

Practice and Implications of Emerging Technology on Sport Management

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Sport has always been under pressure to change. Fortunately, we can see the pressures coming as emerging technologies are published online. This situation offers an advantage as sport management students can be taught to ponder such technological advancements. No one has the complete right answer(s) today - but we can speculate and begin to prepare sport for the emerging technologies. This paper outlines five (5) advancing technologies and proposes questions for debate on their potential impact on sport. The technologies include: sporting equipment and 4D printing; deep brain stimulation and competition anxiety; block chain management; human driven drones and long distance races; and preparing for races that are higher, faster, and further around the moon and back. It is important to begin to prepare so we 'get it right' as an example of potentially not getting it right is offered to start the discussion. Insights and debate can aid to devise strategies concerning the way forward in emerging times. This means we have an opportunity to contribute to leading edge education and advance management skills for the future of sport. Significant change is happening – and sport management educators can aid in getting ahead of the issues.

Keywords: *sport management education, emerging technologies and sport, management of sport challenges, sport policy*

Introduction

Sport has changed over time. The change has encompassed, for example, the sophistication of sport facilities, the modernization of sport equipment technologies, innovations in sport clothing and shoes, the progress of rules and regulations, along with the addition of a plethora of niche sporting events. There is currently pressure for sport to continue to change that stems from an influx of emerging technologies. These technologies have the potential to impact the future of sport.

Those in sport management need to prepare for a future of adaptations for the integration of -- or rules to prohibit -- emerging technologies in sport. This includes preparing sport management students today to be ready for sport of tomorrow. It is not too early to consider emerging technologies, along with their implications, and to begin making determinations concerning the way forward for the future of sport.

Researchers have recognized that insights concerning our uncertain future can aid in preparing for policy development and the act of policymaking for a field of

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endeavor (Rijkens-Klomp 2012, van der Steen and van Twist 2012). It has been noted that work to generate foresight aids to lay the groundwork for policies needed in the future (van Dorsser et al. 2020). Yet, preparations, or the development of foresight, have not been considered to the fullest – particularly when it comes to policy analysis and development (van Dorsser et al. 2020). This lack of preparation has been attributed to “an absence of well-defined links between the fields and a common unambiguous typology” (van Dorsser et al. 2020, p. 1). An application of this conclusion is that there is a lack of understandings and interpretations of emerging technologies and their potential impacts on the way forward in policies that will ensure fair and equitable competitions for the future of sport. Action to move forward to prepare for policies for emerging technologies can be implemented today.

Van Dorsser et al. (2020) developed a framework that aids in guiding an examination of one’s future with links to both policy analysis, along with policymaking. The framework which is based on the research of Walker (2000) and Voros (2003), encourages the consideration of the driving forces in our uncertain future and has three areas of focus. The first focus is on the identification of potential problems (in this case the potential problem is the integration of emerging technologies within sport). The second area of focus is on the identification of potential solutions that are not fixed statements but flexible options. The third area of focus is on understanding the impacts and trade-offs for the consequences associated with each solution.

To begin a study on the future of sport with emerging technologies, this paper offers an example of a controversy that illustrates the need for those in sport management to ‘get it right’ when applying technologies. Next, an examination of emerging technologies, or application scenarios concerning technologies, are presented to stimulate debate on their application within sport. The technologies include: (i) beyond 3D printing -- preparing for 4D printing and sport, (ii) deep brain stimulation and sport, (iii) blockchain management of sport competition registration and results, and (iv) robotic game officials. Finally, the discussion encourages preparing for additional emerging technologies.

The Need to Get it Right -- Technology and Sport!

When technology is introduced within sport, it is imperative that those in sport management ensure that the associated rules ensure fair and equitable competitions. But in some instances, there is controversy concerning the application of technology and the associated rules – and it can take years until all parties impacted agree that we “got it right”. For example, controversy has arisen concerning the starting blocks setting/policy established for false starts in Athletics sprint races.

Studies have indicated that the average start time out of the blocks is 115 milliseconds (Davis 2022), but that is only an average, the best in the world are faster than average. The rule for false starts in athletics involves any reaction to the starting gun earlier than 100 milliseconds (Davis 2022). Campbell (2022) noted

that “1-thousandth of a second can determine the difference between great start vs. illegal one” (para. 1). However, not all starting blocks are the same and their small differences in the technology may impact athletes.

