ADOPTION OF TECHNOLOGICAL INNOVATIONS BY SPORTS SPECTATORS

POPESCU MARIUS CĂTĂLIN
LECTURER PHD. UNIVERSITY OF CRAIOVA, ROMÂNIA
e-mail: catalin.popescu@edu.ucv.ro
POPA MARIAN GABRIEL
LECTURER PHD. UNIVERSITY OF CRAIOVA, ROMÂNIA
e-mail: gabriel.popa@edu.ucv.ro
DIACONESCU DRAGOȘ LAURENȚIU
LECTURER PHD. UNIVERSITY OF CRAIOVA, ROMÂNIA
e-mail: dragos.diaconescu@edu.ucv.ro
PĂSĂRIN LEONARDO DANIEL
LECTURER PHD. UNIVERSITY OF CRAIOVA, ROMÂNIA
e-mail: daniel.pasarin@edu.ucv.ro
COSTIN DAN EUGEN
LECTURER PHD DUNĂREA DE JOS UNIVERSITY OF GALAȚI, ROMÂNIA
e-mail: dan.costin@ugal.ro

Abstract

In the paper "Adoption of technological innovations by sports spectators" we make a brief analysis of the importance of technology in sports and in the fans' experience, and in the last part a technology used by both athletes and fans is presented, which is revolutionizing the sports field. Just as it happens in any other field, in the case of professional sports, modern technology has produced important changes. And if we think about everyday life, instead of going up the stairs, you use the elevator, instead of writing on paper, you use your computer or laptop at the office, the phone, you pay with a card when you go to the table. Technology becomes part of our lives once we come into contact with it, so it is normal to see the world of professional sports very interested in new technologies. We already see many of these technologies in tennis, where the ball can be tracked with amazing precision, in football, where we have the replay and detailed analysis of any movement made by the players on the field. Others are there, but not so well known.

Keywords: *technology, innovations, fans, sporting events.*

JEL classification: M30, M31, M37.

1. Introduction

Despite the difficult economic climate, the sports industry continued to grow, with major sporting events enjoying unprecedented popularity [18]. Media coverage of sporting events has also improved as a result of advances in information technology. Television companies, sports clubs, international federations, as well as sports stars, are increasingly using social media to communicate with fans and provide a better participatory experience for spectators during competitions [8]. Sponsors remain keen to fund sporting events and clubs as part of their marketing mix and are now using increasingly sophisticated data analytics tools to better understand their target markets and measure the return on investment in sports advertising.

Professional sports are among the few fields that have quickly adapted to new technologies [20]. As soon as they were available, they began to be used and explored to help athletes and the sports world in general. Although in the first moments people were a bit reluctant about the performance of modern technologies, as we got used to them and learned to use them to our advantage, we adopted them and we can no longer give them up.

Technology, needless to say, is revolutionizing the way we live and will continue to do so, at increasingly surprising speeds. Sport industry must manage the technological advances not just

for the professional sport but also for the spectator, to increase the relationships between sport organizations and their fans base [1].

Technology is truly at the forefront of everything we do in society today. In other words, technology has not only changed the way we train, but it has changed the entire sports experience we live [7], [6]. Sport industry needs to continuously scan the environment to identify the best technologies [15], not just for the players but also for the spectators.

2. Literature review

In the past, a workout required entire documents of analysis and extensive effort to gather all the graphical data and see if the effort was correct and where it can be improved.

Now, technology has taken over this task and this is our normal.

With smaller, more durable devices that bring with them sensors and real-time information, technology has opened the way for new opportunities in every sport.

What did the spectators gain?

First of all, you don't need a coach if you want to track your athletic progress. Even the most amateur sportsman can understand if he just had an effective workout or not.

Second, the coach does not have to be physically near the athlete. Performance athletes can train anywhere, future training is planned individually, doctors and coaches can avoid injuries much more effectively, and knowing all the data, and communication is much faster [10].

