A Review of the Role of Digital Innovation in Sport Management

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Abstract. This paper develops a more inclusive and cutting-edge literature review, in view of the major areas that digital innovation playing roles in sport management and in order to provide efficient insights for sport management development, future research and public policy. Starting from the important ideas of service, management, and business model from the concept of digital innovation, six parts that the priority areas digital innovation playing roles in sport management will be elaborated in detail, which are digital innovation for athletic performance, digital innovation for sport fan engagement, digital innovation in sport event management, digital innovation in sport fitness management, digital innovation in sport branding and e-sport.

Keywords. Digital innovation, sport management, literature review

1. Introduction

Nowadays, in the highly competitive sports industry landscape under digitalization and innovation, the ubiquitous functions of digital innovation can be intensively observed in sport management. For instance, The growing importance of cognitive computing based on big data and artificial intelligence technologies in the sports industry is transforming various aspects of sport management, such as athletic performance, sport fitness management and e-sport by providing exploration possibilities of observing sport participants' brain waves and psychological activities. With waves of digitalization and acceleration of industry 4.0, the sports industry, regarded as one of the most outstanding industry sectors around the world, is closely intertwined with digital innovation, in various range of sporting events and applications. Supported by information and communication technologies, artificial intelligence technologies, big data technologies and other significant digital technologies, digital innovation becomes a substantial driver for sport management.

As a growing field of interest in the role of digital innovation in sports by researchers due to the accelerating growth of the sports industry, scholars from sport computer science, management, economic and other relevant academic background attach great importance to this topic [1][2]. In the past decades, digital innovation has remarkably transformed sport management through various application of digital

technology in the sports industry [3]. Increasing significance is attached to digital innovation in sport management [4]. Stegmann et al. draw a conclusion that the factors facilitating digital innovation such as value co-creation as well as disruptive digital technologies are undervalued in the past researches on the sport management [5].

However, the role of digital innovation in sport management is an newly emerging area of research in recent years, with few barely any literature reviews in relevance. Existing models given in researches in regards to digital innovation in sport management are confined to specific or regional phenomenon, deficient in macro perspective of the industry, such as only focusing on the utilization of information and communication or AR technology to manage sport event, or the case of athletic performance of the football industry chain in Europe. In addition, among reviews of digital sport or sport innovation, there is inadequate consideration of the sport management level and even some recent reviews of sport management are short of the perspective of digital innovation and frontier business models in sport management like e-sport [5][6][7][8]. These circumstances of the current researches lead to the gap this literature review aims to help to fill.

The framework for this literature review is both the keynote and the difficulty of this paper, for that it is hard to classify digital innovation in sport management and the framework is supposed to take the financial and economic factors involved in the sport management into account. A relational financial-economic model developed by ATKearney, including elements of players, fans, club, brands, and players, as one of the few established models designed for the idea of power of sport management is of inspirational significance for this review. Taking e-sport's emerging researches and market share in the sports industry into consideration, this paper adopts framework of analyzing six parts of literatures that the priority areas digital innovation playing roles in sport management, which are athletic performance, fan engagement, sport event management, sport fitness management, sport branding and e-sport.

For the purpose of providing efficient insights for sport management development, future research and public policy, and in view of the major areas that digital innovation playing roles in sport management, this paper develops a more inclusive and cutting-edge literature review. In the main body of this paper, starting from the important ideas of service, management, and business model from the concept of digital innovation, digital innovation for athletic performance, digital innovation for sport fan engagement, digital innovation in sport event management, digital innovation in sport fitness management, digital innovation in sport branding and e-sport will be elaborated in detail.

2. Literature Review

2.1. Digital Innovation for Athletic Performance

Sport activities supported by digital technologies have always been a topic of interest for researchers due to the constant advancements in technology and the growing number of sport participants. There are far more opportunities provided by digital innovation in regards of digital technologies in sport management than it used to be in the past. For instance, mobile sensors as well as portable computers are invented to collect data of athletes in physical activities, such as data of endurance runners and

distance cyclists [9]. Tjønndal finds that digital training tools for boxers can help solve problems occur during the COVID-19 pandemic [6].

