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COVID-19 Sport Transformation: New Challenges and New Opportunities

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Abstract

The new pandemic lifestyle advocates new rules for sport at all levels, from amateur to elite. Consequently, it has transformed the ways in which sports are performed and consumed, provoking demand for new technologies and/or the development of existing ones. This paper aims to identify, describe, and visualize the process of sport transformation as radical internal and external industry changes brought about by the COVID-19 pandemic. It is intended to qualitatively explain the current 'metamorphoses' in the field and subsequently answer the question of how the COVID-19 pandemic drastically changed all aspects of sports and physical culture. The literature and empirical dataset (qualitative open-ended written interviews, N = 147) were analysed in the spirit of grounded theory, referring to the holistic approach. The results demonstrated that the COVID-19 pandemic has had an unprecedented effect on sports by touching on all aspects, levels, and stakeholders. The paper also outlines challenges and opportunities for the industry in these extraordinary times. The key dimensions of transformation are identified and explained. The findings of this research have significant implications for the understanding of how COVID-19 gave rise to the transformation of sports in different aspects. This study adds to the growing body of research on the positive and negative impacts of COVID-19 on sports, new technologies demand, and the transformation of sports.

Key words: COVID-19, sports transformation, challenge, opportunity, technology

Introduction

"No one anticipated the pandemic that paralysed the entire world in the 21st century, but the impossible has become a reality. It was necessary to rethink daily duties and adapt to the situation. The pandemic and government measures taken due to the pandemic have changed our plans and lives, obliging us all to move to our home offices in mid-March 2020. Although this happened, we tried and still try to pull the good parts out of it all, according to one study participant and professional sport manager" (Hungarian Coaching Association president, interview, 10 October 2020).

This statement offers a glimpse into the abrupt, drastic, and transformational nature of the COVID-19 pandemic, demonstrating its impact on sports.

Given the well-known examples of the COVID-19 pandemic effects on the sport industry, such as the Tokyo Olympic Games or the EURO 2020 postponements, it is clear that the pandemic and lockdown restrictions had a far-reaching impact in terms of sports and physical activity on the global level, transforming the world of sport. In the current paper, we consider sport holistically, including physical activity at the individual level, professional sport, spectator sport, "sportainement" (Desbordes & Richelieu, 2012, p. 208), and the sport industry in general. We also consider a broader understanding of the meaning of sport (Gammelsæter, 2021). Examining the COVID-19 transformation in a holistic manner provides an opportunity to take into account all aspects of change, which often overlap.

The aim of this paper is to identify, describe, and visualize, in the spirit of grounded theory, the sport transformations brought about by the COVID-19 pandemic. It is intended to qualitatively explain the current 'metamorphoses' in the field and subsequently answer the question of how the COVID-19 pandemic drastically changed all aspects of sports and physical culture, including sport management, marketing, development, policy, training, performance, coaching, judging, and others. First, the scale of impact was determined and is explained. Second, we identify the main sport transformation dimensions, crossing them (Table 2) along with the levels of impact. Third, by synthesizing the literature and empirical data sets, the key challenges and opportunities for the sport industry are discerned. The final impact of the COVID-19 pandemic on the sports and exercise industry cannot be underestimated, yet it cannot be determined for the moment (Wong et al., 2020); nevertheless, understanding the current challenges and opportunities associated with these transformations will allow sport managers and researchers to leverage this information to their advantage in the sports and exercise industry.

Theoretical background

COVID-19 has challenged almost every sector of our society. As an essential economic, sporting, and social sector, the sports sector is no exception when it comes to the restrictions placed on it. According to Ratten (2020, p. 633),

"the sports sector has been particularly affected by the COVID-19 crisis in a way that has never been seen before".

With all these changes, sports organizations have had to reinvent themselves to offer quality services to their users. Moreover, although this pandemic threatens and pressures global sport, it has provided an unprecedented opportunity for sport stakeholders to learn vital lessons (Pitsiladis et al., 2020), address unresolved integration issues, and devise creative and long-lasting solutions. Due to its highly infectious nature, COVID-19 continues to affect all world regions (WHO 2019). To control the virus, most countries' governments were forced to take restrictive measures that have changed the lives of many people, organizations, and institutions (del Rio-Chanona et al., 2020).

All international mega-events, elite domestic competitions, and grassroots sports were affected. Several professional sports leagues in Europe and Asia as well as the National Hockey League (NHL) and National Basketball Association (NBA) in North America decided to postpone or suspend their seasons to mitigate the disease's spread (Cutler, 2020). Therefore, there is uncertainty about future events. Similarly, in other aspects of sport, managers face uncertainty in their organizations (Lyng, 2008); preparing athletes and keeping them motivated is a major concern. Moreover, during this unprecedented time, some athletes were infected with the virus, and athletes' training was stopped or practiced under quarantine conditions at home. For instance, Toresdahl and Asif (2020) remarked in their study that although athletes are younger and have fewer illnesses than the general population and are at lower risk of severe illness or death, prevention strategies for COVID-19, common symptoms of the disease, potential treatment options, and safety when returning to athletic participation after infection are necessary measures for them.

