68	3.46	0
CV %	13.58	5.41	14.39	2.65	3.94	0

F-smoking subject
 M-arithmetic mean
 S-standard deviation
 CV%-coefficient of variability

Figure 1. Average values of weight, height, FC and SaO₂ parameters of climbing subjects (male)

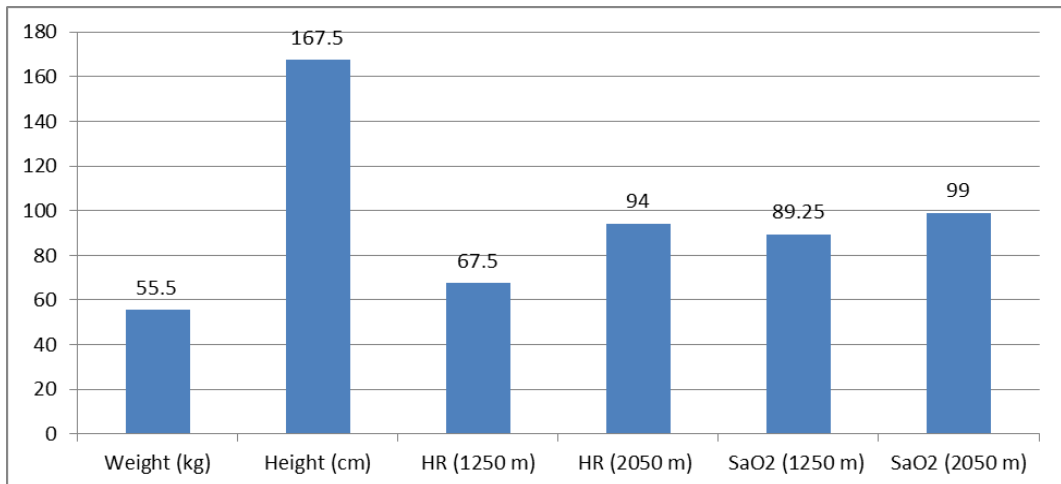


Table 3. Measurements of climbing subjects (female) registered in Mont Blanc (France)

No. years	Weight (kg)	Height (kg)	HR(b/min)		SaO ₂ (%)	
			1.030 m	3.823 m	1.030 m	3.823 m
S6-39	48	167.5	70	95	90.5	99
S7-37	63	167	65	93	88	99
Average	55.50	167,50	67.50	94	89.25	99

It is noted that the youngest female participant was 37 years old, and the oldest male participant was 49 years old. It should be noted that all participants reached the Mont Blanc Peak–4.810 m after considerable efforts at high altitude and in special weather conditions: wind of 80 km/h and temperatures of -20°C . As preparation for this high-altitude expedition, they all participated in a training tour in the Bâlea Lac area, where they encountered similar mountain conditions.

A 43-year-old male participant recorded the best parameters (99%–SaO₂ and HR of 70 bpm) at 375 m (Geneva) when returning to departure altitude due to the condition of returning the body to the altitude where it reacted best, being used to it.

During the acclimatization stage for the ascent of Mont Blanc peak–4.810 m, the incidence of RAM–acute mountain sickness at the altitude of 3.823 m was 47% mild cases, 33% moderate cases and 20% were severe cases, which required medication or rest.

The incidence of mild symptoms was lower than in the case of moderate or severe symptoms.

At the altitude of 3.823 m the worst symptoms were those of vomiting, fatigue and insomnia, but they were not so serious as to require withdrawal from the mountain.

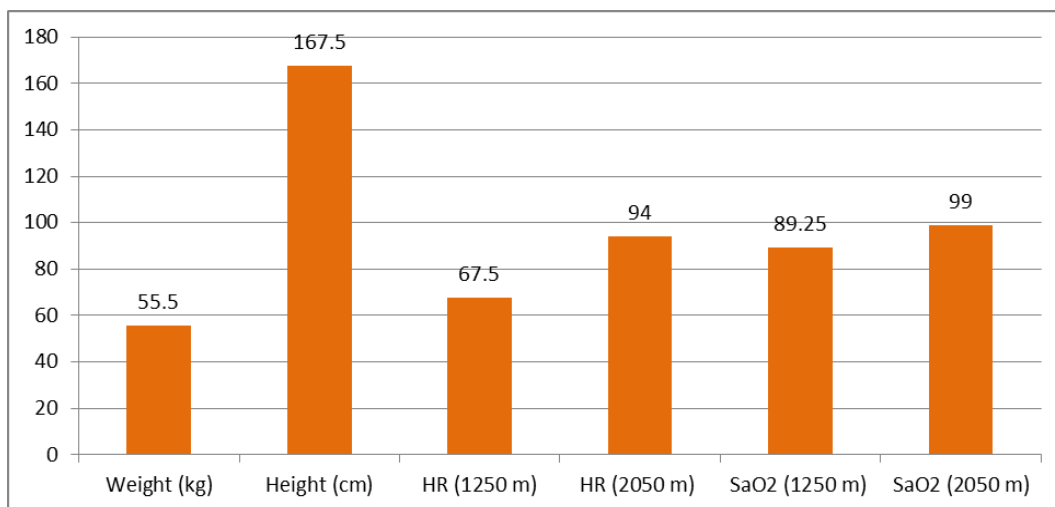


Figure 2. Average values of weight, height, FC and SaO₂ parameters of climbing subjects (female)

The above measurements were taken as follows:

- weight and height at the beginning of the ascent;
- pulse and SaO₂ were measured both at the beginning of the ascent and during it.

It was found that there is no general rule according to which a correct and effective acclimatization can be carried out, this adaptation to altitude variations depends on the physical and mental state of the subject, the environment, the weather conditions, the geographical area in which it is carried out the ascent, smoking or non-smoking status and previous altitude experience of the climbers.

Discussions

It was found that a 37 - year - old female subject (according to table no. 3), who was also the youngest person in the group, had the best adaptation to effort through the Harvard test.

