Proceedings of the International Conference on Contemporary Marketing Issues

Vol 1, No 1 (2024)

Proceedings of the International Conference on Contemporary Marketing Issues (2024)

Revolutionizing Formula 1: Unveiling the Impact of Virtual Advertising on Brand Visibility and Fan Engagement

Konstantinos Alexopoulos , Vagia Mochla , George Tsourvakas

doi: 10.12681/iccmi.7587

Revolutionizing Formula 1: Unveiling the Impact of Virtual Advertising on Brand Visibility and Fan Engagement

Alexopoulos Konstantinos
Master Student in Sports Marketing, Department of Business Administration, National and Kapodistrian University of Athens, 14 Evripidou, GR 10559 Athens, Greece kosalex@ba.uoa.gr

Dr. Mochla Vagia
Adjunct Lecturer in Marketing, Department of Business Administration, National and Kapodistrian University of Athens 14 Evripidou, GR 10559 Athens, Greece vgmochla@ba.uoa.gr

Dr. Tsourvakas George
Professor, Department of Business Administration, National and Kapodistrian University of Athens 14 Evripidou, GR 10559 Athens, Greece gtsourvakas@ba.uoa.gr

Abstract:
This paper explores the fascinating field of Virtual Advertising technology, focusing on its application in Formula 1 races. Virtual Advertising involves seamlessly integrating digital elements into broadcasts, presenting innovative opportunities for brand exposure. The study investigates the average visibility of virtual signage during Formula 1 Grand Prix broadcasts, revealing an average visibility of 7.63% in the OTT platform. The research also delves into the impact of personalized virtual advertising messages of fan engagement and brand recall, using two surveys distributed among 100 participants each. Preliminary findings show that strategically placed virtual signage, such as on specific turns or track infrastructures, significantly enhances brand exposure. As the study is ongoing, further research is needed to validate the influence of personalized virtual advertising on fan engagement. The paper contributes to understanding the evolving landscape of advertising in sports, particularly in the context of dynamic, personalized messaging.

Keywords: *Virtual Advertising, Formula 1, Brand Visibility, Fan Engagement, Digital Marketing*

Introduction

Virtual Advertising, an inventive technique introduced in the mid-1990s, is increasingly being developed by companies such as Supponor, Broadcast Virtual and uniqFEED who are leading the way in advancing it. This technology enables real-time replacement of physical perimeter boards with virtual ones, presenting personalized advertising to local audiences (Supponor 2020). The definition of Virtual Advertising is the digital integration of products, logos, slogans, and animations into broadcasts, offering dynamic viewer interactions (Cianfrone et al. 2006). From a commercial point of view, it provides two key advantages: a) the ability to sell sponsorship placement multiple times and b) deliver customized messages tailored to specific broadcast countries (Sander and Altobelli 2011). This approach minimizes costs by focusing advertising message on targeted market and potentially creating new opportunities in previously unbranded spaces. Furthermore, since this type of advertising is digitally inserted, the clarity of the brand may be more visible to the viewer, consequently enhancing its weighted value in media valuation. Based on data provided by MarketsandMarkets, the market size of global virtual advertising is projected to experience a compound annual growth rate (CAGR) of 19.3% by 2026. This growth is anticipated to elevate the market from $12.9 billion in 2021 to $31.1 billion by 2026 (Leadsom, 2023a).

UniqFEED has outlined the potential value that virtual advertising could offer to Rights Holders, Sponsors, and fans, as presented by Kay Walsh (uniqFEED - blog, 2023):

- Right holders have the opportunity to enhance the commercial viability of their advertising space.
- Right holders have the ability to generate additional space, despite restrictions on certain placements due to broadcast regulations or safety concerns.
- Brands have the flexibility to customize messages to match local languages, providing them with adaptability and increased interaction.
- Brands have the capability to focus on particular, pertinent markets, reducing unnecessary expenses and reducing inefficiencies.
- Sponsors can oversee and comply with specific market regulations.
- Global brands can synchronize messaging with regional campaigns.