Another challenge that can be mentioned is the planning of training, which is a concern for sport managers and coaches. Quarantine has had negative effects on physiological variables and influenced numerous emotional aspects, which can harm training (Mon-López et al., 2020). Moreover, online forums as a safe way to interact with other people (Ratten, 2020) have been highlighted. During this pandemic, many events went online as virtual gatherings, including conferences and general assemblies as well as sports events. Furthermore, certain workplaces recognized that the majority of tasks could be done remotely, which could lead to considerable post-pandemic change: sports events organizers will be able to work at several different international events, even if they do not live in the host city or country.

Apart from the challenges, there are also opportunities for sport managers, who have attempted to turn restrictions and weaknesses into advantages and possibilities. According to Mastromartino et al. (2020), one of these

opportunities involves improving the sport industry's environmental impact. Due to the disruption caused by COVID-19, sport organizations had an opportunity to rethink their normal operations.

The absence of the Olympic and Paralympic Games inspired advertising on social media. Young adults were also affected by the pandemic (e.g. the closure of schools and the cancellation of sports competitions and social leagues); therefore, an opportunity exists for sports organizations to provide supportive content on social media and to encourage young people to increase their physical activity (Hayes, 2020). Furthermore, this unanticipated pandemic period pressured sport managers to enhance and develop communication tools, e-learning platforms, communication strategies, and networking. In his research, Mataruna-Dos-Santos (2020) discussed the impact of technology on sport management from the perspective of critical stakeholders in high-performance sports, leisure, education, talent, journalism, tourism, sports economics, and performance analysis.

Given the important role of social media, especially during the pandemic, it can be said that sports organizations were inspired to adapt and find innovative ways to engage consumers in maintaining their exercise activities. As Hayes (2020) stated, social media is a key way to spread powerful messages to a broader audience and encourage people to participate in physical activity and sports in the future. As social media appears to be heavily entrenched in the sport industry, there will be opportunities for sports organizations and athletes to continue these interactions as the pandemic ends.

Gilat and Cole (2020, p. 175) emphasized the role of sport at the individual level during the pandemic as *"unprecedented, fascinating, and [revealing of] the immense impact sports has on every aspect of our lives"*.

Relatedly, Odekerken-Schröder et al. (2020) analyzed the role of the companion robot Vector during the COVID-19 pandemic and postulated that such robots have the potential to mitigate feelings of loneliness, thus supporting well-being. Their study contributes to the transformative service body of knowledge by developing an integrative framework introducing the roles of personal assistant, relational peer, and intimate buddy that companion robots can fulfil. Such roles can mitigate feelings of loneliness by building different types of supportive relationships.

Regular physical activity and sports practice are essential for many people for their psychological, nutritional, and physical balance. Sport managers and other sport stakeholders must therefore rethink the world of sport in the context of digital technology. Some actors, such as online fitness classes, have adapted well to the detriment of other actors, such as fitness rooms, which have seen their membership decrease. Virtual reality provides solutions for remote sports. Moreover, in addition to the surprising changes brought about by the pandemic, the sport industry is faced with a holistic technological transformation (Glebova et al., 2020; Glebova & Desfontaine, 2020) caused by the rapid development and diffusion of digital technologies.

Methodology

The methodology of this study combined a literature review and data collection. The literature review carried out in the theoretical background with the objectives of the study; the selected methods are clearly perceptible as an extension of this rational. A series of 147 unstructured, open-ended qualitative written interviews (Tharenou et al., 2007) were conducted mainly in English, using a grounded theory approach. The purpose was to describe the process of transformation, based on data that were systematically obtained and analyzed using comparative analysis.

Participants

Given the large heterogeneous sample, all the data were collected by referring to the personal preferences of interviewees, and the questions list was personalized in every case, based on the experiences and professional background of each informant. The main criteria for inclusion were belonging to the sport industry and a commitment to sharing one's point of view about the current subject. Initially, we intended to involve male and female participants equally, and the final sample consisted of 69 female and 78 male interviewees (Table 1). No age, geographic location, or other demographic criteria were applied. Codes were used as a substitute for the names of interviewees who preferred to participate anonymously (codes were composed of the letter A (amateur athletes, sport faculty students) / B (professional athletes, coaches) / C (sport management post-graduate students) / D (top managers and academics) and a number in chronological order). We referred to the other participants by their names.

Table 1. Study participants

Group	General description	N	N Male/Female	Comments
A	amateur athletes, sport faculty students	59	30/29	The main kinds of sports they are involved: karate, rugby, basketball, dance, football, tennis, fitness.
B	professional athletes, coaches	21	11/10	
C	sport management post-graduate students	42	19/23	Domestic and international students and doctorants at the University Paris Saclay
D	top managers and academics	25	18/7	Public and private oraganisations
All together	Sport managers and physical culture professionals from around the world	147	78/69	