It is noted that the youngest female participant was 37 years old, and the oldest male participant was 49 years old. It should be noted that all participants reached the Mont Blanc Peak – 4.810 m after considerable efforts at high altitude and in special weather conditions: wind of 80 km/h and temperatures of -20°C. As preparation for this high-altitude expedition, they all participated in a training tour in the Bâlea Lac area, where they encountered similar mountain conditions.

A 43 - year - old male participant recorded the best parameters (99% – SaO₂ and HR of 70 bpm) at 375 m (Geneva) when returning to the starting altitude due to the condition of returning the body to the altitude where it reacted best, being used to it.

Walls (2018) shows that one of the most significant physiological changes that occurs during acclimatization is the increase in immediate ventilation. Within minutes of exposure to high altitude, peripheral chemoreceptors in the carotid bodies sense the hypoxemia resulting from the decrease in the partial pressure of oxygen in the alveoli (PaO₂) and signal the medullary respiratory control center to increase ventilation, which causes a decrease in the partial pressure of dioxide of carbon in the alveoli (PaCO₂).

Aebi (2020) shows the implications of CVR (cerebrovascular reactivity) in hypobaric normoxia/hypoxia are of interest to both aviation and high altitude dwellers/climbers or workers as they may be exposed to the hypobaric environment with supplemental oxygen.

According to Harris (2008), the principles of high-altitude symptoms result from exposure to low-oxygen situations caused by low atmospheric pressure. Brain and lung syndromes are the primary clinical manifestations of high altitude sickness (HAS).

Burtscher (2022) argues that modern acclimatization training strategies do not require actual high-altitude environments, but only controlled indoor or laboratory conditions, with instruments that can mimic aspects of such environments to prepare the body for high-altitude exposures.

Conclusions

The conclusions of the study highlighted that during the acclimatization stage for the ascent of the Mont Blanc peak–4.810 m, the incidence of RAM–acute mountain sickness at the altitude of 3.823 m was 47% mild cases, 33% moderate cases and 20% were severe cases, which required medication or rest. The incidence of mild symptoms was lower than in the case of moderate or severe symptoms.

At the altitude of 3.823 m the worst symptoms were those of vomiting, fatigue and insomnia, but they were not so serious as to require withdrawal from the mountain.

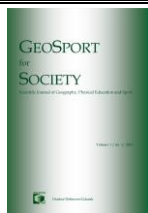
Other conclusion showed that there is no general rule according to which a correct and effective acclimatization can be carried out, this adaptation to altitude variations depends on the physical and mental state of the subject, the environment,

the weather conditions, the geographical area in which it is carried out the ascent, smoking or non-smoking status and previous altitude experience of the climbers.

Acclimatization, an important element in reducing the occurrence of RAM-acute mountain sickness, is mandatory from above 3.000 m, being recommended in mountain ascents, assuming an average ascent of 300 m per day difference in level.

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Destination branding through major sporting events: The case of the 2021 Africa Cup of Nations in Cameroon

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Abstract: The study elicits visitor perceptions on the destination brand of Cameroon through sport event hosting. The nations' brand is often reduced to its geo-political and socio-economic status, and it becomes challenging for Cameroon to overcome this powerful negative discourse. Sport events are proven to be a powerful vehicle for changing perceptions and reimagining nations. This study employed a quantitative approach to data collection whereby face-to-face survey questionnaires were conducted with sport event spectators (n=465) at the AFCON tournament to determine the brand images held in the minds of visitors and moreover to determine the consequential effects on destination branding. Results of the study not only reveal that positive brand imagery is linked to cultural diversity but that it also demonstrates strong associations to sport brand positioning. The results further expose elements of branding challenges linked to policy development and leadership. This research holds key significance for destination brand stakeholders in terms of utilising appropriate marketing strategies in event promotions. It also supports existing destination branding constructs linked to brand image and brand positioning.

Keywords: Destination branding, Cameroon, sport mega-events, tourism development, AFCON

Introduction

Branding can be viewed as an important and powerful tool to destination marketers, especially where the destination is confronted with perpetuating adverse media attention and subsequent negative brand images (Khodadadi, 2019). According to Morgan et al. (2002), the goal for every destination is to position itself in the minds of visitors so that their experiences of the place will result in repeat visits and so that visitors will become voluntary ambassadors for the destination. For African nations, Freire (2014) particularly emphasises the importance of branding as there is an increased flow of investment and development of improved businesses and tourism infrastructure, which has led to the development of a stronger middle class and a greater competitive place brand. Moreover, its diverse geography and climate, coupled with its rich natural resources such as oil, minerals, timber, wildlife, water, and a rich soil for agriculture, makes Africa a very attractive place to visit (Freire, 2014). Contrastingly, adverse narratives on the brand image of poorer and more economically, socially and politically vulnerable African countries still persist. Cameroon is particularly susceptible to such negative brand perceptions since it experiences a number of geo-political issues (Clarke, 2022; Harilal et al., 2022). According to Khodadadi (2019), it is extremely challenging for destinations to overcome such powerful negative discourse.

It has been proven that sport is a powerful tool to influence destination branding in order to achieve imaging and re-imaging objectives (Higham and Hinch, 2009; Knott and Hemmonsby, 2015; Hemmonsby and Tichaawa, 2018). Specifically, the mega-event is argued to yield high levels of tourism, media coverage, prestige, and positive economic impacts for the host destination (Bob and Swart, 2010; Getz, 2012; Tichaawa and Bob, 2015; Nyikana and Tichaawa, 2018; Hritz and Cecil, 2019; Nyikana and Tichaawa, 2020). Knott et al. (2017) have critically revealed that nation branding benefits linking to socio-economic, political, and tourism were experienced by South Africa when hosting the 2010 FIFA World Cup Games. Strategically, sport events can also present long-term positive impacts that persist beyond the event hosting phase (O'Brien and Chalip, 2008; Tichaawa and Bob, 2015; Hemmonsby and Tichaawa, 2018; Hemmonsby et al., 2018).