In other words, technology has not only changed the way we train, but it has changed the entire sports experience we live.

Some technologies have a real impact on physical and mental health, and the versatility of functions is amazing. It's no wonder the world of sports has benefited from technology.

The accuracy of the data influences the accuracy of the results. And this can be seen now, more than ever. Brands focus on data accuracy, whether it's GPS, maps or analytics data, the safety of their customers or battery life [14].

Sport also has a technological side, which we can use to improve our every movement.

Swimming is no longer a simple sport either. Swimmers know how hard it is to be two seconds faster than they were in their last practice, but it is very important to become extremely efficient in the movements you make in the pool.

Equipment such as paddles, fins, snorkels, kickboards, parachutes, resistance bands and traction buoys are some of the most important.

As we rely on technology in motion, we become better. Although the training equipment is not technology, behind it there was data tech analysis, which developed it to help swimmers become more efficient.

Although there are actually headphones you can use in the pool to listen to your favorite music while swimming. Or to talk to your coach, who sits by the pool and can spot every mistake.

Technology is far from its limit, in fact, we are only now beginning to discover all the needs, everything we can use to become better, and we will certainly have a lot to learn.

What exactly is technology in sports?

- Touch screen for easy map use;
- Pulse OX that measures your altitude acclimatization and monitors your sleep;
- The pulse measured at the wrist, regardless of effort or stress;
- Monitoring breathing during exercise or sleep;
- Advanced sleep monitoring, a real help if you have a stressful job;
- Monitoring Body Battery energy or hydration level;
- VO2 max, to improve your effort every time;
- Personal workouts uploaded to your watch;
- You have your own recovery consultant, listen to him to give yourself time to recover, to rest;
- MTB dynamics that evaluates the difficulty of the route and the ease of descent;

- Live track – family can track your location when you're on a bike training for added safety;
- XC skiing dynamics – the current level of demand in cross-country skiing training;
- Ski View maps for over 2000 ski resorts worldwide;
- Complete GPS systems;
- Real-time acclimatization;
- Step by step navigation;
- ClimbPro – data about climbs, current climbs, gradient, distance when training or competing on mountain terrain;
- Maps – terrain contours, peaks, elevations, lakes, parks, whether you are in the city or on the mountain, regardless of the weather, you can rely on the data received on your smart watch;
- Cycling map, which brings you back to your starting point, an important feature when you're doing a lap and can get lost very easily;
- Music apps on watch;
- Contactless payments, directly from your smart watch.

All the tech features can be information that gets lost in your mind if you are not directly interested in them. But they can save your life, sometimes. Or it can improve it, most of the time.

3. Research methodology

To explain the ways in which fans adopted the technology, we used the exploratory and descriptive method of investigation. These methods assume the use of preliminary studies to understand the investigated phenomenon, when there are no already in-depth studies in the field, as well as when the focus is on highlighting some aspects of the phenomenon, and not on the causes that determined the phenomenon in question. Some relevant examples for the investigated problem are presented in order to contribute to the achievement of the research objectives. The selected practical examples are relevant to the purpose of our investigation, contributing to the rigor and relevance of our research. The challenge of our approach is to make a distinction between the theory and the sources that provide the data. We congregate findings from scatter pieces of research into appropriate categories to provide a typology of technologies available to sport spectators.

4. How important is technology in improving the experience of fans in the sports world?

Technology is now evolving much faster compared to the previous period, in the sense that it has made a strong advance and shows no signs of stopping. Virtual reality and augmentation, the creation of robots to replace repetitive work, the first manned space flight is just a few re-uses that have taken place recently, and the future is even more promising. Things that until some time ago seemed intangible to us, are now possible thanks to technology. And once we have tasted these benefits and possibilities, we will never be able to go back to the things before.

If we do not think about the impact of technology on man and everyday life, only the positive aspects will not come to mind. As we may have already gotten used to, when we think of sports, we mainly think of all the sports competitions over the years. And even if we don't understand how important technology is in the world of sports, all these details come to light during major competitions.