Note: N – number

Data collection

For the data collection, we used a wide sample (quota sampling technique; Luborsky & Rubinstein, 1995) of different sport industry professionals around the world (without any geographical attachment): athletes, amateur and professional players, sport managers, university professors related to the field, coaches, sport association employees, sport management graduate students, and sport marketing professionals. All interviews (average duration is 35 minutes) were individually structured and conducted using an open-ended process to reveal attitudes or opinions. The written interview was often followed by a few clarifying open-ended questions. The main purpose of each interview was to collect data that clearly explained the personal/professional opinion and experiences of a particular informant concerning the impact of the extraordinary pandemic circumstances on the sport industry and physical culture. Data have been collected in September-December 2020. This study adopted a holistic approach to examining the research questions by including multiple perspectives from a diverse range of participants to collect versatile data and achieve multifaceted results. In 2006, Hesse-Biber and Leavy explained why extraordinary complex phenomena should be holistically researched based on a qualitative paradigm, using the example of a 'sweeping the globe epidemic'. Therefore, their arguments seem fully applicable to the current study, which was focused on a profound understanding of the dynamic process of change in the sport industry, brought about by the 'sweeping the globe' COVID-19 pandemic. In this case,

> *"qualitative research involves a holistic approach, […] the practice of qualitative research is reflexive and process-driven, ultimately producing culturally situated and theory-enmeshed knowledge through an ongoing interplay between theory and methods, researcher and researched"* (Hesse-Biber and Leavy, 2006, 5).

Individual interview questions were unstructured and personalized for all the participants (considering the wide range of the sample), but, in general, the interrogations covered the following points:

1. What types of changes has the pandemic brought to sport in your own professional experience? What is completely new in the sport industry due to COVID-19?
2. The pandemic is temporary, but are there any fundamental effects of COVID-19 on sports that will remain after it is over?
3. Do COVID-19 outbreaks and further restrictions provide opportunities to develop and deploy new technologies in sports? How may this fact be used by sport managers as an advantage?
4. What opportunities does the pandemic provide for sport management and marketing? Are there are any positive points at the intersection of COVID-19 and sport?
5. How has COVID-19 affected the sport industry and physical culture globally?
6. Have the COVID-19 extraordinary circumstances brought about any kind of transformation?

Data analysis

A qualitative approach allows for the collection of in-depth insights into a problem and the generation of new concepts through data synthesis and analysis. It was also seen as an opportunity to capture the changing attitudes within the sport industry. Moreover, a qualitative approach to research is not bound by the limitations of quantitative

methods and can focus on the primary questions of 'how' and 'why' the COVID-19 transformed the sport industry (Kelle, 2006). We have been continuously engaged in the process of reflexivity throughout the research process, constantly evolving in our understanding of the problem. Recently, we have conducted a series of similar studies, thus, tried to be free of a priori assumptions and definitions.

The analysis included several stages. First, we perused, systematized, and inductively coded the collected data. This process comprised different tasks: an overview, labelling, organization, and provisional identification of key themes and the relationships between them. After synthesizing this work with the literature, the main themes were tentative multiple levels of impact (Figure 1), various multifaceted dimensions (Figure 2), disadvantages and difficulties for the industry and stakeholders (challenges), and finally, new unexpected opportunities. In a ddition, at this stage,

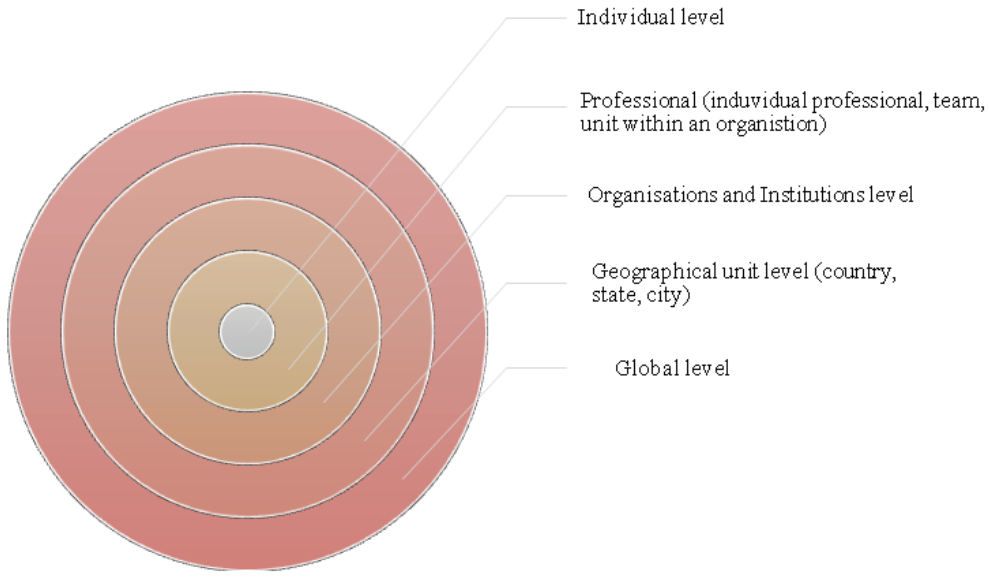


Figure 1. Multi-tier cake, view from above illustrating the multi-level nature of transformation