When starting block technology for athletics was introduced, multiple companies began to develop and utilize different algorithms within their equipment (Davis 2022). This meant that there could be miniscule levels of difference between starting blocks - depending on which company manufactured the equipment being used at a competition (Campbell 2022, Davis 2022). These very small differences could have an impact on an athletes’ race as it has been noted that the algorithms do not:

measure a runner's exit from the blocks; just the pressure sprinters exert with their feet prior to taking their first step. If the equipment is more sensitive, it'll register that pressure sooner, and likely shave a few thousandths [of a second] off a lot of people's reaction times (Campbell 2022, para. 23).

This measurement of foot pressure could result in legal starts that are declared to be false starts and an athlete can be eliminated from a competition, despite years of training for the event (Campbell 2022).

When it comes to getting out of the starting blocks, very minor differences in reaction time or the algorithm can mean an athlete can continue to compete or they are thrown out of a race for a false start. For example, National Football League (NFL) wide receiver and sprint competitor, Devon Allen (from the USA), false started at the 2022 World Championships men’s semi-final 110-metre hurdles event with a time that one thousand (.001) of a second below the established threshold (Campbell 2022, Davis 2022, Schad 2022, Sutter 2022). His false start was noted as being “completely undetectable to the human eye” (Schad 2022, para. 4). Another example involves TyNia Gaither (from the Bahamas) with a false start at the 2022 World Athletics Championships 110-meter women’s event that was 0.093 seconds too fast compared to the threshold (Davis 2022, Hassenfeld and Resnick 2023). These individuals were thrown out of their race for a false start – despite years of training/competing to get to the event. It has been suggested that the current “increase in the number of [elite] sprinters trying to jump the gun is probably just a more accurate picture of their hair-trigger reflexes in action” (Campbell 2022, para. 24).

Reaction times (RT) of sprinters have been studied. For instance, Haugen et al. (2012) examined 571 international sprint athletes that competed between 1997-2011 and concluded “that world class sprinters’ reaction times and thereby their 100m performance can vary 0.03–0.05 [seconds] depending on false start regulations and holding time” (p. 1). Also, Harrison et al. (2018) in their study found:

that in all trials, the hand plate RT [reaction time] occurred significantly before the IAAF RT with an average difference of 64 ms [milliseconds]. The consistent differences in RT’s suggested that the two systems measured separate events. A re-evaluation of false start detection technology based on measuring hand RT is recommended (p. 1).

A call for the starting blocks to measure the hand plate (instead of the foot plate) was proposed by Davis (2022). This call was made with the caveat that adapting to testing the hand movement was a better test of a false start - as that is what moves first (Davis 2022). Calls for World Athletics to change their false start policy have been made (Campbell 2022, Schad 2022).

Meanwhile, World Athletics hired scientists to examine start times and the starting block technology (Campbell 2022). These scientists suggested that the algorithms could adapt the allowable start time to 80 milliseconds [or .08 seconds] to account for extremely fast - but feasible - reactions to a starting gun (Campbell 2022). So, do those in sport management for athletics have starting block technology management correct or not?

Other technologies that emerge in the marketplace will challenge those in sport management to “get it right” for athletes. Currently, there are several known emerging technologies, and we can begin to prepare today by considering their implications and debate the way forward for their use within sport.

Beyond 3D Printing -- Preparing for 4D Printing and Sport

Three-dimensional (3D) printing (or additive manufacturing) options are advancing. A host of sport-related items have been developed with 3D printing techniques, including the examples of sport shoes (Deng 2018), badminton shuttlecocks (Lin et al. 2014), baseball leg guards (Lee et al. 2016), hurling gloves (Harte and Paterson 2018), and American football helmets (Schwaar 2023). The 3D printed sports equipment has been noted by Novak and Novak (2020) as providing “improvements in performance of [the]products” (p. 1). This was reiterated by Scott (2018) when discussing the 2018 Winter Olympics men’s 500 metre short track speedskating gold medal winner, Daijing Wu, from China. This medal win could have been, in part, attributed to the novel 3D printed gloves with metal fingertips that were used to touch the ice with less friction when navigating the curves on the track (Scott 2018).

Monitoring any 3D printed sport equipment adaptations is challenging for those in sport management seeking to ensure fair and equitable competitions. While novel equipment is being developed with 3D options, 4D printing techniques are emerging.