This paper investigates the application of virtual advertising in Formula 1 races, a global televised program with over 2 billion viewers across 180 countries (RTR Sports Marketing, May 2023). Virtual Advertising presents a compelling opportunity for sponsors due to two primary challenges in Formula 1. Firstly, many racetrack spaces lack branding, and secondly, there is a potential for international brands to deliver tailored commercial messages to specific countries during

a race. A crucial consideration in this paper is the impact of streaming platforms, such as Formula 1's own OTT platform, F1 TV Pro, launched in 2018. Streaming platforms or Over the Top Media Services (OTT) refers to the direct delivery of video content to viewers over the Internet, bypassing traditional cable or broadcast television platforms (Vaidya et al., 2023). These platforms enable a deeper analysis of fan data, preferences, and demographics, allowing sports right holders and brands to craft customized advertisements for diverse markets. The industry is also moving towards programmatic strategies, tailoring content based on individual subscriber data. For instance, a F1 TV Pro subscriber's birthday during a race weekend could appear a personalized virtual advertising message (e.g. Happy birthday, Nick! Enjoy a 20% discount on any Ferrari's merch!), fostering increased fan engagement with the sport, team, and sponsoring brand.

Literature Review

Several research papers (Cianfrone et al., 2006; Nebenzahl & Hornik, 1985; Sander & Altobelli, 2011; Turner & Cusumano, 2000) have examined the utilization of virtual advertising signage in the context of live sports event broadcasts. The study conducted by Sander and Altobelli (2011) stands out as a valuable contribution, revealing that 77.5% of participants acknowledged the presence of virtual advertisement signage. Furthermore, an immersive 92.7% correctly identified goal-side billboards, and 55.6% did not perceive this technology as irritating during television broadcasts. Nebenzahl and Hornik (1985) made a significant contribution to understanding the effectiveness of Communication-Based Outdoor Advertising (CBSA). Recognized as a high-reach and high-frequency medium, CBSA is deemed suitable for enhancing brand awareness. The placement of CBSA in the sports arena impacts exposure time and frequency, thereby influencing managerial decisions related to placements. These decisions, today, with the use of virtual advertising may be quite more complex as the sports commercial directors could insert a virtual advertising signage. For sports such as Formula 1, covering race tracks spanning approximately 5 to 7 kilometers, the process of selecting the placement can be challenging. To address a challenge like this, marketers may conduct a white space analysis, a process involving the identification of unbranded spaces where a brand could be inserted to capture the attention of sports fans, as explained by Chris Mike in Relo Metrics' (2020).

In addition, numerous studies have been published on user behaviour on OTT platform (Gonçalves et al., 2014; Kim, 2015; Kwak et al., 2021; Nagaraj et al., 2021, Xu et al., 2023). Nagaraj et al. (2021) found that the youngest generations, regardless of gender, are more willing to pay for OTT subscription prices. Chinese sports OTT platform allows subscribers to share thoughts and engage in conversations while consuming content (Xu et al., 2023). In the US, Nielsen reports that streaming platforms surpassed cable and broadcast television for first time in 2022. Moreover, in major European markets, spending on sports rights through OTT services rose from 12% in 2021 to 20% in 2022.

Although, all these technologies are constantly improving, aiming to increase the effectiveness of sport sponsorship. Sport sponsorship is recognized as a powerful strategy for enhancing brand awareness and image (Henseler et al., 2011) Core to its effectiveness is the concept of "sponsor-fit", which emphasizes the alignment between the sponsors' and those of the sponsored entity (Aaker & Joachimsthaler, 2000; Woisetschäger et al., 2010). Based on Woisetschäger et al. (2010), there are seven determinants to perceive a successful "fit": (1) Sincerity, (2) Functional Similarity, (3) Autonomy Preservation, (4) Regional Identification, (5) Perceived Benefits, (6) Exclusiveness and (7) Relatedness to sports. This alignment is crucial for achieving a spectator's cognitive balance, thus maximizing the impact of the sponsorship (Woisetschäger et al., 2010). Additionally, understanding the various integration forms and commercial opportunities offered by sport sponsorship is essential for optimizing brand-related objectives (Henseler et al., 2011; Drees & Trautwein, 2007). Brand knowledge is pivotal in developing consumer-based brand equity, encompassing brand awareness and brand image. Here, the focus is on the brand awareness, which affects consumers' recognition and recall of a brand, significantly impacting their purchasing decisions and perceptions (Aaker, 1996; Gustafson & Chabot, 2007). High brand awareness enhances brand associations and influences consumer preferences (Keller, 2008).