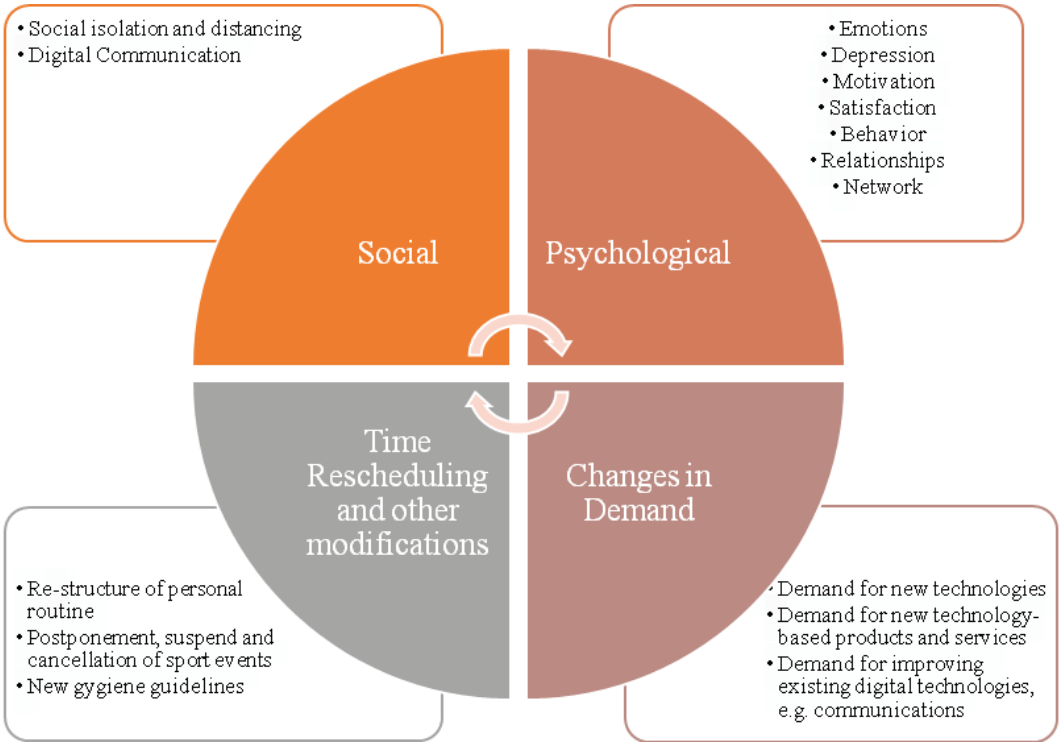


Figure 2. Dimensions of cports COVID-19 transformation

we ensured that no information was left out or went unnoticed or ignored. Data has been analyzed as a whole set, without consideration of participants' individual characteristics and roles. Second, we iteratively read all the materials and outlined the key points. The data insights were systematized and organized. Later, with the iterative analysis, we synthesized all the theoretical and empirical insights to produce the results. The verbatim nature of the responses helps to deliver the data insights directly to the reader, to avoid rephrasing and, subsequently, modification of information.

Results and discussion

The multi-tier cake metaphor shown in Figure 1 is proposed to better visualize the results of the literature and data analysis. First, the transformation in sports was multi-level, affecting all stakeholders, but with different sizes and positions of layers. Figure 1 visually illustrates this metaphor with a view from above the multi-tier cake. All the tiers were 'baked' from the same 'dough'; furthermore, larger levels embrace smaller ones, notably, the global level includes all further, each in its turn: geographical unit (country, city), organization, professional (for example, individual professional, team, unit within an organization), and, finally, an individual (personal) level. Moreover, based on the interviews with participants, we identified four main dimensions (maybe partially overlapping) of transformation: social, psychological, rescheduling, and new product/services/technologies demand (Figure 2; Table 2).

Table 2. COVID-19 Sport Transformation – on the crossing of dimensions and levels of transformation

Dimension/ Level	Individual	Professional	Institutional	Local/National	Global
Social	Distancing, Isolation	Shift to digital communication	Restructuring and optimization of business processes	Coordination, exchange, and cooperation of different geographical and political zones for COVID-19 issues	Aggregation of all interrelations of national zones from the perspective of the epidemic on a worldwide scale; International mobility issues
Psychological	Emotions Mental health	Motivation	Relationship, Network, Safety	Regional and National policy-making,	Pandemic as a global issue from a psychological and psycho-cultural point of view
Modifications	Routine rescheduling, mobility limitations, hygiene rules	Work from home, limitations in mobility, Hygiene rules, Events postponement, and rescheduling	Organizational Effectiveness, Financial issues, limitations in mobility, Hygiene rules, Events postponement, and rescheduling	Financial issues, limitations in mobility, Hygiene rules, Events postponement, and rescheduling	Financial issues, limitations in mobility, Hygiene rules, Events postponement, and rescheduling
Demand and opportunity for new products, services, and technologies in sports	XR (VR, AR); Coaching on distance, often in a home environment; Digital ommunication; E-learning; Gaming; E-sport	Online training and communications	Organization and maintenance of digitalization of work processes, Safety, and Hygiene	Improving existing and developing new technologies to combat COVID-19 and conduct social distancing: Safety, Security, Hygiene, ICTO	Vaccination; Improving existing and developing new technologies to combat COVID-19 and conduct social distancing: Safety, Security, Hygiene, ICTO

Social

The pandemic changed our methods of communication and their intensity based on quarantine, confinement, and other restrictions. The 'global drama' of COVID-19 led to unemployment, isolation, and a serious reduction in wealthy strata consumption (Grigoryev, 2020, p. 18). For the first time in modern history, people were limited in their local, regional, and international mobility on a global scale. Therefore, social aspects of sport were affected (Glebova et al., 2021).