2.2. Digital Innovation for Sport Fan Engagement

In the competition of attracting fan attention to generate more advertising profits between traditional and digital platform to broadcast live sports, fans will be more likely to turn to the digital one instead of the traditional one, which can be more apparent in the case of top-tier sports events [10]. Mastromartino and Naraine show that fans obtain the strongest level of engagement among all the customers under a digital innovation strategy of using social media through examining professional sport sponsors [11]. It is worthwhile to notice that nowadays some sport fans may be addicted to the hype of non-fungible tokens. Pandita et al. create a model to elaborate the aspects involving in the enhancement of activation of the sport fan base, and to assist sport managers to reasonably harnessing sport fan engagement [12].

2.3. Digital Innovation in Sport Event Management

In the research on the digital sport entrepreneurial ecosystems, the operation of digital-technology-supporting sport events may lead to radical innovations [13]. From the perspective of a forced e-ticket environment, sport event ticket-type preference can be analyzed into five topics, which is a huge research gap in the research field of e-ticket consumption preference [14]. The adaptation of digital innovation on sports can be observed in broadcasting live streaming of sport events. Brochado et al. study on organizing sports events from the perspective of the promoters in Europe through questionaire by 41 interviewees, which comes into the conclusion that three catagories can be classified within the sample events [15]. Digital ticketing virtual spectating ensures necessarity of innovation during the COVID-19 pandemic [16].

2.4. Digital Innovation in Sport Fitness Management

Sport fitness management, with the utilization of digital innovation, particularly focusing on sport fitness app operation is a research topic being discussed since recent years. Behr mention that the clothe that fitness trackers in the research wear and sport application of wearable technology sensors they use do not necessarily show the connection between innovation and digital sport [17]. Fenton et al. discover that digital innovation level needs to be improved from the type of sport innovation of fitness app [18]. Soulé et al. pay attention to the sports and fitness mobile applications (SFMAs) and carry out a review on the utilization of sport and fitness app from the perspective of social science [19].

2.5. Digital Innovation in Sport Branding

From most researches on digital innovation in sport branding, it is obvious that the branding strategies are based on the reputation of athletes or sport teams. Ballouli and Hutchinson interview Digital Royalty＇s Amy Martin and stress the importance of integrated marketing strategy for professional athletes as well as sports teams [20]. Stegmann et al. carry out a sport marketing research and perceive that online and

mobile strategies lead to affection of brand in sports teams [5]. Fenton et al. conduct the branding strategy for fitness apps. Petit et al. complete a research of digital touch in sport sponsorship and discuss practice circumstances of virtual reality in sport management and some related sectors [21].

2.6. E-sport

E-sport, as a type of competitive new sport playing computer or video game as well as a kind of digital-based game, is not independent but derived from and in close relation to real sports [22]. Martin-Niedecken and Schättin discuss a motivating and promising complementary training method utilized by e-sport players, indicating that exergames provides physical approaches to e-sport [23]. The trajectory of digital sport and media innovation move more and more closely and overlap with each other. E-sport is a prime instance and the interactive effect will be strengthened in the long-term future [24]. Digital innovation also plays important role in E-sport human capital management [25].

3. Discussion and Conclusion

This paper provides a literature review on the role of digital innovation in sport management, offering insights for industry development, future research, and public policy. It develops a six-element framework of the role of digital innovation in sport management and highlights the impact of digital innovation on athletic performance, sport fan engagement, sport event management, sport fitness management, sport branding, and e-sports.

For the limitations of this paper, a six-element framework including athletic performance, fan engagement, event management, fitness management, branding, and e-sports is applied in this literature review. However, it cannot include all of the other minor factors that play role in digital innovation's influence on sport management.