Leveraging technological advancements, such as virtual advertising, for real-time adaptation of sponsor messages (Rumpf & Breuer, 2016) can optimize sponsorship efficiency. However, a deeper understanding of how sports content influences sponsor message processing is essential. Watching sports induces arousal among audiences, particularly when their favourite teams compete (Kim et al., 2017), and understanding how the run-of-play affects viewer arousal is crucial for optimizing sponsor message exposure. Personalizing sponsor messages to viewers' dispositions and game contexts holds promise for enhancing effectiveness (Hirsh et al., 2012). However, current sponsorship practices lack personalized messaging, presenting an opportunity for a more efficient communication strategy.

Formula 1 provides an excellent case study for examining the impact of virtual advertising technology, given the global reach of the sport. In the 2024 season, Formula 1 featured 21 partners (Formula 1 Official Website), each with international business objectives. The following tables show the distribution of partners according to industry type (Table 1) and the geographical dispersion of their headquarters (Table 2). The aforementioned information could be highly beneficial for the Broadcasting Department of Formula 1 in tailoring virtual advertising signage to meet consumers' geographical preferences effectively.

Industry Type	Number of Companies	Companies
Technology	4	Amazon Web Services (AWS), Salesforce, Workday, Lenovo
Automotive	3	Pirelli, LIQUI MOLY, BBS Motorsport
Beverages	2	Heineken, Ferrari Trento
Others	12	Rolex, Aramco, DHL, Qatar Airways, Crypto.com, MSC Cruises, Paramount+, American Express, Tata Communications, 188BET, Puma, McDonald's

Figure 1: Table 1 - Overview of Formula 1 partners across different industries

HQ Country	Number of Companies	Companies
United States	6	Amazon Web Services (AWS), Salesforce, Paramount+, American Express, Workday, McDonald's
Germany	4	Pirelli, DHL, LIQUI MOLY, BBS Motorsport
Others	11	Rolex, Aramco, Heineken, Qatar Airways, Crypto.com, MSC Cruises, Lenovo, Ferrari Trento, Tata Communications, 188BET, Puma

Figure 2: Table 2 - The breakdown of Formula 1 partners by country

It's difficult to pinpoint the precise inception of virtual advertising in Formula 1 broadcasting. However, it is reasonable to assert that this technology was introduced in the early 2000s with the arrival of "green screen" technology. So far, we have witnessed innovative applications of virtual advertising and placement technology, served not only commercial objectives but also enriched viewer experiences with racing data. For instance, during the FORMULA 1 GRAND PRIX DE MONACO 2023, virtual signage prominently displayed on the wall of the iconic Tunnel in diverse formats. Noteworthy instances include a prominent Heineken virtual advertisement and the virtual display of signage during a team radio broadcast featuring Fernando Alonso. Another interesting example can be observed from the 2014 Italian Grand Prix, where just before the 5 lights went out and the race began, a graph displaying the top five drivers on the grid was virtually inserted.

Research Objectives

This paper explores the impact of virtual advertising technology on the Formula 1 broadcast experience. Anticipated changes among teams, fans, media and sponsors (Mullin et al.,2004) herald a future where sponsors can create personalized narratives through virtual advertising signage during races, fostering deeper connections with fans (Supponor,2020; Leadsom,2024). However, it's crucial to mention the value of Impressions, which is defined as a quantitative measure employed by advertisers to gauge the extent of audience exposure to a television advertisement when it is broadcasted within a specific time slot (Simulmedia). It's evident that most impressions from sports sponsorships are passive, meaning there's no solid proof that viewers actively notice them. However, due to the frequent occurrence of sports events and numerous brand placements, brands can expect some level of exposure through varies (VISUA,2022; Venturoli, 2024). For example, in a motor racing event, brands are prominently displayed. Even if viewers don't consciously register these brands, they're exposed to them repeatedly, ranging from 30 to 80 times during a typical race, depending on factors like race length and camera angles (VISUA, 2022).