From the social perspective, the pandemic provided further opportunities for diversity in sport, embracing all ages, genders, and abilities and opening up to a wider audience.

> *"The pandemic was an opportunity to rethink sports as a visual and viewing experience. The inclusion of women in sport was especially significant. For athletes, it also represented some much-needed downtime"* (Zushan Hashmi, interview, 20 November 2020).

Digital tools of communication

The lack of face-to-face communication encouraged people's engagement with digital tools and interaction at a distance.

> *"Although the pandemic did not drastically cause our work commitment to a major earthquake, our activities required some rethinking. The most significant change was moving from personal contact to digital (online) contact. We replaced personal administration with digital administration and minimized face-to-face contact at work, which required and continues to require very strict rules (social distancing, mask, hand washing). Communication occurred digitally with the help of existing online platforms (applications)"* (C1, interview, 2 October 2020).

The question of the role of social media in times of social distancing and isolation has been raised by Glebova et al. (2021). Empirical data of the current study demonstrated the significance of social media and various digital communication tools as ways to socialize, replacing face-to-face communication:

> *'I used applications to speak with friends, and I did not lose out on my social life'* (A28, interview, 4 October 2020).

The social dimension of sport has a significant impact on the psychological dimension of sport; they partially overlap and influence each other.

Psychological

The psychological impact of the COVID-19 pandemic is evident at all levels. The sudden change in lifestyle and business processes and the emergence of the 'new normal' influenced the human mind and its functions, affecting behaviour, in particular (Truxillo et al., 2015).

At the individual level (Halbwachs, 1938), many people have been limited in mobility and socially isolated for fear of being infected with the virus. They have found themselves in a state of total uncertainty (del Rio-Chanona et al., 2020). People around the world retreated to 'basic needs', as represented by Maslow's pyramid of physiological needs and security (Grigoryev, 2020). Most sports facilities closed for some time, leaving the population with a limited choice of physical activities.

> *"It changed my habits because we were obliged to wear face masks; we could not see people's emotional expressions and could not use nonverbal language to express ourselves. We had to pay attention to everyone's health by respecting medical indications (hand washing). It changed our way of life. We had to take more precautions"* (B16, interview, 17 October 2020).
>
> *"COVID-19 is the worst contemporary health crisis. Its impact on both the economic and social spheres is very significant globally. However, concerning this specific topic, I will explain how it influenced my social life. First, COVID-19 prevented me from going out with my friends and family, which is very important for combatting stress and anxiety. Second, with the self-isolation, many of the cultural and social activities that were supposed to take place throughout the year in my community were basically cancelled, which had a big impact on my social freedom. The coronavirus modified social connections by changing the way we greet our friends and requiring us to stay 1.5 metres from our loved ones"* (B65, interview, 17 October 2020).

In terms of collective psychology (Halbwachs, 1938), at the level of team sports and other social and business groups, individuals' opinions, attitudes, and adaptations affect group behaviour. Consequently, individual points of view might also be affected (Goldstone et al., 2008). Moreover, in most cases, the pandemic has influenced team

effectiveness, work mode (often switching to online), work performance, and work satisfaction. Moreover, Anita Urr (Secretary General, Hungarian Paralympic Committee) highlighted the importance and necessity of strengthening sports psychology, which seems reasonable in these difficult times.

At the organizational level (Luthans, 1985; Spector, 2011), the pandemic and its restrictions affected sports organizations, which embraced organizational psychology to address employee motivation, occupational safety, and organizational culture.

The pandemic has local, national, cross-cultural, and international effects, from the perspective of global psychology (Shiraev & Levy, 2020; Stevens & Gielen, 2007), which "incorporates concepts and findings from societies and cultures from all parts of the world" (Berry, 2013, p. 391).

It seemed unbelievable that unprecedented measures had to be applied to postpone and cancel sports events at the local, national, and international levels, often for the first time.

Time re-framing, rescheduling, and other modifications

Anett Fodor[1] shared her professional experiences and the changes and trends in sport due to COVID-19:

> *"The possible cancellation or postponement of events is keeping the organizers in uncertainty, which definitely makes it harder to organize anything. Key people are falling off from the team at key moments, which causes insecurity. More planning is needed. Having a plan A and plan B is not enough anymore; we also need C and D. Sometimes, this uncertainty results in money being invested for nothing, as they cancel the event at the last minute, or decide to organize it behind closed doors but have already ordered some items, catering, and services. Athletes are kept in bubbles after testing for COVID-19, creating new logistics needs, such as more space in dining rooms and meeting rooms (four square metres per person is recommended). Moreover, testing must be organized before each meeting of the national team, invitation documents for border control must be issued, and there are limited time and people who can get together. If an event can be held, it is less sustainable, as organizers need to provide participants with masks every four hours, gloves, plexiglass, or face shields for specific jobs, such as when the employee meets with many people during the job; only pre-packed food can be served, which comes with a lot of single-use plastic"* (Anett Fodor, interview, 30 October 2020).