The research dispensation on destination branding through sport for developing, African nations remains limited, thus presenting a knowledge gap for the emerging Cameroon brand when drawing on best practices for destination branding through mega-event hosting. Furthermore, while previous studies on the Cameroon brand have been conducted in the contexts of responsible tourism (Bama and Tichaawa, 2015), visitor profiles (Achu et al., 2015), business tourism (Tichaawa, 2017 and 2021) and sport tourism development (Swart et al., 2018; Nyikana and Tichaawa, 2020; Nyikana et al., 2021), no study has explicitly focused on destination branding. This study thus addresses this theoretical gap by applying destination brand constructs to the Cameroon brand. Additionally, this study offers empirical evidence of sport event attendees of the 2022 men's Africa Cup of Nations [AFCON] tournament on destination brand imagery through sport mega-event hosting.

Branding of places and destinations

With their book, 'Destination Branding: Creating the unique destination proposition', Morgan et al. (2002) were of the first scholars to make a landmark contribution to place and destination branding theories. A collection of papers from the book include one by Ryan (2002) on the politics of branding cities and regions; one by Hall (2002) on branding and national identities, and one by Palmer (2002) on destination branding and the web. Sport as a determinant for image perceptions of a place brand have been hugely underestimated in the literature. It is through the emerging field of nation branding that the role of sport in country image perceptions has gained recognition (Brown et al., 2001; Gilmore, 2002; Motion et al., 2003).

The definition of destination branding is ever evolving in the literature. One of the first and most applicable definitions was offered by Ritchie and Ritchie (1998) and later by Blain et al. (2005) as follows:

"...a name, symbol, logo, word mark or other graphic that both identifies and differentiates the destination; furthermore, it conveys the promise of a memorable travel experience that is uniquely associated with the destination; it also serves to consolidate and reinforce the recollection of pleasurable memories of the destination experience".

From the above definition, the unique associations linked to visitor experiences are based on prior perceptions of people about a brand. While Wijaya (2013) labels visitor perceptions towards the destinations brand image constructs, Bickford-Smith (2009) confirms that "destination branding would be a major way in which we are told both how to imagine and consume places". Brand images may influence peoples' reality of a place when visiting and may also further occupy a permanent space in the minds of visitors.

Cameroon is reputed to have an incomparable brand image in terms of the diversity of natural, cultural, and historical touristic attractions and potentials (Tegomoh and Molombe, 2020). A study by Kimbu (2017) found that Cameroon's main tourism products are typically linked to photographic wildlife and eco/nature safaris which are regularly combined with sun, sand, and sea. Moreover, the discovery/adventure, cultural, mountaineering, and hiking tourism segments are consistently growing. Kimbu (2017) cites that this diversity in the tourism sectors, coupled with its relative peace and bilingual people, allows tourism in Cameroon to compare favourably with its neighbouring countries, such as the Republic of the Congo, Gabon, and Equatorial Guinea. Tegomoh and Molombe (2020) flag that through effective marketing and by employing strategic planning, such brand associations can match the changing trends in tourists' motivations and behaviours when visiting the destination as well as secure returns for investors.

Cameroon is however relatively unknown for its brand image and largely underexplored by key international tourism markets (tourisminformationcameroon.net). Furthermore, the Cameroon brand has been compromised by structural issues linked to socio-economic, cultural, and political issues which saturates the international media (Clarke, 2022) and thus adds to the obscure brand images of the nation. As a consequence for unclear visitor perceptions towards destination brands, benefits which are typically associated

with event hosting, such as media coverage, nation building, and economic development, might either go unrealised or be poorly planned by event and destination brand stakeholders (Hemmonsby and Tichaawa, 2020). The literature on destination branding is however scant in the area of the brand image and positioning of Cameroon as a developing African nation. As such, the results of this study aim to uncover the perceptions of visitors at a sport event on the brand messages of Cameroon and determine the image and positioning for this underexplored African destination brand.

Destination branding through sport events

From a sport event perspective, some destinations use the hosting of mega-events as a re-positioning strategy with the expectation that the international media coverage of the event will contribute towards destination profiling and to increased prominence (Heslop et al., 2013). Specifically, the positive media coverage that the 1995 Rugby World Cup received helped in South Africa's quest to re-engage the international community and acted as an affirmation of the arrival of the "new" South Africa (Jago et al., 2010). Linking to re-imaging benefits, Higham and Hinch (2009) advocates for national identity benefits through positive brand identity and positioning as an interesting and unique place to host sport events.

Critically argued for developing nations are soft/ power public diplomacy benefits (Nauright, 2013). These refer to utilising events as a platform for building a nation's soft power by means of using dominant social and economic practices to influence current foreign policy (Al Thani, 2021). For example, Brazil uses the bidding and staging of mega-events as part of a broader government strategy to derive national recognition and symbolic power in the international arena (De Almeida et al., 2014). Elsewhere, Panagiotopoulou (2012) recognises the Chinese government's attempt to use the 2008 Beijing Olympics as a platform to promote their local economy as well as technological achievements and organisational capacities. A more recent study by Al Thani (2021) concludes that, while Qatar has been a source of global scrutiny due to contested human rights issues, their national government, together with event organisers, have employed mechanisms around the 2022 men's football World Cup in order to counter such discourse and to showcase accountability and commitment towards international standards and international development and thus, restoring its soft power abilities in the process.

Within the foreign policies of Cameroon, it is known that the Cameroon Vision 2035 strategy is positioned to guide tourism development in Cameroon with the aim of consolidating democracy and enhancing national unity, reducing poverty, and ultimately, to becoming a middle-income and newly industrialised country (Ministry of economy, planning and regional development, 2009). Through this policy, the Ministry of Tourism and Leisure aims to unite the people of Cameroon (Nonos, 2022) along with the aims of the Cameroonian Government to aggressively push the tourism agenda in the Western Hemisphere i.e., to attract one million foreign visitors to Cameroon by 2025 (tourisminformationcameroon.net). However, the study implies branding opportunities through sport tourists' perceptions and

experiences at the men's 2022 AFCON tournament that influence the trajectory in policy implementation for destination branding and policy development.