4D printing techniques add another dimension to personalized sporting equipment options. The 4D printing technique allows for “outside energy inputs” (Haleem et al. 2021, p. 311) with stimuli such as temperature or light that can be added. This technology can

“...reimagine building, production, assembly of products, and performance” (Haleem et al. 2021, p. 311). An imagined example of 4D printing involves the potential advance of skis and snowboards that can be made to be temperature activated ... to adapt for temperature changes during a competition. This means the ski or board can sense the temperature and adapt to be efficient for the conditions to obtain optimal speed. Another issue for those in sport management could be that hackers could impact the 4D printing process of a board of a competitor - perhaps the world champion!

Those in sport management need to determine the way forward with the advance of 3D and 4D printing. When is the appropriate time to consider arising questions concerning the advance of 3D and 4D printing of sport equipment and the impacts on sport? The authors of this study promote that sport managers need to debate the potential implications and begin the process today of deciding the rules and regulations for such potential sporting equipment options with an effort to support fair and equitable sporting contests. Starting with research on advancing printing techniques - that is currently under-represented in the body of sport management manuscripts (Novak and Novak 2020). It is not too early to consider how emerging printing innovations could impact sport and the rules that may need to be implemented.

Deep Brain Stimulation and Sport

Sunnybrook Health Science Centre (in Toronto, Canada) has been completing studies and clinical trials on deep brain stimulation, or what has been referred to “as a new scientific discipline called neuromodulation” (Mitchell 2021, para. 13). In one clinical trial, two electrodes were permanently placed deep within the brain of a live patient (that was also a scientist), a battery pack was linked to the electrodes and placed in range of the collarbone, and an electric current was run from the battery to the electrodes (Mitchell 2021). Why did they do this? The electrodes were positioned in a section of the brain that controls feelings and actions (Mitchell 2021). They were trying to interrupt the regular brain activity to eliminate the patients’ anxiety and cravings for alcohol (or alcoholism) with targeted electrical current. It was not a ‘cure’, but did result in reducing the cravings.

Over time, if this technology is perfected, it could be utilized in curbing other addictions, such as smoking and gambling. An extension is that, in sport, the technology could aid elite athletes to manage pre- and during competition anxiety/jitters. Those in sport management may not know that the technology is being utilized if an athlete’s hair covers the wires and battery pack. Now is the time to start the debates on the technology and its use in sport – or should it be prohibited?

Further, Elon Musk started clinical trials with brain implants in 2023. His implant technology focuses on patients with paralysis (Reuters 2023, Vance 2023) with the aim “to enable people to control a computer or keyboard using thoughts alone” (Reuters 2023, para. 3). The hope is to advance the ability to obtain brainwaves onto a computer through thought. The technology is open for additional purposes (Vance 2023). Application of brain implants for the purpose of overcoming anxiety with respect to sport performance, thus, is not far-fetched!

So, questions arise: Whom in sport management should begin to debate and determine the way forward in sport for neuromodulation (when clinical human trials on brain stimulation have already begun)? Should we wait to see if such technology gets used in sport and then develop rules/regulations, or, debate and determine the way forward prior to the first athlete being caught with such technology? If caught, should this technology be considered as legal, or should it be prohibited in sport? If legal, what are the impacts on fair and equitable sport

competitions? If illegal – or not - how could it be monitored, managed, and penalized? Debate questions/issues swirl as the potential implications and strategies for moving forward concerning the potential for neuromodulation technology to be in the marketplace and its application to those in sport. We now address another emerging technology.

Blockchain Management of Sport Competition Registration and Results

Blockchain technology involves recording data in a closed system (Li et al. 2023). A large amount of data can be stored simultaneously on all computers in the system for a consistent data display (Liu et al. 2023) that will be resilient over time (Gad et al. 2022). This software technology is an “alternative to databases” (Gad et al. 2022, p. 6738) that provides up-to-the-minute accuracy, along with a time stamp stating when the data was recorded within the system and by whom (Gad et al. 2022). The data cannot be changed without pre-determined permission/access, and if approved, keeps track of any changes made (Gad et al. 2022). Overall, the “advantages of blockchain include its distributed ledger, decentralization, information transparency, tamper-proof construction, and openness” (Xu et al. 2019, para. 1). The technology has been utilized in various fields, such as music (O’Dair and Beaven 2017), exporting (Ipek 2019), along with healthcare and financial practices (Kim and Sarin 2018), including cryptocurrency (Xu et al. 2019). Improvements in this technology are advancing, for example with “cross-chain technology [that] has a significant impact on improving blockchain performance” (Liu et al. 2023, para. 1).