For example, we could take a look at the Olympic Games, in terms of gymnastics and more. Another example we could think of is the big tennis competitions or why not the football matches.

Everyone knows and appreciates the rules of this game, especially since we are talking about the most beloved game - football.

Fans are extremely important for any team, they create atmosphere, buy tickets, and can purchase products with the club's insignia, of course if they exist. They should have an essential role in the life of a club, as is the case in many countries around the world [17].

The physical endurance and speed of play have increased enormously, and in conjunction with the slowing down of the surfaces, have completely changed the face of the game of tennis compared to a few decades ago, turning it into one almost exclusively of the backcourt [12].

As we said earlier, technology is very important, especially when we are dealing with those international competitions. Let's not forget the fact that technology is also important in the case of sports betting. One such site where you can bet on your favorite athletes or certain competitions is the fortune online sports betting.

And when it comes to betting, we think that the male audience is much more trained with what happens in this segment and there is no need to confirm this fact. Moreover, the technology has shown its usefulness during sports matches at the national level and why not, even at the local level. And, this time we can consider football matches:

- The technology displays accurate data - especially when we are talking about football matches. The electronic table that keeps the score of the game, as well as the changes made by both teams, is really a factor of the help given by technology for the sports framework;
- The technology offers the spectators replays of the important phases - and this happens even in as real a time as possible [16]. And we say this because you no longer need to watch the match at certain times, as the important phases benefit from replays, shortly after they have taken place;
- The technology provides and displays the appropriate grades (score) for competitions - and here we are talking about gymnastics in general.

As we have already said, technology makes its presence felt in any sports competition, and this is beneficial for everyone. Especially when we talk about the big international competitions, which take place all over the world. And fans can engage in collaborative sport consuming practices such us texting and posting on social networks [5], [2].

It is possible to use technology to bring fans closer to the action and enhance the viewing experience. For example, VR can be used to provide a 360 degree view of the pitch or track, allowing fans to feel as if they are right there in the middle of the action.

For example, VR can be used to provide an overhead view of a football field or to provide an in-depth view of a basketball court.

VR can also be used to give fans access to some of the best seats on the field or track without having to travel to the event. For example, VR can be used to give fans a view from the sidelines of the football field or the race track.

VR can be used to host various types of virtual sporting events, such as marathons, cycling races or swimming competitions. They can be organized similarly to a real sporting event, with athletes competing against other athletes or trying to improve personal records.

It can also be used to allow sports fans to participate in virtual sporting events without having to travel to a competition venue. For example, VR can be used to allow sports fans to participate in a virtual cycling race from the comfort of their own home. We can say that technology has a positive impact for the life of sports fans.

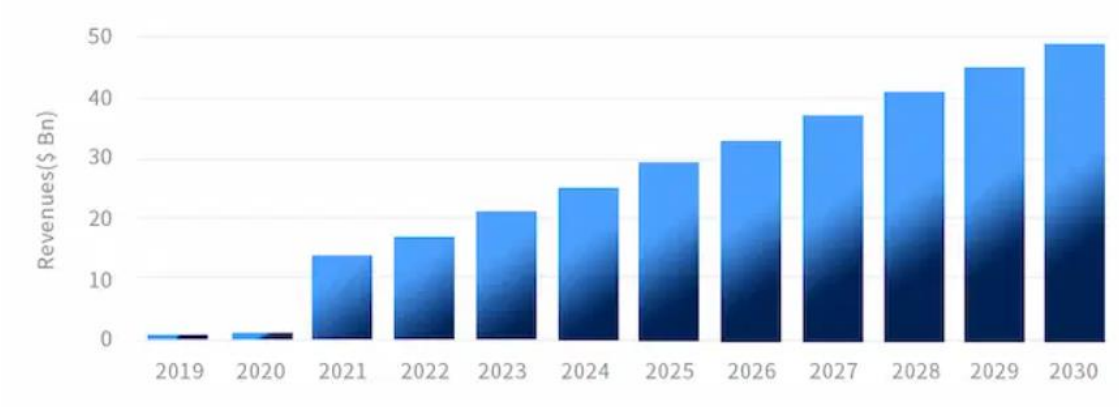
5. Internet of things/loT - dream or reality?