The Cameroon sport brand

Sport such as football, boxing, wrestling, basketball, cycling, table tennis, netball and handball hold prominent positions in the make-up of the Cameroon sport brand. Marathon running events such as the Mount Cameroon Race for Hope are also popular since they draw large numbers of participants. While Cameroon has three golf courses, it does not compare with other African golfing destinations, for example, Morocco, Tunisia, Egypt, Kenya, Mauritius, and South Africa (Knott and Hemmonsby, 2017). It is without a doubt that football is the most popular sport in Cameroon, with most villages having their own team fixtures against each other (Pannenberg, 2008, 2010; Tichaawa and Swart, 2010).

The sporting success for Cameroon is immense. Previous accolades of their national football team include five African Cup of Nations titles. Other accolades highlight the great impact that the men's football team made on the field in the 1990 FIFA World Cup in Rome. In other global sport, the nation's first time competing in the Tokyo 1964 Olympic Games was a great achievement for Cameroon (Pannenberg, 2010). While even greater achievements followed with their first silver medal for boxing in the 1968 Mexico Olympic Games, a gold medal for the men's football team at the 2000 Sydney Olympic Games, and Cameroon's first female medalist for the women's triple jump event in the Athens 2004 Olympic Games. Topendsports.com reports that Cameroon is also one of the few tropical states that has competed in the Olympic Winter Games.

From a sport event hosting perspective, Cameroon has hosted several major events. The most recent event was the 33rd edition of the AFCON tournament in 2022 which was only the second time Cameroon has hosted- the first time being in 1972. In 2016, Cameroon hosted the 12th edition of the Women's AFCON. These types of major sports events not only promise media attention for the Cameroon nation brand, but also create opportunities for inbound tourism and other sport business related benefits (Knott et al., 2017; Achu et al., 2022). Clarke (2022) reports that economically, businesses in Cameroon all have their eyes on a revival and boost in revenue through the 2022 AFCON tournament.

Materials and methods

A quantitative research approach grounded in the post-positivist paradigm was adopted for the current study. According to Creswell and Clark (2011), this approach delineates certain variables that are empirically measured and cannot be otherwise achieved through qualitative inquiries. With the intention to explore the perceptions of sport event attendees on aspects of the destination brand of Cameroon at a selected major event, the said approach was deemed appropriate. More specifically, a cross-sectional research design was adopted and survey questionnaires were selected as the quantitative approach for collecting the data from event attendees. Its usefulness in assessing large populations with relative ease

to yield meaningful results (Jones et al., 2013) is one of the key advantages for selecting this research design.

Due to Covid-19 regulations, the capacity of the stadiums hosting football matches at the AFCON was capped between 60% and 80% at six different stadiums in five cities across the country. The total capacity of these stadiums ranged from 20 000- 60 000. Using the sample size calculator, which includes the 95% confidence level as posited by Raosoft Inc. (2004), the sample size for this current study resulted in n=465 across various host cities in Bafoussam, Limbe, Yaounde, and Douala. The sample technique applied to this quantitative data collection was non-probability sampling with a random sampling approach. This technique is effective as it allows each event attendee an equal and independent chance to be selected. An additional advantage of this technique is that findings can be generalised to the broader population (Gratton and Jones, 2010; Acharya et al., 2013).

Face-to-face survey questionnaires were conducted by a group of trained fieldworkers. The quality of these surveys was supervised by the research leads of the study. The survey design was adapted from a previous research study conducted on the leveraging of sport tourism events for destination brand objectives (HemmonsbeY and Tichaawa, 2020). Moreover, questions on nation branding elements are guided by studies such as Feinberg and Zhao (2011). Close-ended questions were asked in a 5 point Likert scales to elicit the event attendees' level of agreement to various statements on 'brand messages of Cameroon through sport event hosting', 'promotional activities for brand engagement, and 'the role of stakeholders for destination branding practices'. Informed consent was requested before participants agreed to complete the questionnaires. All participants in the study remain anonymous and their confidentiality is guaranteed as there is no indication of their names on the questionnaires.

The data analysis process that followed included inspecting, cleaning, transforming, and modeling the data in order to highlight useful and relevant information, to suggest conclusions, and to support decision making (Welman et al., 2005). The quantitative data obtained from a survey instrument was captured on the Statistical Package for Social Sciences (IBM SPSS) (Version 27). This software permits researchers to not only run various statistical analyses on the data, but it is also useful to extract data summaries for visually presenting the study's findings. These visualisations come in the form of tables, which form part of the findings and discussions section.

Results

Attendees' profile

The results of this study reveal that sport event attendees to the AFCON tournament in Cameroon are traveling (young) adult males. To illustrate, the respondents' profiles illustrate that there were a significant number of male attendees (70.1%) compared to females (29.2%). The average age of the attendees ranged between 26-35 years (34.6%). The geographic results reveal that most of the event attendees were traveling from outside of the host nation including Gambia (24.1%), Burkina Faso (10.5%) and Tunisia (10.1%).

Cameroon’s perceived brand messages and attendees’ experiences

The respondents were asked about the perceived brand messages of Cameroon that are advertised in the event media. A 5-point Likert scale in table 1 reveals that all the brand messages were positively positioned in the minds of sport event attendees. Specifically, the brand messages that were mostly agreed to by respondents are the nation’s ‘cultural diversity’ (37.9%) as well as being a prime ‘destination for sport and leisure tourism’ (36.3%). A reinforcement of the Cameroonian culture shows that brand messages linked to ‘native music’ (35.5%), and the ‘community/local people’ (34.1%) were also being avidly perceived. Moreso, brand perceptions on the nation’s ability to be a ‘competitive destination for sport in Africa’ (32.7%) further reiterates the nations’ position as a sport and leisure brand. Additionally, ‘geographical landscapes and destination attractions’ (32.0%) which can refer to the mountains, forests or coastline, were also positively perceived. Despite the agreement to brand imageries, the results show a close link to the neutral responses on perceived brand messages in the event media.