Today, sport managers and students can debate the use of blockchain technology and its potential within sport. For instance, blockchain technology could be used to develop a revolutionary system for sport registration and performance management. An example scenario is football registering every player into a blockchain system, starting at the grassroots and up to the elite level. This registration system would, thus, follow every player as they moved up the competition ranks. Individual leagues could be combined into one blockchain system from each city/town, province/state, country, and then be interconnected databases that has a record of players worldwide. This would result in a one-stop, longitudinal, sport registration/results system.

The player registration data could be standardized and cover the usual requirements that would be maintained forever in the blockchain system. Such data includes an annual record of an athlete’s address, proof of birthdate, height, weight, a headshot/photo, along with the team in which they were a member, their position, the coach, etc. All data for registered athletes and coaches in the sport is then in one place and builds over time - if they continue in the sport. Some of this type of data can currently be found within online sites that offer historical data for many individual athletes – but, generally, starting at higher levels of sport, not from the grassroots levels. Additionally, the current data is incomplete and a blockchain system would be advanced.

A player blockchain system could also include the registration date, a record of an athlete’s performance results, including statistics for each season played, a

link to a video of each game, video recordings of each players highlights, such as each goal, save, key plays, penalties, interviews, any coaching reports on the player, etc. The system could be open to allowing athletes to present postings/video clips for approval to be added to the database. Once approved, they could be uploaded to provide evidence that each player desires to promote their achievements. Overall, this blockchain registration and performance management system provides an in-depth history for scouts with data from a global body of athletes, along with their statistics and video data that illustrates each athlete's progress over time. Additionally, it can record the performance results of every coach in the system. The data can offer a one-stop global system that builds over time and does not lose any previous data.

A comprehensive player database generates a recruiting tool that can be seen, potentially, by any scout, from any league or team around the world. It could advance the predictive future with, for example, what Wickramasinghe (2020) worked on for cricket whereby all-rounders were classified into four categories to aid in the prediction of new all-rounders. This means a specific algorithm could be generated to predict the next top players in a sport. This could provide an advantage to athletes that could may be overlooked, for example, due to the lack of scouts in their part of the world.

Another scenario is a blockchain fan registration system. This would generate a one-stop site of support for a sport from the grassroots fan to the international and professional level fan-base. An all-inclusive system could aid sport organizations, leagues, and football clubs as they seek to generate targeted communications “to booster the emotional and mediated connections with fans, creating a strong community” (Borges 2018, p. 263). Further, it could advance a targeted reach that is open to events “which comprises [both] online and presence times [as well as those that] can be placed in the category of ‘hybrid events’” (Gebler-Branch 2018, p. 293).

Importantly, the blockchain fan registration system could be used to establish statistics concerning the performance of club fan behaviour – aiding in reducing stadium violence – including pinpointing individual perpetrators. It could include a record of those that have been involved in violent incidents surrounding football – starting at any age. Further, it can be used to aid in reducing fan violence as those caught committing such violence can mean their whole fanbase could get punished. This could promote a fan self-management system. This may aid authorities to manage such individuals and incidents.

Early adopters of a blockchain sport systems for players and/or fans may obtain widespread media coverage, recognition, and advantages from an all-inclusive database. They will also be tasked with overcoming any issues that arise. Today, those in sport management can consider potential issues and can debate the way forward with respect to questions that stem from the potential multiple perspectives when considering the use of blockchain technology for sport registration and performance results.

Issues from an athletes' perspective include examples of questions that arise concern the confidentiality of the data and, specifically, if each athlete owns their personal data. The owner of the data gets to determine who has access and how the

data will be utilized – so this is a critical point to resolve. Further, the safety and security features for their data is a concern. If a player must be added to the database when they register to play, is this leading to an invasion of privacy? If players are minors, where does parental approval come into play? An advantage is that players could have the opportunity for their data to be seen by scouts – despite where they live in the world. Will there be a way within the system for players to see which scouts have accessed their data? Or will scouts need an athlete's permission/consent prior to accessing data? What about the issue if a player wants a particular item in the data deleted as it could hurt their career path (i.e., a dirty/illegal play). Can they request alterations, or have it removed? Or ... is sport data in a blockchain truly irreversible? Additionally, how will the data be protected from computer hacks that could pilfer data and hold it for ransom or steal one's identity?