Innovation and the development of technology have brought mankind into a new era where traditional production and lifestyle have been profoundly changed [9]. The Internet of all things" is a concept that shows how any object or space can become part of the Internet. In this case, not only people communicate with each other on the Internet through laptops, iPads or mobile phones, but also with objects of any kind. For example, the balcony door can use a cheap and easy channel to tell the air conditioning system that it is open, the LED light could detect the presence of a person in the room (providing an alarm system that can be used by anyone) or the olive tree can send a signal to the irrigation system saying that it needs more water.

The Internet of Things, commonly referred to as IoT, is a global technology trend that combines everyday devices with cloud computing to create endless business opportunities. It is expected that this technology will occupy a market size to 38.6% between 2020 and 2030.

If we talk in numbers, then this market of the technology of things applied in sports have 1.35 billion in 2019, it is projected to reach USD 49.31 billion by 2030.

Chart no. 1 - The global headlight market size by loT



Source: MOKO BLUE [19]

In cities, electricity production and water supply are automatically adjusted based on real-time data from each consumer, and car traffic is already stabilized by the presence of a growing number of cars with semi-autonomous functions.

All this and much more will mark our lives in the coming years, by expanding the concept called IoT (Internet of Things): the Internet of Things.

More specifically, IoT is the network established between the objects that surround us, through embedded chips that continuously transmit and receive data.

From refrigerators to automobiles and from cell phones to sneakers, nothing will escape the Net.

Fitness apps, pre-installed on many smartphones, record data about how much we moved each day, and some even remember where. We even provide them with new data about how much and how we slept, how much we weigh, what we ate and so on.

Google Maps not only knows where I've been and at what times, but also stores where I've travelled in recent years. Facebook and other social media apps encourage us to say what we're thinking, to show off not just photos from now, but photos from 10 years ago.

And smart watches or smart bracelets are able to record our EKG, pulse and other data that can be combined with medical insurance services that take into account our state of health.

Professional sports are among the few fields that have quickly adapted to new technologies. As soon as they were available, they began to be used and explored to help athletes and the sports world in general. Although in the first moments people were a bit reluctant about the performance of modern technologies, as we got used to them and learned to use them to our advantage, we adopted them and we can no longer give them up.

Because we are talking about professional sports, the technologies have been chosen every time based on efficiency, yield and the possibility of integration in everything that means professional sports. Only the best and most interesting ones ended up being used in performance sports, each technology contributes to an improvement in the performance of those who practice it.

1. Preventive genomics. No matter what type of sport you play, talent is important. Every time. You either have it in your genes or you don't. But what would happen if genetics could tell you if your child could do x sport or y sport? What if you knew how to change your training to avoid any kind of injuries and problems, accidents of all kinds. All this is already possible.

A company is already working with several athletes to collect DNA in order to improve the athlete's performance, health and safety. Special genetic tests developed by the company could reveal important data about the injury risk or nutritional needs of athletes.

In the future, we may see professional athletes who already know what to do in terms of nutrition or training, based on individual genetics.

2. Nutrigenomics or how to find the best diet. It starts with a DNA sequencing, after which, depending on what is discovered in the DNA, those from the sequencing company will tell you what sport to practice and what kind of training program suits you. An application will tell you what to eat, what not to eat, when to eat in order to perform very well.

Genetic markers are used to identify ideal meals, customized for each individual athlete. Once it is known what you can eat, the respective menu will be delivered to your home. It is simpler and more efficient to already know what you can eat to achieve the desired success and nutrigenomics can be a hopeful ally in the future.