Table 1. The following brand messages of Cameroon are advertised in the event media

Variables	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Competitive destination for sport in Africa	14.3%	24.9%	16.0%	32.7%	12.1%
Destination for sport and leisure tourism	10.0%	16.5%	24.1%	36.3%	13.0%
Cultural diversity	8.1%	17.0%	22.9%	37.9%	14.1%
Community/ local people	7.9%	15.7%	24.9%	34.1%	17.5%
Native music	8.0%	17.3%	24.7%	35.5%	14.5%
Geographical landscapes/Destination attractions i.e. landmarks, museums etc.	10.0%	19.7%	18.8%	32.0%	19.5%

Table 2 illustrates the steadily high mean scores (above 3) that were obtained across all brand messages of Cameroon. A consistent average of mean scores of about 3.3 reflects for all variables linked to the cultural/ natural destination’s brand, such as ‘cultural diversity’, ‘native music’, and ‘geographic landscape’ with the exception of ‘community and local people’ which scored (M=3.38). Sport brand variables (albeit in the lowest range of mean scores), is still in the range of a mean score of 3 which shows congruence with the cultural/ natural destination brand variables.

Table 2. Means and standard deviations relating to brand messages of Cameroon

Brand messages	Mean	Standard Deviation
Competitive destination for sport in Africa	3.03	1.278
Destination for sport and leisure tourism	3.26	1.177
Cultural diversity	3.33	1.155
Community/ local people	3.38	1.172
Native music	3.31	1.155
Geographical landscapes/Destination attractions i.e. landmarks, museums etc.	3.31	1.265

Respondents were further probed on whether their perceptions of the Cameroon brand had either changed, been reinforced or are in support of brand elements through hosting the AFCON tournament. Encouraging results, illustrated in table 3, reflect a grappling in responses between the agree and strongly agree categories to all the variables linked to the Cameroon brand. Concurring with the above-mentioned results on sport brand messaging, event attendees also articulated the brand positioning of Cameroon in Africa as a 'leading destination for sport' (38.5%) and more so, for Cameroon to 'attract future sport mega-events' (36.5%). Interestingly, sport event attendees believed that 'cementing government support for future event hosting' (35.7%) was a key imperative through the AFCON tournament. Brand image variables linked to the 'change or reinforce perceptions of the country's brand' (35.0%) was also strongly perceived thus positing the influence of sport for nation branding. Accompanying this brand perception is, 'promoting the country's brand to global sport tourism markets' (34.6%). Lastly, but not at all insignificant, to the business variables, it was revealed that respondents either opted to 'agree' or 'strongly agree' to the notion that the AFCON will help Cameroon to 'attract commercial sponsorship for future event hosting' (32.8%). Naturally, a fairly even number of respondents showed their 'support for local business' (32.1%), thus indicating opportunities for (new) business through event hosting.

Table 3. Hosting the AFCON will help Cameroon to (n=465)

Variables	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Attract future mega sporting events to the country	8.5%	11.1%	15.3%	36.5%	28.6%
Position the country's brand in Africa as a leading destination for sport hosting	6.1%	10.1%	19.5%	38.5%	25.8%
Promote the country's brand to global sport tourism markets	7.2%	11.4%	18.8%	34.6%	28.0%
Change/ reinforce people's perceptions of the country's brand	4.9%	11.8%	19.0%	35.0%	29.2%
Attract commercial sponsorship for future event hosting	5.5%	9.3%	19.5%	32.8%	32.8%
Support for local business	6.8%	12.4%	18.1%	32.1%	30.6%
Cement government support for future event hosting	4.5%	10.8%	19.0%	35.7%	29.9%

A deduction of respondents' overall experiences of Cameroon during their visit to the AFCON tournament reveal mixed results, however, most were linked to positive experiences. Specifically, respondents experienced Cameroon as 'very favourable' (36%), while a significant number indicated 'somewhat favourable' (30%). An equal number of respondents indicated 'extremely favourable' (15%) and 'not so favourable' (15%). The least number of respondents alluded to their experience being 'not at all favourable' (4%). These responses may reverberate the positively perceived brand messages, as well as indicate a level of future sport tourism for Cameroon when hosting sporting events.

Promotional activities that support destination branding and sport tourism to Cameroon

From their experiences of event media used during the AFCON tournament, respondents indicated that ‘television’ (28.2%) presided as the main media source for promotional activities. ‘The event venue’ (23.3%) also surfaced as significant for promoting brand messages since sport event attendees can directly engage with marketing activations within the space. Respondents viewed ‘social media’ (19%) as an additional important media tool for destination brand promotions which represents the ‘young adult’ sport attendees. Naturally, respondents also trusted the ‘event website/ internet’ (10.5%) to have some implication to the nation’s brand messages. Traditional media, such as ‘radio’ (9%) and ‘print media’ (8.5%) showed the least interest among respondents, which consequently reiterates the trajectory of media promotions- from traditional to online/digital.

In addition to event media experiences, event attendees responded to their level of agreement on the promotions of the Cameroon brand for sport and other tourism because of the AFCON tournament. Table 4 illustrates that, for the most part, event attendees grappled with the promotions of the brand Cameroon as there is a close overlap between ‘neutral’ and ‘agreed’ responses. For the agreed responses, event attendees believed that there is ‘potential for hosting new events in Cameroon’ (33.8%), thus implying the successful staging of the AFCON. Furthermore, ‘the promotion of local activities through tour operating companies’ (31.9%) was also encouraged, however, whether or not visitors utilised the services for tourism purposes is unclear. That said, attendees also recognised that ‘secondary motivations for traveling to Cameroon is stimulated via promotions’ (31.7%) and that ‘promotional packages compiled beyond event visitation’ (28.5%). What was however disagreed with by a number of attendees was the matter of the ‘synergy of event promotions between the AFCON and other destination attractions (24.8%) which reveals that the co-branding of events and destination is minimally leveraged.