For the managerial implications, it is discovered that media, or digital media platform, such as social media, is a assignable favourable factor in the progress of digital innovation promoting global sports industry growth. Among different digital innovation types, disruptive innovation has a tremendous bearing on the sports industry, such as Twitter as disruptive innovation in sport communication. In addition, according to the patchy development of digital innovation and sport management, as well as relevant law and regulation environment including difference in patent act and anti-monopoly law, the presenting function and development level of digital innovation in sport management vary in different regions.

For future research directions, two main directions can be suggested from the literature review analysis in this paper. First, the changing relations of the six elements in this article's framework can be discussed by researchers in the future. Second, quantitative researches are infrequently carried out on the topic of the role of digital innovation in the sports industry, regarding with more academic attempts can be encouraged.

Digital Innovation plays a vital role in sport management. The concept of digital innovation in sport management intersect with sport digitalization and sport innovation. In this paper, for an explicit observation of digital innovation in sport management, literatures about digital innovation for athletic performance, digital innovation for sport fan engagement, digital innovation in sport event management, digital innovation in

sport fitness management, digital innovation in sport branding and e-sport are reviewed on its academic map. It is hopefully that digital innovation plays an interactive role in sport management in the future, with regard to the aspects of product, service, process or business model.

References

[1] O'Reilly N , Rahinel R. Forecasting the importance of media technology in sport: the case of the televised ice hockey product in Canada. International Journal of Sports Marketing and Sponsorship. 2006, 8(1):76-91.DOI:10.1108/IJSMS-08-01-2006-B009.

[2] Santos D, Alonso M. Sport Marketing: Cyber Strategies for Clubs and Events. In: Ghorbani A, editor, Marketing in the Cyber Era Strategies & Emerging Trends. IGI Global; 2014. pp. 177-189. DOI:10.4018/978-1-4666-4864-7.ch0012.

[3] Ráthonyi G, Müller A, Rathonyi-Odor K. How Digital Technologies Are Changing Sport? APSTRACT: Applied Studies in Agribusiness and Commerce, 2018; 12: 89-96. DOI:10.22004/ag.econ.292396.

[4] Girginov V, Toohey K, Willem A. Information, knowledge creation and innovation management in sport: an introduction to the thematic section. European Sport Management Quarterly. 2015, 15(5):516-517.DOI:10.1080/16184742.2015.1105273.

[5] Stegmann P, Nagel S, Strbel T. The digital transformation of value co-creation: a scoping review towards an agenda for sport marketing research. European Sport Management Quarterly. 2021;23:1221 - 1248. DOI:10.1080/16184742.2021.1976241.

[6] Tjønndal A. The use of digital tools and online training among boxers and boxing coaches during the COVID-19 pandemic. Frontiers in sports and active living. 2020;2:589483. DOI:10.3389/fspor.2020.589483.

[7] Appelbaum LG, Erickson G. Sports vision training: A review of the state-of-the-art in digital training techniques. International Review of Sport and Exercise Psychology. 2018. 11(1), 160-189. DOI:10.1080/1750984X.2016.1266376.

[8] Angosto S, Lara-Bocanegra A, Bohórquez MR, García-Fernández J, Zhang JJ. Challenges in Sport Marketing: A Systematic Review of Digital Sport Marketing. Marketing Analysis in Sport Business. Routledge;2022. pp.70-92. DOI:10.1016/j.jsams.2009.10.170.

[9] Lee VR, Drake J. Digital physical activity data collection and use by endurance runners and distance cyclists. Technology, Knowledge and Learning. 2013;18:39-63, DOI:10.1007/s10758-013-9203-3.

[10] Gantz W, Lewis N. Sports on traditional and newer digital media: Is there really a fight for fans?. Television & New Media. 2014. 15(8), 760-768, DOI:10.1177/1527476414529463.