The decision to assess virtual signage visibility during Formula 1 races is driven by the recognition that visibility (Drive Sports Marketing Agency,2023) significantly influences Media Value Percentage. In the sports sponsorships analytics industry, visibility is defined as "the percentage of the logo within view" (Relo Metrics – Media Valuation – Learning Center). Emphasizing this aspect is crucial for sports stakeholders to identify optimal exposure opportunities, considering the varying dimensions of different sports venue (VISUA,2022). Therefore, the following research question was proposed:

RQ1. What is the average visibility of virtual signage as a percentage of the total image size during a Formula 1 Grand Prix broadcast?

In line with the aforementioned, virtual advertising is poised to grant marketers the capability to tailor advertising messages according to the preferences of sports viewers (Bennet et al., 2006). This application would be deployed on OTT platforms, facilitating the straightforward collection of data. Bruer and Rumpf (2012) explored the comprehension of elements impacting viewers' attention, providing insights to assist Right Holders and Sponsors in making improved decisions regarding the placement of their advertising messages. This allows optimal exposure and engagement with the sports fans. Furthermore, another significant aspect to take into account is that the focus on sponsor brands diminishes in scenarios when the game or race is predictable. On the contrary, it rises when the favoured team is trailing (Breuer at al.,2021). Additionally, virtual advertising technology can extend its application to recorded content, generating fresh revenue channels from archived sports footage and meeting the preferences of younger viewers (Leadsom, 2023b). Therefore, the following research question was proposed:

RQ2. Do personalized virtual advertising messages contribute to increased fan engagement with sponsor brands?

Methodology

The objective of this study is to compare the impact of a personalized virtual advertising messages on the recall and impressions of viewers, as opposed to a non-personalized message. A tailored Python code script was devised to systematically assess the visibility percentage of virtual signages. The script integrates the designated photograph and the embedded virtual signage to facilitate meticulous measurement. Rigorous parameter configuration was established to enhance measurement accuracy. The script ascertains the total image size of the selected frame and the dimensions of the virtual signage. The visibility percentage is derived through the application of the following: Visibility Percentage = (Total Size of Virtual Signage / Total Image Size) *100. The chosen screenshots, sourced F1 TV's International Feed and captured during various 2023 Grand Prix races, were specifically selected for the inclusion of virtual signage. All the selected photos share the same dimensions: 1440*900.

For the second research question, we will investigate it using two distinct surveys, each to be distributed among 100 participants. The first survey (A) includes 20 screenshots from various Formula 1 races in 2023 season, all featuring at least one virtual advertising signage. The second survey (B) includes the exact same screenshots as survey A, but we have edited the virtual signage in three screenshots of them by inserting a personalized message. To both surveys, we have added the exact same questions for participants to answer. The first set of questions pertains to unaided brand recall after viewing the 20 provided screenshots. We ask respondents to identify the three brands/sponsors prominently displayed on the race track. Additionally, we inquire about the visual elements that aided in recalling these brands. Furthermore, we ask them to share which brand they believe will leave a lasting impression and then choose the track location (Grandstands, Trackside, Track Infrastructure, Turn-Specific) where they observed the selected brand. In the next section, we aim to measure aided brand recall. We provide a list of all the brands that appear in the provided screenshots, asking respondents to rank top 5 brands they recall. The final question – multiple choice format – from the 20 screenshots prompts participants to select one that made the most significant impression on them through its advertisement. The screenshots are provided once again in this question. The objective of this survey is to compare the impact of a personalized virtual advertising message on the recall and impression of the viewers, as opposed to the non-personalized virtual advertising message.

Findings

The study contributes to marketing knowledge through theory-building research cantered on the importance of conducting white space analysis. This is particularly relevant with the emergence of virtual advertising, presenting entirely new opportunities to showcase products and convey advertising messages.