Table 4. Please use the following scale to respond to the questions on event promotions below (n=465)

Variables	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
There is clear synergy in the event promotions between the event (AFCON) and other destination attractions	18.1%	24.8%	18.8%	23.5%	14.9%
There are promotional packages that include additional tourism opportunities in Cameroon (i.e. beyond the event attendance)	9.5%	20.3%	27.4%	28.5%	14.3%
Other (local) activities are encouraged by tour operating companies during the AFCON	8.7%	17.2%	28.4%	31.9%	13.8%
There is a potential for hosting new events in Cameroon because of the AFCON	9.6%	16.4%	23.4%	33.8%	16.6%
Secondary motivations for traveling are stimulated through the event media/ promotional activities	9.8%	15.7%	27.4%	31.7%	15.4%

Considering the destination branding practices of Cameroon through sport event hosting, event attendees believed that not all stakeholders play an equal part in branding the destination. Results show that 'sport organisers' (26.7%), 'governments' (23.2%), and 'private investment companies/ sport brand sponsors' (20.6%) hold the most responsibility for branding practices. This may be the case as they are directly involved in event and destination marketing. Since sport events are a natural attraction for (sport) tourism, 'tourism companies/ organisations' including tour operations (14.8%) played a significant role in branding practices. Other variables, such as 'community' (9.8%) and media (5.0%) also surfaced as indirect stakeholders.

Discussions and implications

Current reports on the unknown and largely underexplored destination brand images of Cameroon by key international tourism markets (tourisminformationcameroon.net, n. d) coincide with the current study's results on the degree of neutral perceptions of sport event attendees towards the brand messages of Cameroon. Nonetheless, the study's results reveal that the brand messages of Cameroon are intrinsically linked to the cultural diversity that reflects through native music and its people/local community. Furthermore, the geographical landscape, such as the mountains, forests, and coastlines, communicate distinct destination brand messages. Such brand messages certainly relate to Cameroon's main tourism products such as cultural and eco-tourism as posited by Kimbu (2017). It further positively elucidates the leisure tourism features of Cameroon.

That said, it remains obscure and limited in the literature how sport tourism is advancing the brand positioning of developing African nations. From the study's results, it is apparent that the emerging Cameroon sport brand positioning is underpinned by the strong associations to Cameroon being considered a destination for sport and leisure tourism and moreover, being a competitive destination for sport in Africa. While such findings communicate a solid global sport brand position for Cameroon, it adds to the extant destination branding knowledge in the context of developing nations.

Notably, the results further reveal positive destination brand benefits that are commonly linked to reasons why nations bid for sport mega-events. For Cameroon, the AFCON helps to attract future (new) mega-events to the destination and evidently it helps to cement government support for future event hosting. Results also posit positive new business opportunities through commercial sponsorships for future events and a generous support for local businesses to increase through the AFCON. In addition, current studies reveal that nations bid for mega-events for specific benefits linked to media coverage (Heslop et al., 2013), national identity (Higham and Hinch, 2009), and related public diplomacy benefits (Nauright, 2013) in order to encourage lasting legacy. Al Thani (2021) in particular, advocates for the significance of such benefits as key imperatives for developing nations and emerging states such as Cameroon where structural issues remain prevalent (Clarke, 2022).

To this end, other developing nations such as Brazil, Beijing, and Qatar are known to have mobilised sport mega-events for nation branding benefits in order to positively change their image on the international stage (Al Thani, 2021). However, it remains unclear as to how national efforts are coordinated by Cameroon towards integrating foreign policy for sport tourism and destination brand development despite their adopted Cameroon Vision 2035 which acts as a guiding framework for public diplomacy (Ministry of economy, planning and regional development, 2009). The study's results clearly indicate a healthy (sport) tourism potential through sport mega-events and elucidates that the AFCON is a powerful agent for shifting the trajectory of (sport) tourism development and destination brand positioning for Cameroon within Africa and on global platforms. However, since there is no guarantee of a lasting positive perception from international visitors, it is up to established governing structures to strategically integrate with sport tourism policy objectives and interested groups of the community in order to successfully realise (sport) tourism development and destination branding outcomes.

Although not equally responsible for branding the destination to sport tourists, results reveal that a great responsibility for initiating, implementing, and managing branding practices through event hosting lies with the sport organisers, local/national government, and private investment companies/ sport brand sponsors. This may be due to their direct connections to the sport event and host destination. Tour operating companies and tourism organisations also prove to have their share in branding practices as they are favourably perceived to promote local activities- whether their branding practices are purposeful or inadvertent is not explained. The current study's results therefore correspond with Hemmonsbey and Tichaawa (2019) on the role of stakeholders in destination branding through sport.

It was found that the community and the media are perceived to have a small degree of responsibility for destination branding through sport. That said, media is persistently believed to portray positive brand images of Cameroon during the AFCON tournament. Kimbu (2011) however found contrasting results in relation to the significant role of community in promoting tourism for a cultural festival in Cameroon which in turn prompted the prioritisation of governments to not only financially support event organisers, but also to augment Camerons' multicultural richness and diversity to national and international audiences. The findings of such studies are thus optimistic for sport to similarly be influenced by community support and initiatives, and to subsequently encourage governments' commitment towards greater efforts of promoting and developing the sport tourism industry. This may further fashion synergistic efforts through co-branding between role-players of sport and destination brand practitioners, including government and community (Rodríguez-Molina et al., 2019).

Conclusions and future research

This study sought to determine the perceptions of sport event visitors on the brand messages of Cameroon during a selected intercontinental mega-event. A quantitative methodology of face-to-face survey questionnaires was administered with event spectators at the AFCON tournament at various hosting venues. The

brand image and positioning constructs are underpinned in this study which reveals the importance of brand messages and imagery in the minds of visitors when reflecting on a developing African nation in the context of sport event hosting.

The Cameroon brand messaging is strongly linked to its culturally diverse brand images and such images hold a strong position in the minds of visitors. Mega-events reinforce extant brand messages and further position Cameroon favourably as a fierce competitor for sport mega-event hosting within Africa and on the global stage. Events like the AFCON demonstrates great potential to develop a strong identity and reputation amid perpetuating structural challenges as a destination. Best practices on policy development reveal how resultant nation building and brand imagery objectives can be strategically realised for Cameroon. What is more, a consideration for synergistic efforts amongst a range of stakeholders can enhance the promotion of brand messages provided it is effectively supported and managed.