3. Health management with sensors and smart wearable devices. There are already on the market bracelets, watches that measure all kinds of parameters with the help of sensors and give you real-time information about your health and the workouts you do. And you don't have to look too hard to find applications that integrate all this data.

In online application stores you can find one or more applications for monitoring sleep, for activities during daily exercises, for monitoring stress [13]. Even the trivial jumping with a rope during training can be monitored with an application to know when you are tired and it is too much for the body and what you have to do to have a better performance. It is ideal to know at any moment what is happening with your body and to be able to adjust any kind of training and preparation for the following sports competitions.

The Vaaka Cadence sensor can be attached to the paddle, providing real-time data on paddling cadence. It connects wirelessly to the digital watch - for example to the one from Garmin, which offers its users an application dedicated to this sport, Garmin Canoeing App, or to the smartphone that provides real-time feedback of the training.

Afterwards, the free VaakaAnalytics software transforms the data into graphical details for comparing training sessions.

Among the top manufacturers of competitive kayaks is Nelo, the Portuguese company boasts the most advanced kayak, the Nelo 7, with speed and direction thanks to the design and advanced materials used.

4. Technologies that improve performance. In addition to all kinds of gadgets, we also have faces, clothes that monitor your health, devices that improve your performance in professional sports. We already see many athletes wearing shirts with sensors that monitor vital signs during training or even during on-going matches.

There is already on the market a blouse, shirt, whatever you want to call it, which uses sensors to measure heart rate, breathing, number of steps, rhythm, calories burned. Many faces can simultaneously measure several vital signs, there are also helmets, caps that detect if the athlete has suffered a cranial trauma during a collision.

Smart wearable

When it comes to smart devices, there are many ways in which they can be customized. In addition, they can be easily melded to the needs of the users, depending on each individual's preferences. As many people want to do more sports at the beginning of the year, such devices can help. In addition, thanks to the design, they can be worn not only at the gym, but also at the office.

Fortunately, the modern world and the way technology has evolved in recent years are beginning to support us in the direction of balanced habits. One of the many reasons why we love technology is that it can play an increasingly important role in our health. New devices appear from year to year:

- Smart bracelets that can monitor the number of steps you take daily distance covered, heart rate, body temperature;
- Gadgets that can measure the number of calories you consume;
- Devices capable of measuring body mass index, fat percentage, water, muscle and bone mass;
- Devices that offer a complete picture of the lifestyle with detailed explanations, recommendations and suggestions for improvement.

Smart clothing and footwear

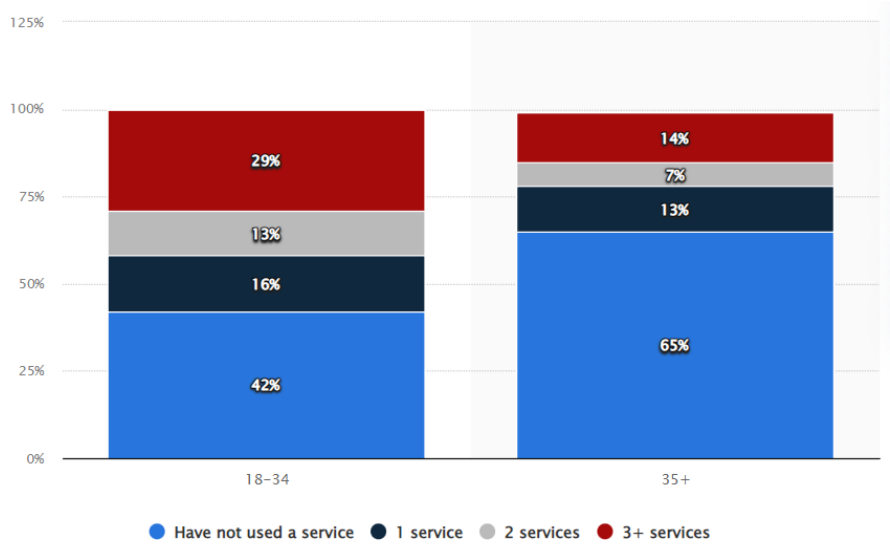
Another company thought of putting on the market a material that absorbs any shock and protects athletes on impact. The idea behind the material is simple: when there is no shock, the molecules "walk" freely through the material, it remains soft and flexible, but when the shock, the impact, the molecules "group", they stand next to each other to absorb the energy and reduce the transmitted force.