From a team and scouting perspective, examples of questions that arise concern the construction of a process for accessing data, the specific data that can be accessed, the requirements to gain approval(s) to be able to utilize the data, and any restrictions concerning the usage of the data (i.e., to ensure confidentiality). Will this database save teams time and money as scouts could sift through the data (in particular, the videos) and not attend as many games, including national and international travel to games? Or will there be fees for every accessing the data and no financial advantages will be obtained? With respect to leagues, additional questions arise concerning the data being retained that relates to the league, the associated teams, coaches, schedule, history, etc. Further, what access will media have to obtain data? An overall critical question is: Who manages the data? Additionally, if data is only changeable by qualified individuals (when an error has occurred), then, who are those individuals?

From a fanbase perspective, questions arise concerning the use of the data by sport organizations, leagues, and clubs. Also, and particularly important, are the boundaries for security and police to utilize the data for their advantage.

Research needs to be completed to reveal insights on blockchain technology and sport (i.e., the cost to startup and then to manage the system, and where is the best place to store the data, onshore or offshore)? It is not too early to debate the use of blockchain technology and its application to sport, in this scenario, an application to sport registration and performance management. There are additional emerging technologies as well.

Robotic Game Officials

Sport has a problem concerning game officials – there are not enough well-trained and experienced game officials staying in the role at all levels of sport (Pierce et al. 2020, Seippel et al. 2020). These individuals are critical for ensuring fair sporting competitions (Hancock et al. 2020), yet their numbers have been dwindling due to one key reason – abuse. This abuse causes individual officials to not want to officiate, or to quit, and is generating issues from recruiting to retaining officials (Clegland et al. 2017, Downward et al. 2023, Mojtabehi et al.

2022, Pierce et al. 2020, Webb et al. 2019a, b). The abuse crisis (Pierce et al. 2020) has led to mental health issues for some game officials (Brick et al. 2022).

Emerging technology may assist with the provision of game officials for sport. According to Kittel et al. (2021, p. 1), “decision-making has commonly been cited as the most important skill for successful performance in sport officials, however, insight into how this critical skill is improved through off-field training has lagged”. These authors concluded that decision-making training for sport officials should be advanced by including three key aspects – including “constraints faced in competition such as match context, fatigue and the perspective used to make decisions” (p. 8); training for “the adequacy of decisions in relation to the wider context” (p. 8); and “reflective learning [that] ... allows officials to reflect on their decisions with consideration to the wider context, rather than assessing the accuracy in comparison to one putative ‘correct’ decision” (p. 8).

Web-based training resources have been around for game officials for well over a decade (Put et al. 2013). According to Schweizer et al. (2011), along with Kittel et al. (2019a), a valid measurement of one’s decision-making can be observed with video-based strategies. Simulators have been generated to aid game officials in decision making (Samuel et al. 2019).

Kittel et al. (2019b) supported their previous conclusion further by conducting “the first study to examine the reliability and validity of 360⁰ VR [virtual reality] footage as an off-field decision-making assessment tool in sport” (p. 1). VR was defined by Craig (2013) as involving both real and imaginary simulations. When such simulations are applied to game officials, it allows them to perceive player actions and to interact with these players as they make officiating decisions. Spitz et al. (2021) research on VAR (video assistant referees) reported that there was an increase in the accuracy of game calls from “92.1% to 98.3%” (p. 147) when utilizing the technology.

Video-based officials training (Schweizer et al. 2011), has given way to new technologies. The use of VR and VAR technology has implications concerning training robots to be game officials to solve the lack of game officials’ issue for sport. The sport managers of today can begin to debate how this could work. For instance, should the VAR technology be advanced to become an off-field referee making calls in real time. This could involve a movement from the technology analyzing video to live analysis and decision-making as a referee. Decisions concerning the placement of the technology (i.e., on the sidelines, running on the field or court, or suspended above the play) needs to be determined. If above the field of play, the robot does not need to run, eliminating the exhaustion issue for officials, and perhaps, providing a better position to see more of the playing surface and action compared to being on the field. This could then be advanced to operate with robots that act as game officials - to augment human game officials. Devising how this could work is one step in alleviating the officials’ situation.