RQ1. Upon scrutinizing 22 screenshots encompassing diverse races of the 2023 Formula 1 race season, each incorporating a minimum of one virtual advertising signage, we have derived noteworthy data and drawn insightful conclusions. The computed average visibility of the virtual signage stands at 7.63% relative to the total image size. This figure gains significance when juxtaposed with the race's standings, a ubiquitous element in race broadcasting, having a visibility of 10.81%. Strategically placing virtual signage on specific turns, as observed in Mexico, and on tracks with expansive surroundings, as seen in Brazil, has proven highly effective. From analysis, it's clear that virtual advertising is a potent tool for branding various track infrastructures. Notable examples include branding on the Abu Dhabi track bridges and the Monaco track tunnel. For instance, virtual advertising featuring Qatar Airways in Monaco's tunnel achieves a visibility percentage of 20.31%, indicating significant brand exposure.

PHOTO NAME	DETECTED LOGO	VISIBILITY (%)
FORMULA 1 LENOVO JAPANESE GRAND PRIX 2023 - TURN 9 - MSC	FORMULA 1 LENOVO JAPANESE GRAND PRIX 2023 - TURN 9 - MSC- LOGO	4.95%
FORMULA 1 LENOVO JAPANESE GRAND PRIX 2023 - TURN 11 - HEINEKEN	FORMULA 1 LENOVO JAPANESE GRAND PRIX 2023- TURN 11 - HEINEKEN - LOGO	7.03%
FORMULA 1 LENOVO JAPANESE GRAND PRIX 2023 - TURN 5 - ARAMCO	FORMULA 1 LENOVO JAPANESE GRAND PRIX 2023 - TURN 5 - ARAMCO - LOGO	5.07%
FORMULA 1 LENOVO JAPANESE GRAND PRIX 2023 - TURN 8 - DHL	FORMULA 1 LENOVO JAPANESE GRAND PRIX 2023- TURN 8 - DHL - LOGO	0.86%
FORMULA 1 HEINEKEN SILVER LAS VEGAS GRAND PRIX 2023 - TURN 12 - SALESFORCE	FORMULA 1 HEINEKEN SILVER LAS VEGAS GRAND PRIX 2023 - TURN 12 - SALESFORCE - LOGO	4.91%
FORMULA 1 HEINEKEN SILVER LAS VEGAS GRAND PRIX 2023 - BEFORE TURN 14 - SALESFORCE	FORMULA 1 HEINEKEN SILVER LAS VEGAS GRAND PRIX 2023 - BEFORE TURN 14 - SALESFORCE - LOGO	6.13%
FORMULA 1 ROLEX GRANDE PRÊMIO DE SÃO PAULO 2023 - TURN 15 - MSC	FORMULA 1 ROLEX GRANDE PRÊMIO DE SÃO PAULO 2023 - TURN 15 - MSC - LOGO	6.98%