While quantitative results reflect the position of the brand in the minds of sport event visitors, this can be further explored in order to establish brand intentions of key industry and government stakeholders through employing a qualitative inquiry. Such results can thus be used to support and validate the brand perceptions of Cameroon, as well as to provide deeper insight to the overall branding policies. Moreover, perceptions and experiences of non-sport visitors can be elicited for wide-ranging brand-related assessments. Resultant studies alluding to mega-event leveraging in this destination context can further contribute to extant practice and place branding theory.

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The influence of the pandemic generated by the SARS-COV-2 virus on the activity of the CSU Oradea women's handball team in the 2020-2021 season

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Abstract: The COVID-19 pandemic has had a significant effect on ordinary activities and lifestyles. As a result of all these changes, it was anticipated that the level of physical activity would also change. Knowing and highlighting the effects of the pandemic on the CSU Oradea women's handball team can generate relevant data regarding the involvement of the players in the preparation process and also the obtained results in the competitions. The subjects of the research have been 16 members of the CSU Oradea women's handball team from the 2020-2021 season. The questionnaires applied, which includes 22 items, was pretested and then applied online between April and May 2021, without undergoing changes from one subject to another. The female athletes of the CSU Oradea team were mostly affected by this pandemic, primarily in terms of sports.

Keywords: COVID-19, sport, young, players perception, COVID-19 effects, rules, training

Introduction

The COVID-19 pandemic has had a significant effect on ordinary activities and lifestyles. Schools and universities have switched from face-to-face to online

education (Erdely et al., 2020), more jobs have moved from the office to the home, sporting events have been postponed or cancelled, and physical distancing has become something usual. As a result of all these changes, it was anticipated that the level of physical activity would also change, which will affect the mental well-being of the population (Brajša-Žganec, 2011; Ilies et al., 2014; Dragos, 2015a; Papp et al., 2019; Yan and Spaulding, 2020).

Other sport performers, such as coaches and referees were also experiencing meaningful changes to their sport engagement and career trajectories (Ilies et al., 2021, Mchunu et al., 2022), feeling less publicly essential than they were used to (Taku and Arai, 2020). It was suggested that elite referees faced issues, such as quarantine, time away from families and loved ones, a lack of ongoing contact with colleagues and fiscal concerns (Webb, 2020).

Once athletes have reduced training time and increased sedentary behavior, many harmful effects could occur during quarantine. The COVID-19 pandemic has shown that the protection of athletes' health must be seen in the context of the complex social systems of which they are included.

The quarantine period has led to many changes in the routine where high-performance athletes have to look for alternative strategies to stay in shape and maintain their training schedule by improvising both the home space and training tools safely (Chuchu et al., 2021). All these routine adjustments can culminate in constant episodes of sleep deprivation induced by changes in the regular circadian rhythm.

In addition to physical activity, the well-being of members of the sports sector is also very important to consider during the COVID-19 pandemic. Research in recent months has shown the importance of physical activity but also the intake of vitamins against severe (or even lethal) side effects of COVID-19 and its support for the immune system (Skalska et al., 2019).

In the time of the pandemic and physical distancing, in addition to physical health, mental and spiritual health has also been focused, and sport is one of the most effective tools to influence them (Mann et al., 2020). Several studies have shown the positive effect of physical activity and sport on shaping and supporting mental health and psychological well-being (Dragos, 2014; Gherman, 2014; Dragos, 2015b; Samuel, 2020).

Starting from these aspects and taking into consideration the effects of the pandemic on the population in general but especially on sport in particular (Turcu, 2020), by elaborating of this paper the authors tried to highlight the changes generated by the SARS-COV-2 virus and the influence of the pandemic on the activity of the CSU Oradea women's handball team in the 2020-2021 season.

Knowing and highlighting the effects of the pandemic on the CSU Oradea women's handball team can generate relevant data regarding the involvement of the players in the preparation process and also the results obtained in the competitions. In the same time, all this data will be able to be used in the future to reduce the possible negative effects generated by other malfunctions or unknown situations.

The objectives established in order to achieve the proposed goal were: determining the ways to act in order to obtain relevant and objective data, in

correlation with the topic studied; developing a questionnaire to collect the data necessary to establish the conclusions of the study; capitalizing on research results.

Methodology

The subjects of the research have been 16 members of the CSU Oradea women's handball team from the 2020-2021 season, almost half of them had been under contract for at least two years at this club. They are between 18 and 26 years old, 14 athletes are bachelor students, one of them is a master's student and another one is a student in High School. Out of the 16 subjects, only one is from Oradea, more than half live with their colleagues, one with her parents, two of them live alone and four with other people. Also, only one is engaged in other gainful activities.

The questionnaire, which includes 22 items, was pretested and then applied online between April and May 2021, without undergoing changes from one subject to another. During the completion of the questionnaire, no player abandoned or interrupted the completion of the set of questions. After the questionnaire was applied, the obtained results were centralized and analyzed both quantitatively and qualitatively, by the influence of the answers obtained.

In addition to the questions regarding general aspects like age, level of studies, residence or involvement in other activities, the questionnaire was developed to collect data about the players' perception of the emotional impact, the influence on the results achieved in trainings and competitions, financial aspects related to the club and players itself but also the degree of damage to the health of players infected with the coronavirus.

Results and discussions

Regarding the level of restrictions of sports activity adopted by the authorities, out of a total of 16 handball players of the CSU Oradea club, almost half, i.e. 43.75%, considered that it was too high, also 43.75% were satisfied with the measures and restrictions imposed while a female athlete characterized them as too permissive (Table 1). One of the respondents could not appreciate it. From another point of view, 50% of the subjects stated that they cannot appreciate if the crisis has affected the club where they are active, being a party where they do not have access to information regarding the club's losses, gains, income during 12.5% believe that it was very affected. The rest believe that the club has been affected more or less, in equal proportions. Also in the same direction, the majority of respondents believe that at CSU Oradea the sports part, represented by the interruption of training and competitions, had the greatest negative effect.

On the other hand, 81.25% of the players were affected from a sporting point of view, they consider it a psychological and motivational problem that the pandemic stopped their performance at an age when a brutal interruption of the activity could compromise their future in sport performance. The emergence of the COVID virus also affected the financial side of sportswomen, due to the restrictions imposed, which prohibited the holding of matches for quite a long period of time. This also led to the decrease in monthly earnings, as for every match won according to the input, the players receive a game bonus (Table 1).