The "global drama" (Grigoryev, 2020, p. 18) of numerous postponements and cancellations of sports events has touched all kinds of sports but in different ways. For example, the situation is complicated for swimming because the water and pool facilities are essential for training and performance:

> *"Because of the pandemic situation, most of the competitions were postponed or cancelled. Training could only take place at certain times and was sometimes impossible. Because swimming requires water, the closing of swimming pools resulted in dry land preparation, which is not specific at all. The age group swimmers suffer more because the adult national team has priority; therefore, the disadvantages are more serious for them"* (Csaba Sós –University Professor, University of Physical Education, Budapest. Head coach of Hungarian Swimming 2017 – Department leader Swimming and Water Sports Department HUPE, interview, 1 November 2020).

Evidently, as athletes' professional routines became more complicated because of the pandemic, it inevitably caused 'barriers' to all kinds of sports consumption. Accordingly, Rögler Gábor (Sports manager – Hungarian Wrestling Federation) listed the following re-timing and modifications: (1) total uncertainty, both in terms of future events and in terms of preparation, which makes it difficult to maintain motivation, according to coaches, (2) it is much more difficult to organize a trip, as it must take into account, among other things, the limited travel options and the often-changing epidemiological regulations of the host country, (3) continuous testing, the uncertainty of tests, due to which the composition of the travellers and home team is constantly changing; (4) stricter and longer-lasting sports medicine examinations, both the examination itself and the appointment, which should otherwise be included in the examinations under normal circumstances (more thorough cardiological screening, troponin level).

Moreover, Anett Fodor foresaw the long-term consequences of the pandemic (Grigoryev, 2020):

> *"It will take some time to recover the sport competition calendars. As many events/tournaments/championships were cancelled or postponed, the federations, clubs, sponsors, and athletes lost money and/or investments. The cancellation*

[1] UEFA EURO 2020 – Head of Volunteer program; Hungarian Olympic Committee – Women and Sport Commission Member; Budapest Association for International Sports – Co-founder, Advisor of the Presidency; ENGSO Youth – Committee Member.

of mega sporting events can also lead to diplomacy issues. From some athletes' point of view, a one-year postponement is too long to be able to maintain their top performance. All of these effects will end within the next four years" (Anett Fodor, interview, 30 October 2020).

New product/services/technologies demand

In terms of social distancing and isolation, many sport and business processes shifted from real life to an online format. Although far from new, digital communications platforms and technologies are, however, still emerging, yet are indispensable for all needs: training, meetings, streaming, and others.

"Spectators focus has likely shifted to a wider assortment of sports content, based on the rapid digitalization of sports programming and an increase in fan engagement. The newest focus is on the sports cinematic industry and content with sports stories off the pitch/court" (Zushan Hashmi, interview, 20 November 2020).

Recently, Glebova et al. (2021) described the rising interest of football fans in gaming and e-sports in times of quarantine. The current study's collected data also contain numerous mentions of various types of digital gaming:

"This pandemic has changed, first, my habits because I have had to go swimming a lot, and I could not during this period. But if we forget about this, it does not really change my way of life because I play a lot of mobile games". (A18, interview, 10 October 2020).

"I think many organizations have included the pandemic as an option in their disaster plans. Based on this experience, we will be wiser if another epidemic breaks out (which is expected to happen a lot more because of climate change). Technologies became involved mostly with fan engagement when people were able to support their teams via the internet while their faces appeared at the stadium. During the matches, the sound of the crowd is played in a TV broadcast to preserve the atmosphere of the events. At some events, they even 'painted' [printed] virtual spectators to imitate the crowd. This could represent a new opportunity for some IT companies to jump into the sport industry; however, I think that for sport management, it is better to keep the fans in the stadium. Moreover, in-person sports events should also be organized, not virtual ones, and training should be in person, not online" (Anett Fodor, interview, 30 October 2020).

"Online meetings, webinars, and training are much more popular than they were, and they will most certainly be used in the future by those who have not tried them…" (Rögler Gábor, interview, 5 November 2020).

Furthermore, Gábor saw demand for two categories of technologies throughout the pandemic: (1) those for hygienic procedures (more practical touchless sanitizers and devices) and procedures for measuring body temperature (various camera devices capable of detecting the exact body temperature) and (2) individual training becoming more prominent, thus expanding the repertoire of these training tools. However, for contact sports, this could be an advantage only in terms of developing conditioning skills because, for example, wrestling a partner/opponent is essential.

"Home viewing will definitely increase, and fans are likely to engage with sports differently, for example, using XR[2] technologies… We have definitely seen rapid growth in sports technology, including its funding. Virtual accelerators have enabled venture capitalists to invest in companies from around the globe and sport start-ups to access markets much more quickly. Smart companies have been able to utilize this to their advantage" (Zushan Hashmi, interview, 20 November 2020).