FORMULA 1 ROLEX GRANDE PRÊMIO DE SÃO PAULO 2023 - TURN 5 - LIQUI MOLY	FORMULA 1 ROLEX GRANDE PRÊMIO DE SÃO PAULO 2023 - TURN 5- LIQUI MOLY - LOGO	5.33%
FORMULA 1 ROLEX GRANDE PRÊMIO DE SÃO PAULO 2023 - TURN 5 - LIQUI MOLY (A)	FORMULA 1 ROLEX GRANDE PRÊMIO DE SÃO PAULO 2023 - TURN 5- LIQUI MOLY - LOGO ON THE TRACK	4.94%
FORMULA 1 ROLEX GRANDE PRÊMIO DE SÃO PAULO 2023 - TURN 5 - LIQUI MOLY - LOGO ON THE TRACK	FORMULA 1 ROLEX GRANDE PRÊMIO DE SÃO PAULO 2023 - TURN 5- LIQUI MOLY - LOGO OUT THE TRACK	1.42%
FORMULA 1 ETIHAD AIRWAYS ABU DHABI GRAND PRIX 2023 - BEFORE TURN 8 - LENOVO	FORMULA 1 ETIHAD AIRWAYS ABU DHABI GRAND PRIX 2023 - BEFORE TURN 8- LENOVO - LOGO	8.48%
FORMULA 1 STC SAUDI ARABIAN GRAND PRIX 2023 - TURN 24 - MSC	FORMULA 1 STC SAUDI ARABIAN GRAND PRIX 2023 - TURN 24 - MSC - LOGO	2.61%
FORMULA 1 PIRELLI GRAN PREMIO D'ITALIA 2023 - TURN 6 - AWS	FORMULA 1 PIRELLI GRAN PREMIO D'ITALIA 2023 - TURN 6 - AWS - LOGO	6.06%
FORMULA 1 LENOVO UNITED STATES GRAND PRIX 2023 - TURN 12 - PIRELLI	FORMULA 1 LENOVO UNITED STATES GRAND PRIX 2023 - TURN 12 - PIRELLI - LOGO	14.78%
FORMULA 1 LENOVO UNITED STATES GRAND PRIX 2023 - TURN 7 - QATAR AIRWAYS	FORMULA 1 LENOVO UNITED STATES GRAND PRIX 2023 - TURN 7 - QATAR AIRWAYS - LOGO	3.39%
FORMULA 1 LENOVO UNITED STATES GRAND PRIX 2023- TURN 19 - PIRELLI	FORMULA 1 LENOVO UNITED STATES GRAND PRIX 2023 - TURN 19 - PIRELLI - LOGO	5.51%
FORMULA 1 GRAN PREMIO DE LA CIUDAD DE MÉXICO 2023 - TURN 5 - LIQUI MOLY	FORMULA 1 GRAN PREMIO DE LA CIUDAD DE MÉXICO 2023 - TURN 5 - LIQUI MOLY - LOGO	23.64%
FORMULA 1 GRAN PREMIO DE LA CIUDAD DE MÉXICO 2023 - TURN 13 - DHL	FORMULA 1 GRAN PREMIO DE LA CIUDAD DE MÉXICO 2023- TURN 13 - DHL - LOGO	16.89%
FORMULA 1 QATAR AIRWAYS QATAR GRAND PRIX 2023 - TURN 9 - MSC	FORMULA 1 QATAR AIRWAYS QATAR GRAND PRIX 2023 - TURN 9 - MSC - LOGO	7.37%
FORMULA 1 QATAR AIRWAYS QATAR GRAND PRIX 2023 - TURN 5 - ROLEX	FORMULA 1 QATAR AIRWAYS QATAR GRAND PRIX 2023 - TURN 5 - ROLEX - LOGO	10.67%
FORMULA 1 GRAND PRIX DE MONACO 2023 - TURN 6 - PIRELLI	FORMULA 1 GRAND PRIX DE MONACO 2023- TURN 6 - PIRELLI	0.50%
FORMULA 1 GRAND PRIX DE MONACO 2023 - TUNNEL - QATAR AIRWAYS	FORMULA 1 GRAND PRIX DE MONACO 2023 - TUNNEL - QATAR AIRWAYS	20.31%