Virtual Reality and Augmented Reality are ideal for better performance in professional sports. It is easier to get used to stressful situations in VR or AR and to prepare for competitions in a virtual or augmented reality where you can practice all the details learned during training.

Young sports fans were more likely to subscribe to more sports-focused streaming services.

While nearly 30% of sports fans aged 18-34 subscribed to three or more sports streaming services, that number dropped to 14% among respondents aged 35 and over lot.

Chart no. 2 - The probability to subscribe to more sports-focused streaming services



Source: MOKO BLUE [19]

Fitness apps

Sedentarism and lack of movement are real dangers for the tens of thousands of people forced to work from home or stay with children during this period. Individual exercise is a handy solution to staying in shape. Here are some free apps that can be installed on your mobile phone or tablet and help you do simple but effective exercises.

Daily Workouts Fitness Trainer. Over 100 sets of exercises that can be done at home either with equipment or without anything but your own willpower. It can be downloaded for iOS and Android:

- ✓ Nike Training Club. The app developed by the sports equipment manufacturer offers 185 exercises for all needs, including personalized recommendations. It can be downloaded for iOS and Android;
- ✓ Active. An audio app with over 2,500 exercises updated weekly. Available for iOS and Android;
- ✓ 7 Minute Workout. It has hundreds of 7-minute exercise sets that require no equipment. Available on iOS and Android;
- ✓ Swork It. Exercises to strengthen the abdominal and back muscles. Available on iOS and Android.

IoT in the sports sector: Future developments

Technology becomes part of our lives once we come into contact with it, so it is normal to see the world of professional sports very interested in new technologies.

We already see many of these technologies in tennis, where the ball can be tracked with amazing precision, in football, where we have the replay and detailed analysis of any movement made by the players on the field. Others are there, but not so well known.

Professional sports are among the few fields that have quickly adapted to new technologies. As soon as they were available, they began to be used and explored to help athletes and the sports world in general. Although in the first moments people were a bit reluctant about the performance of modern technologies, as we got used to them and learned to use them to our advantage, we adopted them and we can no longer give them up [11].

But the sports of the future mean much more – the use of genomic studies in determining the potential of athletes, the improvement of performance with the help of nutrigenomics, and the management of health by monitoring certain physical indicators of athletes are discussed.

Sports equipment will directly help create an environment conducive to performance, and sensory analysis systems will be used to monitor the athlete's progress in real time. Sports with a high level of hardness (American football, rugby, etc.) will benefit from special equipment, which will increase the level of performance, but also the safety of the athletes.

Stamina will increase by up to 60%, bone density will improve, muscle mass will double, and the centres responsible for blocking pain will be activated through this equipment.

AR and VR technologies have started to be used by an increasing number of people, and will help to create a much closer relationship between the athlete and the spectator.

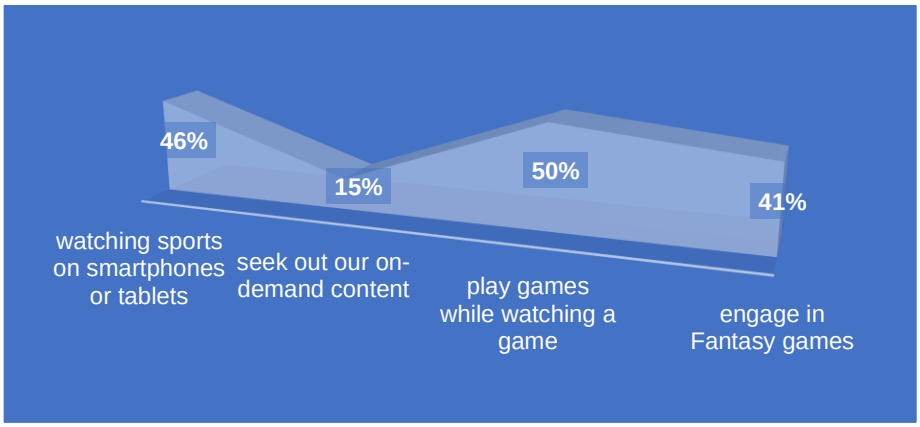
Moreover, athletes will be able to benefit from real-time information regarding the environment (car and motorcycle marathons). Or, they will use the devices equipped with such technologies to get used to certain scenarios by simulating them with the help of VR terminals.