Csaba Sós suggested that the experience of dry land preparation could be improved for swimmers:

"It could have a positive effect in the future, after the pandemic situation… However, we still do not know yet, because it could also be a bad experience. If we over-strengthen a certain swimmer, they may not be successful in the water. We probably did more examinations, with technical and movement analysis, and checked for turns and starts. However, this is specific to Hungarian swimming because Hungarians tend to be weaker in these fields. Therefore, we had more time to deal with them. In addition, I should mention that this (pandemic) is a new situation, as a worldwide phenomenon; therefore, our advantages and disadvantages may be the same as other nations. Consequently, I honestly do not calculate that our position will change on the world map in swimming. If something is to change, I will only be able to tell when the pandemic situation is over. We will see…" (Csaba Sós, interview, 1 November 2020).

[2] Immersive technologies, XR – eXtended Reality.

Challenges

According to Anita Urr, the COVID-19 pandemic has fundamentally changed the sport industry, especially the professional sports sector. However, the pandemic also had a strong impact on recreational, hobby, and leisure sports. The COVID-19 pandemic has affected all industries and sports companies in general, including sport clubs. Several challenges must be faced, including suspension of tournaments and postponed events. Regarding the cancellation of sports events, as of mid-January 2020, isolated sports in Asia were postponed or cancelled. These postponements or cancellations related to the pandemic later spread and affected organized sports at all levels and in almost all countries (Drewes et al., 2020). For instance, the 2020 Olympic Games in Tokyo were postponed to 2021. These sports events' postponements and cancellations represented the most severe market shock to sport in modern history (Parnell et al., 2020). The postponement and cancellation of sports competitions and the re-scheduling of sports events represents a major challenge for sport managers.

Another challenge that can be mentioned is the limitation and/or suspension of training possibilities. For example, Dove et al. (2020) suggested new training rooms during COVID-19; in this respect, education is the first step to helping protect athletes and providers. All athletes should be aware of the signs and symptoms of COVID-19 infection. Before athletes or essential personnel can enter the training room or facility, a screening assessment should be performed. Moreover, the current pandemic situation provides some challenges and opportunities for sports psychologists, highlighting the importance and necessity of sports psychology. Ammar et al. (2020) conducted an international online survey (ECLB-COVID19) in seven languages to shed light on the impact of COVID-19 restrictions on mental health and emotional well-being. They concluded that increased psychosocial strain is triggered by home confinement. A crisis-oriented interdisciplinary intervention is urgently needed to reduce the high risk of mental disorders and foster an active and healthy confinement lifestyle. In addition, the predictability of organized sports events is unclear. Lastly, motivation to continue training is a major challenge for sport managers.

The case of the Hungarian Coaching Association

The current case is a part of dataset and can illustrate the process of transformation in sport organisation, in the field of sport training and educational activities. The Hungarian Coaching Association's (HCA) continuously evolving e-learning platform serves as an interesting case for examining the challenges brought about by this unprecedented situation. University lockdowns and the governmental compulsory digital education decree placed universities dealing with physical education and coaching education in a difficult situation. Accordingly, HCA provided assistance to these universities by offering physical education and access to its e-learning platform free of charge to coaching students. The platform offers educational and coaching material as well as functional training content.

A new commitment is moving face-to-face continuous professional development (CPD) programs for coaches to digital spaces. The transition from personal attendance to online was well-received by all parties: participants, coach educators, and HCA staff. The transition concerned the question of how to "invest" and "learn" to adapt to the new situation. The new situation also required rapid and ongoing technical skills development for those not using electronic devices. In addition, the unusual situation required HCA staff to continuously develop abilities such as technical and communication flexibility and assistance skills. There was also a need to invest in IT technical equipment, such as laptops and tablets, as tools to assist daily work.

CPD programs required flexibility, as the annual program design required modifications to be 'COVID-compatible'. At present, the program deals with issues according to the needs of coaches, and the topics are carefully selected based on these aspects; many are related to the COVID-19 pandemic. The focus is on assisting and informing coaches in their daily work during the pandemic; the topics give advice for coaching and working from home (for example, topics were related to sports injuries and their rehabilitation and COVID strategies in elite sports).

In addition, Laszlo Szalma supposed that the COVID-19 extraordinary circumstances taught us a

"good lesson in developing our online communications" (Laszlo Szalma, interview, 6 November 2020).

The lessons learned included answers to many questions regarding the significance of all forms of digital communication: why we need it, how to make it cost-effective, and how to turn it into an advantage.

Opportunities

In the current paper, the aim is to identify and outline opportunities hidden behind the difficulties of these extraordinary COVID-19 times.

> *"COVID-19 complicated the sport industry with its limitations. Now, as the number of infected people is increasing, the restrictions are becoming stricter. We are even more limited in organizing events, not just in professional sports, but also in grassroots sports. However, marketing can always find its way, if creative enough. The Coca-Cola 'Smile with your eyes' campaign is an example"* (Anett Fodor, interview, 30 October 2020).