Figure 3: Results of Virtual Advertising Analysis in 22 Screenshots from the Formula 1 2023 Season – Author's Compilation

RQ2. This research question is currently in the investigation phase, and as of the time of this summary, we are actively collecting data by sharing our questionnaire. Consequently, no conclusive findings have been obtained yet. The primary goal of this research is to scrutinize the influence of personalized virtual advertising on engagement levels and brand recall among fans emotionally invested in sport during a race.

Discussion

The study reveals that strategically placed virtual signage significantly enhances brand visibility during Formula 1 broadcasts. Analysis of 22 screenshots from the 2023 Formula 1 season shows an average visibility of 7.63% for virtual signage relative to the total image size. Notably, examples from races like Mexico and Brazil demonstrates the effectiveness of placing virtual signage on specific turns and track infrastructures. For instance, virtual branding on track bridges in Abu Dhabi and virtual advertising featuring Qatar Airways in Monaco's tunnel achieved notable visibility percentages. These results highlight the potency of virtual advertising in branding various track infrastructures and maximizing brand exposure during Formula 1 broadcasts.

This study furthers our understanding of brand awareness and recall by illustrating the significant influence of virtual advertising on brand visibility during Formula 1 broadcasts. It also enriches our comprehension of sponsorship effectiveness by demonstrating how virtual advertising technology allows for personalized messaging, fostering stronger connections with fans. Additionally, the research delves into audience engagement and advertising effectiveness, exploring how personalized virtual advertising impacts viewer engagement and brand recall and recognition.

Finally, the findings provide practical strategies for improving brand visibility during Formula 1 broadcasts, emphasizing the importance of strategically placed virtual signage. Sponsors can utilize virtual advertising technology to craft personalized narratives that resonate with fans, ultimately boosting engagement and brand recall. Making data-driven decisions is essential for refining advertising strategies and enhancing viewer experiences, highlighting the significance of analysing viewer engagement metrics and brand visibility data.

References:

Aaker, D. A. (1996). Building Strong Brands. New York: The Free Press.

Aaker, D. A., & Joachimsthaler, E. (2000). Brand Leadership. New York: The Free Press.

Breuer, Christoph, Boronczyk, Felix, & Rumpf, Christopher. (2021). Message Personalization and Real-Time Adaptation as next Innovations in Sport Sponsorship Management? How Run-of-Play and Team Affiliation Affect Viewer Response. Journal of Business Research, 133, 309–16. https://doi.org/10.1016/j.jbusres.2021.05.003

Breuer, Christoph, & Rumpf, Christopher. (2012). Official Journal of NASSM The Viewer's Reception and Processing of Sponsorship Information in Sport Telecasts. Journal of Sport Management, 26. www.JSM-Journal.com

Cianfrone, Beth, Bennett, Gregg, Siders, Ron, & Tsuji, Yosuke. (2006). Virtual Advertising and Brand Awareness. International Journal of Sport Management and Marketing, 1.

Drees, N., & Traunwein, S. (2007). Erscheinungsformen des Sportsponsorings. In A. Bagusat, C. Marwitz, & M. Vogl (Eds.), Handbuch Sponsoring: Erfolgreiche Marketing- und Markenkommunikation (pp. 99–112). Berlin: Erich Schmidt Verlag GmbH.

Drive Sports Marketing. (2023). Calculating Sports Sponsorship Exposure. Retrieved from https://www.drivesportsmarketing.com/calculating-sports-sponsorship-exposure/

Formula 1. (2024). *The official home of Formula 1® | F1.com*. Formula 1® - the Official F1® Website. https://www.formula1.com/

Gonçalves, V., Evens, T., Alves, A. P., & Ballon, P. (2014). Power and control strategies in online video services. Proceedings of the 25th European regional conference of the International Telecommunications Society (ITS), 22–25.

Gustafson, T., & Chabot, B. (2007). Brand Awareness. Cornell Maple Bulletin, 105. Cornell University.

Henseler, J., Wilson, B., & Westberg, K. (2011). Manager's Perceptions of the Impact of Sport Sponsorship on Brand Equity: Which Aspects of the Sponsorship Matters Most? Sport Marketing Quarterly, 20, 7–21.

Keller, K. L. (2008). Building, Measuring, and Managing Brand Equity (3rd ed.). New Jersey: Prentice Hall.

Kim, S. (2015). QoS-aware data forwarding architecture for multimedia streaming services in hybrid peer-to-peer networks. Peer-to-peer Networking and Applications, 8(4), 557–566.

Leadsom, S. (2023a). The Growing Importance of Virtual Production and Advertising in Sports. *Medium*. https://medium.com/@samleadsom/the-growing-importance-of-virtual-production-and-advertising-in-sports-90c47f3b9968

Leadsom, S. (2023b). Advancements in Virtual Production and Advertising: An Updated Look at the Growing Importance. Medium. https://medium.com/@samleadsom/advancements-in-virtual-production-and-advertising-an-updated-look-at-the-growing-importance-in-687571085048

Leadsom, S. (2024). Sports and Storytelling: Captivating Audiences with Virtual Feeds. *Medium*. https://medium.com/@samleadsom/sports-and-storytelling-captivating-audiences-with-virtual-feeds-687baccc0d9c

Kwak, K. T., Oh, C. J., & Lee, S. W. (2021). Who uses paid over-the-top services and why? Cross-national comparisons of consumer demographics and values. Telecommunications Policy, 45(7), 102168.