Metaverse technology allows a participant to experience an alternative or virtual world. In this scenario, the metaverse could aid the development of game officials in their training real game setting. This could build the confidence and skill of game officials and aid in reducing abuse as officials learn their craft. The metaverse technology could include videos of games in which the trainee game

official must make decisions – and their decisions impact the game/athletes (i.e., if a player is ejected from the game). A database of thousands of scenarios could be developed for multiple sports, such as from football/soccer, hockey, field hockey, water polo, etc.

If non-professional and professional players enter the metaverse they can practice shooting on any one of the goalies. This scenario allows players to test their shooting skills and to learn about the tendencies of any goalie in the metaverse system.

Those in sport management can debate the ethics of this scenario from multiple perspectives. Such perspectives include the goalies, the players shooting on goalies from grassroots to the professional level, coaching staff, leagues, sponsors, fans, and the developers of the metaverse technology.

Preparing for Additional Emerging Technologies

There are many emerging technologies that those in sport management can begin to debate. Examples include the requirements for hosting races that are higher, faster, and further – including rockets and drones and their implications for sport events. Such races could include people in rockets that race around the moon and back. If a competitor ‘moons’ those watching the race via satellite as they circle the moon, will there be pre-established rules for such scenarios? Humans in drones could race to another continent and back. Implications include determining the requirements for staging the technology prior to races, technicians that need to be on site for monitoring and maintenance requirements, the rules and regulations that ensure safety and support for performers, as well as the management of media access (will it be a satellite feed or can they be in the sky?).

Also, the use of video drones placed on a racing drone offer “the view from the top of a sports event also provides new information that cannot be generated otherwise and whose use significantly changes the staging of sports, sports reporting and sports training” (Hebbel-Seeger and Horkey 2018, p. 279). The drone races may, thus, include a two-fold experience – one whereby the drone is the race vehicle, and two, whereby the drone offers a video experience of the in-air race. Drones are highly rated for their potential for sport communication (Hebbel-Seeger et al. 2017) – but also offer more for sporting purposes.

Beginning to develop operational plans for races with emerging technologies can flush-out the implications and adaptation requirements and can promote preparations that begin today for sport of tomorrow. This includes determining the place of drones as race vehicles and for video purposes along with “the aesthetic, journalistic and economic aspects [that] must be taken into account as well as data-and-security-level concerns and psychological effects” (Hebbel-Seeger and Horkey 2018, p. 279). Such debates are needed for each emerging technology to determine the implications and to decide on the equitable and fair way forward in sport. Additionally, such debates are also important to determine the skills needed to manage sport into the future. Keeping tabs on emerging technologies, some that we cannot conceive of today, is important for the future of sport.

Conclusion

Van Dorsser et al. (2020) provided a framework that aids examinations of the future for linkages to both policy analysis and policymaking. An application of the framework, that was based on the work of Walker (2000) and Voros (2003), encourages three aspects when applied to the scenario of emerging technologies and sport. The first is to identify the potential emerging technologies and their potential application to sport. The second is to identify potential flexible-option solutions. The third is to develop understandings of the impacts and trade-offs for the consequences of each emerging technology if applied to sport into the future.

Additionally, Peters (2018) noted that predicting and planning the future is a fundamental human activity that aims at the development of public policies based on careful design through cooperation between public policy practitioners and scholars of public policy. Hence, the significance of identification of potential problems in any policy field, should be enforced by linking policy designs to theory and politics (Bobrow and Dryzek 1987).

Those in sport management can prepare – and prepare their students - to guide sport forward into the future with respect to the integration of emerging technologies within sport. We can begin to advance insights today with discussions/debates on the topic(s). It is not too early to develop foresight for policy development and policymaking for leading sport management in emerging technologies in sport.

Multiple emerging technologies are being discussed online. Given this, these technologies and can be discussed in relation to possible challenges and opportunities that arise in the framework of policy making with identification and participation of all sport stakeholders involved in the process.

This paper sought to stimulate debate by outlining a few emerging technologies and offered a look at potential scenarios should they be applied to sport. The time is now to get ready for the future of sport with discussions/debates on the potential way forward for the future in sport management.

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