So technology means progress and advantages for both athletes and spectators. However, some sports will no longer be as passionate as in the past, but others will benefit from the integration of technology, as the level of interaction between the audience and the athletes will transform the sports spectacle from the stage of viewing to the stage of direct involvement.

While young audiences are consuming sports at an equal or higher rate than previous generations, their consumption methods are clearly changing.

Almost half (46%) of younger fans have expressed a preference for watching sports on smartphones or tablets and are 15% more likely to seek out our on-demand content. The same group is also over 50% more likely to play games while watching a game and over 41% more likely to engage in Fantasy games.

Chart no. 3 - The distribution depending on the method of consumption



Source: MOKO BLUE [19]

Equipment such as paddles, fins, snorkels, kickboards, parachutes, resistance bands, and traction buoys are some of the most important.

As we rely on technology in motion, we become better. Although the training equipment is not technology, behind it there was data tech analysis, which developed it to help swimmers become more efficient.

Although there are actually headphones you can use in the pool to listen to your favorite music while swimming. Or to talk to your coach, who sits by the pool and can spot every mistake.

Technology is far from its limit, in fact, we are only now beginning to discover all the needs, everything we can use to become better, and we will certainly have a lot to learn.

All this proves that loT is not a dream, and their use in the future will change the lives of both fans and professional athletes.

5. Conclusions

Sports and technology are increasingly concepts that go hand in hand. Predicting the future is no easy task, and even more so given the speed with which new technologies and their uses evolve.

Throughout the history of sports, the application of technology has evolved gradually, although in recent years it has undergone a great acceleration following the good acceptance of society and the great technological advances that have occurred at dizzying rates. Within the multiple benefits offered by technological advances in the sports industry, we can highlight different areas of action:

- Increased performance of professional and amateur athletes;
- Fairer arbitration;
- Injury recovery and prevention;
- Sports management software.

Sports events are one of the shows that attract the most viewers. Sports cannot be understood without fans and these events move large masses. Nowadays, these events can be watched both in person and via streaming thanks to online bookmakers that have this feature.

Sport has always been a present and necessary activity in our lives and after the pandemic it became obvious the beneficial role it plays for our physical and mental health [3]. Its practice has grown and new companies and services related to the sports industry are emerging every time.

It is abundantly clear that sports are transforming with the help of technology, with new formats and concepts, so that they continue to capture the attention of viewers. The sustainable development of sport industry cannot be imagined outside the integration with the technological advances [4]. The use of technology means progress for athletes and sports as well as for spectators and viewers. With certainty that the sport will enjoy the same level of interest in the future and the new advantages it offers will contribute to increasing the popularity of the already established sports, but also to the creation of new sports, which will offer everyone a pleasant way to relax!

Acknowledgment

All authors contributed equally to this research.

6. Bibliography

[1] Barbu, M., *Marketing în sport,* Craiova, Editura Universitaria, 2010;

[2] Barbu, M.C.R., Barbu, C.M., & Diaconescu, D.L., *Marketing developments in the sharing economy,* In: R. Pamfilie, V. Dinu, L. Tăchiciu, D. Pleșea, C. Vasiliu eds. 6th BASIQ International Conference on New Trends in Sustainable Business and Consumption, Messina, Italy, 4-6 June 2020. Bucharest: ASE, pp. 97-104, 2020.