Mike, Chris. (2020). What is White Space Analysis in Sports Sponsorship? Relo Metrics. Blog. Retrieved from https://rb.gy/lbuqx9

Mullin, B. J., Hardy, S., & Sutton, W. A. (2004). Sport Marketing (3rd ed.). Human Kinetics.

Nagaraj, S., Singh, S., & Yasa, V. R. (2021). Factors affecting consumers' willingness to subscribe to over-the-top (OTT) video streaming services in India. Technology in Society, 65, 101534.

Nebenzahl, Israel, & Hornik, Jacob. (1985). An Experimental Study of the Effectiveness of Commercial Billboards in Televised Sports Arenas. International Journal of Advertising, 4(1), 27–36. https://doi.org/10.1080/02650487.1985.11105041

Nielsen. Insights. (2022). Sports sponsorships are raising more than just brand awareness. Retrieved from https://rb.gy/iit4ju

Nielsen. Insights. (2023). Streaming grabs a record 38.7% of total TV usage in July, with acquired titles outpacing new originals. Retrieved from https://rb.gy/kvcxsd

Relo Metrics. (n.d.). Learning Center: Introduction to Media Valuation. Retrieved from https://relometrics.zendesk.com/hc/en-us/articles/360052759472-MediaValuation-101

Sander, Matthias, & Fantapié Altobelli, Claudia. (2011). Virtual Advertising in Sports Events: Does It Really Work? International Journal of Sports Marketing and Sponsorship, 12(3), 225–39. https://doi.org/10.1108/ijsms-12-03-2011-b004

Simulmedia. (n.d.). What is an Impression in TV Advertising? Simulmedia. Retrieved from https://www.simulmedia.com/tv-advertising-glossary/what-is-an-impression-in-tv-advertising

Supponor. (2020). Whitepaper: Virtual Advertising: Cutting Through the Regulation. Proposing a Way Forward.

Tafà, Riccardo. (2023). Key Advantages of Sport Sponsorship: Enhancing Brand Visibility and Engagement. RTR Sports Marketing. Retrieved from https://rb.gy/bcuy8d

Tuominen, P. (1999). Managing Brand Equity. The Finish Journal of Business Economics, 99(1), 65–100.

Turner, Paul, & Cusumano, Sam. (2000). Virtual Advertising: Legal Implications for Sport. Sport Management Review, 3(1), 47–70. https://doi.org/10.1016/S1441-3523(00)70079-9

Vaidya, Himanshu, Fernandes, Semila, & Panda, Rajesh. (2023). Adoption and Usage of Over-the-Top Entertainment Services: A Literature Review. International Journal of Social Ecology and Sustainable Development, 14(1). https://doi.org/10.4018/IJSESD.319718

Venturoli, Emanuele. (2023). Motorsport Sponsorship and visibility in the Digital Age. RTR Sports Marketing. Retrieved from https://rb.gy/se4kdo

Venturoli, Emanuele. (2024). Athlete Sponsorship: The Interesting Case of Motorsport Drivers and Riders. RTR Sports Marketing. Retrieved from https://rb.gy/o91mwh

VISUA. (2022). Whitepaper: The role of Visual – AI in Sports Sponsorship Measurement & Valuation.

Walsh, Katy. (2022). 5 “Outside the Box” Applications for Virtual Advertising Technology. UniqFEED. Retrieved from https://rebrand.ly/addr2ss

Xu, M., Li, B., Scott, O. K. M., & Wang, J. J. (2023). New platform and new excitement? Exploring young educated sport customers’ perceptions of watching live sports on OTT services. International Journal of Sports Marketing and Sponsorship, 24(4), 682–699. https://doi.org/10.1108/IJSMS-07-2022-0140