Table 1. Centralized answers from questionnaires

Questions	Answer 1	Answer 2	Answer 3	Answer 4
Do you think that the measures to restrict sports activity taken by the authorities in the current crisis were:	<i>Too drastic</i>	<i>Exactly as needed</i>	<i>Too loose</i>	<i>I don't know</i>
	7 (43.75%)	7 (43.75%)	1 (6.25%)	1 (6.25%)
To what extent has your club been affected by the current crisis?	<i>Very much</i>	<i>Enough</i>	<i>A little bit</i>	<i>I don't know</i>
	2 (12.25%)	3 (18.75%)	3 (18.75%)	8 (50%)
What do you think is the most affected part of the health crisis at your club?	<i>Financial part</i>	<i>The sports part, represented by the interruption of training and competitions</i>	<i>Both, equally</i>	<i>I don't know</i>
	0	11 (68.75%)	4 (25%)	1 (6.25%)
From what point of view were you mainly affected by the interruption of sports activity?	<i>Financial</i>	<i>Sport</i>	<i>Personal</i>	<i>I was not affected</i>
	2 (12.25%)	13 (81.25%)	0	1 (6.25%)
Resuming sports activity has generally induced feelings of:	<i>Happy</i>	<i>Fear</i>	<i>Uncertainty</i>	<i>It was something normal</i>
	12 (75%)	0	1 (6.25%)	3 (18.75%)
How do you rate the training sessions after resuming them?	<i>Totally limited</i>	<i>Narrowed down to a few basic exercises</i>	<i>Only partially limited, able to perform several activities</i>	<i>Almost the same as under normal conditions</i>
	1 (6.25%)	1 (6.25%)	4 (25%)	10 (62.5%)
Resuming sports activity meant for you, in particular, first of all:	<i>The joy of returning to sports</i>	<i>The joy of returning to the team and implicitly the socializing part</i>	<i>Joy, generated by the possibility of improving the financial situation</i>	
	8 (50%)	7 (43.75%)	1 (6.25%)	
Your involvement in the training process in terms of motivation was:	<i>At the pre-pandemic level</i>	<i>Above the pre-pandemic level</i>	<i>Below the pre-pandemic level</i>	
	12 (75%)	4 (25%)	0	
Adapting to effort after the pandemic break have been for you:	<i>Very difficult to achieve</i>	<i>Very easy to achieve</i>	<i>It didn't require much effort as we had a period of transition and gradual readjustment</i>	
	4 (25%)	1 (6.25%)	11 (68.75%)	
Yes / No Questions	Yes	No	It was a break I wanted	
Have you been affected in sport way by the COVID pandemic?	15 (93.75%)	1 (6.25%)	0	
But on a personal level?	10 (62.5%)	4 (25%)	2 (12.25%)	
Did you ever think about not returning to your sport when it resumed?	0	16 (100%)	NA	
Did the uncertainty and permanent change of the competitive schedule have influences on motivation and involvement in training?	7 (43.75%)	9 (56.25%)	NA	
Have you been confirmed as a person infected with COVID-19?	10 (62.5%)	6 (37.5%)	NA	
If YES, do you have any repercussions from the infection?	2 (12.25%)	8 (50%)	NA	

The feelings generated by the resumption of activity for the sportswomen surveyed are those of happiness for 75% of them. This is due to the fact that the players have reunited, and have resumed training for participation in competitions. The joy of returning to sports activity was declared by 11 of the athletes, the joy of returning to the team and implicitly the socializing part was expressed by 7 of them, and the joy, generated by the possibility of improving the financial situation, by only one athlete.

Regarding the idea of not returning to sports activity when it resumed, all subjects responded negatively. During this unexpected break, they realized that this sport is part of their lives, each having at least 7 years of practice, spending most of their free time in the gym.

The subjects considered that the involvement in training was at a high level, like the one before the pandemic, sometimes even above it, which means an assumption of the new normality and hopes for regaining the pleasure of doing performance sports. More than half of the respondents considered that the return effort was acceptable through the way of a properly managed transition and personal will of each of them and the technical staff. For only four athletes, the effort was very difficult to manage being less trained during the break, while only one stated that it was very easy to achieve. The only changes in training were the observance of the measures taken for the spread of the virus and the performance of a periodic covid test, changes that did not affect their normal course, being not disturbing.

In terms of sports, almost all players have been affected by the COVID-19 pandemic due to the lack of training, matches, the lack of exchange of game ideas, isolation, the impact of sports regime and discipline in performance, the imbalance of the diet, the disappearance of good mood. Only one athlete was not affected. Also, more than half of the sportswomen were personally affected by the pandemic through the fear of moving outside the home, unbalanced caloric meals, disruption of the rhythm of life. Four of them were not affected, and two considered this period to be auspicious.

On the other hand, the uncertainty and permanent modification of the competitive program had influences on the motivation and involvement in training just for 7 sportswomen, while 9 declared that they were not affected. The matches were played as tournaments, so players were more involved in training because the risk of injury was higher. Those that were not affected, had the same motivation and involvement as before the pandemic.

Of all sportswomen surveyed, 62.5% were confirmed positive for the COVID-19 virus (Table 1). Although more than half were affected by the disease, there are no functional sequelae for any of them.

Conclusions

The female athletes of the CSU Oradea team were mostly affected by this pandemic, primarily in terms of sports. Being a young team with an average age of 21, they were also affected personally by the lack of going out and socializing. Most

of the players considered the measures taken to be a bit drastic, and the others, to a small extent, considered that they were necessary for that period. In any case, the training and competition schedule has been disturbed by this global pandemic. After this unwanted break, the players of the Oradea team returned with new ambitions and better motivation. The majority considered that they gradually readapted to the effort, the training being almost the same as before the pandemic. Although most of the sportswomen were infected with COVID-19, according to the answers received, there are no functional sequelae, which proves that, through their good physical and mental health due to the fact that they carry out sports activities regularly, they were protected from the effects of the disease.

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