[3] Barbu, M.C.R., Burcea, G.B., Dumitru, R., & Popescu, M.C., *The contribution of sport to a healthy life,* Studia Universitatis Babes-Bolyai Educatio Artis Gymnasticae,64(4), pp. 31-42, 2019;

[4] Barbu, M.C.R., Popescu, M.C., Burcea, G.B., Costin, D.E., Popa, M.G., Păsărin, L.D., & Turcu, I., *Sustainability and social responsibility of Romanian sport organizations,* Sustainability - Special Issue "Sustainable Management of Sport Organizations", 14(2), 643, 2022;

[5] Barbu, M.C.R., Popescu, S.S., & Popescu, M.C. (2019). *Sport clubs interaction with the fans using social media communications. Case study at SCM Craiova,* Studia Universitatis Babes-Bolyai Educatio Artis Gymnasticae,64(1*)*, pp. 31-43, 2019;
[6] Barbu, M.C.R., Turcu, I., Sandu, I.E, Diaconescu, D.L., Păsărin, L.D., & Popescu, M.C., *The impact of technology on the definition of sport,* GYMNASIUM - Scientific Journal of Education, Sports and Health, 21(2, suplement), pp. 5-22, 2020;
[7] Boyle, R., Haynes, R., *Power Play: Sport, the Media and Popular Culture,* Edinburgh University, Edinburgh, UK, 2009;
[8] Cave, A., Miller, A., *Technology in sport: the speed of science,* The Telegraph, 2015, August 20;
[9] Collins, A., Flynn, A., *Measuring the environmental sustainability of a major sporting event: a case study of the FA Cup Final,* Tourism Economics, 14(4), pp. 751-768, 2008;
[10] Giampiccoli, A., Nauright, J., *Beyond the reach of FIFA: football and community development in rural South Africa, towards a politics of inclusion and sustainability,* Soccer & Society, 20(2), pp. 1-19, 2017;
[11] Igel, L., *Economics no longer the major factor for sports investment,* Sport Business Journal, April 10, 2017, available at: www.sportsbusinessdaily.com;
[12] Milah, A., *Genetically Modified Athletes: The Ethical Implications of Genetic Technologies in Sport (Ethics and Sport),* London, Routledge, 2004;
[13] Murray, T., Maschke, K., & Wasunna, A., *Performance-enhancing technologies in sports: Ethical, conceptual, and scientific issues,* Johns Hopkins University Press, 2009;
[14] Nauright, J., *Global games: Culture, political economy, and sport in the globalized world of the twenty-first century,* Third World Quarterly, 25(7), pp. 1325-1336, 2004;
[15] Nistorescu, T., Barbu C.M., *A model for enterprises environmental scanning,* Management & Marketing Journal, 4(1), pp. 57-62, 2006;
[16] Quadcopter Arena, *Are Drones the Future of Sport Training?*, retrieved from https://quadcopterarena.com/are-drones-the-future-of-sport-training, accessed 12 April 2023;
[17] Ross, S., *Higher, Further, Faster: Is technology improving sport? (Science museum techknow series),* John Wiley & Sons, 2008;
[18] Stroe, C.A., Barbu, M., *Impactul sportului asupra economiei,* Craiova, Editura Universitaria, 2006;
[19] Tang, D., *The Impact IoT Beacon Makes in The Sports And Fitness Sector,* MOKO BLUE, June, 15, 2022. Available on: https://www.mokoblue.com/ro/the-impact-iot-beacon-make-in-sports/;
[20] Turcu, I., Burcea, G.B., Diaconescu, D.L., Shaao, M., Barbu, M.C.R., Popescu, M.C., & Tohăneanu, A.A., *The use of technological innovations in sport,* Bulletin of the Transilvania University of Braşov - SERIES IX - Science of Human Kinetics, 14(1), pp. 107-116, 2021.