The COVID-19 outbreak and related restrictions provided an opportunity to develop and deploy new technologies in sports. Accordingly, sport managers might capitalize on these new technologies through

1. The wider spread of digital sports applications;
2. The enhanced use of communicational tools, the development of networks and CPD on digital platforms, and the learning of new ways to deliver training programs;
3. The enhancement of opportunities for learning on e-learning platforms and the development of online training;
4. The coaching and assisting of staff in their work (useful tools), and;
5. The hosting and organization of online sports competitions and other events and the strengthening of cost-efficiency.

According to Bence Garamvölgyi (President of the Budapest Association for International Sports), the pandemic provided new opportunities in online sports streaming that we had not seen before. It contributed to increasing digitalization in the sector. Sports activities were only impacted by the pandemic when severe restrictions were introduced; however, this year, we managed to develop and grow despite the situation.

Some opportunities for sport management and marketing brought about by the pandemic included cost efficiency with wider implementation of digital tools for communication, coaching, streaming, and development of adequate communicational strategies for actual situations. These opportunities were also supported through the use of social media. Coaching was also affected by the pandemic; for example, coaching took on a 'digital form', requiring educators' assistance to provide easy access to CPDs for coaches in remote areas. Further, the strengthening of community cohesion, communication, marketing, and good practices is considered an opportunity for sport managers and marketers.

The pandemic is driving digitalization in the sports sector; however, it is also impacting traditional, club-based sporting structures. Some sports clubs that have been struggling to maintain their activities will probably cease to exist, while new digital sports ventures can take over their role. The pandemic contributed to the transformation of the sports sector:

> *"More innovative digital solutions will be introduced to keep the population fit and active"* (Bence Garamvölgyi, interview, 8 November 2020).

Conclusion

In this paper, the process of sport transformation brought about by the COVID-19 pandemic has been explored and described to identify the challenges and opportunities in the field. In line with the famous words of Albert Einstein, in the middle of multiple difficulties for the sport industry, the pandemic opened up and revealed new opportunities and perspectives.

The literature review and empirical dataset show that the COVID-19 pandemic has had an unprecedented effect on sports and the sport industry, touching all aspects, levels, and stakeholders; it has been an extraordinary period. It was found that the pandemic's impact on sports could be sorted into five levels, where larger ones embrace smaller ones, as in a multi-tier cake (Figure 1). Furthermore, the four key dimensions of transformation in sports – social aspects, psychological aspects, modifications (time re-framing and policies change), and demand for new technologies (technology-based products and services) – were identified and explained.

For all participants in this study, this period seemed complicated, difficult, and challenging. However, most recognized opportunities brought about by the pandemic and looked at COVID-19 global problems in a bright, constructive, and positive light. The pandemic negatively impacted most sports activities at all levels, from individual to global (Figure 1); on the other hand, it opened up new positive perspectives. For example, it provided the opportunity to stream sports activities online and focus more on social media-based communication.

The new reality of the pandemic advocates new rules for sports at all levels, from amateur to elite, affecting many stakeholder groups. Consequently, the pandemic transformed the ways in which sports are performed and consumed, provoking demand for new technologies and/or developing existing ones: immersive technologies (XR,

VR, AR), online communication technologies in all forms (to be able to provide the same value as face-to-face communication), distant coaching (for example, see HCA case), and training in the home environment.

The findings of this research have implications for the understanding of how COVID-19 gave rise to the transformation of sports in different aspects. Moreover, they provide some insights for setting in an unanticipated situation. This study adds to the growing body of research on the positive and negative impacts of COVID-19 on sports, new technologies demand, and the transformation of sports. Taken together, the results suggest that sports policymakers should consider the different levels and dimensions affected by the pandemic.

Limitations

1. Regardless of the recent increase in the number of COVID-19 studies, the first limitation is the lack of prior research on this topic, which affected the theoretical background construction.
2. Like all qualitative studies, this research is unique and would be arduous to replicate. The wide range of the sample in this study may raise questions about accuracy; however, we embraced this form of multifaceted data collection as part of a holistic approach framework (Hesse-Biber and Leavy 2006).
3. By answering open-ended questions in writing, the participants maintained control of the content of the collected data. Therefore, researchers will not be able to verify the results in the scenarios described by the interviewees objectively. At the same time, the size of the sample and the high confidence level of the participants made the data accurate and reliable.
4. We followed inductive reasoning (grounded theory); therefore, we were not able to measure their results or assess the importance of the proposed dimensions.
5. On the one hand, the wide perspective of the sample (quota technique, global scale, no geographical attachment) coupled with the holistic view on sports led us to general 'surface' results and conclusions. On the other hand, this seemed to be the best way to achieve the research aims by referring to the holistic approach.

Given these limitations, we suggest future research to address these shortcomings: a systematic literature review, considering the rapidly growing number of studies at the intersection of the pandemic and social sciences, and further qualitative research on the sport industry and physical transformation, focused on particular regions, geographical areas, and narrower sports fields. For future studies, an organizational/stakeholder approach and purposive sampling will be considered as methodologies.

Competing interests

There are no conflicts of interest associated with this manuscript, financial or otherwise.

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