[11] Mastromartino B, Naraine ML. (Dis) Innovative digital strategy in professional sport: Examining sponsor leveraging through social media. International Journal of Sports Marketing and Sponsorship. 2022, 23(5), 934-949. DOI:10.1108/IJSMS-02-2021-0032.

[12] Pandita D, Agarwal Y, Vapiwala F. Fostering the sustainability of organizational learning: reviewing the role of Gen-Z employees. Industrial and Commercial Training. 2023;55(3):375-387.DOI:10.1108/ict-09-2022-0064.

[13] Ratten V, Thompson AJ. Digital sport entrepreneurial ecosystems. Thunderbird International Business Review. 2020. 62(5), 565-578. DOI:10.1002/tie.22160.

[14] Popp N, Simmons J M, Smith D K, Tasker R. Understanding sport event ticket-type preference in a forced e-ticket environment. Sport, Business and Management: An international Journal. 2021; 11(3): 287-301. DOI:10.1108/SBM-08-2020-0079.

[15] Brochado A, Dionísio P, Leal MDC, Bouchet A, Conceição H. Organizing sports events: the promoters' perspective. Journal of business & industrial marketing, 2022; 37(6):1281-1298.DOI:10.1108/JBIM-10-2020-0451.

[16] Nick E, Jerry R, Matt M, Shelby W. The Management of Spectators Through the Lens of High School Athletic Directors. 2024(5):53-66. DOI: 10.33043/SSWJ.5yd83ba.

[17] Behr O. Fashion 4.0‑digital innovation in the fashion industry. Journal of technology and innovation management. 2018; 2(1), 1-9. DOI: 10.13140/RG.2.2.25902.43849.

[18] Fenton A, Parry KD, Chadwick S, Guimarães G, Aeron V. Digital innovation in sport – barriers and opportunities for branded fitness apps for fans. In: Ratten V. (eds) Entrepreneurial Innovation. Studies on Entrepreneurship, Structural Change and Industrial Dynamics. Springer, Singapore; 2022, pp 25–42. DOI:10.1007/978-981-16-4795-6_3.

[19] Soulé B, Marchant G, Verchère R. Sport and fitness app uses: a review of humanities and social science perspectives. European Journal for Sport and Society. 2022. 19(2), 170-189, DOI:10.1080/16138171.2021.1918896.

[20] Ballouli, K., Hutchinson M. Digital-branding and social-media strategies for professional athletes, sports teams, and leagues: An interview with Digital Royalty's Amy Martin. International journal of sport communication. 2010. 3(4), 395-401, DOI: 10.1123/ijsc.3.4.395.

[21] Petit O, Lorey T, Dosquet F. Digital touch in sponsorship: Getting closer to the brand through virtual reality. International Journal of Consumer Studies. 2023;47(5): 1758-1771. DOI:10.1111/ijcs.12945.

[22] Hebbel-Seeger A. The relationship between real sports and digital adaptation in e-sport gaming. International Journal of Sports Marketing and Sponsorship. 2012 Jan;13(2):43-54. DOI: 10.1108/IJSMS-13-02-2012-B005.

[23] Martin-Niedecken A L., Schättin A. Martin-Niedecken A L, Schättin A. Let the body'n' brain games begin: toward innovative training approaches in esports athletes. Frontiers in psychology. 2020 Feb; 11: 138, DOI:10.3389/fpsyg.2020.00138.

[24] Miah, A., Fenton, A., & Chadwick, S. Virtual reality and sports: The rise of mixed, augmented, immersive, and esports experiences. 21st century sports: How technologies will change sports in the digital age. 2020; 249-262. DOI:10.1007/978-3-030-50801-2_15.

[25] Mastromartino B. Human capital development in sport marketing: industry insights, International Journal of Sports Marketing and Sponsorship. 2024 March. DOI:10.1108/IJSMS-11-2023-0238.